ECONOMIC ROOTS OF CIVIL WARS AND REVOLUTIONS IN THE CONTEMPORARY WORLD [i]

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(October 11, 2007)

i A first version of this paper was prepared for the Yale Conference on Order, Conflict and Violence, April 30th-May 1st, 2004. I thank the comments of the participants and particularly of Robert Bates, Stathis Kalyvas, David Laitin, Nicholas Sambanis and three anonymous referees.

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Abstract

To explain the distribution of civil wars, guerrilla warfare and revolutionary outbreaks, the literature on modern political violence has shifted, broadly speaking, from a modernization perspective that emphasized the role of material conflict and of grievances to a more recent research program that stresses the geographical and organizational opportunities that insurgents may have to engage in violence. Drawing on those lines of inquiry equally, this article offers an integrated analytical model that considers both the motives and the opportunities of states and rebels. Civil wars, guerrillas and revolutionary outbreaks are seen as a result of the nature and distribution of wealth in each country. Systematic and organized violent conflicts are most likely in economies where inequality is high and wealth is mostly immobile, that is, in societies where those worse off would benefit substantially from expropriating all assets. Violence is conditional on the mobilizational and organizational capacity of challengers and on the state capacity to control its territory. The theory is tested on data on civil wars from 1850 to 1999 for the whole world and data on guerrilla warfare and revolutionary episodes spanning from 1919 to 1997 across all countries.

Research on the sources of modern political violence (in the form of civil wars and guerrilla warfare) has gone through several theoretical turns since its inception as a comparative endeavor almost fifty years ago. Modernization scholars explained rebellions as a function of economic inequality (Russett 1964, Paige 1975, Midlarsky 1988, Muller 1985), the impact of social and economic development and the status and political claims of particular social groups (Huntington 1968, Wolf 1969, Gurr 1973). That strand of inquiry was joined by a second line of research relating violent conflict to ethnic nationalism and the distribution of resources along ethnic lines (Horowitz 1985, Connor 1994). In recent year, however, almost all scholars have shifted away from those explanations that emphasize the structure of economic relations, the importance of existing grievances or the role of political ideologies in igniting violent conflicts to stress instead the context of economic and political opportunities in which potential rebels may decide to engage in violent action. On the one hand, Collier and Hoeffler (2004) have linked the emergence of rebellious activities to the availability of both finance – namely, abundant natural resources – and potential recruits – individuals with very reduced prospects of material advancement through peaceful activities. On the other hand, Fearon and Laitin (2003) have emphasized that grievances are not a sufficient condition to generate political violence since there is an almost infinite supply of them across the world and hypothesize that "financially, organizationally, and politically weak central governments render insurgency more feasible and attractive due to weak local policing or inept and corrupt counterinsurgency practices" (75-76) to conclude that civil wars happen in "fragile states with limited administrative control of their peripheries" (88).[1] Writing from a different angle, rooted in the examination of the micro logic of violence deployed in civil wars, Kalyvas downplays the presence of single, sociologically unique motivations and describes civil wars as "imperfect, mulilayered, and fluid

1 Beyond the literature on civil wars, there is of course a long tradition in political science has insisted on organization and resources as an essential pre-requisite to have social mobilization, protest and violence (Tilly 1978). Moore (1966: 479) and Skocpol (1979:114-115) also insisted that agrarian grievances did not translate directly into revolutionary action, that is, that they rather required the organized mobilization by particular groups, such as students, parties and so on.

aggregations of highly complex, partially overlapping, diverse, and localized civil wars with pronounced differences from region to region and valley to valley" (Kalyvas, 2006: 371).

The advocates of these different strands of work have generally presented them as advancing opposite explanations of political violence. Yet each one of them offers partial and, when considered separately, insufficient insights on the same empirical puzzle – with the former literature focused on the reasons actors may have to engage in violence and the latter centered on their opportunities. A more satisfactory theory of political violence needs to subsume both approaches to be successful. To paraphrase Collier and Hoeffler, political violence, as the commission of any crime, requires both "motive and opportunity" (2004: 563).

I take up this task in this article. Accordingly, I start by specifying the set of conditions that may motivate actors to engage in political violence. Since the literature on political opportunities and the organizational failures of states is right in pointing that the notion of acute 'grievances' is especially difficult to pin down and that economic resentments, ethnic antagonisms and personal or clique grudges are too common or widespread to specify the cases in which political violence will erupt, I offer a more precise model of the (mostly material) conditions under which political actors may engage in open political violence. In a nutshell, I predict that the use of openly violent means in the political arena will be most likely in countries that are highly unequal and where wealth is mostly immobile. In unequal societies, the well-off sectors (such as landowners or government officials in control of mining resources in rentier states) become more reticent toward the introduction of democratic means to set policy. The losses they would incur (from redistributive mechanisms voted by the majority) would be just too substantial. Similarly, resorting to violence to effect political change becomes attractive to those that do not own most of the wealth when the wealthy own a sizeable fraction of the economy. In addition to formalizing the role of inequality, which played a central role in the first wave of research on civil wars, the articles shows analytically that political violence intensifies in unequal economies in which most wealth is fixed. The least well-off sectors can engage in violent actions relatively certain that if they win,

no assets will be moved out of the country. Violence is also more likely within the wealthy elite: in economies abundant in immobile assets, its members have a much higher incentive to resort to overt armed activities to grab the property of other wealthy owners (particularly if the least-off sectors are politically demobilized and thus hardly threatening).[2]

Within this model of material incentives, I then integrate the most recent work on civil wars on financial opportunities and state capacity by explicitly modeling the costs of engaging in violent activities into the decision of political actors. As discussed later, the costs of employing violent means of action vary, on the one hand, with the organizational capabilities of both the state and potential rebels and, on the other hand, with more pre-ordained factors such as the type of terrain, the distribution of the population and so on.

The contribution of this article is not only theoretical. Due to a lack of detailed data, the first structural models of political violence were poorly tested. More recently, researchers have generated much more systematic studies of the causes of violence (Collier and Hoeffler 2004; Fearon and Laitin 2003). But their analyses have mostly looked at the opportunities of violence and have been restricted to civil wars (after 1950). In addition, their central social and economic indicator has been reduced to per capita income – which, among all the theoretical interpretations it may be given, has been chosen there as an indicator of the organizational capabilities of the state. By contrast, I develop more fine-grained and direct measures of the nature and distribution of wealth (without giving up on the exploration of the economic, geographical and technological factors that may determine the presence of violent conflict). In

2 In part, these conditions can be traced back to the more structural theories developed so far. On the one hand, the article brings back in the initial literature on political violence and economic inequality. On the other hand, it integrates work by Collier and Hoeffler (1999, 2004) who, at least initially, explained the occurrence of civil wars as a function of greed. In their account greed is fueled by the abundance of natural 'resources' (measured through the percentage of primary products) and by the relatively low life chances of potential rebels (proxied by rates of secondary-school enrollment for males). These two latter factors can be easily folded into the model as follows. The presence of abundant natural resources (rather than all sorts of resources, which, prima facie, could also finance any type of illegal activity and therefore should lead us to expect violence everywhere) fits squarely with the idea that only fixed assets can be easily expropriated and controlled by the rebels. Educational attainment also points to the type of assets and to the underlying income distribution in society.

addition, I extend the empirical analysis to examine the occurrence of civil wars between 1850 and 1999 and to explore the correlates of guerrilla warfare and revolutionary outbreaks between 1919 and 1997.

THEORY

To pin down conditions under which political violence takes place, I describe an economy characterized by two main traits: the distribution of assets among individuals; and the extent to which those assets are mobile and can be actually taxed. In this economic context, economic agents, who are endowed with some organizational and military resources, choose the political strategy that is more likely to maximize their wealth. The use of violence to choose political institutions (and the extent to which wealth will be redistributed) is one of these political strategies – its study constitutes, again, the focus of this article.[3]

Economy

Assume an economy with two types of individuals, poor and wealthy. Poor individuals P hold a total capital stock K_p. In turn, wealthy individuals W hold aggregate capital stock K_w. By definition, P are the majority of society, that is, $P>W$. The economy-wide stock of capital is $K_p+K_w=K$. For notational convenience, the aggregate share of capital of each group can be represented as $k_j=K_j/K$ so that $k_p+k_w=1$. The capital held by each poor individual is $k_p^i=k_p/P$ and by each rich individual is $k_w^i=k_w/W$. By definition, $k_p^i < k_w^i$. The average capital per person, k_a^i equals $K/(W+P)$. The difference between k_p^i and k_a^i measures the extent of income inequality.

Production is constant returns to scale, so that output can be normalized to $y_j=k_j, j=w,p$. Capital varies in how specific it is to the country in which it is used. The higher the country-specificity of capital, the lower its value when it is moved abroad. Mines and land are fully specific. By contrast, high skills and

3 Although this model builds on previous work such as Boix (2003), it differs in two respects: it explores in more detail the use of violence in the choice of institutions; and it extends the model to examine the effects of democracy

financial capital are highly mobile – they generate similar returns across countries. The extent to which it is specific is given by the productivity of capital at home relative to abroad and is measured by the parameter $\sigma = (0,1)$. Capital k, which at home would produce $y=k$, produces abroad $y^a = (1-\sigma)\, k$.

Political Strategies and Political Regimes

Given a particular economic structure (and their position in it), both the wealthy and the poor engage in a set of political actions to choose the political regime that will maximize their wealth. More precisely, they play a game with the following sequence:

(1) First, the wealthy decide whether to establish an authoritarian regime or to accept democracy. If they move to democracy, the poor accept and everybody votes to set the level of taxes and redistribution. (The model assumes that the poor are better off under democracy than under a revolutionary outcome. In Appendix 3 I relax this assumption and consider the possibility that the poor revolt under democracy. Broadly speaking, this increases the occurrence of authoritarianism.) Assume, following standard political economy models (e.g. Persson and Tabellini 2000), that the state taxes agents with a linear tax τ on their income y (so that each individual pays τy_i) and distribute revenue equally among all individuals (so each individual receives τy^i_a). In a democracy, the median voter (who, given our assumptions, is a poor individual) sets taxes to maximize transfers to herself, taking into account the welfare losses of taxation (which for simplicity may be assumed to be given by a quadratic function $\tau^2/2$) and constrained by the decision of the wealthy to move their income abroad. Formally:[4]

$$\max_{\tau} (1-\tau)\, y_p^{\,i} + y_a^{\,i}\, \tau - y_a^{\,i}\, \tau^2/2 \qquad (1)$$

in the use of violence and to allow for open warfare within the wealthy elite.

4 This formalization (particularly the constraint) assumes that the timing of the political process is such that each individual wealthy voter can choose to move his income abroad and still receive a transfer. This is a Nash equilibrium assumption: the deviation by each voter, in deciding to carry her capital abroad takes the transfers in the economy as given. Altering this assumption so that exiting the country must be done before obtaining transfers slightly complicates the algebra but does not change any of the analysis that follows.

such that $(1-\tau)\, y_w^i > (1-\sigma)\, y_w^i$

Solving this maximization problem, the tax is:

$$\tau^* = \min\left(1-(y_p^i / y_a^i),\ \sigma\right) \qquad (2)$$

This result simply implies that the median voter will choose a tax rate equal to the smaller of two parameters: the difference between 1 and the ratio of inequality (expressed as the income of the poor divided by the average income per person) and the level of specificity of the wealth. Accordingly, with low capital mobility, the tax rate will be a positive function of income inequality because the wealthy cannot credibly threaten with their exit in response to heavy taxes. Yet, as capital mobility rises (and σ approaches 0) the tax rate becomes constrained by the possibility that the wealthy will move their capital abroad and, regardless of inequality, the tax rate will decline.

(2) If, instead of accepting democracy, the wealthy decide to maintain an authoritarian regime, the poor may either acquiesce or revolt. If the latter acquiesce, a right-wing authoritarianism takes place, that is, a system where only the wealthy decide over taxes and transfers. Since wealthy voters have no interest in transferring income to themselves (particularly given that taxes have some distortionary effect on the economy), the tax rate will be 0.[5] Naturally, the imposition of such a regime will require incurring some repression costs r_w. Given that the tax is 0, the wealthy individual has $k_w^i - r_w^i$. In turn, each poor person has assets k_p^i.

(3) If the less well-off revolt, violence takes place. Depending on the resources of each party in contention, violence results in either a reassertion of the right-wing authoritarian regime or the establishment of a left-wing regime (in which the assets of the wealthy are expropriated).[6] If a left-wing

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5 For the sake of simplicity I disregard the possibility of collecting revenue to fund some level of public goods.

6 In the model agents only live for one period, and do not care about leaving a bequest to their children. Hence, they undertake a sequence of one-period optimizations. The only links between the different periods is the state of the political system at the start of the period and the capital stock at the start of the period. In each period wealthy and poor agents observe the political system inherited, the distribution of wealth and its specificity and play a game that determines the choice of political regime and, given the latter, the tax rate. The solution concept used is perfect

regime is established, only the poor vote after they have expropriated all the wealthy's assets. In such a regime, the poor individual gets: $k_p^i + \sigma k_w/\alpha - \omega_p^i$ (with ω denoting the costs of war) and the rich obtain their mobile wealth minus the costs of repression, $(1-\sigma)k_w^i - r_w^i$.

(4) Finally, once the poor have taken a particular course of action (rebelling or acquiescing), the wealthy individuals consider in turn the possibility of challenging the status of other members of their own group – simply with a view to accumulate more assets and hence become even more dominant in the context of a non-democratic state. Hence, open intra-elite or intra-class conflict may also arise from time to time. Notationally, fighting implies incurring some war costs ω_w . The winner *i* (against another wealthy individual *j*) gets $k_w^i + \sigma k_w^j - \omega_w^i$. The loser can only keep her non-specific wealth and so she gets $(1-\sigma)\, k_w^j - \omega_w^j$.

As examined shortly, the decision of the political actors of this set-up to engage in open political violence will be a function of the distribution and nature of economic assets as well as their level of (political, organizational and military) strength. To capture the varying strength of the parties in conflict, let us model the repression costs of the wealthy to range from very low to high. The wealthy bear very low repression costs ($r_{w\text{-}minimal}$) when any wealthy individual <u>alone</u> succeeds at repressing a rebellion by the poor. Low repression costs ($r_{w\text{-}low}$) denote a situation in which the wealthy acting <u>together</u> are the stronger party: once challenged, they defeat the poor and they reassert an authoritarian outcome only if they pool all their resources together (but not if they act separately). High repression costs ($r_{w\text{-}high}$) occur when the wealthy (even acting together) are weak vis-à-vis the poor. Here the poor always win if they decide to rebel.

The variation in repression costs may be a function of the distribution of assets: in extremely unequal societies, wealthy individuals may have enough advantage over everyone else to defeat any challenger using their own particular resources. Yet, as the concentration of wealth declines, they may

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Bayesian equilibrium, as agents play what is essentially a different game in each period.

need to associate with others to reassert an authoritarian regime. Nonetheless, repression costs also vary as a function of the organizational capacity of each group, the technologies and resources at their disposal and the geographical characteristics of the areas in which each party is located. Thus, for example, the costs of repression will be low whenever the least well-off are completely demobilized, the wealthy have extremely sophisticated mechanisms of control or the country's geography makes the suppression of political protest and violence relatively easy. By contrast, whenever the poor organize in political parties and trade unions or live in highly mountainous terrain, which may breed the formation of guerrilla movements, or the state has poor roads and is badly organized, the costs of repression will increase.

Given this potential variation in the strength of political actors, violence erupts precisely because there is some lack of information or uncertainty about the costs of repression and the ability of each side to win in a violent contest. If everybody knew the strength of its adversary, then the weaker party would not contest the regime imposed by the other party and there would be no open conflict ever. If weak, the wealthy would not choose an authoritarian strategy – since they would know they would be defeated. Similarly, faced with a strong party of wealthy individuals, the poor would not challenge authoritarianism.

More precisely, the model assumes the following informational structure. The poor do not know about the strength of the wealthy with certainty and need to estimate the likelihood that they will succeed in a civil war before rebelling. Formally, they estimate the cost of repression to the elite to be high with probability q and to be low (or very low) with probability $(1 - q)$. In turn, the rich know their type (weak, strong or very strong) vis-à-vis the poor. Still, the wealthy also face some uncertainty: they are unsure about the internal distribution of power within their own group and whether they can successfully defeat one of their own kind should they decide to do so.

Peace versus Violent Conflict

Peaceful Conditions

Violence will not take place under both low and medium levels of inequality and asset specificity. When either the level of inequality or wealth specificity is sufficiently low, democracy takes place regardless of the cost of repression.[7] This is the case because for sufficiently low levels of inequality or asset specificity the tax rate in a democratic setting will be low enough to make the introduction of democracy cheaper than the maintenance of an authoritarian regime (even when repression costs are low or very low).

The likelihood of having a democracy declines in those cases in which either wealth inequality or asset specificity increase so that, although they are low, they are not sufficiently low for democracy to be preferred to repression in all cases. The type of political regime that prevails (for medium levels of inequality and specificity) varies with the type of repression costs in place. If repression costs are low or very low, the wealthy prefer to repress than to allow for democratic elections. The poor do not contest the authoritarian regime because they know that for the rich to repress under these circumstances (moderate inequality and asset specificity), the repression costs must be low and that, therefore, a revolution would fail. If repression costs are high, then the wealthy simply move to accept a democratic constitution. The political outcome is identical to the one that takes place when society is very equal or assets scarcely taxable. In both cases, political violence between wealthy and poor should not occur under those circumstances.

Outbreaks of Inter-Class Violence

As the levels of inequality and asset specificity go up, the cost of taxation under democracy always becomes higher than the cost of repression born by the wealthy to maintain an authoritarian regime. Under those circumstances, the excluded majority may resort to violence whenever the expected

7 I discuss the choice of political regimes (under peaceful conditions) very briefly to focus instead on the causes of violence.

gain of revolting is larger than the value of accepting an authoritarian regime:

$$q(k_p + \sigma k_w /\alpha - \omega) > k_p \quad (3)$$

Sustained violence occurs when the wealthy decide to respond to the poor's rebellion. If the costs of repression are low, the rich will always repress, knowing that an authoritarian regime will eventually prevail. If the costs of repression are high, the wealthy have no dominant strategy to follow. On the one hand, they will not always choose repression. If they did, the poor would systematically try their luck and revolt. This would make a repressive strategy not optimal when repression was indeed expensive. On the other hand, the rich will not always avoid repression either. A non-repressive strategy would make the poor believe that those that repress have a low cost of repression. This would in turn give the wealthy an incentive to repress (and exploit the beliefs of the poor) even in cases in which the cost of repression was high. Since the wealthy cannot follow a pure dominant strategy, they will simply follow mixed strategies to make the poor indifferent between revolution and acquiescence. Appendix 1 formally develops the equilibrium that determines the wealthy's strategy as well as the poor's probability of revolting. As shown in that Appendix, within the high inequality/high specificity equilibrium, the probability of the revolt increases as income inequality and particularly asset specificity increase.

[Figure 1 here]

Figure 1 summarizes the insights of the model. The vertical axis captures the level of inequality. The horizontal axis measures the level of asset specificity. Democracy prevails at either low levels of inequality or low levels of asset specificity (or both). The probability of an authoritarian regime rises as both economic parameters go up. For sufficiently high levels of inequality and fixed wealth, violent clashes become increasingly likely. To sum up, we should expect civil wars, guerrilla warfare and revolutionary to be clustered in the upper-right corner of Figure 1. This result, which I explore empirically below, coincides with the clustering of a substantial number civil wars and revolutionary events in agrarian and unequal economies such as parts of Southern and Eastern Europe, Central and Latin America, China and South Eastern Asia in the twentieth century.

Outbreaks of Intra-Class Conflict

So far, I have modeled the conditions under which violence takes places between economic classes. However, conflict may also happen within the wealthy elite – that is, each wealthy individual may have an incentive to expropriate the assets of other members of his group. In the game I just constructed, once the wealthy have established an authoritarian regime and once the poor have decide whether to rebel or to acquiesce, one or some of the members of the wealthy class may choose to fight with others of their own group.

Under what conditions will intra-class conflict emerge? The frequency of intra-class conflict will depend, in the first place, on the repression costs of the wealthy (vis-à-vis the poor). If repression costs are high and the poor decide to revolt, the wealthy do not engage in intra-elite conflict because they would end up being defeated and engaging in intra-elite conflict would only imply losing the extra costs of war ω_w^i. Similarly, if the poor have revolted, the wealthy will not fight each other even when their repression costs are low. As noted before, low repression costs imply that the wealthy can only defeat the poor if they act together. Hence any intra-elite conflict leads to the same outcome than with high repression costs: defeat before the poor plus extra losses ω_w^i. By contrast, the wealthy may engage in intra-elite conflict even in the face of a poor's rebellion when repression costs are very low (that is, when any wealthy individual can defeat the poor alone). Thus, as repression costs decline in size, intra-elite conflict may increase in frequency. [8]

When intra-elite conflict does not jeopardize the dominant position of the elite (either because the rest of the population remains acquiescent or because it can be contained), political violence will happen with some positive probability among the wealthy. For the sake of simplicity, consider a game similar in structure to the one just described for the wealthy-poor interaction: every time after the poor have decide

8 If those costs are inversely related to inequality, then intra-elite conflict will be more frequent in highly unequal places.

whether to revolt or not, one wealthy individual (chosen randomly by nature) decides whether to make a demand or not over the assets of other wealthy individuals. At this point, the selected individual knows whether he is strong or weak vis-à-vis other individuals. The other individuals do not know. If no demand is made, everyone retains their initial wealth. If a demand is made, the individual upon which the demand is made may acquiesce (forsaking part of his wealth) or respond with force. Given the lack of information the latter individual has about the distribution of force within the elite, there is some chance open conflict will happen within the wealthy elite.

Appendix 2 formally develops and solves the game. The central result of the model is that, as asset specificity increases, the wealthy have a stronger incentive to fight each other – there is more wealth to grab from each other.[9] As assets become more mobile, the cost of war deters everyone from fighting over their sources of income. In other words, intra-elite conflict takes place in agrarian or natural-resource economies (in which the least well-off are demobilized or not threatening). Because intra-elite wars would dissipate all industrial wealth, they do not happen in developed nations. Graphically, we should find this type of wars clustered in the right-hand side of Figure 1 – and most probably in relatively unequal societies since those are the ones in which the wealthy have enough resources to neutralize the least well-off. This analytical result seems to fit the historical record well. Many 19th-century civil wars in Latin America involved oligarchical elites in the context of little mobilization of the least-well-off sectors – to name a few, consider the Venezuelan wars of 1868-70, 1888-89, the Colombian wars in the second half of the 19th-century, Chile in 1851, 1859 and 1891, and Argentina's interterritorial fights (Huntington 1968, Centeno 2002). Similar wars did not happen in the industrial core of Europe. And they also disappear as class-based mobilization grew in the 20th century.

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9 The likelihood of war also goes up when the imbalance of wealth within the elite grows. This requires relaxing the model's assumption that all wealthy individuals have the same assets.

EMPIRICS OF POLITICAL VIOLENCE

To explore the validity of the explanatory model, which predicts that political violence increases with inequality and wealth specificity, conditional on the costs of choosing violent means of action, I examine data on the occurrence of the following types of violent events: civil wars, guerrilla warfare and revolutionary episodes.

Broadly speaking, a civil war is any conflict in which military action takes place between agents of (or claimants to) a state and organized, non-state groups who seek to take control of the state (in the entire country or in part of the country) or to change governmental policies, and where the conflict exceeds a certain threshold of deaths. As shown in Sambanis (2004), current data sets of civil war incidence employ partially different coding strategies to operationalize such a general definition and therefore generate partly different lists of war onsets and terminations.[10] Since, with a few exceptions, most explanatory variables are very sensitive to the data set employed by the researcher (Sambanis 2004: 831-853), here I employ four data sets. To examine the incidence of civil wars since the first half of the nineteenth century, I examine the data set of the "Correlates of War" (COW) project as updated by Sarkees (2000), which includes data from 1816 through 1997. I then turn to the three most recent and probably best documented data sets on civil wars after World War II: Fearon and Laitin (2003), the Uppsala-Prio data set developed by Gleditsch et al. (2002) and Sambanis (2004).[11]

The data on guerrillas is taken from Banks (1997) and cover the period from 1919 to 1997. Episodes of guerrilla warfare are any armed activity, sabotage, or bombings carried on by independent bands of citizens or irregular forces and aimed at the overthrow of the present regime. I complement this

10 Most of the disagreement is related to the definition of violence and death thresholds employed in each data set. For example, whereas the correlates of war project seems to require a minimum of 1,000 battle deaths to code a conflict as a war, Fearon and Laitin (2003) further qualify a civil war as a conflict where at least 100 were killed on both sides. I refer to Sambanis (2004) for a full analysis of the coding strategies employed in each data set.

11 Fearon and Laitin (2003) code 101 war onsets and 893 years with civil war from 1950 to 1997, Gleditsch et al. (2002) code 89 war onsets from 1950 to 1999 and 347 years at war and Sambanis (2004) list 135 war onsets and 911 years at war from 1950 to 1999. According to Sambanis, the correlation (for war incidence) across data sets is about

analysis with an examination of the onset of minor civil conflicts reported by Gleditsch et al. (2002) and defined as those conflicts that have experience between 25 and 999 battle-related deaths in a given year.

Finally, the data on revolutions is taken from Banks (1997) and also extends from 1919 to 1997. Revolutionary events include any illegal or forced change in the top governmental elite, any attempt at such a change, or any successful or unsuccessful armed rebellion whose aim is independence from the central government.

Graphic Evidence

I first investigate the validity of the theory graphically. I then engage in more systematic econometric work to show that the rather striking patterns revealed in Figures 2 to 7 (and that meet John Tukey's famous "interocular traumatic test" [Putnam 1993: 13]) survive more thorough statistical tests.

Figures 2 to 7 examine the economic sources of civil war onsets, guerrilla warfare onsets and revolutionary events across the world by plotting two sets of data in each graph. The first set of data consists of all the country-year observations for the period of investigation, regardless of whether there was violence or not, along two dimensions: the average level of industrialization and urbanization (on the x axis) and the percentage of family farms (on the y axis). These data are represented using small black dots. The second set of data consists of the country/year in which there was an outbreak of violence. These data points are marked with the abbreviated name of the country (in which it took place).

Before I further discuss the evidence, let me consider the appropriateness of the two measures I have chosen for the figures: percentage of family farms and average of industrialization and urbanization. The percentage of family farms captures the degree of concentration and therefore inequality in the ownership of land. That measure, gathered and reported by Vanhanen (1997), is based on defining as family farms those "farms that provide employment for not more than four people, including family members, [...] that are cultivated by the holder family itself and [...] that are owned by the cultivator

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0.7.

family or held in ownerlike possession." (Vanhanen 1997: 48) The definition, which aims at distinguishing 'family farms' from large farms cultivated mainly by hired workers, is not dependent on the actual size of the farm -- the size of the farm varies with the type of product and the agricultural technology being used.[12] The data set, reported in averages for each decade, ranges from 1850 to 1999. An extensive literature has related the unequal distribution of land to an unbalanced distribution of income. For the period after 1950, and excluding the cases of socialist economies, the correlation coefficient among the Gini index and the percentage of family farms is -0.50.[13] For the purposes of investigating the causes of violence, the measure is appropriate for the following reason. In the model violence only results from the presence of unequal conditions in the agrarian or fixed-assets sector. Again, remember that as assets become less fixed or specific, the incentives to engage in violent action decline, even when inequality in the distribution of mobile wealth is still high. The average of industrialization (measured as the average of the percentage of non-agricultural population) and urban population (defined as percentage of population living in cities of 20,000 or more inhabitants) is also taken from Vanhanen and is used to approximate the extent to which assets may be mobile.[14] (In the statistical analysis that follows, several controls are employed to account for those other factors – such as cultural traits and toleration – that may be also proxied by those measures. Similarly, other measures of asset immobility, such as oil wealth, are considered.)

Notice that in all figures both axes are drawn in the reverse order (decreasing in value as one moves away from the origin) so that the high inequality/high specificity area is in the upper-right corner. This way we can compare them with the baseline model in Figure 1.

12 It varies from countries with 0 percent of family farms to nations where 94 percent of the agricultural land is owned through family farms: the mean of the sample is 30 percent with a standard deviation of 23 percent. A detailed discussion and description of the data can be found in Vanhanen (1997: 49-51) and the sources quoted therein.

13 Socialist economies are excluded from this calculation because most of them nationalized all or most of agrarian property therefore driving the percentage of family farms to 0 (equivalent to an extremely unequal landowning economy).

[Figure 2 here]

Figure 2 explores the distribution of civil war onsets from 1850 to 1944. Again, the black dots, which represent country-year observations regardless of whether there was violence or not (the number of observations is close to 4,600), show that there was considerable dispersion in how industrialized countries were and how unequal their agrarian sectors were. Just to help interpreting Figure 2, consider two examples. The dotted line in the upper left area (marked with a cross and moving moving from right to left) corresponds to the United Kingdom – it traces a story of continuous industrialization without much change in a considerably concentrated (yet progressively more irrelevant) agrarian sector. A symmetrically opposite case is Norway (marked with a cross as well) – where family farms accounted for 64 percent of the cultivated land in 1850 and about 84 in 1939 while industrialization remained sluggish.

The cases in which a civil war (as defined by the Correlates of War dataset) started are then marked with the abbreviated name of the country in which it took place. As predicted in the theoretical model (summarized in Figure 1), most civil wars occur in countries where both the agrarian sector is still dominant and land is distributed unequally: basically within the triangle to the right of a diagonal going from no industrialization and less than 50 percent of the land to middle levels of industrialization with no family farms at all. The American civil war, the Austrian civil conflict of 1934 and the Greek war of 1944 are the only conflicts that fall outside the boundaries of the theoretical expectations of the article.

[Figure 3 here]

Figure 3 represents the cases of civil war onsets after 1945. The abbreviations in large font correspond to the COW database. The abbreviations in small font correspond to additional wars coded by Fearon and Laitin (2003). In addition, the graph denotes oil exporters at war with a diamond. The dots that represent all the country-year observations regardless of whether there was an episode of violence total over 6,900 and cover the whole figure. In line with our expectations, most civil war onsets fall squarely within the area defined by high inequality and high asset specificity. Several cases that are closer

14 This average has a mean of 35 percent and varies from 3 to 99 percent.

to the middle (that is, farther away from the upper-right corner) have considerable oil resources and so conflict there may be related to asset immobility. The distribution of observations in the graph has the additional advantage of making it easier to identify in a clear manner the few outliers to an otherwise relatively parsimonious model: Argentina, the United Kingdom, Croatia, Georgia and Djibouti.

[Figures 4 and 5 here]

Figures 4 and 5 depict the distribution of guerrilla warfare before and after 1945 respectively. Two traits deserve attention. First, the location of guerrillas is still similar to civil wars: violence is heavily concentrated in unequal agrarian economies. Second, the occurrence of guerrillas is more widespread than systematic civil wars. This is in line with the model for the following reason. The model predicts that, given a certain economic structure, the level and type of violence will be shaped by the costs of violence. More expensive forms of violence will be less frequent than cheaper and more sporadic types. Although also hard to organize, guerrilla warfare is easier to generate and sustain than a full-scale war.

[Figures 6 and 7 here]

Figures 6 and 7 display the distribution of revolutionary events before and after 1945. As predicted by the model, they also cluster in unequal agrarian economies: pre-Second World War Southern and Eastern Europe, Czarist Russia, Central and South America, Cuba, mid-twentieth-century China, Vietnam, Cambodia, and most sub-Saharan and Middle Eastern states.

Estimation

The graphical evidence presented thus far supports the model of the article. But, naturally, we need to control for the impact of other variables in the current literature on political violence (such as per capita income, population, political regime, geography and ethnic and religious composition) to probe the validity of this article's theoretical model. Tables 1 and 3 report the multivariate analysis of the factors

influencing both onset and incidence of civil wars. Table 4 examines the correlates of guerrilla warfare. Table 6 considers revolutionary events.

For each class of political violence I consider three types of specifications. The first one includes data prior to 1950 (since 1850 for civil wars and since 1919 for the rest of violent events) – this data set maximizes the number of observations, which range from about 8,900 to 6,200 country-years, but cannot include variables such as ethnic or religious composition, for which we only have good information after World War Two. [15]

To expand the number of independent variables that may compete with the model's explanation, the second specification includes data only for the second half of the twentieth century – the number of observations drops by about a third but the list of controls is much longer. Generally speaking, all coefficients remain very stable across the two models – whenever they change they do not affect the thrust of the article's argument.

Finally, the third specification substitutes direct measures of income inequality (the Gini index) for the distribution of property. This latter model is only run for data after World War Two. The pooled data is much smaller than in the other two models – the number of observations falls to around 700. But even with these limitations, its results validate the core of the theory.

Independent Variables. In the first two specifications, I employ the following independent variables:

(1) *Lagged Value of War Incidence*, that is, whether there was an ongoing war or guerrilla in the previous year or not.

15 The use of Correlates of War data reduces the danger of missing data bias considerably. For the period from 1800 to 1999 there are 14,792 country-year observations of sovereign states. For the period from 1850 to 1999 there are 12,972 country-years. The data covered by Correlates of War covers 14,147 country-years and 12,289 country-years respectively. The Vanhanen data includes 10,462 country-years since 1850 or about 85 percent of the data. Two thirds of the data not covered by the Vanhanen data belong to small countries (those with fewer than 6 million inhabitants). The fall to less than 8,900 observations in Table 1 results from employing income, population and political regime data.

(2) *Percentage of Family Farms*.

(3) *Index of Occupational Diversification*, that is, the average of industrialization and urbanization.[16]

(4) *Interaction* of the two previous variables. Our theoretical expectation is that the interactive coefficient should be statistically significant and with a negative sign.

In the third specification, which attempts to measure the impact of inequality employing direct measures, I replace variables (2), (3) and (4) with:

(2') *Gini Index of Income Inequality*, taken from Deininger and Squire (1996), and adjusted to control for cross-national variation in the methods used to measure income distribution.[17]

(3') *Average Share of Agricultural Sector over GDP*.

(4') *Interaction between Gini Index and Share of Agriculture over GDP*. The coefficient of this variable should be positive and statistically significant.

Control Variables. I add the following control variables in all specifications:

(5) *Log Value of Population*, taken from Banks (1997).

(6) *Log Value of Per Capita Income*. This variable is built with data reported in the Penn World Tables 6.1 (Summers, Heston and Atten 2002), covering the period from 1950 to 1999, plus data from Maddison (1995), which provides observations for the period previous to 1950 (essentially for developed countries and some large Asian and Latin American cases), adjusted to make it comparable with the

16 I have also used each variable (industrialization and urbanization) separately without any changes in the results I reproduce below.

17 This variation is a function of the choice of the recipient unit (individual or household), the use of gross versus net income and the use of expenditure or income. Following the suggestions of Deininger and Squire, the adjusted Gini is equal to the Gini coefficient plus 6.6 points in observations based on expenditure (versus income) and 3 points in observations using net rather than gross income. The results reported do not vary if I use unadjusted Gini coefficients. The year-country adjusted Gini coefficient employed in the sample is a 5-year average of adjusted Gini coefficients. This procedure minimizes the volatility in the inequality measures and maximizes the number of observations (approximately doubling them).

Summers-Heston dataset, and some interpolated data from Bourguignon and Morrission (2002).[18] Per capita income is given in constant dollars of 1996.

(7) *Democracy.* This variable is taken from Boix and Rosato (2001), where all sovereign countries from 1800 to 1999 are coded as either democratic or authoritarian. Countries are coded as democracies if they meet three conditions: elections are free and competitive; the executive is accountable to citizens (either through elections in presidential systems or to the legislative power in parliamentary regimes); and at least 50 percent of the male electorate is enfranchised.

Additional Control Variables After 1950. For the specifications including postwar data only, I add the following variables:

(8) *Log of Percentage of Mountainous Territory*.

(9) *Non-contiguous Territory*: A dummy variable coded 1 if the state is composed of non-contiguous territories. Both this variable and the previous one test for the presence of structural (geographical) barriers to violence.

(10) *Oil Exports*: A dummy variable coded as 1 if oil represents more than one third of the country's exports. (Following Humphreys (2005) and Ross (2006) I have also substituted fuel production and fuel reserves per capita for the dummy variable. The latter variable (fuel reserves per capita) should mitigate some endogeneity problems since conflict or the anticipation of conflict may affect actual oil production).

(11) *Political Instability*: A dummy variable indicating whether a country has a three-or-greater change in the Polity IV regime index in the three years prior to the country-year in question. The last four variables are taken from Fearon and Laitin (2003).

(11) *Ethnic Fractionalization*. This measure is computed as one minus the Herfindhal index of ethnolinguistic group shares, with new data gathered and calculated in Alesina et al. (2003).

18 For the post-1950 period I use Fearon and Laitin (2003) definition of per capita income.

(12) *Religious Fractionalization*, computed as one minus the Herfindhal index of religious groups, taken from Alesina et al. (2003). For both fractionalization measures I include their square transformation.

(13) *Percentage of Muslims, Catholics and Protestants*, taken from LaPorta et al. (1999).

(14) *Rate of Economic Growth* (in the year before the observed event).

Civil Wars

In Table 1 I report the covariates of civil war from 1850 to 1997 employing the coding of the Correlates of War dataset. In Models 1 through 3 the dependent variable is war onset, coded as 1 when there is a war start, 0 otherwise.[19] The estimation is done through probit analysis.[20] Model 1 reports the results for the period from 1860 to 1997, Model 2 displays the period from 1900 to 1997 and Model 3 shows the period from 1945 to 1997. In all cases, the interactive term of family farms and non-agrarian assets is statistically significant and has a substantial depressing impact on the occurrence of civil wars. This result validates the graphical evidence and our theoretical expectations.[21] Notice as well that the coefficient increases in size as we move closer to our contemporary period.[22]

[Table 1 here]

A simulation of the results (in Model 1) is shown in Table 2 (with all the remaining variables except the lagged value of civil war set at their median value). In countries with either less than 20

19 Alternatively, I have coded war onset as 1 at the start of a war, 0 if there is no war and missing for all observations of ongoing war after the first observation. These alternative specifications do not alter the results in any substantive manner.

20 Logit analysis does not change any of the results.

21 For the period 1850 to 1997, the interactive term is very similar in substantive terms to the coefficient in Column 1, close to statistical significance (p=0.137) alone and fully significant in a joint test with the separate terms of the interaction.

22 Dropping income, population and democracy as control variables, the number of observations rises to 10,462 and the coefficients of the variables of interests remain statistically significant and similar in size.

percent of the land held by family farms or with and average urbanization and industrialization below 25 percent, the probability of a civil war starting (that is, with the lagged value of the dependent variable set at 0) is more than 5 percent over the course of a 5-year period. Notice as well that, as predicted in the discussion of the model of intra-elite conflict, in eminently agrarian societies civil wars occur with a similar probability regardless of the distribution of land. With growing economic diversification, conflict declines. But it is when both equality and industrialization increase that the probability of a civil war declines quickly. In countries where family farms control more than 50 percent of the cultivated land and average industrialization and urbanization are also over 50 percent, the probability of a civil war occurring over a period of 5 years drops below 1 percent.

[Table 2 here]

Confirming all existing studies on the causes of civil wars, both population and per capita income are statistically significant and behave in the theoretically expected direction. Per capita income decreases the risk of civil war. With all other variables at the median values, the annual probability of war onset declines from 2.4 percent for a per capita income of $500 (in dollars of 1996) to 1.6 percent for $1,000 and less than 0.5 percent for $5,000. Population increases the probability of a civil war. For all other variables at their median values, the probability of a civil war rises from 1 percent in a country of about 4 million inhabitants to 1.7 percent in a country of 20 million and 4 percent in a nation of half a billion inhabitants. Nonetheless, concluding that small countries are less prone to experience political violence than large countries is probably deceptive for two reasons. In the first place, the specialized literature has already pointed that the requirement of a minimum threshold of conflict-related deaths to count any conflict as a war results in some underreporting of civil wars in small countries (Sambanis 2004, Sambanis and Hegre 2006).[23] In the second place, population size has declining marginal effects on the

23 This point seems to be corroborated by the fact that if we run the same model excluding large states (for example, the upper half of the sample), the coefficient of population becomes much larger (four times bigger for the regression ran using the lower half). Conversely, excluding the smaller states makes the coefficient smaller – and in fact statistically not significant for the upper third of the sample.

likelihood of war onsets. Holding other things constant, a country with 100 million inhabitants has a 2.7 percent chance of having a civil war in any given year. If we split it in five countries of equal size, the probability that at least one of them falls into a civil war goes up to 8.5 percent. Naturally, the scale of the civil war may be bloodier in the larger country – but the actual occurrence of violence is certainly lower for all the population involved. Finally, the coefficient of democratic regimes is not statistically significant.[24]

Models 3 to 6 in Table 1 explore both the incidence and duration of civil wars. The estimation is done using a dynamic probit model in which I calculate the effect of the independent variables on both the likelihood of starting a war and sustaining a war conditional on the initial state (peace or ongoing war). The dynamic probit model generates two sets of parameters – beta and alpha.[25] The first parameter (the beta coefficient) estimates the probability of transition from a situation of peace to one of civil war. The sum of the two coefficients (beta and alpha) indicates the probability that an existing civil war will continue to take place. Once more, each column reports a different time period: Model 4 examines the period from 1860 to 1997, Model 5 looks at the 20th century and Model 6 is restricted to the post-World War Two period.

Population increases the chances of a war onset but has no effect on duration. Per capita income ceases to be significant. A more equal agrarian distribution and more industrialization have (as separate variables) no impact on war starts but they seem to lengthen existing conflicts. However, even this last result stops being significant after 1900 (Models 5 and 6). More important, the interactive term of family farms and non-agrarian assets continues to be strongly significant: it reduces both the chances of a war onset and the length of conflicts.

[Table 3 here]

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24 Substituting democracy as defined in Polity IV for the Boix-Rosato variable does not change the results.

25 See Amemiya (1985: chapter 11) for the estimation and properties of the dynamic probit model.

Table 3 reports all (probit) estimations of civil war onsets for the period after 1950. Models 1 through 3 employ the data sets of Fearon-Laitin, Sambanis and Uppsala-Prio with the specification of family farms and non-agrarian assets. Models 4 through 6 employ at the Gini index as a direct measure of inequality. Estimating the models through dynamic probits, not reported here for space limitations, leads to very similar results.[26]

In Models 1 through 3, the interaction of family farms and non-agrarian assets is always statistically significant and has an even bigger impact from a substantive point of view than in Table 1. In Models 4 through 6, where inequality is measured through the direct measure of the Gini index, results are weaker but in the same direction. The interaction of agriculture and income inequality is statistically significant in the Sambanis data set. In the Fearon-Laitin data set it achieves statistical significance in a joint test. According to the results using the Sambanis data set, an increase in the interactive term of inequality and agriculture from its 25th percentile to its 75th percentile rises the likelihood of war from 0 to 26.4 percent (with all the other variables at their median variables).

Population and per capita income remain significant in Models 1 through 3 in Table 3 – they do not, however, in Models 4 through 6. Being an oil exporter does not lead to more civil wars except in the Sambanis data set.[27] The significant result in the Sambanis data set is probably related to the fact that it codes a significantly larger number of civil war in oil exporters than in other data sets – e.g. eleven war onsets more than Fearon and Laitin.[28] Geography has a partial effect: the coefficient of mountainous terrain is positive and significant in Models 1 through 3; by contrast, the effect of noncontiguous states is

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26 Results can be obtained from the author.

27 In Model 4 oil drops out because it predicts all failures perfectly. Employing the variables of fuel production per capita and fuel reserves per capita does not change the results. These variables are taken from Humphreys (2005).

28 See Fearon (2005) for a discussion of the effect that oil may have in strengthen states and therefore "offset increased possibilities for rebels" (487).

statistically not significant. Political instability is positively correlated with war onsets.[29]

Neither ethnic fractionalization nor religious fractionalization are not statistically significant in more than one specification. The proportion of Muslims and Catholics has a small positive effect on civil wars – but not in a systematic manner across all models. Contradicting part of the existing literature (such as Collier and Hoeffler 2004 and De Miguel et al. 2004), economic crises are not correlated with more violence.

Guerrilla Warfare

Table 4 reports the covariates of guerrilla warfare. Models 1 and 2 use the data coded by Banks for the period 1919-1997. Because the Banks' data set does not distinguish between guerrilla onsets and remaining years with an ongoing guerrilla, the estimation looks at the incidence of guerrilla warfare and is done through a dynamic probit model.[30] Model 1 runs the model for the whole period 1919 to 1997. Model 2 restricts the analysis to the period after 1950 to expand the number of control variables. Model 3 substitutes the Gini index for the percentage of family farms. Finally, Models 4 and 5 estimate the covariates of the onset of those violent conflicts coded as "minor conflicts" (i.e. those with a number of deaths between 25 and 999) in the Uppsala-Prio data set. These two latter models employ a probit specification: the first one looks at the impact of family farms and non-agrarian assets; the second one employs the Gini index as an independent variable.

The results for guerrilla incidence parallel those for civil wars. The effect of inequality and asset

29 The variable of anocracy or semidemocracy (any case that scores between -5 and 5 when we substract the measure of democracy from the measure of autocracy in Polity IV) has no statistical significance and has been dropped from the estimations. Similarly, a variable measuring "years since independence" (under the assumption that states gain in stability over time) is not statistically significant and does not change any of the results presented in this article.

30 In a probit model with guerrilla onsets as the dependent variable and the lagged value of ongoing guerrilla as an independent variable, the latter predicts failures perfectly and drops out of the estimations jointly with a large number of observations.

specificity is very similar in statistical significance and substantial size for both guerrilla and civil war. Their interaction reduces the incidence of guerrilla warfare. Table 5 simulates the probability of a guerrilla starting (setting the lagged value at 0) over a 5-year period (the remaining variables are set at their median value). For low levels of family farms and industrialization, the probability fluctuates around 35 percent. In fact, it slightly increases with each value separately – this may be capturing the fact that societies with family farms may organize violence more easily. Nonetheless, as both variables increase, the probability drops: it falls below 10 percent at the median values of both variables and below 5 percent for values common in developed countries.

[Table 3 here]

Since guerrilla warfare is a far more widespread phenomenon than civil wars, factors other than land inequality and asset mobility must account for the former's higher probability.[31] Per capita income becomes not significant from a statistical point of view in most models. Population continues to be associated with violent events. Democracy now increases the likelihood of guerrilla movements in the whole sample – this may be related to the fact that, at least for small scale violence, democracy may have weaker short-run repressive capacity than dictatorships. It is the variables of ethnicity and geography that turn out to be relevant. Ethnic fractionalization, which becomes statistically significant, has a substantial impact, following a quadratic form. With all other values at their median, a highly fragmented country (with an index of 0.08, which corresponds to the tenth percentile of the universe of observations) has an annual probability of having a guerrilla movement of about 5.7 percent. This probability peaks at 7.6 percent among countries with an ethnic fractionalization of 0.45 (about the sixtieth percentile) and then declines to 3.7 percent for the most homogeneous country in the sample (with an ethnic fractionalization index of 0.93). Not unexpectedly, geography plays also a stronger role than for civil wars. Mountainous terrain leads to more guerrillas – with all other parameters at their medians, the probability changes from

31 Again, all these comments are mostly based on Models 1 and 2, which are based on large data sets.

5.4 percent for the minimum value to 7.5 percent for the fiftieth percentile and to 10.0 percent for the maximum value. Noncontiguous states are also much more prone to violence: the probability of a guerrilla increases by 12.5 percent (relative to contiguous countries).

Revolutionary Outbreaks

Table 6 examines the sources of revolutionary events. All estimations are done through a dynamic probit analysis because, as in the data on guerrilla warfare examined in Table 4, the Banks data set does not distinguish between revolutionary outbreaks and successive years of revolutionary activities. Model 1 reports the results for the period from 1919 to 1997. Models 2 and 3 examine the period from 1950 to 1997.

Both the distribution and type of wealth are statistically significant and behave in the predicted direction. Again, I simulate their effect in Table 7 (employing Model 1 in Table 6). Over a period of 5 years, the combination of land equality and mobile assets reduces the probability of a revolutionary event from over 7 percent (for a proportion of family farms and an index of occupational diversification of 10 percent) to 28 percent for values of 50 percent and then to less than 5 percent in very industrialized, equal societies.

[Tables 6 and 7 here]

Per capita income enters now very strongly in the model. With all other values at their median, the annual probability of a revolutionary event is 15.2 percent for a country in the tenth percentile in per capita income, 11.5 percent at the median and 6.3 percent at the ninetieth percentile. Population is only significant in Model 1. Democracy does not matter. Geography is irrelevant as well – although mountainous terrain may raise the length of revolutionary actions. The lagged growth rate is not statistically significant. Ethnic fractionalization decreases the probability of revolutionary events for medium values but increases it when societies are either very fragmented or extremely homogeneous.

Regional and Period Effects

All the variables of interest (on type and nature of assets) in Tables 1, 3, 4 and 6 are robust to the addition of dummies for each continental region (but one) and for each decade (but one). Broadly speaking, regional dummies are not statistically significant. By contrast, decade dummies have statistical significance and tend to capture the temporal fluctuations in occurrence of violence across the world.

Endogeneity

In exploring the impact that the nature and distribution of wealth has on political violence, we need to address the issue of reverse causality, that is, the probability that violence affects the types of economic activity and income distribution and not the other way around.

An alternative account (to the model of the article), in which inequality and asset specificity do not lead to political violence but, rather, it is civil wars, guerrillas and revolutions that generate a particular distribution of wealth, would run along the following lines. At some initial moment, all countries had the same material and social conditions. Only those experiencing political violence (for either unknown or random reasons) did not experience sufficient growth and, as a result, remained 'stuck' in a situation of fixed wealth and inequality. Accordingly, the interpretation of the correlations suggested in this article would be wrong -- we would be examining data for periods in which the underdevelopment and inequality caused by violence are already in place (and where the former two would be just leading to more violence in some type of vicious circle).

A strict interpretation of that causal story (where, again, mass political violence precedes poverty and inequality) is difficult to defend given what we know about the relationship between state formation and patterns of wealth distribution. As explored by North (1979, 1981) and Olson (2000), the patterns of ownership (and even the type of wealth) are a function of the process of state building, that is, of the

particular institutions established to secure external peace and domestic order. The distribution of wealth, ranging from landlordism and the feudal order to relatively equal farming communities in preindustrial societies, was shaped by different kinds of military technologies employed by the rulers, by the presence or absence of internal or external groups or individuals competing with the rulers and by the institutions of governance (more or less hierarchical and more or less authoritarian).[32] The construction of a specific political (and economic) order was then followed in the contemporary period by mass political violence of the kind explored in this article, this is, civil wars, guerrilla activities and revolutions. The intensity of the violence depended both on the particular distributions of assets and on the progressive organization and mobilization (which accelerated in the nineteenth and twentieth centuries) of particular political actors and social groups. Two examples of this chronological pattern may suffice here to clarify the causal flow of the theory. The way in which settlers organized the colonial institutions and arranged the property of land determined the different levels of inequality (and the chances to grow and acquire mobile assets) in the Americas. Whereas the Spanish colonies were structured through hierarchical, exploitative arrangements, the Northeastern colonies and Canada were settled by communities of farmers (Mariscal and Sokoloff 2000). After independence and as political mobilization grew, violence varied accordingly. Latin America experienced considerable levels of violence in the 19th and 20th centuries. Canada and the Northern states of the United States did not. Similarly, the distribution of land in Russia or the American South also preceded and generated the Soviet revolution and the Civil War respectively.[33]

To tackle the extent to which modern political violence precedes economic conditions or simply shapes them, I engage in two exercises. First, I take advantage of the time dimension of the panel of world nations and conduct a Granger causality test between types of political violence and wealth inequality and asset specificity. Second, I instrument for the independent variable interacting inequality and capital

32 See also Boix and Rosenbluth (2006).
33 To put it differently, this article does not deny that the construction of the state was intertwined with the use of violence. What it simply does is to focus in the analysis of violence after a given political and economic arrangement had been constituted.

specificity.

[Table 8 here]

The Granger causality test -- with individual equation estimates for one and two lags – is presented in Table 8. To have a long data series, I only explore the data from the COW and Banks sets (with extend before World War II). Except for revolutionary events, the lagged values of the interaction of agrarian property and weight of agriculture affect significantly—or jointly significantly for two lags—the occurrence of political violence in the expected direction. By contrast, the past occurrence of political violence does not significantly enter in the regression of the interaction of type and distribution of wealth.

Table 9 reproduces the instrumentation exercise. Showing that non-European countries where Europeans faced high mortality rates and where the latter emigrated in small numbers resulted in stagnant political economies, some recent empirical work has attributed the outcome of underdevelopment to the design of inefficient political institutions (Acemoglu et al. 2001). However, recent contributions by Glaeser et al. (2004) and Engerman and Sokoloff (2005) link the patterns of European settlement to the distribution of land, differential rates of investment on human capital formation and therefore to overall inequality. Accordingly, to instrument for the inequality-specificity variable I employ the percent of European population in 1900.[34] Since this variable, which is well correlated to the instrumented one (with a correlation of -0.58), only gives us observations for colonial cases and therefore forces us to drop all European countries, I employ a second instrument: latitudinal distance to equator. This second instruments allows us to expand the data set to 86 observations (including now most OECD countries). As discussed by Hall and Jones (1999), Europeans were more likely to settle in areas with a climate similar to their metropolis – climate patterns are well captured by distance to equator. Again, the larger the settlement of Europeans, the more subdued predation was and, hence, the more equal and more

34 An alternative variable, the rate of European settler mortality, offers a much lower number of observations (40 versus over 60). Djankov and Reynal-Querol (2007) also choose the percentage of Europeans in 1900 as an instrument to assess the impact of colonial instutions on the likelihood of civil war onsets.

industrialized economies became over time.

[Table 9 here]

Models 1 and 2 in Table 9 report the effect of the interaction term of family farms and economic diversification (respectively instrumented by latitude distance to equator and European population in 1900) on civil wars (using the Fearon-Laitin codification). Models 3 and 4 look at guerrillas. Models 5 and 6 consider the effect on revolutionary events. The interaction of equality and non-specificity instrumented using latitude holds very well (Models 1, 3 and 5): it continues to depress violence and it is statistical significant at 5 percent or less. Employing the percentage of European population, the coefficient remains stable (except for revolutions, where it declines substantially) and loses significance. However, in a joint test with per capita income (with which the index is substantially correlated) it is significant. Moreover, if we drop per capita income (which does not have any statistical significance in the first-stage estimation), the instrumented terms regains its significance. Overall, the results confirm that political violence is shaped by the level of inequality and asset specificity.

Still, the results of this article should not be interpreted as rejecting the hypothesis that political violence may in turn affect economic development at all. Some researchers have produced some (tentative) evidence showing that political violence reduces growth (Perotti 1996; Barro 1997). Accordingly, we may want to consider a more eclectic argument (to be explored in more detail in future research) along the following lines. First, the distribution of wealth (in conjunction with the type of assets), which took shape as a result of a particular pattern of state formation, colonization, conquest and so on, determines the occurrence of political violence with some probability. Second, those countries marred by violence are likely to remain trapped in poverty, that is, they are unable to develop economically beyond the exploitation (if at all) of their natural resources (land and minerals).[35] In short,

35 It is less clear how political violence may shape inequality – it is not violence itself but the outcome resulting from violence (the victory of one party, the change of regime) that may alter the distribution of wealth. Still, it is true that, by leading to economic stagnation or collapse, violence may depress the wages of certain economic sectors and exacerbate economic inequalities.

initial conditions may lead to violence with some probability – and if violence occurs, those conditions remain unmodified and feed into the cycle of violence which tends to block any path to more mobile forms of wealth.

CONCLUSIONS

Combining several strands of the literature on political violence – the literature on material grievances and motivations and recent research on the geographical and organizational opportunities that foster conflict – I offer a formal model to account for the distribution of civil wars, guerrillas and rebellious actions across the world in contemporary times. The model is successfully tested with a comprehensive data set that covers most of 20th-century and goes back to mid-19th century for civil wars.

Modern political violence (particularly violence of an organized nature) occurs in states in which assets are immobile and unequally distributed. In relatively equal societies, peaceful, democratic means of solving conflict are advantageous to all parties and violence happens with little probability. In economies where wealth is either mobile or hard to 'tax' or confiscate, sustained political violence to grab those assets does not pay off since their owners can either leave in response to the threat of confiscation or are indispensable to the optimal exploitation of assets. These two simple parameters (inequality and specificity of assets) capture and systematize in an analytical manner the set of intuitions previous scholars have employed to examine the underlying motivations that generate violence, such as the role of inequality or the idea that 'lootable assets' correlate with the presence of civil wars.

Besides depicting the motives of political violence, the model incorporates the notion that 'opportunities', of an organizational or geographical nature, drive the costs of engaging in violence and therefore determine the likelihood with which overt conflict will occur (as well as the likelihood with which different types of violence will be employed).

The examination of the four data sets on civil wars as well as of data on guerrilla warfare and

revolutionary outbreaks validates the model of the article – outperforming previous research on this question. Spells of organized political violence in the world tend to cluster in a relatively tight manner in states where inequality is high and the economy is mainly agrarian. By contrast, ethnic and religious traits play only a sporadic role – the distribution of ethnic groups is only relevant for guerrilla warfare and the proportion of religious groups has no effect on violence. Geography matters in a less than systematic way: mountainous terrain matters for civil wars; non-contiguous states are in turn more prone to guerrillas.

The empirical strength of the model, which naturally has to be read in probabilistic terms, has an additional advantage: it allows us to think about all the variance that is left unexplained in a fruitful way. A second look at the visual information conveyed in the figures of the article shows that although most cases of 'organized' political violence (wars, guerrillas and rebellions) occur within the upper-right area of inequality and asset specificity, there are a few cases that do not – most of them seem to belong to the cases of 'urban terrorism'. Our theories for those cases are thus far wanting. Again, this calls for stepping up our efforts in establishing their theoretical underpinnings.

APPENDIX 1: INTER-CLASS CONFLICT

To see the conditions under which violence occurs in the model, remember that after the wealthy established an authoritarian regime, the poor either acquiesce or rebel. If they rebel and the wealthy are strong, the rebellion is quelled and authoritarianism is reasserted. The cost incurred by each wealthy member in a successful civil war is r and the individual income of each wealthy person is $k_w^i - r_{w\text{-}low}^i$. In turn and by assumption, the poor lose their assets and their income becomes $y_p = 0$. If the wealthy are weak, the poor win the war and impose a regime in which the wealth of the rich that is country-specific, and cannot therefore be moved away, is confiscated. Hence, each wealthy person keeps $(1-\sigma)k_w^i - r_{whigh}^i$. The poor incur, when winning a civil war, ω. Each one of them will then get: $k_p^i + \sigma k_w/\alpha - \omega^i$.

The excluded majority resort to violence whenever the expected gain of revolting is larger than the value of accepting an authoritarian regime. Formally:

$$q(k_p + \sigma k_w /\alpha - \omega) > k_p \qquad (1.1)$$

Sustained violence occurs when the wealthy decide to respond to the poor's rebellion. If the costs of repression are low, the rich will always repress, knowing that an authoritarian regime will eventually prevail. If the costs of repression are high, the wealthy have no dominant strategy to follow and simply follow mixed strategies to make the poor indifferent between revolution and acquiescence.

To construct such an equilibrium, beliefs about the probability of victory by the poor in a revolution (β) must be such that the poor are indifferent between provoking a civil war and not doing anything:

$$\beta (k_p + \sigma k_w /\alpha - \omega) = k_p \qquad (1.2)$$

This implies beliefs given by:

$$\beta = k_p /(k_p + \sigma k_w /\alpha - \omega) \qquad (1.3)$$

The beliefs of the poor are determined by the actual strategy of the wealthy by Bayes rule. Representing the probability that the wealthy choose to repress when repression costs are high as p_A, and imposing that these beliefs be correct determines p_A as a function of β:

$$\beta = p_A q / (p_A q + (1-q)) \quad (1.4)$$

Substituting β from (1.3) the probability of repression when its cost is high is:

$$p_A = (1-q/q) (1-k_w/(\sigma k_w - \omega)) \quad (1.5)$$

In turn, p_R or the probability that the poor revolt is determined by the indifference condition of the wealthy who face a high repression cost. The wealthy are indifferent when the probability of maintaining their wealth under authoritarianism without the poor challenging them is equal to their income after transiting to democracy (denoted as $\hat{y}_w$):

$$(1-p_R) (y_w - r_w) = \hat{y}_w \quad (1.6)$$

Hence the probability of the poor revolting is:

$$p_R = 1 - (\hat{y}_w / (y_w - r_w)) \quad (1.7)$$

That is, within the high inequality/high specificity equilibrium, as income inequality and asset specificity increase, the probability of the revolt increases (since the income under democracy relative to income under authoritarianism declines therefore making p_R rise). Notice that the marginal impact of inequality and mobility is different. Lower inequality increases the numerator relative to the denominator in expression (1.7) and so leads to a lower probability of revolt. An increase in capital mobility, instead, leaves the denominator unchanged and in fact increases the potential income of the wealthy under democracy, hence reducing p_R . Thus, within the high inequality/high specificity area, revolts should be concentrated in very highly specific economies.

APPENDIX 2: INTRA-ELITE CONFLICT

After the poor decide whether to revolt or not, a wealthy individual *i* (randomly selected by nature) has the right to make a demand over any other wealthy individual *j* asking the latter to give up his wealth. In this game, the demander knows her type – either strong (with war costs ω_l) or weak (war costs ω_h). By contrast, those that face the demand do not know whether they are strong or weak. Once *i* makes his demand, *j* may acquiesce or fight back. If the demander *i* does not demand anything, each individual retains his initial wealth (k_w^i and k_w^j respectively). If *i* makes a demand and *j* acquiesces, *i* receives $k_w^i + \sigma k_w^j$ and *j* keeps $(1-\sigma) k_w^j$. If *j* fights back but loses, the payoffs are $k_w^i + \sigma k_w^j - \omega_l$ for *i* and $(1-\sigma) k_w^j - \omega$ for *j*. If *j* wins, the payoffs are $(1-\sigma) k_w^i - \omega_h$ for *i* and $k_w^j + \sigma k_w^i - \omega$ for *j*.

As in the interclass game, there are as set of σ values close enough to 0 (i.e. high capital mobility) to make $\omega_l > \sigma k_w^j$ so that indidividual *i* has no incentive to make any demand on individual *j*.

As asset specifity increases, the assets that can be grabbed from individual *j* grow to a point where they are larger than low war costs but still less than high war costs ($\omega_h > \sigma k_w^j > \omega_l$). In those circumstances, a separating equilibrium follows. If the demander *i* has low war costs, she makes a demand and individual *j* acquiesces because he knows that, given the medium levels of σ, she would not make a demand if she had high war costs. If individual *i* has high wage costs, she has no incentive to make a demand since it is better off maintaining the status quo.

Finally, for sufficiently high levels of asset specificity, $\sigma k_w^j > \omega_h > \omega_l$, an individual *i* has an incentive to make a demand on *j*. In turn, individual *j* fights back if he is better off doing so in expected terms:

$$q\,(k_w^j + \sigma k_w^i - \omega) + (1-q)\,((1-\sigma) k_w^j - \omega) > (1-\sigma) k_w^j \qquad (2.1)$$

Here *q* denotes the probability that *j* wins. Individual *i* makes a demand always if her costs are low. If war costs are high, she follows mixed strategies to make individual *j* indifferent between acquiescing and fighting back. Simplying (2.1) and using Bayes' theorem to determine the strategy of individual *i* to make individual *j* indifferent shows that the former will make the demand when war costs

are high with probability p = $\omega / (\sigma(k_w^i - k_w^j) - \omega)$.

In turn, any individual *j* will fight back with a probability that makes the demander *i* indifferent between making a demand (and *j* not responding) and not making any demand:

$$(1-p_j)\ (k_w^i + \sigma k_w^j) = k_w^i \qquad (2.2)$$

Hence the probability of *j* fighting back is:

$$p_j = \sigma k_w^j / (k_w^i + \sigma k_w^j) \qquad (2.3)$$

This result implies that, within a context of relatively high levels of asset specificity, the probability of *j* fighting back increases with asset specificity. Relaxing the assuming of an equal distribution of assets within the elite, that is, making $k_w^i \neq k_w^j$, would imply that growing disparities within the elite would increase conflict as well.

APPENDIX 3: DEMOCRACY AND CONFLICT

The model developed in the article assumes that the poor are always better off under a democratic regime. Here I relax this assumption and allow them to entertain the possibility of revolutionary action (even after the wealthy move to democracy). Three scenarios are possible:

1. In cases of low inequality and specificity, where the wealthy are always better off under democracy (i.e., $\hat{y}_w > y_w - r_{wlow} > y_w - r_{whigh}$, where $\hat{y}_w$ is the income of the wealthy under democracy), the wealthy always move to democracy. Even if they are strong, there is no point in repressing because democracy is their best option even if the poor revolt. If the wealthy are weak, repressing would show that they are weak, giving the poor an incentive to revolt, and resulting in the victory of the poor and in a payoff for the wealthy ($(1-\sigma)y_w - r_{whigh}$) lower than any other alternative. In turn, the poor will only revolt when $\hat{y}_p > q(y_p + \sigma y_w)$. (Notice that for similar levels of inequality, capital mobility reduces even more any incentive the poor may have to revolt.)

2. For cases of medium inequality and asset specificity, that is, whenever $y_w - r_{wlow} > \hat{y}_w > y_w - r_{whigh}$, we should distinguish two scenarios. If the wealthy are strong ($y_w - r_{wlow} > \hat{y}_w$), they always repress since they are better off under authoritarianism (and they can suppress any revolt). If the wealthy are weak ($\hat{y}_w > y_w - r_{whigh}$), their reaction is a function of the payoff of the poor. If the poor are better off under democracy than under a revolutionary outcome ($\hat{y}_p > q(y_p + \sigma y_w)$), then the wealthy move to democracy, knowing than no revolt will take place. By contrast, if the poor are better off by revolting ($\hat{y}_p < q(y_p + \sigma y_w)$), the wealthy follow a repressive strategy. They repress because if they did not, the poor would understand that the wealthy are weak and then would immediately revolt. The wealthy would be defeated and would obtain $(1-\sigma)y_w - r_{whigh}$. This would be less than the payoff under authoritarianism, which would be some weighted average of $y_w - r_{whigh}$ (the payoff under authoritarianism with the poor acquiescing) and $(1-\sigma)y_w - r_{whigh}$ (the payoff after the poor revolt and defeat the wealthy). To sum up, entertaining the possibility that the poor may revolt under democracy reduces the feasibility of democracy (and naturally increases the space in which revolts may occur).

3. Finally, if inequality and asset specificity are very high, so that $y_w - r_{wlow} > y_w - r_{whigh} > \hat{y}_w$, the strategies each party plays are as follows. If the rich are strong, they always repress. If they are weak, they always repress as long as the poor are better off after revolution than under democracy ($\hat{y}_p < q(y_p + \sigma y_w)$). The reasons are the same described in the previous paragraph: if the wealthy did not repress, the poor would know they face a weak enemy and would always revolt. The wealthy prefer to go for some lottery between losing and keeping in power without being challenged. If the poor are better off under democracy, they will have no incentive to revolt (if the wealthy concede democracy). Under this circumstance, the wealthy may play a mixed strategy to get away with authoritarianism with some probability and hence maximize their payoff.

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TABLE 1. DETERMINANTS OF CIVIL WARS, 1860-1997

	War Onset (Probit Analysis) -----			War Incidence (Dynamic Probit Analysis) ----------					
	Model 1	Model 2	Model 3	Model 4		Model 5		Model 6	
	1860-1997	1900-1997	1945-1997	1860-1997		1900-1997		1945-1997	
				Beta	Alpha	Beta	Alpha	Beta	Alpha
Constant	-1.538**	-1.746**	-1.354*	-2.228***	3.619***	-2.607***	3.536***	-2.185***	3.519***
	(0.700)	(0.751)	(0.818)	(0.697)	(0.435)	(0.759)	(0.434)	(0.831	(0.443)
Civil War t-1	0.101	0.119	-0.030						
	(0.143)	(0.151)	(0.179)						
Percent of	0.002	0.006	0.008	0.000	0.025**	0.005	0.022*	0.007	0.020
Family Farms t-1	(0.004)	(0.004)	(0.005)	(0.004)	(0.010)	(0.005)	(0.012)	(0.006)	(0.015)
Index of Occupational	0.005	0.006	0.009	0.002	0.022*	0.005	0.021	0.008	0.012
Diversification t-1	(0.005)	(0.005)	(0.006)	(0.005)	(0.012)	(0.006)	(0.014)	(0.007)	(0.016)
Family Farms *	-0.021*	-0.027**	-0.029**	-0.023*	-0.013	-0.033**	-0.011	-0.035**	0.000
Occup. Diversif. t-1	(0.012)	(0.012)	(0.014)	(0.013)	(0.034)	(0.014)	(0.037)	(0.015)	(0.041)
Log of Per Capita	-0.236**	-0.223**	-0.258**	-0.141	-0.103	-0.115	-0.079	-0.166	0.050
Income t-1	(0.093)	(0.093)	(0.104)	(0.095)	(0.097)	(0.099)	(0.107)	(0.108)	(0.126)
Log of	0.117***	0.120***	0.093***	0.126***	-0.117*	0.133***	-0.117*	0.116***	-0.186**
Population t-1	(0.026)	(0.026)	(0.034)	(0.027)	(0.061)	(0.031)	(0.068)	(0.036)	(0.080)
Democracy t-1	-0.014	-0.051	0.016	0.106	0.057	0.068	0.136	0.143	0.097
	(0.115)	(0.122)	(0.132)	(0.120)	(0.227)	(0.127)	(0.237)	(0.137)	(0.255)
Observations	8576	6995	5312	8136		6596		4872	
Log likelihood	-520.9	-416.43	-314.38	-636.32		-502.04		-381.27	
Prob>chi2	0	0	0	0		0		0	
Pseudo R2	0.0662	0.0757	0.687	0.5981		0.626		0.6688	

Estimation: Probit analysis in Models 1 through 3; Dynamic probit analysis in Models 4 through 6.

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

TABLE 2. PREDICTED PROBABILITY OF CIVIL WAR ONSET OVER 5 YEARS BY SIZE OF AGRARIAN SECTOR AND LANDHOLDING INEQUALITY

		Share of Family Farms over Total Cultivated Land				
		10	30	50	70	90
	10	0.08	0.08	0.08	0.08	0.08
Index of	30	0.06	0.05	0.04	0.03	0.02
Occupational	50	0.05	0.03	0.02	0.01	0.01
Diversification	70	0.04	0.02	0.01	0.00	0.00
	90	0.04	0.01	0.00	0.00	0.00

Simulation based on Table 1, Column 1.
Lagged value of civil war set to 0. All other variables set at their median values.

TABLE 3. PROBIT ANALYSIS OF CIVIL WAR ONSETS AFTER 1950

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Fearon-Laitin 1950-97	Sambanis 1950-99	Uppsala-Prio 1950-99	Fearon-Laitin 1950-97	Sambanis 1950-99	Uppsala-Prio 1950-99
Constant	-3.254*** (1.121)	-3.396*** (1.028)	-3.939*** (1.297)	-29.205 (23.433)	8.059 (9.058)	12.810 (12.689)
Prior War	-0.429** (0.170)	-0.186 (0.138)	-0.531* (0.311)	-1.620 (1.112)	-0.266 (0.388)	
Percent of Family Farms	0.020*** (0.007)	0.015*** (0.006)	0.023*** (0.008)			
Index of Occupational Diversification	0.012 (0.008)	0.006 (0.007)	0.022*** (0.008)			
Family Farms * Occupational Divers.	-0.040** (0.016)	-0.026* (0.013)	-0.041** (0.017)			
Gini Index of Inequality				-0.076^ (0.145)	-0.178* (0.092)	-0.060 (0.101)
Share of Agriculture over GDP				-0.134^ (0.186)	-0.203 (0.125)	-0.129 (0.166)
Gini Index * Agriculture/GDP				0.550^ (0.488)	0.617* (0.350)	0.249 (0.403)
Log of Population t-1	0.131*** (0.049)	0.103** (0.044)	0.107** (0.054)	-0.143 (0.363)	-0.141 (0.229)	-0.075 (0.244)
Log of Per Capita Income t-1	-0.254* (0.134)	-0.160 (0.120)	-0.247* (0.146)	0.314 (0.723)	-0.699 (0.621)	-1.634** (0.819)
Growth rate t-2 to t-1	-0.083 (0.847)	-0.783 (0.681)	-1.429* (0.786)	3.559 (4.311)	0.062 (3.103)	-6.662 (4.265)
Democracy t-1	0.135 (0.144)	-0.011 (0.136)	0.051 (0.163)	0.306 (0.587)	0.110 (0.433)	0.169 (0.535)
Log (Percent Mountainous)	0.085* (0.049)	0.086* (0.044)	0.154** (0.061)	0.122 (0.318)	-0.047 (0.241)	0.028 (0.295)
Non Contiguous State	0.105	-0.028	0.084	0.927	1.149*	1.878**

	(0.167)	(0.153)	(0.181)	(0.956)	(0.592)	(0.858)
Oil Exporter	0.203	0.305*	0.174		0.867	0.995
	(0.180)	(0.159)	(0.192)		(0.836)	(0.958)
Political Instability	0.272**	0.344***	0.282**	0.381	0.141	0.512
	(0.127)	(0.115)	(0.140)	(0.507)	(0.458)	(0.565)
Ethnic Fractionalization	1.063	0.530	0.394	2.696	2.698	7.130
	(1.071)	(0.960)	(1.242)	(6.286)	(3.174)	(5.203)
(Ethnic Fractionalization)^2	-0.965	-0.203	0.334	-1.394	-3.784	-11.364
	(1.116)	(0.982)	(1.254)	(9.712)	(4.540)	(7.333)
Religious Fractionalization	1.297	2.438**	0.412	70.767	9.639	3.870
	(1.127)	(1.079)	(1.325)	(48.509)	(9.238)	(14.836)
(Religious Fractionalization)^2	-1.226	-2.428*	0.780	-45.697	-6.695	-3.068
	(1.343)	(1.279)	(1.670)	(30.331)	(6.412)	(9.925)
Percent of Muslims	0.004*	0.002	0.004	0.006	-0.000	-0.001
	(0.003)	(0.002)	(0.003)	(0.008)	(0.008)	(0.009)
Percent of Catholics	0.004	0.002	0.006*	-0.001	0.006	0.005
	(0.003)	(0.002)	(0.003)	(0.012)	(0.008)	(0.010)
Percent of Protestants	0.002	-0.001	-0.020*	-0.174	-0.028	-0.075
	(0.006)	(0.006)	(0.011)	(0.295)	(0.053)	(0.119)
Observations	4239	4239	4239	705	705	694
Log Likelihood	-276.30	-341.47	-218.40	-28.37	-45.30	-27.36
Prob>chi2	0.0000	0.0000	0.0000	0.0023	0.0045	0.1699
Pseudo R2	0.1109	0.1129	0.1396	0.4112	0.3008	0.3010

Estimation: Probit analysis.
Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
^ significant at 10 % in joint test

TABLE 4. DETERMINANTS OF GUERRILLA WARFARE

	Guerrilla Incidence (Dynamic Probit Analysis)						Minor Conflict Onset (Probit Analysis)	
	Model 1		Model 2		Model 3		Model 4	Model 5
	1919-1997		1950-97		1950-97		Onset	Onset
	Beta	Alpha	Beta	Alpha	Beta	Alpha		
Constant	-3.219*** (0.432)	3.127*** (0.854)	-2.767*** (0.658)	1.789 (0.248)	2.096 (4.658)	-13.590 (9.730)	-2.452*** (0.765)	-2.394 (5.289)
Minor Conflict t-1							0.131 (0.104)	-0.492 (0.301)
Percent of Family Farms t-1	0.003 (0.003)	0.004 (0.005)	0.005 (0.004)	0.009 (0.008)			0.023*** (0.005)	
Index of Occupational Diversification t-1	0.002 (0.003)	0.012* (0.006)	0.008* (0.004)	0.006 (0.008)			0.025*** (0.005)	
Family Farms t-1 * Occup. Divers. T-1	-0.021*** (0.005)	-0.005 (0.012)	-0.026*** (0.008)	-0.000 (0.017)			-0.046*** (0.010)	
Gini Index of Inequality					-0.021 (0.029)	0.054 (0.057)		-0.048 (0.033)
Share of Agriculture Over GDP					-0.106* (0.061)	-0.047 (0.124)		-0.105* (0.062)
Gini Index * Agriculture / GDP					0.216^^ (0.143)	0.205^^ (0.276)		0.370** (0.154)

Log Population t-1	0.198*** (0.18)	-0.113*** (0.036)	0.131*** (0.027)	-0.089 (0.055)	0.114 (0.084)	-0.159 (0.247)	0.082** (0.033)	0.067 (0.118)
Log (Per Capita Income) t-1	0.009 (0.055)	-0.146 (0.108)	-0.086 (0.086)	-0.053 (0.149)	-0.882** (0.356)	1.299* (0.679)	-0.282*** (0.092)	-0.062 (0.389)
Growth Rate t-2 to t-1			0.222 (0.529)	-0.632 (0.963)	3.991 (2.536)	-6.082 (4.384)	-0.896 (0.556)	1.698 (2.383)
Democracy t-1	0.213*** (0.070)	-0.088 (0.120)	0.190** (0.089)	-0.105 (0.157)	0.745*** (0.248)	-0.409 (0.448)	-0.038 (0.102)	0.404 (0.296)
Log (Percent Mountainous)			0.071** (0.028)	-0.037 (0.064)	0.044 (0.112)	-0.614** (0.247)	0.055* (0.033)	-0.132 (0.133)
Noncontiguous State			0.599*** (0.096)	-0.326** (0.164)	0.858** (0.339)	-0.109 (0.643)	0.150 (0.112)	0.408 (0.371)
Oil Exporter			0.062 (0.115)	-0.352 (0.220)	0.668** (0.311)	-0.591 (0.640)	0.091 (0.123)	0.639 (0.425)
Political Instability			0.074 (0.091)	0.184 (0.156)	-0.056 (0.287)	0.368 (0.524)	0.097 (0.094)	0.014 (0.319)
Ethnic Fractionalization			1.570*** (0.591)	1.779 (1.157)	2.784* (1.609)	2.432 (5.177)	1.405* (0.739)	1.766 (1.759)
(Ethnic Fractionalization)^2			-1.518** (0.655)	-1.467 (1.274)	-4.354* (2.419)	-0.516 (5.130)	-1.037 (0.781)	-3.027 (2.446)
Religious Fractionalization			0.227 (0.652)	-0.723 (1.342)	6.962 (5.544)	13.709 (13.604)	1.113 (0.777)	3.711 (5.879)

(Religious Fractionalization)^2		-0.244	1.574	-5.142	-8.518	-1.184	-3.250
		(0.753)	(1.716)	(3.709)	(8.758)	(0.937)	(4.027)
Percent of Muslims		0.001	-0.005	0.002	-0.009	0.003*	-0.003
		(0.002)	(0.003)	(0.004)	(0.009)	(0.002)	(0.005)
Percent of Catholics		0.002*	0.002	0.000	-0.002	0.002	0.000
		(0.001)	(0.003)	(0.004)	(0.008)	(0.002)	(0.004)
Percent of Protestants		-0.005	-0.014	-0.039	0.064	-0.004	-0.028
		(0.003)	(0.009)	(0.029)	(0.060)	(0.005)	(0.028)
Observations	6242	3937		703		4239	705
Log Likelihood	-1999.83	-1308.86		-173.88		-619.20	-77.27
Pro>Chi2	0.0000	0.0000		0.0000		0.0000	0.0165
Pseudo R2	0.2369	0.2719		0.4764		0.1038	0.1821

Estimation: Dynamic probit analysis in Models 1 through 3; Probit analysis in Models 4 and 5.
Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.
^^ significant at 5% in joint test.

TABLE 5. PREDICTED PROBABILITY OF GUERRILLA WARFARE ONSET OVER 5 YEARS BY SIZE OF AGRARIAN SECTOR AND LANDHOLDING INEQUALITY

		Share of Family Farms over Total Cultivated Land (percentiles)				
		10	30	50	70	90
	10	0.36	0.37	0.38	0.40	0.41
Index of	30	0.36	0.32	0.28	0.24	0.21
Occupational	50	0.36	0.27	0.20	0.14	0.10
Diversification	70	0.36	0.23	0.14	0.08	0.04
	90	0.37	0.19	0.09	0.04	0.02

Simulation based on Table 4 Column 1
Lagged value of guerrilla warfare set to 0. All other variables set at their median values.

TABLE 6. DETERMINANTS OF REVOLUTIONARY OUTBREAKS

	Model 1 1850-1997		Model 2 1950-1997		Model 3 1950-1997	
	Beta	Alpha	Beta	Alpha	Beta	Alpha
Constant	-0.010	1.138	0.337	-1.977	2.642	-170.449**
	(0.409)	(0.826)	(0.670)	(1.442)	(3.602)	(76.926)
Percentage of Family Farms t-1	0.002	-0.000	0.009**	-0.006		
	(0.003)	(0.005)	(0.004)	(0.008)		
Index of Occupational Diversification t-1	0.003	0.010*	0.008*	0.001		
	(0.003)	(0.006)	(0.004)	(0.010)		
Family Farms t-1 * Occupational Divers.	-0.022***	0.013	-0.027***	0.043**		
	(0.006)	(0.014)	(0.009)	(0.021)		
Gini Index of Inequality t-1					-0.071***	0.440*
					(0.025)	(0.244)
Share of Agriculture over GDP t-1					-0.185***	0.526
					(0.051)	(0.407)
Gini Index * Agriculture over GDP t-1					0.492***	-0.911
					(0.123)	(0.980)
Log Population t-1	0.044***	0.032	0.027	0.015	0.064	0.475
	(0.017)	(0.034)	(0.028)	(0.062)	(0.077)	(1.187)
Log (Per Capita Income) t-1	-0.207***	-0.091	-0.298***	0.082	-0.464*	5.735*
	(0.053)	(0.105)	(0.084)	(0.162)	(0.270)	(3.330)
Growth Rate t-2 to t-1			-0.714	0.177	1.279	-4.032
			(0.533)	(0.886)	(1.891)	(9.625)
Democracy t-1	0.032	0.077	0.015	0.182	-0.043	3.437**
	(0.067)	(0.128)	(0.088)	(0.174)	(0.210)	(1.447)
Log (Percentage Mountainous)			0.009	0.128**	0.018	-1.026
			(0.028)	(0.060)	(0.094)	(0.706)
Noncontiguous State			0.100	0.104	0.127	-4.567
			(0.102)	(0.211)	(0.259)	(4.373)
Oil Exporter			0.189*	-0.439**	0.306	
			(0.113)	(0.213)	(0.311)	
Political Instability			0.350***	-0.042	0.503**	2.256

		(0.084)	(0.147)	(0.220)	(1.992)
Etnic Fractionalization		-1.029*	3.513***	1.106	23.302
		(0.604)	(1.294)	(1.319)	(20.015)
(Ethnic Fractionalization)^2		1.369**	-3.252**	-3.110*	-14.675
		(0.654)	(1.343)	(1.793)	(29.347)
Religious Fractionalization		0.152	2.605*	5.484	215.639**
		(0.666)	(1.424)	(3.726)	(107.935)
(Religious Fractionalization)^2		-0.340	-1.764	-4.352	-130.691*
		(0.785)	(1.800)	(2.735)	(67.527)
Percentage of Muslims		-0.000	0.004	-0.005	0.027
		(0.002)	(0.003)	(0.003)	(0.037)
Percentage of Catholics		0.003**	0.003	-0.004	0.045
		(0.001)	(0.003)	(0.003)	(0.037)
Percentage of Protestants		-0.006	0.006	-0.010	1.037**
		(0.004)	(0.009)	(0.009)	(0.406)
Observations	6243	3937		699	
Log Likelihood	-2140.76	-1275.64		-154.77	
Prob>chi2	0.0000	0.0000		0.0000	
Pseudo R2	0.1954	0.2322		0.3503	

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

TABLE 7. PREDICTED PROBABILITY OF REVOLUTIONARY EVENTS OVER 5 YEARS BY ECONOMIC STRUCTURE AND LAND INEQUALITY

		Share of Family Farms over Total Cultivated Land (percentiles)				
		10	30	50	70	90
	10	0.77	0.77	0.76	0.76	0.75
Index of	30	0.65	0.56	0.48	0.40	0.34
Occupational	50	0.54	0.39	0.28	0.19	0.13
Diversification	70	0.45	0.27	0.15	0.08	0.04
	90	0.37	0.18	0.08	0.03	0.01

Simulation based on Table 6, Column 1.
Lagged value of revolutionary outbreak set to 0. All other variables set at their median values.

TABLE 8. GRANGER CAUSALITY TEST

A. Civil War

	Model 1	Model 2	Model 3	Model 4
	Civil War	Family. Farms * Occ. Diversif.	Civil War	Family Farms * Occ. Diversif.
Constant	-0.037**	0.992***	-0.041***	-0.279
	(0.015)	(0.358)	(0.014)	(0.351)
Civil War t-1	0.509***	0.744	0.471***	0.285
	(0.026)	(0.610)	(0.022)	(0.553)
Civil War t-2	-0.146***	-0.668		
	(0.028)	(0.637)		
Percent of Family Farms t-1	0.002**	0.023	0.002***	0.009
	(0.001)	(0.021)	(0.000)	(0.011)
Percent of Family Farms t-2	-0.000	-0.012		
	(0.001)	(0.021)		
Index of Occupational Diversification t-1	0.003**	-0.176***	0.001***	0.069***
	(0.001)	(0.028)	(0.000)	(0.010)
Index of Occupational Diversification. t-2	-0.002	0.297***		
	(0.001)	(0.031)		
Family Farms.t-1 * Occup. Diversif. t-1	-0.004*	0.722***	-0.003***	0.919***
	(0.002)	(0.044)	(0.001)	(0.019)
Family Farms t-2	0.002	0.192***		
	(0.002)	(0.048)		
Observations	1743	1877	1894	2057
Adjusted R-squared	0.1482	0.8989	0.1536	0.8844

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%.

B. Guerrilla

	(1)	(2)	(3)	(4)
	Guerrilla	Family Farms * Occ. Diversif.	Guerrilla	F. Farms * Occ. Diversif.
Constant	-0.000	-0.600	0.003	0.671
	(0.035)	(0.711)	(0.030)	(0.636)
Guerrilla t-1	0.338***	0.067	0.332***	0.293
	(0.033)	(0.667)	(0.027)	(0.582)
Guerrilla t-2	0.009	1.061*		
	(0.031)	(0.635)		
Family Farms t-1	0.002*	-0.001	0.003***	0.012
	(0.001)	(0.026)	(0.001)	(0.016)
Family Farms t-2	0.000	-0.005		
	(0.01)	(0.027)		
Occupational Div. t-1	-0.001	-0.161***	0.002**	0.096***
	(0.002)	(0.036)	(0.001)	(0.016)
Occupational Div. t-2	0.003	0.333***		
	(0.002)	(0.040)		
Family Farms t-1 *	-0.004	0.694***	-0.004***	0.815***
Occup. Diversification t-1	(0.003)	(0.056)	(0.001)	(0.030)
Family Farms t-2	0.000	0.126**		
Occup. Diversification t-2	(0.003)	(0.061)		
Observations	1083	1138	1320	1375
Adjusted R-squared	-0.0014	0.7999	0.0101	0.7821

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%.

C. Revolutionary Events

	(1)	(2)	(3)	(4)
	Revolutions	F. Farms * Occ. Div.	Revolutions	F. Farms * Occ. Div.
Constant	0.014	-0.736	0.038	0.673
	(0.061)	(0.717)	(0.050)	(0.641)
Revolutions t-1	0.359***	-0.545	0.337***	-0.053
	(0.037)	(0.450)	(0.029)	(0.375)
Revolutions t-2	0.032	0.584		
	(0.036)	(0.419)		
Family Farms t-1	0.001	0.000	0.001	0.013
	(0.002)	(0.026)	(0.001)	(0.016)
Family Farms t-2	0.001	0.000		
	(0.002)	(0.027)		
Occupational Div. t-1	-0.003	-0.162***	0.002	0.096***
	(0.003)	(0.036)	(0.001)	(0.016)
Occupational Div. t-2	0.005	0.340***		
	(0.003)	(0.040)		
F. Farms * Occup. t-1	-0.000	0.694***	-0.002	0.812***
	(0.005)	(0.056)	(0.002)	(0.030)
F. Farms * Occup. t-2	-0.002	0.116*		
	(0.005)	(0.061)		
Observations	1083	1138	1320	1375
Adjusted R-squared	-0.0374	0.7998	-0.0283	0.7821

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

TABLE 9. INSTRUMENTING FOR INEQUALITY AND ASSET SPECIFICITY

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:	Civil wars (F-L)		Guerrillas ----------		Revolutions ----------	
Constant	-1.165*	-0.632	-1.786***	-0.937**	-0.406	0.378
	(0.654)	(0.578)	(0.533)	(0.438)	(0.399)	(0.342)
Family Farms *	-0.011**	-0.008^	-0.014***	-0.007	-0.009***	-0.002^^
Index of Divers.	(0.005)	(0.006)	(0.004)	(0.005)	(0.004)	(0.003)
Log of Population	0.086***	0.102***	0.080***	0.080***	0.025*	0.015
	(0.021)	(0.027)	(0.017)	(0.021)	(0.013)	(0.016)
Log of Income	0.092	-0.003^	0.190***	0.065	0.060	-0.042^^
Per Capita	(0.082)	(0.065)	(0.067)	(0.049)	(0.050)	(0.039)
Observations	86	60	86	60	86	60
R-squared	0.09	0.23	0.07	0.25	0.02	0.14
First Stage						
Constant	-75.946***	16.528	-75.945***	16.528	-75.945***	16.528
	(13.661)	(13.920)	(13.661)	(13.920)	(13.661)	(13.920)
Distance from Equator	38.206***		38.208***		38.208***	
	(8.116)		(8.116)		(8.116)	
Percentage of European		0.339***		0.339***		0.339***
Population in 1900		(0.057)		(0.057)		(0.057)
Log of Population	0.933	1.775***	0.933	1.775***	0.933	1.775***
	(0.799)	(0.659)	(0.798)	(0.659)	(0.798)	(0.659)
Log of Income	9.414***	0.587	9.415***	0.587	9.415***	0.587
Per Capita	(1.639)	(1.735)	(1.639)	(1.735)	(1.639)	(1.735)
R-Squared	0.689	0.688	0.688	0.688	0.688	0.688

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
^ significant at 10% in joint test of inequality interaction and per capita income; ^^ significant at 5% in joint test

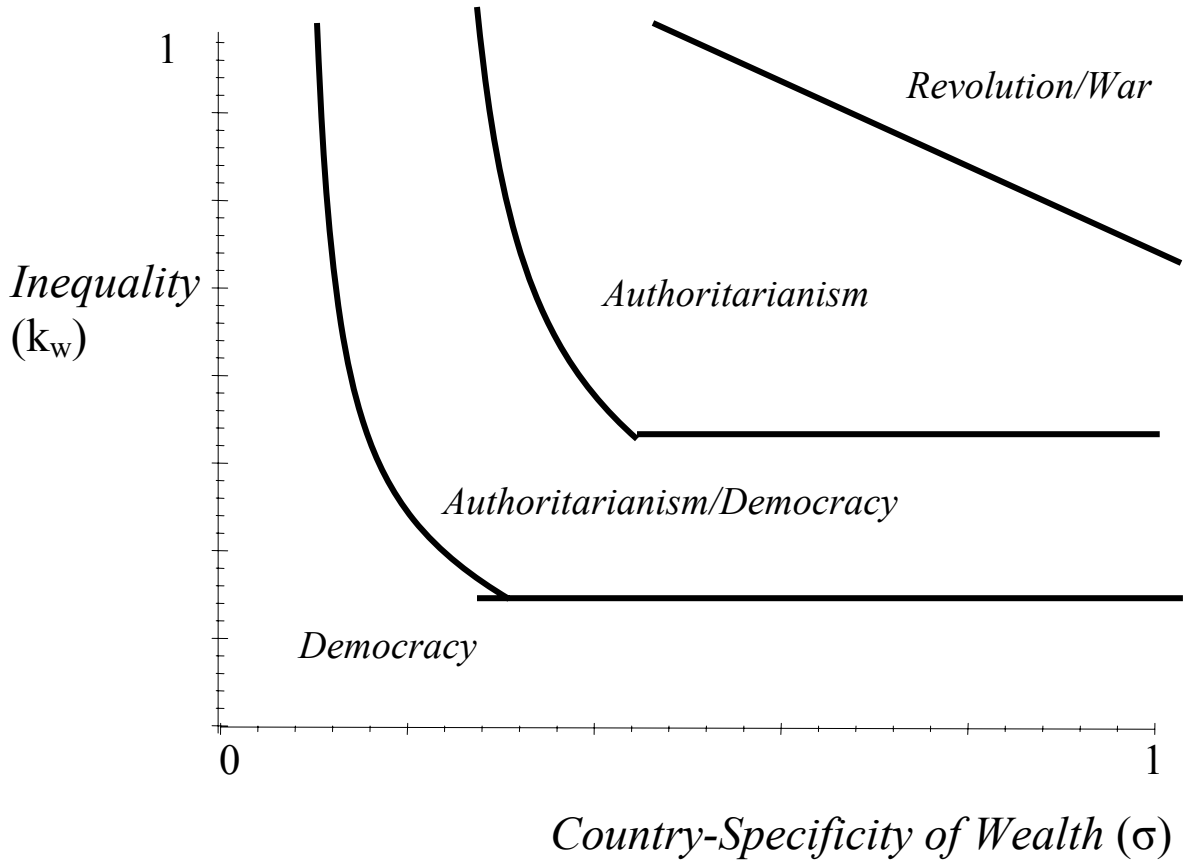
1
Revolution/War
Inequality
(k_w)
Authoritarianism
Authoritarianism/Democracy
Democracy
0
1
Country-Specificity of Wealth (σ)

Figure 2

Economic Structure and Civil Wars before 1945

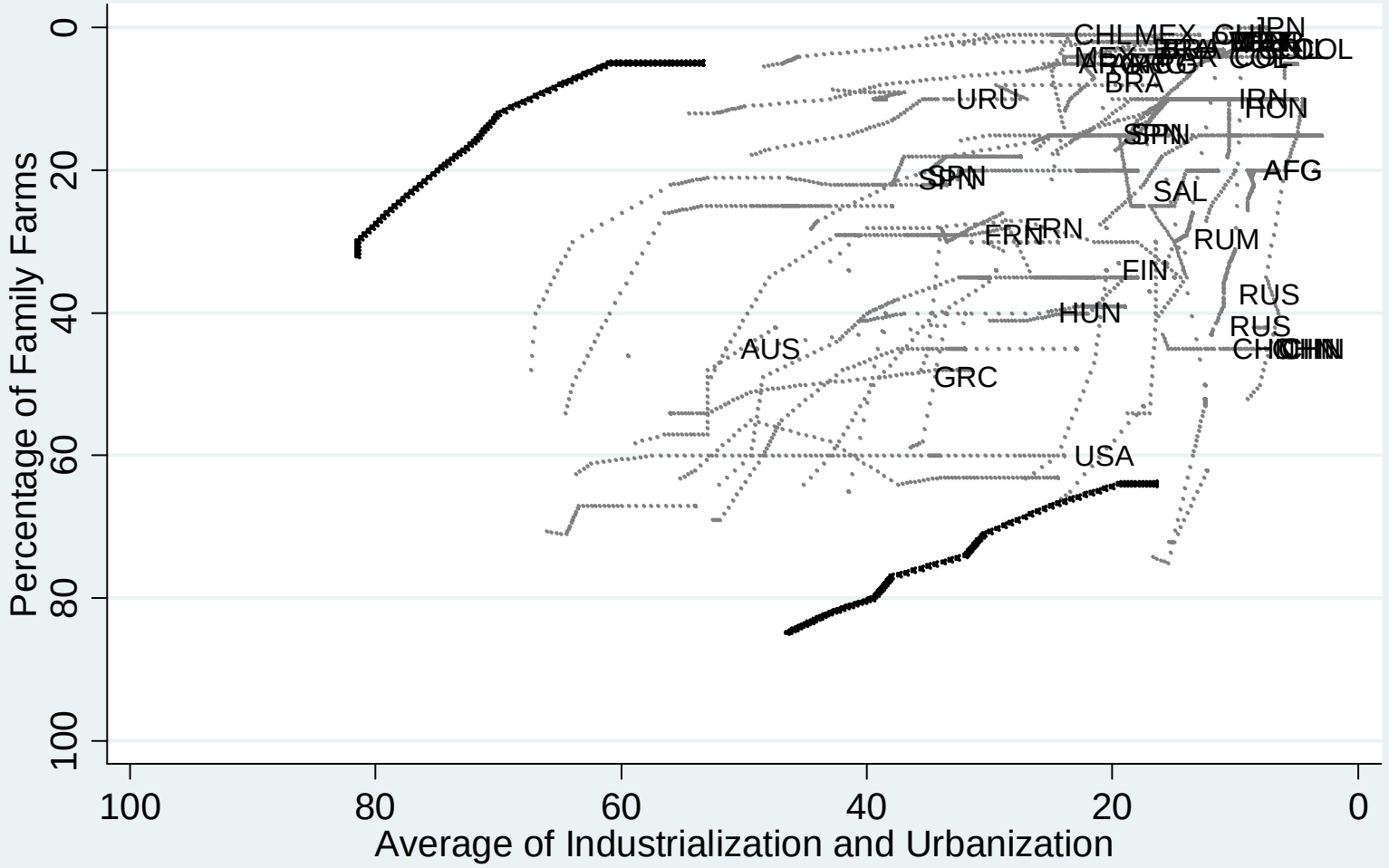

Figure 3

Economic Structure and Civil Wars after 1945

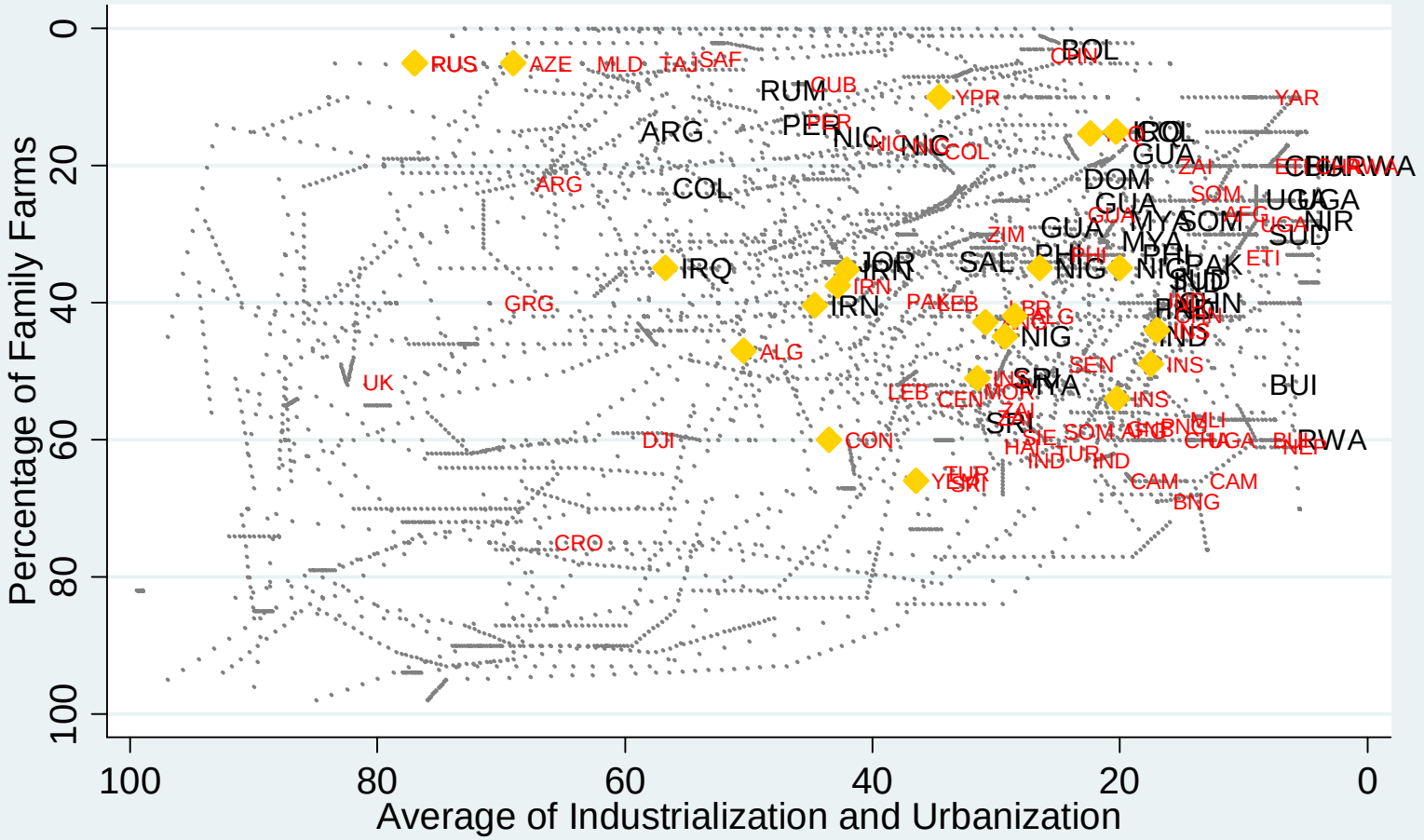

Figure 4

Economic Structure and Guerrillas before 1945

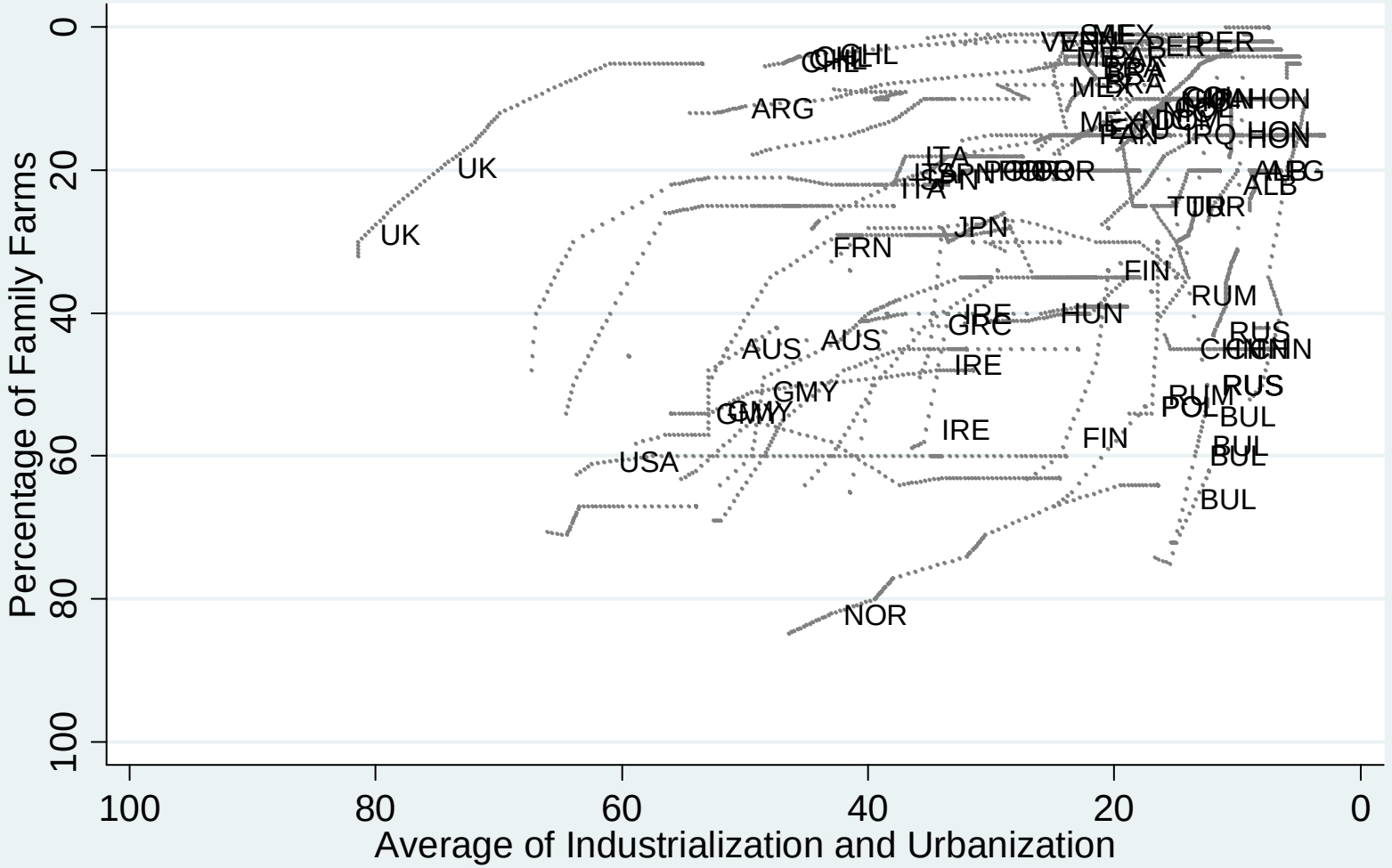

Figure 5

Economic Structure and Guerrillas after 1945

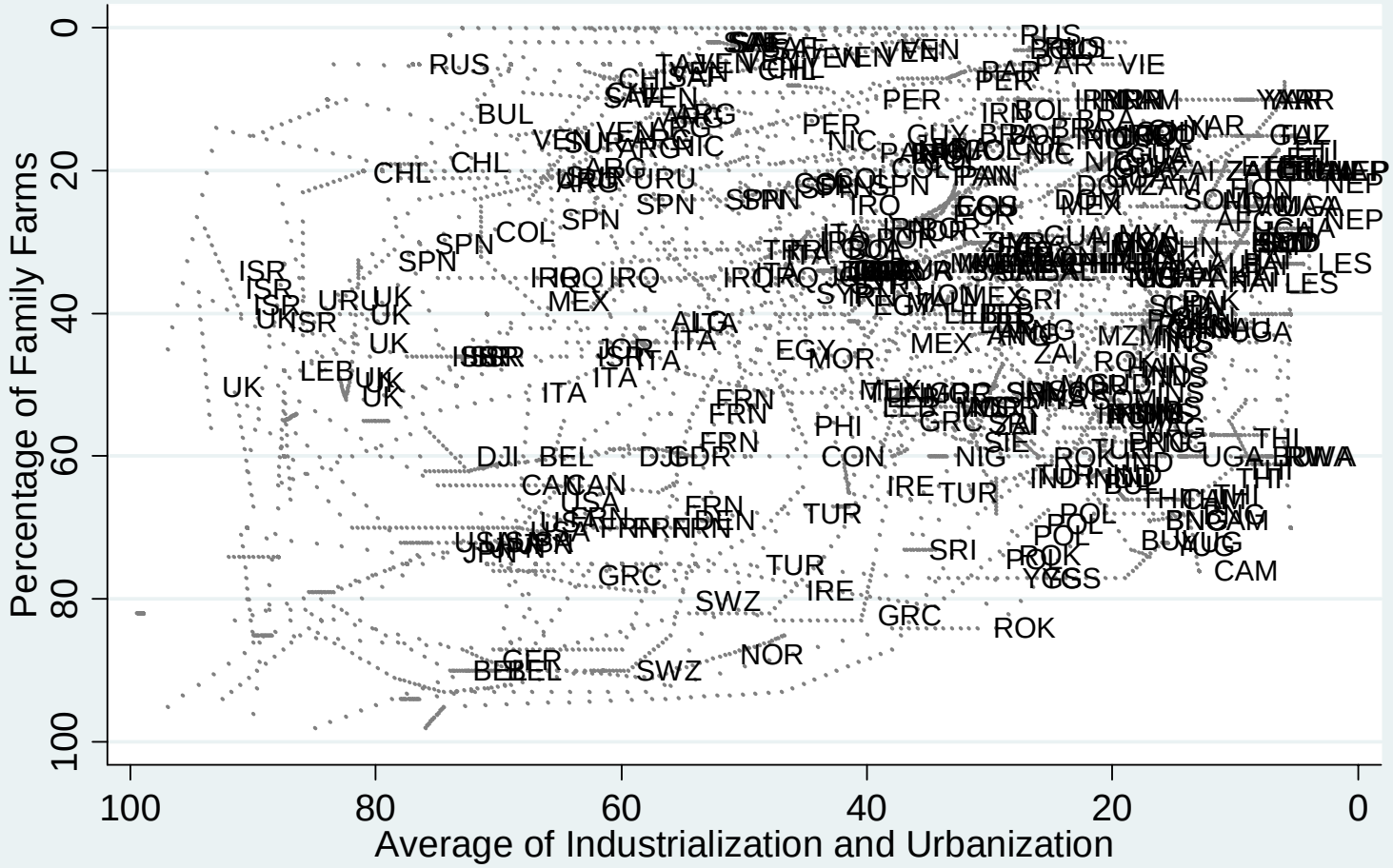

Figure 6

Economic Structure and Revolutionary Events before 1945

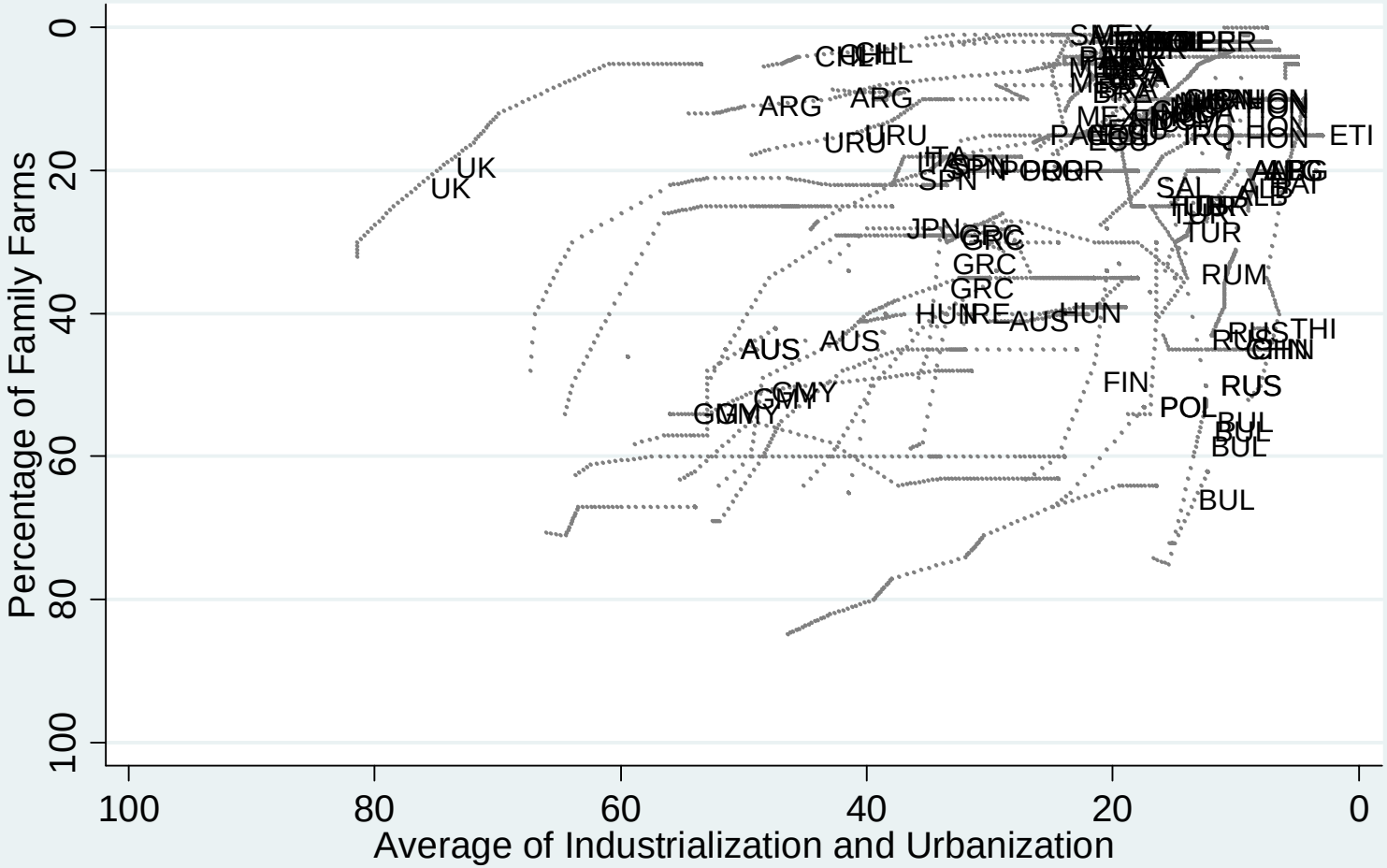

Figure 7

Economic Structure and Revolutionary Events after 1945