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Elite-led revolutions

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Abstract

Revolutions are often perceived as the key event triggering the fall of an autocratic regime. They are believed to be driven by the people with the purpose of establishing a democratic regime for the people. However, the historical record does not agree with this picture: revolutions are rare, elite-driven, and often non-democratising. We first develop a new set of stylised facts summarising and deepening the latter features. Second, to explain these facts, we develop a theory of elite-driven non-democratising institutional changes triggered by popular uprisings. Our model includes four key ingredients: (i) a minority/majority split in the population; (ii) the persistence of fiscal particularism post-revolution; (iii) the presence of windfall resources; (iv) a distinction between labour income and resource windfalls as well as endogeneity of the labour supply. We show that revolutions are initiated by the elite and only when fractionalisation is moderate. Resource windfalls and labour market repression can also play a role in triggering this 'alliance' between the majority and the elite. If a revolution happens, redistribution in the subsequent regime still favours the elite, although the masses are better off.

Keywords: Dominant minorities, Elite-led revolutions, Social structures, Particularism, Resources

JEL classification: D72, C73, Q32

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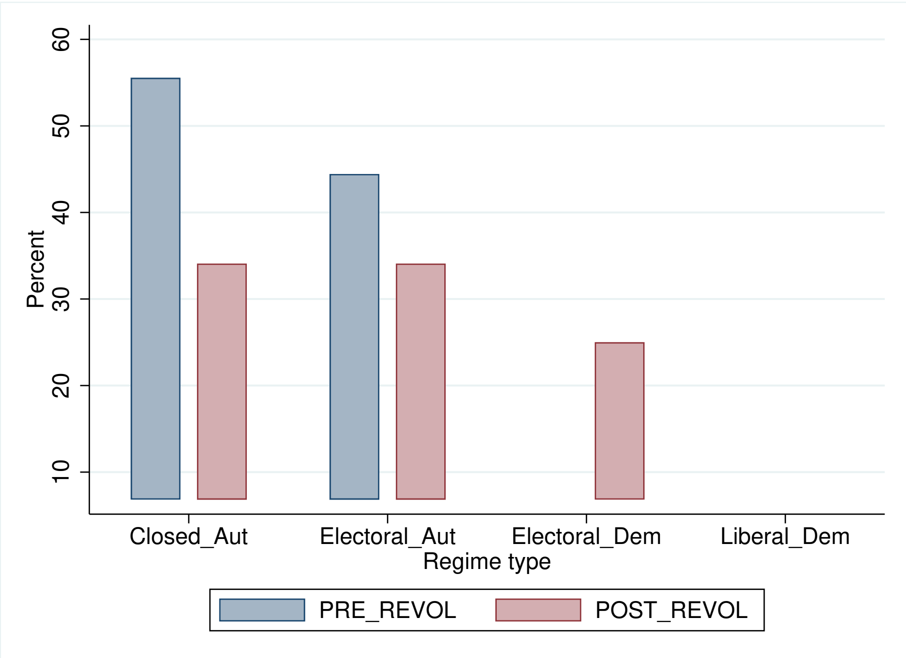
1 Introduction

In the public mind, the fall of autocratic leaders is often associated with popular uprisings. The experience of the 'colour' revolutions of Eastern Europe and Central Asia (e.g. Georgia's rose revolution in 2003; Ukraine's Orange Revolution in 2004, Kyrgyzstan's Tulip Revolution in 2005) or the 'Arab Spring' (e.g. Egypt and Tunisia in 2011, and more recently in Algeria, 2019) seems indeed to suggest that mass protests are a key determinant of how autocratic regimes breakdown and transition to democracies. However, the historical record tells a different story. According to the V-Dem database, over the 1959-2021, only 9% of autocracies have ended with a popular uprising. In addition, Figure 1 highlights that, when a revolution is successful in bringing down an autocratic regime, there is no guarantee that a democratic regime emerges. The purpose of this paper is then to develop a theoretical model which makes sense of this overall picture, in particular why revolutions do not necessarily lead to the emergence of a full democratic regime.

Figure 1: Detailed nature of the pre- and post-revolution regime



Notes: Data from V-Dem, 1960-2021. Closed autocracy (aut): no multiparty elections for the chief executive or the legislature. Electoral autocracy (aut): *de jure* multiparty elections. Electoral democracy (dem): *de facto* free and fair multiparty elections. Liberal democracy (dem): De-facto free and fair multiparty elections and respect of liberal principles. PRE: last year of the political regime. POST: five years later. 45 revolutions.

The Political Science literature stresses that answers to this question lie in the political game played by the key actors of authoritarian regimes: the leader, the masses, but also the elites. The behaviour of the latter group is often perceived as the key factor enabling, or preventing, the fall of authoritarian regimes, including through popular protests. Thus, O'Donnell and Schmitter (1986) argue that all authoritarian transitions is the consequence of divisions among elites. For Svolik (2012), authoritarian politics are shaped by not only the 'problem of authoritarian control' (ruling a majority excluded from political power) but also by 'the problem of authoritarian power-sharing' (challenges from elites). The 'colour' revolutions of Eastern Europe and Central Asia are a case in point. Levitsky and Way (2010), Hale (2014), Way (2015) have stressed how former regime-supporting political and business elites used their resources and networks to mobilise, organise, and fund the popular protests, while the military elite made the choice not to repress violently opposition forces. Radnitz (2012) argues that *mass mobilisation can in fact be understood as elite self-defense*.

Elites withdraw their support for an autocratic leader when they believe that their survival chances and economic welfare may become better under an alternative regime (Geddes et al., 2018), because, for example, of succession expectations or low popular support (Hale, 2006, 2014). Hence, revolutions interpreted as purely grass-root mass movements may in fact be substantially driven by elites taking advantage of, or amplifying, popular discontent (Hale, 2019). Without their support, mass mobilisation is more difficult and less likely to turn into successful revolutions, especially in personalist regimes where the leader, which may only be removed forcefully, concentrates all powers. This key role played by elites in the fall of authoritarian regimes characterised by weak pro-democracy movements often means that 'rotten-door transitions' happen (Levitsky and Way, 2010). The fall of the autocratic regime, facilitated from within by elite divisions, is often not followed by a democratic regime because, in the absence of a strong opposition movement, there is little elite turnover and institutional change. While a movement towards democratisation may initially happen, elite networks are likely to coordinate again around a new leader and contribute to the establishment of a regime whose 'patronal' structure exhibits, like the previous regime, strong clientelist and particularist features (Hale, 2014, 2018). These patterns have been noticed around the world, including in Latin America, Africa, or Asia (Levitsky and Way, 2010; Hale, 2014; Kongkirati, 2019; Sanches, 2022).

Our stylised facts provide credence to the above narrative. More specifically, in addition to underlining again that revolutions are rare and do not necessarily lead to democratisation, we highlight that pre-revolution autocracies tend to exhibit exclusive personalist institutions, obtain sources of revenue not primarily derived from natural resources, and rely on the support of a medium-sized minority group. After a revolution, particularism falls but often remains at a high level while pre-revolution support groups remaining important political players post-revolution.

We then develop a theory of elite-led revolutions in line with these stylised facts. Our theoretical model aims at capturing the crucial interaction between masses (the 'majority') and elites (the 'minority') in triggering a successful revolution and highlights under which conditions an elite-led popular revolution is fostered, ultimately leading to the demise of the initial autocracies and the emergence of minority-dominant regimes. We pay specific attention to the role of the minority in the three stages of the institutional game: under autocracy, in the genesis of the popular revolution and in the post-revolution regime. Under autocracy, the minority is a close ally of the autocrat, a dominant or insider minority, which allows it to benefit from a better redistribution of national wealth compared to the majority. In the genesis of a revolution, the minority engages with the majority into a bargaining process on wealth redistribution in the post-revolution regime, in exchange of sharing with them the revolution costs and giving up their redistribution premium under autocracy. This process may lead or not to a revolution, provided both the majority and minority groups are better off under the post-revolution regime. We theoretically uncover the conditions under which such a process may lead to a regime change, in accordance with the stylised facts identified for non-democratising elite-led revolutions.

To this end, we introduce the following crucial ingredients. First, we assume that revolution costs are a positive function of the minority/majority structure: the degree of fractionalisation. The latter allows to simply but significantly capture the role of social structures in the type of institutional change under scrutiny; we shall see that it's indeed a first-order driver. Second, in order to track the degree of minority dominance, especially after a popular uprising, we proceed in two steps. We depart for the median voter assumption and assume that the minority/majority bargaining process is a Stackelberg game with the minority as the strategic leader. The two groups essentially bargain on the income retention rate which applies to the two groups: in this sense, the post-revolutionary regime is "more democratic" than the preceding autocracy, but it is not a democracy. Last but not least, we design a particularistic inter-group redistribution of total revenue collected: we build up an elementary axiomatic-based determination of the inter-group redistribution, favourable to the minority (fiscal particularism) as the share of total revenue accruing to each group is a decreasing function of its demographic weight. As such, the post-revolution regime is dominated by the former insider elite under autocracy, in line with our *Key fact 5* below. Besides the novelty of our modelling approach (see the relation to the literature below), a key contribution of our work is to identify the institutional and socio-economic conditions under which such a deal between the minority and majority takes place.

To make our analysis more relevant with regard to the set of countries of interest mentioned above, we make two further additions. We first introduce resource windfalls, a well identified potential cause of conflicts since Ross (2001). They can indeed play a key role in enabling fiscal particularism and general patronalism. Second, we distinguish between labour income and resources, and labour supply is endogenous. This is connected to the fact that job provision can be another autocratic tool of income redistribution and political control, as illustrated by Banerji and Ghanem (1997) and Assaad (2014). In particular, it has been convincingly shown that resource-rich countries ruled by autocracies have combined labour market policies and direct resource redistribution to ensure survival in office. To the best of our knowledge, our work is the first one in this stream of literature incorporating simultaneously the two latter components into the analysis of political transitions to dominant-minority regimes.

With the two competing political regimes and the transition process via popular uprising fully specified, we complete the theory with the formulation of a three-stage political game. In this game, we implicitly assume, following the terminology of Svolik (2012), that the autocrat is much more concerned by the “problem of authoritarian power sharing" than by the “problem of authoritarian control": in other words, the autocrat does not feel threatened by the majority but by the elites. This covers the case of entrenched autocracies with strong personalist traits which are much less vulnerable to pure popular revolutions (the revolution costs being prohibitive for the majority) than to conflicts fueled by insider elites. In our political game, the autocrat can still increase the redistribution rate for minority members in response to an elite-led revolution in the last stage of the game. Our analysis shows that such a revolution cannot be always averted, and we clearly identify the conditions under which it is unavoidable.

Our theoretical analysis of the political game equilibrium delivers several results which appear consistent with our stylised facts and existing literature on the determinants of revolutions. We show that an elite-led revolution depends on specific conditions (*Key fact 1*) and is notably more likely to occur when the minority (the ‘supporting group’) is of an intermediate size (*Key fact 4*), meaning that the society is not strongly fractionalised. In this context, the level of (often natural) resources controlled by the autocrat matters. In agreement with Acemoglu et al. (2004), Andersen and Aslaksen (2013) or Wright et al. (2015), greater natural resources are associated with higher autocratic regime survival (*Key fact 3*). Lastly, we show that a higher wage level in a segregated labour market helps triggering a revolution, which can be interpreted in the light of the 'unhappy development' paradox (Arampatzi et al., 2018). Although national income increases, the vast majority of the population doest not benefit from it, notably because access to jobs are reserved to a politically-favoured minority (*Key fact 2*). Said differently, under autocracy, not only resource revenues are distributed in a politically biased way, jobs are also "distributed" in the same biased way, directly or indirectly, and this is perceived as such and even amplified in the collective memory of the population, as stressed by Devarajan and Ianchovichina (2017) in their review of the causes of the Arab Spring. This inequality of treatment can fuel mass mobilisation by inducing relative deprivation and perceptions that the social contract (between the autocrat and the majority) no more withstands.

Relation to the literature Our paper is of course related to the democratisation theories developed by Acemoglu and Robinson (2006). Indeed, we show in this paper that our model does degenerate into the benchmark Acemoglu and Robinson model in the absence of population heterogeneity and the associated specifications. Previous extensions of this benchmark to minority/majority settings, e.g. Boucekkine et al. (2021a), have not endogenised fiscal particularism in the post-revolution regime as we do in this paper.

Our paper is also related to the abundant literature on conflicts and institutional change in resource-rich countries (Collier and Hoeffler 2004, Haber and Menaldo 2011, Robinson et al. 2014, Boucekkine et al. 2016, to cite a few). In terms of theoretical contribution, key differences with respect to this literature are population heterogeneity (minority/majority), fiscal particularism and work incentives. As explained above, there is a compelling evidence that resource richness, fiscal particularism and direct control of the labour market usually go together, which justifies our more holistic approach. Another (subsequent) major difference is that we do not study democratic transitions in the traditional sense of median voter decision-making but popular uprisings to regimes dominated by minorities, that's we focus of elite-driven revolutions.

The role of minorities is acknowledged by several streams of the literature ranging from Political Economy as in Alesina et al. (1999) on public good provision to Public Choice with Hirshleifer

(1991)'s celebrated 'paradox of power" However, only a few theoretical papers have studied in depth the role of minorities in institutional change. Among them, Esteban and Ray's contributions are key studies on the political and institutional role of population fractionalisation/polarisation (see for example, Esteban and Ray 2011). Using a quite general and flexible class of contest games, these authors have been able to relate systematically the occurrence and severity of conflicts and political regime breakdowns to the group structure of the population under scrutiny. This being said, our game-theoretic setting is more akin to Acemoglu and Robinson's framework: Esteban and Ray's setting is a general class of contest games, and as such, the players (groups) players fight for given alternative resource sharing rules, i.e. what they fight for is exogenous. In contrast, the cost of change is endogenous in Esteban and Ray's setting, and this precisely measures the intensity of conflicts. This cost (cost of revolution) is exogenous in our case, but it is crucially indexed on the given social structure indicator capturing the extent of coordination costs.

Last but not least, the questions of how revolutions are launched, the form they may take and the respective probability of success in a minority/majority-autocracy model like ours have obviously been a key concern for a long time in political science and political economy (see the recent survey by Vahabi et al., 2020). We innovate in studying this process in the context of autocratic regimes manipulating resource and job redistribution to lengthen survival, in particular relying on an insider minority. The question is how this minority may break the alliance and fuel a popular revolution by the majority.

The paper is organised as follows. Section 2 provides with an original account of the related stylised facts. Section 3 displays the main components of our theoretical framework. Section 4 delivers the main results of our analysis as to the emergence of minority-based regimes through popular revolutions, and Section 5 concludes.

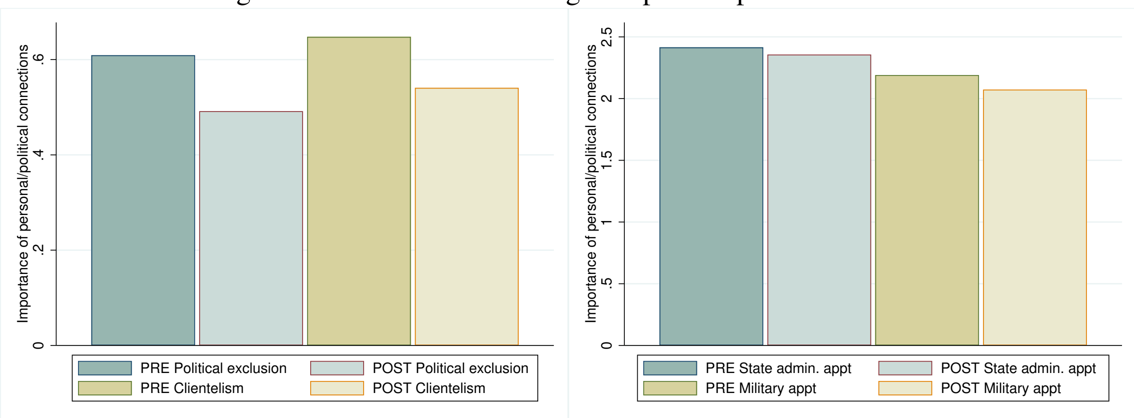
2 Stylised facts

Our theoretical modeling is guided by five key facts associated with revolutions (popular uprisings).

Key fact 1: **Regime-changing revolutions are relatively rare**. According to the V-Dem database, over the 1959-2021, only 9% of autocracies have ended with a popular uprising; i.e. in 45 regime breakdowns, out of 509 regime breakdowns, a popular uprising has contributed to the end of the autocratic regime. In comparison, military coups contribute to 42% of all regime breakdowns.

Key fact 2: **Autocracies are based on exclusive personalist institutions**. Figure 2, provides a summary of various indicators of personalism, i.e. the extent to which a regime is dominated by a leader who has secured "personal control over as many major political instruments as they can while in office,such as assignments to political posts, policy directives, ùand the security forces" (Frantz, 2018, p.49). Pre-revolution regimes as highly clientelist (targeted distribution of resources such as services, goods, jobs, money, for political support), highly particularist (exclusion from public participation and public resources such as state jobs or state-business opportunities based on political party), and with appointments in state administration and military forces decided on the basis of personal or political connections.

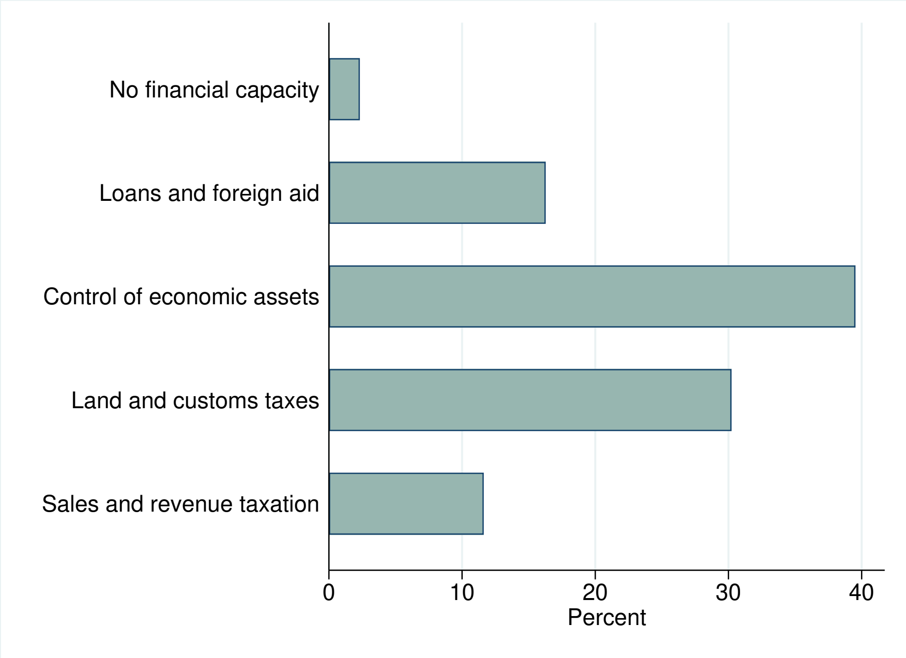
Figure 2: Personalisation of regimes pre and post-revolutions



Notes: Data from V-Dem, 1960-2021. *Political exclusion* (0-1): is there exclusion from public participation and public resources (civil liberties; public services; state jobs; state business opportunities) based on political group membership? *Clientelism* (0-1): to what extent are politics based on clientelistic relationships (targeted distribution of resources such as services, goods, jobs, money, for political support)? *Appointment (appt) decisions in the state administration or armed forces* (0-4): to what extent are appointment decisions in the state administration based on personal and political connections, as opposed to skills and merit? PRE: last year of the political regime. POST: five years later. 45 revolutions.

Key fact 3 : **Natural resources are often not the primary source of state revenues**. as indicated by Figure 3, clientelism and particularism are facilitated by, and may explain, the fact that the state does not primarily rely on the private sector (sales and revenue taxation) to finance its activities. Instead, revenues tend to come from natural resource rents or state monopolies, taxes on property and trade, or foreign aid. Keeping in mind that the 'control of economic assets' categories goes beyond the exploitation of natural resources, Figure 3 underlines that the majority of revolutions do not happen in resource-rich countries.

Figure 3: State fiscal source of revenue pre-revolution

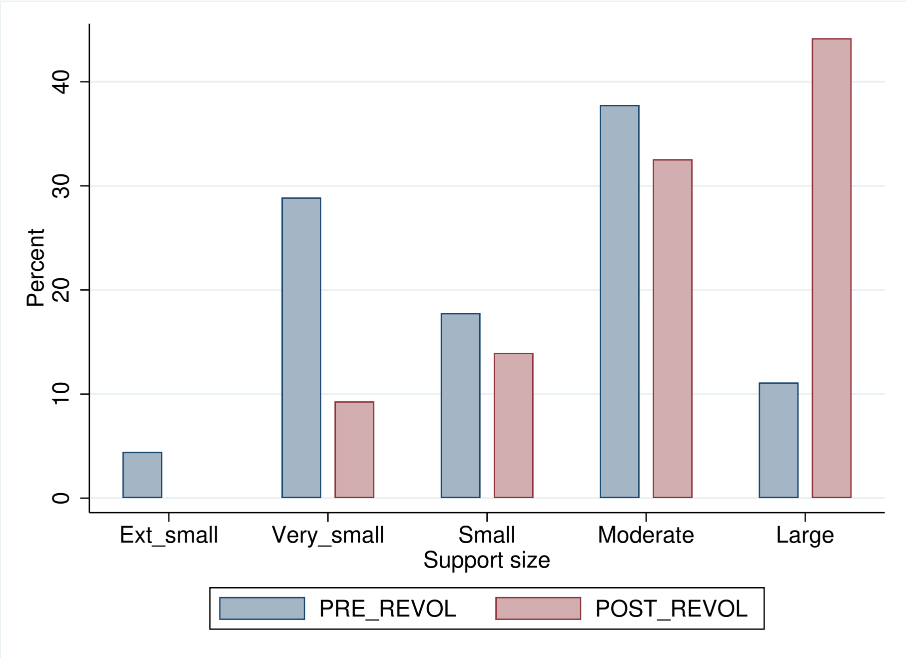


Notes: Data from V-Dem, 1960-2021.Sources of revenue on which the central government primarily rely to finance its activities. Last year of the political regime before a revolution. 45 revolutions.

Key fact 4: **Personalist autocracies rely on the support of a medium-sized minority**. A consequence of the concentration of power achieved by personalist autocrats is that opposition groups are relatively weak, and therefore, the survival of the regime is expected to depend on the support of a small share of the population, such as party, business, military, ethnic 'elites'. Figure 4 highlights that, on the verge of a successful popular uprising, the size of the support groups (if they were to retract its support to the regime, they would most endanger the regime) may be very small but tends to be between 10-15 and 30% of the population.

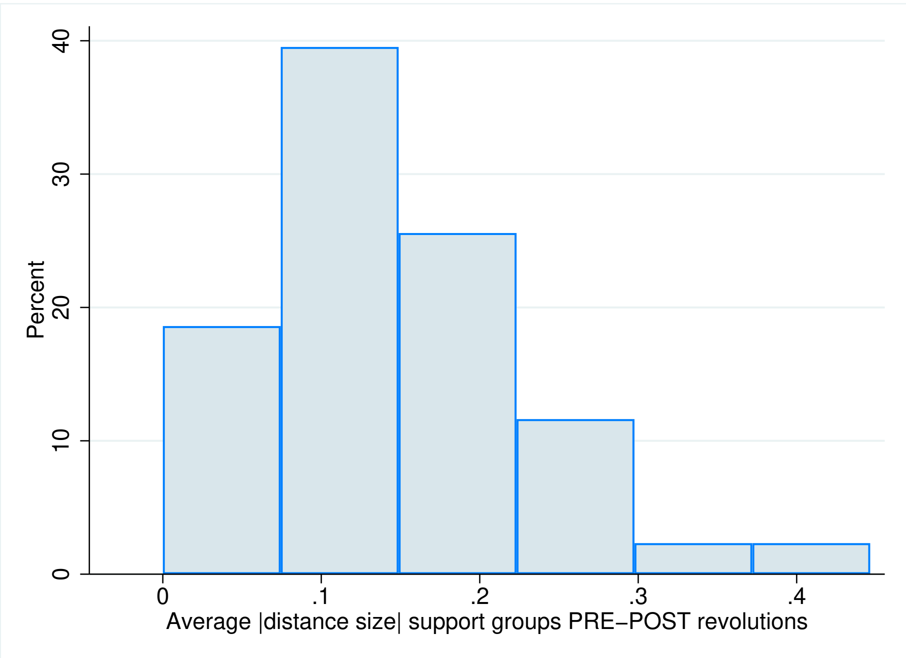
Key fact 5: **The post-revolutionary regime can be another, slightly more inclusive, autocracy**. Figure 1 offers a detailed picture of the autocratic regimes post-revolution. They tend to provide some limited democratisation by allowing for de-jure (but rarely de-facto free and fair) multi-party elections. The size of the support groups is also larger, although often smaller than 50% of the population (Figure 4) and pre-revolution support groups remain important political players post-revolution (Figure 5). Post-revolution, indicators of personalism tend to fall but remain relatively high (Figure 2).

Figure 4: Size of support groups pre and post-revolution



Notes: Data from V-Dem, 1960-2021. The answer takes into account size (in % of total adult population) and importance of the groups that are essential for the regime to remain in power. Ext_Small: extremely small, about 1%. V_Small: very small, 1-5%. Small: 5-15%. Moderate: 15-30%. Large: +30%. PRE: last year of the political regime. POST: five years later. 45 revolutions.

Figure 5: Distance in support groups pre and post revolution



Notes: Data from V-Dem, 1960-2021. PRE: last year of the political regime. POST: five years later. V-Dem identified 12 support groups (S_i) and assessed their importance for the survival of the regime ($0 \leq S_i \leq 1$). The distance is the average of the absolute difference in the importance of these groups PRE and POST revolution. 45 revolutions.

3 The set-up

3.1 General specifications

As in the benchmark theory of institutional change (Acemoglu and Robinson, 2006), we consider an economy initially populated by two groups: a non-benevolent autocrat and a group of citizens. Initially, the political regime is an autocracy which takes all relevant economic decisions, notably those related to income redistribution. The unique potentially powerful lever in the hands of citizens is the possibility to revolt against the autocracy, which would pave the way towards institutional change. All the action takes place in one unit of time and the model is static. Citizens are divided in two subgroups of different size: they might belong either to the majority (M) of size q, or to the minority (m) of size $1-q$. Of course $q \in \left(\frac{1}{2}, 1\right)$. There are two main sources of income in this economy: resource windfalls, R, and labour income, w, earned by citizens, where w is the exogenous hourly wage rate and l the time worked or labour supply. Implicit in the latter assumption, productivity w is taken to be the same across groups of citizens. As it will be clear along the way, we will only differentiate across groups in terms of political power deriving from group membership. In other words, we shall not allow for any inter-group discrepancies in terms of abilities or preferences.

The utility of the representative citizen at time t is defined over the consumption of a private good, c and leisure, $1-l$ and has the following quasi-linear form:

$$u = c + \gamma \ln(1-l) \tag{1}$$

Parameter $\gamma > 0$ defines the weight of leisure with respect to consumption, i.e. the marginal rate of substitution of leisure in terms of consumption. It is worth pointing out that, as mentioned above, we do not consider group-specific preferences. All the citizens share the same marginal disutility from working. Therefore if inter-group discrepancies in labour supply happen to occur, they cannot be due to heterogeneity in preferences but to other factors, in first place: distortionary policy.

The assumption of a utility function with endogenous labour supply is the first departure from the typical model in the institutional change literature. This function is able to capture how the interplay between the labour market outcomes and distortionary fiscal policy can play a role in the emergence of revolutionary movements. Linearity in consumption is needed for analytical tractability. We will highlight along the way the specific implications of this specification. Clearly, such a linearity assumption is likely to deliver some highly stylised outcomes, in particular through the emergence of zero labour supply solutions under some exogenous environments, which is indeed reinforced by the presence of resource windfalls. This said, we shall show that these stylised results do not preclude a quite neat interpretation of the contrasted labour outcomes of our political game.

With respect to the benchmark theory with homogeneous population, two new questions arise. One has to do with citizens' heterogeneity and the second with the consequences of this heterogeneity for redistribution and taxation policies. In line with the selectorate theory of De Mesquita et al. (2005) and De Mesquita and Smith (2010), the main objective of the autocrat is to stay in power and to do so he may favour one group in the population over another. In other words, the autocrat may not treat the minority in the same way as the majority. In our theory, autocrats tend to rely on a minority group, the 'elite', to uphold their position (see Figure 4). Here we assume that the minority is an insider as defined in Albertus and Menaldo (2018), but in contrast to the latter (and the elite-based model developed in Boucekkine et al., 2021a) this elite may end up allied with the majority to break down the initial autocratic regime and build-up an alternative regime more favourable to their interest. Under the autocratic regime, the minority benefits, as an insider elite, from a more favourable income redistribution.

In the rest of this Section, we proceed as follows. We first characterise the timing of the political game. Then, we analyse citizens' decisions in the autocratic regime for given redistribution policy, after a couple of important remarks on how we deal with citizens and income heterogeneities. Finally, we describe the post-revolution regime driven by a dominant minority with a special emphasis on the definition of particularistic public expenditures and the game-theoretic foundations of minority dominance. All the proofs of the propositions made along the main text are reported in the Appendix of the paper to ease the exposition.

3.2 The timing of the political game

We shall work with the following timing.

- *Step 1* — The autocrat sets an optimal redistribution for the insider minority and the majority by maximizing its income after redistribution. By construction, the net income redistribution rate maximizer depends on the existence of an insider minority redistribution premium.

- *Step 2* — Given the minority redistribution premium and the resulting chosen redistribution under autocracy, the insider minority and the majority compare their payoffs under autocracy with those under the post-revolution regime to decide whether to overthrow the autocratic regime or not. If either of the two groups decide to not revolt, the autocrat retains power and the political regime remains unchanged.

- *Step 3* — If both groups decide to revolt, the autocrat may adjust the minority premium rate to an admissible level still assuring non-negative net income, such that the insider minority refrains from revolting. If such a blocking adjustment exists, the autocrat retains the power. Otherwise, a revolution takes place and the new political regime sets in.

The timing of the game gives the autocrat the possibility to strike back by adjusting the redistribution premium (Step 3). The induced "hierarchy" between the two control variables in the hands of the autocrat can be easily justified. As explained in the Introduction, we consider the case where the standard pro-democratic revolution led by the sole majority is deemed impossible. We will provide further elaboration on this assumption in the theoretical developments below. Justifying this assumption in a framework à la Acemoglu and Robinson, which involves a minority-majority structure and uneven revolution costs, is relatively straightforward. Therefore preventing the minority from fostering rebellions is key for the autocrat to remain in office. In this respect, the control minority redistribution premium is key, and it's the one the autocrat activates in the ultimate step of the game.

3.3 The autocratic regime

We now come to the redistribution policy used by the autocrat. As argued in detail in the Introduction, we shall extend the scope of redistribution to embed the labour market so as to account for the "redistribution of jobs" phenomenon outlined by several authors. This is far from a distraction, it's a key engine in the Arab Spring revolutions for example. Rather than modelling directly job redistribution, which would increase the set of policy controls and render analytical treatment unfeasible, we proceed as follows, along with the treatment of redistribution of the two sources of income present in our model. Indeed,national income is twofold, resource windfalls and labour income. The typical fiscal treatment of these two types of income in economic theory is to assume that resource revenues are redistributed and labour income is taxed. However, given that the state can control major sources of jobs and revenues in authoritarian regimes (see Figures 2 and 3), we shall accordingly model fiscal policy with redistribution being the exclusive instrument: the autocrat redistributes total income (labour plus resource revenues), not distinguishing between the two income components but taking into account group membership. Incidentally, with this treatment, we can generate straightforwardly an indirect “job redistribution" mechanism under autocracy: indeed, if the redistribution rate is more favourable to the minority, which will be explicit just below, then labour supply will be higher for minority members, which leads to more jobs to the latter at equilibrium, and mimics unequal access to jobs documented in the literature. Said differently, when observing such an unequal treatment in labour net remuneration, the majority members limit their participation in the labour market.[1] As we shall see, the outcomes of this discrimination will be even more dramatic in the log-linear utility case we consider.

To model fiscal particularism under autocracy, we simple assume that the autocrat sets a redistribution rate, μ_A^M, for the majority members, and a redistribution rate, μ_A^m for the minority members.[2] Particularism is introduced via the assumption: $\mu_A^m > \mu_A^M$. The extent of particularism under autocracy is measured by $\delta_A = \mu_A^m - \mu_A^M > 0$. We shall take it as given for now on.[3]

The assumptions above imply the following per capita consumption rules for each group under autocracy, c_A^i with $i \in \{m, M\}$:

$$c_A^i = (R + w\, l_A^i)\, \mu_A^i, \tag{2}$$

with l_A^i the labour supply of an individual of group i under autocracy. Given the choice of redistribution imposed by the autocrat, the representative citizen of group i will choose a work effort, l_A^i such that the utility function (1) is maximised under the constraint (2):

[1]This typically leads at the same time to the irresisible rise of the informal sector in theses economies. To simplify, we do not model this sector here. Note that even if a majority member refrains from participating in the segregated labour market, she does receive her share of natural resources revenues, and therefore can still afford consumption.

[2]The lower index stands for political regime, in this case autocracy (A), and the upper index for group-membership, that is majority (M) or minority (m).

[3]Of course δ_A cannot take any arbitrarily large value as the condition $\mu_A^m < 1$ has to be checked along the way. See for example the case of minima redistribution treated in this section.

$$l_A^i = 1 - \frac{\gamma}{w\mu_A^i} \tag{3}$$

As usual with this type of set-up with log-linear preferences, we have to set a condition to ensure that labour supplies are non-negative. We also need to impose a companion condition on the extent of particularism, δ_A. To this end, we impose the following constraint:

Constraint 1. *Redistribution policy is such that* $\mu_A^M \geq \underline{\mu}_A \equiv \frac{\gamma}{w}$ *with* $\gamma < w$*. Accordingly, we pose:* $\delta_A < 1 - \underline{\mu}_A$*.*

An immediate (but interesting) corollary result follows.

Corollary 1. *At the minimal admissible redistribution rate* $\mu_A^M = \underline{\mu}_A$ *(and therefore,* $\mu_A^m = \underline{\mu}_A + \delta_A$*), one gets:* $l_A^M = 0$ *and* $l_A^m > 0$ *. Moreover, under Constraint 1,* $\mu_A^M < 1$ *and* $\mu_A^m < 1$ *at this minimal redistribution case.*

Under the constraint above, particularly the condition on labour productivity, $\gamma < w$, we ensure that $\underline{\mu}_A \in (0, 1)$ and $l_A^i \in [0, 1)$ for $i \in \{m, M\}$. It is worth pointing out that our constraint on the control set of the autocrat (minimum redistribution) does prevent zero redistribution even in the absence of explicit revolutionary threat. This comes from the log-linear specification of the utility function: if redistribution tends to 0, then consumption goes to zero by equation (2) and labour supply becomes infinitely negative (so as to increase utility from leisure infinitely). We shut down this theoretical (and unrealistic) possibility by setting the minimal redistribution threshold, $\underline{\mu}_A$. Active revolutionary threat would lead the autocrat to raise redistribution above this level. The minimal redistribution rate, $\underline{\mu}_A$, will play indeed a central role in our theory: as it will be shown in Section 4.1, this rate may be indeed optimal for the autocrat, in particular when the level of natural resources is high enough.

Another seemingly intriguing property conveyed by Corollary 1 is that the minimal redistribution case is associated with a zero labour supply by majority members, and strictly positive labour supply by minority members, which is extremely interesting as a benchmark. It is possible to give a broad interpretation to this property well beyond the minimal redistribution case. Indeed, as one can see from equation (3), labour supply is an increasing function of the redistribution rate. This may seem strange at first glance as one may read behind this a magnification of a wealth effect, which normally drives labour supply down! Our seemingly peculiar result comes actually from the fact that we are studying an autocratic economy in which labour income (or jobs) are (re)distributed just like any other rent source.

To clarify this crucial point, we can substitute the consumption rules per group (2) in the utility function (1). After some trivial manipulations, one can write the utility function of group i members, say u_A^i as follows:

$$u_A^i = (R + w\ l_A^i)\ \mu_A^i + \gamma \ln(1 - l_A^i) = R\mu_A^i + wl_A^i\mu_A^i + \gamma \ln(1 - l_A^i).$$

The key point here is that our focus on an economy which redistributes resource revenues and jobs in the same way leads to a specific term, $wl_A^i\mu_A^i$, in the utility function of all individuals. Obviously, this extraneous term cannot emerge in an economy with a competitive labour market. More specifically, one can see that as μ_A^i goes up, the marginal return of labour income rises while the disutility from working remains unaffected. As a result, an increase in the redistribution rate should also necessarily raise labour supply. As the minority is insider under autocracy, its members will typically have a larger supply relative to the majority members. At the particular minimal redistribution case, the labour supply of the majority members is, by construction (given the log-linear utility specification), zero while the minority members' is strictly positive. At any level of particularistic redistribution under autocracy, this will end up delivering an equilibrium picture with minority members enjoying more jobs than the majority, which is likely to reflect the particularism enjoyed by insider minorities.

3.4 The post-revolution regime

We now describe the second regime which may replace the initial autocracy. We shall assume that under some conditions to be uncovered, the insider minority (or the elite) under autocracy push for a popular uprising eventually leading to the fall of the autocracy and its replacement by a political regime managed by the minority, but more favourable for the majority compared to the initial autocratic regime.

3.4.1 Revolution process and associated costs

Assume for the moment that a revolution took place and that a new regime has replaced the initial autocracy (which ends up leaving the country). Of course, revolutions do not occur systematically and we shall characterise accurately their occurrence in the next section. Here, we need a couple of preliminary points to properly describe citizens' behaviour in the post-revolution era. In particular, we need to specify the cost of revolutions and the role of social groups (minority/majority in our context) in this process, a crucial question implied by our heterogeneous population assumption.

Generally speaking, minority and majority groups may not necessarily face the same cost of revolution, whatever the revolutionary process (from above or from below). It depends upon the exposition to repression and the efficiency of the revolution "technology" (for example, the existence of well organised rebellion structures within groups as explained in the Introduction). In the case of countries we have been pointing at throughout this work, if the majority aims to revolt alone, the cost faced is huge, and is often prohibitive. This explains why for example Arab populations have been unable to get rid of the ruling autocratic regimes more than four decades. Insider minority members do not have objectively the same motivations to revolt nor do they face the same revolution cost as they typically have a largely superior self-organisation capacities.[4] In this paper, we implicitly assume that the majority faces an important revolution cost if they decide to revolt alone. Accordingly, they would never revolt alone. Instead, they will only do so if the minority group members are willing to share the cost of the revolution. But obviously, the insider minority will not engage into subversive activities without receiving a sufficient reward in exchange as explained in the Introduction. And, as we will clarify later, sufficient reward may only materialise under certain conditions on the socio-economic environment.

In line with the arguments above, we focus on elite-led revolutions. We assume that all citizens, whatever their group membership, incur a coordination cost $\psi[q]$ when revolting against the autocrat, that's the cost of minority/majority coordination. In other words, the revolution cost only depends on the degree of population fractionalisation, and is shared equally by all the citizens of both majority and minority. Needless to say, we could have easily dealt with an additional fixed cost reflecting destructions due to popular uprising as in Acemoglu and Robinson (2006). Without loss of generality, we deliberately focus on coordination costs, which depend on population heterogeneity. Since citizens are divided into majority and minority groups, we reasonably model this coordination cost as an increasing function of the fractionalisation level of the society, where $\psi[q]$ is an inverted u-shaped with a maximum in $q = \frac{1}{2}$. The larger the fractionalisation/polarisation

[4]In reality, the elite is hardly homogeneous, it's typically composed of a small number of groups. A subset of them, usually including the security forces, may seek alliance to oust the autocrat, at a relatively low cost

within citizens, the larger the cost of the revolution and, therefore, the lower the post-revolution disposal material pay-off.[5] Of course, function $\psi[.]$ may also encompass other (exogenous) aspects related to the vulnerability of the regime (that's its ability to repress), which may be reflected through the shape and/or scale of this function. Next, we remove all sources of uncertainty from the model. In particular we postulate that the cost of revolution is deterministic, the autocracy will be removed provided citizens are better off (in terms of utility) in the post-revolution regime, after accounting for the cost of revolution.

3.4.2 Group size heterogeneity and redistribution: particularistic redistribution

We now develop the key feature of the set-up: the fiscal particularism due to group membership in the post-autocratic regime. In contrast to the democratization model à la Acemoglu-Robinson, the post-autocratic politics will not be ruled by the median voter principle. In exchange of sharing the revolution cost and giving up its redistribution premium under autocracy, the minority will seek some kind of fiscal advantage in the post-revolution regime. This will lead to a particularistic fiscal rule under the latter regime. We shall develop in detail this point as it's one of the novel ingredients of our theory.

To keep things comparable with the initial autocratic regime, we assume that wealth is redistributed as the same rate, irrespective of its nature (resource windfalls or labour income). Discretionary particularism is banished in the new regime, which seemingly appears *democratic*. However, the post-revolution regime is minority-dominant in a precise sense: redistribution is decided upon a leader-follower game where the minority plays the role of the leader. Broadly speaking, while redistribution is initially fixed by the autocrat, it is under the control of the group holding the *de facto* power after the revolution. In other words, the distinctive feature of the post-revolution regime in our setting is that policy is not determined by the median voter but is the result of a political competition dominated by one group, the one which owns the political power.

We denote by μ_m, the redistribution rate in the post-revolution regime (the upper index "m" goes for "minority-dominant regime"). In the autocratic regime, two different redistribution rates co-exist depending on group membership, μ_A^i with $i \in \{m, M\}$.[6] Assume that institutional change

[5] Kovacic and Zoli (2021) define the *index of conflict potential* within a society as the combination of the effective power of groups and the between group interactions. A special case of this index is the fractionalisation index, defined as $FRAC = \sum q_i(1 - q_i)$, which is a parabola with a maximum in $q = \frac{1}{2}$. Note that fractionalisation and polarisation are undistinguishable concepts when there are just two groups (see also Esteban and Ray, 2008).

[6] Notice that to have redistribution between groups we must have $\mu_m < 1$.

does not alter the fundamentals of the labour market nor the pace of technological progress such that the wage rate remains the same, equal to w. We also hypothesise the same for the size for resource revenues. The total revenue available after redistribution at time t writes as follows:

$$G = (R + wl^M)(1 - \mu_m)q + (R + wl^m)(1 - \mu_m)(1 - q). \tag{4}$$

Let's get now to modelling particularism under the minority-dominant regime. In agreement with Figure 1, we devise an inter-group sharing of G favourable to the minority, therefore departing from the more traditional treatment of G (and counterparts) as a public good. Let's denote by $\lambda^i G$ the amount of wealth further redistributed per capita to group i along with the particularistic inter-group sharing. The standard public good universalistic scenario necessarily implies $\lambda^i = 1$, $\forall$ $i \in \{M, m\}$. We shall define our inter-group sharing devise as follows:[7]

Definition 1. *For fixed q, an inter-group particularistic minority-biased sharing rule is a couple of q-functions,* $(\lambda^m(q), \lambda^M(q))$*, such that :*

- $\lambda^m(q) > \lambda^M(q) > 0$ *;*
- *the resource constraint of the economy* $(R + wl^M q + wl^m(1 - q))(1 - \psi[q]) = qc^M + (1 - q)c^m$*, is met for all triples of incomes* (R, wl^m, wl^M)*, where* l^i *and* c^i *stand for labour supply and consumption per capita respectively of group* i *in the post-revolution regime.*

The sharing rule takes the demographic distribution (here, q) as given and allocates available resources across groups in such a way that the same rule holds whatever the levels of the different components of wealth in the economy. It is therefore an institutional rule, formalizing an institutional balance of political power, independently of the income shocks. This does not mean that it will fix once for all income inequality across groups, we shall see in a benchmark case below how citizens feedback and the induced evolution of a broad measure of particularism (consistent with empirical facts given in Section 2).[8] It is easy to prove the following proposition characterising this sharing rule:

Proposition 1. *A couple* $(\lambda^m(q), \lambda^M(q))$ *fulfils Definition 1 if and only if it checks:*

[7]Because the same redistribution rate applies to all the citizens whatever their group membership and irrespective of the income component, functions $\lambda(.)$ will be shown to depend only on q, and not on μ_m.

[8]It should be also noticed that the “shares" $\lambda^i(q)$ may be greater than 1, this is typically the case of $\lambda^m(q)$. This is a mechanical consequence of normalizing total population to 1 ($q < 1$) and given that these "shares" are per capita. We shall keep on using the term "shares" for convenience.

- $\lambda^m(q) > 2 > \lambda^M(q) > 0$;

- $\lambda^m(q) = \frac{2-q\lambda^M(q)}{1-q}$. *As a consequence,* $\lim_{q\to 1} \lambda^m(q) = +\infty$.

Some intermediate computations will be useful hereafter for the interpretation of the results. The idea is to express per-capita consumptions c^i in terms of the parametrised biased sharing rule and the income components per group, plug the corresponding expressions in the right-hand side of the resource constraint of the economy given in Definition 1, and then deduce, by identification with the left hand side of the constraint, the restrictions implied on the sharing rule (since it has to be checked for any triple (R, wl^m, wl^M) by definition). Skipping without loss generality the q-functional dependence of the weights $\lambda^i(q)$, the net inter-group transfer per-capita for any member of the majority (M) and minority (m) is given by $s^M = \lambda^M G - z^M$ and $s^m = \lambda^m G - z^m$ respectively, with $z^M = (R + wl^M)(1 - \mu_m)$ and $z^m = (R + wl^m)(1 - \mu_m)$. Accordingly, the budget constraints, i.e. the consumption rules per capita, for the representative agent of the majority (M) and minority (m) group can be written as:

$$c^M = \left((R + wl^M)\mu_m + s^M\right)(1 - \psi[q]) \tag{5}$$

$$c^m = ((R + wl^m)\mu_m + s^m)(1 - \psi[q]), \tag{6}$$

Several remarks are in order here. One obvious thing to note is that there is an infinity of sharing rules checking the properties listed just above. In particular, the couples $\left(\frac{2-q\lambda}{1-q}, \lambda\right)$ are minority-biased particularistic sharing rules for any constant λ, $0 < \lambda < 2$. Non-uniqueness is not surprising here: for given per capita group share, say $\lambda^M(q)$, we seek for the share of the other group, here $\lambda^m(q)$, meeting the aggregate resource constraint and ensuring inter-group redistribution favorable to the minority. Our definition of biased sharing rules (and the associated identification-based computation) does not lead to select a single rule.

Another possible biased sharing rule is what we will call the inversely proportional rule (IPR) for inverse proportionality to the demographic weight: $\left(\frac{1}{q}, \frac{1}{1-q}\right)$. We shall be using the IPR in most of our analytical explorations hereafter for tractability. Yet, all the biased sharing rules have the same limit property when the minority becomes increasingly smaller, that's when q tends to 1 (without being equal to 1): they all feature that $\lambda^m(q)$ goes to infinity in such a case because $\lambda^M(q)$ is bounded from below and above, and given the relationship relating both given in Proposition 1.

By construction, our biased sharing rules imply not only that the transfer is from the majority to the minority, but also that as the minority gets smaller, the per capital share $\lambda^m(q)$ gets bigger. This is not at all a counter-intuitive property of minority dominance although the limit case may sound as extreme (but this is a limit case!). As such the IPR is not at all an outlier in the class of biased sharing rules as defined above, and is rather a good representative and a useful benchmark for its immediate interpretability (in addition to tractability). We start with a closer characterization of its properties just below.

3.4.3 A closer tracking of particularism in the IPR case

From now on, and as argued above, we will use the IPR as a benchmark. In such a case the consumption per capita and per-capita reduce to:

$$c^M = \frac{(1-q)(R+l^m w) + (R+l^M w)\mu_m - (1-q)(2R+(l^m+l^M)w)\mu_m}{q}(1-\psi[q]), \quad (7)$$

$$c^m = \frac{q(R+l^M w) + (R+l^m w)\mu_m - q(2R+(l^m+l^M)w)\mu_m}{1-q}(1-\psi[q]). \quad (8)$$

Before examining how competition sets in between the minority and majority in the post-revolution regime, it is important to provide a more accurate characterisation of particularism, notably in order to identify precisely how it is connected with citizens' decisions and changes in the exogenous environment. Our biased sharing rules imply that redistribution goes from the majority to the minority, and the smaller the minority, the more it gets favoured by this scheme. So it is for the IPR considered here as a benchmark. It is possible to characterise more finely the particularistic process. Let us work with the following indicator of particularism:

$$P = \frac{(1-q)\ s^m}{(1-q)\ s^m + q\ s^M}.$$

Consistently with the definitions given above, particularism is computed as the share of total transfers earned by the minority. Let us examine some its salient properties taking all the decisions (μ_m, l^m, l^m) as given. Using the expressions of the per capita and per group transfers given in the previous sub-section, one can readily re-express P as follows:

$$P = \frac{q\ \left(R+wl^M\right)}{q\ \left(R+wl^M\right)+(1-q)\ \left(R+wl^m\right)}. \quad (9)$$

It can be noted that while the policy variable μ_m, does not show up directly in the expression above, it does matter via the labour supply functions, which are heavily dependent on policy (as it is already the case in the autocratic regime, see equation (3)) for example. Note also that our particularism indicator P depends directly and indirectly (via labour supplies a priori) on all the parameters of the model (w, q and R). The link between particularism and fractionalisation (as captured by q) is particularly interesting. Tracking the evolution of particularism with institutional change is another key question that we can touch here. The following proposition can be useful in this regard.

Proposition 2. *The particularism indicator P checks the following properties:*

1. *When $l^m = l^M$, one gets $P = q$.*
2. *If $l^m > l^M$, then $P < q$.*

Proposition 2 is far from surprising: group size-based particularist redistribution works as a redistribution scheme from the majority to the minority for equal labour supplies. When one group works more than the other, its share of the total fiscal revenue goes down. When labour supplies are equalised, the particularism indicator is exactly equal to the size of the majority. This allows to connect our exclusion via fiscal particularism story to the polarisation-based theories of conflicts (see for example, Esteban and Ray, 2011). Notice that when society tends to be fully fractionalised/polarised (that is q tends to $\frac{1}{2}$), the indicator P tends to $\frac{1}{2}$: the two groups tend to have the same share of total fiscal revenue. Fractionalisation has a double role in our theory: on one hand, it makes coordination costs larger and thus it discourages rebellions, but on the other hand, it increases the prospects of income extraction for the majority under the particularistic scheme, which might push the majority to revolt against the autocrat and foster transition to a minority-based post-revolution regime. Full analysis of this configuration is provided in the rest of this paper. To this end, we need to specify how economic and political competition sets in the post-revolution regime.

3.4.4 Political competition in the post-revolution period

We now depict political competition in the post-revolution period. Obviously, this model should be compatible with the particularist public spending component of the model as described just above and documented in the stylised facts section, notably in *Key fact 5*. Clearly, this modelling is a short-cut. In reality, minority dominance takes much more sophisticated lobbying and manipulation forms. However, our Stackelberg basic modelling captures the two essential features of the minority dominant-based post-revolution regimes we target: departure from the median voter and strategic advantage to the minority.

We assume the following: the Stackelberg leader (the minority) considers the best response of the follower (the majority), that is, how the follower will react once observed the redistribution policy μ_m chosen by the leader. Solving backward, the representative agent of the majority M chooses her work effort l^M such that the utility function defined by (1) is maximised under the budget constraint (7), yielding:

$$l^M[\mu_m] = 1 - \frac{\gamma}{w\mu_m(1-\psi[q])} \tag{10}$$

The representative agent of the minority chooses her labour supply and the redistribution policy, i.e. μ_m, such that the utility function (1) is maximized under the budget constraint (8), given the reaction function (10). Deriving the two corresponding first-order conditions of this problem and after a few trivial algebraic operations, one gets:

$$l^m[\mu_m] = 1 - \frac{\gamma}{w\mu_m(1-\psi[q])} \tag{11}$$

and

$$\mu_m = \frac{2\gamma q}{\gamma(1-q) + \sqrt{\phi^m[q,\gamma,R,w]}} \tag{12}$$

with $\phi^m[q,\gamma,R,w] = \gamma^2(1-q)^2 + 4\gamma q(2q-1)(1-\psi[q])(R+w) > 0$.[9]

One should already notice that given the first-order conditions (10) and (11), the labour supplies of the minority and majority member are equal. This is no surprise as they share the same log-linear utility function and face the same redistribution rate, μ_m. We can go a small step further and get all the variables of the game in closed-form. Indeed, using μ_m as defined by (12), it is straightforward to derive the optimal labour supply of citizens in a regime with dominant

[9] We should note that since the problem is quadratic, we do get two solutions for μ_m. However, the second order conditions for a maximum are only met for one solution. A proof of this statement is given in the Appendix B.2.

minorities:

$$l^m = 1 - \frac{\gamma(1-q) + \sqrt{\phi^m[q,\gamma,R,w]}}{2qw(1-\psi[q])} \tag{13}$$

with $l^m = l^M$. In contrast to the autocratic regime (see Corollary 1), where the minority members have jobs and the majority members have none, the post-revolution regime (if it materialises) restores equality of labour supplies (and of access to jobs) by removing the redistribution premium accruing to the insider elite in the initial autocratic regime. This is a further "more democratic" feature of the post-revolution elite-led regime with respect to autocracy, although the former is clearly not a democracy. To guarantee that the labour supply of citizens and the redistribution policy are in their admissible intervals, we need one crucial restriction on parameters:

Constraint 2. *For given q, preferences for leisure are such that* $\gamma < w(1-\psi[q])$.

Constraint 2 guarantees that the voted policy is such that $\mu_m \in (0,1)$. Note that if q is given, as we suppose here, then $\psi[q]$ measures the upper bound of the coordination cost of the revolution, that is when $q = \frac{1}{2}$ and the citizens' population is perfectly fractionalised. Constraint 2 also implies that the labour supply is always positive and lower than 1 for any $\mu_m \in (0,1)$. Given the above parameters' restrictions to guarantee a well-specified economic problem, the model necessarily predicts that $c^m > c^M$. Indeed, since labour supplies are the same across groups, fiscal particularism implies that $P = q$, with $q > \frac{1}{2}$, by Proposition 1. In other words, given constant wage rate, minorities are not only dominant in terms on political power, but also in terms of economic power: their members consume more goods than the majority group, and enjoy larger welfare (given equality of leisures across groups).

A few more comparative statics are useful to understand better the determinants of labour decisions and policy choices.

Proposition 3. *Under Constraint 2, the following comparative statics hold:*
(i) Minority Policy: $\frac{\partial \mu_m}{\partial w} < 0$, $\frac{\partial \mu_m}{\partial R} < 0$, $\frac{\partial \mu_m}{\partial \psi[q]} > 0$, $\frac{\partial \mu_m}{\partial q} < 0$;
(ii) Labour supply: $\frac{\partial l^m}{\partial w} > 0$, $\frac{\partial l^m}{\partial R} < 0$, $\frac{\partial l^m}{\partial \psi[q]} < 0$, $\frac{\partial l^m}{\partial q} \lesseqgtr 0$;
(iii) Consumption of the minority members: $\frac{\partial c^m}{\partial w} > 0$, $\frac{\partial c^m}{\partial R} > 0$, $\frac{\partial c^m}{\partial \psi[q]} < 0$, $\frac{\partial c^m}{\partial q} \lesseqgtr 0$;
(iv) Consumption of the majority members: $\frac{\partial c^M}{\partial w} > 0$, $\frac{\partial c^M}{\partial R} > 0$, $\frac{\partial c^M}{\partial \psi[q]} < 0$, $\frac{\partial c^M}{\partial q} \lesseqgtr 0$

Some comments are in order here. First of all, the role of coordination costs can be readily understood. Indeed, the labour supply of both groups negatively depends on coordination costs as it should be: $\frac{\partial l^m}{\partial \psi[q]} < 0$. This outcome is quite intuitive because the cost of revolution enters multiplicatively and not additively in the budget constraint of the citizens. It therefore plays the same role as a proportional income tax. The same results are obtained on consumption of both population groups for the very same reason. As μ_m is chosen by the minority, it is reasonable to get that overall that a rising (multiplicative) cost, $\psi[q]$, is compensated by an increase in the after-tax share of total income retained by citizens.

Now we move to the comparative statics with respect to the two components of wealth, resource revenues and labour income. Concerning the comparative statics with respect to the wage rate w, one gets the usual property: $\frac{\partial l^m}{\partial w} > 0$. If people work more, then they get less welfare from leisure, and thus they would tend to prefer having more consumption through inter-group redistribution. Therefore, the minority members would choose μ_m such that $\frac{\partial \mu_m}{\partial w} < 0$. The overall effect of the consumption of both groups is positive as it should be. Concerning the windfall income R, we have the typical wealth effects on the consumption of both groups (positive) and on labour supply (negative). More interesting, the overall effect of larger windfall income is negative on the after-tax share of total income retained by citizens, μ_m (or equivalently, positive on the inter-group redistribution). We shall use this property intensively in Section 5 when it comes to understand the determinants of the institutional transition.

Finally, let us examine the comparative statics with respect to fractionalisation. Note that under Constraint 2 we get $\frac{\partial \mu_m}{\partial q} < 0$. The sign of this derivative implies that fractionalisation guarantees a higher level of non-taxed resources, i.e. μ_m, to citizens. The intuition behind this result is simple: since minorities are dominant, when they are small in size (no fractionalisation) they push for a high level of public amenities, i.e. $1 - \mu_m$ because $P = q$; when they are large in size (fractionalisation) they prefer do not redistribute their important material pay-off because particularism reduces when $q \to \frac{1}{2}$. Put differently, government activities increase with particularism and decrease with fractionalisation in presence of dominant minorities. However, the sign of the derivative $\frac{\partial l^m}{\partial q}$ remains ambiguous. An increase in q brings down both the levels of the redistribution rate μ and the labour supply. Nonetheless, when q increases, the coordination cost $\psi[q]$ drops which pushes up labour supply. Which effect dominates depends on how the function $\psi[q]$ is made.

4 The emergence of dominant minority-based regimes

We now move to the transition from autocracy to dominant minority-based regimes at equilibrium. As argued repeatedly above, we focus on the emergence of a dominant minority-based regime where a coalition of the formerly insider minority and the majority removes the autocrat from office via a popular revolution leading to an elite-biased regime. The next section digs deeper in the autocrat problem, untouched so far.

4.1 The autocrat problem

We now briefly give an account of the autocrat's optimal decision-making. For given δ_A, the net income of the autocrat , say $\Pi_A(\delta_A)$, is given by

$$\Pi_A(\delta_A) = (R + wl_A^m)(1 - \mu_A^m)(1 - q) + (R + wl_A^M)(1 - \mu_A^M)q,$$

with $\mu_A^m = \mu_A^M + \delta_A$, and $l_A^i = 1 - \frac{\gamma}{w\mu_A^i}$ for $i \in \{m, M\}$. Substituting the two latter equalities into $\Pi_A(\delta_A)$ allows to explicitly rewrite it in terms of δ_A and μ_A^M. With δ_A given, an interior μ_A^M maximizer of $\Pi_A(\delta_A)$ gives the necessary condition:

$$qw\left(-l_A^M + (1 - \mu_A^M)\frac{\partial l_A^M}{\partial \mu_A^M}\right) + (1 - q)w\left(-l_A^m + (1 - \mu_A^M - \delta_A)\frac{\partial l_A^m}{\partial \mu_A^M}\right) - R = 0,$$

provided $\mu_A^M \geq \underline{\mu}_A \equiv \frac{\gamma}{w}$ and $\delta_A < 1 - \underline{\mu}_A$ to check Constraint 1. One can readily show that the necessary condition for an interior maximizer can be written as:

$$\rho(x) = -1 - \frac{R}{w} + \frac{\gamma}{w}\left(\frac{q}{x^2} + \frac{1 - q}{(x + \delta_A)^2}\right) = 0,$$

with $x = \mu_A^M$. It's then easy to prove the following proposition.

Proposition 4. *Under Constraint 1, and for given δ_A, let $R_A(\delta_A) = q\frac{w^2}{\gamma} + (1-q)\frac{\gamma w^2}{(\gamma+\delta_A w)^2} - w > 0$. There exists a unique interior maximizer μ_A^M, $\frac{\gamma}{w} < \mu_A^M < 1$, if and only if $R < R_A(\delta_A)$ and $R_A(\delta_A) > 0$. Otherwise, the unique maximizer is corner and it corresponds to minimal redistribution to the majority: $\mu_A^M = \underline{\mu}_A \equiv \frac{\gamma}{w}$.*

Several remarks are in order here. First of all, it should be noted that, consistently with the comparative statics for the post-revolution regime (Proposition 3), a robust property emerges as the redistribution rates are decreasing with resource revenues. This is indeed a natural outcome as the magnitude that matters in decision making for all agents is not the redistribution rate but the product of the latter and resource and labour incomes. Larger resources leave room for choosing relatively lower redistribution rates. In the autocrat problem, the interior non-minimal maximizer is decreasing in R, falling below the minimal value (equal to $\frac{w}{\gamma}$) above the threshold $R_A(\delta_A)$. Second, it should be noted that still above this threshold, two redistribution rates will be applied by the autocrat: the minimal one for the majority, and a larger one for the minority via the redistribution premium δ_A accruing to the insider minority. So, while stylised, the picture is still highly sensible and realistic. Note also that the threshold $R_A(\delta_A)$ is decreasing in the premium δ_A, which is again reasonable: the more minority membership is rewarded, the larger the room for minimal redistribution for the majority members. It's worth noting that when $\delta_A = 0$, we fall in the case where the minority is no longer favoured: this covers the case of **outsider minorities** as labelled by Albertus and Menaldo (2018). In such a case, the threshold value is the largest: $R_A(0) = w(\frac{w}{\gamma} - 1)$. This is the most favourable case for majority members from the redistribution point of view.

Last, and less importantly, note that the threshold is not necessarily positive for any premium δ_A, an obvious sufficient condition for positivity is w sufficiently large (for example, $w > 2\gamma$).[10] We shall overlook this trivial point hereafter and assume positivity. Moreover, from now on, we assume that the following assumption holds.

Assumption 1. *The country owns a level of natural resources such that* $R \geq R_A(\delta_A)$.

In other words, we shall consider from now on that majority members will get minimal redistribution while the minority's will enjoy a higher one. The autocrat ultimately chooses the minority premium δ_A.

4.2 Transitions

We now study in depth how transition from autocracy to the dominant minority-based regime can take place within the particularist context described above. A key complication of the transition we study is that it requires the move of two groups, the minority and the majority, in contrast to the traditional theories (Acemoglu and Robinson, 2006, or Bourguignon and Verdier, 2000).

[10] Another way to get positivity of $R_A(\delta_A)$ is via Constraint 2, $\gamma < (1 - \psi[q])w$ where $\psi[q]$ is the tent function: $\psi[q] = 1 - q$ for $q \in \left(\frac{1}{2}, 1\right)$. We shall assume such a functional specification from the next section.

Concretely, for this transition to take place, we need the following conditions to hold jointly:

$$u^i_A[\mu^i_A] < u^i_m[\mu_m],$$

for $i \in \{M, m\}$, where $u^i_A[\mu^i_A]$ is the utility accruing to group i under autocracy (with the associated optimal redistribution, μ^i_A), and $u^i_m[\mu_m]$ is the utility of the group i under the post-revolution dominant minority regime (with the inherent redistribution rate, μ_m).

Define $f^i[q, \gamma, R, w] = u^i_A[\mu^i_A] - u^i_m[\mu_m]$ for $i \in \{M, m\}$. The regime change takes place when both functions simultaneously take negative values. Using equations (1)-(8), we get the following joint conditions for the majority and the minority, respectively (under Assumption 1):

$$\frac{\gamma R}{w} - \left(\frac{(1-\mu_m)(1-q)(l^m w + R)}{q} + \mu_m(l^m w + R)\right)(1 - \psi[q]) - \gamma \log(1 - l^m) < 0 \tag{14}$$

$$w\delta_A + R\left(\frac{\gamma}{w} + \delta_A\right) - \left(\frac{(1-\mu_m)q(l^m w + R)}{1-q} + \mu_m(l^m w + R)\right)(1-\psi[q]) - \gamma \log(1-l^m) + \gamma \log\left(\frac{\gamma}{\gamma + w\delta_A}\right) < 0 \tag{15}$$

with μ_m and l^m given by equations (12) and (13), respectively.

The sign of the above equation heavily depends on R, γ, w, and δ_A but also on the composition of the civil society, q. In our particular setting the parameter q has a crucial role. Indeed, it represents the particularist character of the public redistribution system as well as the level of fractionalisation. The latter also determines the level of coordination costs when citizens revolt against the autocrat. For sake of simplicity and economic insight, we start separately studying the two extreme cases of fractionalised societies ($q = \frac{1}{2}$) and quasi-homogeneous societies (q tends to 1). We conclude with the appraisal of the general heterogeneous case where $q \in \left(\frac{1}{2}, 1\right)$.

To unburden the algebra, we will assume that the cost function takes the tent form, that is $\psi[q] = 1 - q$ for $q \in \left(\frac{1}{2}, 1\right)$. Needless to say, this simplification does not alter the main qualitative implications of the model. We shall split the analysis in two stages: we first briefly analyse two polar extreme minority/majority demographic distributions, then we address in detail the case of heterogeneous distributions.

4.2.1 Two polar demographic distributions: full fractionalisation vs quasi-homogeneity

Full fractionalisation Full fractionalisation corresponds to equal size population groups, i.e. $q = \frac{1}{2}$, so strictly speaking, there is no majority or minority. We shall however keep on using these terms to distinguish between the group status in the initial autocratic regime (insider vs outsider).

First notice that in this case, coordination costs are maximal, equal to 1. It can be also trivially shown that in this case, equations (12) and (13) become: $\mu_m = 1$ and $l^m = 1 - \frac{2\gamma}{w}$, respectively, leading to much simpler equations (14) and (15) . The following proposition can be readily proved.

Proposition 5. *Under Assumption 1, Constraint 1 and Constraint 2, the majority always revolts under full fractionalisation. Moreover:*

- *The probability that the minority joins the majority decreases with δ_A.*
- *For any δ_A such that $\frac{1}{2} - \frac{\gamma}{w} < \delta_A < 1 - \frac{\gamma}{w}$, the autocrat can prevent the minority to join the majority for R large enough, leading to neutralize the political transition.*
- *Whatever the level of resource revenues, R subject to Assumption 1, the autocrat can always pick an admissible minority premium value, δ_A, to block institutional change.*

Proposition 5 delivers that under full fractionalisation, the majority may well revolt independently of preferences for leisure, level of resources and wage rate. This might look strange at first glance since the cost of revolting is larger when citizens are increasingly fractionalised. However, the degree of fractionalisation, as captured by q, is also a determinant of the redistribution in the post-revolution period as it affects the right-hand side of the equation (14): fiscal particularism disappears in the new regime when $q = \frac{1}{2}$, and this property decisively shapes the final institutional outcome. It follows that full fractionalisation is a sufficient condition for rebelling against the autocrat. This is an important result which shed light on the role that population composition might have on institutional changes when labour choices, political decisions and heterogeneity in population composition are all taken into account. In the traditional democratisation model with homogeneous population (Acemoglu and Robinson, 2006) and its extensions to resource-rich countries (see Boucekkine et al., 2016), the role of revolution cost is decisive. In our setting revolution occurs systematically under full fractionalisation even though the cost of revolution is maximal. The role of fractionalisation in social conflicts has already been outlined in the economic and political science literatures (see a survey in Esteban and Ray, 2008), in particular for violent conflicts. Quite naturally, it plays a central role in our theory, it even dominates the revolution cost effect, at least in the fully fractionalised societies case studied here. We shall see that it keeps on playing a crucial role in the more general case studied in Section 4.2.2.

Another highly interesting aspect relates to the role of the insider group in this case. It is more involved than what one may think at first glance. Indeed, as fiscal particularism disappears in the new regime under full fractionalisation, minorities cease to be dominant in this new regime. Even more, as the premium δ_A goes up (Step 3 of the game), the minority members become richer under autocracy and the probability for the autocrat to avert political change rises. The proposition shows that it is always possible for the autocrat to block the institutional change by picking the appropriate minority premium δ_A. Moreover, and not surprisingly, the richer the country in terms of windfall resources, the lower the premium required for the autocrat to remain in office.

Quasi-homogeneous societies In the case of quasi-homogeneous population, q tends to 1. Since most of the magnitudes involved in the model are continuous in q at $q = 1$, we can take the limit of these magnitudes when q tends to 1. In this scenario, society is close to homogeneous. Thus, coordination costs tend to their minimal level, equal to 0. Using equations (12) and (13) we can easily derive that $l^m = 1 - \frac{\sqrt{(R+w)\gamma}}{w}$ and $\mu_m = \sqrt{\frac{\gamma}{(R+w)}} \in (0, 1)$. However, note that when q tends to 1, labour supply is positive if and only if $R < w\left(\frac{w}{\gamma} - 1\right)$. When $q \to 1$ it turns out that rich enough countries, in the sense of checking $R > R_A[\delta_A]$, deliver $l^m = 0$ in the post-revolution regime in the case of quasi-homogenous populations. Even more striking, we can readily see that $f^m\left[1, \gamma, R, w, \delta_A\right] \to -\infty$. The following proposition results trivially.

Proposition 6. *Under Assumption 1, the majority (minority) never (always) revolts when* $q \to 1$.

Proposition 6 states that in quasi-homogeneous societies the insider minority would always prefer revolt against the autocrat, independently from redistribution δ_A. This result is quite intuitive: when $q \to 1$ the particularism is maximal and the minority would always prefer a dominant minority regime. However, revolutions against the autocrat never occur when $q \to 1$ because the majority will never accept a regime where the level of particularism is at its maximal level. The result in Proposition 6 for the majority group is symmetric to the full fractionalisation configuration analysed above. In the latter, the majority is willing to revolt while the minority is prevented from doing so (by the autocrat in Step 3 of the game); in quasi-homogeneous populations, it's the majority which has no incentive to join the minority. Again, the composition of population is key. The intuition behind the outcomes of the quasi-homogenous case are quite simple. When $q \to 1$, the large majority of citizens belong to the same group and particularism tends to its maximum level, $P \to 1$. This can be hardly acceptable by the majority, which ends up preferring autocracy. Proposition 6 reflects clearly why this is so: in this extreme case, majority members will consume (per capita) definitely less than under autocracy, and will never accept the dominance of such a small group.

We have shown in the study of the two previous polar cases that regime change from autocracy to dominant minority-based regime is not obvious to emerge in our game-theoretic framework. We now inquire whether such a result still holds for intermediate population compositions. We shall prove that indeed there exists a non-zero measure interval of intermediate q values such that the autocrat is unable to avert the institutional change driven by the dominant minority.

4.2.2 Heterogeneous societies

When societies are composed of different groups of citizens with given sizes, the transition problem from autocracy to dominant minority-based regime becomes quite involved. A probable key determinant of the problem is the magnitude of resource windfalls.[11] One obvious way to view this role is to come back to the comparative statics results, that is Proposition 3. According to the latter proposition, as the level of windfall resources goes up, labour supply of individuals under dominant minority, irrespective of their group membership, goes down. This means that labour income drops and it is unclear what the total impact on wealth would be, this said without having incorporated yet the impact on redistribution of the initial rise in resources. It results that the impact of resource windfalls income is highly non-trivial in our framework. Of course, related to the latter reasoning, the level of development as captured by the wage, w, is also likely to matter as the impact on total income of variations in labour supply (in response to other shocks) depends on this level. We shall also keep in mind that as the remuneration from occupying jobs rises, the majority incentives to revolt go also up as jobs are reserved to the dominant minority under autocracy in our setting. We will see this neatly when exploring the majority problem below.

Finally, the other highly intricate determinant of elite-led institutional change is the level of fractionalisation, q. Outside the extreme cases considered just above (quasi-homogeneous or full fractionalised societies), the analysis of intermediate social compositions is indeed highly demanding from the algebraic point of view as it will transpire along the way. We shall introduce a further

[11] We shall focus here on this wealth component for the connection with the resource curse literature. As we shall see just below, this does not mean at all that the labour market does not matter.

(natural) simplification by replacing Assumption 1 by a stronger condition:

Assumption 2. *The country owns a level of natural resources such that $R \geq R_A$, with $R_A = R_A(0) = w\left(\frac{w}{\gamma} - 1\right)$.*

Because $R_A(\delta_A)$ is a decreasing function of δ_A, the fulfilment of Assumption 2 implies Assumption 1 holds.

The majority decision We shall summarize the outcomes of the analysis of the majority members' decisions in the following proposition.

Proposition 7. *Set $\tilde{q} = 1 - \frac{\gamma}{w}$. Under Constraint 2 and Assumption 2, the following properties hold.*

i) For $q \in \left(\frac{1}{2}, \tilde{q}\right]$, the majority always revolts.

ii) For $q \in (\tilde{q}, 1)$ there exists a threshold $\tilde{R}[q] \geq R_A$ such that: (i) if $\tilde{R}[q] > R_A$ then the majority revolts for $R \in (R_A, \tilde{R}[q])$ and does not revolt for $R > \tilde{R}[q]$; (ii) if $\tilde{R}[q] = R_A$ the majority does not revolts.

Several findings and predictions can be highlighted in the Proposition above. A first important outcome is the hierarchy between the different conflict mechanisms at work in the model, at least for the majority group. The social structure is the main engine of uprising of this social group in our model for given economic and technological development as captured by the wage rate w. According to Proposition 7 i), provided the population is fractionalised enough, majority members are willing to revolt irrespective of the level of resource windfalls.

The intuition behind is similar to the case of full fractionalised societies examined above. Fractionalisation increases the cost of revolutions but also the share of the "cake" going to the majority. When $q \in \left(\frac{1}{2}, \tilde{q}\right)$, the second effect dominates whatever the level of income windfalls. It is worth noticing that the latter condition amounts to $q < 1 - \frac{\gamma}{w}$, which can be interpreted in terms of economic exclusion in autocracy vs the dominant minority-based regime. The relationship $q = P$ is the "cake" share captured by the dominant minority after revolution and $1 - \frac{\gamma}{w}$ is the one captured by the autocrat before revolution. Consistently enough, our model predicts that irrespective of resource windfalls, citizens belonging to the majority group will always tend to revolt if fiscal particularism is more favourable than the autocracy in terms of access to the economy's wealth (measured in shares).

Second, as it transpires from Proposition 7 ii), resource windfalls only matter in the case where the economies are not fractionalised enough in the precise sense given above. Indeed, when the "cake" share potentially captured by the dominant minority (if a successful patronalistic-like revolution occurs) is bigger than the one accruing to the autocrat under autocracy, the level and the composition of total income matters. Under autocracy, labour supply is equal to zero for majority members and their income reduces to income windfalls. Under dominant minority, people work and have an additional source of income. When resource windfalls are low, the additional labour income can make the difference in favour of rebellion in that it could compensate for the lower leisure and for the lower share in national wealth left to the majority under dominant minority. This cannot be the case for large enough resource windfalls. Indeed, while the autocracy redistribution rate is independent of resources, $\mu_A = \frac{\gamma}{w}$, the same rate under dominant minority, μ_m decreases with resource windfalls by Proposition 3. As a result, for given labour productivity and/or remuneration w, the labour income advantage of the dominant minority regime ends up dominated for large enough resource income, and the majority prefers to remain under autocracy in the latter case. Overall, resource income only matters when societies are not enough fractionalised, and it may lead to the autocratic regime breakdown if the economy is initially poor enough.

Last but not least, the labour market matters! Our simple model allows to enhance its role in institutional dynamics. As one can quickly see, as the wage w goes up, the threshold $\tilde{q}$ increases, easing the case for majority revolutions. We shall develop this innovative aspect of our analysis in detail later once the transitions from autocracy to the elite-led post-revolutionary regime characterized accurately enough. We thus move to the minority decision problem.

The minority decision and elite-led institutional change We now close the analysis with the study of the optimal decision of the minority and the reaction of the autocrat in case the minority decides to lead the mass revolt (Step 3 of the game, via the update of the premium δ_A awarded to minority members). The problem of the minority members is trickier than the majority's for two reasons: first, because it includes precisely the premium δ_A, a control in the hands of the autocrat, and second, because minority members enjoy jobs under autocracy, and therefore any variation in labour supply in the post-revolution period, have more intricate wealth and welfare implications for the minority members compared to the majority case.

To ease the exposition, we shall address this more complex algebraical case by making our point around the intermediate and reference population composition, $\tilde{q}$, clearly identified in the majority problem treated above. We can indeed prove quite simply that under mild conditions, the patronalistic-like institutional change takes place on a non-zero measure interval, $I_{\tilde{q}}$, around $\tilde{q}$, in that the autocrat cannot prevent the minority from leading the popular revolution even with the maximal premium, $\delta_A^{max} = 1 - \frac{\gamma}{w}$, on $I_{\tilde{q}}$. That's while patronalistic institutional change cannot emerge when population is too fractionalised or two homogeneous, it does so when the population structure is intermediate under certain conditions. We first summarize the optimal behaviour of the minority members in the following proposition.

Proposition 8. *Suppose Assumption 2 and Constraint 2 hold, and assume δ_A takes the maximal value $1 - \frac{\gamma}{w}$. Then:*

i) For $q \in [\tilde{q}, 1)$, there exists a threshold $\hat{R}[q]$ such that the minority revolts against the autocrat if $\hat{R}[q] > R > R^A$, and does not revolt for $R > \hat{R}[q] > R^A$.

ii) For $q \in \left(\frac{1}{2}, \tilde{q}\right)$, there exists a threshold $\tilde{q}_1$ such that for any $q \in [\tilde{q}_1, \tilde{q})$, the minority revolts against the autocrat if $\hat{R}[\tilde{q}] > R > R^A$, and does not revolt for $R > \hat{R}[\tilde{q}] > R^A$.

It should be noted that the Proposition does not say anything on what happens when $q < \tilde{q}_1$. We know from the analysis of the case of full fractionalisation that the minority members do not revolt when $q = \frac{1}{2}$, and we know they do revolt in a left neighbourhood of $\tilde{q}$ by continuity. We shall discuss the economic aspects of this proposition in the final subsection below. Before let's state the final proposition stemming from Proposition 7 and 8, formalizing the claim at the beginning of this subsection.

Proposition 9. *Suppose Assumption 2 and Constraint 2 hold, and denote by $\underline{R}[q] = Min\left(\hat{R}[q], \tilde{R}[q]\right)$. Then:*

i) For any $q \in [\tilde{q}, 1)$, the elite-led regime emerges provided $R \in (R_A, \underline{R}[q])$.

ii) For any $q \in [\tilde{q}_1, \tilde{q})$, the elite-led regime occurs when $R \in \left(R_A, \hat{R}[\tilde{q}]\right)$.

iii) For any $q \in [\frac{1}{2}, \tilde{q}_1)$, the elite-led regime cannot occur.

Proposition 9 puts together the outcomes of Proposition 7 and 8 to formulate the essential aspects of effective transition from autocracy to the elite-led regimes. It should be noted that while the mathematical conditions for the transition to happen are sufficient (and not necessary and sufficient), the final proposition just above does reflect comprehensively under which conditions on social structure and windfall roles this peculiar type of institutional change occurs, the role of labour market and development being implicit through $\tilde{q}$. We comment on these findings in the section below and relate them to evidence identified in the stylised facts section of this paper and other related empirical findings in the literature.

4.3 Discussion

The importance of social structures One key result of our study in the utmost importance of the social structure as captured by parameter q (whatever its prime origins) at the dawn of popular revolution-based institutional change. In our frame, it turns out that this aspect dominates some of the classical determinants of institutional change such as revolutions costs (Acemoglu and Robinson, 2006). Needless to say, social structure plays such a role here for a strongly relevant reason: it deeply determines the degree of fractionalisation/polarisation of society either under autocracy (insider minorities) or under the elite-led regime through fiscal particularism. In this respect, one of the intriguing properties of our model is that the fiscal particularism indicator is rigorously equal to q in the latter regime (see Proposition 2). This direct connection leads to social structure as the most significant aspect of our theory.

One of the main outcomes of our analytical study in this respect is that elite-led regimes cannot arise for extreme values of q: in particular, when the society is too fractionalised (i.e. when the minority size is close to the majority's), the majority always revolts (as their share of the fiscal revenues is almost the same as the minority's in the post-revolution regime) but the minority will always be prevented from making the regime change happen by the autocrats (additional feasible redistribution premium to the insider minority). Obviously, the majority members will not accept an elite-led regime in replacement of autocracy when the size of the minority is too small as the fiscal particularistic rule gives an excessively high proportion of the fiscal revenues in such a case. All in all, an elite-led institutional change will only take place for intermediate values of q, that is when the size of the minority is intermediate. This is in line with *Key fact 1* (the rarity of revolutions) and, most important, our *Key fact 4* which stresses that revolutions tend to happen in autocracies relying on the support of about 10/15-30% of the population to stay in power.

The importance of windfall resources The role of windfall resources in institutional change has been deeply explored in the literature as outlined in the Introduction. The larger these resources, the more powerful the autocracies, especially the most entrenched ones. However, as these resources keep growing, an inappropriate redistribution policy (in a broad sense) would trigger revolts of the population, or at least of some components of it (the least favored by the redistribution policy).

In our frame, the population, being non-homogenous, the design of the appropriate redistribution policy by the autocrats is much trickier (compared the homogenous population case). However, as perfectly illustrated by Proposition 9, the three-stage decision game considered in our theory does allow the autocrat to block the emergence of elite-led regimes if they control large enough windfall resources. When society is not fractionalised enough ($q > \tilde{q}$), the optimal redistribution policy of the autocrat (along with the three-stage game) will enable him to discourage both the minority and majority members to revolt if windfalls resources under their control are large enough. As a result, only when the latter resources are not that large, elite-led regimes emerge. The case of relatively more fractionalised societies ($q \leq \tilde{q}$) is theoretically more interesting as by Proposition 7, the majority would prefer the minority-led alternative regime (and accordingly, is willing to revolt) irrespective of the windfall resources endowment. However, in this case, the minority members will not pave the way to this regime change if the autocrat is able to redistribute more in favour of the insider minority members. Proposition 8 states that this is possible and feasible when resource windfalls are large enough. Therefore, only when the latter resources are not sizeable enough, the elite-led regime will emerge. This result agrees with our *Key fact 3* which indicates that revolutions have happened in regimes not relying on natural resources as their primary source of state revenues.

The importance of the labour market institutions As outlined after Proposition 7 above, another original contribution of the paper is to highlight the potentially significant role of the labour market institutions in institutional change for a certain class of countries. Indeed, in our frame, moving from autocracy to the dominant minority-based regime is also a transition from a totally repressed labour marked with zero participation for the majority members to a less repressed market with possibly positive labour supply for all the citizens independently of group membership. As a result, our model generates a gap between actual levels of productivity (w) and participation in the labour market, which is admittedly another potentially important engine of popular revolutions. In our theory, the majority members account for the fact that the dominant minority regime would allow them to work and to earn a labour income. The higher w, the higher this relative advantage of the latter regime relative to autocracy.

The role of the wage rate, and more broadly, of the level of development, is indeed much richer in our frame. Another effect of rising w works through the redistribution rates, μ_A and μ_m: both decrease in w (see Proposition 3). However, the (optimal) minimal redistribution μ_A, being inversely proportional to w, declines more quickly than μ_m when w is raised, by equation (12). This ultimately increases the advantage of the dominant minority regime and shows up neatly in the fractionalisation threshold $\tilde{q}$ increasing with w. All in all, exogenous increases in labour productivity negatively impact the survival of the autocratic regime in our setting.

Broadly speaking, these findings are in line with our *Key fact 2*. Pre-revolution autocracies are highly personalist (highly clientelist and particularist) but, after revolution, personalism tends to fall, even when pure democratic regimes do not emerge.

5 Conclusion

We have developed a full fledged theory to examine under which conditions elite-led revolutions occur, ultimately leading to post-revolution regimes dominated by the insider elites of the falling autocrats. Our theory is particularly suitable to analyse institutional change in autocracies with personalist traits where, as documented in the Introduction and stylised facts sections, the main engine of change are the active minorities/elites mostly gravitating around the autocrats. We have shown to which extent the outcomes of our theory are mostly consistent with the stylised facts of institutional change in personalist autocracies.

More precisely, we have shown that only under specific circumstances, such an elite-led regime change can take place. In particular, we have highlighted the role of social structure, in the form of population fractionalisation, as a major driver of elite-driven revolutions: only countries with intermediate fractionalisation levels can accommodate the multiple conditions required for this type of autocracy breakdown. Also while the predictions of our theory regarding the role of resource windfalls are largely consistent with the pre-existing literature on institutional change in resource-rich countries, we have innovated in highlighting the role of labour market institutions in personalist autocracies and their interplay with the level of economic development.

Clearly, our theory is not refined enough to account for another important aspect of elite-led institutional change, that is the heterogeneity of elites. Liberal elites are unlikely to push institutional change in the same direction as conservative elites, and these different elites do not need to have the same political power in all circumstances: the distribution of political power is likely to depend on the nature of the ruling autocracy and other external aspects, and it is also likely to change over time.[12] We are exploring this research line.

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Appendix

A Proofs

A.1 Proof of Proposition 1

The per capita consumption for the majority and minority members can be written more explictly, respectively, as:

$$c^M = \left((R + wl^M)\left((2\mu_m - 1) + \lambda^M(1-\mu_m)q\right) + (R + wl^m)(1-\mu_m)(1-q)\lambda^M\right)(1-\psi[q]),$$

$$c^m = \left((R + wl^m)\left((2\mu_m - 1) + \lambda^m(1-\mu_m)(1-q)\right) + (R + wl^M)(1-\mu_m)q\lambda^m\right)(1-\psi[q]).$$

The proof of the proposition derives readily from substituting c^M and c^m by the expressions above in the aggregate resource constraint of the economy, that's:

$$qc^M + (1-q)c^m = (R + wl^M q + wl^m(1-q))(1-\psi[q]),$$

and to proceed by identification of the right and left sides of the developed resource constraint using the fact that, by Definition 1, this resource constraint should be met **for all** triples of incomes (R, wl^m, wl^M). Notice the resource constraint can be rewritten as

$$\frac{C^T}{(1-\psi[q])} = q\frac{c^M}{(1-\psi[q])} + (1-q)\frac{c^m}{(1-\psi[q])} = R + wl^M q + wl^m(1-q),$$

where C^T is aggregate consumption, which allows us to obtain our results independently of the specification of the coordination costs; $\psi[q]$. The rest of the proof is heavily computational but trivial. Once c^M and c^m are replaced by the expressions given at the beginning of the proof, one can rewrite $\frac{C^T}{(1-\psi[q])}$ as follows

$$\frac{C^T}{(1-\psi[q])} = A(\mu,q)R + B(\mu,q)wl^M q + C(\mu,q)wl^m(1-q),$$

with $A(\mu,q)$, $B(\mu,q)$ and $C(\mu,q)$ some well-defined (tedious) expressions. By identification with the right-hand side of the resource constraint (that's $R + wl^M q + wl^m(1-q)$), one should obtain by identification as this should hold for all triples of incomes (R, wl^m, wl^M), $A(\mu,q) =$

$B(\mu, q) = C(\mu, q) = 1$. One can check that the three identities deliver the very same identifying rules λ^M and λ^m through the restriction:

$$q = \frac{\lambda^m - 2}{\lambda^m - \lambda^M},$$

which imposes the condition $\lambda^m > 2 > \lambda^M > 0$ of the Proposition 1, and is equivalent to the relationship stated above between the two shares (that's, $\lambda^m(q) = \frac{2-q\lambda^M(q)}{1-q}$. Notice μ does not show up in the final result, the result is valid for any μ, provided $\mu \neq 1$. □

A.2 Proof of Proposition 2

The proof is trivial after substituting the net transfers per capita s^m and s^M in the expression of the indicator P. If labour supplies are equal, then particularism is inversely related to fractionalisation: as fractionalisation decreases (that is q goes to 1), the larger the share of national transfers accruing to the minority. □

A.3 Proof of Proposition 3

Define for simplicity $\phi^m[q, \gamma, R, w] = \gamma^2(1-q)^2 + 4\gamma q(2q-1)(1-\psi[q])(R+w) \equiv \phi^m$. First of all, we check the sign of its partial derivatives: $\frac{\partial \phi^m}{\partial w} = \frac{\partial \phi^m}{\partial R} = 4\gamma q(2q-1)(1-\psi[q]) > 0$, $\frac{\partial \phi^m}{\partial \psi[q]} = -4q(2q-1)(R+w)\gamma < 0$. The derivative with respect to group size $\frac{\partial \phi^m}{\partial q} = \gamma\left(4(4q-1)(R+w) - 2\gamma(1-q) + 4(R+w)((1-2q)q\frac{\partial \psi[q]}{\partial q} + (1-4q)\psi[q])\right)$. We can show, after some tedious algebra, that $\frac{\partial \phi^m}{\partial q} > 0$.

First, consider the policy μ_m. The partial derivatives $\frac{\partial \mu_m}{\partial w} = -\frac{q\gamma\frac{\partial \phi^m}{\partial w}}{\sqrt{\phi^m}\left(\gamma(1-q)+\sqrt{\phi^m}\right)^2} < 0$, $\frac{\partial \mu_m}{\partial R} = -\frac{q\gamma\frac{\partial \phi^m}{\partial R}}{\sqrt{\phi^m}\left(\gamma(1-q)+\sqrt{\phi^m}\right)^2} < 0$, $\frac{\partial \mu_m}{\partial \psi[q]} = -\frac{q\gamma\frac{\partial \phi^m}{\partial \psi[q]}}{\sqrt{\phi^m}\left(\gamma(1-q)+\sqrt{\phi^m}\right)^2} > 0$, because $\frac{\partial \phi^m}{\partial w} > 0$, $\frac{\partial \phi^m}{\partial R} > 0$ and $\frac{\partial \phi^m}{\partial \psi[q]} < 0$, defined above. The partial derivative $\frac{\partial \mu_m}{\partial q} = \frac{\gamma\left(2\gamma\sqrt{\phi^m}+2\phi^m - q\frac{\partial \phi^m}{\partial q}\right)}{\sqrt{\phi^m}\left(\gamma(1-q)+\sqrt{\phi^m}\right)^2}$ requires more algebra. The sign depends on the numerator because $\frac{\partial \phi^m}{\partial q} > 0$. Using $\frac{\partial \phi^m}{\partial q}$ defined above, we get $\frac{\partial \mu_m}{\partial q} = \frac{2\gamma\left(\gamma(1-q)+\sqrt{\phi^m}+2q(R+w)\left(\psi[q]-1+q(2q-1)\frac{\partial \psi[q]}{\partial q}\right)\right)}{\sqrt{\phi^m}\left(\gamma(1-q)+\sqrt{\phi^m}\right)^2}$, with $\frac{\partial \psi[q]}{\partial q} < 0$ for all $q \in \left(\frac{1}{2}, 1\right)$. Using ϕ^m it can be shown that the numerator is always negative. It follows that, $\frac{\partial \mu_m}{\partial q} < 0$.

Now consider the labour supply under dominant minority regime. The derivative with respect to the wage rate, $\frac{\partial l^m}{\partial w} = \frac{(2q-1)\gamma\left(2(q-1)R\gamma\sqrt{\phi^m}+2R\phi^m+w(R+w)\frac{\partial \phi^m}{\partial w}\right)}{\sqrt{\phi^m}\left(\gamma(1-q)+\sqrt{\phi^m}\right)^2} > 0$. Indeed, using $\frac{\partial \phi^m}{\partial w} = 4q(2q-1)\gamma(1-\psi[q])$, we can easily rewrite $\frac{\partial l^m}{\partial w} = 4q(2q-1)w(R+w)\gamma(1-\psi[q]) + \sqrt{\phi^m} +$

$2\phi^m R > 0$. The derivative with respect to R is $\frac{\partial l^m}{\partial R} = -\frac{(2q-1)\gamma\left(2(q-1)\gamma\sqrt{\phi^m}+2\phi^m R-(R+w)\frac{\partial \phi^m}{\partial R}\right)}{\sqrt{\phi^m}\left(\gamma(1-q)+\sqrt{\phi^m}\right)^2}$. Using $\frac{\partial \phi^m}{\partial R} = 4q(2q-1)\gamma(1-\psi[q])$ and ϕ^m, gives: $\frac{\partial l^m}{\partial R} = \frac{\gamma(1-2q)}{w\sqrt{\gamma^2(1-q)^2+4\gamma q(2q-1)(1-\psi[q])(R+w)}} < 0$. The derivative with respect to coordination costs $\frac{\partial l^m}{\partial \psi[q]} = \frac{(2q-1)(R+w)\gamma\frac{\partial \phi^m}{\partial \psi[q]}}{\sqrt{\phi^m}\left(\gamma(1-q)+\sqrt{\phi^m}\right)^2} < 0$ since $\frac{\partial \phi^m}{\partial \psi[q]} < 0$. The sign of the derivative $\frac{\partial l^m}{\partial q} = \frac{(R+w)\gamma\left(2\gamma\sqrt{\phi^m}-4\phi^m+(2q-1)\frac{\partial \phi^m}{\partial q}\right)}{\sqrt{\phi^m}\left(\gamma(1-q)+\sqrt{\phi^m}\right)^2}$ is, however, ambiguous.

Finally, consider the consumption level of the minority. The derivative with respect to R is given by $\frac{\partial c^m}{\partial R} = \frac{q(1-\psi[q])-\frac{\frac{\partial \phi^m}{\partial R}}{2\sqrt{\phi^m}}}{1-q}$. Using $\frac{\partial \phi^m}{\partial R} = 4\gamma q(2q-1)(1-\psi[q])$, we can rewrite $\frac{\partial c^m}{\partial R} = \frac{q(1-\psi[q])\left(2\gamma(1-2q)+\sqrt{\phi^m}\right)}{(1-q)\sqrt{\phi^m}}$. The sign depends on $2\gamma(1-2q)+\sqrt{\phi^m}$. Using the definition of ϕ^m, after some algebra, we find that the latter is strictly positive. Thus, $\frac{\partial c^m}{\partial R} > 0$. The derivative $\frac{\partial c^m}{\partial w} = \frac{q(1-\psi[q])-\frac{\frac{\partial \phi^m}{\partial w}}{2\sqrt{\phi^m}}}{1-q}$. Proceeding as above, using $\frac{\partial \phi^m}{\partial w}$, we derive $\frac{\partial c^m}{\partial w} = \frac{q(1-\psi[q])\left(2\gamma(1-2q)+\sqrt{\phi^m}\right)}{(1-q)\sqrt{\phi^m}}$. Thus, as for R, $\frac{\partial \phi^m}{\partial w} > 0$. The derivative $\frac{\partial c^m}{\partial \psi[q]} = \frac{q(R+w)+\frac{\frac{\partial \phi}{\partial \psi[q]}}{2\sqrt{\phi}}}{1-q}$. Using the definition of ϕ, it can be proven that the numerator is strictly negative. Therefore, we get that $\frac{\partial c^m}{\partial \psi[q]} < 0$. Finally, the derivative $\frac{\partial c^m}{\partial q}$ is ambiguous as for labour supply.

As to the consumption of the majority members, the following results can be easily obtained. The derivative $\frac{\partial c^M}{\partial R} = \frac{\frac{(2q-1)\frac{\partial \phi^m}{\partial R}}{\sqrt{\phi^m}}+4(1-q)q(1-\psi[q])}{4q^2} > 0$, since $\frac{\partial \phi^m}{\partial R} > 0$. The derivative $\frac{\partial c^M}{\partial w} = \frac{\frac{(2q-1)\frac{\partial \phi^m}{\partial w}}{\sqrt{\phi^m}}+4(1-q)q(1-\psi[q])}{4q^2} > 0$ since $\frac{\partial \phi^m}{\partial w} > 0$. The derivative $\frac{\partial c^M}{\partial q}$ is again ambiguous. Finally, one gets: $\frac{\partial c^M}{\partial \psi[q]} < 0$. Of course, $\frac{\partial c^i_A}{\partial w} < 0$ and $\frac{\partial c^i_A}{\partial R} > 0$, given $c^M_A = \frac{R\gamma}{w}$ and $c^m_A = \left(\frac{R\gamma}{w} + \delta_A\right) + w\delta_A$. □

A.4 Proof of Proposition 4

The proof immediately derives from the fact that function $\rho(x)$ is strictly decreasing with $\rho(1) < 0$, $\forall R \geq 0$ as $\gamma < w$, by Constraint 1. Therefore, $\rho(\frac{\gamma}{w}) > 0$ is a necessary and sufficient condition for an (unique) interior maximizer to exist. This condition puts an upper bound on the resource revenues, R. Only if this magnitude is small enough, the redistribution rate for the majority chosen is non-minimal. □

A.5 Proof of Proposition 5

It's trivial to observe that Constraint 2, that is in our specific case $\gamma < qw \equiv \frac{w}{2}$, is instrumental to get $f^M\left[\frac{1}{2}, \gamma, R, w\right] < 0$. The second item of the Proposition follows from the fact that

$f^m\left[\frac{1}{2},\gamma,R,w,\delta_A\right]$ is linear in R with the coefficient multiplying R equal to $\frac{\gamma}{w}-\frac{1}{2}+\delta_A$. This coefficient is unambigously strictly positive when $\frac{1}{2}-\frac{\gamma}{w}<\delta_A<1-\frac{\gamma}{w}$. Therefore, for each δ_A value in this range, $f^m\left[\frac{1}{2},\gamma,R,w,\delta_A\right]>0$ for R large enough, assuming all the other parameters fixed at any admissible values. The remaining items derive from the fact that function $f^m[.]$ is increasing in δ_A whatever R, with $f^m\left[\frac{1}{2},\gamma,R,w,1-\frac{\gamma}{w}\right]=\frac{R+w}{2}-\gamma\log(2)>0$. □

A.6 Proof of Proposition 6

To prove Proposition 6 consider the following. First of all, when $q\to 1$ equation (15) goes to infinity, given $\mu_m=\frac{\gamma}{\sqrt{(R+w)\gamma(1-\psi[1])}}\in(0,1)$. Thus, it is trivial to show that $f^m[1,\gamma,R,w,\delta_A]=-\infty$. Note that when $q\to 1$ the labour supply l^m is positive if and only if $R<w\left(\frac{w(1-\psi[1])}{\gamma}-1\right)$. Thus, $l^m=0$ when $q\to 1$, under Assumption 1. Note also that the limit of equation (14) when $R\to w\left(\frac{w(1-\psi[1])}{\gamma}-1\right)=0$, while the limit when $R\to\infty$ goes to ∞. Moreover, the derivative of equation (14) when $q\to 1$ gives $\frac{\partial f^M[1,\gamma,R,w]}{\partial R}=\frac{\gamma}{w}-\frac{(R+2w)\sqrt{(R+w)\gamma(1-\psi[1])}}{2(R+w)^2}$. This derivative is positive when $2\gamma(R+w)^2-w(R+2w)\sqrt{(R+w)\gamma(1-\psi[1])}>0$. Under Assumption 1 and Constraint 2, the latter equation is always positive. Therefore, given that for $q\to 1$ equation (14) is a strictly increasing function of R, Proposition 6 holds trivially. □

A.7 Proof of Proposition 7

We shall start with two preliminary results that will allow us to prove the proposition.

First, using (13) and $\psi[q]=1-q$, we derive that $l^m=0$ when $R=\bar{R}[q]$, with $\bar{R}[q]=\frac{qw(qw-\gamma)}{(2q-1)\gamma}$. Note that $\bar{R}[q]>0$ under Constraint 2. Using equation (11) when $R=\bar{R}[q]$ and $l^m=0$, we get that $\mu_m=\frac{\gamma}{wq}>\frac{\gamma}{w}=\underline{\mu}_A$ and $f^M[q,\gamma,\bar{R}[q],w]=\frac{(1-q)\bar{R}[q](\gamma-qw)}{qw}<0$, again under Constraint 2. Therefore, under Assumption 1, when $R=\bar{R}[q]>R_A$ the function (14) is strictly negative and the majority members always revolt.

Second, the comparison between $R_A=w\left(\frac{w}{\gamma}-1\right)$ and $\bar{R}[q]=\frac{qw(qw-\gamma)}{\gamma(2q-1)}$, gives directly that $R_A<\bar{R}[q]$ when $q\in\left(\frac{1}{2},\tilde{q}\right)$ and $R_A>\bar{R}[q]$ when $q\in(\tilde{q},1)$, with $\tilde{q}=1-\frac{\gamma}{w}$.

Consider the case $q\in\left(\frac{1}{2},\tilde{q}\right]$. Using the two preliminary results above and knowing that $\frac{\partial l^m}{\partial R}<0$ by Proposition 3, we observe that $l^m=0$ for all $R\geq\bar{R}[q]$, while $l^m>0$ for all $R<\bar{R}[q]$. Notice that the limit $\lim_{R\to\infty}f^M[q,\gamma,R,w]=\infty\left(q-1+\frac{\gamma}{w}\right)$ is strictly negative $\forall\ q\in\left(\frac{1}{2},\tilde{q}\right)$ and that $f^M[q,\gamma,R,w]<0$ in $R=\bar{R}[q]$. Solving equation (14) gives that

$f^M[q,\gamma,R,w] = 0$ if and only if $R = \tilde{R}[q]$, with $\tilde{R}[q] = \frac{w(qw-\gamma)\left(\gamma-(1-q)^2 w\right)}{q((1-q)w-\gamma)^2}$. By monotonicity it follows directly that for all $R > \bar{R}[q]$, the function (14) must be negative because it can take the value of zero once in the point $\tilde{R}[q]$ that cannot be larger than $\bar{R}[q]$. When however $R \in (R_A, \bar{R}[q])$ we observe that $l^m > 0$ and the algebra becomes more complicated. To prove that the function $f^M[q,\gamma,R_A,w] < 0$ for all $R \in (R_A, \bar{R}[q])$, consider the general form $f^M[q,\gamma,R_A,w] = \frac{R\gamma}{w} - q\left(\frac{(1-\mu_m)(1-q)(l^m w+R)}{q} + \mu_m(l^m w + R)\right) - \gamma(\log[1-l^m])$. The latter function is zero when $l^m = 1 - \frac{\Omega[e^{w\chi[q]+R\left(\chi[q]+\frac{\gamma}{w}\right)} w\chi[q]]}{w\chi[q]}$, with $\Omega[.]$ defining the Lambert function and $\chi[q] = q - 1 + \mu_m(1-2q) < 0$. Since the argument of the Lambert function is strictly negative, we observe that $\Omega[.] < 0$. Therefore, we should necessarily have that $l^m < 1$ given that $\frac{\Omega[e^{w\chi[q]+R\left(\chi[q]+\frac{\gamma}{w}\right)} w\chi[q]]}{w\chi[q]} > 0$. Note now that if $\frac{\Omega[e^{w\chi[q]+R\left(\chi[q]+\frac{\gamma}{w}\right)} w\chi[q]]}{w\chi[q]} \geq 1$, the function $f^M[q,\gamma,R_A,w]$ can be zero if and only if $l^m \leq 0$, that is excluded when $R \in (R_A, \bar{R}[q])$, as previously observed. Using the properties of the Lambert function, one can also observe that $\Omega[e^{w\chi[q]+R\left(\chi[q]+\frac{\gamma}{w}\right)} w\chi[q]] > w\chi[q]$. Therefore, it necessarily follows that $f^M[q,\gamma,R_A,w] < 0$ when $l^m > 0$ and $q \in \left(\frac{1}{2}, \tilde{q}\right]$. This prove part i) of Proposition 7.

Now, consider the case $q \in (\tilde{q}, 1)$. We know from the preliminary results above that $R_A > \bar{R}[q]$. Therefore, $l^m = 0 \;\forall\; R > R_A$. We also know the function $f^M[q,\gamma,R,w]$ is zero when $R = \tilde{R}[q]$ and $l^m = 0$. Since for $R < R_A$ the function (14) is no longer valid, two scenarios are possible when $q \in (\tilde{q}, 1)$: (i) the function $f[q,\gamma,R,w]$ is negative close to R_A. In this case, given that $\lim_{R\to\infty} f[q,\gamma,R,w] = \infty\left(q - 1 + \frac{\gamma}{w}\right)$ is strictly positive, it must necessarily be that $\tilde{R}[q] > R_A$, since the function $f^M[q,\gamma,R,w]$ when $l^m = 0$ can take the value of zero only in the point $R = \tilde{R}[q]$. It follows that $f^M[q,\gamma,R,w] < 0$ for all $R \in (R_A, \tilde{R}[q])$ and that $f^M[q,\gamma,R,w] > 0$ for $R > \tilde{R}[q]$. (ii) the function $f^M[q,\gamma,R,w]$ is non-negative close to R_A. In this case, it must necessarily be that $\tilde{R}[q] \leq R_A$ because $\lim_{R\to\infty} f[q,\gamma,R,w] > 0$. However, under Assumption 1, it must be that $R > R_A$. Therefore $f^M[q,\gamma,R,w] > 0$. Indeed, note that this result confirms previous proposition: the $\lim_{q\to 1} \tilde{R}[q] = R_A$, that is the majority never revolt for all $R > R_A$, as suggested by Proposition 6. □

A.8 Proof of Proposition 8

We shall analyse when the function defined by equation (15) is negative. We concentrate on the extreme case of maximum particularism in favour of the insider elite under autocracy, that is

$\delta_A = 1 - \frac{\gamma}{w}$. Using (11) and $\psi[q] = 1 - q$, we can rewrite $\mu_m = \frac{\gamma}{wq(1-l^m)}$. Equation (15) reduces to:

$$w - \gamma - \gamma \log(1 - l^m) - \frac{(l^m w + R)\left((1 - l^m)q^2 w + \gamma(1 - 2q)\right)}{(1 - l^m)(1 - q)w} + R + \gamma \log\left(\frac{\gamma}{w}\right).$$

We first concentrate on the case $q \in [\tilde{q}, 1)$ so that $R^A \geq \bar{R}[q]$. Using the preliminary results provided in the proof of Proposition 7, we know that when $R = \bar{R}[q]$ then $l^m = 0$. Using the comparative statics results in Proposition 3, we also know that l^m is decreasing in R. Therefore, $l^m = 0 \; \forall \; R > \bar{R}[q]$. Under Assumption 2, that is $R > R^A$, we have that for all $q \in [\tilde{q}, 1)$, the labour supply $l^m = 0$ and the function $f^m\left[q, \gamma, R, w, \delta_A^{max}\right]$ reduces to:

$$f^m\left[q, \gamma, R, w, \delta_A^{max}\right] = R + (w - \gamma) - \frac{R(q^2 + q - 1)w + \gamma - 2q\gamma}{(1 - q)w} + \gamma \log\left(\frac{\gamma}{w}\right).$$

We can easily observe that the function above is negative for all:

$$R < \frac{(1 - q)w\left(\gamma - \gamma \log\left(\frac{\gamma}{w}\right) - w\right)}{\left(1 - q^2 - q\right)w + 2\gamma q - \gamma} \equiv \hat{R}[q]$$

Two cases arise for all $q \in [\tilde{q}, 1)$:

- when $\hat{R}[q] > R > R^A$ then $f^m[q, \gamma, R, w, \delta_A^{max}] < 0$ for all $q \in [\tilde{q}, 1)$;
- when $R > \hat{R}[q] > R^A$ then $f^m[q, \gamma, R, w, \delta_A^{max}] > 0$ for all $q \in [\tilde{q}, 1)$.

Proposition 8 ii) is an implication of the statement in Proposition 8 i). Indeed as the function $f^m\left[\tilde{q}, \gamma, R, w, \delta_A^{max}\right] < 0$ when $\hat{R}[\tilde{q}] > R > R^A$, equation (15) must remain strictly negative by continuity with respect to q at $q = \tilde{q}$, for the same values of the parameters (including R) validating this property at $\tilde{q}$. Therefore, there exists a threshold $\tilde{q}_1$ such that for any $q \in [\tilde{q}_1, \tilde{q})$, the minority revolts against the autocrat if $\hat{R}[\tilde{q}] > R > R^A$, and does not revolt for $R > \hat{R}[\tilde{q}] > R^A$. $\square$

A.9 Proof of Proposition 9

The Proposition follows directly from Propositions 7 and 8. $\square$

B Online Appendix: useful checks

B.1 The Model with Universalistic Public Good

Assume that the total tax revenue (4) is equally shared between majority and minority members. The budget constraints (5) and (6) can be respectively rewritten as follow:

$$c^M = \left[(R + wl^M)\mu_m + G\right](1 - \psi[q]),$$

$$c^m = [(R + wl^m)\mu_m + G](1 - \psi[q]),$$

As for the particularistic redistribution system the government budget constraint is always binding since $c^M q + c^m(1-q) = [R + (l^M q + l^m(1-q)](1 - \psi[q])$.

Without loss of generality assume that $\psi[q] = 0$. Consider first that the representative agent of the minority is the strategic leader of the game. Therefore, the representative agent of the majority moves first and maximises utility (1) under the budget constraint c^M defined above and chooses her optimal labour supply:

$$l^M = 1 - \frac{\gamma}{qw(1-\mu_m) + w\mu_m}.$$

Given majority labour supply, the representative agent of the minority maximizes her utility under the budget constraint c^m to derive:

$$l^m = 1 - \frac{\gamma}{qw(1-\mu_m) + w}.$$

Since minority members have *de jure* power, they will set the fiscal policy. Deriving their utility with respect to μ_m one gets two solutions: $\mu_m = 1$ and $\mu_m = \frac{q^2+q-1}{(1-q)^2}$. The first solution is compatible with local concavity if and only if $q < \frac{2}{3}$. The second solution, if and only if $q > \frac{2}{3}$. However, in the latter case, we observe that $\mu_m = \frac{q^2+q-1}{(1-q)^2} > 1$. Therefore the only acceptable solution is $\mu_m = 1$. When $\mu_m \to 1$ we get that:

$$l^M = l^m = 1 - \frac{\gamma}{w}.$$

Therefore, the model with pure public good degenerates to the standard model of institutional changes without redistribution across groups of citizens.

Assume now that the strategic leader of the game is the representative agent of the majority. Minority members move first and choose the following labour supply:

$$l^m = 1 - \frac{\gamma}{w - qw(1-\mu_m)}.$$

Given minority labour supply, the representative agent of the majority maximises utility under the budget constraint c^m to derive:

$$l^M = 1 - \frac{\gamma}{qw(1-\mu_m) + w\mu_m}.$$

Deriving utility (1) with respect to policy, we get $\mu_m = \{1 + \frac{1}{q^2} - \frac{3}{q}; 1\}$. The first solution is not admissible since it is always negative. Again, the model with majority strategic leader predicts that $\mu_m = 1$ and $l^m = l^M = 1 - \frac{\gamma}{w}$. As for the dominant minority scenario, the model degenerates to the benchmark case with only one group of citizens.

B.2 Second Order Conditions for a Maximum

Given the reaction function (10), minority members maximise (1) under the budget constraint (8). Solving both first order conditions for a maximum in terms of labour supply, one gets :

$$l^m[\mu_m] = 1 - \frac{\gamma}{w\mu_m(1-\psi[q])},$$

and

$$l^m[\mu_m] = \frac{q\left((\mu_m)^2(1-\psi[q])(2R+w) - \gamma\right) - (\mu_m)^2 R(1-\psi[q])}{(\mu_m)^2(1-q)w(1-\psi[q])}.$$

Since the problem is quadratic, we derive two solutions for μ_m :

$$\mu_m^1 = \frac{2\gamma q}{\gamma(1-q) + \sqrt{\gamma\left(\gamma(1-q)^2 + 4q(2q-1)(1-\psi[q])(R+w)\right)}},$$

and

$$\mu_m^2 = -\frac{2\gamma q}{\gamma(1-q) + \sqrt{\gamma\left(\gamma(1-q)^2 + 4q(2q-1)(1-\psi[q])(R+w)\right)}}.$$

Using the above solutions and (11) we can derive two solutions for labour supply (say $l^{m,1}$ and $l^{m,2}$). To check if these solutions are stable we should the sign of the determinant. We define the

Hessian matrix of second partial derivatives as follows:

$$\text{Hess} = \begin{bmatrix} -\frac{\gamma}{(l^m-1)^2} & w(1-\psi[q]) \\ w(1-\psi[q]) & \frac{2q\gamma}{(q-1)(\mu_m)^3} \end{bmatrix}. \tag{16}$$

The determinant of the Hessian is therefore given by:

$$\det = -\frac{2q\gamma^2}{(l^m-1)^2(q-1)(\mu_m)^3} - w^2(\psi[q]-1)^2.$$

Since the sign of the determinant is ambiguous, we should check local stability when solutions are given by the following two couples of policy/labour supply: (i): $\mu_m = \mu_m^1$ and $l^m = l^{m,1}$; (ii): $\mu_m = \mu_m^2$ and $l^m = l^{m,2}$. For the first solution, (i), we derive:

$$\det = \frac{w^2(\psi[q]-1)^2\sqrt{\gamma\left(\gamma(1-q)^2 + 4q(2q-1)(1-\psi[q])(R+w)\right)}}{\gamma(1-q)} > 0,$$

while for the second, (ii):

$$\det = -\frac{w^2(\psi[q]-1)^2\sqrt{\gamma\left(\gamma(1-q)^2 + 4q(2q-1)(1-\psi[q])(R+w)\right)}}{\gamma(1-q)} < 0.$$

Since the second solution is negative, the problem is convex at local level. Therefore we exclude this solution.