Seduction and Violence in Autocratic Regimes*

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Abstract

Abstract In establishing and consolidating strong centralized states absolute monarchs do not rely on sheer force alone but they also resort to the tactic of seduction whereby they buy the loyalty of potential rivals or dissenters. Our model attempts to elucidate the conditions under which an autocrat is more or less likely to grant substantial material privileges to the counter-elite so as to coopt them. In our setup, two equilibrium strategies are available to the ruler, opposition suppression and opposition confrontation. We show that more abundant resources help the autocrat consolidate his regime but that, when the counter-elite is more prone to venality, this does not necessarily help maintain the autocrat in power. We also propose novel insights derived from the application of our theory to present contexts, such as the Arab Spring.

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1 Introduction

A central message from the political science literature on state formation is that in establishing and consolidating strong centralized states absolute monarchs do not rely on sheer force alone. To a varying extent, they also resort to the tactic of seduction whereby they buy the loyalty of potential rivals or dissenters. The contrast, here, is between the ruling elites and their inner circle or core group of supporters, on the one hand, and the counter-elite, i.e., people who are excluded from the sphere of power and may therefore foment or support a rebellion, on the other hand. In order to mitigate that risk, the ruling elites may shower upon the counter-elite exemptions, privileges and advantages large enough to make the cost of rebellion very high. Political power thus becomes "a fountain of privilege", and by judiciously targeting his favours the monarch can make or break the fortunes of a clan head or a warlord suspected of coveting the crown (Bates, 2001: Chap. 3).

Potential rivals or enemies may be feudal or quasi-feudal lords who wield military, administrative and judicial power in countries where the central state authority is not yet well-established. Buying these lords into submission to consolidate a royal or imperial power is a tactic that has been often observed in the historical process of formation of modern nation-states in Europe (North et al., 2009: Chap. 3). It has also been followed by the emperor of Japan when he decided to bring the samuraï to the imperial capital city in order to sever the link between them and their subjects (Smith, 1959). Potential rivals may also be the leaders of an ethnic group that is not well represented in the ruling clique. Resenting what they perceive as ethnic discrimination, they are natural enemies of the political regime. If they are not tamed or assuaged by privileges that give them an interest in preserving the status quo, they will remain a constant threat and source of insecurity for those at the top, as attested by the unstable political situation prevailing in many developing countries today, especially but not exclusively in Sub-Saharan Africa.

Finally, seduction is not necessarily confined to political, military, or ethnic rivals and enemies, but may also be extended to counter-elites. Insofar as the latter wield considerable prestige in the eyes of the population, such as is the case in traditional societies, their legitimizing of the ruling sovereign helps sheltering him from open opposition and defusing potential rebellion. Like seduction of the political elite, seducing counter-elites may therefore be a cost-effective strategy to use in combination with bullying. That there exists a close analogy between seduction of political rivals and counter-elite is apparent from the following excerpt which refers to the situation in the Ottoman empire:

> "The biographies of scholars show that, with the elaboration of a bureaucratic hierarchy, interest in careers outweighed genuine piety and learning. The influence of entrenched families enabled them to promote their children into the higher grades of the educational and judicial hierarchies without having reached the proper preliminary levels, while theological students who could not find patronage were

> excluded. In the course of the eighteenth century the ulama became a powerful conservative pressure group. As servants of the state the ulama no longer represented the interests of the people, nor protected them from the abuses of political power. No longer did they represent a trancendental Islamic ideal opposed to worldly corruption. Their integration into the Ottoman empire made them simply the spokesmen of Ottoman legitimacy" (Lapidus, 2002: 268; see also Hourani, 1991: 224-25; 1993; Malik, 2012: 8).

In this paper we write a model in which autocratic ruling elites can use a seduction tactic in addition to repression in order to maximize their revenue. We specify a loyalty function to capture the extent to which the seduced or co-opted counter-elite are ready to shore up the prevailing autocratic rule as a function of the material privileges granted. We thus depart from political economy models in which a dictator makes transfer payments directly to the population or to a subgroup (say, an ethnic group) of it in order to stay in power and generate personal rents (Acemoglu and Robinson, 2001; 2006; Acemoglu et al. 2004; Padro i Miquel, 2007; Hodler, 2012). We also depart from Acemoglu et al. (2011) whose model focuses on the cooptation of the military since we propose a more detailed analysis of the cooptation determinants that takes into account the strategic reaction of the popular masses, as well as the sensitivity of the counter-elite to material advantages. Such sensitivity, or venality, may be conceived as the inverse of the potential rivals' attachment to the social and political status derived from their local power prerogatives (in the case of feudal lords), to their feelings of identity (in the case of ethnic leaders), to a revolutionary doctrine (in the case of class-based leadership), or to the values and tenets of the religion that they represent (in the case of counter-elite). In short, the degree of venality of the counter-elite is inversely proportional to the strength of their commitment to non-material determinants of wellbeing; To make short, we label it ideological commitment.

A second fundamental difference is that we allow the players to endogenously determine their likelihood of prevailing in case of revolutionary attempts where Acemoglu et al. (2011) take this probability as exogenous. As will become obvious, this endogenous feature lies behind all the paper's findings. Finally, we are not proposing a theocracy model since, if potential rivals are conceived as clerics, indeed, they are not depicted as ruling elites in our approach, but rather as an institution that can be instrumentalized by autocrats. In our setting, the influence of the ruling elites's largesse runs through an intermediary group acting as a counter-elite potentially transformed into a second tier of the ruling clique. Our main interest in following this original approach lies in determining whether such transformation through seduction and co-optation may increase the stability of autocratic regimes.

Complete stability is achieved when the ruling elites are able to suppress dissent or contest altogether, that is, to reduce the risk of open rebellion to zero. When this outcome is not obtained, the degree of stability of the political regime is inversely proportional to the probability of success of a popular rebellion. We have a special interest in knowing how the degree of venality of potential rivals or enemies influences the stability of autocratic rule. Lower venality (or higher ideological commitment), intuition suggests, makes seduction a more costly strategy for the ruling elites, so that political stability is then more difficult to achieve. This is especially evident in the extreme case where potential rivals are impossible to seduce because their "price" is infinitely high, such as happens with the leaders of fundamentalist opposition movements (think, for example, of Salafist movements in Muslim countries today). Conversely, greater venality works to the advantage of the autocrat.

In reaching this conclusion, however, the reverse side of venality has been overlooked, namely that easier-to-buy dissenting leaders also carry less prestige in the eyes of their followers and are therefore less able to mobilize them effectively for rebellion. When the two sides of venality are taken into consideration, it is no more clear that the autocrat may want to increase his recourse to seduction if venality of the counter-elite is greater. And the effect on the stability of the autocratic regime is not clear either. The present paper precisely aims at elucidating the conditions under which the paradoxical outcome -greater venality works to the disadvantage of the autocrat- may be obtained. This requires that we place our argument within a tight analytical structure.

The structure of the paper is as follows. In Section 2, the model is presented in three successive steps. After detailing the setup, we proceed by examining the simple case in which the people's collective capacity, itself determined by the extent of support of the counter-elite, is exogenous. We make a crucial distinction between the Opposition Suppression Strategy and the Opposition Confrontation Strategy. The groundwork will thus be laid for the analysis of the more complex case in which the amount of material privileges awarded to the counter-elite and, therefore, their political positioning are endogenously chosen. The comparative-static results are derived and commented in Section 3. Section 4 concludes and proposes novel insights derived from the application of our theory to present contexts, such as the Arab Spring.

2 The Model

2.1 The setting

We consider a setting featuring three actors, the elite, the counter-elite, and the common people. However, only the elite who control the government and the ordinary people are genuine actors who act strategically. In our setup, the elite may face a revolutionary attempt by the common people movement. If a revolution is attempted, the people's efficiency in opposing the government's forces depends on their cooperation capacity, which is itself influenced by the legitimacy and leadership given by the counter-elite to the rebellion. In this framework we do not consider the possibility that the counter etlite act as informants of the ruling elites as in Egorov and Sonin (2011).

The government under the control of the elites manages the country's wealth,

Y assumed to be exogenous. This wealth can be used (i) to enhance the state's repressive forces through military spending r, (ii) to coopt the counter-elite by paying them bribes w, and (iii) to enrich members of the ruling clique by awarding them the residual wealth, $(Y - r - w)$. If a revolution is attempted by the people, they decide their revolutionary effort, x, which maps into effective strength $l(w; \beta, \alpha)x$. The function $l(w; \beta, \alpha)$ therefore describes the effectiveness of a nominal amount of revolutionary effort, which depends on the capacity of the people to organize collectively toward the purpose of contesting the regime. By buying out the support of the counter-elites, the ruling elites are able to sap the revolutionaries' collective action capacity so that $l(w; \beta, \alpha)$ is a decreasing function of w. Moreover, we assume that the loyalty of the counter-elite is increasingly costly to purchase for the ruling elites so that $l_{w,w} > 0$, where lower scale letters stand for partial derivatives.

The parameter β is a measure of the counter elites' venality, and α denotes any factor affecting the people's collective strength or capacity that has nothing to do with the leadership and support provided by the counter-elite. More venal counter-elites have less influence on the potential revolutionaries, so that $l_\beta < 0$. Moreover, we assume that the marginal erosive effect of venality on the people's collective action capacity decreases as the venality of the counter-elite increases: $l_{\beta,\beta} > 0$. What is less clear, however, is the sign of the cross-derivative $l_{w,\beta}$ capturing the effect of more venal counter-elites on the marginal impact of cooptation on the revolutionaries' fighting efficiency. Two opposing forces are, indeed, at play. As the venality of the counter-elite rises, the marginal negative impact of an increase in the bribes on the fighting effectiveness of opposition forces is larger since a given unit of bribe money purchases more support from these counter-elites. On the other hand, however, owing to reduced prestige and moral authority, counter-elites will be less successful in mobilizing and leading the potential rebels when their degree of venality is higher (and known to be so). As a result, their cooptation by the ruling elites will have less impact on the revolutionaries' organizational abiliy. We shall consider both scenarios where either of the two effects dominates.

The α parameter may be interpreted, in particular, as a technological and/or motivational factor encapsulating the influence of the state of communication technologies or the level of inspiration or emulation, both organizational and emotional, gained from successful rebellions in other countries. These forces have an effect on the effectiveness of any level of support provided by the counter-elite to popular mobilization. We thus have that $l_\alpha(w; \beta, \alpha) > 0$. It is also natural to assume that this effect is decreasingly important: $l_{\alpha,\alpha}(w; \beta, \alpha) < 0$.

In order to make the problem analytically tractable, we need to impose an additional restriction that bears upon the shape of the relationship expressing l as a function of w, as well as one additional assumption on the sign of the cross-derivative $l_{w,\alpha}$. Beginning with the former, we write:

Assumption 1. $\epsilon_{l_{w,w}} > \epsilon_{l,w}$

We thus assume that the elasticity with respect to bribes of their marginal effect on the collective action capacity of the opposition is larger than the direct elasticity of this capacity with respect to bribes. This implies that the collective action capacity of the people is a decreasing and sufficiently convex function of the bribes handed to the counter-elite. In other words, the dampening effect of the regime's seduction tactic on the people's ability to revolt must be sufficiently strong at the margin.

Regarding the α parameter, we assume:

Assumption 2. $l_{w,\alpha}(w;\beta,\alpha) \geq 0$

We thus impose that the effect of an increase in α on the collective action capacity of the people is either monotonically increasing in the amount of the bribes paid to the counter-elite, or independent of it. In other words, we assume that for high bribes a favourable change in the technology of revolutionary organization or in the motivation drawn from similar experiences elsewhere may not have a smaller marginal impact on people's collective action capacity. The underlying idea is that stimulating forces that are exogenously determined act as substitutes for the leadership provided by the counter-elite.

Lastly, we denote by ϕ the economy's resilience to violence so that a share $(1-\phi)$ of the economy's wealth gets destroyed if a revolution is attempted.

If no revolution is attempted, the utility of the ruling clique is given by the following expression:

$$U = Y - w - r \tag{1}$$

And the utility of the people then equals:

$$u = -x \tag{2}$$

Under a revolutionary attempt, the utility of the ruling clique and the utility of the people read, respectively, as:

$$V = \frac{r}{r + l(w)x}\phi\,(Y - w - r) \tag{3}$$

$$v = \frac{l(w)x}{r + l(w)x}\phi\,(Y - w - r) - x \tag{4}$$

The timing of the game is sequential. The autocrat first sets the values of r and w, and then the people decide whether or not to revolt, and how much effort to invest in the revolution. We solve for the game's subgame perfect Nash equilibria.

We first treat the simplified version in which w, and hence $l(w)$, are assumed exogenous so that w is not a decision variable in the hands of the ruling clique. This will help us to lay the ground for the resolution of the complete problem in which w is endogenized.

2.2 Exogenous collective capacity l

In the game's last stage, the people maximize (4) w.r.t. x subject to $v(x) \geq 0$, which yields:

$$\frac{lr}{(r+lx)^2}\phi(Y-w-r)=1$$

The people's reaction function is therefore given by:

$$\begin{aligned} x(r) = & \left(\tfrac{r\phi(Y-w-r)}{l}\right)^{1/2} - r/l && \text{if } \frac{l\phi}{1+l\phi}(Y-w) > r \Leftrightarrow v(x(r)) > 0 \\ = & \quad 0 && \text{otherwise} \end{aligned} \tag{5}$$

Replacing (5) in (4), simplifying and collecting terms, we deduce that the people's utility of fighting is given by:

$$\begin{aligned} v(r) = & \ \phi\left[\phi\,(Y-w-r)^{1/2} - \left(\tfrac{r}{l}\right)^{1/2}\right]^2 && \text{if } r < \frac{l\phi}{1+l\phi}(Y-w) \\ = & \quad 0 && \text{otherwise} \end{aligned} \tag{6}$$

In the first stage of the game, the autocrat decides the amount of repression, given the following two potential strategies:

1. *The Opposition Suppression Strategy (OSS),* which consists in repressing the revolutionary attempts by deploying a sufficiently large force so that the people will not find it optimal to contest the autocracy. We denote the corresponding suppression-repression effort by r^s, which is a deterrence effort.

2. *The Opposition Confrontation Strategy (OCS),* which consists in opting for violent confrontation, where power may be lost with a positive probability. We denote the corresponding repression effort by r^c.

The deterrence level is set in such a way that people are indifferent between contesting the autocrat, and taking their exit option which in our basic framework is equivalent to receiving zero income or utility. We thus have that r^s should set (6) to zero, and this is verified when r equals:

$$r^s = \frac{l\phi}{1+l\phi}(Y-w) \tag{7}$$

Bearing (1) in mind, the utility obtained by the ruling elite under the OSS therefore equals:

$$U^* = \frac{Y-w}{1+l\phi} \tag{8}$$

Using (3) and (5), the utility of the ruling clique under the alternative OCS comes out as:

$$V = \left(\frac{r\phi(Y-w-r)}{l}\right)^{1/2} \qquad \text{if } r < \frac{l\phi}{1+l\phi}(Y-w) \tag{9}$$

$$= (Y-w-r) \qquad \text{otherwise} \tag{10}$$

The second possibility obviously corresponds to the OSS since, to put the people at their reservation utility (=0), the ruling clique will set the repression effort, r^s, at the minimum level compatible with $v(.) = 0$, which is identical to the solution depicted by (7).

Bearing the above in mind, optimizing under the OCS simply yields:

$$r^c = \frac{Y-w}{2} \tag{11}$$

and the survival probability of the current autocrat at equilibrium, denoted by p, therefore equals:

$$p = (l\phi)^{-\frac{1}{2}} \tag{12}$$

The associated condition can now be written as $l\phi > 1$, instead of $r < \frac{l\phi}{1+l\phi}(Y-w)$.

It is noticeable that the equilibrium level of repressive forces under the OCS is independent of both l and φ, a property that will prove very helpful when we analyze the more complex case discussed in the next subsection. It is easy to show that this property follows from the specification of the probability of success (the standard contest success function) combined with our particular setting.

The expression for the survival probability of the regime is also quite simple since it just depends (negatively) upon l and ϕ. Derivation of (12) is rather straightforward. Using (5), we get that $r + lx = [rl\phi(Y-w-r)]^{1/2}$, so that $p = r/(r+lx) = r^{1/2}/\left(l\phi(Y-w-r)\right)^{1/2}$. Using (11), this can be simplified into: $p = (l\phi)^{-1/2}$. We will soon provide comments on the meaning of such a result.

We are now able to write the autocrat's indirect utility as follows:

$$V^* = \frac{1}{2}\left(\frac{\phi}{l}\right)^{1/2}(Y-w) \tag{13}$$

Since we know that, when $l\phi \leq 1$, the optimal strategy for the autocrat is always the OSS (the radical strategy aimed at suppressing any risk of revolt), it remains to verify whether the alternative strategy, the less radical OCS, can be optimal when $l\phi > 1$. To answer that question, we must compare V^* with U^* when $l\phi > 1$. We have that:

$$U^* \geq V^* \Leftrightarrow 2\left(\frac{l}{\phi}\right)^{1/2} \geq 1 + l\phi \tag{14}$$

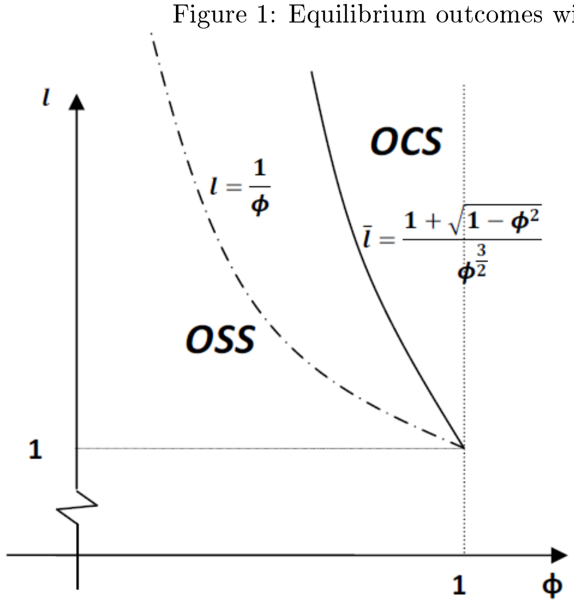
Some basic algebra shows that Inequality (14) is verified for $l \in [\underline{l}(\phi); \bar{l}(\phi)]$, where $\underline{l}(\phi) = \frac{\left(1-(1-\phi)^{1/2}\right)}{\phi^{3/2}}$, and $\bar{l}(\phi) = \frac{\left(1+(1-\phi)^{1/2}\right)}{\phi^{3/2}}$. Because $\phi^{3/2}$ is smaller than 1 by the definition of ϕ, it is evident that $\bar{l}(\phi) > 1$. It is immediate to establish that for $\phi < 1$, $\bar{l}(\phi) > \frac{1}{\phi}$, so that when $l\phi > 1$, the threshold value for determining the autocrat's optimal strategy is $\bar{l}(\phi)$. Indeed, in the case where $l\phi > 1$, which implies $l > 1$, two possibilities arise: either $l < \bar{l}(\phi)$ and the OSS is optimal, or $l > \bar{l}(\phi)$ and it is the OCS that is optimal. On the other hand, it is easy to check that $\underline{l}(\phi)\phi < 1$ for any value of ϕ, which implies that the OSS is always optimal when l is smaller than the lower bound of the interval $[\underline{l}(\phi); \bar{l}(\phi)]$. The following proposition summarizes these findings:

Proposition 1. *When people's collective capacity is exogenous, the Opposition Suppression Strategy (OSS) is the preferred option of the ruling clique whenever $l\phi \leq 1$. When $l\phi > 1$, the alternative Opposition Confrontation Strategy (OCS) is optimal but only if $l > \frac{1+(1-\phi)^{1/2}}{\phi^{3/2}}$.*

Proposition 1 states that the autocrat is more likely to suppress potential dissent when people face large collective action problems and when the economy is less resilient to violence. Figure 1 helps visualizing the content of the proposition. On the x-axis we measure the economy's resilience to violence, while on the y-axis we represent the collective action ability of the people in case of a revolutionary attempt. The downward sloping curve $\bar{l}(\phi)$ divides the parameter space in two regions, with repression being the outcome below the curve, and revolution above. The rectangular hyperbola $l\phi = 1$ is another downward sloping curve shown in the figure, and we know that the OSS is always obtained below it while the OCS *may* occur above it. For low levels of resilience, deterring people from attempting a revolution is cheap since, irrespective of the revolution's outcome, much of the contested wealth will be destroyed. Moreover, destruction of wealth reduces the incentives for the autocrat to confront the dissenters, thus further inducing it to choose repression. Increasing the economy's resilience therefore has the double revolution-promoting effect of making the *OSS* strategy costlier, and increasing the payoff from revolution for both the ruling clique and the people.

On the other hand, when people are ill-organized and face serious collective action problems, while repression is cheap, the odds of quelling the revolutionary attempt are high, therefore making both options attractive. When the collective action capacity is sufficiently low ($l \leq 1/\phi$), if a revolution is attempted the small security forces deployed by the autocrat under the OSS will be sufficient to prompt the dissenters to reduce their revolutionary effort to nothing. As a consequence, they are effectively deterred or suppressed as an opposition movement. For higher collective action abilities, the cost of deterrence becomes proportionally higher than the optimal expenditures required to face a revolutionary attempt. Hence, while the probability that the autocrat remains in control of political power gradually declines as l becomes higher, putting his political survival at risk is preferred to spending a significant part of the budget in order to deter revolutionaries. The following corollary summarizes the findings regarding the equilibrium survival probability of the regime.

Figure 1: Equilibrium outcomes with exogenous l



Corollary 1. *For any $\tilde{\phi}$, there exists a unique $\tilde{l}$ such that for any $(\phi, l) < \left(\tilde{\phi}, \tilde{l}\right)$, $p = 1$, otherwise $p = (l\phi)^{-1/2}$.*

The proof of this Corollary follows directly from Proposition 1 which reveals the existence of threshold values of ϕ and l below which the OSS is the equlibrium strategy, that is, the regime is fully secure. More resilient economies (higher values of ϕ) and/or more efficient revolutionary movements (higher values of l) induce the autocrat to implement the OCS strategy, in which case the survival probability of the regime monotonically decreases in both ϕ and l. The logic behind the effect of a change in l on p is immediate: more efficient revolutionary movements have better chances of ousting the ruling clique from power. As for the rationale underlying the effect of a change in ϕ, it is as follows. On the one hand, as damages inflicted on the economy are smaller in more resilient economies, revolutionaries are willing to invest more effort in their struggle against the regime. On the other hand, the optimal confrontation effort of the ruling clique is unaffected byϕ because the economy's resilience affects both the marginal benefit and the marginal cost of confrontation in a proportional manner. We can then deduce that, in more resilient polities vulnerable to revolutionary attempts, the probability of winnning is unambiguously higher for the struggling people.

2.3 Endogenous collective capacity $l(w)$

We now allow that the people's collective action ability varies with the material privileges granted by the ruling clique to the counter-elite, w.

Under the OCS, the optimal bribes is denoted by W^*. This bribes is obtained by optimizing the ruling elites's utility given by (9) with respect to w, conditional on $l(W^*) > \bar{l}(\phi)$ (otherwise the outcome of the game is repression). The unconstrained optimization yields:

$$-\frac{\phi^{1/2}}{2l^{1/2}}\left(\frac{l^{'}(w)(Y-w)}{2l(w)}+1\right)=0 \tag{15}$$

In Appendix A.1, we verify that the problem is quasi-concave in w when Assumption 1 is satisfied. As a consequence, the optimal cooptation bribes under the OCS, W^*, is such that:

$$W^*:\ -\frac{l^{'}(W^*)(Y-W^*)}{2l(W^*)}=1 \qquad \text{if} \qquad l(W^*)>\bar{l}(\phi) \tag{16}$$

$$W^*:\ l(W^*)=\bar{l}(\phi) \qquad \text{otherwise} \tag{17}$$

To distinguish between the optimal bribes under the OCS, and the interior solution of the problem, we denote by $\hat{W}$ the bribes level satisfying (16) when disregarding the constraint. A useful lemma regarding this variable needs to be stated here:

Lemma 1. *$\hat{W}$ (and therefore $l(\hat{W})$) is independent of ϕ.*

This follows from a property uncovered in the previous subsection, according to which, under the OCS, r is independent of φ and l. This property ensures that when ϕ is higher the cost decreases for both the ruling elite and the revolutionaries. To be more specific, $V(r, x, w; \phi)$ as given by (3) can be expressed as $p(r, x, w; \phi)\phi(Y - w - r)$. We have seen earlier (subsection 2.2) that $r + lx = \varphi^{1/2}\left[rl\left(Y-w-r\right)\right]^{1/2}$, which means that the aggregate strength involved in rebellion is a multiplicative expression of ϕ. It follows that ϕ also enters in a multiplicative manner in $V(r, x, w; \phi)$, since $V = \left[\frac{r(Y-w-r)}{l}\right]^{1/2}\varphi^{1/2}$. Using the short notation $\nu(r(x), w)$ to designate all the elements that are independent from ϕ, we write $V(r(x), w; \phi) = \nu(r(x), w)\cdot\phi^{1/2}$, which implies that ϕ impacts on the utility level of the agents but not on the optimal values of either r or w.

Under repression by the autocrat, differentiating U^* w.r.t. w yields the following expression:

$$-\frac{1}{(1+l(w)\phi)^2}\Big((Y-w)l^{'}(w)\phi+1+l(w)\phi\Big) \tag{18}$$

This problem admits an interior optimum. In Appendix A.1, we show, indeed, that the function is quasi concave in w, so that when (18) is satisfied with equality, the second-order derivative is negative.

Because of the additional constraint that $l(w^*) \leq \bar{l}$, the optimal bribes level under the OSS, w^*, should satisfy:

$$w^* : -\frac{(Y - w^*)l'(w^*)\phi}{1 + l(w^*)\phi} = 1 \qquad \text{if} \qquad l(w^*) < \bar{l}(\phi) \tag{19}$$

$$w^* : l(w^*) = \bar{l}(\phi) \qquad \text{otherwise} \tag{20}$$

As above, we designate by $\hat{W}$ the unconstrained solution to (19).

To determine the equilibrium outcome of the game, in Appendix A.3, we consider two different scenarios according to the values which $l(\hat{W})$ may take: $l(\hat{W}) \leq 1$, or $l(\hat{W}) > 1$.

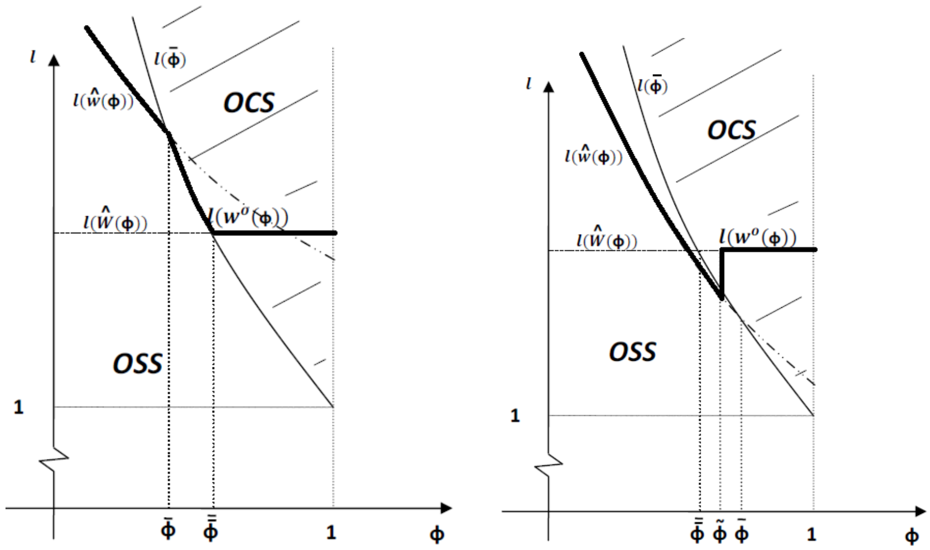
When the parameter configuration is such that $l(\hat{W}) \leq 1$, the unique equilibrium outcome for any parameter configuration compatible with this condition is repression. When the parameter configuration is such that $l(\hat{W}) > 1$, then for low levels of resilience, the outcome is opposition suppression, while for levels of resilience the outcome is confrontation. For some parameter configurations, there may exist an intermediate range of ϕ values such that the autocrat is indifferent between the two strategies.

We can therefore state the following proposition:

Proposition 2. *If an economy is not very resilient to violence (ϕ is low), revolutionary movements are always suppressed (the autocrat uses the OSS). In resilient economies (ϕ is high), the autocrat may choose to use the way of confrontation (the OCS).*

In Figures 2a and 2b, we revisit Figure 1 by allowing the bribes to be endogenous, and by assuming that $l(W^*) > 1$. Three curves are represented: $l(\hat{w})$, $l(\hat{W})$, and $\bar{l}(\phi)$. Remember that the latter corresponds to the frontier between the domains of repression and revolution, whereas the former two curves describe how people's collective action capacity evolves when the optimal bribe is chosen by the autocrat under the OSS and the OCS, respectively. Following Lemma 1, $l(\hat{W})$ is a horizontal line. Two intersection points matter for the analysis: one corresponding to the crossing of $l(\hat{w})$ and $\bar{l}(\phi)$, and the other to the crossing of $l(\hat{W})$ and $\bar{l}(\phi)$. The former intersection defines a first threshold, $\bar{\phi}$, and the latter a second threshold, $\bar{\bar{\phi}}$. As explained below, these elements allow us to depict the equilibrium locus $l(w^o(\phi))$ which indicates how the people's collective action capacity changes as we vary the parameter ϕ, via the effect of the optimal cooptation bribes w^o. This function is represented by the bold kinked curve.

In Figure 2a, we have $\bar{\phi} < \bar{\bar{\phi}}$, as a consequence of which the outcome is opposition suppression low levels of resilience to violence, while the outcome is confrontation for very resilient economies (see Appendix A.3 for the proof). The intuition behind this result is rather straightforward: incentives to mount a revolution are contained when the level of destruction is high, and this implies that the ruling clique can deter such movements at reduced cost. On the other



$\bar{\phi} < \bar{\bar{\phi}}$ (2a) $\qquad$ $\bar{\phi} > \bar{\bar{\phi}}$ (2b)

Figure 2: Equilibrium outcomes with endogenous l: $l(W^*) > 1$.

hand, when revolutions do not affect the country's wealth much, deterring revolutionaries becomes a costly option if the latter are sufficiently organized (i.e. $l(W(1)) \geq 1$). Lastly, there is an intermediate range of values of the parameter ϕ for which the optimal cooptation bribe under the OCS would deter the revolution from occurring, while the optimal bribe under the OSS would be too low to yield such an effect. As a consequence, the bribe paid to the counter-elite is such that the autocrat is exactly indifferent between deterring a revolution and not deterring it.

In Figure 2b, we have the same pattern of deterrence for non resilient economies and non deterrence for resilient economies. Unlike in Figure 2a, however, we now have $\bar{\phi} > \bar{\bar{\phi}}$, which implies the disappearance of a ϕ-parameter region where both opposition suppression and confrontation are possible. The above strategy of choosing a level of cooptation bribe that would leave the autocrat indifferent between the two outcomes of the game is therefore ruled out, and there will be a switching level of resilience $\tilde{\phi}$ below (above) which the outcome is opposition suppression (confrontation) for the same reasons as those previously described. As is evident from the two figures, the optimal cooptation bribe increases (and, therefore, the people's collective capacity decreases) as the economy's resilience, ϕ, increases, up to a point above which the bribe becomes constant (Fig. 2a), or experiences a downward jump and then remains constant (Fig. 2b).

A second corollary can now be stated concerning the equilibrium survival probability of the ruling elites in the full fleged model.

Corollary 2. *The equilibrium survival probability of the ruling elites is monotonically decreasing in the economy's resilience to violence.*

The proof of this Corollary follows directly from a combination of Proposition 2 and Equation (12). For the same reasons as for Corollary 1, more resilient economies tend to increase the revolutionaries' incentives to combat the central regime, eventually improving their odds of ousting the ruling elites. Alternatively, economies heavily relying on activities easily and deeply disrupted by violent conflict will tend to create more stable authoritarian regimes.

3 Comparative statics results

In this section, we explore the effect on the game's equilibria of modifying the country's wealth, Y, the venality of the counter-elite, β, and the effectiveness of the support they provide to popular dissent, α. We also explore the behaviour of the likelihood of regime survival, p.

3.1 Wealth

Changing the wealth level has no influence on the locus separating the opposition confrontation region from the opposition suppression region (bear in mind that $\bar{l}$ is independent of Y). Indeed, if the prize at stake, $Y - w$, experiences an exogenous change, the incentives to suppress or to confront dissenters remain unchanged because in both cases the ruling clique's equilibrium utility is linear in the prize. On the other hand, the optimal cooptation bribe under both regimes is affected by a change in Y. Rearranging (16) and applying the implicit function theorem yields:

$$\frac{\partial \hat{W}}{\partial Y} = -\frac{l'}{l''(Y-w)+l'} > 0 \tag{21}$$

The sign follows from the denominator of the expression being positive, as proven in Appendix A.1.

Proceeding likewise with (19) gives:

$$\frac{\partial \hat{w}}{\partial Y} = -\frac{l'\phi}{l''(Y-\bar{W})\phi + l'\phi} > 0 \tag{22}$$

The sign follows from the denominator of the expression being positive, as proven in Appendix A.2.

We can therefore deduce that $\partial l(\hat{W})/\partial Y < 0$, and $\partial l(\hat{w})/\partial Y < 0$. These two results imply, respectively, that $\partial\bar{\bar{\phi}}/\partial Y > 0$ and $\partial\bar{\phi}/\partial Y > 0$. In Figure 2a, this means that an increase in Y is reflected in a downward shift of the curves $l(\hat{w}(\phi))$ and $l(\hat{W}(\phi))$. The locus of equilibria $l(w^o(\phi))$ is thus affected in such a way that the opposition suppression region is enlarged (see Appendix A.4 for a treatment of the case where $\bar{\phi} > \bar{\bar{\phi}}$). We can therefore write the following proposition:

Proposition 3. *As the economy is wealthier, the autocrat is more likely to opt for opposition suppression than for opposition confrontation. If his power remains contested even though the economy has become wealthier, he is more likely to survive in power.*

The first part of Proposition 3 is proven in Appendix A.4. As for the second part, it is directly inferred from combining (21) and (22) with the fact that $l_w < 0$, and $p_l < 0$ as deduced from (12).

The intuition behind this result is of particular interest since it sheds new light on an old debate about the wealth-conflict nexus. When the country's wealth, Y, is more important, in accordance to the *greed* theory (Collier and Hoeffler, 2004) the incentives of the dissenters to mount a revolution increase, implying a greater willingness to invest in revolutionary efforts. Under both opposition suppression and confrontation, the autocrat will respond to the emboldened rebels by increasing his own military effort. Moreover, as the opposition has become emboldened, the marginal return to military investment has become lower to the marginal return of bribing the counter-elites, hence incentivizing the ruling elites to grant larger favors to the counter-elites. The combination of these two reactions on behalf of the ruling elites eventually implies that under the confrontation strategy the survival probability of the regime is now higher. Nevertheless, the OSS becomes comparatively more attractive. When the value of the prize is larger, the additional forces deployed by the autocrat are increasingly smaller because of the increasing reliance on the bribing of the counter elites and because of the decreasing marginal returns of the rebels' efforts in terms of the probability to win the war. The same reasoning applies to the scenario where a revolutionary attempt is being faced. Yet, although the same mechanism applies under both scenarios, a crucial distinction is that while in the former scenario the ruling clique retains control over the whole prize increase, in the latter this is true only in a probabilistic sense. Therefore, even though the marginal cost of the two moves is identical, the marginal benefit of opposition suppression outmatches the marginal benefit of confrontation.

This is an important point because it invites us to revisit the resources-conflict nexus. The initial view that has been made popular through the empirical results of Collier and Hoeffler (2004) is that the presence of a larger booty induces more conflict, a finding in line with the theoertical findings that larger stakes incentivizes players to fight more fiercly over the prize (see Garfinkel and Skaperdas' (2007) ltierature review). These empirical findings have been contested however since natural resources have been shown to have a pacifying effect through their positive effect on a country's state capacity (Fearon and Laitin 2003, Besley and Persson 2011). Using more contemporaneous econometric techniques, Tsui (2011) presents evidence that oil discoveries make countries more authoritarian, and Cotet and Tsui (2013) demonstrate that when country fixed effects are included in cross-country analyses, oil discoveries increase military spendings - hence possibly coercion - in non-democratic regimes, without however increasing the risk of civil war.

Our setup provides some theoretical foundations combining the above seemingly contradictory findings. Indeed, our analysis shows that whether a revolution is attempted or not may hinge on something else than a static conception of state capacity: as a matter of fact, the ruler may be able to quell rebellions yet be unwilling to do so. Wealthier autocrats, on the other hand, may not have incentives in letting the country plunge into civil war, especially in contexts of economies that are not very resilient to violent conflict. The latter point brings support to Cotet and Tsui's (2013) findings.

A similar result is derived in Hodler's (2012) analysis of the political economy of the Arab Spring. He shows that, when the ruling circle is able not only to coopt the opposition, but also to mobilize popular support in case of a violent uprising, the equilibrium outcome will be context-specific. Conditional on resources being sufficiently important, if the ethnic group of the leader is weak, cooptation of the opposition is more likely to be implemented when it becomes *feasible*. By endogenizing the respective strengths of the leader and the opposition, Proposition 3 sheds light on a novel mechanism: in wealthier polities, the ruler has stronger incentives to deploy a deterrent force so as to avoid damages to the economy. In other words, when the country is richer, the government is not only more able but also more willing to adopt the OSS rather than the OCS.

3.2 Venality of the counter-elite

We may now address the issue that lies at the heart of this paper: how does the equilibrium strategy of the ruling clique possibly change when the counter-elite's venality increases or decreases? To model the impact of such a change, we consider how $l(w^o;\beta;\alpha)$ is affected as the value of β is modified.

To capture the effect of β on the equilibrium outcome, we proceed as above and analyze therefore how the loci $l(\hat{w})$, $l(\hat{W})$, and $l(\bar{\phi})$ are affected under the two possible scenarios, $\bar{\phi} > \bar{\bar{\phi}}$ and $\bar{\phi} < \bar{\bar{\phi}}$. The results of this comparative statics are stated in the next proposition:

Proposition 4. *if the counter-elite's legitimacy does not suffer too much from their venality (i.e., $l_{w,\beta}$ is negative or weakly positive), the effects of a higher (lower) venality are as follows:*

(i) The autocrat is willing to pay a higher (smaller) cooptation bribe in order to undermine revolutionary efforts and, possibly, suppress the risk of revolution.

(ii) Repression expenditures are concomitantly reduced (increased).

(iii) As a consequence, the OCS (OSS) becomes more costly and the OSS (OCS) more attractive.

(iv) The probability that the autocrat survives a revolutionary attempt increases (decreases), assuming that the OCS regime prevails before and after the change in β.

If, on the contrary, the counter-elite's legitimacy is severely affected by their venality (i.e., $l_{w,\beta}$ is strongly positive), the opposite results are obtained. In particular, the autocrat lowers the cooptation bribe paid to rivals whose venality has increased and raises the bribe paid to those whose venality has decreased.

The proof for the first three effects is presented in Appendix A.5. Result (iv) is directly inferred from combining the results in Appendix A.5. on $\partial\hat{w}/\partial\beta$ and $\partial\hat{W}/\partial\beta$with (12).

Consider the case of decreased venality of the counter-elite as a result of enhanced ideological commitment on their part. This change wields two opposing effects. Keeping in mind that the ruler has two instruments available to counter popular discontent, investing in military strength and coopting rival leaders, it is natural that the increase in the cost of either instrument gives rise to a substitution effect. Thus, as the loyalty of the counter-elite becomes more costly to secure because of the latter's diminished venality, the ruler chooses to lower the cooptation bribe and simultaneously raise the level of militarization.

The second effect is more subtle since it captures the manner in which the people's collective action capacity responds to changes in the cooptation bribe for lower levels of the counter-elite's venality. Thus, if the responsiveness of this capacity to a change in the cooptation bribe is significantly stronger for higher levels of ideological commitment (lower levels of venality) of the counter-elite (that is, $l_{w,\beta}$ is strongly positive), the fall of the cooptation bribe induced by the substitution effect of a higher β will significantly enhance the collective strength of the people. As a consequence, the autocrat is prompted to increase his use of the seduction tactic by raising the cooptation bribe of the counter-elite, and to concomitantly economize on military expenditures.

The converse outcome is obtained if the responsiveness of the people's collective action capacity to a change in the cooptation bribe is smaller, or not much higher, for lower levels of venality of the counter-elite. In other words, if the loyalty of the counter-elite to the autocracy (or its inverse, their support of rebellion) is less sensitive, or not much more sensitive (that is, $l_{w,\beta}$ is negative or weakly positive), to a change in w for a lower level of β, the ruler will choose to pay a smaller w to the counter-elite at the new equilibrium. And the military expenditures will be larger as a result. Since military expenditures have diminishing returns in terms of effectiveness of repression, the OSS becomes more costly and the OCS more attractive. This means that the autocrat accepts open confrontation and the risk of losing power because this outcome is obtained at a much smaller cost than the more secure suppression strategy.

In sum, the net effect of a lower β on w is not clear, and we cannot rule out the possibility that the autocrat will increase w when the counter-elite has become more committed ideologically and, therefore, more costly to seduce and coopt.

3.3 Organizational capacity of revolutionaries

Our last comparative static exercise concerns the effect on people's fighting effectiveness, l, of varying the intensity of the forces unrelated to the counter-elite's support. Increases in such intensity may result from the use of more effective communication technologies or from the occurrence of successful revolutions elsewhere which have the effect of boosting the morale and enhancing the motivation of the dissenters. We are therefore considering how $l(w^o;\beta,\alpha)$

is affected when the value of α is increased.

Reproducing the reasoning of the previous comparative statics, our findings are summarized in the next proposition:

Proposition 5. *The higher (lower) the people's fighting effectiveness that arises from factors unrelated to the counter-elite's support, the lower (higher) the cooptation bribe, the higher (smaller) the military expenditures, and the more likely the OCS (OSS). Within the domain of the OCS, the higher (lower) the people's fighting effectiveness, the lower (higher) the probability that the autocrat survives a revolutionary attempt.*

The proof is presented in Appendix A.6. The last part of the above proposition is directly inferred from (12).

As above, the result may be decomposed as the consequence of two effects which, in this case, unambiguously point in the same direction. When, for any given level of cooptation bribe, there is an exogenous increase in people's fighting effectiveness, the opposition movement becomes stronger, therefore prompting the autocrat to substitute military effort for cooptation of potential rivals. In other words, the autocrat chooses to lower w because the impact in efficiency terms of a bribe unit has fallen. If, as we have assumed (see Assumption 2), the negative impact of this substitution effect on people's collective capacity is smaller for higher levels of α (i.e., $l_{w,\alpha} > 0$), the negative consequence of the fall in w for the autocrat is rather contained, hence further favouring the military option. As explained in relation to the previous comparative-static result, the twin movements of increased military effort and reduced cooptation of the counter-elite have the effect of making the OSS more costly. The autocrat then prefers to face open confrontation with the opposition and to incur the risk of defeat.

If the autocrat had adopted the OCS prior to the change in α, the probability that the opposition wins the contest increases as α is raised.

3.4 Summing up

We are now in a position to specify the circumstances under which the autocrat is going to pay a very low bribe to the counter-elite, that is, when there is minimal recourse to the tactic of seduction. These are the following: (i) a poor economy; (ii) an economy that is poorly resilient to violence, (iii) a high ideological commitment, or very low venality, of the counter-elite, and (iv) a high fighting effectiveness of the people that is caused by factors unrelated to the counter-elite's support. If the effects (i), (iii) and (iv) are directly inferred from various propositions stated above, effect (ii) is immediately evident from an inspection of Figures 2a and 2b. Regarding this last effect, the idea is that when the masses perceive that a violent encounter with the regime's forces will cause huge material losses, their motivation to rebel is bound to be very low so that the autocrat does not need to rely significantly on the support of the counter-elite.

4 Discussion and conclusion

There are three main results yielded by the theory of seduction of counter-elites proposed in this paper. First, our theory brings forth a new mechanism explaining why, other things being equal, resource-rich autocratic regimes should be better able than resource-poor countries to keep opposition at bay thanks to more effective use of the tactic of seduction of counter-elites. The latter group of countries is expected to be more rebellion-prone. The contrast between the Gulf monarchies, on the one hand, and Tunisia and Egypt where the Arab uprising erupted, on the other hand, springs to mind here.

Second, the theory's prediction regarding the effect of a change in the technological/motivational parameter matches a widespread explanation for the sudden outburst of street demonstrations that were recently observed in many Arab countries and known as the Arab Uprising, or in countries such as Ukraine (street demonstrations in Kiev in 2013-2014), Russia (demonstrations following the flawed election of President Putin in Moscow in 2013), and Turkey (the Tahrir square rebellion in 2013). This explanation stresses the role of the new information communication technologies that enable frustrated and angry citizens to quickly inform each other and coordinate their protest moves (Hofheinz, 2005; Allagui and Kuebler, 2011; Ellis and Fender, 2011; Khondker, 2011; Stepanova, 2011). Moreover, in the case of the Arab Spring, the advent of satellite networks and the consequent spreading of Arab TV channels (Al Jazeera, al Arabiya, Ikrâa, in particular) which offer regular news but also a lot of religious programmes and tele-preaching, have allowed sudden expressions of anger in countries considered to be close to generate strong spillover effects that lend added force to the opposition movements. In the first instance, new communication technologies help solve an internal coordination problem while in the latter they facilitate local rebellions through a globalization or contagion process.Thus, we learn that the 1979 Islamic revolution in Iran "brought excitement, hope, and bigger political aspiration for Islamists across the Middle East" (Kaboub, 2013: 16). In Tunisia, according to a 2008 poll, 73% of the viewers went to Arab channels, 54% to local channels and hardly more than 3% to the French network (Kammarti, 2010). According to the mechanism implied by our theory, when such exogenous changes occur, the allegiance of counter-elites to the autocratic ruling elites becomes less effective in shoring up the regime so that the seduction tactic becomes more costly. The autocrat responds by diminishing their material privileges, which has the effect of reducing the extent of religion-based allegiance and increasing the clerics' leadership and support for the rebellion. Owing to the decreasing effectiveness of military expenditures, the autocrat may no more be able to avoid the risk of open confrontation.

Third, the theory's prediction regarding the effect of a change in the venality parameter states that, provided that the counter-elites' prestige in the eyes of the population is highly diminished when they are more prone to venality, or highly enhanced when they are less prone to it, the response of the autocrat, somewhat paradoxically, is to have more recourse to seduction of the counter-elite if they have become more expensive to buy ot coopt. The possibility of an open confrontation with an autocratic regime may consequently decrease. Moreover, assuming that the OCS regime prevails before and after the fall in the venality parameter, the probability that the autocrat remains in power increases.

One application of our theory yields an interesting lesson that is less straightforward than the aforementioned role of technology/motivation. The new insight is based on the following idea: religious officials may differ from ordinary members of the counter-elite in that, at least in certain circumstances, the legitimacy effect of their behaviour vis-à-vis the ruling clique is comparatively important (in formal terms, the value of l_{w,\beta} is strongly positive). This is due to the strong influence of religion and the high prestige attached to religious dignitaries in traditional societies. If that is the case, we expect that, for a constant level of venality of the counter-elites, the autocratic rulers of more religious societies, those in which religious dignitaries are coopted, will pay lower cooptation wages to rival leaders. As a consequence, the value of l(w;\alpha,\beta) will be higher in those societies and the probability of regime survival lower. This is precisely the same effect as that produced by a rise in \alpha . The effect of $l_{w,\beta}$ -which has highly positive values in religious societies and weakly positive or negative ones in other societies- is especially likely in Arab countries where the dissemination of Islamist values of the radical puritanical kind tends to exacerbate tensions around, and trigger accusations against, shameful allegiance to rulers perceived as corrupt and unjust, particularly when the 'sin' is committed by religious officials.

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A Appendix

A.1 Second order condition under revolution

Differentiating (15) w.r.t. w yields:

$$\frac{\phi^{1/2}}{4l^{3/2}}\left(\frac{l^{'}(w)(Y-w)}{2l(w)}+1\right)-\frac{\phi^{1/2}}{2l^{1/2}}\frac{(l^{''}(Y-w)-l^{'})2l-2l^{'}l^{'}(Y-w)}{4l^{2}}$$

The first term of this expression equals zero when the FOC is satisfied, thus implying that the objective function is quasi-concave in w if:

$$\frac{(l^{''}(Y-w)-l^{'})2l-2l^{'}l^{'}(Y-w)}{4l^{2}}>0 \tag{23}$$

Using the fact that the bracketed term in expression (15) is equal to zero, and substituting in (23) enables us to re-write the condition as:

$$l^{''}(Y-w)+l^{'}>0$$

Yet, if the FOC is satisfied, the above condition becomes:

$$2l^{''}l>l^{'}l^{'}$$

And this last condition is verified because of Assumption 1.

A.2 Second order condition under repression

Differentiating (18) w.r.t. w yields:

$$\frac{2l^{'}(w)\phi}{(1+l(w)\phi)^{3}}\Big((Y-w)l^{'}(w)\phi+1+l(w)\phi\Big)-\frac{1}{(1+l(w)\phi)^{2}}\Big(l^{'}(w)\phi-l^{'}(w)\phi+l^{''}(w)\phi(Y-w)\Big)$$
(24)

Whenever (18) equals zero, the first term of (24) equals zero as well, thus implying that (24) is negative if the last expression between brackets is positive. This is necessarily true since by Assumption 1 we must have $l^{''}(w)>0$.

A.3 Optimal bribes

Case 1: $l(\hat{W})\leq 1$ in $\varphi=1$

We proceed in three steps. We first show that, over the whole range of admissible ϕ values, the optimal cooptation bribes under the OCS is such that $l(W^{*})=\bar{l}(\phi)$. We next show that, in the same parameter space, the optimal cooptation bribes under the OSS is strictly larger than W^{*}, and this allows us to conclude that given $w^{*}\geq W^{*}$, and since W^{*} is feasible under OSS, it is necessarily the case that $U(w^{*})>V(W^{*})$.

For the first step, from (18) we know that the interior value $\hat{W}$ is independent of ϕ. Since $\bar{l}(\phi) \geq 1, \forall \phi \in [0,1]$, with strict equality in $\phi = 1$, and since $l(\hat{W}) \leq 1$ by assumption, it follows that the condition in (16) is violated so that W^* is given by (17).

For the second step, we demonstrate using lemmatas 3 to 5 that (i) if $\phi = 1$, then $l(\hat{W}) \leq 1 \Rightarrow l(\hat{W}) \leq l(\hat{w}(1)) \leq 1$, (ii) if $\phi = 0$, $\bar{l}(0) > l(\hat{w}(0))$, and (iii) there exists a single crossing point between $l(\hat{w}(\phi))$ and $\bar{l}(\phi)$. Combining these elements enables us to conclude that for $\phi \in [0,1]$, $l(\hat{w}(\phi)) \leq \bar{l}(\phi)$ with equality in $\phi = 1$ and $l(\hat{W}) = 1$.

Lemma 3. $l(\hat{W}(1)) \gtreqless 1 \Rightarrow l(\hat{W}(1)) \gtreqless l(\hat{w}(1)) \gtreqless 1 \Leftrightarrow \hat{w}(1) \gtreqless \hat{W}(1)$

Proof. If we set $\phi = 1$ in (19) and drop the ϕ arguments to save on notation, the expression becomes:

$$-l^{'}(\hat{w})(Y - \hat{w}) = 1 + l(\hat{w}) \tag{25}$$

Re-arranging (16) we obtain:

$$-l^{'}(\hat{W})(Y - \hat{W}) = 2l(\hat{W}) \tag{26}$$

As the shape of the expression (25) will be used in what follows, we rewrite the expression as $\Xi(\hat{w}) = -l^{'}(\hat{w})(Y - \hat{w}) - (1 + l(\hat{w}))$, and making use of (18) and the problem's concavity, we therefore know that $\Xi(\hat{w})_{\hat{w}\hat{w}} \leq 0$, with $\Xi(0)_{\hat{w}} > 0$ if an interior solution exists.

Take first the case where $l(\hat{W}) = 1$, so that the RHS of (26) is equal to 2. By comparing (25) and (26), it is immediate that if we substitute $\hat{w}$ by $\hat{W}$ in (25), (25) holds true. We therefore have that if $l(\hat{W}) = 1$, $\hat{w} = \hat{W}$ is the unique solution to the problem, since $\hat{w}$ is unique.

Consider next the bribes $\hat{W}$ such that $l(\hat{W}) < 1$. Replacing $\hat{W}$ in (25), the RHS of (25) is necessarily larger than the RHS of (26), thus implying that $\Xi(\hat{W})_{\hat{w}} < 0$. Because of the problem's concavity, we deduce that $\hat{w} < \hat{W} \Rightarrow l(\hat{w}) > l(\hat{W})$. Lastly, to show that $1 > l(\hat{w}) > l(\hat{W})$, we proceed by contradiction. We know that $l(\hat{w}) \neq 1$, otherwise we would have $l(\hat{w}) = l(\hat{W}) = 1$. Assume that $l(\hat{w}) > 1 > l(\hat{W})$. Substituting the value of $\hat{w}$ into (26) would make the RHS of the expression larger than the LHS. Applying the same reasoning as above, this would eventually imply that $\hat{W} < \hat{w}$, hence $l(\hat{W}) > l(\hat{w})$, which constitutes a contradiction.

Proceeding likewise, we can show that $l(\hat{W}) > 1 \Rightarrow 1 < l(\hat{w}) < l(\hat{W}) \Leftrightarrow \hat{w} > \hat{W}$. □

Lemma 4. $\bar{l}(0) > l(\hat{w}(0))$

Proof. This result follows directly from the assumption that $l(0)$ is finite, while $\lim_{\phi \to 0} \bar{l}(\phi) = \infty$. □

Lemma 5. *There exists at most one ϕ such that $l(\hat{w}(\phi)) = \bar{l}(\phi)$*

Proof. To establish Lemma (5), it is sufficient to show that, whenever $l(\hat{w}) = \bar{l}$, the slope of $\bar{l}$ is smaller (i.e. more negative) than the slope of $l(\hat{w})$. This implies that at the crossing point, the difference between the slope of $\bar{l}$ and the slope of $l(\hat{w})$ is negative. Since the functions are continuous on the interval $\phi \in [0,1]$, this is a sufficient condition for proving that there can be at most one crossing between the two functions. Dropping the ϕ arguments to save on notation, we therefore begin by re-writing the difference between $\bar{l}$ and $l(w)$ at the crossing point as:

$$\overbrace{\frac{(1+(1-\phi)^{1/2})}{\phi^{3/2}}}^{\bar{l}} - l(\hat{w}) = 0$$

$$\Leftrightarrow \left(1+(1-\phi)^{1/2}\right) - l(\hat{w})\phi^{3/2} = 0$$

$$\Leftrightarrow (1-\phi) = \left[l(\hat{w})\phi^{3/2} - 1\right]^2 \tag{27}$$

$$\Leftrightarrow -\phi\left(1+\phi^2 l(\hat{w})^2 - 2\phi^{1/2} l(\hat{w})\right) = 0 \tag{28}$$

Differentiating w.r.t. ϕ gives:

$$\frac{\partial\left[-\phi\left(1+\phi^2 l(\hat{w})^2 - 2\phi^{1/2} l(\hat{w})\right)\right]}{\partial\phi}$$

$$= -\underbrace{\left(1+\phi^2 l(\hat{w})^2 - 2\phi^{1/2} l(\hat{w})\right)}_{=0} - \phi\left(2\phi l(\hat{w})^2 + 2\phi^2 l(\hat{w}) l^{'}(\hat{w})\hat{w}^{'}(\phi) - l/\phi^{1/2} - 2\phi^{1/2} l^{'}\hat{w}^{'}(\phi)\right) < 0$$

The first term of the above expression is equal to zero because condition (28) must be satisfied when $\bar{l}$ and $l(\hat{w})$ cross. We therefore need to show that:

$$2\phi l(\hat{w})^2 + 2\phi^2 l(\hat{w}) l^{'}(\hat{w})\hat{w}^{'}(\phi) - l/\phi^{1/2} - 2\phi^{1/2} l^{'}\hat{w}^{'}(\phi) > 0$$

Factoring this expression out, we get:

$$2\phi^{1/2} l^{'}(\hat{w})\hat{w}^{'}(\phi)(\phi^{3/2} l(\hat{w}) - 1) + \frac{l(\hat{w})}{\phi^{1/2}}(2l(\hat{w})\phi^{3/2} - 1) > 0$$

By equation (27) we know that $l(\hat{w})\phi^{3/2} - 1 = (1-\phi)^{1/2} > 0$. As a consequence, the above inequality holds if the following inequality is satisfied:

$$\left(l(\hat{w})\phi^{1/2} - 1\right)\left(2l(\hat{w})/\phi^{1/2} + 2\phi^{1/2} l^{'}(\hat{w})\hat{w}^{'}(\phi)\right) + l/\phi^{1/2} > 0$$

Because of $\phi \in [0,1]$ it follows that $l(\hat{w})\phi^{1/2} > l(\hat{w})\phi > 1$, and the above condition will therefore necessarily hold if

$$2l(\hat{w})/\phi^{1/2} + 2\phi^{1/2}l^{'}(\hat{w})\hat{w}^{'}(\phi) > 0$$

$$\Leftrightarrow \frac{2}{\phi^{1/2}}\left(l(\hat{w}) + \phi l^{'}(\hat{w})\hat{w}^{'}(\phi)\right) > 0$$

It is therefore sufficient to have:

$$l(\hat{w}) > -\phi l^{'}(\hat{w})\hat{w}^{'}(\phi) \tag{29}$$

Computing $\hat{w}^{'}(\phi)$ by applying the IFT on (19) yields:

$$\frac{\partial w^*}{\partial \phi} = -\frac{(Y - w^*)l^{'}(w^*) + l(w^*)}{(Y - w^*)l''(w^*)\phi} \tag{30}$$

Substituting in (29) gives us:

$$l(\hat{w}) > \frac{l^{'}(\hat{w})\phi\left(l^{'}(\hat{w})(Y - \hat{w}) + l(\hat{w})\right)}{(Y - \hat{w})l''(\hat{w})}$$

Using the implicit definition of $\hat{w}$ as given by (19) so that the term between brackets in the numerator of the RHS is equal to $-1/\phi$, the condition can be written thus:

$$l(\hat{w}) > -\frac{l^{'}(\hat{w})}{(Y - \hat{w})l''(\hat{w})}$$

Using the fact that $(Y - \hat{w}) = -\frac{(1+l(\hat{w})\phi)}{l^{'}(\hat{w})\phi}$, the above inequality is satisfied if:

$$l(\hat{w})^2\phi + l(\hat{w})l^{''}(\hat{w}) > (l^{'}(\hat{w}))^2\phi$$

Since, $l(\hat{w})^2\phi > 0$, and $\phi \leq 1$, this inequality is necessarily satisfied if:

$$l(\hat{w})l^{''}(\hat{w}) > (l^{'}(\hat{w}))^2$$

a condition which has been assumed in Assumption 1. $\square$

Combining Lemmatas 3 to 5 implies that, for $\phi \in [0, 1[$, there can be no crossing between $\bar{l}(\phi)$ and $l(\hat{w}(\phi))$, while in $\phi = 1$, $\bar{l}(\phi) \geq l(\hat{w}(\phi))$ with strict equality for $l(\bar{w}) = 1$. We therefore have that $l(\hat{w}(\phi))$ lies beneath $\bar{l}(\phi)$ over the whole interval $\phi \in [0, 1]$. As a consequence, $w^o = \hat{w}$ and $l(\hat{w}) \leq l(W^*)$, hence $\hat{w} \geq W^*$. Since, however, W^* is feasible under OSS (while $\hat{w}$ is not feasible under the OCS), it must be the case that $U(\hat{w}) > V(W^*)$, and that $w^o = w^*$. The OSS is thus always preferred when $l(\hat{w}) \leq 1$.

Case 2: $l(\hat{W}) > 1$ in $\phi = 1$

By Lemma 4, the fact that $l(\hat{W}) > 1 = \bar{l}(1)$, and $\partial\hat{W}(\phi)/\partial\phi = 0$, there exists a unique $\bar{\bar{\phi}}$ such that $l(W^*) = \bar{l}$ for $\phi \leq \bar{\bar{\phi}}$, and $l(W^*) = l(\hat{W})$ for $\phi > \bar{\bar{\phi}}$.

By Lemma 3, we know that $l(\hat{W}(1)) > l(\hat{w}(1)) > 1$. Combining this with Lemmatas 4 and 5 implies that there exists a unique $\bar{\phi}$ such that $w^* = \hat{w}$ for $\phi < \bar{\phi}$, and $w^* = \bar{l}(w(\phi))^{-1}$ for $\phi \geq \bar{\phi}$.

Combining these findings, we conclude that if $\bar{\phi} < \bar{\bar{\phi}}$, then for $\phi < \bar{\phi}$, $w^o = w^* = \hat{w}$, for $\phi \in [\bar{\phi}, \bar{\bar{\phi}}[$, $w^o = \bar{l}(w(\phi))^{-1}$, and if $\phi \in [\bar{\bar{\phi}}, 1]$, $w^o = W^* = \hat{W}$.

If, however, $\bar{\phi} > \bar{\bar{\phi}}$, then there exists a $\tilde{\phi} \in]\bar{\phi}, \bar{\bar{\phi}}[$ such that for $\phi < \tilde{\phi}$, $w^o = w^* = \hat{w}$, while for $\phi > \tilde{\phi}$, $w^o = W^* = \hat{W}$.

A.4 Proof of Proposition 3

Proof. The proof of Proposition 3 is decomposed in two parts.

a) If $\bar{\phi} < \bar{\bar{\phi}}$, from a simple look at Figure 2a it is evident that (i) the range of ϕ parameters for which OSS is used is enlarged when Y increases, and the curves $l(\hat{w})$ and $l(\hat{W})$ shift downwards as a consequence, and that (ii) the range of ϕ parameters for which a revolutionary attempt is not deterred is correspondingly narrowing.

b) If $\bar{\phi} > \bar{\bar{\phi}}$, we need to show that the threshold value $\tilde{\phi}$ is monotonically increasing in Y. To that end, it is sufficient to show that in $\phi = \tilde{\phi}$, $\partial\tilde{\phi}/\partial Y > 0$, which will necessarily be true if in that point $\partial(U(\hat{w}) - V(\hat{W}))/\partial Y > 0$. The difference in utilities in $\tilde{\phi}$ is, by definition, equal to zero and, therefore, is given by:

$$\frac{Y - \hat{w}}{1 + l(\hat{w})\phi} - \frac{\phi^{1/2}(Y - \hat{W})}{2l(\hat{W})^{1/2}} = 0 \tag{31}$$

Rearranging, we get:

$$(Y - \hat{w})\, 2l(\hat{W})^{1/2} - \phi^{1/2}(Y - \hat{W})\,(1 + l(\hat{w})\phi) = 0 \tag{32}$$

Differentiating w.r.t. Y yields the required condition

$$2l(\hat{W}) - \partial\hat{w}/\partial Y \left[2l(\hat{w})^{1/2} + l^{'}\hat{w}\phi^{3/2}(Y - \hat{W})\right] - \phi^{1/2}(1 + l(\hat{w})\phi) + \partial\hat{W}/\partial Y \left[\frac{l^{'}\hat{W}}{l(\hat{w})^{1/2}}(Y - \hat{w}) + \phi^{1/2}\,(1 + l(\hat{w})\phi)\right]$$

Replacing (32) in the two squared-bracketed terms allows us to re-write the above condition as:

$$2l(\hat{W}) - \partial\hat{w}/\partial Y \frac{(Y - \hat{W}))\phi^{1/2}}{Y - (\hat{w})} \underbrace{\left[1 + l(\hat{w})\phi + l^{'}(\hat{w})\phi(Y - w)\right]}_{=0} - \phi^{1/2}(1 + l(\hat{w})\phi)$$

$$+\partial\hat{W}/\partial Y \frac{(Y - \hat{w})}{l(\hat{W})^{1/2}(Y - \hat{W})} \underbrace{\left[l^{'}\hat{W}(Y - \bar{W}) + 2l(\hat{W})\right]}_{=0}$$

in which the two terms set equal to zero are, respectively, (19) and (16).

What remains to be shown therefore:

$$2l(\hat{W}) - \phi^{1/2}(1 + l(\hat{w})\phi) > 0 \tag{33}$$

Since $\bar{\phi} > \bar{\bar{\phi}}$, it is necessary that in $\phi = \tilde{\phi}$, $\hat{w} > \hat{W}$, which implies that $Y - \hat{w} < Y - \hat{W}$. Combining this last inequality with (32) enables us to infer that (33) is satisfied. □

A.5 Proof of Proposition 4

Proof. To establish Proposition 4, we analyse how $l(\hat{w})$ and $l(\hat{W})$ are influenced by β, and we then turn to the effect of β on the threshold value $\tilde{\phi}$

Rearranging (16) and applying the IFT gives:

$$\frac{\partial \hat{W}}{\partial \beta} = -\frac{l_{w\beta}(Y - \hat{W}) + 2l_\beta}{l_{w,w}(\hat{W})(Y - \hat{W}) + l_w(\hat{W})} \tag{34}$$

The denominator of (34) has been shown to be positive in Appendix A.1. Therefore, the sign of this expression will be positive if the numerator is negative, which will be the case if $l_{w\beta} < 0$. This is also a sufficient condition for obtaining $\partial l(\hat{W})/\partial\beta < 0$ since the total effect of β on $l(w;\beta,\alpha)$ is given by: $l_\beta + l_w \frac{\partial \hat{W}}{\partial \beta}$

Proceeding likewise on (19) we obtain:

$$\frac{\partial \hat{w}}{\partial \beta} = -\phi \frac{l_{w\beta}(Y - \hat{w}) + l_\beta}{l_{w,w}(\hat{w})(Y - \hat{w}) + l_w(\hat{w})} \tag{35}$$

Through an analogous reasoning, we deduce that a sufficient condition for obtaining $\partial l(\hat{w})/\partial\beta < 0$ is that $l_{w\beta} < 0$.

Combining the above findings implies that when $\bar{\phi} < \bar{\bar{\phi}}$, increases in β have the effect of enlarging (narrowing) the OSS (OCS) region if the cross-derivative $l_{w\beta}$is negative. Otherwise, for highly positive values of $l_{w\beta}$, we could obtain $\partial\hat{w}/\partial\beta < 0$ and $\partial\hat{W}/\partial\beta < 0$. In that case, the net effect of changes in β on the equilibrium strategy depends on the relative size of the direct (l_β) and indirect ($l_w \frac{\partial \hat{W}}{\partial \beta}$) effects, with the OSS region becoming larger if the direct effect dominates the indirect effect.

To deal with the scenario where $\bar{\phi} > \bar{\bar{\phi}}$, we demonstrate that in the neighbourhood of $\tilde{\phi}$, increases in β always lead to larger increases in U^* than in V^* when $l_{w\beta} < 0$ is satisfied, thus implying that $\partial\tilde{\phi}/\partial\beta > 0$. If, however, $l_{w,\beta}$ is sufficiently positive the opposite holds true. Assume first that $l_{w\beta} < 0$.

We differentiate expression (31) w.r.t. β, which yields:

$$\underbrace{\frac{\partial U(\hat{w},\beta)}{\partial \hat{w}}\frac{\partial \hat{w}}{\partial \beta}}_{=0} + \frac{\partial U(\hat{w},\beta)}{\partial \beta} - \underbrace{\frac{\partial V(\hat{W},\beta)}{\partial \hat{W}}\frac{\partial \hat{W}}{\partial \beta}}_{=0} - \frac{\partial V(\hat{W},\beta)}{\partial \beta} \tag{36}$$

in which two terms (as indicated) are equal to zero by application of the enveloppe theorem. Computing the derivatives yields:

$$-\frac{(Y-\hat{w})l_\beta(\hat{w})\phi}{(1+l(\hat{w})\phi)^2}+\frac{(Y-\hat{W})\phi^{1/2}l_\beta(\hat{W})}{4l(\hat{W})^{3/2}}$$

Substituting (31) in this expression and factoring out, we obtain:

$$\frac{(Y-\hat{W})\phi^{1/2}}{2l(\hat{W})^{1/2}}\left[\frac{l_\beta(\hat{W})}{2l(\hat{W})}-\frac{l_\beta(\hat{w})\phi}{1+l(\hat{w})\phi}\right] \tag{37}$$

Since $\hat{w}>\hat{W}\Leftrightarrow l(\hat{w})<l(\hat{W})$, and since $l_{w,\beta}<0$, it follows that $l_\beta(\hat{w})<l_\beta(\hat{W})$. To show that (37) is positive, it is then sufficient to show that:

$$\frac{1}{2l(\hat{W})}<\frac{\phi}{1+l(\hat{w})\phi}\Leftrightarrow 1+l(\hat{w})\phi<2l(\hat{W})\phi$$

This last inequality is necessarily satisfied since in $\tilde{\phi}$, $l(\hat{W})\phi>l(\hat{w})\phi>1$.

Having thus shown that, in $\tilde{\phi}$, the difference between the utility under the OSS and under the OCS increases in β, it follows that $\partial\tilde{\phi}/\partial\beta>0$.

If $l_{w\beta}$ is sufficiently positive, the above result may be inverted.

□

A.6 Proof of Proposition 5

Proof. To prove Proposition 5, we replicate the steps of Appendix A.5 to show that both $l(\hat{w})$ and $l(\hat{W})$ increase in α because the direct and indirect effects of α on the equilibrium fighting efficiency of the revolutionaries go in the same direction. Moreover, it can be shown that $\partial l(\tilde{\phi})/\partial\alpha<0$. By analogy to Appendix A.5, this will be true if $l_{w,\alpha}>0$, which is always verified because of Assumption 2. □