

# Resource rents and conflict in polarized societies

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## Abstract

The present paper analyses how resource rents may affect political outcomes in a polarized society, where groups hold conflicting views on economic policy. A politically dominant group decides whether or not to include the opposition in the national political process. The politically weaker group chooses whether to remain in the union with the dominant group, or break away from this union by seeking regional autonomy. The key variables determining whether there is peace or conflict in society, and whether there is democracy or dictatorship, include the level of resource rents, the degree of preference polarization between groups, the groups' relative control over the country's natural resources, and the ability to commit to democratic institutions and economic policies. The analysis finds that, depending on the social environment and level of natural resources, changes in natural resources may be a source of conflict or peace, and promote democratic participation or political pacification.

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# 1 Introduction

The potential negative effects of natural resources on economic development, peace, democracy and the quality of institutions more generally have received a lot of attention lately in the literature. Sachs and Warner (2001) show that there exists a “resource curse”, in the sense that endowment of natural resources tends to slow down economic growth. Similarly, Collier and Hoeffler (2004) find that primary commodity exports is the strongest single factor explaining civil war. Ross (2001), Lam and Wantchekon (2002) and Damania and Bulte (2003) find evidence of a positive correlation between natural resource abundance and dictatorship. More broadly, Busby et al (2003) show that there is a negative link between resource rent and the quality of institutions, measured by rule of law, political stability, and government effectiveness. Oil resources in particular seems to have a strong negative impact on economic, political, and social development, see for instance Busby et al (2003), de Soysa (2002) and Fearon and Laitin (2003), and for an overview, Ross (2004). Theoretical contributions on the mechanisms of the resource curse typically focus on rent seeking, see for instance Tornell and Lane (1999), Baland and Francois (2000), and Torvik (2002).

Although the emphasis in the recent literature has been on the negative effects of resource wealth on economic growth and political institutions, it is clearly not the case that such resources *necessarily* lead to slower growth, dictatorship, or civil war. For instance, Mehlum et al (2006) find evidence that the economic resource curse applies only to countries with poor institutions. Even stronger, economic historians have traditionally emphasized the great *benefits* of natural resource endowment for a country’s economic development (see for instance Wrigley, 1998). Moreover, some authors like Homer-Dixon (1999) see scarcity of resources rather than resource abundance as a source of conflict in society. Similarly, Smith (2004) concludes that oil wealth reduces social protest and reduces the incidence of civil war. Herb (2005) finds no evidence that resource rents reduce the level of democracy. Indeed, some case studies point to the potential of oil revenues in promoting cooperation between groups in society and stimulating democracy. Neuhausser (1992) argues that, by allowing a “class compromise” between workers and capitalists, rising oil revenues was key to the formation and stability of democracy in Venezuela from 1958 onwards. Similarly, Karl (1997, page 101) states that: “Petroleum rents underlay this new system of reconciling competing interests by turning all organized interests into subsidized clientele and thus

permitting them to avoid the zero-sum economic games that have proved so detrimental to democracy in the rest of Latin America.” The compromise in Venezuela was institutionalized as a democracy, dominated by two political parties, Acción Democrática and COPEI, and a mutual understanding that whoever won the elections, each party was guaranteed some access to the oil rent through allocation of public employment, public procurement contracts, and the like. For overviews on the positions of resource “optimists” and resource “pessimists”, see for instance de Soysa (2005) and Gleditsch (2001).

Oil seems to have contributed to cooperation between social groups in other parts of the world too. In a study of the Middle Eastern monarchies, Herb (1999) shows that before oil, the Gulf monarchies were characterized by a relatively high degree of regional autonomy, each region led by a prince of the ruling family. Family ties did not prevent conflict; intrafamily wars often erupted on the death of a ruler. According to Herb, oil has transformed the states of Arabia from segmentary to unitary states. It has enabled the ruler to secure allegiances by bestowing special favors, such as positions in the state bureaucracy, to influential individuals. Moreover, by increasing the value of power, oil has in fact stimulated cooperation among the members of the ruling families. This is due to the fact that the throne is not necessarily handed over from father to son in the Arabian dynasties. Instead, the future ruler has to receive the *bay'a*, a pledge of allegiance, from key members of the ruling family. A large number of shaykhs and princes are thus eligible to take over power. Rather than choosing confrontation, the various princes cooperate in the hope of one day becoming the ruler of the country and thereby controlling its oil wealth. The indeterminacy of the succession is “the glue that holds the family together”, in the words of Herb (1999, page 46). Hence, if not producing broad based democratization in the oil rich Arabia, oil at least appears to have promoted stability and the political participation of various factions of the ruling families.

The above evidence from cross-country regression analysis and in depth country studies demonstrates that resource rents may affect political and social development through various channels, and that their net effect on war and peace, democracy and dictatorship, is far from clear. The present paper is an effort to think in a systematic way about at least some aspects of this complexity. The model will demonstrate that resource rents have the potential to both stimulate and obstruct cooperation between social groups, and specify under which circumstances different political outcomes are likely to apply. In this way, the paper can be seen as shedding light on the lack of

clear results from the empirical literature on the relation between resource rents and social and political outcomes: This relationship is likely to be highly non-monotonic and complex, and, say, linear regression models are not likely to capture these mechanisms very well.

The paper is related to Acemoglu and Robinson (2001) who analyze the interaction between a rich elite and a poor opposition. The elite may try to prevent revolution by offering redistributive policies. If this is not enough, the elite may offer a promise of democratization, which can be seen as a credible commitment to future redistribution. The present paper also studies the incentive of a powerful incumbent to offer democratization to a less powerful opposition. It adds to the study by Acemoglu and Robinson (2001) by analyzing how an external source of public finance interacts with polarization of preferences to determine political outcomes.

Acemoglu, Robinson, and Verdier (2004) analyze the survival ability of a kleptocracy. Focusing on the ability of opposition groups to coordinate on attempts to overthrow the dictator, they show that resource rents and foreign aid, by increasing the ability to implement policies of divide-and-rule, may increase the longevity of such regimes. In contrast, the present model demonstrates that such resources may in fact stimulate political inclusion of the opposition, and specifies the conditions for when this is likely to take place.

Robinson, Torvik, and Verdier (2006) study the effect of resource revenues on political competition and economic efficiency within a given political system. In particular, they show how temporary and permanent oil booms may affect inefficient distribution of rents in the form of public sector patronage employment. The present paper differs from theirs primarily by focusing on political outcomes, and in particular the way in which resources and polarization of preferences interact to determine transitions between dictatorship and democracy.

Collier and Hoeffler (2005) present a model where an altruistic party that favors the supply of public goods competes against a patronage party that offers special favors to influential groups. A resource rent increases the likelihood that the patronage party wins the election and increases the scope for patronage policies, and thus reduces the provision of public goods. In the empirical part of their paper, they find that in developing countries, the combination of resource wealth and democracy leads to low growth. In resource poor countries, democracy outperforms autocracy, whereas in resource rich countries, autocracy outperforms democracy. While the theoretical analysis

in their paper focuses on the economic consequences of resources, the present paper studies how resources affect the choice between democracy and dictatorship.

Aslaksen and Torvik (2006) analyze a situation where two equal parties choose between democratic competition or conflict. Democratic competition is less costly than armed conflict. However, a democratic victory also brings less freedom to define policies and hence lower gains to the winning party than victory through conflict. The present analysis differs from their paper by analyzing the choice of an incumbent government on whether to include the opposition in the political process or not. Hence, our starting point is one of asymmetry in power between the groups.

The paper is organized as follows. Section 2 presents the benchmark version of the model, where public spending policies are exogenously determined, given by the ideal position of the ruling group. Section 3 analysis the political and economic outcome in this benchmark scenario. Section 4 presents the version of the model where policies are endogenously determined, and not necessarily identical to the ideal position of each group. Section 5 presents the analysis of this scenario. Section 6 concludes.

## 2 Model

There are two groups of people in the country, group  $a$  and  $b$ . The groups are of equal size, the mass of each measured by unity. The groups differ only on three dimensions. First, they are geographically segregated, with a concentration of group  $a$  in region  $A$  and group  $b$  in region  $B$ . Second, they have conflicting views on what the optimal policy should be. Third, one of the groups is politically dominant, for instance because of an incumbency advantage and/or because of close connections to the military.

For concreteness, let group  $a$  be the dominant group. The main decision by this group is whether or not to include the weaker group, i.e., group  $b$ , in the political process at the national level. The main decision by group  $b$  is whether to stay in the union or to secede, seeking regional autonomy in its home region  $B$ .

The sequence of moves is as follows: First, the dominant group determines whether or not to allow democratic elections at the national level. Second, the weaker group decides whether to stay in the union or to seek regional autonomy. Third, national elections, if offered, are held. Fourth, policies are

implemented and payoffs are realized.

I shall identify secession with conflict, and national unity with peace. According to this definition, there are four possible outcomes in the present analysis, two peaceful and two involving conflict. The first peaceful outcome is “inclusion”, where the stronger group includes the weaker group in the political process at the national level, by opening up for elections, and the weaker group chooses to take part in this process. The second peaceful outcome is “compliance”, where the weaker group is not offered political participation, but still prefers to stay in the union, rather than to secede. The two conflict outcomes differ according to which groups initiate the conflict. First, there is “exit”, where the weaker group prefers to secede even when offered political participation by the stronger group. Second, there is “exclusion”, where the weaker group is excluded from political participation by the stronger group, and responds by seeking regional autonomy.

There are efficiency gains from national unity, which can be interpreted as a peace dividend. By choosing national unity, the groups avoid the costly duplication of the public good associated with regional autonomy. As will become clear, the size of the peace dividend is a falling function of the degree of polarization in society. In the present paper, the cost of secession, and hence the cost of conflict, is limited to the costly duplication of public goods.<sup>1</sup>

Since there are efficiency gains from cooperation, the Coase theorem implies that the groups should be able to negotiate sharing rules so that conflict never would arise in equilibrium. Sharing in the benchmark version of the model takes the form of the dominant group including the weaker group in the political process, by opening up for democratic elections. I shall, however, assume that there are limits to the ability of the dominant group to promise free and fair elections, and hence a limit to the extent of redistribution. The Coase theorem therefore does not necessarily apply, and conflict may arise in equilibrium.

Another source of redistribution is through modification of policies. In the benchmark version of the model I only allow for the ability to make (imperfect) commitment to hold elections, but exclude the opportunity to

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<sup>1</sup>Other costs of war, including loss of lives, output and capital, are therefore not modelled explicitly. The groups can be seen as having a comparative advantage in the use of force in their respective home regions. In this way, the only relevant response by group  $b$  to exclusion from political participation at the national level is political separation through regional autonomy. Similarly, group  $a$  cannot challenge a decision by  $b$  to exit the union and establish regional autonomy.

make binding commitments on policy. Hence, in the benchmark version of the model the group in power necessarily implements his or her ideal policy. This dichotomy between the (limited) ability to commit to elections and the lack of ability to commit to policies can be justified by pointing to the more complex and multi-dimensional nature of policies relative to holding elections. In an extension section, however, I also open up for the ability of groups to commit to policies that differ from their ideal positions.

Each individual is endowed with wealth  $w$ . Government expenditures are financed by a head tax  $t_i$  and revenues  $\rho_i$  from a natural resource. In a political union, everybody pays the same tax so that  $t_a = t_b = t$  and the national government controls the entire natural resource  $\rho$ . In a regional solutions, taxes may differ between regions and the regional governments receive income from the natural resources under their control. Government revenues finance a public good  $g_i$ , e.g., law enforcement and defense. There is a disagreement between the two groups on what the public good should be. The type of public good preferred by group  $a$  is  $g_a$  and that of group  $b$ ,  $g_b$ . Utility for an individual of group  $i$  is given by

$$U_i = (w - t_i) u_i(g_i), \quad (1)$$

where  $w - t_i$  is consumption of the private good and  $u_i(g_i)$  measures utility derived from the public good  $g_i$ . In case of a national government, the public budget constraint is given by  $g_i = 2t + \rho$ . With political separation between the two regions, the public budget constraint of each region is  $g_i^r = t_i + r_i\rho$ , where  $s_i$  is the share of the natural resource located in region  $i$ , and superscript  $r$  indicates that this is the regional solution. In the following, let  $s_b = s$  and  $s_a = 1 - s$ .

With each group implementing their ideal policies, the benefit to the opposition group in a national union from public goods provision is only a fraction  $(1 - \gamma)$  of the benefit to the group in government. I shall refer to  $\gamma$  as a measure of polarization of political preferences in society, or simply “polarization”. In this way, the public good can be seen as “impure”, with the degree of purity falling in the degree of polarization in society. With full polarization, i.e.,  $\gamma = 1$ , there are no spillovers across groups from public goods provision. The publicly provided good is then a private one, and there are no efficiency gains from forming a union. Utility derived from public spending for group  $i$  when members of its own group are in power of a

national government, implementing group  $i$ 's ideal policy, is given by:

$$u_i(g_i) = 2t + \rho. \quad (2)$$

Utility derived from public spending for the same group when the other group  $j$  is defining national policies according to that group's ideal is given by:

$$u_i(g_j) = (1 - \gamma)(2t + \rho). \quad (3)$$

Under regional autonomy, each group defines regional policies. The ability of group  $b$  to define policies according to its own preferences is the benefit of secession. Utility derived from public spending for people in region  $A$  in this case is given by:

$$u_a(g_a^r) = t_a + (1 - s)\rho, \quad (4)$$

and for those in region  $B$  as:

$$u_b(g_b^r) = t_b + s\rho, \quad (5)$$

In an extension to the model I shall consider also the possibility of the groups committing to policies that differ from their first best positions. This will involve a modification of equations (2) and (3).

There are six relevant payoffs we need to consider, three for each group, depending on whether there is a national government (and therefore by definition, peace) or secession (and therefore conflict), and, in case of a national government, whether there are democratic elections (which we term "inclusion") or not (i.e., "compliance").

## 2.1 Peace

### 2.1.1 Compliance

Compliance describes the case where group  $a$  chooses not to share political power, but that group  $b$  still prefers to stay in the union rather than to seek regional autonomy. From (2) and (1) we see that the utility of group  $a$  is then given by:

$$U_a = (w - t)(2t + \rho). \quad (6)$$



The utility of group  $b$  in this case can be found from (1) and (3) as:

$$U_b = (1 - \gamma) (w - t) (2t + \rho). \quad (7)$$

The governing group sets the tax level so as to maximize utility for its group. Maximizing  $U_a$  with respect to  $t$ , the optimal tax in case can be expressed as:

$$t = \frac{1}{2}w - \frac{1}{4}\rho \equiv t_N. \quad (8)$$

Note that for  $\rho > 2w$ ,  $t_N < 0$  implying that the optimal policy is a subsidy. Inserting the optimal tax in (6) yields:

$$U_a(t_N) = \frac{1}{8} (2w + \rho)^2. \quad (9)$$

Similarly, for group  $b$ , inserting the optimal tax rate from (8) in (7), we find that:

$$U_b(t_N) = \frac{1}{8} (2w + \rho)^2 (1 - \gamma). \quad (10)$$

### 2.1.2 Inclusion

In the “inclusion”-scenario, group  $a$  offers to hold national election, and group  $b$  accepts this offer. By holding elections, the dominant group risks losing power. In the present framework, the only reason why group  $a$  would be willing to share power is to prevent  $b$  from seceding. The exit of group  $b$  from the political union would lead to a loss of the national tax base and hence a limit to group  $a$ 's ability in carrying out its preferred policies. For group  $b$ , the benefit of seeking regional autonomy is that it will enable it to implement its ideal policies with certainty, i.e., without standing the risk of losing an election. The cost, however, is that it will be limited by the regional tax base in financing these policies. In this way, they have to forsake the scale economies present in public goods supply at the national level, i.e., forsake the peace dividend.

In a less than ideal institutional environment (which we assume is the case here), it may not be possible for the dominant group to commit to completely free and fair elections. The election campaign and count of votes may be (or at least perceived to be) biased in favor of group  $a$ . The dominance of this group would typically involve control over the media, courts, military, police

etc., which gives this group an incumbency advantage in elections. A promise to hold free and fair elections, even if sincere, may therefore not be seen as credible by the opposition. Once group  $b$  has made the decision not to break away from the union, which I assume is an irreversible decision, the dominant group has an incentive to manipulate the election campaign and the count of vote to increase their chance of victory. Let  $\lambda \leq 0.5$  denote the (expected and de facto) possibility of group  $b$  to win the election, where  $\lambda = \frac{1}{2}$  describes an unbiased system. A lower  $\lambda$  means a system more biased in favor of the dominant group. Under national democracy, the expected utility derived from public spending for group  $a$ , call it  $u_a^e(g_a)$ , is therefore:

$$u_a^e(g_a) = (1 - \lambda) u_a(g_a) + \lambda u_a(g_b) = (2t + \rho)(1 - \gamma\lambda), \quad (11)$$

and for group  $b$ :

$$u_b^e(g_a) = \lambda u_b(g_b) + (1 - \lambda) u_b(g_a)(1 - \gamma) = (2t + \rho)(1 - \gamma(1 - \lambda)). \quad (12)$$

In the political and economic union, both groups pay taxes, so that the public budget constraint is given by  $g_i = 2t + \rho$ . Using (11) in (1), the expected utility for group  $a$  in this case can be expressed as:

$$U_a^e = (2t + \rho)(1 - \gamma\lambda)(w - t). \quad (13)$$

Similarly, using (12) in (1), we find the expected utility for group  $b$  as:

$$U_b^e = (2t + \rho)(1 - \gamma(1 - \lambda))(w - t). \quad (14)$$

There is no disagreement between the two groups in choice of taxation, nor is there any time consistency issue: The tax level  $t_N$  given by (8) is the optimal ex post choice of whichever group wins the election, as well as the choice that maximizes the ex ante expected utility  $U_a^e$  and  $U_b^e$ . Hence, the only fundamental difference in preferences between the two groups is on the public spending program. Inserting  $t_N$  in (13), we can express expected utility for group  $a$  in the present case as:

$$U_a^e(t_N) = \frac{1}{8}(2w + \rho)^2(1 - \gamma\lambda), \quad (15)$$

and that of group  $b$  as:

$$U_b^e(t_N) = \frac{1}{8}(2w + \rho)^2(1 - \gamma(1 - \lambda)). \quad (16)$$

We see that the expected utility under “inclusion” equal those under “compliance”,  $U_i^e(t_N) = U_i(t_N)$  for  $\lambda = 0$ : Obviously, if the dominant group is certain to win the elections, the opposition group is de facto not included in any political process. Note also that for  $\lambda > 0$ , the expected utility under democratic elections falls in  $\gamma$  for both groups. Intuitively, the peace dividend in this analysis is caused by the provision of an impure public good. The more heterogenous are preferences, the smaller is the positive externality from public goods provision on the utility of the group in opposition. Hence the (expected) benefit from forming a union is smaller the more polarized is the society.

## 2.2 Conflict

Consider now the situation where group  $b$  chooses to secede from the union. Using (1) and (4) we find the utility of group  $i$  in this case as:

$$U_i(g_i^r) = (t_i + s_i\rho)(w - t_i). \quad (17)$$

Maximizing regional utility with respect to taxation  $t_i$ , we find that:

$$t_i = \frac{1}{2}(w - s_i\rho) \equiv t_i^r. \quad (18)$$

Inserting this optimal tax level in (17), we get for group  $a$ :

$$U_a(t_a^r) = \frac{1}{4}(w + (1 - s)\rho)^2, \quad (19)$$

and for group  $b$ :

$$U_b(t_b^r) = \frac{1}{4}(w + s\rho)^2, \quad (20)$$

I now turn to a comparison of the various payoffs, focusing on the way that polarization interacts with changes in resource rents to determine political outcomes.

## 3 Analysis: Benchmark scenario

Assume first that the dominant group  $a$  decides not to share political power. By comparing (10) and (20) we can derive the critical level of polarization

for which group  $b$  is indifferent between subordinating to the rule of group  $a$  in a national union and seeking regional autonomy as:

$$U_b(t_N) = U_b(t_b^r) \Rightarrow \gamma = \frac{2w^2 + 4w\rho(1-s) + \rho^2(1-2s^2)}{(2w + \rho)^2} \equiv \gamma_1. \quad (21)$$

For  $\gamma < \gamma_1$ ,  $U_b(t_N) > U_b(t_b^r)$  and group  $b$  is loyal to the dictatorial rule of group  $a$ , whereas if  $\gamma > \gamma_1$ ,  $U_b(t_N) < U_b(t_b^r)$ , group  $b$ 's response to dictatorship by  $a$  is secession. Note that in the absence of natural resources, i.e., for  $\rho = 0$ ,  $\gamma_1 = 0.5$ . Hence, without natural resources, group  $b$  would accept a group  $a$  dictatorship for  $\gamma < 0.5$ , implying moderate or low polarization in society, while its response would be regional autonomy for  $\gamma > 0.5$ , implying a more polarized society.

Similarly, comparing (16) and (20), group  $b$  is indifferent between taking part in national elections and seeking regional autonomy when:

$$U_b^e(t_N) = U_b(t_b^r) \Rightarrow \gamma = \frac{2w^2 + 4w\rho(1-s) + \rho^2(1-2s^2)}{(2w + \rho)^2(1-\lambda)} \equiv \gamma_2. \quad (22)$$

Note that  $\gamma_2 = \gamma_1/(1-\lambda)$ . Hence, changes in  $s$ ,  $\rho$  and  $w$  affect  $\gamma_2$  in qualitatively the same way as  $\gamma_1$ . Using (19) and (15), we observe that group  $a$  is indifferent between sharing power in a national democracy and not sharing power, followed by secession by group  $b$ , when:

$$U_a^e(t_N) = U_a(t_a^r) \Rightarrow \gamma = \frac{2w^2 + 4\rho s(w + \rho) - \rho^2(1 + 2s^2)}{(2w + \rho)^2 \lambda} \equiv \gamma_3. \quad (23)$$

For  $\gamma > \gamma_3$ ,  $U_a^e(t_N) < U_a(t_a^r)$ , implying that group  $a$  prefers not to share political power even when this leads to group  $b$  breaking away from the union. For  $\gamma < \gamma_3$ ,  $U_a^e(t_N) > U_a(t_a^r)$ , and group  $a$  prefers to offer democratization. In other words, when rents are low, more precisely,  $\gamma < \gamma_3$ , group  $a$  prefers to offer political participation when this is necessary to prevent group  $b$  from seeking regional autonomy. For higher levels of rent,  $\gamma > \gamma_3$ , the relative importance of tax income declines, and the dominant group prefers dictatorship, even when this leads to group  $b$  exiting the political and economic

Note that the payoff-functions are the same in the two cases of secession  $\gamma > \gamma_2$  and  $\gamma > \gamma_3$ , and given by (19) and (20). However, the process leading

to secession, and thereby conflict, is different in the two cases. In the first case, for  $\gamma > \gamma_2$ , group  $b$  chooses secession even if group  $a$  offers political participation at the national level. In this way, we can say that group  $b$  initiates the conflict. We call this “exit”. In the second case, for  $\gamma > \gamma_3$ , it is group  $a$ ’s unwillingness to share power with group  $b$  that is the source of the latter’s move towards regional autonomy. We shall therefore refer to the outcome under  $\gamma > \gamma_3$  as “exclusion”.

The share of natural resources controlled by group  $b$ , i.e.,  $s$ , is obviously important for the choice of group  $b$  whether or not to seek regional autonomy, and for group  $a$ ’s choice on whether or not to offer  $b$  political participation. Intuitively, the larger is  $s$ , the higher is the payoff to group  $b$  from choosing the “exit” strategy. However, in order to reduce the number of possible cases in the analysis, we shall in the remainder of the paper assume that the weaker group controls less than half of the country’s natural resources, i.e.,  $s < 0.5$ . We can justify this assumption by referring to group  $a$ ’s relative strength over  $b$ . In case of conflict, this strength allows group  $a$  to control at least half of the country’s resources.

Table 1 summarizes the effect on from changes in  $s$ ,  $\rho$  and  $w$  on the critical levels of polarization,  $\gamma_1$ ,  $\gamma_2$ , and  $\gamma_3$ .<sup>2</sup>

Table 1. Comparative statics

	$\Delta s$	$\Delta \rho$	$\Delta w$
$\Delta \gamma_1, \Delta \gamma_2$	–	+	–
$\Delta \gamma_3$	+	–	+

An increase in  $s$  lowers  $\gamma_1$  and  $\gamma_2$ : A larger share of natural resources in region  $B$  naturally makes group  $b$  more inclined to choose regional autonomy. An increase in  $s$  raises  $\gamma_3$ : A larger share of natural resources in region  $B$  makes group  $a$  more inclined to share political power in order to prevent group  $b$  from breaking away from the political union.

An increase in  $\rho$  leads to an increase in  $\gamma_1$  and  $\gamma_2$ : It increases the relative income in the country controlled by group  $a$  and thus makes it more attractive for group  $b$  to be loyal to this group. An increase in  $\rho$  leads to a reduction

<sup>2</sup>Table 1 is based on the following derivatives:

For  $\gamma_1$ , it can be shown that:  $\frac{\partial \gamma_1}{\partial s} = -4\rho \frac{w+\rho s}{(2w+\rho)^2}$ ,  $\frac{\partial \gamma_1}{\partial \rho} = 4w \frac{(w+\rho s)(1-2s)}{(2w+\rho)^3}$ , and  $\frac{\partial \gamma_1}{\partial w} = -4\rho \frac{(w+\rho s)(1-2s)}{(2w+\rho)^3}$ . We know that  $\frac{\partial \gamma_2}{\partial s} = \frac{\partial \gamma_1}{\partial s} \left( \frac{1}{1-\lambda} \right)$ . For  $\gamma_3$ , we find that:  $\frac{\partial \gamma_3}{\partial s} = 4\rho \frac{w+\rho(1-s)}{(2w+\rho)^2 \lambda}$ ,  $\frac{\partial \gamma_3}{\partial \rho} = -4w \frac{\rho(1+2s^2-3s)+w(1-2s)}{(2w+\rho)^3 \lambda}$ ,  $\frac{\partial \gamma_3}{\partial w} = 4\rho \frac{\rho(1+2s^2-3s)+w(1-2s)}{(2w+\rho)^3 \lambda}$ .

in  $\gamma_3$ : It increases the relative income in the country controlled by group  $a$  and thus makes it more attractive for this group to hold on to power by not offering national elections.

An increase in  $w$  leads to a fall in  $\gamma_1$  and  $\gamma_2$ . A higher  $w$  implies that the relative importance of income controlled by group  $b$  increases, which makes this group more inclined to choose regional autonomy. A higher  $w$  leads to an increase in  $\gamma_3$ : The relative importance of income controlled by group  $b$  now increases, which makes group  $a$  more inclined to share power.

Note that for  $\lambda = 0.5$ , which implies that the dominant group can commit to perfectly free and fair elections,  $\gamma_2 = 1$  for  $\rho = 0$ . Any  $\rho > 0$  therefore implies  $\gamma_2 > 1$ . Group  $b$  would therefore always prefer a perfect democracy over regional autonomy, for any level of resource rents. With a (perceived) bias in favor of group  $a$  in national elections, however, i.e., for  $\lambda < 0.5$ , there exist combinations of low rents and high levels of polarization, defined by  $\gamma_2 < \gamma < 1$ , such that group  $b$  prefers regional autonomy to national democracy.

Focusing on polarization and rents, we can therefore conclude that, given  $0 < \lambda < 0.5$ :

**Lemma 1** *There exists a range of polarization levels, defined by  $\gamma \in (\gamma_1, \gamma_2)$ , for which group  $b$  chooses to stay in the union if, and only if, group  $a$  offers political participation. In a more homogenous society, i.e., for  $\gamma < \gamma_1$ , group  $b$  would choose “compliance”, remaining loyal to a group  $a$  dictator. For  $\gamma > \gamma_2$ , group  $b$  chooses “exit”, leaving the union even when offered political participation. For  $\gamma > \gamma_3$ , group  $b$  is excluded from political participation at the national level and therefore chooses to leave the union (“exclusion”).*

We know from the discussion so far that: (i) In a relatively homogenous society with sufficient resource rents, exclusion of the weaker group from the political process does not necessarily lead to cessation and conflict (i.e., for  $\gamma < \gamma_1$ ); (ii) If rents are more modest relative to the level of polarization, group  $b$  may insist on participating in the political process at the national level in order to remain in the political union with group  $a$  (i.e., for  $\gamma > \gamma_1$ ); (iii) With an election bias in favor of the dominant group and a situation with high polarization and low resource rents, group  $b$  may choose regional autonomy even if offered democratic participation in national elections (i.e., for  $\gamma > \gamma_2$ ); (iv) Unless rents are too high, the dominant group may offer political participation in order to prevent group  $b$  from breaking away from

the union (i.e., for  $\gamma < \gamma_3$ ). (v) If rents are sufficiently high, the dominant group may exclude the weaker group from the political process, even if this leads to cessation and conflict (i.e., for  $\gamma > \gamma_3$ ). Finally, we have seen that the way in which increased rents affects the choices of the two groups depends on which groups controls the larger share of the country's natural resources.

Focusing on the effect on political outcomes from changes in resource rents, we can conclude that:

**Proposition 1** *The effect of changes in resource rents on political outcomes is highly non-monotonic. For a given level of polarization in society, starting from low levels of rent, an increase in rents may first change the outcome from secession and conflict to peaceful political competition at the national level. A further increase in resource rents may destabilize this democratic equilibrium, inducing the dominant group to exclude the weaker group from the national political process, the response of the weaker group being secession and therefore conflict. Increasing resource rents even more may again change the outcome from conflict to peace, where the weaker group agrees to join the union even without being offered political influence.*

It is instructive to demonstrate this proposition by means of an illustration. Figure 1 illustrates the way in which rents and polarization affect the political outcome.<sup>3</sup> As noted above,  $\gamma_1 \geq 1/2$ , and so the Figure restricts its attention to this interval of polarization ( $\gamma < 1/2$  being characterized by “compliance”). The shaded areas are characterized by conflict, the unshaded by peace.

The observation made in Proposition 1 is true for  $\gamma \in (\gamma_0, \gamma_4)$ , where  $\gamma_0$  is defined as  $\gamma_2$  for  $\rho = 0$  and  $\gamma_4$  is the level of  $\gamma$  where the  $\gamma_2$ -curve and the  $\gamma_3$ -curve intersect. Start with a situation where  $\gamma \in (\gamma_0, \gamma_4)$ , and where  $\gamma > \gamma_2$ . This describes a society with relatively low resource rents, and where the population is relatively polarized in terms of their preferences on public policy. These fundamentals translate into conflict, based on the wish of group  $b$  to exit the union. Group  $b$  wishes to leave the union even if group  $a$  is positive about including the former in the political process. But the fact that group  $b$  expects elections to be biased together with the fact that a high level of polarization limits the size of the “peace dividend”, induces group  $b$  to opt for regional autonomy.

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<sup>3</sup>In the figure,  $w = 1$ ,  $\lambda = \frac{1}{3}$ , and  $s = 0$ .

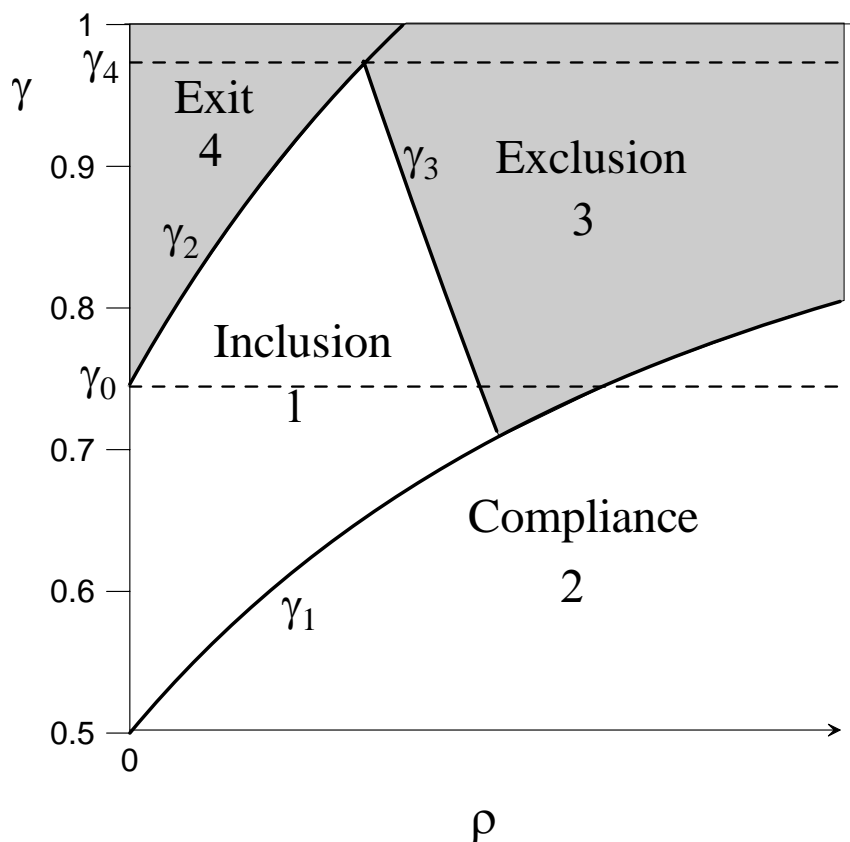


Figure 1: Rent, polarization, and political equilibrium

Holding the degree of polarization constant, an increase in  $\rho$  such that we cross the  $\gamma_2$ -curve and enter area 1 would result in an end to that conflict. The increased resource wealth, under the control by whichever group sits in the national government, makes participation in national elections more attractive. In this way, oil money, or the like, can “grease the machinery” of democracy. As long as polarization is not too big, i.e., that we are below the  $\gamma_4$ -level in Figure 1, the peace dividend is sufficiently large to induce both groups to participate in democratic elections.

A further increase in  $\rho$  such that we cross the  $\gamma_3$ -curve and enter area 3, results in a change from peace and democracy to secession and conflict. With the growth in  $\rho$ , the relative importance of group  $b$  as a source of taxation declines. Group  $a$  therefore chooses to exclude  $b$  from the national political



process, even when knowing that group  $b$ 's best response to this action is secession, and therefore conflict. This effect is an example of the political resource curse, emphasized by many authors in the recent literature.

Note, however, that a further increase in resource rents sooner or later will cause a shift from “exclusion” to “compliance”.<sup>4</sup> In this case, the massive provision of public goods provided by the group  $a$  dictator convinces group  $b$  that it is better to join the union than to stay out of it, even if they have no influence at all on the use of public funds.

To complete the picture, we observe that if polarization in society is extremely high, i.e., for  $\gamma > \gamma_4$ , the differences between the two groups are simply too great to create a basis for political participation by both groups. The level of resource rents needed to induce group  $b$  to participate in national elections is so high that, given this level of rents, group  $a$  is unwilling to share power. For  $\gamma \in (\frac{1}{2}, \gamma_0)$ , preferences are sufficiently homogenous to make political participation the optimal choice for both groups for low levels of rent. An increase in rents in this case may create conflict (as we move from area 1 into area 3) or compliance (as we move into area 2). But given that the starting point is inclusion, an increase in resource rents can only weaken this outcome.

It is also interesting to note the effects of increased polarization for a given level of rents. Starting with  $\gamma < \gamma_1$  in area 2, i.e., dictatorship and “compliance”, an increase in  $\gamma$  such that we cross the  $\gamma_1$ -curve and enter area 1 takes us into a region characterized by democratization. Hence, in the present model, increased polarization in society may in fact stimulate democratization. A further increase in  $\gamma$ , such that we cross the  $\gamma_2$  or  $\gamma_3$ -curve, however, leads to dictatorship, in area 3 because of the dominant group's wish to keep rents for itself, and in area 4 because the dominated group prefers regional autonomy to participating in a (biased) democratic process at the national level.

## 4 Endogenous policy

So far we have assumed that a government implements its ideal policy. In this section we consider the possibility of policy moderation. It may be in the interest of the dominant group to commit to policies closer to those preferred by the weaker group in order to prevent this group from seeking regional

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<sup>4</sup>This is true, since  $\gamma_1$  goes to unity as  $\rho$  goes to infinity.

autonomy. Similarly, the weaker group may seek to commit to policies closer to those preferred by the dominant group, in order to prevent being excluded from the political process at the national level. Let  $\mu_i$  measure the degree of policy moderation implemented by the governing group  $i$ . With modified policies, the benefit from public spending for the governing group is:

$$u_i(\mu_i) = (2t + \rho)(1 - \gamma\mu_i). \quad (24)$$

Similarly, the benefit from public spending for the group in opposition is given by:

$$u_j(\mu_i) = (2t + \rho)(1 - \gamma(1 - \mu_i)). \quad (25)$$

Clearly, for  $\mu_i = 0$ , there is no policy moderation, and we are back to the benchmark case of no policy commitment, as defined by (2) and (3). An increase in  $\mu_i$ , *ceteris paribus*, reduces the payoff of the ruling group and increases that of the opposition. As in the case with commitment to democracy, the degree to which a group can credibly commit to policies is assumed to be limited. Let the maximum policy commitment be given by  $\mu < \frac{1}{2}$ .

In what now follows, I describe the relevant payoffs with policy moderation. Note that in the case of regional autonomy, there is no basis for policy moderation. Hence, there are two relevant cases to consider; “compliance”, and “inclusion”.

## 4.1 Peace and policy moderation

### 4.1.1 Compliance

The utility of group  $a$  as dictator, with group  $b$  choosing to remain in the union, is now given by:

$$U_a(\mu_a) = (2t + \rho)(1 - \gamma\mu_a)(w - t), \quad (26)$$

and the utility of group  $b$  is:

$$U_b(\mu_a) = (2t + \rho)(1 - \gamma(1 - \mu_a))(w - t). \quad (27)$$

Maximizing  $U_a(\mu_a)$  with respect to  $t$ , we find that the optimal tax level is given by  $t_N$ , as defined in (8). Using this in (26), we get:

$$U_a(\mu_a, t_N) = \frac{1}{8}(2w + \rho)^2(1 - \gamma\mu_a). \quad (28)$$

Group  $b$ 's utility when staying in the union under an  $a$ -dictatorship, is given by:

$$U_b(\mu_a, t_N) = \frac{1}{8}(2w + \rho)^2(1 - \gamma(1 - \mu_a)). \quad (29)$$

Equations (26) to (29) reduce to their counterparts (6) to (10) in the benchmark scenario when  $\mu_a = 0$ . The dictator moderates his policy in order to prevent group  $b$  from breaking away from the union. We know from the benchmark case that for low levels of  $\gamma$ , group  $b$  chooses to stay in the union even without any influence over policy. This is true below the  $\gamma_1$ -curve, in area 2 in Figure 1. Clearly, when this is the case, there is no need for the dictator to modify his policy. Policies are defined according to the ideal position of the politically dominant group. Hence, policy moderation is only relevant for  $\gamma > \gamma_1$ .

The optimal degree of policy moderation is such that group  $b$  is indifferent between staying in the union and breaking away from it (and therefore chooses to stay), which can be found from the condition  $U_b(\mu_a, t_N) = U_b(t_b^r)$  as:

$$\mu_a = 1 - \frac{2w^2 + 4w\rho(1 - s) + \rho^2(1 - 2s^2)}{(2w + \rho)^2\gamma} \equiv \mu_a^*. \quad (30)$$

Given the assumption of limited ability to commit to policy, policy moderation by the dictator in equilibrium is given by  $\mu = \min(\mu_a^*, \mu)$ . It can be shown that implementing  $\mu_a^*$  offsets any changes in the benefit of public policy to group  $b$  caused by changes in polarization (as can be seen by the fact that  $U_b(\mu_a^*, t_N)$  is independent of  $\gamma$ ).

## 4.2 Inclusion

Consider now the situation with democracy. Group  $a$  may choose to moderate its policy in order to prevent group  $b$  from breaking away from the union. Similarly, group  $b$  may choose policy moderation in order to avoid being excluded from political participation at the national level. We first consider policy moderation by group  $a$ .

### 4.2.1 Policy moderation by group $a$

Recall from the benchmark scenario that for sufficiently high levels of  $\gamma$  and low levels of  $\rho$ , group  $b$  chooses secession even if offered political participation (i.e., for  $\gamma > \gamma_2$ ). Group  $a$  may try to induce the opposition to stay in the union by moderating its policy. We know that when offered political participation, group  $b$  stays in the union even without policy moderation for  $\gamma < \gamma_2$ . Hence, group  $a$  would only offer policy moderation for  $\gamma > \gamma_2$ . With policy moderation by group  $a$ , and the policy outcome determined by the winner of the national elections, the expected utility for group  $a$  is given by:

$$U_a^e(\mu_a) = (2t + \rho)(1 - \gamma(\lambda + (1 - \lambda)\mu_a))(w - t), \quad (31)$$

and for group  $b$ :

$$U_b^e(\mu_a) = (2t + \rho)(1 - \gamma((1 - \lambda)(1 - \mu_a)))(w - t), \quad (32)$$

where (31) and (32) reduce to (13) and (14) for  $\mu_a = 0$ . Maximizing  $U_a^e(\mu_a)$  or  $U_b^e(\mu_a)$  with respect to  $t$ , we find that the optimal tax level is again given by  $t_N$ , as defined in (8). Using this in (31), we get:

$$U_a^e(\mu_a, t_N) = \frac{1}{8}(2w + \rho)^2(1 - \gamma(\lambda + (1 - \lambda)\mu_a)). \quad (33)$$

Similarly, using (8) in (32), we get:

$$U_b^e(\mu_a, t_N) = \frac{1}{8}(2w + \rho)^2(1 - \gamma((1 - \lambda)(1 - \mu_a))), \quad (34)$$

where (33) and (34) reduce to (15) and (16) for  $\mu_a = 0$ . The optimal degree of policy moderation for group  $a$  in the “inclusion” scenario can be found from the condition  $U_b^e(\mu_a, t_N) = U_b^e(t_b^*)$  as:

$$\mu_a = 1 - \frac{2w^2 + 4w\rho(1 - s) + \rho^2(1 - 2s^2)}{(2w + \rho)^2\gamma(1 - \lambda)} \equiv \hat{\mu}_a. \quad (35)$$

Equilibrium policy moderation by group  $a$  under democracy is thus given by  $\mu_a = \min(\hat{\mu}_a, \mu)$ . It can be shown that  $U_b^e(\hat{\mu}_a)$  is independent of  $\gamma$ . Hence, implementing  $\hat{\mu}_a$  offsets any changes in the benefit of public policy to group  $b$  caused by changes in polarization.

### 4.2.2 Policy moderation by group $b$

We know from the benchmark scenario that if rents are sufficiently high, the dominant group has an incentive to exclude the opposition from the political process, even if this induces group  $b$  to secede from the union. In order to prevent exclusion from national political process, group  $b$  could modify its policy platform, call it  $\mu_b$ . This is relevant for  $\gamma > \gamma_3$ . When group  $b$  modifies its policy, the expected utility for group  $a$  is given by:

$$U_a^e(\mu_b) = (2t + \rho)(1 - \gamma(\lambda(1 - \mu_b)))(w - t), \quad (36)$$

and for group  $b$ :

$$U_b^e(\mu_b) = (2t + \rho)(1 - \gamma(1 - \lambda(1 - \mu_b)))(w - t). \quad (37)$$

Maximizing  $U_a^e(\mu_b)$  or  $U_b^e(\mu_b)$  with respect to  $t$ , we find that the optimal tax level is given by  $t_N$ , as defined in (8). Using this in (36), we get:

$$U_a^e(\mu_b, t_N) = \frac{1}{8}(2w + \rho)^2(1 - \gamma\lambda(1 - \mu_b)), \quad (38)$$

Similarly, we find the expected utility for group  $b$  in this case as:

$$U_b^e(\mu_b, t_N) = \frac{1}{8}(2w + \rho)^2(1 - \gamma(1 - \lambda(1 - \mu_b))). \quad (39)$$

Equations (38) and (39) reduce to (15) and (16) for  $\mu_b = 0$ . The optimal degree of policy moderation for group  $b$  can be found from the condition  $U_a^e(\mu_b, t_N) = U_a^e(t_a^r)$  as:

$$\mu_b = 1 - \frac{2w^2 + 4ws\rho - \rho^2(1 + 2s^2 - 4s)}{(2w + \rho)^2 \lambda \gamma} \equiv \hat{\mu}_b. \quad (40)$$

Equilibrium policy moderation by group  $b$  is thus given by  $\mu_b = \min(\hat{\mu}_b, \mu)$ . Since  $U_a^e(\hat{\mu}_b)$  is independent of  $\gamma$ , implementing  $\hat{\mu}_b$  offsets any changes in the benefit of public policy to group  $a$  caused by changes in polarization.

## 5 Analysis: Endogenous policy

For  $\gamma > \gamma_1$ , the group  $a$  dictator implements policy moderation  $\mu_a^*$  to prevent exit by the opposition. At some point,  $\mu$ , the dominant group has gone as far as it can in terms of credibly committing to policies closer to those favored

by the opposition. Given  $\mu$ , the critical level of polarization for which group  $b$  is indifferent between staying in the union and seeking regional autonomy can be found from the condition  $U_b(\mu, t_N) = U_b(t_b^r)$  as:

$$\gamma = \frac{2w^2 + 4w\rho(1-s) + \rho^2(1-2s^2)}{(2w+\rho)^2(1-\mu)} \equiv \gamma_1(\mu). \quad (41)$$

We see that for  $\mu = 0$ ,  $\gamma_1(\mu) = \gamma_1$ , defined in (21). If  $\gamma > \gamma_1(\mu)$ , group  $b$  chooses regional autonomy unless offered participation in national elections. Consider next the case of national democracy. For  $\gamma > \gamma_2$ , group  $a$  may offer policy moderation  $\hat{\mu}_a$  together with political participation in order to prevent exit by the opposition. Given that the dominant group has modified its policies as much as it can, i.e.,  $\mu$ , the critical level of polarization for which group  $b$  is indifferent between staying in the union and leaving it can be found from the condition  $U_b^e(\mu, t_N) = U_b(t_b^r)$  as:

$$\gamma = \frac{2w^2 + 4w\rho(1-s) + \rho^2(1-2s^2)}{(2w+\rho)^2(1-\lambda)(1-\mu)} \equiv \gamma_2(\mu), \quad (42)$$

which reduces to  $\gamma_2$  for  $\mu = 0$ . Finally, we know that for  $\gamma > \gamma_3$  group  $b$  will be excluded from political participation in the absence of policy moderation. To avoid this, group  $b$  implements policy moderation  $\hat{\mu}_b$ . Given that group  $b$  has gone as far as it can in terms of policy moderation, i.e.,  $\mu$ , the critical level of polarization for which the dominant group is indifferent between sharing political power or not can be found from the condition  $U_a^e(\mu, t_N) = U_a(t_a^r)$  as:

$$\gamma = \frac{2w^2 + 4ws\rho - \rho^2(1+2s^2-4s)}{(2w+\rho)^2\lambda(1-\mu)} \equiv \gamma_3(\mu), \quad (43)$$

which reduces to  $\gamma_3$  for  $\mu = 0$ . From this discussion we can conclude that:

**Lemma 2** *For low levels of polarization, there is no incentive for group  $a$  to moderate its policies. For medium levels of polarization, policy moderation is a substitute for democratization: Group  $a$  offers policy moderation instead of democratization in order to prevent group  $b$  from breaking away from the union. For high levels of polarization policy moderation complements democratization: For low rents policy moderation by group  $a$  is used together with a commitment to democratization in order to prevent exit by group  $b$ . For higher rents policy moderation is used by group  $b$  in order to prevent being excluded from the national political process.*

Figure 2 adds the possibility of policy moderation to Figure 1.<sup>5</sup>

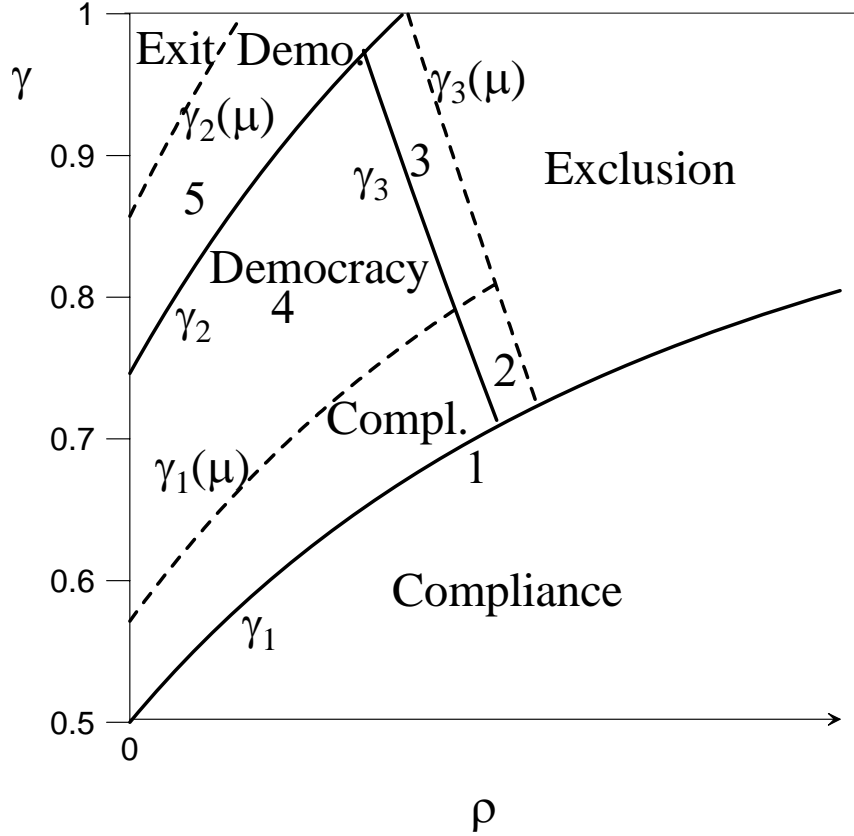


Figure 2: Endogenous policy

Below the  $\gamma_1$ -curve, there is no incentive to moderate policy and the outcome is as in the benchmark version of the model, characterized by compliance. Policy moderation by the dictator extends compliance by areas 1 (in the benchmark scenario characterized by “inclusion”) and area 2 (in the benchmark scenario characterized by “exclusion”). The degree of policy moderation increases in  $\gamma$  and falls in  $\rho$ . In area 4 there are national elections and no incentive for the parties to moderate policies. In area 3, policy moderation by group  $b$  results in national democracy (in the benchmark scenario characterized by “exclusion”). The degree of policy moderation by  $b$  increases in

<sup>5</sup>Figure 2 is based on  $w = 1, s = 0, \lambda = \frac{1}{3}$  (as in Figure 1), and  $\mu = \frac{1}{8}$ .

$\gamma$  and  $\rho$ . In area 5, policy moderation by  $a$  leads to “inclusion” (where the benchmark solution was “exit”). The degree of policy moderation by group  $a$  increases in  $\gamma$  and falls in  $\rho$ . The present scenario thus demonstrates that changes in  $\rho$  and  $\gamma$  may affect not only political institutions, i.e., the choice between democracy or dictatorship, but also economic policy, i.e., the degree to which policies are polarized or more moderate.

## 6 Conclusion

Resource rents may have a complex effect on political and economic outcomes. The possibility of such resources representing a curse for political and economic outcomes has received a lot of attention in the recent literature. However, it is clearly not the case that such resources necessarily are bad for countries. Focusing on the interaction between resource rents and polarization of preferences on public policy, the present analysis has analyzed the circumstances under which resource rents are likely to promote political divisions in society, and when such resources may stimulate political and economic cooperation. Moreover, the model has shown how resource rents and polarization may shape economic policies.

More specifically, starting from low levels of rent and a high levels of polarization, an increase in rents may induce the weaker group to move from regional autonomy and accept to take part in national elections. A further increase in rents may, however, induce the politically stronger group to exclude the weaker group from political participation at the national level, and the response from the weaker group is likely to be regional autonomy. A further increase in resource rents may, however, again lead to social and political transitions, from conflict and separation to peaceful cooperation.

When society is less polarized, on the other hand, democracy is the likely political equilibrium when rents are small. An increase in rents will weaken the forces of democracy. It does so by reducing the relative importance of tax income from the dominated group to finance public spending, which in turn may tempt the dominant group not to share political power. The more homogenous are preferences, and the higher are the rents, the less likely is the dominated group to withdraw from the political union when excluded from political participation.



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