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# Sharing Oil Rents and Political Violence

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## Abstract

This paper investigates how the devolution of oil windfalls affects the likelihood of political violence. It shows that transferring large shares of oil wealth can prevent conflict, while transferring small shares can trigger it. Among the different transfer schemes, fiscal transfers (to subnational governments) yield the highest levels of consumption, but direct transfers (to people) are the most effective in preventing conflict. By averting conflict, transfers can improve ex ante welfare; however, only a subset of the ex ante welfare optimal transfers is optimal ex post and thus self-enforcing. Among them, those that avert conflict by reinforcing repressive regimes are of particular policy interest.


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# Sharing Oil Rents and Political Violence*

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# 1 Introduction

The jury is still out on whether oil is a gift from god or the devil's excrement.[1] There are instances where it supported a well-functioning welfare state; but, in many other cases, oil wealth ended up feeding corruption, rent-seeking behavior, and often it led to conflict. There is probably nothing intrinsically good or evil in oil–or in any other natural resource for that matter–; however, unlike other natural resources that are diffused spatially, oil reserves are typically concentrated (point resource). As a result, oil rents are often captured by a small elite, which can lead to grievances. [2]

Then, one may ask, to prevent rent-seeking and political violence, should oil revenues be kept under the control of the central government, as in Kuwait, Qatar, the Islamic Republic of Iran, and Libya, given back to the people, as in Norway and Alaska,[3] devolved to regions, as in the United Arab Emirates, or wasted as in ... so many places? This paper tries to answer these specific questions from the perspective of conflict prone countries. Doing so, it shows why the devolution of oil windfalls with potential opposition groups sometime has decreased the likelihood of conflict and sometime it has increased it. In addition, it also explains why transfer schemes that may be effective in averting conflict may also be difficult to implement.

The reason why transfers may either increase or decrease the likelihood of conflict is that they affect the incentives to fight in two opposite ways: on the one hand, they reduce the amount of resources that are up for grabs, and thus the incentives to fight for them (the "rent dissipation" channel); on the other, they increase the resources available to competing groups, making it easier to finance a rebellion or a conflict (the "opportunity cost" channel). Hence, we are in the presence of a trade-off and, depending on which of the two channels is stronger, transfers can increase or decrease the likelihood of political violence.[4]

To study such an important trade-off, we build upon Besley and Persson's (2011) model of contest and political violence (BP hereinafter), where two groups, which compete for power and the associated control of natural resource wealth, have to decide whether to abide by the democratic rules or to take up arms to fight for power. In such a setup, we introduce different transfer schemes and study how they affect the likelihood of conflict.

Our main result is that the effect of transfers on the likelihood of conflict depends on

[1] According to the famous definition of Venezuelan mine minister and OPEC founder Juan Pablo Pérez Alfonso.

[2] Ross (2003) also suggests that, compared to other natural resources, oil is less lootable and more obstructable, which increase the odds of experiencing a separatist conflict, with increased duration and intensity.

[3] This idea is gaining increasing traction in policy circles. Devarajan and Giugale (2013) argue that direct dividend payment may increase both private consumption and the provision of public goods by fostering citizens' scrutiny of government's expenditures. See also the "Oil-to-cash initiative" of the Center for Global Development.

[4] The existing empirical literature tends to look at the two channels separately. One strand focuses on the rent dissipation channel (see, among others, Fearon, 2005), another investigates how the access to natural resource revenues may increase the likelihood of conflict by reducing the opportunity cost of mobilizing an army (see, among others, Collier and Hoffler, 2004, Collier et al., 2009). Our analysis provides the theoretical underpinnings for both mechanisms in a unified framework.

how large the transfers are as a proportion of the rent. More precisely, we show that in oil rich countries, large (enough) transfers decrease the likelihood of conflict, while small(er) transfers increase it. We then compare direct transfers, that is, unconditional cash transfer to the people, and fiscal transfers, that is, central government transfers to subnational entities, and show that whereas the former tend to be more effective in reducing the likelihood of conflict, the latter allow for higher levels of consumption and provision of public goods. In addition, we also consider a policy of wasting natural resources (e.g., building so called "white elephants") and show that while such a policy is, unsurprisingly, the most taxing in terms of foregone consumption, nonetheless, it can also be the most effective in reducing the likelihood of conflict.

Building upon such results, we then characterize the transfer schemes that would be agreed by the two parties ex-ante, that is, before knowing which group ends up controlling power. Of course, absent enforcement mechanisms, the party in charge will be tempted to renege on many transfer schemes agreed ex-ante, but not on all of them. Indeed, we show that those transfers that enforce repression as the equilibrium outcome, when the incumbent reacts first, and those that enforce peace, when the opposition does, may be self-enforcing.

Our work builds on a vast body of literature. The idea that natural resource rents may divert resources away from productive uses and foster rent seeking behavior has been studied, among others, by Gelb (1988), Lane and Tornell (1999), Bourgignon and Verdier (2000), Powell (2006), and, more recently, by Nunn and Qian (2014), Lei and Michaels (2014), and Berman et al. (2014). Such a rent seeking behavior often takes the form of appropriation through armed rebellion, civil war, or oppression.[5]

The role of transfers in preventing resource-related conflicts, which is the focus of this paper, is analyzed by a relatively smaller literature. The two papers that are particularly relevant to our analysis are Azam (1995) and Beviá and Corchón (2010). The former considers a contest model where one of the two players (the incumbent) can credibly commit to transferring a portion of windfall revenues to the other (the opponent). In the absence of such transfers, military expenditures are excessively high from a social point of view. Beviá and Corchón (2010) also consider transfers before the contest, and they show that they decrease the likelihood of conflict by increasing the opportunity cost of waging a war.

We also consider the role of transfers in a contest model and, unsurprisingly, we find that transfers between players may indeed decrease the likelihood of conflict. However, unlike Azam (1995) and Beviá and Corchón (2010), we do not consider a winner-takes-it-all contest. In our model, natural resource windfalls can be appropriated, but non-resource income cannot, and conflict does not wipe out non-oil income. This is an important difference because it allows the opportunity cost of conflict to be decreasing in income (e.g., because some of the costs of building an army are fixed); consequently, transfers could increase or decrease the likelihood of conflict. The net effect depends on the size of the resource windfalls *vis-à-vis* total wealth.

[5] There is an extensive literature that investigates the structure of natural resources and conflict relationship. Garfinkel and Skaperdas (2007), Blattman and Miguel (2010), and van der Ploeg (2011) provide excellent surveys of the theoretical and empirical work on this.

Another important novel aspect of our model is that we consider more than one strategic interaction between players:[6] a contest for the appropriation of revenue windfall and a public good provision game. The latter follows the recent aggregative public game literature, particularly Jensen (2006), Kotchen (2007), Cornes and Hartley (2007), and Acemoglu and Jensen (2013). An interesting implication of this modeling choice, and the reason why we adopted it, is that our results depend on the magnitude of total transfers, not on how they are allocated among the different parties. This simplifies the comparative static exercise and makes it less arbitrary.

The paper is organized as follows: section 2 provides some stylized facts (and estimates) about the relationship between transfers and (likelihood of) conflict; section 3 introduces our basic model of conflict and finds the thresholds (in terms of institutional resilience) for the emergence of conflict, unrest, or peace as the equilibrium outcomes in the absence of transfers. Section 4 introduces different transfer schemes and discusses how they can influence the equilibrium outcomes. Section 5 provides a welfare analysis for different transfer schemes both from an ex-ante and an ex-post perspective; finally, section 6 concludes. Proofs are provided in Appendices 1 and 2.

## 2 Stylized Facts

In resource-rich countries, the effects of fiscal transfers on the likelihood of conflict are ambiguous. In Indonesia, devolution, through fiscal decentralization, has probably been instrumental to the 2005 peace agreement, which ended a three decades old war between the central government and the Aceh Freedom Movement (Agustina et al., 2012). In Colombia, instead, a similar policy may have contributed to an escalation of the conflict. Indeed, following the 1991 fiscal reform, which transferred more resources to local governments, both left-wing guerrillas groups (FARC and EZLN) and the pro-government paramilitary force (AUC) apparently found it easier to appropriate revenues and finance armed operations (Dube and Vargas, 2013).

An interesting and more nuanced case is that of the Kurdistan Region of Iraq, which has long aspired to become autonomous and to exert control over the oil fields on its territory. Saddam Hussein's regime fought hard to prevent that.[7] After the 2003 war, Baghdad government agreed to a revenue sharing mechanism allocating 17 percent of all fiscal revenues–more than 90 percent of which comes from hydrocarbons–to the Kurdistan Regional Government (KRG), in an attempt to prevent a possible secession. Although not fully implemented,[8] such transfers may have helped preserving the territorial unity of the country, at least until now. Nonetheless, some observers believe that access to oil revenues, by enabling the Kurds

[6] Rajan and Zingales (2000) also consider the effect of transfers in a multidimensional model, but their focus is on resource fungibility.

[7] Thousands of Kurdish villages were destroyed and tens of thousands of civilians were killed, some with chemical weapons, during the infamous Anfal Campaign between 1986 and 1989 only, see Black (1993).

[8] See Powell (2016) for an excellent analysis of how the relation between Baghdad and the KRG evolved overtime.

to build on their own military force and governance mechanisms, could eventually backfire and facilitate secession. Anderson (2007) notes that the same factors that made federalism a necessity in Iraq could also make federalism a risk to its territorial integrity.[9]

Interesting lessons on how transfers may affect conflicts can also be learned from the Arab Spring. In countries like Tunisia and the Arab Republic of Egypt, the failure of incumbents to effectively use redistributive policies led to abrupt regime changes (see Boucekkine et al, 2016). In others such as the Gulf monarchies[10] and Algeria, instead, rulers were able to scale up redistributive measures at the outset of the protests, and they managed to keep their grip on power. Notice that the large increases in transfers were accompanied by a surge in repression in the Gulf States, suggesting that successful incumbents may find these policies as complementary.

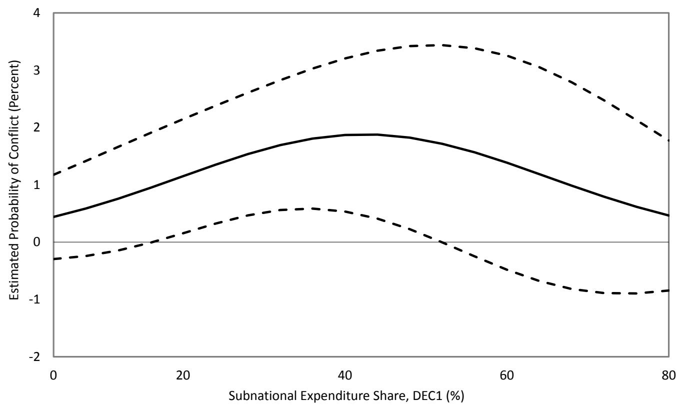
Overall, these observations suggest that transfers affect the likelihood of conflict in an ambiguous way. One may then wonder whether such an ambiguity is driven by differences in the size of transfers. To see whether this may be the case, we collected data for 86 countries for the period 1990-2011, and computed the predicted probabilities of conflict as a function of decentralization –our a proxy for transfers– from a logit regression while controlling for total public expenditures, oil rents as a share of GDP, per capita income and regional dummies.[11] Referring the reader to Appendix 2 for the regression table, our results are summarized in Figure 1, which portraits a non-monotonic relationship between the probability of conflict and transfers. In particular, increasing the share of transfers from 20 percent of total public expenditures to 40 percent increases the likelihood of conflict by half (from 1 to 1.5 percent). However, the likelihood of conflict starts decreasing with further decentralization, and becomes insignificant at about 50 percent. In other words while small transfers are correlated with an increase the probability of conflict, large transfers are correlated with a decrease in it. While these results apply to all countries, such a hump-shaped relationship becomes more prominent when we focus on the oil-rich country group only (oil revenues above 1 percent of GDP). However, with a substantially reduced sample size, we also lose significance. The remaining of the paper will build upon such a stylized fact.

[9] See also Barkey (2009) and Voller (2013).

[10] Immediately after the events in Tunisia and Egypt, King Abdullah of the Kingdom of Saudi Arabia announced large-scale benefits especially for low and middle income citizens. These included salary increases, bonuses for public employees, and construction of low-income housing units. The strategy of buying off social peace was effective in minimizing the protests, and any remaining unrest was then cracked down easily. Other Gulf monarchies followed similar approaches. Kuwait increased public salaries by 115 percent while the Gulf Cooperation Council promised an additional $20 billion fund for investments in Bahrain and Oman.

[11] The selection of data reflects the availability of government expenditures and decentralization figures, which we use as a proxy for transfers in the absence of a good measure of natural resource transfers. More specifically, we use expenditure decentralization measured as the share of subnational governments in general government expenditures. Our measure of conflict is conflict onset from the UCDP/PRIO Armed Conflict Database. A complete description of the data is provided in Appendix 2.

Figure 1: Predicted effects of decentralization on the likelihood of conflict




*Notes:* The figure plots the estimates of the marginal effect from model 5 of Table 3 in Appendix 2. All control variables are evaluated at their sample mean; dashed lines show 90% confidence intervals. Technical details are provided in the same appendix.

# 3 The Model

We consider an economy comprising two groups of equal size who interact strategically over three periods (0, 1, and 2). As in BP, the critical decision they undertake is whether to mobilize an army in period 1 and fight for the control of an oil windfall of size $W$, which materializes in period 2, or to play by the democratic rules. This set-up fits well the situation of a federal state with weak institutions, where groups with a regional basis are tempted to take control of the central government to appropriate some of the country's rent.

We denote the two groups/subnational states[12] with superscript $i \in \{I, O\}$, where $I$ denotes the "incumbent" group (the one that has control over central government in period 1) and $O$ the "opposition." Each group chooses $\delta^i \in \{0; A\}$; if $\delta^I = \delta^O = 0$, neither group mobilizes, we are in a situation of peace and each group assigns the same probability of controlling the central government and, thus, the oil wealth in period 2 (see below); the same is also true if both groups mobilize (civil conflict), that is, when $\delta^I = \delta^O = A$. If only one group mobilizes, the one that does has a higher probability of controlling the state (and of appropriating the natural resource windfall) in the future. Following BP, we denote as repression the situation in which only the incumbent mobilizes, and as insurgency the situation in which only the opposition does. More precisely, we assume that one party maintains the control of the government with probability

$$\pi^i = \frac{1}{2} + \frac{1}{\mu}(\delta^i - \delta^{-i}), \tag{1}$$

where $\mu$ can be thought of as a measure of the resilience of democratic institutions to political violence; the higher the $\mu$ the harder it is to achieve or maintain power by means of violence.

[12]Throughout the paper, we will use subnational state and group interchangeably.

We further assume that $A \leq 1/2$ to ensure that probabilities are bounded at 1.

The groups gain utility from consuming a private good $C$ and a public good $G$, which is financed by imposing distortionary taxes on period 1's exogenous incomes (see below). In addition, the access to natural resource revenues also provides utility, but it is realized in period 2. Assuming that natural resource windfalls are fully appropriated by the "winner,"[13] and ignoring time discounting, the expected utility of each group at the time of army mobilization is given by:

$$V^i = f(C^i, G) + \pi^i h\left(W\right), \tag{2}$$

where $f(C^i, G)$ denotes the utility derived from consuming the private and public goods, $C^i$ and $G$, respectively, and $h\left(W\right)$ denotes the utility from receiving oil rents $W$, which, given our focus on oil rich countries, is large enough. We further assume that (i) preferences for the consumption of the private and public good are homothetic and thus $f(.)$ is a well behaved concave function, and (ii) $h\left(W\right)$ is a continuously differentiable function with $h(0) = 0$, $h'(W) > 0$, $h''(W) \leq 0$. The amount of public good available to each party is given by:

$$G = G^I + G^O, \tag{3}$$

where $G^I$ and $G^O$ denote the contributions of the incumbent and the opposition to the public good, respectively. This means that the public goods provided by each group are perfect substitutes, and that the public good game is "aggregative;" agents' utility only depends on the total provision of the public good. Lately, such kind of games have received a lot of attention because of a number of appealing properties, which will become apparent in the next section; we refer the interested reader, among others, to Kotchen (2007), Cornes and Hartley (2007), and Acemoglu and Jensen (2013) for a more comprehensive discussion.

The consumption of private goods is subject to the following budget constraint:

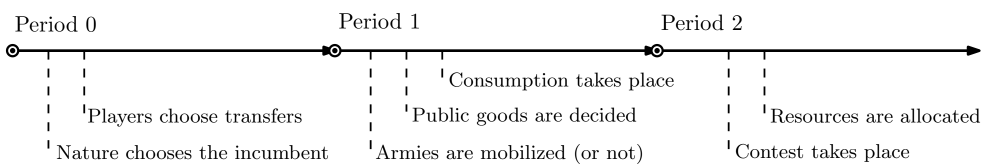
$$C^i \leq w - (1 + \lambda)(c^i(\delta) + G^i), \tag{4}$$

where $w$ denotes the initial endowment, which we assume to be identical for the two groups, and $\lambda > 0$ denotes the distortionary cost of taxation. We allow the cost of mobilization $c^i(\delta)$ to be higher for the opposition, and we assume that $c^I(\delta) = \delta$ and $c^O(\delta) = \delta/\zeta$, where $\zeta \in (0, 1]$.[14] Taxes are raised to finance mobilization of armies and the provision of the public good. To simplify notation, it is useful to define the income that group $i$ can devote to the

[13] All our results would hold true had we followed BP and assumed that the incumbent group can only grab a fraction $\theta$ of the natural resource revenues. The decision to set $\theta = 1$ is only made to simplify notation. In addition, given that in the case of no violence each group has probability one half of appropriating the natural resource windfall, our model is equivalent to one in which, if all parties abide by the democratic rules, natural resource rents are equally split between them.

[14] Note that the allocation of costs across players could be more general and each player could pay for a fraction of the other player's mobilization costs, i.e., $C^I \leq w - (1 + \lambda)\left[\alpha\delta^I + (1 - \beta)\frac{\delta^O}{\zeta} + G^I\right]$, and $C^O \leq w - (1 + \lambda)\left[(1 - \alpha)\delta^I + \beta\frac{\delta^O}{\zeta} + G^O\right]$. For instance, BP assume $\alpha = 1/2$, $\beta = 1$. However, in our set up, where, as long as both groups contribute to the public good, the equilibrium outcome does not depend

Figure 2: Timing




consumption of private and public goods, net of mobilization costs, as:

$$\Psi^i \equiv w - (1+\lambda)c(\delta^i). \tag{5}$$

For the time being, we assume that resources cannot be transferred from period 2 to period 1, or vice versa. The first assumption will be relaxed in section 4. However, throughout the paper, we will maintain that parties are unable to save resources[15] in period 1.

## 3.1 Equilibrium

We start by clarifying the timing of actions. In period 1, each group first decides whether to mobilize or not; such choices then become public information and, upon observing them, each player chooses its contribution to the public good. Note that these decisions also determine the consumption of the private good via the budget constraint. By the end of period 2, the conflict is resolved and natural resources are appropriated by the party in power. Figure 2 shows the sequence of actions and Figure 3 the extensive form game.

As standard, we solve this game by backward induction. We start from period 1 (no strategic decision occurs in period 2) and solve for the Nash equilibrium in each state $j \in \{C, P, R, IN\}$, that is, civil conflict, peace, repression, and insurgency. Denoting the case with no transfers by superscript $B$, for benchmark, the utility of group $i$, in state $j$, can be written as $V_j^{i,B}$. Using (3) and (4), the problems of group $i$ can be written as:[16]

$$\underset{G}{Max}\ f(w - (1+\lambda)(c^i(\delta) + G - G^{-i}), G). \tag{6}$$

Denoting by an asterisk the equilibrium values,[17] and dropping the arguments of the

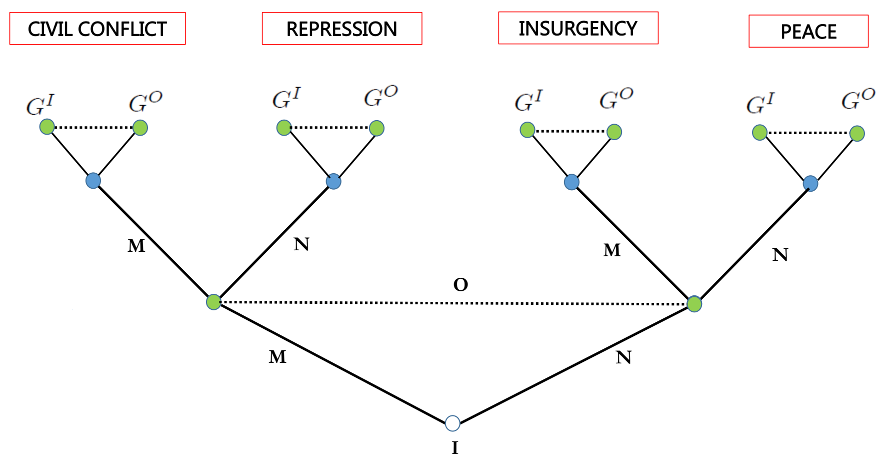
on the values of $\alpha$ and $\beta$, the change would be irrelevant.

[15]We could drop this assumption without great loss of generality, but this would come at the cost of making the welfare discussion less crisp.

[16]Since mobilization decisions are already undertaken, we can drop the term $\pi^i h(W)$ as it does not affect the optimal consumption choices of the two groups. Expressing the maximization in terms of $G$, rather than $G^i$, simplifies the proofs in the Appendix.

[17]Existence and unicity of equilibria (in each state) can be proved using the same arguments as in Kotchen (2007).

Figure 3: Extensive form game




function $f(.)$ to simplify notation, we have that $V_C^{i,B^*} = f_C^{i,B^*} + \frac{1}{2}h(W)$ for either party: $V_R^{I,B^*} = f_R^{I,B^*} + \left(\frac{1}{2} + \frac{A}{\mu}\right) h(W)$ for the incumbent, $V_R^{O,B^*} = f_R^{O,B^*} + \left(\frac{1}{2} - \frac{A}{\mu}\right) h(W)$ for the opposition, and so on. With this formulation we can characterize the strategic interaction between the players with a normal form game, which is provided in Figure 4.

If we further assume that the aggregative game is "nice,"[18] so that for player $i$ the first order conditions hold with equality when $G = G^{-i}$ is a best response,[19] following Cornes and Hartley (2007), we have that for all $j$:

**Lemma 1.** *(i)* $f_j^{I,B^*} = f_j^{O,B^*}$, *(ii)* $f_j^{i,B^*}$ *is an increasing function of, and only depends on, the aggregate value of* $\overline{\Psi}_j \equiv \Psi_j^{I,B} + \Psi_j^{O,B}$, *(iii)* $f_P^{i,B^*} > f_R^{i,B^*} \geq f_{IN}^{i,B^*} > f_C^{i,B^*}$, *and (iv)* $f_{IN}^{i,B^*} > \frac{f_P^{i,B^*} + f_C^{i,B^*}}{2}$.

To gain a better intuition of this Lemma, notice that in "nice" aggregative public good games, where both agents (generally) contribute to the public good, in equilibrium, the marginal utility of consuming the public and the private goods are the same for the two groups. Given that utility functions are also the same, this implies that both groups consume the very same bundle of goods. Therefore, $f_j^{i,B^*} = f_j^{-i,B^*}$, which allows us to drop superscript $i$ hereinafter.

Another interesting implication of the aggregative public good framework is that if parties face identical costs, and they both contribute to the public good,[20] then transfers of income

[18] See Cordella and Gabszewicz (1998) and Acemoglu and Jensen (2013).

[19] That is $f_G'^{i}(G; G^{-i}, .)\Big|_{G^{-i} = \widetilde{G}^{-i}} = 0$, with $\left\{\widetilde{G}^{-i} : f(0; G^{-i}, .) = 0\right\}$.

[20] Actually, we just need that the game is nice, not that both agents contribute; however, almost always, the two conditions overlap.

Figure 4: Normal form game

| Inc. \ Opp. | $N$ | $M$ |
|---|---|---|
| $N$ | $V_P^{I^*} = f_P^{I^*} + \frac{1}{2}h(W)$, $V_P^{O^*} = f_P^{O^*} + \frac{1}{2}h(W)$ | $V_{IN}^{I^*} = f_{IN}^{I^*} + \left(\frac{1}{2} - \frac{A}{\mu}\right)h(W)$, $V_{IN}^{O^*} = f_{IN}^{O^*} + \left(\frac{1}{2} + \frac{A}{\mu}\right)h(W)$ |
| $M$ | $V_R^{I^*} = f_R^{I^*} + \left(\frac{1}{2} + \frac{A}{\mu}\right)h(W)$, $V_R^{O^*} = f_R^{O^*} + \left(\frac{1}{2} - \frac{A}{\mu}\right)h(W)$ | $V_C^{I^*} = f_C^{I^*} + \frac{1}{2}h(W)$, $V_C^{O^*} = f_C^{O^*} + \frac{1}{2}h(W)$ |

from one party to the other do not affect the consumption bundle of either party –provided that such transfers do not entail transaction costs. Therefore, the consumption bundles of the parties depend only on the aggregate amount of resources available in each state. Since spending on army mobilization drains resources that can be allocated to consumption (of both private and public goods), and the amount of resources drained is the largest when both parties mobilize, and the smallest when neither does, it then follows that $f_P^{B*} > f_R^{B*} \geq f_{IN}^{B*} > f_C^{B*}$. Finally, the last property, which plays an important role in our proofs, follows directly from the homotheticity of preferences.

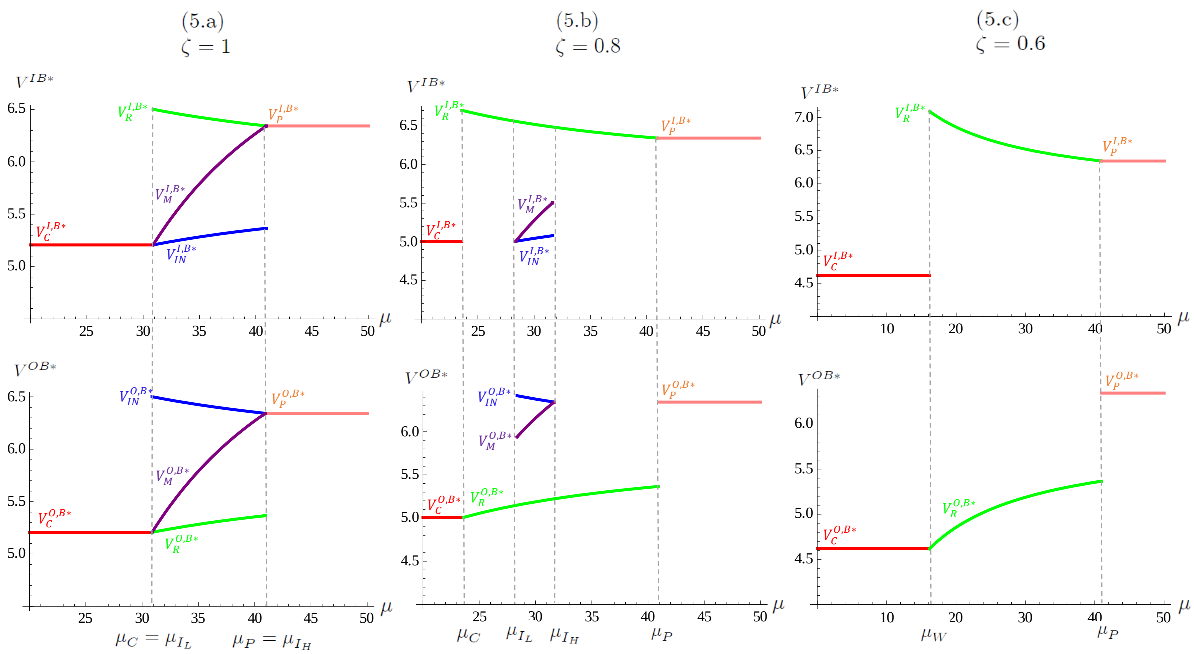
Given the optimal consumption choices in period 1, we can now look at the mobilization decisions, and solve for the subgame perfect Nash equilibria (SPNE). Notice that, since mobilization decisions are undertaken before consumption decisions, and they cannot be reverted, the set of the SPNE coincides with the set of Nash equilibria of the normal form game illustrated in Figure 4. If natural resources are large enough,[21] the following Lemma describes the equilibrium outcomes, which encompass BP's results.

**Lemma 2.** *(i) Peace is a SPNE iff* $\mu > \frac{Ah(W)}{f_P^{B*} - f_R^{B*}} \equiv \mu_P^B$*; (ii) civil conflict is a SPNE iff* $\mu < \frac{Ah(W)}{f_R^{B*} - f_C^{B*}} \equiv \mu_C^B$*; (iii) repression is a SPNE iff* $\mu \in [\mu_C^B, \mu_P^B]$*; (iv) insurgency is a SPNE iff* $\mu \in [\frac{Ah(W)}{f_{IN}^{B*} - f_C^{B*}} \equiv \mu_{I_L}^B; \frac{Ah()}{f_P^{B*} - f_{IN}^{B*}} \equiv \mu_{I_H}^B]$ *and* $\zeta$ *is large enough for this interval to be non empty; (v) if this is the case and* $\mu \in [\mu_{I_L}^B; \mu_{I_H}^B]$ *both repression and insurgency are SPNEs; (vi) a mixed-strategy SPNE also exists.*

Figure 5 illustrates these results with a numerical example, where the equilibrium payoffs for the incumbent (first row) and the opposition (second row) are plotted under the different regimes. For each regime, we present three different cases: the symmetric case in which the incumbent has no cost advantage (5a), the case in which the cost advantage is large enough

[21]Indeed, we need $h(W) > \frac{f_R^{B*} - f_C^{B*}}{2}$ to ensure that $A \leq \frac{\mu}{2}$ and $\mu \geq \frac{Ah(W)}{f_R^{B*} - f_C^{B*}}$ hold simultaneously.

Figure 5: Equilibrium payoffs




Notes: Simulations are performed using the following quasi-linear utility functions and parameterization:
$f(\Psi^{i,B}, G) = \log(\Psi^{i,B} - (1+\lambda)G^i)) + \log(G^i + G^{-i})$ and $h(W) = W$, where $w = 15$, $A = 5$, $\lambda = .3$, $W = 10$, $\rho = 1.1$.

to rule out insurgency as an equilibrium[22] (5c), and the intermediate case where insurgency occurs, but only in a sub-region of repression (5b).

In a relatively resilient system, that is when $\mu \geq \mu_P^B$, the gains from mobilization, which are defined in terms of the increase in the probability of appropriating the natural resource endowment, are low compared with the associated cost. Therefore, peace arises as the only equilibrium regime (pink line). In comparison, when $\mu < \mu_C^B$, the political outcome can be manipulated easily through the use of violence, both groups have higher incentives to mobilize, and thus they end up in the civil conflict zone (red line). For intermediate values of $\mu$, we end up in a situation of unrest, which we define as repression or insurgency, where one of the two groups mobilizes. In this region, the green line denotes the repression equilibrium (only the incumbent mobilizes), the blue one the insurgency (only the opposition mobilizes), and the purple line the mixed strategy equilibrium. Next, we investigate how transfers of natural resources can affect these equilibrium outcomes.

[22] We can rule out insurgency as an equilibrium outcome when $\mu_{I_L}^B > \mu_{I_H}^B \iff F_P^{B*} > F_{IN}^{B*} + (F_{IN}^{B*} - F_R^{B*})$. Notice that this condition is verified if the cost disadvantage of the opposition is large enough (that is $\zeta$ small enough).

# 4 Transfers and Conflict

Having presented a model in which oil wealth may trigger conflict or unrest, we now discuss how the redistribution of such a wealth may affect mobilization decisions and thus the likelihood of conflict. The question of whether, and under which circumstances, such transfers will actually be implemented is, instead, the focus of the next section.

Transfers can target directly the population, taking, for instance, the form of social protection, education or house allowances, conditional or unconditional cash payments, or they can go to subnational governments that can use them *in lieu* of taxation. Oil revenues can also be wasted in projects that generate no (or very little) utility, the so called "white elephants," which will be discussed at the end of this section.

Assume now that the incumbent transfers a portion $0 < \phi < \frac{1}{\rho}$ of the natural resource windfall in the beginning of period 1 and, in doing so, it incurs an iceberg cost $\rho > 1$ –that is, $\rho$ units have to be transferred for every unit that reaches the recipient. Such a cost may reflect the cost of borrowing against future revenues as well as distortions due to corruption, bureaucratic inefficiencies, etc. Such transfers may go to the citizens (direct transfer), to subnational governments (fiscal transfer), or to both.

Denoting by superscript $T$ the transfer case, the payoff functions can now be written as

$$V^{i,T} = f\left(\Psi^{i,T} - (1+\lambda)G^{i,T}, (G^{i,T} + G^{-i,T})\right) + \pi^i h\left(W(1-\rho\phi)\right), \tag{7}$$

and, if transfers are equally split among the two parties,

$$\Psi^{i,T} \equiv w + \tau^D - (1+\lambda)(c^i(\delta) - \tau^F), \tag{8}$$

where $\tau^D = \frac{\gamma\phi W}{2}$ denotes direct transfers and $\tau^F = \frac{(1-\gamma)\phi W}{2}$ fiscal transfers, with $\gamma \in [0,1]$. Hence, $\phi$ designates the scale of redistribution, that is, the share of oil revenue, and $\gamma$ its composition, that is, the share of direct transfers.

Given a transfer scheme, we can solve for the new equilibrium outcomes, which are qualitatively similar to the benchmark's, and are fully characterized in Appendix 1. Here, we focus on the more interesting question of how the introduction of transfers may change the likelihood of peace. We will first focus on the scale and then on the composition of redistribution. With respect to the scale, our main finding is that:

**Proposition 1.** *In oil rich countries, a small transfer decreases the likelihood of peace, while a large transfer increases it.*

To grasp the intuition behind Proposition 1, notice that, in countries with large oil rents, for the incumbent to be indifferent between peace and repression,[23] instead of preferring repression, the opportunity cost of mobilization (in terms of lost consumption) in period 1 should be quite high to fully offset the increase in the expected probability of appropriating the large oil wealth induced by mobilization. This means that resources are relatively scarce

[23] This is the case when $\mu = \mu_P^T$.

when army mobilization needs to take place. In such a situation, a small transfer (from period 2 to period 1) has a large marginal effect in releasing the resource constraints while its marginal cost in terms of period 2 utility is necessarily limited. This, in turn, implies that, in the case of small transfers, the opportunity cost dominates the rent dissipation effect because resources are valued "more" in period 1 than in period 2. Hence, if the opportunity cost is equal to the rent dissipation effect in the absence of transfers, which is exactly the case when $\mu = \mu_P$, with a (small) transfer the first effect dominates, $\mu_P$ moves to the right, shrinking the support for peace.

With larger transfers, the rent dissipation effect increases, while the opportunity cost effect decreases (because of the concavity of the utility function) so that transfers are more likely to dissuade mobilization. Notice that large enough transfers necessarily decrease the likelihood of conflict: if all resources are transferred, then there are no rents to appropriate to begin with.

The discussion so far has focused on the scale effects of transfers while holding their composition fixed. The composition itself, however, can play an important role as it influences directly the opportunity cost of mobilization. In fact, fiscal transfer schemes provide the subnational government with a fungible source of financing that can be readily used to finance the mobilization effort (or to increase the provision of public good or even to be even be redistributed to the people), while the revenues received by means of direct transfers need to be taxed to be used by the subnational government. The following result shows that the difference between the two transfer schemes is relevant for policies.

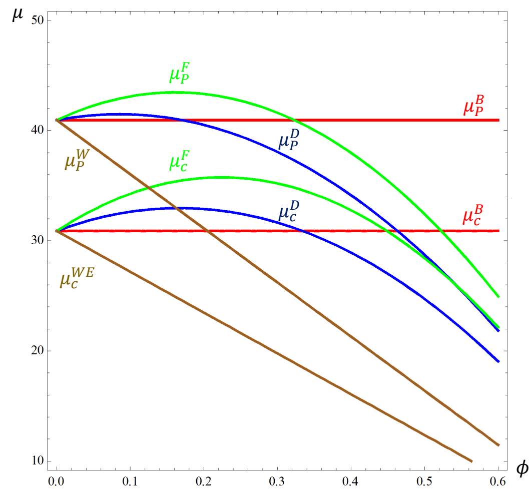
**Proposition 2.** *For a given level of aggregate transfers ($\phi W$), an increase in the share of direct transfers ($\gamma$) increases the likelihood of peace, while it decreases consumption.*

The intuition behind this result is quite straightforward. In our model, taxation is distortionary; hence since fiscal transfers can be rebated to the population, all allocations that are feasible under direct transfers only, that is, when $\gamma = 1$, are also feasible under fiscal transfers only, that is, when $\gamma = 0$; however, the opposite is not true. This implies that, for any given mobilization choice, consumption is necessarily higher with fiscal than with direct transfers. However, since mobilization efforts have to be financed through taxation as well, fiscal transfers decrease the associated opportunity cost more than direct transfers. We thus face an interesting trade-off: fiscal transfers are preferred to direct transfers from a consumption perspective; however, they are less effective in avoiding conflict and unrest. The less efficient they are (that is, the higher the distortionary cost of taxation), the more prominent is the difference between direct and fiscal transfers in these aspects.

Following a similar logic, it is then clear that, somehow paradoxically, the most effective way to reducing conflict is just to dissipate the oil rents, for instance by building white elephants, so that the opportunity cost of mobilization is not affected at all.[24] Of course, such a policy entails very substantial costs in terms of the foregone consumption. The following corollary formalizes this result.

[24] In our set-up this is equivalent to setting $\tau^D = 0$ and $\tau^F = 0$ for any given $\phi$.

Figure 6: Transfers and conflict




Notes: Simulations are performed using the same functional forms as in Figure 5 and the following parameterization: $w = 15$, $A = 5$, $\lambda = .3$, $W = 40$, $\rho = 1.1$.

**Corollary 1.** *Investments in white elephants are more effective than direct or fiscal transfer in reducing the likelihood of conflicts.*

Our results are summarized in Figure 6, where we plot the threshold values for peace and conflict as a function of $\phi$, for the same parameterization used in the previous figures. With relatively large natural resource endowment, the effect of transfer on conflict is non-monotonic, as suggested by Figure 1: small transfers increase the likelihood of conflict, larger ones tend to decrease it. The figure, where the red line denotes the benchmark, the blue purely fiscal transfers ($\gamma = 0$), the green purely direct transfers ($\gamma = 1$), and the brown white elephants, makes it clear that direct transfers are more effective than fiscal transfers in reducing violence, and that investments in white elephants always decrease the likelihood of conflict.

# 5 Welfare analysis

Having discussed the effects of different transfer schemes on the likelihood of conflict, we now investigate how such transfers affect the welfare of the different parties. Before moving further, however, it is worth recalling that, in our aggregative public good game, the way transfers are allocated between the two parties is irrelevant: parties may only disagree on the volume of total transfers, not on the share each group is entitled to. This not only simplifies our analysis substantially, but it also makes the comparative statics less arbitrary as our results do not depend on specific distributive rules.

In what follows, to provide the reader with clear intuitions, we first discuss the welfare implications of a given transfer scheme. Then, we characterize the "ex-ante" welfare optimal transfers, which are chosen before parties know who the incumbent and who the opposition is, and compare them with the "ex-post" welfare optimal ones, which, instead, are chosen by the actual incumbent before mobilization takes place.

The ex-ante analysis sheds light on the thought process that parties may undertake when deciding on transfer/decentralization rules before knowing who will actually gain control of the power. This is the case, for instance, during a peace process or in a constitutional setting. Decisions taken at this stage sometimes are difficult to revert, sometimes not. When they are not, then, among the wide range of transfers that are socially desirable ex-ante, only a subset is likely to be put in place once one of the parties gains power. This is when the discussion of ex-post optimal and self-enforcing transfers becomes pertinent.

## 5.1 Transfers and welfare

Before moving ahead it is important to notice that, in our framework, intertemporal transfers from period 2 to period 1 may be desirable for two different motives: a consumption smoothing motive and an equilibrium selection one.[25]

The consumption smoothing motive arises from a (positive) difference between the utility of consuming $\frac{1}{\rho}$ additional units of income in period 1 (where $\rho \geq 1$ denotes the iceberg cost associated with transfers) and the utility loss of giving away an expected unit of income in period 2.[26] The equilibrium selection motive, instead, arises from the fact that transfers could induce agents to select a welfare superior equilibrium, that is, one with a lower level of socially inefficient military expenditures. Given the focus of this paper, we restrict our attention to the equilibrium selection channel, and rule out consumption smoothing.[27] This, in turn, implies that, within a given conflict regime, no transfer can be welfare improving. Hence, transfers can only improve welfare when they induce agents to move from one equilibrium to a welfare superior one.

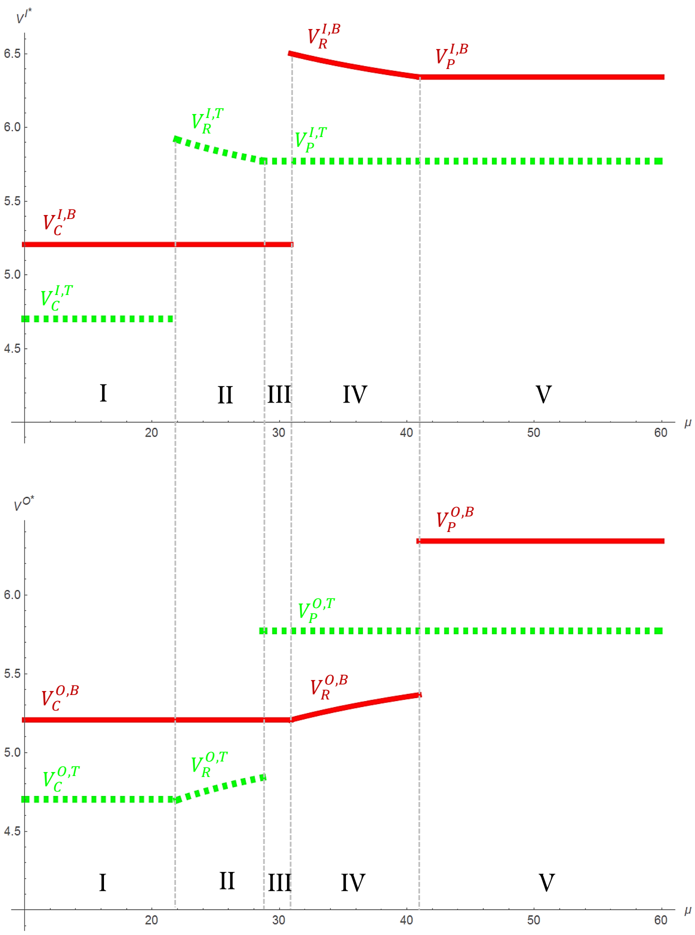
Figure 7 plots the welfare of both players for a given level of transfers (30 percent of the oil wealth), which is split evenly between fiscal and direct transfers ($\gamma = 0.5$), and assuming that the incumbent has a first mover advantage. We can distinguish five different regions. In region I, institutional resilience is so low that, for the transfers we consider, conflict is the equilibrium. In such a case, absent consumption smoothing motives, both parties are better off without transfers. In region II, the transfer scheme moves the equilibrium from conflict to repression. Clearly, the incumbent is better off with transfers than without, but this is not true for the opposition. In region III, institutional resilience is high enough to

[25]Remember that we ruled out by assumption the possibility of savings the first period income to finance consumption in the second period.

[26]Of course, the consumption cost is borne by the party in power in period 2, while the gains are shared by the two agents.

[27]A sufficient condition for ruling out consumption smoothing is that $2\frac{\partial f_W^{T^*}}{\partial \phi}\Big|_{\substack{\phi=0\\ \gamma=0}} < -\rho\frac{\partial h(.)}{\partial \phi}\Big|_{\phi=0}$.

Figure 7: Equilibrium payoffs




Notes: Simulations are performed using the same functional forms as in Figure 5 and the following parameterization: $w = 15$, $A = 5$, $\lambda = .3$, $W = 4$, and $\rho = 1.1$. The scale of the specific transfer in this case is given by $\phi = 0.3$, and it is evenly distributed between fiscal and direct transfers, $\gamma = 0.5$.

support peace under the chosen transfer scheme and, interestingly, both parties are better off with than without transfers. In region IV, transfers continue to support peace as the equilibrium and, they are preferred by the opposition, but not by the incumbent, who prefers repression without transfers. Finally, in region V, peace is the equilibrium both with and without transfers and, as in the situation of conflict, absent consumption smoothing motives, transfers necessarily reduce the welfare of both parties.

## 5.2 Ex-ante optimal transfers

When solving for ex-ante optimal transfer, the multiplicity of equilibria in period 1 is problematic. To address this issue, we further assume that either player has a first mover advantage in mobilizing an army. This guarantees a unique subgame perfect Nash equilibrium in period 1: repression if the incumbent has the first mover advantage, and insurgency if the opposition has it. In addition, we also concentrate our attention to the symmetric case where both groups face the same cost of mobilizing the army ($\zeta = 1$), so that the thresholds for the repression and the insurgency equilibria overlap.

Under these assumptions, we start by considering the situation in which parties agree on a transfer scheme under a veil of ignorance, that is, when they do not yet know who will be in power in period 1. For the sake of simplicity, and without great loss of generality, we assume that both parties assign an equal probability of being in power in period 1.[28] When this is the case, in state $j$, the ex-ante expected utility of either party, $E[V_j^*]$, is given by:

$$E[V_j^*] = \frac{1}{2}V_j^{I^*} + \frac{1}{2}V_j^{O^*}, \tag{9}$$

which does not depend on whether the incumbent or the opposition has a first mover advantage. Also, notice that, in this set-up, there is no difference between what either party prefers and what a benevolent dictator/central planner would. Given that mobilizations are wasteful, it is necessarily the case that the following welfare ranking holds: $Peace \succ Unrest \succ Civil\ Conflict$.

In such a setting, a transfer scheme needs to satisfy two conditions to be preferred ex-ante. The first is that it should disarm at least one party. Notice that, as small transfers increase the likelihood of conflict in oil-rich countries (by Proposition 1), transfers that can switch equilibria need to be somehow large and thus costly (large enough transfers always satisfy this condition). The second condition, on the other hand, is that the transfers that induce demobilization should be relatively small because they are costly and inefficient otherwise. Therefore, for ex-ante welfare improving transfers to exist, the gains brought by transfers, which take the form of regime changes, should exceed the efficiency costs associated with them. Thus, depending on the resilience of institutions, ex-ante welfare optimal transfers may exist or not. Hence, we have that:

[28] Our results would carry through as such if the probability that one specific party gains/maintains power is the same over time. If they are highly correlated, they will be qualitatively similar.

**Proposition 3.** *i) When, in the benchmark case, conflict is the equilibrium: (a) if institutional resilience, $\mu$, is sufficiently low, ex-ante optimal transfers exist and are the smallest ones that switch the equilibrium from conflict to unrest; (b) for even lower levels of if institutional resilience, the ex-ante optimal transfers are those that switch the equilibrium from conflict to peace.*
*(ii) When, in the benchmark case, unrest is the equilibrium, if institutional resilience, $\mu$, is sufficiently low, ex-ante optimal transfers exist and are the one that switch the equilibrium to from unrest to peace.*

To grasp the intuition behind the results, notice that for the existence of ex-ante welfare maximizing transfers, the gains from demobilization need to be greater than its costs. Consider the case of a transfer that induces a change in equilibrium from conflict to repression. The gain is given by the increase in first period consumption $(f_R^T - f_C^B)$ and the cost is given by the reduction in second period consumption $hW - h\left(W(1-\rho\phi)\right)$. If institutional resilience is strong, and thus $\mu$ is large, for conflict to be an equilibrium, the utility of consumption in period 2 should also be very high. When this is the case, transfers need to be large to switch equilibria and, thus, their associated cost is also large. This, in turn, implies that ex-ante welfare optimal transfers may not exist. For lower values of institutional resilience, conflict can be an equilibrium also when the utility of consumption in period 2 is not so high; so that the gains associated from the increase in first period consumption may be large enough for repression to be welfare improving. However, utility in period 2 may still be too high to justify the very large transfers necessary to move from conflict to peace. Hence, it is only when institutional resilience is low enough that those large transfers that move the equilibrium from conflict to peace may also be welfare improving.

## 5.3 Ex-post optimal transfers

The existence of ex-ante optimal transfers does not mean that such transfers will actually be implemented. It is indeed one thing to agree on rules when it is uncertain who will acquire the power, another is to abide by such rules when uncertainty about incumbency is resolved. In other words, what is optimal ex-ante, may not be so ex-post, and the party in power may find it in its self-interest to renege on previous agreements. It is thus important to find out which transfers are self enforcing, that is, are optimal both ex-ante and ex-post. We can prove that:

**Proposition 4.** *Among the ex-ante optimal transfers, the only ones that are ex-post optimal are: (i) those that switch the equilibrium from conflict to repression or peace, when the incumbent has the first mover advantage, and (ii) those that switch the equilibrium from conflict or repression to peace, when the opposition has the first mover advantage.*

Intuitively, while inducing the opposition to disarm by means of transfers, the incumbent faces the same expected gains in terms of higher first period consumption as the ex-ante players . However, now there are additional gains in term of a higher probability to capture second period rents (because of the demobilization of the opposition). This in turn implies that any transfer scheme that is ex-ante welfare optimal, is *a fortiori* ex-post optimal for the incumbent. Hence it is self-enforcing.

Also note that, absent the consumption smoothing motive, the incumbent has no reason to transfer an amount that is larger than the minimum required to disarm the opposition; nor does it have any incentive to use otherwise undesirable transfers to disarm itself, which can be done without bearing the distortionary costs of transfers. However,

**Corollary 2.** *When the opposition has a first mover advantage, there exist ex-post optimal transfers that switch the equilibrium from conflict to insurgency, and these transfers are larger than the optimal ex-ante transfers.*

When the opposition has a first mover advantage, and the equilibrium is insurgency, the incumbent knows that the odds of remaining in power and capturing rents in period 2 are low. Hence, it may find it profitable to transfer a large portion of these rents to the first period, when it is sure of consuming part of them.

# 6 Conclusions

The idea of addressing the oil wealth-conflict nexus by devolution is undoubtedly appealing. To see whether such a tempting idea may work, or it is just too good to be true, in this paper, we introduced oil wealth transfers into a standard model of political conflict, and we analyzed how such transfers affect the incentives of the different parties to fight or to abide by the democratic rules.

As a matter of fact, we did find situations in which redistributing oil revenues prevents conflict and makes all parties better off. However, we also found that transfers may end up fostering violence by decreasing the opportunity cost of mobilization. Other things being equal, small transfers in countries with large oil wealth are of that kind.

We also showed that the way oil wealth is transferred matters. Transferring the money directly to people, an idea that is gaining appeal in policy circles, is more effective in preventing conflicts than fiscal transfers to subnational governments. However, the latter typically generates greater welfare through higher levels of consumption, especially when taxation is relatively inefficient. Similarly, wasting the money, for instance by investing it in pharaonic projects (white elephants) may be the most effective way to prevent conflict but it is also the most costly one.

Looking forward, a promising next step could be that of using the lenses of our model to conduct selected country case studies. In this respect, it would be interesting to use our framework to better understand how countries with different characteristics have responded to the "common shock" of the Arab Spring and how such responses have affected the dynamics of political conflict.

# Appendix 1

## Lemma 1

*Proof.* (i) From the first order conditions of (6), we have that, for all $j$,

$$-(1+\lambda)f_C'^i(\Psi^{i,B}+(1+\lambda)(G^{-i}-G))+f_G'^i(G)=0, \tag{10}$$

where subscripts denote the arguments with respect to which derivatives are taken, and thus that

$$f_C'^I(.)=f_C'^O(.)\Longrightarrow f^{I,B*}=f^{O,B*}. \tag{11}$$

(ii) Let now assume that $\Psi^{I,B}=\omega\overline{\Psi}$ and $\Psi^{O,B}=(1-\omega)\overline{\Psi}$. We need to show that $\frac{\partial G^*}{\partial \omega}=0$ and $\frac{\partial G^*}{\partial \overline{\Psi}}>0$. Summing expressions (10) for $i=I,O$ at the equilibrium, and dropping superscripts, we have that

$$\begin{array}{l} -(1+\lambda)f_C'\left(\omega\overline{\Psi}+(1+\lambda)(G^O-G);G\right)+f_G'(.) \\ -(1+\lambda)f_C'\left((1-\omega)\overline{\Psi}+(1+\lambda)(G^I-G);G\right)+f_G'(.) \quad =0. \end{array} \tag{12}$$

From (11), we know that $f_{CC}''^I(.)=f_{CC}''^O(.)$ so that, implicitly differentiating (12), it is immediate to verify that

$$\frac{\partial G^*}{\partial \omega}=0.$$

(iii) Since we assumed that preferences are homothetic, the equilibrium ratio of public and private goods consumed by the agent is independent of income levels. From the concavity of the utility function, we then have that, in equilibrium, the indirect utility function is necessarily concave in income. Finally, defining $\Psi_j^{B^*}\equiv\Psi_j^{I,B^*}+\Psi_j^{O,B^*}$, from (5) we have that $\Psi_{IN}^{B^*}\equiv\Psi_j^{I,B^*}+\Psi_j^{O,B^*}\geq\frac{\Psi_P^*+\Psi_C^*}{2}$ and thus that $f_{IN}^{B^*}>\frac{f_P^{B^*}+f_C^{B^*}}{2}$. □

## Lemma 2

*Proof.* (i) Peace is an equilibrium iff

$$V_P^{I,B^*} \quad > \quad V_R^{I,B^*}\Longleftrightarrow\mu>\frac{Ah(W)}{f_P^{B^*}-f_R^{B^*}}\equiv\mu_P^B, \tag{13}$$

and

$$V_P^{O,B^*} \quad > \quad V_{IN}^{O,B^*}\Longleftrightarrow\mu>\frac{Ah(W)}{f_P^{B^*}-f_{IN}^{B^*}}\equiv\mu_{I_H}^B; \tag{14}$$

then, from Lemma 1, we know that $f_R^{B^*}>f_{IN}^{B^*}$, which in turn implies $\mu_P>\mu_{I_H}$, so that $\mu>\mu_P$ is a necessary and sufficient condition for peace to be an equilibrium.

(ii) Civil conflict is an equilibrium iff

$$V_C^{I,B^*} > V_{IN}^{I,B^*} \Longleftrightarrow \mu < \frac{Ah(W)}{f_{IN}^{B^*} - f_C^{B^*}} \equiv \mu_{I_L}^B, \tag{15}$$

and

$$V_C^{O,B^*} > V_R^{O,B^*} \Longleftrightarrow \mu < \frac{Ah(W)}{f_R^{B^*} - f_C^{B^*}} \equiv \mu_C^B; \tag{16}$$

then, from Lemma 1, we know that $f_R^{B^*} > f_{IN}^{B^*}$, which in turn implies $\mu_C < \mu_{I_L}$, so that $\mu < \mu_C$ is a necessary and sufficient condition for civil conflict to be an equilibrium.
(iii) Repression is an equilibrium iff

$$V_R^{I,B^*} > V_P^{I,B^*} \Longleftrightarrow \mu < \mu_P^B, \tag{17}$$

and

$$V_R^{O,B^*} > V_C^{O,B^*} \Longleftrightarrow \mu > \mu_C^B; \tag{18}$$

and thus iff $\mu \in [\mu_C^B, \mu_P^B]$. It remains to prove that this interval is non empty or, using (13) and (16), that $f_R^{B^*} > \frac{f_C^{B^*} + f_P^{B^*}}{2}$. This follows directly from the fact that $f_J^{B^*}$ is concave in $\Psi$ and $\Psi_R^* \geq \frac{\Psi_C^* + \Psi_P^*}{2}$.
(iv) Insurgency is an equilibrium iff

$$V_{IN}^{O,B^*} > V_P^{O,B^*} \Longleftrightarrow \mu < \mu_{I_H}^B, \tag{19}$$

and

$$V_{IN}^{I,B^*} > V_C^{I,B^*} \Longleftrightarrow \mu > \mu_{I_L}^B; \tag{20}$$

and thus iff $\mu \in [\mu_{I_L}, \mu_{I_H}]$. It remains to prove that this interval is non empty. This is always the case if $\zeta$ is large enough since $\lim_{\zeta \to 1} \mu_{I_L}^B = \mu_C^B$, $\lim_{\zeta \to 1} \mu_{I_H}^B = \mu_P^B$ and, from (iii), $\mu_P^B > \mu_C^B$.
(v) From (iii) and (iv), it follows that, iff $\mu_{I_H}^B > \mu_{I_L}^B$, then both repression and insurgency are equilibria.
(vi) There also exists a mixed strategy equilibrium in which the incumbent mobilizes with probability $p = \frac{f_{IN}^{B^*} - f_P^{B^*} + Ah(W)}{f_{IN}^{B^*} + f_R^{B^*} - f_C^{B^*} - f_P^{B^*}}$ and does not mobilize with probability $1 - p$; similarly, the opposition mobilizes with probability $q = \frac{f_R^{B^*} - f_P^{B^*} + Ah(W)}{f_{IN}^{B^*} + f_R^{B^*} - f_C^{B^*} - f_P^{B^*}}$ and does not with probability $1 - q$. To see that this is the case, it is easy to verify that if the incumbent mobilizes with probability $p$, the opposition is indifferent between mobilizing and not mobilizing; the same is true for the incumbent, if the opposition mobilizes with probability $q$. Finally $\mu \geq \mu_C^B \Longrightarrow p \leq 1$, and $\mu \geq \mu_{I_L}^B \Longrightarrow q \leq 1$. □

## Equilibrium Outcomes in the Transfer Regime

*Proof.* (i) Peace is an equilibrium iff

$$V_P^{I,T^*} > V_R^{I,T^*} \Longleftrightarrow \mu > \frac{Ah((1-\rho\phi)W)}{f_P^{T^*} - f_R^{T^*}} \equiv \mu_P^T, \tag{21}$$

and

$$V_P^{O,T^*} > V_{IN}^{O,T^*} \Longleftrightarrow \mu > \frac{Ah((1-\rho\phi)W)}{f_P^{T^*} - f_{IN}^{T^*}} \equiv \mu_{I_H}^T; \tag{22}$$

then, from Lemma 1, we know that $f_R^{T^*} > f_{IN}^{T^*}$, which in turn implies $\mu_P^T > \mu_{I_H}^T$, so that $\mu > \mu_P^T$ is a necessary and sufficient condition for peace to be an equilibrium.
(ii) Civil conflict is an equilibrium iff

$$V_C^{I,T^*} > V_{IN}^{I,T^*} \Longleftrightarrow \mu < \frac{Ah((1-\rho\phi)W)}{f_{IN}^{T*} - f_C^{T*}} \equiv \mu_{IN}^T, \tag{23}$$

and

$$V_C^{O,T^*} > V_R^{O,T^*} \Longleftrightarrow \mu < \frac{Ah((1-\rho\phi)W)}{f_R^{T^*} - f_C^{T^*}} \equiv \mu_C^T; \tag{24}$$

then, from Lemma 1, we know that $f_R^{T^*} > f_{IN}^{T^*}$, which in turn implies $\mu_C^T < \mu_{I_L}^T$ so that $\mu < \mu_C^T$ is a necessary and sufficient condition for civil conflict to be an equilibrium.
(iii) Repression is an equilibrium iff

$$V_R^{I,T^*} > V_P^{I,T^*} \Longleftrightarrow \mu < \mu_P^T, \tag{25}$$

and

$$V_R^{O,T^*} > V_C^{O,T^*} \Longleftrightarrow \mu > \mu_C^T; \tag{26}$$

and thus iff $\mu \in [\mu_C^T, \mu_P^T]$. It remains to prove that this interval is non empty, or using (21) and (24), that $f_R^{T^*} > \frac{f_C^{T^*} + f_P^{T^*}}{2}$. This follow directly from the fact that $f_j^{T^*}$ is concave in $\Psi$, and $\Psi_R = \frac{\Psi_C + \Psi_P}{2}$.
(iv) Insurgency is an equilibrium iff

$$V_{IN}^{O,T^*} > V_P^{O,T^*} \Longleftrightarrow \mu < \mu_{I_H}^T, \tag{27}$$

and

$$V_{IN}^{I,T^*} > V_C^{I,T^*} \Longleftrightarrow \mu > \mu_{I_L}^T; \tag{28}$$

and thus iff $\mu \in [\mu_{I_L}^T, \mu_{I_H}^T]$. It remains to prove that this interval is non empty. This is always the case if $\zeta$ is large enough since $\lim_{\zeta \to 1} \mu_{I_L}^T = \mu_C^T$, $\lim_{\zeta \to 1} \mu_{I_H}^T = \mu_P^T$ and from (iii) $\mu_P^T > \mu_C^T$.
(v) From (iii) and (iv), it follows that iff $\mu_{I_H}^T > \mu_{I_L}^T$ both repression and insurgency are equilibria.
(vi) There also exists a mixed strategy equilibrium in which the incumbent plays $M$ with

probability $p = \frac{f_{IN}^{T^*} - f_P^{T^*} + Ah((1-\rho\phi)W)}{f_{IN}^{T*} + f_R^{T*} - f_C^{T*} - f_P^{T*}}$ and $N$ with probability $1-p$; and the opposition plays $M$ with probability $q = \frac{f_R^{T^*} - f_P^{T^*} + Ah((1-\rho\phi)W)}{f_{IN}^{T*} + f_R^{T*} - f_C^{T*} - f_P^{T*}}$ and $N$ with probability $1-q$. To see that this is the case, it is straightforward to verify that if the incumbent plays $M$ with probability $p$, the opposition is indifferent between $M$, and $N$; and the same is true for the incumbent, if the opposition plays $M$ with probability $q$. Finally $\mu \geq \mu_C^T \Longrightarrow p \leq 1$, and $\mu \geq \mu_{I_L}^T \Longrightarrow q \leq 1$. □

## Proposition 1

*Proof.* To show that transfers increase the likelihood of peace, we have to show that $\mu_P^T < \mu_P^B$. Since $\mu_P^B = \lim_{\phi \longrightarrow 0} \mu_P^D$, for a small transfer to increase the set of $\mu$ that supports peace, it is enough to prove that $\frac{\partial \mu_P^T}{\partial \phi} < 0$. Without any loss of generality, we assume that the transfer goes entirely to the incumbent. Remembering that

$$\mu_P^T \equiv \frac{Ah((1-\rho\phi)W)}{f_P^{T^*} - f_R^{T^*}}, \tag{29}$$

$$f_P^{I,T^*} = f\left(w + (1+\lambda(1-\gamma))\phi W - (1+\lambda)\, G_P^{I,T^*}, G_P^{T^*}\right), \tag{30}$$

$$f_R^{I,T^*} = f\left(w + (1+\lambda(1-\gamma))\phi W - (1+\lambda)\left(A + G_R^{I,D^*}\right), G_R^{T^*}\right), \tag{31}$$

we have that

$$\frac{\partial \mu_P^T}{\partial \phi} = -\frac{A\rho W\left(f_P^{T^*} - f_R^{T^*}\right)\frac{\partial h(.)}{\partial \phi} + Ah\Gamma}{\left(f_P^{T^*} - f_R^{T^*}\right)^2}, \tag{32}$$

where

$$\begin{aligned} \Gamma \quad \equiv \quad & \frac{\partial f_P^{T^*}}{\partial \phi} - \frac{\partial f_R^{T^*}}{\partial \phi} = \left((1+\lambda(1-\gamma))W - (1+\lambda)\frac{\partial G_P^{I,T^*}}{\partial \phi}\right)\frac{\partial f_P^{T^*}}{\partial C} + \\ & \frac{\partial f_P^{T^*}}{\partial G_P^{T^*}}\frac{\partial G_P^{T^*}}{\partial \phi} - \left((1+\lambda(1-\gamma))W - (1+\lambda)\frac{\partial G_R^{I,T^*}}{\partial \phi}\right)\frac{\partial f_R^{T^*}}{\partial C} - \frac{\partial f_R^{T^*}}{\partial G}\frac{\partial G_R^{T^*}}{\partial \phi}. \end{aligned} \tag{33}$$

Notice further that

$$\frac{\partial G_j^{T^*}}{\partial \phi} = \frac{\partial G_j^{I,T^*}}{\partial \phi} + \frac{\partial G_j^{O,D^*}}{\partial \phi}, \tag{34}$$

and, because of (10), that

$$(1+\lambda)\frac{\partial f_j^*}{\partial C} = \frac{\partial f_j^*}{\partial G}. \tag{35}$$

Using (34) and (35), (33) can be written as:

$$\begin{aligned}\Gamma = &\left((1+\lambda(1-\gamma))W + (1+\lambda)\frac{\partial G_P^{O D^*}}{\partial \phi}\right)\frac{\partial f_P^{D^*}}{\partial C} \\ &- \left((1+\lambda(1-\gamma))W + (1+\lambda)\frac{\partial G_R^{O,D^*}}{\partial \phi}\right)\frac{\partial f_R^{D^* *}}{\partial C}.\end{aligned} \tag{36}$$

In addition, homothetic preferences imply a unitary income elasticity, and thus that

$$\frac{\partial G_P^{O,D^*}}{\partial \phi} = \frac{\partial G_R^{O,D^*}}{\partial \phi} = \frac{\partial G^{O,T^*}}{\partial \phi} = \xi W, \tag{37}$$

with the constant $\xi \in (0,1)$. We thus have that

$$\Gamma = \kappa W \left(\frac{\partial f_P^{T^*}}{\partial C} - \frac{\partial f_R^{T^*}}{\partial C}\right), \tag{38}$$

with $\kappa = (1+\lambda(1-\gamma)) + \xi$. Hence,

$$\frac{\partial \mu_P^T}{\partial \phi} = \frac{AW}{\left(f_P^{T^*} - f_R^{T^*}\right)^2}\left(-\rho\left(f_P^{T^*} - f_R^{T^*}\right)\frac{\partial h(.)}{\partial \phi} + \kappa\left(\frac{\partial f_R^{T^*}}{\partial C} - \frac{\partial f_P^{T^*}}{\partial C}\right)h(.)\right). \tag{39}$$

From Lemma 2, we know that $f_P^* > f_R^*$, and thus that $\frac{\partial f_P^*}{\partial C} - \frac{\partial f_R^*}{\partial C} < 0$. Hence,

$$\frac{\partial \mu_P^T}{\partial \phi} > 0 \Longleftrightarrow \frac{h((1-\rho\phi)W)}{\frac{\partial h((1-\rho\phi)W)}{\partial \phi}} > \frac{\left(\rho\left(f_p^{T^*} - f_R^{T^*}\right)\right.}{\kappa\left(\frac{\partial f_R^{T^*}}{\partial C} - \frac{\partial f_P^{T^*}}{\partial C}\right)}. \tag{40}$$

Notice that the LHS of the second inequality in (40) is an increasing function of $W$, it is equal to 0 when $W = 0$, and it goes to infinity when $W$ goes to infinity. The RHS is also positive and when $\phi \longrightarrow 0$ it does not depend on $W$. This, in turn, implies that for sufficiently large values of $W$ (that is, when a country is oil rich), $\left.\frac{\partial \mu_P^T}{\partial \phi}\right|_{\phi=0} > 0$. This proves the first part of the proposition. The second part follows trivially form the fact that the LHS of (40) goes to 0 when $\phi \longrightarrow 1/\rho$. □

## Proposition 2

*Proof.* For the first part, we need to show that $\frac{\partial \mu_P^T}{\partial \gamma} < 0$. Differentiating (29) with respect to $\gamma$, we have that

$$\frac{\partial \mu_P^T}{\partial \gamma} = -\frac{\lambda A W h(.)}{(f_P^{T^*} - f_R^{T^*})^2}\left(\frac{\partial f_R^{D^*}}{\partial C} - \frac{\partial f_P^{D^*}}{\partial C}\right) < 0. \tag{41}$$

For the second part, we have that

$$V^{i,T^*} = f(\omega - (1+\lambda)(c^i(\delta) + (1+\lambda(1-\gamma))\phi W - (1+\lambda)G^{iT*}; G_P^{iT^*} * + G_P^{-iT^*}) + ..., \quad (42)$$

and that

$$\frac{\partial V_j^{i,T^{*2}}}{\partial G^{i,T^*}\partial\gamma} = \lambda(1+\lambda)\phi W f''_{CC}(.) < 0, \quad (43)$$

which, using the strict monotonicity theorem (Edlin and Shannon, 1998), implies that $\frac{\partial G^{iT^*}}{\partial \gamma} < 0$, for $i = I, O$, and thus $\frac{\partial G^{T^*}}{\partial \gamma} < 0$. The fact that $\frac{\partial C^{i,T^*}}{\partial \gamma} < 0$, follows directly from the homotheticity of preferences. □

## Corollary 1

*Proof.* In the case of wasteful expenditures ($WE$), we have that

$$\mu_P^{WE} \equiv \frac{2AR(1-\rho\phi)}{f_P^{WE^*} - f_R^{WE^*}}, \quad (44)$$

$$f_P^{I,WE^*} = f\left(w - (1+\lambda)\, G_P^{I,T^*}, G_P^{T^*}\right), \quad (45)$$

$$f_R^{WE^*} = f\left(w - (1+\lambda)\left(A + G_R^{I,D^*}\right), G_R^{T^*}\right). \quad (46)$$

From the concavity of $f(.)$, we have that, for any given $\phi$, $f_P^{WE^*} - f_R^{WE^*} > f_P^{T^*} - f_R^{T^*}$, so that $\mu_P^{WE} < \mu_P^T$. □

## Proposition 3

*Proof.* (i) The minimum transfer $\widehat{\phi}_R \in (0, 1/\rho)$ that equalizes the utility of the opposition– and thus defines the threshold–between repression and conflict is implicitly defined by $\left\{\widehat{\phi}_R : V_R^{O,T^*} = V_C^{O,T^*}\right\}$, or

$$\left\{\widehat{\phi}_R : f_R^{T^*}(., \widehat{\phi}_R W, .) - f_C^{T^*}(., \widehat{\phi}_R W, .) = \frac{A}{\mu} h((1-\rho\widehat{\phi}_R)W)\right\}. \quad (47)$$

The existence of such a $\widehat{\phi}_R$ follows from the fact that when conflict is the equilibrium, at $\phi = 0$, $V_C^{O,T^*} > V_R^{O,T^*}$ and, at $\phi = 1/\rho$, $V_R^{O,T^*} = f_R^{O,T^*} > V_C^{O,T^*} = f_C^{O,T^*}$. For such a transfer to be ex-ante welfare improving we need to verify that $E[V_R^*(\widehat{\phi}_R)] > E[V_C^*(\phi = 0)]$, or

$$2f_R^{T^*}(., \widehat{\phi}_R W, .) + h((1-\rho\widehat{\phi}_R)W) > 2f_C^*(., 0, .) + h(W), \quad (48)$$

condition that can be rewritten as

$$f_R^{T^*}(.,\widehat{\phi}W,.) - f_C^*(.,0,.) > \frac{h(W) - h((1-\rho\widehat{\phi}_R)W)}{2}. \tag{49}$$

Using (47), and remembering that $f_C^{T^*}(.,\widehat{\phi}_R W,.) > f_C^*(.,0,.)$, and thus that $f_R^{T^*}(.,\widehat{\phi}_R W,.) - f_C^{T^*}(.,\widehat{\phi}_R W,.) < f_R^{T^*}(.,\widehat{\phi}W,.) - f_C^*(.,0,.)$, a sufficient condition for (49) to hold is that

$$\frac{A}{\mu}h((1-\rho\widehat{\phi}_R)W) > \frac{h(W) - h((1-\rho\widehat{\phi}_R)W)}{2}, \tag{50}$$

or that

$$A > \mu\frac{h(W) - h((1-\rho\widehat{\phi}_R)W)}{2h((1-\rho\widehat{\phi}_R)W)} \equiv \widehat{A}_R, \tag{51}$$

expression that, in terms of $\mu$, can be rewritten as

$$\mu < \frac{2Ah((1-\rho\widehat{\phi}_R)W)}{h(W) - h((1-\rho\widehat{\phi}_R)W)} \equiv \widehat{\mu}_R. \tag{52}$$

It remains to prove that the interval $[\mu_C^T, \widehat{\mu}_R]$ is non empty, so that condition (51) is compatible with repression being the equilibrium, or that

$$\frac{2Ah((1-\rho\widehat{\phi}_R)W)}{h(W) - h((1-\rho\widehat{\phi}_R)W)} > \frac{Ah((1-\rho\phi)W)}{\hat{f}_R^T - \hat{f}_C^T}. \tag{53}$$

Using (47) and simplifying, the expression can be rewritten as (51), which guarantees that the interval is indeed non-empty. In addition, notice that, since $\frac{\partial V_R^{T^*}(.,\widehat{\phi}_R W,.)}{\partial \widehat{\phi}_R} < 0$, larger transfers that support repression are necessarily welfare dominated by $\widehat{\phi}_R$. Finally, it is immediate to prove that we would get the same exact results and thresholds had the opposition the first mover advantage.

(ii) and (iii). Assume now that repression is the equilibrium without transfers (or with a transfer $\widehat{\phi}_R$). The minimum transfer $\widehat{\phi}_P \in (0, 1/\rho)$ (or $\widehat{\phi}_P \in (\widehat{\phi}_R, 1/\rho)$) that equalizes the utility of the incumbent–and thus defines the threshold–between peace and repression is implicit defined by $\left\{\widehat{\phi}_P : V_P^{I,T^*} = V_R^{I,T^*}\right\}$, or

$$\left\{\widehat{\phi}_P : f_P^{T^*}(.,\widehat{\phi}_P W,.) - f_R^{T^*}(.,\widehat{\phi}_P W,.) = \frac{A}{\mu}h((1-\rho\widehat{\phi}_P)W)\right\}. \tag{54}$$

The fact that such a $\widehat{\phi}_P$ exists follows from the fact that since repression is the equilibrium at $\phi = 0$ (or at $\phi = \widehat{\phi}_R$), $V_R^{I,T^*} > V_C^{I,T^*}$ and, at $\widehat{\phi}_P = 1/\rho$, $V_P^{I,T^*} = f_P^{I,T^*} > V_R^{I,T^*} = f_R^{I,T^*}$. For such a transfer to be ex-ante welfare improving, we need to verify that $E[V_P^*(\widehat{\phi}_P)] >$

$E[V_R^*(\widehat{\phi}_P)]$, or

$$2f_P^{T^*}(.,\widehat{\phi}_P W,.) + h((1-\rho\widehat{\phi}_P)W) > 2f_R^*(.,0,.) + h(W), \tag{55}$$

condition that can be rewritten as:

$$f_P^{T^*}(.,\widehat{\phi}_P W,.) - f_R^*(.,0,.) > \frac{h(W) - h((1-\rho\widehat{\phi}_P)W)}{2}. \tag{56}$$

Using (53), and remembering that $f_R^{T^*}(.,\widehat{\phi}_P W,.) > f_R^*(.,0,.)$, and thus that $f_P^{T^*}(.,\widehat{\phi}_P W,.) - f_R^{T^*}(.,\widehat{\phi}_P W,.) < f_P^{T^*}(.,\widehat{\phi}_P W,.) - f_R^*(.,0,.)$, a sufficient condition for (55) to hold is that

$$\frac{A}{\mu}h((1-\rho\widehat{\phi}_P)W) > \frac{h(W) - h((1-\rho\widehat{\phi}_P)W)}{2}, \tag{57}$$

or that

$$A > \mu\frac{h(W) - h((1-\rho\widehat{\phi}_P)W}{2h((1-\rho\widehat{\phi}_P)W)} \equiv \widehat{A}_P, \tag{58}$$

expression that, in terms of $\mu$, can be rewritten as:

$$\mu < \frac{2Ah((1-\rho\widehat{\phi}_P)W)}{h(W) - h((1-\rho\widehat{\phi}_P)W)} \equiv \widehat{\mu}_P. \tag{59}$$

It remains to prove that the interval $[\mu_P^T, \widehat{\mu}_P]$ is non empty, so that condition (58) is compatible with repression being the equilibrium, or that

$$\frac{2Ah((1-\rho\widehat{\phi}_P)W)}{h(W) - h((1-\rho\widehat{\phi}_P)W)} > \frac{Ah((1-\rho\phi)W)}{\hat{f}_P^T - \hat{f}_R^T}. \tag{60}$$

Using (54) and simplifying, the above expression can be rewritten as (58), which guarantees that the interval in indeed non empty. Notice that when conflict is the equilibrium $\widehat{\phi}_P > \widehat{\phi}_R$. In addition, notice that since $\frac{\partial V_P^{T^*}(.,\widehat{\phi}_P W,.)}{\partial \widehat{\phi}_P} < 0$, larger transfers that support peace are necessarily welfare dominated by $\widehat{\phi}_P$. Finally, it is immediate to prove that we would get the same exact results and thresholds if the opposition had the first mover advantage. □

## Proposition 4

*Proof.* (i) First notice that, by a revealed preferences argument, the incumbent strictly prefers repression to peace in the repression equilibrium, and thus transfers that switch the equilibrium from repression to peace are never ex-post optimal. Let us now consider transfers that switch the equilibrium form conflict to repression. Having ruled out consumption smoothing motives, the utility of the incumbent in the repression regime is decreasing in $\phi$, hence the only candidate for an ex-post optimal transfer is $\widehat{\phi}_R \in (0, 1/\rho)$, implicitly defined by (47). Assume now that the incumbent prefers conflict without transfers to repression at $\phi = \widehat{\phi}_R$; this would imply that

$$f_C^*(.,0,.) + \frac{h}{2}(W) > f_R^{T^*}(.,\widehat{\phi}_R W,.) + (\frac{1}{2} + \frac{A}{\mu})h((1-\rho\widehat{\phi}_R)W), \quad (61)$$

or, rearranging,

$$f_R^{T^*}(.,\widehat{\phi}_R W,.) - f_C^*(.,0,.) < \frac{h(W) - h((1-\widehat{\phi}_R\phi)W)}{2} - \frac{A}{\mu}h((1-\rho\widehat{\phi}_R)W), \quad (62)$$

which can never be verified since (49) implies that the LHS of (62) is positive and (50) that the RHS is negative. Thus, ex-ante optimal transfers that switch the equilibrium from conflict to repression are ex-post optimal as well. Finally, for the case of switching from conflict to peace, it is straightforward to prove that what is optimal ex-ante is also optimal ex-post by using the same argument.

(ii) First notice that, at $\widehat{\phi}_R = \widehat{\phi}_{IN}$, the fact that the opposition is indifferent between insurgency and conflict implies that the incumbent strictly prefers the latter, so that ex-ante optimal transfers are not ex-post optimal. Let us now consider the ex-ante optimal transfer $\phi = \widehat{\phi}_P$ that switches the equilibrium from insurgency to peace. Assume now that the incumbent prefers insurgency without transfers to peace at $\phi = \widehat{\phi}_P$, we would than have that (remembering that $f_{IN}^{T^*} = f_R^{T^*}$):

$$f_R^*(.,0,.) + (\frac{1}{2} - \frac{A}{\mu})\frac{h(W)}{2} > f_P^{T^*}(.,\widehat{\phi}_P W,.) + \frac{h((1-\rho\widehat{\phi}_P)W)}{2}, \quad (63)$$

or

$$f_P^{T^*}(.,\widehat{\phi}_P W,.) - f_R^*(.,0,.) < \frac{h(W) - h((1-\rho\widehat{\phi}_P)W)}{2} - \frac{A}{\mu}h(W), \quad (64)$$

which can never be verified since (56) implies that the LHS of (64) is positive, and (56) that the RHS is negative. Finally, for the case of switching from conflict to peace, it is straightforward to prove that what is optimal ex-ante is also optimal ex-post. □

## Corollary 2

*Proof.* Notice that, even if at $\phi = \widehat{\phi}_R$, $V_{IN}^{IT^*} < V_C^{I^*}$, for sufficiently large values of $A$, it may nonetheless be the case that $\frac{\partial V_{IN}^{IT^*}}{\partial \phi}\Big|_{\phi=\widehat{\phi}_R} > 0$, and thus there may exist a $\widetilde{\phi} > \widehat{\phi}_R$ such that $V_{IN}^{IT}(\widetilde{\phi}) > V_C^{I^*}$ holds. □

# Appendix 2: Data and estimations

Our data comprise an unbalanced panel of yearly observations for 86 countries from 1990 to 2011. Country selection reflects availability of government expenditures and decentralization data (Table 1). Our dependent variable is *Conflict Onset 1($CON$),* from the Armed Conflict Dataset of the Uppsala Conflict Data Program, which measures the beginning of an intrastate armed conflict with 25 or more battle deaths per year. As a binary variable, it takes value of 1 if a new conflict starts in one particular year and 0 otherwise.[29] In addition, to distinguish between cases in which a country experiences an enduring conflict or a lasting peace, we control for the *Conflict Incidence* ($INC$) variable of the same dataset, which takes value of 1 in all country-years with at least one active conflict, and 0 otherwise. This allows us to distinguish between "peaceful" and "non-peaceful" zeros.

A reliable measure of natural resource transfers would allow us to disentangle natural resource transfers (to citizens and subnational entities) from other transfers. Unfortunately, with very few exceptions, such data do not exist. Among the available data, the best proxies we could find are measures of expenditure decentralization such as the share of subnational (state and local governments) governments in general government expenditures ($DEC1$), and the ratio of subnational public expenditures to GDP ($DEC2$), both based on IMF's GFS. In order to control for overall public expenditure as fraction of GDP ($GOV$), we use the general government final consumption expenditures. As a measure of natural resource endowment, we use oil rents as a share of GDP ($OilGDP$) from WDI. Finally, for *Per Capita Income* ($GDPpc$), we use the WDI series (in constant 2005 dollars), while we use the UN classification for regional[30] dummies ($\eta_i$). Table 2 provides the summary statistics for our dataset.

## Estimations

In order to ascertain whether large transfers are indeed associated with a lower likelihood of conflict, we estimate the following logistic regression:

$$\begin{aligned} CON_{i,t} &= \beta_0 + \beta_1 INC_{i,t-1} + \beta_2 GDPpc_{i,t-1} + \beta_3 OilGDP_{i,t-1} + \beta_4 GOV_{i,t-1} \\ & \quad \beta_5 DEC_{i,t-1} + \beta_6 DEC^2_{i,t-1} + \eta_i + \tau_t + e_{i,t}, \end{aligned} \tag{65}$$

where the dependent variable $CON$ is the onset of conflict and, among the independent ones, our main variable of interest is fiscal decentralization ($DEC$), which we use as a proxy for the size of transfers. Controls include per capita income ($GDPpc$), oil rents ($OilGDP$), government expenditures as a share of GDP ($GOV$), incidence of conflict ($INC$), time and regional dummies ($\eta_i$ and $\tau_t$).

The estimation of (65) poses several econometric challenges including a possible omitted

[29] A conflict is defined as new if it occurs at least two years after the previous conflict.

[30] We combine Australia and Micronesia in one region, not to drop one group for the absence of conflict.

Table 1: Sources and availability of data

| Source | Variable | Original Database Name | Availability |
|---|---|---|---|
| UCDP/PRIO Armed Conflict | CON | Onset1v412 | 1946-2011 |
| Dataset v.4-2012 | INC | Incidencev412 | 1946-2011 |
| World Bank-WDI | OilGDP | NY.GDP.PETR.RT.ZS | 1970-2013 |
| | LAND | AG.LND.TOTL.K2 | 1965-2011 |
| | GDPpc | NY.GDP.PCAP.KD | 1965-2014 |
| | GOV | NE.CON.GOVT.ZS | 1966-2014 |
| World Bank-Governance | DEC1 | sn_exp_per_ac | 1972-2011 |
| | | / sn_exp_per_c | 1972-2011 |
| Polity IV Project database | POLCOMP | polcomp | 1800-2014 |
| Fearon and Laitin (2003) | ETHFRAC | ethfrac | 1945-1999 |

variable bias and endogeneity of some of the explanatory variables, among which $DEC$, and its interaction terms, see below. To partially address such a problem, following the conflict literature, we lag our right-hand variables by one period in all regressions.

In order to determine the effects of large transfers, we introduce a quadratic decentralization term. If large transfers reduce the likelihood of conflict, then we should have that $\beta_2 < 0$ and, for sufficiently large values of $DEC$, $\beta_5 + 2\beta_6 DEC < 0$.

Result are presented in Table 3. As standard in the literature, the likelihood of a new conflict is positively correlated with oil wealth and negatively with per capita GDP, which should co-move with the quality of institutions. As per fiscal decentralization, we find a negative coefficient on the quadratic term; we also find that if decentralization is larger than 41 percent, then $\beta_5 + 2\beta_6 DEC < 0$, see column 5. These results are robust to the introduction of both regional and time fixed effects, as shown in column 7. As expected, the effects become more prominent when we estimate the same relationship in oil rich country group only (column 8) as expected; however, with a substantially reduced sample size, we lose the significance on the quadratic term.

A number of robustness checks, including the ones with the alternative definition of decentralization $DEC$, also produce similar results, and are available upon request.

Table 2: Summary statistics

| Variable | Unit | N | min | mean | max | sd |
|---|---|---|---|---|---|---|
| Conflict Onset (CON) | Binary (1=onset) | 1122 | 0 | 0.03 | 1 | 0.17 |
| Conflict Incidence (INC) | Binary (1=incidence) | 1122 | 0 | 0.11 | 1 | 0.31 |
| GDP per capita (GDPpc) | logs of constant USD | 1122 | 4.96 | 9.1 | 11.36 | 1.41 |
| Oil Rents (OilGDP) | % of GDP | 1122 | 0 | 2.19 | 70.21 | 7.17 |
| Government Expenditures (GOV ) | % of GDP | 1122 | 2.98 | 17.41 | 43.48 | 4.91 |
| Subnational Expenditures (DEC1) | % of public expenditures | 1122 | 0.37 | 23.47 | 98.76 | 15.86 |
| Subnational Expenditures (DEC2) | % of GDP | 1122 | 0.05 | 4.17 | 19.51 | 3.06 |

Table 3: Estimates for the relationship between decentralization and conflict onset

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| INC | 2.058*** | 2.009*** | 1.999*** | 1.970*** | 1.900** | 1.970** | 1.763*** | 1.698** |
| | (0.636) | (0.664) | (0.706) | (0.740) | (0.760) | (0.774) | (0.582) | (0.767) |
| GDPpc | -0.548*** | -0.558** | -0.474** | -0.449** | -0.573*** | -0.605*** | -0.373** | -0.583* |
| | (0.209) | (0.222) | (0.222) | (0.181) | (0.189) | (0.192) | (0.182) | (0.313) |
| OilGDP | | 0.0219** | 0.0202* | 0.0219* | 0.0265* | 0.0321* | 0.0207 | -0.0115 |
| | | (0.0112) | (0.0114) | (0.0119) | (0.0156) | (0.0184) | (0.0240) | (0.0222) |
| GOV | | | -0.0604 | -0.0646 | -0.0585 | -0.0539 | -0.0432 | -0.063 |
| | | | (0.0596) | (0.0666) | (0.0752) | (0.0679) | (0.0444) | (0.0583) |
| DEC1 | | | | 0.0044 | 0.0747* | 0.0744* | 0.0630** | 0.0914* |
| | | | | (0.0161) | (0.0386) | (0.0398) | (0.0263) | (0.0492) |
| DEC1_SQR | | | | | -0.000902* | -0.000866* | -0.000670** | -0.000787 |
| | | | | | (0.00050) | (0.00046) | (0.00033) | (0.00056) |
| Constant | 0.472 | 0.472 | 0.727 | 0.482 | 0.463 | 3.224 | 0.238 | 3.916 |
| | (1.829) | (1.942) | (2.253) | (1.929) | (1.912) | (2.056) | (1.790) | (2.617) |
| Observations | 1,122 | 1,122 | 1,122 | 1,122 | 1,122 | 944 | 944 | 176 |
| Region FE | No | No | No | No | No | No | Yes | Yes |
| Year FE | No | No | No | No | No | Yes | Yes | Yes |
| OilGDP | All | All | All | All | All | All | All | $> 1\%$ |
| Initial Year | 1990 | 1990 | 1990 | 1990 | 1990 | 1990 | 1990 | 1990 |

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