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Abstract We assess Gordon Tullock's work on dictatorship and revolutions using a common analytic framework that captures the dynamics of mutually reinforcing perceptions within a potentially rebelling subgroup of a population. We can reconstruct all of Tullock's central findings but we also find him failing to consider revolutions as an unintended result of individual action in certain low-cost situations. That notwithstanding, one central implication of Tullock's analysis remains intact, namely that no relation can consistently be constructed between the degree of deprivation of a population on the one hand and the probability of an enforced regime change in a public uprising, at least not within the limits of methodological individualism. Hence, whoever aims at strictly inferring macro results from micro behavior must still find Tullock's work on autocracies and revolutions path-breaking.

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1 Gordon Tullock's view on dictatorship and revolution

According to Ronald Wintrobe, "Gordon Tullock was the first economist to write about autocracy and the *coup d'etat*" (Wintrobe, 2012, p. 115). When Tullock published his "Paradox of revolution" (Tullock, 1971) the public choice school itself was still young and far from well established. But the focus of what had been done so far was on the analysis of democracies both in positive and in normative terms. Having published the famous "Calculus of consent" (Buchanan and Tullock, 1962) together with James Buchanan almost a decade before, Tullock left the contractarian world (Rowley, 2005) and turned his view to societies the political institutions of which can certainly not be reconstructed as a contract among free individuals, namely to dictatorships. He started analyzing these systems in a way that hardly any social scientists had chosen before, at least not in such a rigorous way:[1] He started from individual actors that act rationally on the basis of given preferences.

Although Tullock did not claim to present a fully elaborated theory of autocratic systems, his central message on the roots of both the power and the limits of power of a dictator is this: Different from democracies, where the power of an incumbent depends on the votes of a broadly enfranchised citizenship, the power of an incumbent in a dictatorship depends on the dictator's success in containing the manifold threats that stem from the inner circle around him. Whatever happens in a dictatorship can be traced back to the respective incumbent's efforts in warding attacks on his position and on his person.

Tullock's first paper on the topic already came up with this central message,

[1] Perhaps with the exception of Niccollò Machiavelli's famous work from the early 15th century (Machiavelli, 1998).

which is in stark contrast to the myths around revolutions and "public risings": The attacks on the position and person of a dictator are almost never to be expected from a broad public. No matter how unjust, exploitative or repressive a dictator may be, any enforced overturn of an incumbent dictator in favor of a more just, less exploitative or less repressive government is a public good; and different from public elections, the participation in a public rising is particularly costly so that there are few individuals for whom the expected gross benefits of a participation turn the benefits net of participation costs positive. The latter, in turn, will with necessity be persons who personally benefit from an enforced government change through own government positions and the like since the utility derived from the public good of a new government net of participation costs alone never suffices for making individual participation rewarding. Coup d'etats are hence the rule, even if they may sometimes be accompanied by some myth of a broad participation of a deprived population.

Following his 1971 paper, Tullock wrote mainly two books on dictatorships and revolution, namely "The Social Dilemma" (Tullock, 1974) and "Autocracy" (Tullock, 1987). Both books contain a collection of papers that can as well be used as stand-alone papers. In 2005, a collection of Tullock's most important papers and book chapters around dictatorship, revolution, coup d'etat and also of war has been published (Tullock, 2005), but this book does not contain any new material. Whatever he published on the numerous aspects around non-democratic systems, the logical foundation always remained the same, and that was the insight into the public-good character of a revolution or, more broadly: the collective-action problem of any coordinated effort necessary for overthrowing a dictator.

Note that the collective-action problem is not only relevant for a broad public for which it may be a problem so huge that it almost perfectly protects a dictator from public risings. It is also relevant for smaller groups within some government or societal elite that may plan to get rid of an incumbent.

For them, however, the collective-action problem is not an insoluble problem. Rather, the collective-action problem defines the set of restrictions that those individual actors face that are influential enough for potentially becoming threatening to an incumbent dictator. Hence, a dictator is indeed accountable in a certain way for what he does to others since he will run into serious difficulties when having failed to please potentially threatening individuals. But different from a democracy, this sort of accountability does not refer to a broad public but to small elites around the dictator alone.

Given the straightforward "Olsonian" logical foundation, it is somewhat astonishing that a whole branch of the literature around revolutions and accountability of governments has more or less ignored Tullock's work. This branch is founded on the book by on relative deprivation and revolutionary threats (Gurr, 1970; see also Bloch, 1986). In a series of papers and books, Acemoglu and Robinson base their analysis on the deprivation literature and construct their models around a revolution constraint which is defined by a certain degree of wealth or income that a dictator must leave to the general population in order to keep it from organizing a public rising. By defining such a revolution constraint, they either ignore the collective-action problem (Acemoglu and Robinson, 2000a; Acemoglu and Robinson, 2000b; Acemoglu and Robinson, 2001) or they define it away (Acemoglu and Robinson, 2006, p. 125).

By contrast to the deprivation literature, the more recent literature on "selectorates" takes the public-good character of revolutions particularly serious and defines political regimes over the size of a winning coalition which is, following Tullock, small in dictatorial regimes and which is the only group that a dictator must please in order to preserve his power (Bueno de Mesquita et al., 2005; B. B. De Mesquita and Smith, 2010; E. B. De Mesquita, 2010; Besley and Kudamatsu, 2008; Li and Gilli, 2014).

Following the deprivation literature and ignoring the collective-action prob-

lem is certainly not helpful for understanding the roots of revolutions (Apolte, 2012). On the other hand, though, it is also true that history has indeed seen incidents in which a mass of individuals at least seems to have swept away regimes, and this is clearly a contradiction to Tullock's public-goods view on revolutions. Lichbach (1994) as well as Kurrild-Klitgaard (2004) have hence argued that there is as yet no theory that consistently explains these incidents on the assumption of rational individual actors alone.

Apart from that and following Schelling (1978, pp. 102-110), a literature on so called "critical-mass" or "threshold" models has evolved (see Granovetter, 1978; Yin, 1998; Shadmehr and Bernhardt, 2011). These models explain unintended collective action by a type of individual action that is driven by a well-defined dynamic of mutual expectations. On the basis of these models, one can—under certain conditions—explain rebellious incidents as the unintended result of individual action on a large scale (see Kuran, 1989; Kuran, 1991a; Kuran, 1995). The threshold models alone, however, cannot provide for a link between the degree of deprivation of a population and the outbreak of mass rebellions as, for example, Kuran (1989) clearly admits. They can also not provide for a link between mass rebellions on the one hand and the resignation of an incumbent on the other as long as there is no relation between the loyalty of the incumbent's inner circle and the rebellion.

In the remainder of the paper, we try to resolve these puzzles by help of a common analytic framework comprising of two key elements: The first is the collective-action problem, as it had been at the heart of Tullock's work since his 1971 paper, and the second is the dynamics of the mutual expectations of potentially rebelling individuals as it has been explored by Tullock in his 1987 book and as it is akin to the threshold theories. In doing so we will demonstrate the power of Tullock's approach but also its limitations, and we will do so without leaving the ground of methodological individualism. We will then demonstrate how mass revolts can be related to the fate of a

dictator, but we will also find that one of the central implications of Tullock's work on dictatorship and revolution is always robust, both theoretically and empirically: the implication that there is no relation between the degree of deprivation of a population on the one hand and the probability of a revolutionary incident on the other.

Although Tullock preferred the term autocracy over dictatorship since he was not only interested in modern types of dictatorships but also in Kingdoms and Empires (Tullock, 1987, p. 1), we will use the terms autocracy and dictatorship interchangeably. After all, that is what Tullock himself did as well for most of his word.

In section 2, we develop our common analytic framework. In section 3 we compare coup d'etats with public risings. In section 4 we link public risings with the interest of a small revolutionary elite and in section 5 we ask why and under which conditions a dictator may indeed be threatened by a public rebellion. Section 6 concludes.

2 A common analytic framework

We base our analytic framework on the "critical-mass" or "threshold" models mentioned in the previous section (Granovetter, 1978; Kuran, 1989; Yin, 1998). Consider, for that matter, a subgroup $S \epsilon P$ of the population P that may be—but does not need to be—dissatisfied with the government $R \neq P$. In each period t, a share $s \epsilon [0, 1]$ of S is disloyal to the government whereas a share $1 - s$ is loyal. We denote the share s for any respective previous period $t - 1$ as s_0.

As the share s cannot directly be observed, particularly not as long as disloyal behavior is only mildly expressed and only in smaller subgroups scattered all over the population, individuals in need for information on s are dependent on

an expected value s^* of the disloyal share s. Individual members of subgroup S built expectations on s by observing s_0 from the previous period and adjust them by a correction term m, so that $s^* = s_0 + m$. The term m may be subject to manipulation from outside of subgroup S.

Being disloyal implies becoming engaged in some anti-government activities ranging from mild forms like the expression of once view within a more or less limited public or the participation in peaceful and legal demonstrations, and then further on to illegal or finally even violent activities that aim at overthrowing the incumbent. It is important to note, however, that we assume each individual to be fully aware of the public-good character of an enforced change in the government. This implies persons with only a negligible influence on the outcome of anti-government activities to exhibit disloyal behavior of only a purely expressive character in the sense of Brennan and Lomasky (1993). In other words, the latter activities are not instrumental with respect to a change in the government. By contrast, activities of persons that do indeed exert a significant influence on the incumbent's fate may well be instrumental in their character. They may hence directly aim at overthrowing a government. As a consequence, benefits stemming from the expressive type of disloyal activities are of a mental nature, like the feeling of having been part of a historical moment, while instrumental activities yield more substantive benefits, like rewards granted by a newly enthroned government or even own government positions.

Note that Tullock (1971) mentioned both types of activists and their respective mental or more substantive rewards. However, he repeatedly expressed his doubt that the former could play a decisive role in the power game between an incumbent government and other societal groups (see, *inter alia*, Tullock, 1987, p. 53). By contrast, although still being based on a careful consideration of collective-action problems in general and Tullock's line of reasoning in particular, the literature on threshold models emphasize what Tullock found to be of minor importance, namely the expressive type of dis-

loyal behavior (see Kuran 1989; 1991a; 1991b; 1995). While both, Tullock as well as the authors of the threshold models, start from the collective-action logic of revolutions, Tullock (1974, pp. 60-70) infers that it is basically high-ranking officials who are at the center of enforced government changes whereas the threshold theories emphasize the spontaneous outbreak from within a broad public.

In the following analysis, we capture both the commonalities and the differences between the two approaches in one generalized analytic framework. For that matter, we write the expected indirect utility V_i of being disloyal for each individual member $i \epsilon S$ as:

$$V_i = (1 - \delta \ \pi(s^*)) \ G - \ \pi(s^*) \ C \ r_i, \tag{1}$$

where G is the gross utility derived, and C the costs incurred, from publicly expressing once disloyalty. The costs are weighted by an individual factor r_i which may, if you want, be a degree of individual risk aversion. For reasons of simplicity, we assume a uniform distribution of r_i across the population, so that the cumulative distribution function is simply $r(s) = 1 + s$. Note that the costs only materialize in the case that the incumbent government remains in office, since only then will it be able to punish disloyal persons. We denote the probability for the government to stay in office as π.

As far as disloyal behavior is of an expressive character and, hence, the benefits G are of a mental type, they will flow irrespective of an eventual change in the government. If, by contrast, disloyal behavior is of an instrumental character, the benefits materialize only in the case of a successfully enforced change in government. In the latter case, the expected value is G times the probability $1 - \pi$ of a change in government.

The parameter $\delta \epsilon [0, 1]$ expresses in how far the benefits stem from the expressive rather than from the instrumental type of disloyal behavior. In the

limiting case $\delta = 0$, the rewards accrue from purely expressive behavior and hence flow irrespective of an eventual change in government. We refer to the limiting case $\delta = 0$ as the "Granovetter-Kuran case" or the "GK-case." By contrast, in the other limiting case $\delta = 1$, the benefits are purely instrumental in that they come as rewards for the support of a successful change in government. Hence, they only materialize with probability $1 - \pi$. We refer to the case $\delta = 1$ as the "Tullock case."

We model the subjective probability π of the incumbent government to stay in office as dependent on the expected value s^* of the disloyal share s of subgroup S. In particular, we describe this relation as $\pi(s^*) = (1 - s^*)\bar{\pi}$ with $\bar{\pi}\epsilon[0, 1]$ being the probability that a government remains in office in the case that no member of subgroup S switches to disloyal behavior. The level of $\bar{\pi}$ will usually be rather high, possibly close to unity. In any case, though, it will be related to the size of subgroup S relative to the size of the total population P, and it will certainly be related to the importance of the members of subgroup S with respect to the respective incumbent's power. Summing up, we can write the following generalized version of the utility function 1:

$$V = (1 - (1 - s^*)\delta\bar{\pi})G - (1 - s^*)\pi\ C(1 + s). \tag{2}$$

Each individual for which V_i becomes positive in any period will switch to disloyal behavior and *vice versa*, while individuals are indifferent between loyalty and disloyalty whenever $V_i = 0$. We can hence find a "threshold function" (Granovetter, 1978, pp. 1425-1426; Yin, 1998, p. 537) by setting equation 2 equal to zero and solving for s:

$$s = -\frac{\delta G + C}{C} + \frac{G}{(1 - s^*)\bar{\pi}C.} \tag{3}$$

For any combination of s^* and s that satisfies condition 3, we have $V = 0$. In the limiting GK-case, as it has been defined by $\delta = 0$ above, condition 3 simplifies to:

$$s = -1 + \frac{G}{(1 - s^*)\bar{\pi}C} \qquad GK - case. \tag{4}$$

By contrast, in the "Tullock case", as defined by $\delta = 1$, condition 3 reduces to:

$$s = -\frac{G + C}{C} + \frac{G}{(1 - s^*)\bar{\pi}C} \qquad Tullock\ case. \tag{5}$$

We define an expectation-consistent steady state as $s = s^*$. There is a unique interior steady-state equilibrium at the "critical levels" s^*_{cr} and s_{cr} in figure 1. The line $s(s^*)$ represents equation 3, 4, or 5, respectively, and the line $s = s^*$ represents expectation consistency. The critical values $s^*_{cr} = s_{cr}$ represent the unique interior steady-state equilibrium. Since $s, s^* \epsilon [0, 1]$, there are two corner solutions at $s, s^* = 0$ and $s, s^* = 1$, respectively. As $\lim_{s^* \to 1} s = \infty$ in equations 3 to 5, the critical values and hence the interior equilibrium will always lie within the limits of $s \epsilon [0, 1]$. Note, however, that this is not a stable equilibrium, since any exogenous shift in the expected shares s^* by either $m_1 > 0$ or $m_2 < 0$ launches an adjustment process that either leads all the way up to $s = s^* = 1$ or all the way down to $s = s^* = 0$. For example, a shift $m_1 > 0$ raises the expected share of disloyal members of subgroup S which, in figure 1, leads to point P_1. This lowers the probability π of becoming punished which, according to equations 3 to 5, makes it attractive for some more members of S to switch to disloyalty. As a result, s in figure 1 rises along a vertical line from point 1 on. The rise in s, in turn induces a further adjustment in s^* and so forth.

The government can contain the danger of such an upward spiral toward

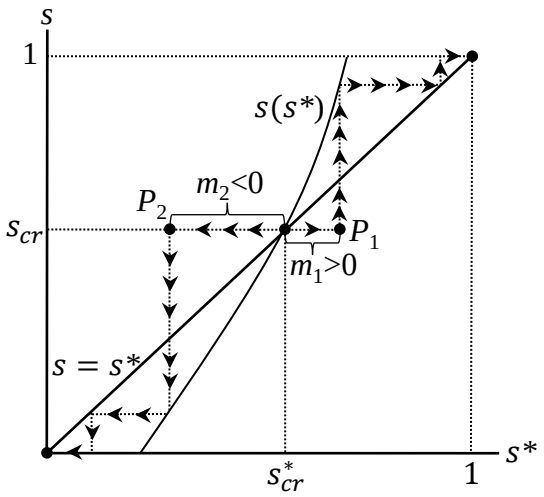

Figure 1: Dynamics of Disloyalty

$s = 1$ as far as it has the capability of keeping the expected share s^* below the critical value s^*_{cr}, since then the actual as well as the expected share of disloyal members of S will always approach zero. However, should the expected share s^* of disloyal members of subgroup S ever exceed the critical value s^*_{cr}, things tend to run out of control for the government. Formally, it will still have the option of raising the costs C so as to stop the mutually enforcing upward trend in s and s^*. However, as historical examples demonstrate, the change in expectations and the ensuing rise in s will sometimes built up so rapidly, that bringing the process to a halt may require a rise in C so large that a government is not in a position to enforce it or that a government may simply shy away from, possibly indeed for ethical reasons (see Kuran, 1989; Kuran, 1991b). We will come back to this point further below.

The critical values s^*_{cr} of the share s^* are different for the two limited cases we have considered. For identical levels of the benefits G, the critical value in the Tullock case is higher than that in the GK-case. The reason is that, in the Tullock case, the benefits of disloyal behavior materialize only in the case of a successful revolution which makes loyalty tentatively more attractive.

However, this effect is very likely to be offset by the fact that the benefits in the Tullock case are more substantive than those in the GK-case. They are therefore likely to rise in δ. Also, the more mental character of the benefits in the GK-case may tend to make G highly volatile and only loosely related to the incumbent government's quality. Even minor objections against the incumbent's politics may thus happen to launch an outburst of public violence whereas substantial and enduring deprivation may sometimes—acutally quite frequently—not suffice to challenge the incumbent's power position.

Note that the Tullock case and the GK-case are not fundamentally different with respect to the dynamics of a government overturn. To the contrary, the free-rider problem of collective action is at the heart of both the logic of the Tullock case as well as that of the GK-case, since in both cases it takes a number of individuals to act in a somehow coordinated way, and in both cases the dynamics of this collective action critically depends on the mutual expectations of the individual actors. What rather makes a difference between the two limiting cases is the size of group S both in absolute numbers and in relation to the total population P. In Tullock's view, group S would practically always and everywhere be small both in absolute and in relative terms.

3 Coup d' etats versus public risings

Whatever Tullock wrote on autocracies, revolutions, and coup d'etats, it always circles around the mechanisms we have tried to capture in the analytic framework presented in the previous section. In particular, his core propositions are:

- while the power of politicians in a democracy is bound to the electorate, an autocrat's power hinges upon the support of those who have the capability of overthrowing him (Tullock, 1987, pp. 1-15, 175-207);

- the collective-action problems precludes any large-scale coordination of deprived citizens so as to assemble to a group powerful enough for intentionally overthrowing an autocrat (Tullock, 1971; 1987, pp. 53-78);
- there is a whole bunch of higher officials who have both the capability of becoming dangerous to the government and an interest in exploiting that capability: "The problem here is that in a real sense a dictator lives in a state of nature" (Tullock, 1987, p. 28; see also Tullock, 1974, pp. 71-86).
- since even the most powerful single official that becomes threatening to an incumbent derives his power from the influence this official exerts on other key individuals, any potential rebellion is embedded in the dynamical interplay of expectations and loyalty, as summarized in our analytic framework (see Tullock, 1974, pp. 60-70; Tullock, 1987, pp. 17-31).

While exploring numerous facets of the different threats that different types of autocrats in different situations face, Tullock always placed all of them in the framework of these four propositions. Even the legitimacy and ethics of an autocrat is something that Tullock derived from this logic (Tullock, 1987, pp. 79-114), but he did that, as a matter of fact, within a positive and not a normative setting.

However, he focused his analysis on the instrumental type of disloyal behavior, presumably because it was here were he located the "hard facts". Though initially not being trained as an economist, all of his analysis was strictly rooted in economic reasoning. This may have contributed to the fact that he was deeply skeptical about the power of soft incentives like those that we refer to as "mental" motivations. He sometimes even went as far as to ridicule these motives. In his "paradox of revolution" (Tullock, 1971) he referred to the mental motivation as "entertainment" and wrote:

> "Entertainment is probably not an important variable in serious revolutionary or counter-revolutionary activity. People are willing to take some risks for the fun of it, but not very severe ones. If, however, we consider such pseudorevolutions as the recent student problems in much of the democratic world, it is probable that entertainment is one of the more important motives"
> (Tullock, 1971, p. 92).

This mindset, in turn, may have brought him to combine the collective-action character of a revolution with the mere mental participation benefits so as to come to the conclusion that there can never arise a serious threat to a dictator from public risings:

> "I am not here discussing the overthrow of the dictator by popular forces. If the police and army are even reasonably efficient and willing to shoot to kill, that won't happen." (Tullock, 1987, p. 20)

Tullock was convinced that a dictator would always have command over a sufficiently strong potential for scaring discontented or deprived masses away from taking action against the him. The situation is completely different when it comes to higher officials of the government, however. To them a revolution not only provides chances for substituting the incumbent—or some secretaries or ministers—by themselves. Rather, it would not even be a good idea for risk avers officials to generally abstain from acting whenever a struggle for power arises. Once again, this can directly be derived from our simple analytic framework: Whenever there is a certain chance $1 - \pi > 0$ for a conflict to end up in a government overturn, having remained neutral or even loyal to the incumbent may lead to punishments in the case of a government overturn in much the same way as when having changed sides at an early stage of a conflict only to see the government overturn failing. Tullock summarized:

> "Most of the masses will be well-advised to remain inactive. Most

> members of the government, on the other hand, would be most ill-advised to remain neutral in conflict." (Tullock, 1974, p. 66)

This is the background against which it can be understood that Tullock almost completely ruled out the case of public risings—it is all about the size of subgroup S. In a public rising, this size is large by definition, possibly comprising an overwhelming share of the total population. In such cases, though, conspiracies are particularly dangerous within subgroup S since one can never be positive about the stance of any co-member of this subgroup. Hence, the expected share of disloyal members can easily be kept low by the government with the help of the conventional methods applied in dictatorships: control of the press, sharp restrictions in the freedom of speech and widely visible punishments for all sorts of violations of these rules and restrictions. By contrast, the smaller a subgroup S, the easier will it be to conspire and hence the more likely will it be to built up a sufficiently high expected share s^*. What is more, material and hence costly benefits are better distributed to small as compared to large groups, for obvious reasons. The larger a group, the less credible are thus promises on rewards for those who switch to disloyalty and to join a revolutionary group instead.

In a coup d' etat, subgroup S is small by definition, and Tullock would probably have added: the smaller, the better, since conspiring remains dangerous, and no single member of S has any reason to trust any other member. Hence, at least in principle, the same general logic as in a large group S applies. As long as a single member within the inner circle around the government has no reliable information about the degree of dissatisfaction with the dictator on the side of other members of the circle, it would be hazardous for him to take action alone, and any dictator will do his best to amplify this problem. As Tullock put it:

> "By making it illegal to even discuss overthrowing a dictator, the dictator makes it difficult for such positive information to develop.

> Thus the dissatisfied lieutenant in the dictator's personal guard is apt to feel that his dissatisfaction is a limited phenomenon and not realize that there are a great many other people who'd be delighted to overthrow the dictator." (Tullock, 1987, p. 66)

On the other hand, though, the dictator's position becomes threatened whenever a sufficiently large number of members has somehow credibly bound itself to disloyal behavior, since each individual who switches to disloyalty changes the probability of the incumbent to survive in office which will tend to attract more members of S into disloyalty. Beyond a critical value s^*_{cr}, this launches a cascade of members switching from loyalty to disloyalty in much the same way as in large groups (Tullock, 1987, pp. 17-33). In large groups, though, the benefits of participation are low and vague (Shadmehr and Bernhardt, 2011), whereas the costs are so severe that it will simply not pay for an individual member of group S to participate. There will hence hardly ever be a chance of a large group S for reaching the critical value s^*_{cr} of perceived disloyal members.

As a result, revolutions by the masses of a people are the topic of romantic myths while the real world does hardly ever see them. By contrast, any dictator acts in an environment comparable to a Hobbesian state of nature. The latter has mainly two implications: The first is that a dictator is continuously threatened by the people in the inner circle around him and, indeed, it is those persons who are closest to the dictator that are usually most dangerous. The second implication is that there are no rules of the game and there is no constitutional setting within which the struggle for power takes place in any orderly way. The dictator as well as his challengers are actually forced by the competitive pressure to choose whatever action it takes to either preserve or challenge the dictator's power. This pressure tends to compete away all sorts of ethical restrictions, and that may indeed mark the most important difference between an autocracy on the one hand and a somehow constitutionalized set of credible rules for an orderly change in

government power in general and a democracy in particular.

4 Public risings and revolutionary elites

While Tullock's line of reasoning is both appealing and convincing in general, his verdict on popular risings has become challenged by a number of incidents since 1989. Like most political observers of that time, Tullock did not foresee the collapse of the communist regimes, least of all did he give the Eastern European citizens any chance for achieving that on their own. Just two years before the Berlin Wall came down, he wrote:

> "I doubt that any east European government would be regarded as being legitimate in the sense of having true popular support and being in accord with the the local moral code. Nevertheless, I don't think there is much prospect of theirs being overthrown by domestic uprisings. They may be overthrown as a result of external interference, of course." (Tullock, 1987, p. 87)

Undoubtedly, though, the regime changes in Eastern Europe have at least been accompanied—if not driven—by the action of the masses, and it would be difficult to reconstruct them as the result of either concealed coups d'etats or external interventions behind a veil of insignificant mass protests.

The first loss in power of a communist regime within the former Warsaw pact was admittedly forced by an organization that was, by that time, already almost institutionalized and dominated by some sort of an elite of prominent intellectual and religious leaders: the independent labor union Solidarność in Poland. The Polish regime change may therefore still be rationalized within Tullock's coup d' etat framework. But the collapse of the Berlin wall just a few months later cannot reasonably be explained in such a way, at least not alone, and the same applies to the subsequent regime

changes in Hungary, Czechoslovakia, and to some extent even to Romania. Moreover, each subsequent regime collapse occurred within a shorter time span as compared to the respective previous one (Kaempfer and Lowenberg, 1992). Kuran (1991a, p. 42) quotes a banner from the days of the so called "velvet revolution" in Czechoslovakia which read: 'Poland—10 years, Hungary—10 month, Germany—10 weeks, Czechoslovakia—10 days.' And Kuran added: "Had this banner been prepared a few weeks later, it might have added 'Romania—10 hours'."

In 2011, the Ben Ali regime in Tunisia collapsed, apparently again under the pressure of mass protests, and only a few month later, the same happened with the Mubarak regime in Egypt. Obviously, the success of the Tunisian protesters has encouraged discontented Egyptian citizens to pursue what their Tunisian neighbors had already achieved. All this appears to be in conflict with the collective-action view on public revolts, at least in Tullock's sense.

It is worth noting that, with the Romanian exception, the collapse of the communist regimes as well as those that happened up to the Egypt case in the Arab world occurred almost without any violence. Within the communist world, Romania remained the only case where violence played a role, while in the Arab world, Tunisia and Egypt in 2011 turned out to be the only cases without significant violence. All violent incidents in the Arab world came after the two non-violent cases in Tunisia and Egypt.

This is an interesting observation since the expectation of a non-violent environment of mass protests by potential participants may dramatically change their calculation. Within the framework of the previous section, the expected costs πC drop substantially and create a typical low-cost situation in which even low and only "mental" benefits may suddenly come to play a decisive role.

Once the expected punishment costs have dropped to a sufficient extent, participating in mass protests becomes rewarding to some individually insignificant members of even a large subgroup S of the population, namely those with a low degree of risk aversion. This, then, lowers the probability of further members of S of becoming punished and turns their expected reward of participation positive and so forth. Once the expected value of punishments runs into such a downward spiral, then this creates a situation similar to what Tullock ridiculed in his 1971 paper, when he referred to the "pseudo-revolutionaries" of the late 1960s (Tullock, 1971). Upon having reached a critical value s^*_{cr}, participating in the rebellion becomes so cheap that even the vague entertainment benefit of participation will eventually suffice for making the process feeding itself. Masses attract masses and the situation runs out of control.

Tullock has certainly been aware of these dynamics, but he never gave them a chance for becoming seriously threatening to a dictator. To him it is one thing to go out on the streets and protest under non-hazardous conditions while it is just another thing to seriously threaten the power of a dictator. Time and again, he underscored the hard incentives that it takes for the latter. Indeed, for being subject to such hard incentives, a potential rebel must be influential, and in two ways: Firstly, he or she must be influential in a way as to be able to seriously change the probability of the incumbent to remain in office; and secondly, he must be influential in a way as to expect a substantial return on his rebellious activities.

Whoever is not influential in both respects cannot seriously be expected to intentionally challenge an incumbent's power. This does indeed make perfect sense, but note that it is conditional on the intentionality of the rebel's activity. It may fail, however, when a regime-collapse is the *unintended* result of individual action of a large number of individuals.

It is somewhat surprising that Tullock did never seriously consider the latter case. However, such unintended effects are far from impossible. We may look at them through our analytic framework: When the δ in the indirect-utility function 2 approaches zero, the intention of overthrowing the incumbent cancels out of the motivating factors. That does of course not imply the absence of any mass protests, as the GK-case of our analytic framework demonstrates. Hence, should the mass protests occur nevertheless and should they pile up to an incident so powerful as to finally sweep away a government or regime, then this is clearly an unintended—though possibly welcomed—result of individual action on a large scale. It is the threshold models rather than Tullock's public-goods view that describe and explain precisely that.

Note that these models only explain why we may—perhaps in a completely unexpected way—observe masses that somehow publicly express their discontent with the government. However, the models do not provide for a causal link between these actions—typically some sort of mass protests—on the one hand and the collapse of a regime on the other. The question we need to answer is thus: Why should an incumbent be forced to step down "only" because a more or less large number of individuals are protesting, as long as those who really count with respect to the incumbent's power position—those that the recent selectorate theory refers to as the winning coalition (Bueno de Mesquita et al., 2005)—remain loyal?

5 Mass protests and the fate of the incumbent

Self feeding mass protests will eventually become challenging to an incumbent for at least the following two reasons: Firstly, the masses may approach the government's seat and become physically threatening if no police or military

forces step in; and secondly, the mass protests may bring public life to a halt and lead to chaos and losses in production, welfare and, of course, taxes. However, should some security force finally intervene, then Tullock's logic immediately re-enters the scene from the backdoor. No matter how intensive the protests by the masses are, a publicly enforced government change won't happen, if "the police and army are even reasonably efficient and willing to shoot to kill" (Tullock, 1987, p. 20). The perhaps both most impressive and horrifying example for this is the Tiananmen Square massacre that ended the peaceful student protests in the summer of 1989. However, not all mass protests ended that way, particularly not those that emerged later on in the same year in Eastern Europe. For most of what happened there, the security forces did not shoot at the protesters.

An answer to the question as to why the Chinese forces decided to shoot while most of the Eastern European forces decided not to shoot is not straightforward. On the face of it, these decisions were made by the political leaders themselves and not by their security forces. But this is only half the truth at best, since any rational decision on issuing a command to shoot presupposes an anticipation on the question as to whether such a command will loyally be assumed by the subordinates or not. And indeed, the Chinese government had any reason to trust in the military leaders when they sent them to Tiananmen Square, while the East German government had any reason for serious doubts, not least because of the semi-free elections in Poland only weeks before and Gorbachev's famous remark on the sovereignty of the Warsaw-Pact countries in East Berlin in October 1989.

Under what conditions, then, can an incumbent expect a supreme commander of the security forces to remain loyal to the incumbent when masses of people are protesting in the streets? Put in more general terms, the question is: How, if anything, will mass protests impact on the degree of loyalty of the security forces to the incumbent? Note, for that matter, that there are two options for ending mass protests: one is brute force like in the Tianan-

men case, and the other is calming down the protesters by switching to a non-discredited government. The latter option, however, requires the availability of some potential successor of the incumbent who is, in technical terms, trustworthy enough for being able to drive the expected value s^* of disloyal members of group S below the critical value s^*_{cr}, so that the protests will peter out following the successor's inauguration.[2] We refer to such a potential successor as the challenger CH[3].

Naturally, the challenger can only succeed the incumbent once the supreme commander SC has given up his loyalty to the incumbent. The latter, however, will do so only if he sees a better future for himself as the supreme commander under the challenger CH rather than under the incumbent. Had that already been the case prior to the mass protests, though, then he would have been free to change loyalty before. Note that we were right back in Tullock's coup d'etat world if that were the case, since then, once again, the regime change had nothing to do with the mass protests. Hence, for finding a relation between the mass protests on the one hand and the regime change on the other, we must be able to answer the following question: Given that, prior to any mass protests, a supreme commander sees his best future as a loyal supreme commander of the incumbent dictator, what is it that makes him change his mind once mass protests pop up?

In order to keep things as simple as possible, let us evaluate $SC's$ future according to his subjective probability of remaining supreme commander under whoever might be the future head of the government. This probability is ε_l if he remains loyal and ε_d if he becomes disloyal and switches to the challenger. The supreme commander expects the challenger to successfully calm down the protesters with probability ϱ upon the challenger's inaugu-

[2]Within our analytic framework, such a potential successor must be capable of manipulating the exogenous variable m so as to establish a new initial value $s^* < s^*_{cr}$.

[3]See Apolte (2015) for a detailed analysis of the relation between such a challenger and the public.

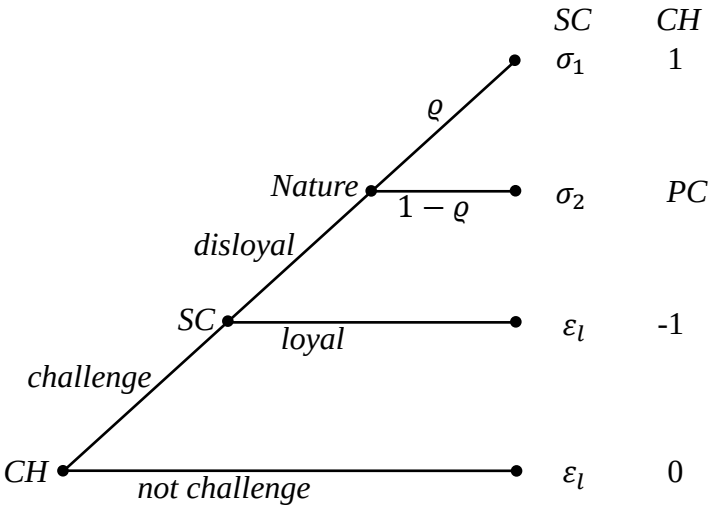

Figure 2: Supreme Commander and Challenger

ration. Conditional on CH having successfully calmed down the protesters, the probability of SC of remaining supreme commander is σ_1. By contrast, it is σ_2 conditional on CH having failed to calm down the protesters—which may of course also happen.

Let us now briefly turn to the challenger. We assign a zero payoff in the case of him to remain inactive; he gets nothing and he loses nothing if he does not challenge the incumbent in the first place. By contrast, if he challenges the incumbent and if the supreme commander switches to him, he will become the new head of the government. We assign a payoff of one to that conditional on CH being successful in calming down the protesters. Should, by contrast, CH challenge the incumbent and win the loyalty of the supreme commander but fail to calm down the protesters, the payoff will be $PC\epsilon(0,1)$. Finally, should CH challenge the incumbent but find SC remaining loyal to the incumbent, then CH becomes subject to punishments, and the payoff is -1. Look at Figure 2 for a summary.

For the sake of simplicity, assume all relevant information to be common

knowledge. Whenever public protests affect the prospect of SC of remaining in office such that $\varepsilon_d = \varrho\ \sigma_1 + (1 - \varrho)\sigma_2 > \varepsilon_l$, the challenger expects the supreme commander to switch to disloyalty upon having observed CH challenging the incumbent. The challenger will then expect a payoff $\varrho + (1 - \varrho)PC > 0$, so that he will indeed challenge the incumbent. For Tullock, however, mass protests do not affect the power game within the inner circle of the government, that is the game between the incumbent, the challenger, and the supreme commander.[4] If that were indeed the case, then the probability of the supreme commander to remain in his position following a change in government could not depend on whether the new government achieved to calm down the masses, as long as he, the supreme commander, only remained loyal to the new government. Technically, this implies $\sigma_1 = \sigma_2 = \sigma$. Since switching to disloyalty requires $\varrho\ \sigma_1 + (1 - \varrho)\sigma_2 > \varepsilon_l$, this boils down to $\sigma > \varepsilon_l$ which is completely independent of whatever the population or any subgroup of it—except the inner circle of the government—does. We may refer to such a world as the "Tullock-Selectorate world" in which the struggle for government power depends on deliberate action within a certain circle around the government alone. By implication, this struggle is not influenced in any respect from individuals outside of the winning coalition and it is not influenced by non-intentionally emerging processes like public rebellions as they are described by the threshold models.

The latter two assumptions will turn out to be too strong, however, if there are non-intentionally emerging processes and if these processes impact on the loyalty of security officials in any respect. Both conditions are far from unrealistic, but we have, as yet, not discussed the latter of the two. The point here is: Whenever mass protests emerge and whenever a government—be it the incumbent or the challenger—turns out to be unable to calm down the

[4]Note that the same applies to the recent selectorate theory which is also defined solely over deliberately acting individuals for which it is necessary to be individually influential; see Bueno de Mesquita et al. (2005) and Besley and Kudamatsu (2008). See, however, the exception in Li and Gilli (2014).

masses, it will be in the supreme commander's responsibility to suppress the public rebellion by way of force, and this is a particularly demanding endeavor. Apart from ethical questions, it requires the continuance of the loyalty of his subordinate commanders, and this goes all the way down to commanders on the lower and possibly the lowest levels. Moreover, there will usually not be just one supreme commander but rather a number of comparable high-ranking commanders of both the military and the police, and it is most likely that there will be a considerable degree of competition between them.

For these reasons it is very unlikely that mass protests have no effect whatsoever on the probability of a supreme commander for remaining in his position. In particular, the risk of losing his position rises as soon as the supreme commander starts issuing the commands necessary for a violent suppression of a public rebellion. The reason is straightforward: The subordinates may decide to assume these commands, but with a non-zero probability, they may as well refuse assuming them and decide to switch to disloyalty on their part instead. What we have here is a chain of loyalties that must not be interrupted in order for the supreme commander to be able to successfully suppress the rebelling parts of the population. And to each of the subordinate commanders, a similar calculation on loyalty or disloyalty arises once the commands by SC have been issued. Note that the number of commanders on each subordinate level rises as we proceed to the lower levels. It therefore becomes much more difficult for a commander to change loyalty on a lower as compared to a higher level. The dynamics can again be analyzed within our general analytic framework. On higher levels, then, it is much more likely that commanders switch to disloyalty which, so far, is consistent with Tullock's reasoning.

It is clearly beyond the scope of this paper to analyze the structures of loyalty within the police or military forces in detail. Luckily, however, all we need to know for our purposes is that the task of violently suppressing mass protests

potentially challenges the power position of the supreme commander as the probability of his commands to be loyally assumed by subordinate commanders is always below unity. This, then, shifts the probability σ_1 to a level above σ_2 for a simple reason: A new political leader who achieves to calm down the protests turns a violent intervention by the security unnecessary so that the loyalty problems of the supreme commander *vis-à-vis* his subordinates do not arise in the first place. This, in turn, reintroduces the meaning of the probability ϱ of the new government to calm down a rebelling group of the population. If there is a public rebellion on the streets and if, for any given difference $\sigma_1 - \sigma_2$, a challenger CH capable of calming down the rebellion with a sufficiently high probability $\varrho > \varrho_s$ enters the scenery, then it is rewarding for the supreme commander of the security forces to switch his loyalty to that challenger. Since switching to disloyalty is rewarding for SC as soon as $\varepsilon_k = \varrho\ \sigma_1 + (1 - \varrho)\sigma_2 > \varepsilon_l$, the minimum probability of the challenger ϱ_s to successfully calm down the rebellion in order to make $SC's$ switching to disloyalty just rewarding is $\varrho_s = \frac{\varepsilon_l - \sigma_2}{\sigma_1 - \sigma_2}$.

This result implies that rebellions can sometimes induce the leaders of the security forces to switch to disloyalty. However, since there are usually numerous further aspects for the supreme commander to be considered, it is an open question as to whether he finally will or will not give up his loyalty to the incumbent. If, for example, a supreme commander himself is discredited in the eyes of the protesting population to a similar extent as a hated incumbent, he will most probably fail to find a challenger capable of and willing to both succeed the incumbent and keep the supreme commander in office. In that case, SC will hardly have any option but to release the necessary commands for violently suppressing the protesters. That, in turn, may or may not give rise to further loyalty problems on the respective subordinate levels, possibly even ending up in a civil war.

Summing up, Tullock was perfectly consistent in his theoretical work, and it is thanks to him that public-choice theorists started analyzing both autocra-

cies and revolutions from the point of view of methodological individualism. Different from some other authors,[5] Tullock consistently refrained from smuggling non-individualistic methodological elements into his analysis in order to bridge the gap between the public good of a revolution on the one hand and collective action of popular masses on the other. In one aspect, however, Tullock may have driven his efforts in focusing on "hard incentives" a bit too far, namely when his failed to consider a popular uprising as the non-intended result of individual action on a large scale. The latter, however, is it what makes even very weak "entertainment incentives" of the participation in a public rebellion powerful once a low-cost situation has happened to evolve. Whenever that is the case and whenever it impacts on the degree of loyalty within the security forces of an autocracy, the result will be masses that become a serious threat to a dictator, and we can explain them without having to refer to non-individualistic methodologies.

It is important to note, however, that the theoretical feasibility of mass protests effectively challenging an incumbent's power does still not establish the broadly desired link between the degree of deprivation of a population on the one hand and the probability of a public uprising on the other. In that respect, all the theories that tried so hard to establish such a link are still dependent on non-individualistic aspects and can hence still not claim to have seriously taken care of the collectiv-action problem. The reason can once more be made clear with reference to our simple analytic framework. The reasons why the expected share s^* happens to exceed its critical value s^*_{cr} are manifold and not in any way correlated with the degree of deprivation. It may hence happen in countries with a strongly deprived or in countries with an only mildly deprived population. Furthermore, whether eventually ensuing mass protests end up in a change in government or in a violent suppression once again depends on aspects different from the degree of deprivation. Fully

[5]Particulary those in the tradition of the deprivation literature; see, *inter alia*, Gurr (1970), Acemoglu and Robinson (2006), and Boix (2003).

consistent with all that Tullock wrote on autocracies and revolutions, there is no hope for the "romantic view" of revolution for getting reestablished—at least not within the scholarly world—after having been sent into the world of myths by Gordon Tullock as early as in 1971.

6 Conclusions

In this paper, we have assessed the work of Gordon Tullock on dictatorships and revolutions within a general analytic framework, the core of which is the mutual expectations of potentially rebelling individuals within a continuum of group sizes, starting from a small elite around the respective government and then all the way up to a broad mass of individuals. The analytic framework has enabled us to expand on the differences and similarities between rebellions of small elitist groups on the one hand and broad masses on the other. While our results are consistent with Tullock's findings in the case of intentionally rebellious activities in the sense that the rebels individually aim at significantly raising the probability of a government overturn, we found that Tullock failed to seriously consider revolutions as the *unintended* result of individual action based on weak incentives in low-cost situations. Should the latter happen, a government overturn can indeed be the result of mass protests, under one condition: The emergence of mass protests must induce the decisive individuals within the security forces to switch their loyalty from the incumbent to a potential challenger.

Although Tullock ruled out the case of revolutions as the unintended result of individual action on a massive scale, his verdict on theories that relate the degree of deprivation of the population to the probability of a revolution remains intact. The reason is that deprivation is a necessary but not a sufficient condition for mass protests or rebellions to evolve. Rather, for the dynamics of a mass revolt to be triggered, a critical perception on the ratio

of potentially disloyal individuals must first be reached, and whether or not that happens is in no way related to the degree of deprivation of the population. Furthermore, whether mass protests impact on the loyalty of supreme commanders of the security forces once again depends on determinants that are not related to the degree of deprivation.

While, and perhaps just because, Tullock was not fully convincing in each and any respect of his analysis, he has inspired a whole new literature on the analysis of the power struggle in non-democratic regimes including its broad set of implications for the study of political regimes. And one feels save to say that it was precisely his uncompromising view on the macro dynamics of micro behavior within non-democratic environments that made his work on autocracy and revolution truly seminal.

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