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POLITICAL SYSTEMS, STABILITY AND CIVIL WARS

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In this paper we analyze theoretically and empirically the stability of the different political systems; that is, their ability to prevent conflict. According to our model, the proportional system has a lower probability of group rebellion than the majoritarian system. In the empirical part we test the role of political systems in preventing civil wars. We show that democracy by itself does not play an important explanatory role, while the specific type of political system-majoritarian, presidential and proportional-does. The rationale of this result is that different political systems entail different opportunity costs of rebellion.

Keywords: Democracy; Political systems: majoritarian, proportional and presidential

JEL Classification: H11, O11

INTRODUCTION

Social Conflict, and its causes, is an important subject to study from the economic point of view. There is no doubt of the importance of conflict for economic growth and, therefore, the study of its causes is crucial for development. Conflict has also been a central concern in the political science literature.

This paper analyses theoretically and empirically the stability of different political systems; that is, their ability to prevent conflict. There is no strong and clear evidence on the role of democracy on either economic development or on civil war. Sambanis (2001), Hegre *et al.* (2001), Ellingsen (2000), and Reynal-Querol (2002) find that middle-level democracies are more prone to civil war than high-level democracies and high-level autocracies. Moreover, the very question of which political system is more appropriate to reduce violence has not been addressed in depth. In this paper we explore the links between different forms of democratic systems and the level of social conflict.

We develop a simple theoretical model that captures the basic relationship between the political system and rebellion. According to our model, the proportional system turns out to have a lower probability of group rebellion than the majoritarian system. The intuition behind this result is that under the proportional system the opportunity cost of rebellion is higher than under majoritarian systems. Moreover, we also find that given a political

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situation, majoritarian systems need to have higher penalties than proportional representation if the former system wants to avoid rebellion.

In the empirical analysis, we show how a political system is an important mechanism for reducing the probability of civil war. We observe that some countries with high levels of democracy suffer periods of violence, so that having high levels of civil liberties and freedom does not necessarily protect them against violence. Not all democratic governments represent voters in the same way, even when they have high levels of political rights and civil liberties. The basic argument of the paper is that in countries with a high level of democracy and majoritarian or presidential system, groups with lower representation are more likely to begin a rebellion than in countries with more inclusive systems. All democratic countries in our sample that have experienced civil war were under a majoritarian or presidential government, and none were under a proportional system. However most of the countries have a high level of freedom.

Our empirical exercise is performed using a time series of cross-country data on political systems from 1960 to 1995 based on Colomer (2000). Empirically we find that proportional systems have the lowest probability of experiencing a civil war. A majoritarian system with less freedom has the same probability of civil wars as a majoritarian system with a high level of freedom. This probability is not significantly different from that of a non-free system. However, presidential systems work in a different way. A presidential system with low level of freedom has the same probability of civil war as a non-free systems. However, when the country reaches the highest levels of freedom, presidential system has a lower probability to suffer civil war than non-free systems.

Moreover, we order the political systems with respect to its level of inclusiveness following the ranking of Colomer (2000), and we find that the more inclusive is the system, the smaller is the probability of civil war. This means that the political system, which determines the level of inclusiveness, is an important political factor in reducing the probability of civil war.

AN ANALYSIS OF THE STABILITY OF POLITICAL SYSTEMS

The Model

The objective of this section is to capture the basic relation between the probability of rebellion and the political system. The two dimensions that characterize political systems are division of powers and electoral rule. These two characteristics define three political systems: parliamentary-majoritarian, parliamentary-proportional and presidential systems. Under the presidential system, the president is elected by majoritarian rule, and the members of the assembly are elected by majoritarian or proportional rule. Therefore, we consider that presidential system has properties between majoritarian and proportional representation in the treatment of the representation of voters.

The economy consists of citizens divided into G social groups that support G political parties. Groups have preferences over policies. We shall assume that all individuals belonging to a given group share the same preferences. We shall identify each group by the policy they prefer most.

Policies are points in R_+. For simplicity we restrict the model to a one dimensional policy space. We shall assume that preferences over policies are linear in the distance between each policy and the "one" that is most preferred. Let $\tilde{\alpha}_i$ be the most preferred policy for group i, then the valuation of policy α_j by group i is given by:

$$u_i(\alpha_j) = -|\alpha_j - \tilde{\alpha}_i| \tag{1}$$

Generally speaking, the information relevant to any political system will be the location of the most preferred policy and the size of each group. We shall assume that a group's true preferences are public knowledge. We thus exclude that groups may strategically manipulate their location on the political spectrum. In this paper, we shall focus on the role of the location of the groups on the policy spectrum on conflict and leave the role of group sizes aside. Therefore, we shall assume that all groups have the same size.

A **political situation** will be described by a vector $\tilde{\alpha} \in R^G$ of most desired policies. An actual policy is a point in the real line. A **political system** f is a function that assigns a policy to each political situation:

$$\alpha = f(\tilde{\alpha}). \tag{2}$$

Without loss of generality we shall use the convention that $\tilde{\alpha}_i \leq \tilde{\alpha}_{i+1} \ \forall i \in G$. Clearly, $|\tilde{\alpha}_1 - \tilde{\alpha}_G| \geq |\tilde{\alpha}_i - \tilde{\alpha}_j| \ \forall_{i=1,2,\dots,G}$. Therefore, a policy will be a vector p in the unit simplex. Hence, the policy α implemented by p is:

$$\alpha = \sum_{i=1}^{G} p_i \tilde{\alpha}_i. \tag{3}$$

where p_i is the weight assigned to the preference $\tilde{\alpha}_i$ of group i.

The set of policies is thus the entire unit simplex. We shall denote by P the set of such policies.[1]

This representation of political systems is fairly abstract. However, the connection between this representation and the political systems that are usually considered in the literature is straightforward. The majoritarian system, for instance, always selects the policy that is considered ideal by the median voter.[2] This clearly corresponds to a vector p with $p_m = 1$, where m is the median voter, and $\forall i \neq m, p_i = 0$. Indeed, if we denote by α^{mj} the outcome of majority rule, we shall have $\alpha^{mj} = \tilde{\alpha}_m$. The proportional system gives to each group a say equal to its support, that is, $p_i = n_i$, where n_i is the share of total population supporting alternative i. In our case, since we restrict to equally sized groups, we shall have that $p_i = 1/G$ for all i. Therefore, denoting by α^{pr} the outcome of the proportional rule, in view of (3) we shall have $\alpha^{pr} = 1/G \sum_{i=1}^{G} \tilde{\alpha}_i$. This model basically represents democratic political systems. However, we can also capture autocracies by defining the dictatorship by any of the extreme groups. Therefore the dictatorship would be represented by $p_i = 1$, with $i = 1$ or G. More generally the dictatorship could also be represented by any group.

We are interested in characterizing political systems that are socially stable, that is, that no group is interested to rebel against the system. We define a status quo, sq, as the initial political system, characterized by a particular p. $u_i^{sq} = -|\alpha^{sq} - \tilde{\alpha}_i| \ \forall_{i=1,\dots,G}$ is the utility of group i under the status quo. Players decide whether to fight against the sq situation or not. The rebels will fight against the sq situation if the expected benefits from rebellion are positive. The aim of a rebellion is to change the current political system for a new one assigning weight 1 to the policy most preferred by the rebels. Therefore, if group k rebels and wins, they will establish the political system with $p_k = 1$ and $p_i = 0 \ \forall i \neq k$, implementing $\tilde{\alpha}_k$ with probability 1. Notice that we are implicitly assuming that rebel groups act myopically

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[1]f corresponds to social decision functions in Esteban and Ray (2001). Esteban and Ray (2001) address the acceptability of collective decision rules when players can precipitate a conflict game. Moreover, from the theoretical front Esteban and Ray (1999) provide a general theoretical model of conflict.

[2]Downs (1957).

in the sense that the winners impose their most preferred political system, irrespective of whether it is stable or not.[3]

The direct expected gain from a rebellion is given by $\tilde{u}_i - u_i^{sq}$, where $\tilde{u}_i$ is the utility under the group's preferred policy. $\tilde{u}_i$ is equal to zero. If the rebellion fails, the sq political system remains, and a penalty, c, is imposed on the rebels. Being a rebel has a fix cost F and has a probability of success π. Taking all this information together we assume that groups will rebel if the expected net benefit exceeds the expected cost. That is, the rebel will fight if:

$$\pi\tilde{u}_i + (1 - \pi)(u_i^{sq} - c) - F > u_i^{sq} \tag{4}$$

The left hand side of the inequality describes the expected utility of rebellion, and the right hand side represents the utility that the rebels have under the status quo.

Therefore, given that $\tilde{u}_i = 0$, there will be a rebellion whenever:

$$-u_i^{sq} > \delta, \quad \text{for some } i,$$

where $\delta = [F + c(1 - \pi)]/\pi > 0$. Given that F and π are fixed, the value of δ only depends on the penalty c. Therefore, we could loosely interpret δ as the penalty. By differentiation we obtain that $\partial\delta/\partial c > 0$, $\partial\delta/\partial F > 0$, $\partial\delta/\partial\pi < 0$.

That is, groups will rebel if:

$$-u_i^{sq} = |\alpha^{sq} - \tilde{\alpha}_i| > \delta \tag{5}$$

Notice that groups face a dilemma. They either accept the status quo and get u_i^{sq} or engage in a rebellion and obtain the corresponding expected utility. Thus u_i^{sq} can be interpreted as the opportunity cost of rebellion to group i.

The Stability of Political Systems

As in Esteban and Ray (2001) we shall consider that a political system is stable if no group can be better off by triggering a rebellion.

DEFINITION   *A Political System p is* **stable**, *given $\tilde{\alpha}$, if the following inequality is satisfied for all groups*:

$$-u_i^{sq} = \left| \sum_{j=1}^{G} p_j\tilde{\alpha}_j - \tilde{\alpha}_i \right| \leq \delta, \quad \forall i = 1, \ldots, G. \tag{6}$$

The first question we address is if, for any given political situation $\tilde{\alpha}$, there exist stable political systems.

LEMMA 1   *The necessary and sufficient condition for the existence of a stable political system is that*:

$$|\tilde{\alpha}_G - \tilde{\alpha}_1| \leq 2\delta \tag{7}$$

(Proof in the Appendix). The intuition is simple. If the distance between the extreme groups is larger than 2δ, then, no matter what policy α is implemented, the distance between

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[3]This model can be rewritten under more sophisticated hypotheses that assume that rebels have higher degrees of farsightness. However enriching the model in this direction leads to results that are qualitatively identical to the ones obtained under our shortsightness assumption.

one of the extreme groups and the policy implemented is always larger than δ, and therefore this group will rebel. Therefore, from now on, we shall restrict the discussion to situations for which stable political system exists.

The set of stable policies relative to $\tilde{\alpha}$, consists of all $p \in P$ vectors of the unit simplex satisfying the following inequality:

$$\tilde{\alpha}_G - \delta \leq \sum_{i=1}^{G} p_i \tilde{\alpha}_i \leq \tilde{\alpha}_1 + \delta \quad i = 1, \ldots, G \tag{8}$$

The intuition is as follows: if the policy is lower than the left hand side of Eq. (8), then group G will rebel, and if the policy implemented is larger than the right hand side of Eq. (8), then group 1 will rebel. Notice that the set of stable policies depends on $\tilde{\alpha}$.

We shall say that a political system is **democratic** if p depends on group sizes and not on the particular value of the most preferred policies by the different groups. Since group sizes are assumed to be constant and equal, then a democratic political system is simply any vector of p that is not conditional on the particular vector $\tilde{\alpha}$. Proportional and majoritarian systems are examples of democratic political systems. We shall now examine which democratic political systems are stable. As a first step we shall verify the stability properties of these two well known democratic political systems. Given the political system-majoritarian and/or or proportional – we are interested in characterizing the set of political situations, $\tilde{\alpha}$, for which it is stable. Furthermore, for the sake of simplicity, we shall restrict the analysis to three groups, $G = 3$. In this case the majoritarian system always yields the policy preferred by group 2, the median voter, while the proportional corresponds to $p_1 = p_2 = p_3 = 1/3$.

It is plain that under the majoritarian system, the median group has no incentive to begin a rebellion. Yet, the location of the median voter $\tilde{\alpha}_2$ does influence the resulting policy, which in turn determines the opportunity cost of rebellion for each of the extreme groups.

LEMMA 2   *The majoritarian system is a stable political system if and only if the most preferred policy by the median voter belongs to the group of stable policies, that is, $\tilde{\alpha}_2 \in [\tilde{\alpha}_3 - \delta, \tilde{\alpha}_1 + \delta]$. In any other case either group one or three will have incentives to rebel.*

LEMMA 3   *The proportional system is a stable political system if and only if the most preferred policy by the median voter satisfies:*

$$\tilde{\alpha}_2 \in [2\tilde{\alpha}_3 - \tilde{\alpha}_1 - 3\delta, 2\tilde{\alpha}_1 - \tilde{\alpha}_3 + 3\delta] \tag{9}$$

(see proof in Appendix)

Our next step is to compare the stability properties of the systems.

PROPOSITION 1   *For all political situations if the majoritarian system is stable, then the proportional system is also stable, but not the other way around.*

Proof   Define $R = \{0, 1\}$ as the event capturing whether a rebellion starts ($R = 1$) or not ($R = 0$)

$$\Pr(R = 0 \mid \text{majoritarian}) = \Pr(\tilde{\alpha}_2 \in [\tilde{\alpha}_3 - \delta, \tilde{\alpha}_1 + \delta])$$
$$\Pr(R = 0 \mid \text{proportional}) = \Pr(\tilde{\alpha}_2 \in [2\tilde{\alpha}_3 - \tilde{\alpha}_1 - 3\delta, \tilde{\alpha}_1 - \tilde{\alpha}_3 + 3\delta])$$

It is immediate that $[\tilde{\alpha}_3 - \delta, \tilde{\alpha}_1 + \delta] \in [2\tilde{\alpha}_3 - \tilde{\alpha}_1 - 3\delta, \tilde{\alpha}_1 - \tilde{\alpha}_3 + 3\delta]$,

Therefore, $\Pr(R = 1 \mid \text{majoritarian}) = 1 - \Pr(R = 0 \mid \text{majoritarian}) > \Pr(R = 1 \mid \text{proportional}) = 1 - \Pr(R = 0 \mid \text{proportional})$

The previous result can be interpreted in the following way: suppose that the realization of $\tilde{\alpha}_2$ is a random drawing with a given probability distribution. In that case, for a particular political system the probability of rebellion is the probability that the value of $\tilde{\alpha}_2$ is outside the bounds that make that system stable. From the previous result, it follows that for any such probability distribution the probability of rebellion is higher under the majoritarian system than under the proportional.

Finally, we analyze whether there exists a political system that generates stable policies for any vector $\tilde{\alpha}$, that satisfies Eq. (7). Proposition 2 states the main result.

PROPOSITION 2   *The Democratic political system $f(\tilde{\alpha}) = (1/2)\tilde{\alpha}_1 + (1/2)\tilde{\alpha}_3$ is the unique political system that is stable for any vector $\tilde{\alpha}$ and any δ such that $|\tilde{\alpha}_3 - \tilde{\alpha}_1| \leq 2\delta$.*

(Proof in the Appendix).

This result says that the unique political system that is stable for all political situations and values of $\tilde{\alpha}$ is the one implementing the policy lying midway between the extreme groups, regardless of the position of the centre group. The intuition is as follows. It is evident that the extreme groups are the ones that are most likely to rebel against a political system. Given the distance between the extremes, the implemented policy essentially depends on the political location of the centre group, as long as the system assigns any weight to the centre. It follows that the only class of systems whose outcome does not depend on the location of the centre is the one assigning zero weight to the centre. It is straightforward that, within this class, the most stable one is the one giving equal weight to both extremes.[4]

Robustness of Political Systems

The previous results suggest that some systems are more stable than others. Which systems are stable and which are not depends on the size of δ. Obviously for large enough δ, all systems are stable. Thus, an alternative way of ranking political systems is the size of the penalty δ needed to render them stable for all political situations. Among stable political systems, we should prefer those using minimum force.

From Lemma 1 it is immediate that the key variable for political stability is $\delta/(\tilde{\alpha}_3 - \tilde{\alpha}_1) = \delta'$. In order to simplify notation we shall normalize to $\tilde{\alpha}_3 - \tilde{\alpha}_1 = 1$, and without loss of generality take $\tilde{\alpha}_1 = 0$. A political situation will thus be fully described by $\tilde{\alpha} = \tilde{\alpha}_2$, and the normalized δ', $(\tilde{\alpha}, \delta')$.

We have already observed that $\delta' \geq 1/2$ is necessary and sufficient condition for the existence of stable political systems. It is trivial to obtain that whenever $\delta' \geq 1$ all political systems are stable. For intermediate values of δ', the stability of any particular political system will depend on δ' and $\tilde{\alpha}$.

DEFINITION   *Let us say that a political system is robust if it is stable for all $\tilde{\alpha} \in]0, 1[$.*

We wish to investigate the minimum δ' required to render a particular political system robust.[5] For any specific political system p, the condition for robustness, following Eq. (8), is:

$$1 - \delta' \leq p_2\tilde{\alpha} + (1 - p_1 - p_2) \leq \delta' \tag{10}$$

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[4]Notice that the assumption that parties cannot choose their location is essential here. Kalai and Kalai (2000) has shown that in these circumstances if parties could act strategically, their would choose another location away from their true preferences towards the extremes. This type of strategic behaviour might render this political system unstable.

[5]This is somewhat parallel to the role of punishment in the Economics of Law. Arbitrarily large penalties can enforce any rule. Yet, we would like to characterize the minimum penalty that induces compliance with the law.

for all $\tilde{\alpha} \in]0, 1[$. Therefore, p will be robust for δ' if:

$$1 - \delta' \leq (1 - p_1 - p_2) \quad \text{and} \quad 1 - p_1 \leq \delta' \tag{11}$$

These conditions completely characterize the political systems that are robust relative to δ'.

Adding the two inequalities (10) and (11), we obtain:

$$p_2 \leq 2\left(\delta' - \frac{1}{2}\right) \tag{12}$$

From this condition we deduce that the weight attached to the median group decreases as we decrease the cost of rebellion δ'. In the limit, as $\delta' \to 1/2$, $p_2 \to 0$, and p_1 or $p_3 \to 1/2$.

It is easy to see that the minimum value for δ' is $1/2$.

LEMMA 4   *If $\delta' \geq 1 - \min\{p_1, p_3\}$ then the political system p is robust. That is, p is stable for any $\tilde{\alpha} \in]0, 1[$.*

It is obvious that this can be written in the following way: if $p_2 \leq 2(\delta' - 1/2)$, then the political system p is robust.

DEFINITION δ'_m *is the minimum penalty that makes p robust. δ'_m is:*

$$\delta'(p)_m = 1 - \min\{p_1, p_3\} \tag{13}$$

From here we have the following result.

PROPOSITION 3   *Let us consider a given political system p. Then, any alternative political system $\hat{p}$ assigning less weight to the mid-group and more to the extremes can be made robust with a lower penalty, that is $\delta'(p)_m \geq \delta'(\hat{p})_m$.*

The location of the policy implemented depend on the location and weight given to the median voter. The penalty that renders the systems robust has to account for the situations where the median voter is close to the extremes. In that case, the higher is the weight given to the median voter, the closer is the policy implemented to the extreme, and therefore the distance between the policy implemented and the opposite extreme is larger. Therefore, in order to prevent the rebellion of the opposite extreme, the penalty must be higher.

From the previous result Corollary 1 follows immediately.

COROLLARY 1   *The proportional system needs a lower penalty to be robust than the majoritarian system,*

$$\delta'(\text{majoritarian})_m = 1 - \min\{0, 0\} = 1$$
$$\delta'(\text{proportional})_m = 1 - \min\{1/3, 1/3\} = 2/3$$
$$\textit{therefore } \delta'(\text{majoritarian})_m > \delta'(\text{proportional})_m$$

This means that in order to prevent a rebellion, the majoritarian system needs to impose a higher penalty than the proportional system. This result completes our previous findings on the probability of civil war, where for a given δ the majoritarian system has a higher probability of rebellion than the proportional system in terms of the location of the median group. This is because the opportunity cost of rebellion under the majoritarian system is lower than

under the proportional system. Therefore, the penalty in order to prevent groups starting a rebellion is higher when the opportunity cost of rebellion is lower.

Figure 1 shows this result. The penalty cost is represented in the horizontal axis, and the location of the median voter on the vertical axis. Each political system can be represented in this graph. For a given political system, each point in Figure 1 represents the minimum penalty needed for being stable for a given location of the median voter. Notice that for each possible location of the median voter, the majoritarian is the political system that needs to implement a larger minimum penalty for being stable. Moreover, we can also see in the Figure the value of δ that guarantees the robustness of each political system.

The relationship between democracy and development has attracted interest. Most of the recent work focuses on the possible role of democracy in promoting growth. On this specific point we do not have much to say. Accordingly to our analysis, it is indeed the case that increases in δ increase the set of robust political systems. This is true of all systems, democratic or not. The merit is to be found in the rising cost rather than in the virtues of the political system.

Further Results for the Case of Different Group Sizes

Proposition 1 shows the relationship between political systems and the probability of rebellion when the median policy $\tilde{\alpha}$ is located between the two extremes. This comes from the assumption that the three groups have the same size. Once we drop this stringent assumption and let groups have different sizes, the median voter can be located at any of the three potential positions. Let us assume that each variable α can be interpreted as the preferences of group i. We order the preferences of individuals $\alpha_1, \alpha_2, \alpha_3$ where each of them can be interpreted as independent realizations of the distribution of α. Under a majoritarian system the policy imposed is the α_{median}. Under a proportional system the policy imposed is $\bar{\alpha}$, the mean. Moreover, we know from the model that a group will start a rebellion if $|\alpha_{\text{median}} - \tilde{\alpha}_i| > \delta$, for any i, under a majoritarian system, and $|\bar{\alpha} - \tilde{\alpha}_i| > \delta$ under a proportional system. In this section we show that the probability of rebellion is higher under a majoritarian system than under a proportional one for different distributions of the preferred policies of three groups. However it is not possible to obtain an analytical expression to calculate the probability of
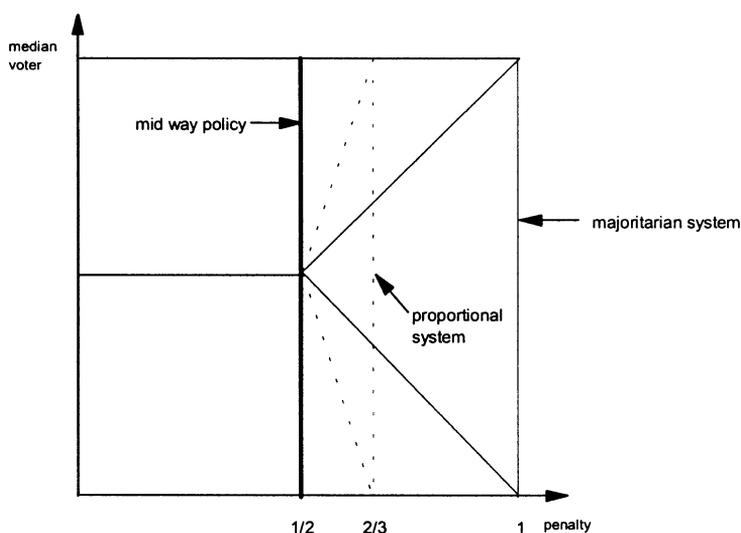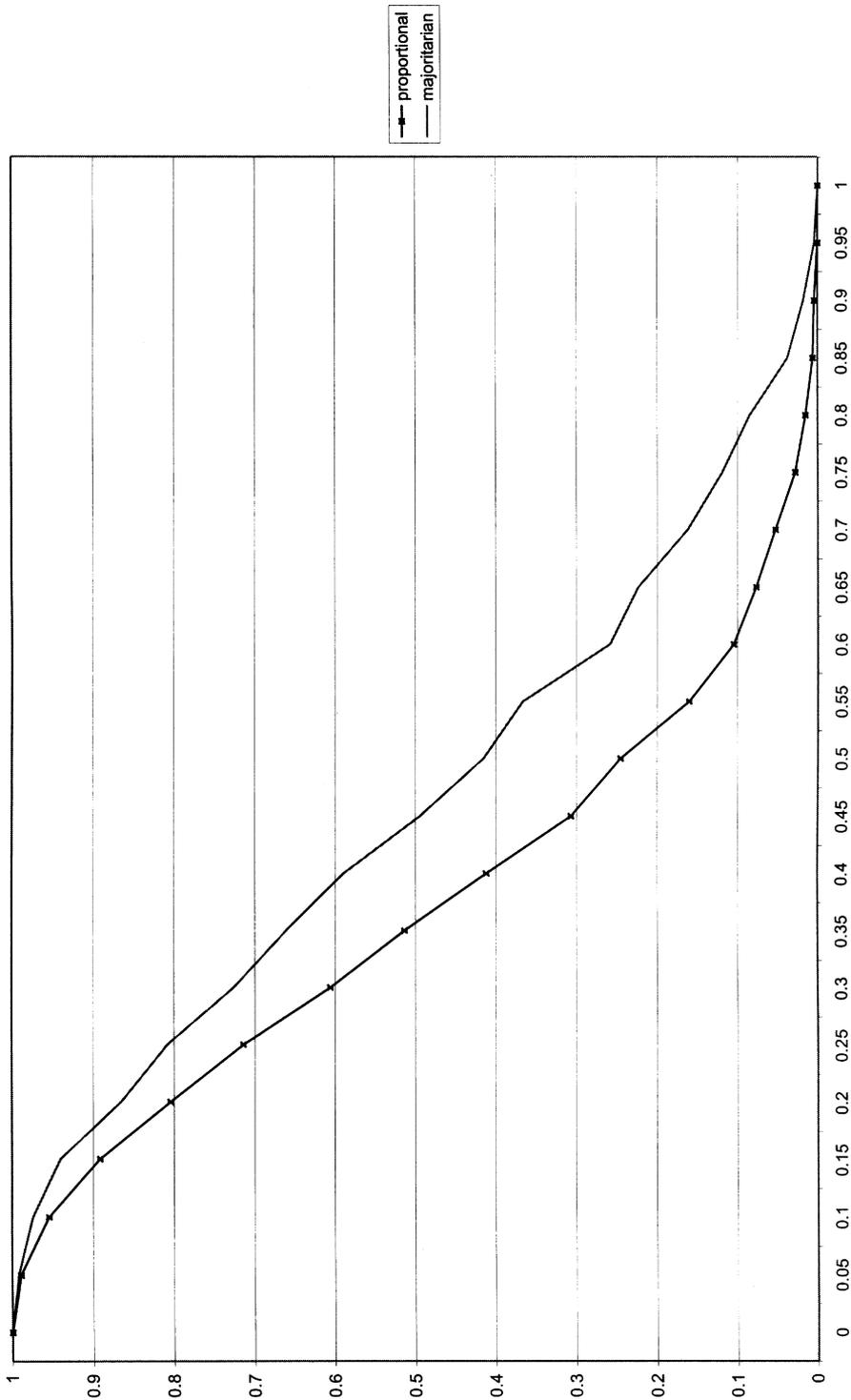

FIGURE 1   Political systems and robustness.

FIGURE 2   Monte Carlo simulations probability of rebellion (uniform distribution). Proportional *versus* majoritarian system.
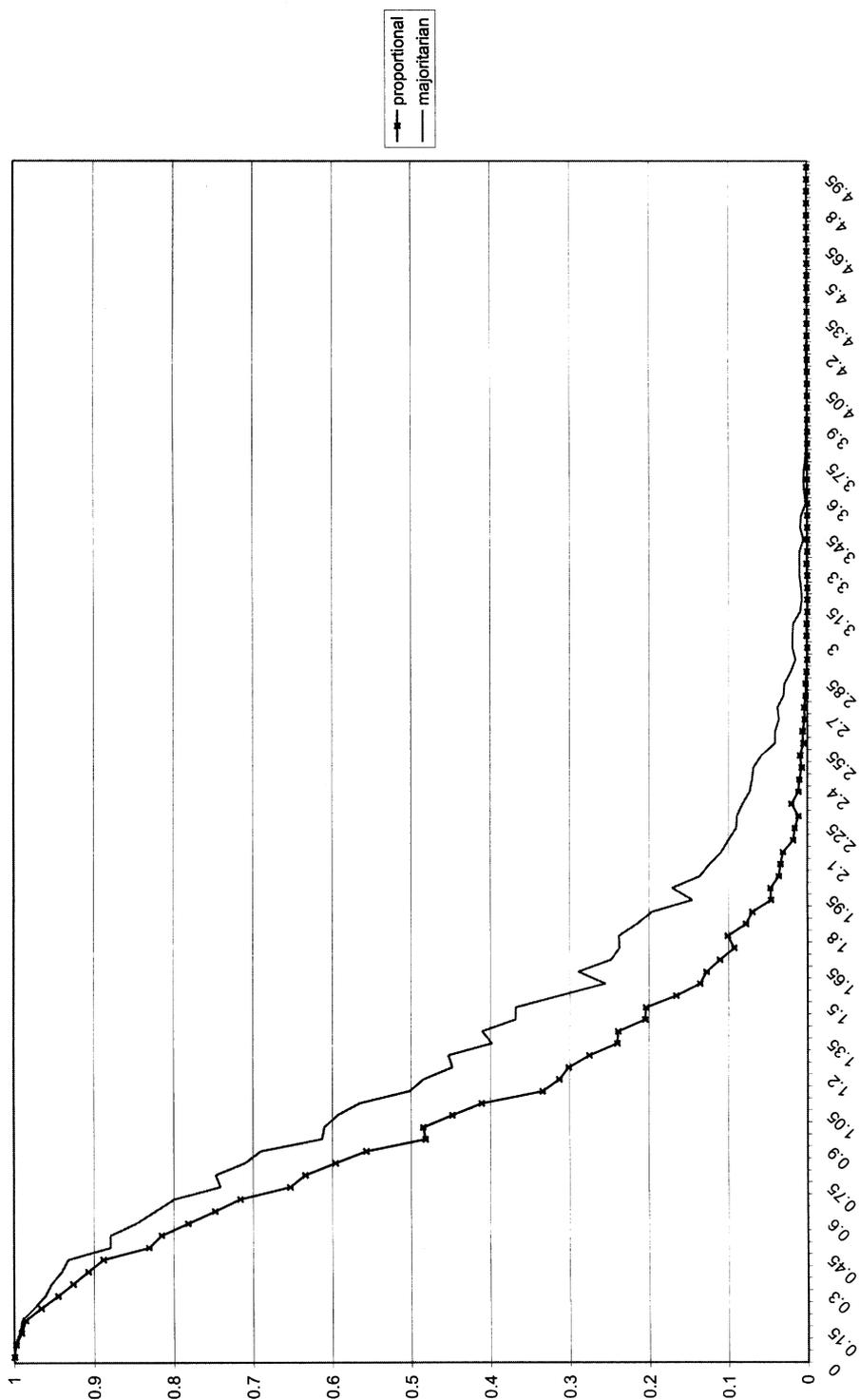
FIGURE 3   Monte Carlo simulations for the probability of rebellion (normal dist.). Proportional *versus* majoritarian systems.

rebellion under both systems. Given that we are dealing with an intractable analytical expression, we have decided to run a Monte Carlo simulation for both statistics using two well know distributions (normal and uniform) as an illustration of our main results.

Figures 2 and 3 show graphically the comparison of the probability of rebellion for both political systems under a uniform and normal distribution for the preferences over the policy α. In the x-axis we show the value of δ. In the y-axis we depict the $\Pr(R = 1)$ under each system. The results show that the probability of rebellion under a proportional system is always lower than the probability of rebellion under a majoritarian system for any δ except for two cases, $\delta = 0$ and δ very large. When δ is zero, which means that there is no cost of rebellion, in both systems groups have incentives to begin a rebellion. When the cost of rebellion is very large, then in both cases no group will begin a rebellion. The results are consistent with the model.

AN EMPIRICAL INVESTIGATION

The Data

We use data from Doyle and Sambanis (2000), (DS). They define a civil war as an armed conflict which meets all the following conditions: the conflict has (a) caused more than one thousand deaths; (b) it has changed the sovereignty of an internationally recognized state; (c) it occurred within the recognized boundary of that state; (d) it involved the state as a principal combatant; (e) it include rebels with the ability to mount organized armed opposition to the state; and (f) the parties were concerned with the prospect of living together in the same political unit after the end of the war. This definition allows them to combine data on wars from several data-sets. This definition is nearly identical to the definition of Singer and Small (1994) and Licklider (1993; 1995).

Political Variables

There are different sources of data on the level of democracy. The Freedom House data source bases the coding of the level of democracy on the level of civil liberties and political rights. These data, usually referred to as Gastil's index of democracy, have been the most commonly used among economists. The disadvantage of this source is that it does not provide data before the 1970s, constraining the length of the sample. A longer and more complete account of levels of democracy is provided by the data of the Polity III project. Scales of democracy and autocracy were created through the aggregation of authority characteristics, reflecting the different dimensions of authority, the recruitment of chief executives.[6] Even though the criteria for the construction of these indices of democracy are different, they look very similar and the correlation among them is about 0.9. By freedom we mean the extent to which the political system satisfies all the criteria for being democratic as defined by Polity III. The three dimensions of democracy in Polity are the amount of regulation and openness of the executive recruitment process and whether it is elected or not, the constraints on the executive and the amount of regulation and competitiveness of participation. However there is no time-series cross-section data collected on the political institutions of the country concerning political systems.

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[6]See: http://weber.ucsd.edu/~kgledits/polity.html.

We construct a time series of cross-section data using as the basic source of information data in Colomer (2000). He takes data for 123 attempts at democratization and major democratic institutional changes in 84 countries with more than one million inhabitants during the 125 years-period, 1874–1999. He distinguishes the following categories of democratic institutional formulas: parliamentary-majoritarian, presidential and semi-presidential, and parliamentary-proportional representation. Institutional changes are grouped in the three historical periods, or democratizing 'waves', usually established: 1874–1943, 1944–1973, 1974–1999. In this data, the number of institutional changes recorded are 31 in the first wave, 49 in the second wave, and 43 in the third wave. The number of successful attempts at democratization, which is to say, the numbers of presently existing democracies which were established in the different periods, is increasing: 9 from the first wave, 18 from the second wave, and 36 from the third wave. Using Colomer (2000)[7] we generate a time series of cross-sections for 138 countries, organized in five-years periods. We only consider the period from 1960 to 1995 because of constraints in some of the control variables defined in following pages.

We capture the democratic rule of the countries at the beginning of each period using also the data in Colomer (2000). Colomer (2000) classifies and orders the political systems following its level of inclusiveness. The proportional systems is the more inclusive one, followed by presidential and majoritarian. For the non-free countries we used data from the Freedom House and Polity III project. Using this additional sources of data we define five categories using dummies: non-free, partly-free, parliamentary-majoritarian, presidential and semi-presidential, and parliamentary-proportional. The less inclusive are the partially free and autocratic systems.

Control Variables

Most of the empirical literature on the study of the causes of civil wars is quite recent. For this reason in order to select the control variable we consider the ones included in Collier and Hoeffler (1998; 2002). The data on primary commodities exports comes from the World Development Indicators (WDI). We take data on income per capita from the Penn World Table (pwt56). The education data comes from Barro and Lee (1996), and represents the average years of schooling in the total population. Education and gdp per capita are highly correlated. Collier and Hoeffler notice that included separately both variables are significant, but once included together, one of them loses its significance.[8] We use data on linguistic and religious fragmentation and the size of the population following Collier and Hoeffler (1998; 2002). The data on linguistic fragmentation come from the well-known index of Taylor and Hudson and the data on religious fragmentation come from Barro (1997), who uses the same index as the linguistic fragmentation but applied to religious differences.[9]

Preliminary Findings

Civil wars are one of the most extreme forms of political violence. For this reason there have been many attempts to implement peaceful agreements in potentially conflictive societies

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[7]The countries considered by Colomer (2000) are the ones identified as free by the FreedomHouse dataset.

[8]They suggest to include one of them at each time. We tried with both variables jointly and separately. The results of the regressions are basically the same but, as pointed out by Collier and Hoeffler (2002), only one, education or GDP per capita, turn out to be significant at each regression. We decide to include both variables. The results would be qualitatively the same no matter if we include one or the other separately.

[9]The inclusion of other control variables as growth rates or indices of income inequality do not alter the basic results of the regressions.

increasing political rights and civil liberties. However, the empirical evidence on the effectiveness of these devices to control civil wars is not clear. In fact countries with high levels of democracy also experience civil war. Using the data on civil wars from Sambanis and Doyle (2000) and the sample of 138 countries of Barro and Lee (1994), we find 68 cases of civil wars that started in the period between 1960 and 1994. More than half of them (52%) occurred in countries with high levels of autocracy, the ones considered to be not free in the Freedom House database. However, 22% of them occurred in completely free countries, with high levels of civil liberties and political rights.

The proportion of cases that started the period with an autocracy and experienced a civil war is 11%. The most interesting thing is to compare this percentage with one of the free countries in which civil war started. As we expected, the proportions of cases that start the period with a free system and experience a civil war is lower, just 4%. The interesting observation is to look at the characteristics of free countries that suffered a civil war. If we distinguish these countries with respect to the different political systems we find that in 8.3% of the countries that started the period with a majoritarian system, a civil war started during the next 5 years. In the case of countries with presidential systems, 7% also experience a civil war. However, none of the countries of our sample with proportional system experienced a civil war. In our sample, we have a similar number of cases that had a majoritarian system, a presidential system and a proportional system. These are just preliminary results, but illustrate the idea that the political system may be more important in protecting democratic countries from violence than just the level of freedom.

Regression Results: Political Systems and the Prevention of Civil War

To analyze the effect of political systems on the probability of civil war we adopt a general specification derived from the Collier and Hoeffler (1998; 2002) model, including alternative explanatory variables in order to check the robustness of our findings. As in Reynal-Querol (2002) we control for the variables that Collier and Hoeffler (1998; 2002) found to be important causes of civil wars. For all the empirical exercises we consider a sample of 138 countries and data from 1960 to 1995, organized in periods of five years. All the explanatory variables are taken at the beginning of the period. The dependent variable is a dummy which takes value one if a civil war has started during the period and zero otherwise[10] (see Tab. I). Because of the nature of the data, the econometric specification should accommodate a discrete variable with the panel data structure. For this reason we use the logistic model.

A surprising result is the poor explanatory power of the proxy for natural resources, opposite to the findings in Collier and Hoeffler (1998; 2002) where they report that natural resources is an important variable in explaining the incidence of civil war. This can be caused by the difference in the sample size that we use. Even though we do not present the results here, we find natural resources to be a very important variable in explaining the incidence of other kind of political violence such as coups or revolutions. Moreover, because there are missing values in the variable natural resources, we lose a lot of observations, therefore, as in Reynal-Querol (2002), we control for other variables. The economic variables added are the investment share of GDP and the consumption share of GDP, which are not directly related to Collier and Hoeffler's model. The idea behind the inclusion of these variables is that, if the country is using the resources for investment and consumption, the opportunity cost of the resources dedicated to supporting violence is high. We also include variables that reflect social fragmentation, as the product of linguistic and religious fragmentation,

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[10]Since we are interested in studying the role of political systems on the beginning of a civil war we do not study the effect on the duration of a civil war.

TABLE I Civil War Since 1960, Using the Barro and Lee (1996) 138 Countries, and Data from Doyle and Sambanis (2000).

Country	War start	War finish	Country	War start	War finish
Afghanistan	78	92	Jordan	71	71
Afghanistan/Taliban	93		Kenya	91	93
Algeria	62	63	Liberia	89	92
Algeria	92	97	Liberia	93	96
Angola	75	91	Mali	90	95
Angola	92		Mexico/Chiappas	92	94
Bangladesh/Hill	73	94	Morocco/W.Sahara	75	89
Burma	68	82	Mozambique	79	92
Burma	83	95	Nicaragua	78	79
Burundi	65	69	Nicaragua	81	89
Burundi	72	73	Nigeria/Biatra	67	70
Burundi	88	88	Nigeria/Muslim	80	84
Burundi	91		Pakistan/Bangladesh	71	71
Cambodia	70	75	Pakistan/Blch.	73	77
Cambodia	79	91	Papua New Guinea	88	91
Central Africa	95	97	Peru	80	96
Chad	65	79	Philippines/MNLF	72	96
Chad	80	94	Philippines/NPA	72	92
China	67	68	Romania	89	89
Colombia	78		Rwanda	63	64
Congo/Brazzaville	92	96	Rwanda	90	94
Congo/Zaire	60	65	Sierra Leone	91	96
Congo/Kisangani	67	67	Somalia	88	91
Congo/shabba I, II	75	79	Somalia	92	
Congo/Zaire	96	97	South Africa	76	94
Cyprus	63	64	SriLanka/JVPI	71	71
Cyprus	74	74	SriLanka/Tamil	83	
Djibouti	91	95	SriLanka/JVP II	87	89
Dominican. Rep.	65	65	Sudan	63	72
El Salvador	79	92	Sudan	83	
Ethiopia/Eritrean	74	91	Thailand	67	85
Ethiopian/Ogaden	77	85	Turkey/Kurds	84	
Ethiopia/Ideol.	74	91	Uganda	66	66
Guatemala	66	72	Uganda	78	79
Guatemala	74	94	Uganda	80	86
Haiti	91	94	Vietnam. Rep.	60	75
Haiti	95	96	Yemen	94	94
India/Kashmir	65	65	Yemen, Arab. Rep.	62	69
India/Kashmir	89	94	Yemen, Peoples. Rep.	86	87
India/Sirkh	84	94	Yugoslavia/Bosnia	92	95
Indonesia/East timor	75	82	Yugoslavia/Croatia	91	91
Indonesia	86	86	Yugoslavia/Croatia	95	95
Iran/Revolution	78	79	Zimbabwe/Rohdes	72	80
Iran	81	82	Zimbabwe	84	84
Iraq/Kurds	61	75			
Iraq/Kurds	88	94			
Iraq/Shiites	91	94			

following Collier and Hoeffler (1998; 2002). However, every time we include this cross product in the regression we also include the level of religious and linguistic fragmentation separately.[11]

Hegre *et al.* (2001) and Reynal-Querol (2002) find evidence that mid-level democracies are more prone to civil wars than full democracies or full autocracies. The interpretation may be that for starting a civil war some level of freedom is needed to let people organize.

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[11]Using only the cross product the results are qualitatively the same. Moreover using only the level of religious fragmentation and the level of linguistic fragmentation separately the results are also qualitatively the same.

Therefore, it seems that freedom is not a sufficient condition to prevent civil wars. We introduce the institutional variables created in this paper following basically Colomer (2000). It includes autocracy (AUTO), partially free (PF), majoritarian system (MAJO), presidential system (PS) and proportional representation (PR). We analyze the effect of the different institutional systems using dummy variables. However, because there is no country that has a proportional system and experience a civil war during the next five years, the predictive power of this dummy is perfect. This fact makes the logit panel a badly defined specification. Therefore, in order to continue analyzing the other systems, we develop two different analysis: in the first analysis we drop the observations that have a proportional system in order to analyse the remaining systems. In the second analysis, we construct a variable that orders the different systems according to the level of inclusiveness of their voting rules ranked by Colomer (2000).

The results of introducing the four dummy variables describing the systems (autocracy (AUTO), partially free (PF), majoritarian (MAJO) and presidential (PS)) are presented in column 1 of Table II. In order to control for the level of democracy, we introduce the interactions between the political system and the level of democracy using Polity III data. In order to avoid collinearity between democracy and partially free we compare only the free political systems. Majoritarian systems exist in free countries, the ones that have high levels of freedom. Does the effect of a majoritarian rule on the probability of a civil war change when the system is completely free? The answer is no. A majoritarian system with less freedom has the same probability of civil wars as a majoritarian system with a high level of freedom. This probability is not significantly different from that of a non-free system. However, from column 1 we can observe that presidential systems work in a different way. A presidential system with low level of freedom has the same probability of civil war as a non-free systems. However, when the country reaches the highest levels of freedom, presidential system has a lower probability to suffer civil war than non-free systems.

In the second analysis, we try to summarize in one variable the information contained in the five dummies referred to before. We order the five dummies with respect to the inclusiveness of the system following the ranking order of Colomer (2000). The most inclusive rule is unanimity. We know that non-free systems are less inclusive than non-authoritarian countries, and that plurality systems are less inclusive than proportional representation systems. A number of countries have presidential systems. The theory does not incorporate this directly. However, there is a sense in which societies with presidential systems and proportional system in the assembly are more inclusive than pure majoritarian systems. By definition the election of the president is by majority rule. Therefore, what makes the difference between presidential systems is the voting rule followed in the assembly. It would be ideal to have data that distinguish between the kind of presidential systems in terms of their different level of inclusiveness depending on the voting rule followed in the assembly. However we do not have this data, therefore if we order the systems by the level of inclusiveness, presidential systems are less inclusive than proportional representation and equal or more inclusive than majoritarian rule systems, depending on the voting rule followed in the assembly elections. Therefore we create a variable called INCV, such that it has value 0 if the system is non-free, 1 if it has a majoritarian system, 2 if it has a presidential system and 3 if it has a proportional system. Alternatively, mainly because it may be debated whether presidential systems are more inclusive that majoritarian, we create another variable, called INCV1 such that it has a value 0 if the country is not free, 1 for majoritarian and presidential systems, and 2 for proportional systems. The difference between INCV and INCV1 is that in the first variable the presidential system is considered to have higher inclusiveness than the majoritarian system. However, in the variable INCV1 they are considered to have the same level of inclusiveness.

TABLE II　Political System, Level of Inclusiveness and Civil War.

Model	1	2	3	4	5
	Dependent variable: The probability of civil war				
Const	−2.50 (−0.58)	1.6 (0.26)	1.26 (0.213)	6.13 (0.975)	5.6 (0.91)
Educ	−0.02 (−0.14)	−0.04 (−0.22)	−0.02 (−0.15)	−0.01 (−0.09)	−0.00 (−0.02)
L_{pop}	0.44 (2.92)	0.44 (3.22)	0.46 (3.36)	0.39 (2.96)	0.44 (3.23)
L_{GDP}	−0.60 (−1.25)	−0.62 (−1.28)	−0.70 (−1.45)	−0.85 (−1.7)	−0.90 (−1.81)
I	−0.02 (−0.54)	−0.07 (−1.58)	−0.06 (−1.4)	−0.07 (−1.66)	−0.06 (−1.48)
C	0.00 (0.21)	−0.024 (−0.67)	−0.02 (−0.57)	−0.03 (−0.93)	−0.03 (−0.84)
Frac	0.02 (0.02)	−0.14 (−0.13)	−0.13 (−0.12)	0.04 (0.04)	0.12 (0.11)
DemocP3	**0.22 (2.31)**	**0.17 (2.43)**	**0.18 (2.38)**		
AutocP3				**−0.25 (−3.28)**	**−0.27 (−3.38)**
MAJO	**0.40 (0.34)**				
Demmaj	**−0.23 (−1.37)**				
PS	**1.81 (1.79)**				
Demps	**−0.48 (−2.59)**				
INCV		**0.43 (1.09)**		**−0.99 (−2.62)**	
INCV1			**0.41 (0.61)**		**−1.66 (−2.80)**
Demincv		**−0.17 (−2.39)**			
Demincv1			**−0.22 (−2.05)**		
Autincv				**0.19 (2.49)**	
Autincv1					**0.28 (2.41)**
N	417	534	534	534	534

Numbers in parentheses are *t*-statistics.
In column 1 we dropped the observations such that PR = 1, and the omitted category if PF and AUTO.
Educ: average years of schooling in the total population.
L_{pop}: log of the population at the beginning of the period.
L_{GDP}: Log of the real GDP per capita of the initial period (1985 international prices).
I: Investment share of GDP; *C*: Consumption share of GDP.
Frac: product of lingustic and religious fragmentation.
DemocP3: Democracy level from Polity III data source.
AutocP3: Autocracy level from Polity III data source.
MAJO: Dummy variable for countries with Majoritarian systems.
PS: Dummy variable for countries with Presidential systems.
Demmaj: DemocP3∗MAJOc; Demps: DemocP3∗PS.
INCV: Level of inclusiveness. INCV1: Level of inclusiveness.
Deminev: DemocP3∗incv; Demincv1: DemocP3∗incv1.
Autincv: AutoP3∗inc.; Autincv1: AutocP3∗incv1.

　　In column 2, 3, 4 and 5 of Table II we analyse the effect of INCV and INCV1 variables. We consider the interactions between the level of inclusiveness and the level of freedom using Polity III data. In columns 2 and 3 we use the level of democracy, and in columns 4 and 5 the level of autocracy. Columns 2 and 3 shows that the level of inclusiveness in countries with low levels of freedom do not affect the probability of civil wars. This is because in countries with a low level of freedom the intensity of inclusiveness is the same no matter how autocratic or democratic is the country. However, in countries with high levels of freedom the level of inclusiveness of the voting rule has a negative and significant effect on the probability of civil war. Moreover, these results indicate that the higher is the level of democracy in the country, the larger is the effect of the level of inclusiveness on civil war. These results corroborate what we obtain using the level of autocracy instead of democracy (columns 4 and 5).

　　In all the regressions we have included regional variables to show that the results do not depend on the fact that many OECD countries have proportional systems and do not experience civil wars. The regional dummies are not significant. Moreover, this effect can also be controlled for by introducing the gdp variable, given that OECD countries are the ones that have the highest levels of income. We have already controlled for income. Moreover, we have run the same analysis without the OECD countries to make sure that the results are not driven

by OECD countries. If we drop the OECD countries and we do the same analysis, the results are qualitatively the same. Notice that not all countries with proportional systems belong to the OECD. Around 17% of the cases with proportional systems included in our sample belongs to non-OECD countries. This includes the cases of Malaysia and South Africa that, after some periods of violence, change their system to a more concensual one.

These results show the need to control not only for the level of democracy but also for the political system. Not all political institutions work in the same way, and from the analysis mentioned above the level of representation of the population is a key element if we want to prevent countries from civil war. Freedom is needed, but it seems to be less important if the political system is not appropriate. The conclusion from the analysis is that political systems with high level of inclusiveness seems to be more appropriate to prevent countries from civil war. This inclusiveness can be achieved applying consensus-coalition systems rather than majoritarian systems.

CONCLUSION

This paper analyses the role of political systems as a mechanism that can prevent or reduce violence in potentially conflictive societies. We show theoretically and empirically how alternative political systems have different probabilities of experiencing a civil war.

We constructed a simple model that captures the basic relation between a political system and the probability of rebellion. According to our model the proportional system has a lower probability of rebellion than the majoritarian system. The intuition behind this result is that under the proportional system the opportunity cost of rebellion is higher than under the majoritarian system. Moreover, we also find that given a political situation, majoritarian systems need to have higher penalties than proportional system to prevent rebellions.

The main finding shows the importance of the combination of the system of representation of the voters in government and the level of freedom or democracy in order to prevent countries from civil war. Empirically, we find that countries with proportional system has the lowest probability that groups rebel and that the more inclusive is the system, the smaller the probability of suffering a civil war. This result solves the puzzling results of the effect of the democracy on the probability of civil wars. This means that the political system, which determines the level of inclusiveness, is an important political factor in reducing the probability of civil war.

APPENDIX

Proof of Lemma 1

Necessity is immediate. As for sufficiency start by noting that the set of policies against which neither of the two extreme groups will rebel is given by $(\alpha_G - \delta), (\alpha_1 + \delta)$, which is non-empty.

The set of acceptable policies for group k, is $\alpha \in [\alpha_K - \delta, \alpha_K + \delta]$.

It is immediate that $[\alpha_G - \delta, \alpha_1 + \delta] \in [\alpha_K - \delta, \alpha_K + \delta] \; \forall k$.

Therefore, since the set of policies is acceptable for all group, it is stable.

Proof of Lemma 3

Under the proportional system, the policy established is the mean $\bar{\alpha} = (\tilde{\alpha}_1 + \tilde{\alpha}_2 + \tilde{\alpha}_3)/3$. The proportional system is stable if $\tilde{\alpha}$ is a stable policy, that is, if $\bar{\alpha} = \sum_{i=1}^{3} \frac{1}{3}\tilde{\alpha}_i = (\tilde{\alpha}_1 + \tilde{\alpha}_2 + \tilde{\alpha}_3)/3 \in [\tilde{\alpha}_3 - \delta, \tilde{\alpha}_1 + \delta]$.

Let us now characterize the values of $\tilde{\alpha}_2$–the preferences of the median voter–for which the proportional system is stable. Clearly, the proportional system is stable if and only if $\alpha^l = \tilde{\alpha}_3 - \delta \leq \bar{\alpha} = (\tilde{\alpha}_1 + \tilde{\alpha}_2 + \tilde{\alpha}_3)/3 \leq \tilde{\alpha}_1 + \delta = \alpha^u$.

Rearranging we have:

$$2\tilde{\alpha}_3 - \tilde{\alpha}_1 - 3\delta \leq \tilde{\alpha}_2 \leq 2\tilde{\alpha}_1 - \tilde{\alpha}_3 + 3\delta$$

Proof of Proposition 2

Proof of Existence   For $p = \{1/2, 0, 1/2\}$, the policy implemented is $\alpha = \sum_{i=1}^{3} p_i \tilde{\alpha}_i = (\tilde{\alpha}_1 + \tilde{\alpha}_3)/2$, for any $\tilde{\alpha}_2$.

We check if this policy belongs to the set of stable policies, that is, if $(\tilde{\alpha}_1 + \tilde{\alpha}_3)/2 \in [\tilde{\alpha}_3 - \delta, \tilde{\alpha}_1 + \delta]$. It is easily to check that these two inequalities are satisfied:

$$\frac{\tilde{\alpha}_1 + \tilde{\alpha}_3}{2} \geq \tilde{\alpha}_3 - \delta$$

$$\frac{\tilde{\alpha}_1 + \tilde{\alpha}_3}{2} \leq \tilde{\alpha}_1 + \delta$$

Both are satisfied if $|\tilde{\alpha}_3 - \tilde{\alpha}_1| \leq 2\delta$, which is a condition for the existence of stable policies.   ∎

Proof of Uniqueness   Suppose that there exists another political system p', such that generates a stable policy for some vector $\tilde{\alpha}$ and δ, such that $|\tilde{\alpha}_3 - \tilde{\alpha}_1| \leq 2\delta$. If this is true, it also has to be stable when $|\tilde{\alpha}_3 - \tilde{\alpha}_1| = 2\delta$. Notice that under this case, the set of stable policies is compose buy one policy,

$$[\tilde{\alpha}_3 - \delta, \tilde{\alpha}_1 + \delta] = \tilde{\alpha}_3 - \delta = \tilde{\alpha}_1 + \delta = \frac{\tilde{\alpha}_1 + \tilde{\alpha}_3}{2}$$

For any $\tilde{\alpha}_2$ the political system p', will assign policy $(\tilde{\alpha}_1 + \tilde{\alpha}_3)/2 = \sum_{i=1}^{3} p_i \tilde{\alpha}_i$. This is a linear convex combination of the $\tilde{\alpha}$. For a given $\tilde{\alpha}_1$ and $\tilde{\alpha}_3$, for different $\tilde{\alpha}_2$ the set of political systems that assigns the stable policy change. Therefore, the only political systems that are in the group of stable political systems for each $\tilde{\alpha}_2$, are ones such that $p_2 = 0$.

Therefore $p' = \{p_1, 0, p_3\}$.

It is immediate that $p' = \{1/2, 0, 1/2\}$, it is the only convex combination that gives the stable policy $(\tilde{\alpha}_1 + \tilde{\alpha}_3)/2$.

Therefore this political system is unique.   ∎

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