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# **Ethnic Minority Rule and Civil War Onset**

## *How Identity Salience, Fiscal Policy, and Natural Resource Profiles Moderate Outcomes*

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Using an agent-based computational framework designed to explore the incidence of conflict between two nominally rival ethnic groups, we demonstrate that the impact of ethnic minority rule on civil war onset *could* be more nuanced than posited in the literature. By testing the effects of three key moderating variables on ethnic minority rule, our analysis demonstrates that: (i) when ethnicity is assumed to be salient for all individuals, conflict onset *increases* with size of the minority in power, although when salience is permitted to vary, onset *decreases* as minority and majority approach parity; (ii) fiscal policy—the spending and investment decisions of the minority EGIP—moderates conflict; conflict decreases when leaders make sound decisions, increases under corrupt regimes, and peaks under ethno-nationalist regimes that place a premium on territorial conquest; and lastly (iii) natural resources—their type and distribution—affect the level of conflict which is lowest in agrarian economies, higher in the presence of lootable resources, and still higher when lootable resource are “diffuse”. Our analysis generates a set of propositions to be tested empirically, subject to data availability.

KEYWORDS: agent-based modeling; civil war; ethnic minority rule; political exclusion

### **1. Introduction**

Can ethnic minority rule effectively increase the risk of civil war onset? Commenting on the nature of majority and minority rule in pre-1994 Rwanda and Burundi respectively, Uvin (1999: 253, 264) notes that the “dynamics that led to violence in Rwanda and Burundi are textbook cases of entirely different processes” and serve

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as “archetypical examples of very different categories of violence”. In Rwanda, discontent ran high among members of the Hutu majority itself, whereas in neighboring Burundi discontent was directed at the minority-led Tutsi regime most vehemently by the disenfranchised Hutu majority. This, according to Uvin, resulted in *fundamentally different dynamics of violence in both countries*, with the Hutu elite in Rwanda playing the ethnic card to legitimize state control among fellow Hutu, and with Burundi’s Tutsi elite systematically repressing the country’s Hutu majority to maintain their stranglehold on power.

Rule by Burundi’s Tutsi minority—arguably more uncompromising than majority rule in Rwanda—increased the restiveness of the dominated majority and the insecurity of the dominant minority, resulting in frequent rebellion and brutal repression. In marked contrast, the majority-led Hutu regime in Rwanda, preoccupied more notably by regional cleavages that served to weaken the regime, did not completely exclude Tutsi from the social, economic, and political realm.<sup>1</sup> Besides, Prunier (1995: 90) notes that in 1994 “the Rwandan political system was on the verge of collapse and any strong push from outside would complete the process”, whereas Burundi’s minority-led regime was not averse to power-sharing experiments, given its ability to intervene militarily and reassert Tutsi rule.

An examination of the ethnic composition of 48 African regimes in 2005 shows that the heads of state in 26 countries belonged to a secondary or minority ethnic group, defined respectively as 10% or more (short of a majority) and 10% or less of a country’s population.<sup>2</sup> Leaders in six other countries were members of the plurality ethnic group, the largest group short of a 50% population share, whereas leaders in only 16 countries hailed from the ethnic majority, defined as 50% or more of the population. Only seven armed conflicts unfolded in these 48 states in 2005; five in countries led by an ethnic minority (Chad, Sudan, Uganda, and Ethiopia with two conflicts) and two in states led by an ethnic majority (Algeria and Burundi). With over 32% of all civil wars in the period between 1946 and 2006 occurring in Africa, and given sizeable variation in the ethno-political composition of African ruling regimes, it seems reasonable to question the connection between the ethnic identity of leaders—those hailing from ethnic minorities, in particular—and the incidence of civil violence.<sup>3</sup>

Clearly, examples of ethnic minority rule are not limited to Africa alone. Take the case of the Pakistani civil war in 1971, which led to the secession of East Pakistan and the foundation of Bangladesh. The insurgents, the *Mukti Bahini* or the “Liberation Army”, claimed to represent the discriminated Bengali population—the largest ethnic group in Pakistan at the time with, some 44% of the population—ruled by a coalition of Punjabis (33% of the population), Sindhis (7%), and Pashtuns (5%). Armed conflict between the Jordanian army and various Palestinian factions in

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<sup>1</sup> We refer to the nature of majority rule in Rwanda for the duration of the Second Republic, and prior to the 1994 genocide.

<sup>2</sup> For a description of the data and sources used see Table A1, Appendix A: [http://plutomail.huji.ac.il/~miodownik/MioBhavCMPS\\_AppendixA](http://plutomail.huji.ac.il/~miodownik/MioBhavCMPS_AppendixA).

<sup>3</sup> This figure represents the total number of *internal armed conflicts* and *internationalized internal armed conflicts* as coded by the UCDP/PRIO Armed Conflict dataset v.4-2007, 1946–2006 (Gleditsch et al., 2002; Harbom and Wallensteen, 2007).

September 1970 provides yet another example. The kingdom of Jordan was ruled by members of the Hashemite family in a coalition with loyal Bedouin tribes (constituting about 40% of the population), while Palestinians in Jordan amounted to over 58% of the population.

Addressing the link between a leader's ethnic identity and civil war onset for all countries from 1945 to 1999, Fearon, Kasara, and Laitin (2007) (henceforth FKL) suggest that minority leaders held power in 25.12% of all country years, albeit with significant cross-regional variation: lows of 7.82% and 8.14% for all country years in Asia and the West; a high of 57.19% in Latin America and the Caribbean;<sup>4</sup> and the still higher figure of 58.51% in Sub-Saharan Africa. As such, FKL argue that civil wars broke out slightly more frequently under ethnic minority leadership: in 2.05% of all ethnic minority leader country years versus 1.5% of all country years with a leader from the plurality group. The numbers are somewhat higher for Sub-Saharan and North Africa (which includes the Middle East) with 2.58% and 2.26% of all minority leader years exhibiting the outbreak of a civil war versus 1.63% and 1.75% of all plurality leader years with a civil war onset, leading the authors to conclude that "countries with heads of state from a minority ethnic group have been marginally more likely to have civil wars begin, although the association is weak and uncertain" (p. 192).

Two recent studies by Wimmer, Cederman, and Min (2009 and henceforth WCM) and Cederman, Wimmer, and Min (2010 and henceforth CWM) question this conclusion, given that FKL's use of a dummy variable to indicate whether the head of state is a member of a minority group is arguably a less than perfect measure of institutionalized exclusion from power (WCM: 325 n9).<sup>5</sup> The fact that the head of state hails from a minority need not necessarily imply that members of other ethnic groups, including the ethnic majority, are wholly excluded from state power. Addressing this concern, the authors develop a set of indicators to better capture how access to state power (or lack thereof) may lead to the outbreak of ethno-nationalist civil war.

Using the Ethnic Power Relations (EPR) dataset, CWM suggest that ethnic conflicts involving excluded groups are more frequent than conflicts involving groups that share political power.<sup>6</sup> Specifically, they observe conflict onset in 27 of the 11,622 group years (0.23%) for groups holding a monopoly of power, dominant groups,

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<sup>4</sup> If "Mestizo" and "White" are coded as separate identities. Only 18.68% of country years are coded as controlled by a minority leader if "Mestizo" and "White" are coded as two separate identities.

<sup>5</sup> Specifically, WCM (p. 325) suggest that "Most researchers define exclusion narrowly, focusing on a small number of minority rights rather than explicitly measuring access to state power. . . . [D]ata sets that use a broader definition of exclusion are limited in geographic scope and purely cross-sectional and therefore do not record changes in ethnic power relations over time."

<sup>6</sup> The EPR data (<http://dvn.iq.harvard.edu/dvn/dv/epr>) used in WCM and CWM measures access to executive-level state power for all politically relevant ethnic groups in the world from 1946 to 2005, matching group information with conflict episodes that reach an annual battle-death threshold of 25 people from the Uppsala/PRIO Armed Conflicts Data Set (Gleditsch et al., 2002). The data used in these papers includes 215 incidents of armed conflicts, of which 110 were ethnic conflicts (57 with secessionist aims), 20 of which were initiated by the ethnic group in power and the remaining 90 initiated by a marginalized ethnic group (WCM: 327, Table 1).

and senior or junior coalition partners (i.e. “included groups”), whereas conflict involving excluded groups—groups enjoying a modicum of regional autonomy, powerless, discriminated and separatist autonomy groups—broke out in 119 of the 17,897 group years (0.66%). Within the category of excluded groups, powerless and discriminated groups initiated wars in 87 out of the 11,988 group years (0.73%) in comparison to groups that enjoyed some level of regional autonomy, the latter accounting for 13 onsets in 5,433 group years (0.24%). And when groups sought separatist autonomy, the likelihood of conflict rose further still, accounting for 19 out of 476 group years (3.99%).

Examining the WCM data, we find that ethnic minorities held power in 1023 (of a total 7155) country years (14.3%) whereas the majority held power in 6123 of the 7155 years (85.7%). Civil war broke out in 42 of the 1023 (4.1%) the minority-dominated country years, and in only 173 of the 6132 (2.8%) majority-dominated country years. And ethnic civil war broke out in 25 of the 1023 (2.4%) minority-dominated country years, and in only 85 of the 6132 (1.4%) years with the majority rule.

The finding that the incidence of civil conflict is marginally more likely under ethnic minority rule in the sample as a whole also obscures the fact that the effect of minority rule tends to vary. Clearly, not *all* ethnic minority regimes exclude other groups from power, and even when they do, exclusion does not *always* lead to the outbreak of war. As the most violent regions, Asia and Sub-Saharan Africa differ with respect to the onset of conflict under ethnic minority rule. In Asia only 6.6% of all conflict and 8.6% of all ethnic conflict took place during periods of minority rule, the preponderance of wars breaking out when a leader from the plurality group was in power. In marked contrast, 46.3% of all conflict onsets and 47.5% of all ethnic conflicts in Sub-Saharan Africa occurred under ethnic minority rule. Even using the much higher threshold of 1000 battle-deaths, the FKL data attest to a similar pattern—with 12.9% of all conflict onsets and a third of all ethnic conflicts in Asia, and 70.6% of all conflict onsets and 100% (10/10) of ethnic conflict onsets in Sub-Saharan Africa occurring under minority rule. Table 1 summarizes the distribution of conflict in each region using the WCM and FKL data.

The regional differences outlined above lead us to question the *conditions under which the marginalization of the ethnic majority from state power triggers conflict*. For as FKL note, “To believe that the coefficients on  $N^*$  or ‘minority leader’ provide decent estimates of causal effect.... one has to believe that these variables are uncorrelated with other, unmeasured determinants of civil war risk” (p. 192).<sup>7</sup> It follows that our concern in this article lies less with re-testing the significance of ethnic minority rule per se. Rather, using a theoretical framework designed to explore the incidence of conflict between two nominally rival ethnic groups, we explore *how* the propensity of the marginalized ethnic group (MEG)—excluded majorities in this case—to rebel against the ethnic group in power (EGIP)—minority-led regimes—*could* be shaped by the following factors: (i) the salience members of the

<sup>7</sup>The  $N^*$  index (Cederman and Girardin, 2007) is comprised of a star-like configuration with the Ethnic Group in Power (EGIP) at the center surrounded by peripheral groups ( $E^*$ ), where the likelihood of conflict is determined by the ability of the latter to challenge the former as a function of resources ( $M^*$ ). Thus,  $N^* = E^*M^*$ .

*Table 1.* Percent and Frequency of Civil War Onset under Minority and Majority Rule [% (N)]

	<i>Fearon et al. (2007)</i>				<i>Wimmer et al. (2009)</i>			
	War Onsets		Ethnic Onsets		War Onset		Ethnic Onset	
	Minority	Majority	Minority	Majority	Minority	Majority	Minority	Majority
West	0 (0)	100 (2)	0 (0)	0 (0)	0 (0)	100 (3)	0 (0)	100 (2)
Eastern Europe	0 (0)	100 (9)	0 (0)	100 (1)	0 (0)	100 (22)	0 (0)	100 (14)
Asia	12.9 (4)	87.1 (27)	33.3 (2)	66.7 (4)	6.6 (4)	93.4 (57)	8.6 (3)	91.4 (32)
N.Africa & Middle East	29.4 (5)	70.6 (17)	50 (1)	50 (1)	10.7 (3)	89.3 (25)	14.3 (2)	85.7 (12)
Sub-Saharan Africa	70.6 (24)	29.4 (10)	100 (10)	0 (0)	46.3 (31)	53.7 (36)	47.5 (19)	52.5 (21)
Latin America & Caribbean	60 (9)	40 (6)	0 (0)	100 (1)	11.7 (4)	88.3 (30)	20 (1)	80 (4)
Total	38.9 (42)	61.1 (66)	65 (13)	35 (7)	19.5 (42)	80.5 (173)	22.7 (25)	77.3 (85)

EGIP and MEG attach to ethnicity as a core or defining identity; (ii) the EGIP’s fiscal policy; and (iii) the country’s resource base and distribution.

The article proceeds as follows. The next section accounts for differences in ethnic minority rule as a function of two aggregate-level factors—fiscal policy and natural resources—and a third, individual-level factor—ethnic salience. Section 3 introduces our theoretical framework, and section 4 presents our experiments and results. A final section discusses the implications of our findings.

## 2. Accounting for Differences in Minority Rule

CWM and WCM argue that the state and its role as a key actor have been largely overlooked by students of civil war. Most states, they note, tend to favor co-ethnics and exclude ethnic outsiders. Rebellions break out when leaders of excluded or marginalized groups, in an effort to increase their share of the spoils, seek to capture the state and redistribute revenue along ethnic lines. In short, ethnicity matters because the state relies on “ethno-nationalist principles of political legitimacy”, favoring co-ethnics to gain political support—an argument that goes a long way in clarifying the “institutional” and “configurational” mechanisms likely to breed conflict when groups are excluded from power (WCM: 321). In spite of our agreement with the basic premise, we express three reservations with this line of reasoning.

First, the authors do not acknowledge the possibility that leaders may, after all, do more than promote the interests of the EGIP in the absence of a vibrant civil society that articulates policy requirements and moderates ethnic cleavages. Absent a vibrant civil society, it seems unreasonable to assume that the state will naturally denigrate into an arena for ethnically preferential policies.<sup>8</sup> Surely the degree to which politics

have been framed in ethnic terms and the weight individuals accord to ethnicity as a core or defining identity matter. And even regimes that are purportedly “ethnic” in their composition have been known to distribute largesse more exclusively, within more narrowly defined clusters, as in Rwanda and, to a lesser extent, in Burundi where regionalism featured more prominently than ethnicity in the distribution of power and spoils (Lemarchand, 1996).<sup>9</sup>

Second, even if we agree with the general WCM/CWM proposition that exclusion breeds conflict and the EGIP may exclusively and evenly favor its members, the ability of the EGIP to *distribute* revenue depends critically upon its capability to *generate* the same. Spending decisions, how leaders spend revenue—whether they consume it frivolously or spend it prudently by strengthening the military, providing social welfare, or investing in the economy—significantly shape future revenue streams. Absent the revenue required to sustain the support of one’s own ethnic kin—the ability to favor co-ethnics and *maintain* legitimacy—the likelihood of challenges from both within and across the ethnic divide is likely to rise.

Third, and in a related vein, the resource endowment places a hard constraint on all economic activity. The low economic barriers to entry that typically characterize lootable resources, like alluvial diamonds, make it easy for small-scale, artisanal miners to profit from extraction, thereby decreasing the EGIP’s ability to establish monopoly control over these resources. In addition, the spatial distribution of resources shapes the EGIP’s ability to exercise control over resources and generate revenue. As such, *point-source* resource distributions—dense clusters of lucrative resources—may more easily be subject to exclusive state control than *diffuse* resource distributions located far from the center(s) of state power (Le Billon, 2001, 2005). Taken together, the resource endowment and distribution—what we refer to as a country’s resource profile—comprise a budget constraint in states that rely on revenue from primary commodities.

The three factors we examine—identity, fiscal policy, and resource profile—work in tandem to shape the propensity of an excluded majority to rebel against the minority EGIP. The resource profile constitutes a budget constraint within which leaders craft fiscal policy to achieve any number of goals, including but not limited to gaining public support and legitimacy, maintaining security and territorial control, or

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<sup>8</sup> Two caveats are in order: first, one needs to distinguish the “bridging” and “bonding” functions of civil society or social capital, given that the two may have largely diametric effects on social order; second, apart from tests in the South Asian context which lack sufficient empirical evidence, the link between social capital and social order in other contexts such as Sub-Saharan Africa has been understudied. A recent study by Backer et al. (2010) even suggests that particular forms of organizational membership, contrary to expectation, *increase* individual dispositions to engage in violence.

<sup>9</sup> The predominantly Hima-Tutsi political elite that ruled Burundi from independence in 1962 instituted predatory and divisive policies unmistakably favoring residents of the southern province of Bururi, from where they hailed. Likewise, the 20-year reign of President Habyarimana in neighboring Rwanda favored a small group of ethnic Hutus known as “Akazu”, composed of relatives and other members from the president’s home district of Gisenyi in the northwest of the country.

maximizing personal revenue. Revenue may be distributed evenly across economic sectors and groups, or in a manner that favors particular sectors or groups over others, generating economic grievances that increase the likelihood of ethnic mobilization.

In the paragraphs that follow, we further discuss how variation in ethnic salience, fiscal policy, and natural resource profiles may shape the relationship between ethnic minority rule and civil war onset.

### ***Ethnic Salience***

CWM and WCM explicitly account for the power differentials among politically relevant ethnic groups. Their new indexes, nevertheless, implicitly assume that the distribution of individuals across ethnic groups determines the salience of ethnicity, or the weight that individuals place on “ethnicity” as a defining or core identity. One consequence of this assumption is that absent a change in relative group sizes, ethnic salience effectively remains constant across groups and, more notably, across individuals *within* ethnic groups if the power configuration remains unchanged.

Clearly, leaders of excluded groups may find it easier to instigate violence if ethnic salience is high across group members (Brass, 1997; Tambiah, 1986, 1996; Kapferer, 1988). Yet, simply assuming this is the case significantly oversimplifies matters. The treatment of ethnicity as an aggregate-level measure captured by the Ethno-Linguistic Fractionalization (ELF) index (Alesina and La Ferrara, 2005; Collier and Hoeffler, 2004; Hegre and Sambanis, 2006), Politically Relevant Ethnic Groups (PREG) index (Posner, 2004), Reynal-Querol (RQ)-index of polarization (Reynal-Querol, 2002; Esteban and Ray, 2008),  $N^*$  index (Cederman and Girardin, 2007), and even the Ethnic Power Relations (EPR) index (Wimmer, Cederman, and Min, 2009; Cederman, Wimmer, and Min, 2010) therefore fails to elucidate the mechanisms underpinning government or opposition support along ethnic lines.

In an effort to address this limitation, we explicitly relax the assumption of “fixed” salience permitting ethnic salience to vary across individuals—members of both the EGIP and MEG—as a function of relative revenue. As such, we subscribe to a distinctly materialist conception of ethnicity (Azam, 2001; Bates, 1974; Gurr, 1970; Hechter and Okamoto, 2001; Laitin, 1998) in keeping with our broader focus on the revenue imperative—the fundamental requirement that all leaders face getting the income with which to govern.<sup>10</sup> We therefore allow for the possibility that variation in the importance placed on ethnicity as a core or defining identity affects a leader’s

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<sup>10</sup> Hechter and Okamoto (2001) identify two different “market mechanisms” for intergroup stratification. The first suggests that social identities emerge as a by-product of collective experience, that markets produce a cultural division of labor in which individuals with distinct cultural markers cluster together. This clustering may be hierarchical, the Indian caste system being a *prima facie* example, or segmental, as with early Portuguese immigrants to the United States who concentrated in New England and dominated the local fishing industry. The second mechanism, which resonates with our approach, suggests that contact and competition over scarce resources triggers collective action along ethnic or nationalist boundaries. Bates (1974) argues that the formation and persistence of ethnic groups in Africa is, by and large, a result of competition for modern benefits. And Azam (2001) suggests that ethnic capital in Africa, which ensures the provision of public services, constitutes a system of redistribution whose

ability to gain popular support and maintain territorial control, with predictable consequences for revenue accumulation and conflict.

### **Fiscal Policy**

The ‘revenue imperative’ lies at the core of a vast literature on the fiscal sociology of state-building in Western Europe (Ardant, 1975; Levi, 1988; Moore, 2004; Schumpeter, 1991; Skocpol, 1979; Tilly, 1990; Weber, 1978) and the rentier state in resource-rich societies (Anderson, 1987; Beblawi and Luciani, 1987; Karl, 1997; Lowi, 2004; Mahdavy, 1970; Ross, 2001; Yates, 1996). Our theoretical framework rests upon the assumption that leaders require revenue to govern, and that a lack of revenue increases the risk of state collapse, which, in turn, increases the risk of civil war. Given the revenue imperative, *how* leaders obtain and spend revenue—their fiscal policies—affects the probability of civil war onset. For instance, spending on administrative and coercive infrastructure can lengthen the reach of the state, making it harder for challengers to organize; spending on social welfare may help mitigate societal grievances in the short term, albeit with serious long-term consequences in the absence of revenue-enhancing investment; and wasteful consumption—if leaders squander their income instead of investing in public services and the military—is all too likely to foment grievances.

The state’s fiscal policy may also have more direct implications for the behavior of challengers, given that revenue is fundamental to launching and sustaining rebellion—the ability to purchase equipment, organize military activity, and pay recruits (Collier and Hoeffler, 2004; Collier et al., 2004; Gates, 2002). Policies that sharply decrease the ability of challengers to generate a steady flow of income or increase the opportunity costs of rebellion are therefore likely to reduce civil war onset. Indeed, a small but growing subset of scholarship on civil war more explicitly analyzes the role of rebel finance (Fearon, 2004; Lujala, 2010; Thies, 2010; Weinstein, 2005).

Based on the concerns elucidated above, we examine how variation in spending and investment *could* influence the effect of ethnic minority rule on civil war onset. Our approach moves beyond testing the effect of *per capita income* on conflict onset, a measure that reveals precious little about the relative income of individuals from the EGIP or MEG, and even less about the availability of income to and its distribution between leaders of these nominally rival groups.<sup>11</sup> By focusing on fiscal policy, we explicitly account for the possibility that calls for rebellion by leaders of the MEG

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breakdown triggers political violence. Taking the logic of materialist considerations further still, Laitin (1998) notes that in Estonia, ethnic-Russian parents sent their children to Estonian speaking schools based on the expectation that knowledge of the vernacular was necessary to complete effectively in social and economic realms. Note that while we subscribe to a ‘materialist’ conception of ethnicity, our framework makes it possible to change the manner in which ethnic salience is calculated.

<sup>11</sup> The per capita income measure is used in dissimilar ways. Collier and Hoeffler (2004), for instance, use mean per capita income as a proxy for forgone rebel income (i.e. income forgone by joining a rebellion), hypothesizing that war onset will be less likely the larger the opportunity cost. Others, like Fearon and Laitin (2003: 75–76), utilize per capita income as a proxy for state capacity, arguing that state weakness “renders insurgency more feasible and attractive due to weak local policing or inept and corrupt counterinsurgency practices”.

may meet with apathy, even resistance, if the EGIP successfully distributes goods across all sectors of society with little regard for ethnicity.

### **Resource Profile**

The story does not end with fiscal policy. Leaders require income to govern, and their challengers require revenue to finance rebellion. Thus, the source of revenue—what we refer to as a state's resource profile—is key. Despite the progression of research on the resource–conflict link, scholars continue to reduce natural resources—their types, characteristics, and distributions—to single categorical variables (e.g. *oil exporter dummy*). As a result, they typically fail to specify finer-grained resource categories—such as alluvial or kimberlite diamonds—or distinguish between different resource distributions (point source or diffuse), to name just a few of the increasingly standard distinctions made in the literature (Auty, 2001; Le Billon, 2001, 2005; Lujala et al., 2005; Ross, 2006; Snyder and Bhavnani, 2005; Snyder, 2006).

Alluvial diamonds, for instance, are typically considered “lootable”. Their high values and low economic barriers to entry, together with their extraction by difficult-to-tax artisanal miners, impedes the ability of the state to establish monopoly control (Lujala et al., 2005; Snyder and Bhavnani, 2005; Ross, 2006). In marked contrast, non-lootable resources such as kimberlite or deep-shaft diamonds have high economic barriers to entry. In most cases, only the state is capable of furnishing the capital and technology required to exploit these resources, thereby enabling monopoly control. Along similar lines, “point source” resource distributions, typified by extractive industries such as mining, are spatially concentrated and therefore more susceptible to monopoly control and exclusion, whereas “diffuse” resource distributions are dispersed over a larger area, making them less amenable to monopoly control and consequently more open to capture by revenue-seeking challengers (Le Billon, 2001, 2005).

It follows that a country's resource endowment and distribution—taken together to denote a resource profile—are key factors to consider. Challengers may face fewer barriers in capturing and controlling resources dispersed across geographically remote regions of a state (Buhaug et al., 2009; Buhaug and Rød, 2006; Buhaug and Lujala, 2005; Cederman et al., 2009). In contrast, the leader's ability to control and extract revenue, essential for combating challenges and maintaining public support, may be commensurately greater if resources are clustered close to centers of state power. Likewise, the motivation for rebellion may be significantly reduced if the resources in question are not “lootable” or if leaders use resource revenue to benefit wider sections of society, ethnic affiliations aside, and secure its control of the state.

In sum, the relationship between ethnic exclusion and civil war onset may be shaped, in no small measure, by the salience individuals (both members of the EGIP and MEG) afford to ethnicity as a core or defining identity, fiscal policy and the state's natural resource profile. Specifically, we argue that the instrumentalization of these factors through the ethnic minority in power affects the likelihood of distributional issues being framed in ethnic terms, the ability to nurture political support both within and across the ethnic divide, and the ability to combat rebellion violently subject to the availability and use of revenue.

### 3. Methodology

Given a limited set of “natural experiments” to test the effect of minority rule on civil war onset, together with a paucity of fine-grained data on the preferences and behavior of individuals from nominally rival ethnic groups, agent-based modeling (ABM) constitutes a plausible complement to, rather than a substitute for, empirically-based research that lends itself well to counterfactual analysis.<sup>12</sup> ABMs (Bankes, 2002; Bonabeau, 2002; Conte et al., 1997) are “formal, unambiguous, thus replicable and testable” (Canessa and Riolo, 2006: 274) and provide powerful ways to develop, evaluate, and test theories by undertaking complex thought experiments that would be difficult to conduct in the real world, or using traditional analytic techniques (Parunak et al., 1998).

The ABM framework—described formally in the appendix<sup>13</sup> to this article and referred to by the acronym REsCape (see Bhavnani et al., 2008)—permits us to specify different patterns of ethnic domination given that the model is intrinsically a game between leaders of two nominally rival ethnic groups, one of which holds power and consequently serves as a target for takeover by the rival leadership.<sup>14</sup> The framework also permits us to vary ethnic salience across individuals as a function of relative income. And in contrast to a standard optimization problem in which a leader would maximize some objective function subject to constraints, we can vary parameter values to define a leader’s strategy set. We model, in other words, boundedly-rational agents in a purposive effort to illustrate how fiscal policy

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<sup>12</sup> Indeed, ABM and empirical observation are well-suited to iteration: existing empirical research may guide model specification; model results may either confirm or disconfirm empirical observation; when confirmatory, the model results help uncover the mechanisms and dynamics by which the observed outcomes occur; when not, they offer new directions for empirical research, which, when completed, may be used to guide the next generation of ABM. Like all modes of analysis, ABM requires researchers to select factors carefully and show restraint in the number they choose.

<sup>13</sup> See Appendix B available at [http://plutomail.huji.ac.il/~miodownik/MioBhavCMPS\\_AppendixB](http://plutomail.huji.ac.il/~miodownik/MioBhavCMPS_AppendixB).

<sup>14</sup> It follows that two leaders make choices about taxation and investment only when *both* exercise territorial control over one or more cells on the landscape. Given a landscape that falls entirely under the control of single leader, we enter a domestic political context in which all citizens are represented by a single national government, in which only the EGIP leader has the ability to dictate national budgets, enforce taxation, and accrue revenue. Consistent with Fearon and Laitin (2003), our model leads to conflict when the state (EGIP) is weak, unable to deter potential challenges by the leadership of the MEG, and unable to retain control of all its territory. Thus, while localized rebellions need not trigger a full-blown insurgency that spreads to all parts of the state, control of even a single cell permits a leader of the MEG to make localized (read cell-specific) spending and investment decisions in an effort to accrue revenue. This logic may be extended to three ethnic groups, arrayed in different power configurations (with the EGIP forming a ruling coalition with one nominally rival group, or potentially excluding both rival groups with the latter either cooperating or competing with each other).

Table 2. Summary of Model Parameters and Settings

Parameter Name	Parameter Settings			
Fiscal Policy <sup>A;B</sup>	benevolent rule	robbery	social welfare	territorial control
Resource Base	agriculture	kimberlite	alluvial industrial	alluvial artisanal
Resource Distribution	diffuse	point source		
Ethnic Group	A	B		
Ethnic Saliency	fixed	variable		
Per Capita Range	single cell	→	entire landscape	
Ethnic Polarization	high	→	low	
Ethnic Dominance	majority rule	contest power	minority rule	

A', B' represent the leaders of ethnic groups A and B respectively.

(both optimal and sub-optimal spending and investment) affects levels of conflict.<sup>15</sup> And lastly, the framework permits us to vary the natural resource endowment and distribution—the resource profile.

Table 2 summarizes key model parameters and value ranges. Leaders of nominally rival ethnic groups (*A* and *B*) may adopt one of four stylized *fiscal policies*: benevolent rule, robbery, social welfare, and territorial control; the *resource base* may vary from agriculture to one based on harder to extract kimberlite or artisanally extracted alluvial diamonds; peasants may belong to one of two nominally rival *ethnic groups*; *ethnic saliency* may be fixed—following the primordial notion that ethnicity is always salient for all individuals—or vary across individuals based on grievances that result from disparities in income; income disparities may, in turn, be calculated over different *per capita ranges*, beginning locally with an agent’s own cell and increasing to cover the entire landscape; and lastly, one may seed the model to capture different patterns of *ethnic polarization* and *ethnic domination*.

Conceptually, and at a high level of abstraction, our model works as follows: we define the model *landscape* as a discrete cellular grid with fixed borders and a capital city located in the center. Each cell on the landscape may contain members from two rival *ethnic groups*—the EGIP and MEG. The landscape is characterized by production, which falls into one of four *economic sectors*. Fiscal policy, defined by the sectoral and spatial spending decisions taken by a leader, determines the amount of revenue available to garner popular support. Where such support is weak, individuals may relocate or migrate to cells populated and/or controlled by members of their own ethnic group. Revenue from production is consequently used by the leader of an ethnic group to *control territory* and we underscore the importance of territorial control in this framework, given that control is a necessary condition for spending, investment, revenue generation, and popular support. All control is cell-specific, as is the breakdown of economic sectors, spending decisions, and peasant support.

<sup>15</sup> Other ABMs used to study civil conflict include MASON, developed by Cioffi-Revilla and Rouleau (2010) and a model of insurgency developed by Bennett (2008). Earlier efforts include Epstein’s (2002) model of civil violence.

*Conflict*, also cell-specific, emerges when the leaders of rival groups seek to control the same territory or cell.

At the level of social mechanisms, our model includes the following: *robbery* leads to a decline in economic growth, undermining popular support and weakening the state, making it more vulnerable to capture over time; spending on coercive power alters popular support and is essential for *territorial control*; and investment in the economy, subsumed under the notion of *benevolent rule*, increases the flow of revenue over time with a positive effect on popular support. Key feedback loops include the following: changes in revenue (relative to the revenue of nominal rivals) increase (or decrease) the salience of ethnicity; ethnic salience affects popular support; high levels of popular support decrease the cost of control, and control has a non-monotonic effect on support (excessive control lowers support, as does weak or insecure control); when support for the leader in control of a cell is weak, individuals may exercise the option to migrate to ethnic enclaves in an effort to find safety in numbers; migration changes the calculus of control, and thus affects spending, investment, and support for leaders;<sup>16</sup> conflict, which arises when leaders seek to control the same territory, alters the control of individual cells and may ultimately alter control of the state.

In sum, a leader(s) makes spending and investment decisions at each timestep; these decisions in turn generate varying amounts of revenue, affect territorial control and popular support, and determine the emergence or progression of conflict which occurs when rival leaders vie for control of the same cell(s); conflict, in turn, leads to new patterns of control over time. We consequently underscore the notion that patterns of spending and investment directly influence the instigation and spread of civil unrest by altering popular support, the leadership's capacity to control territory, and by implication, the ability to wage conflict.

Our computational model is best conceived of as an *exploratory* device, one that may be used to understand key causal drivers and mechanisms underpinning the incidence of civil war in artificial landscapes or specific real-world cases. Using this model, it is possible to conduct complicated thought experiments for which empirical data would, in most cases, be difficult if not impossible to collect. For example, those interested in the behavior of key agents could explore how a leader's ability to generate revenue through the taxation or looting of natural resources affects the onset and duration of civil war; those interested in understanding the micro-foundations of recruitment could focus on the conditions under which the opportunity costs faced by peasants for joining a rebellion increase or decrease; while those interested in studying the conditions under which minority rule alters the incidence of civil war, as we are in this article, could formally study the consequences of different distributions of salience and patterns of domination.

The next section describes our experiments and results; it is followed by a discussion of our findings.

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<sup>16</sup> In contrast to Lim et al.'s (2007) assumption that both highly mixed and well-segregated regions do not engage in violence, we analyze the conditions under which nominal rivals form ethnic enclaves and whether any resulting group segregation prevents violence. Migration therefore serves as a non-trivial model mechanism, one that underpins the formation of majority/minority enclaves on the landscape, and one that we devote more attention to in other research.

Table 3. Group Size, Ethnic Salience, and Conflict Onset

Size of Group A	Conflict Onset (s.d.)	
	Fixed Salience	Variable Salience
$n_A = 0.15$	0.25 (0.01)	0.34 (0.00)
$n_A = 0.25$	0.26 (0.02)	0.27 (0.01)
$n_A = 0.35$	0.28 (0.01)	0.27 (0.02)
$n_A = 0.45$	0.38 (0.03)	0.22 (0.03)
$n_A = 0.50$	0.35 (0.05)	0.21 (0.02)

A', B' represent the leaders of ethnic groups A and B respectively. In all model runs our baseline parameter settings are as follows: fiscal policy A', B' = *Robbery, Benevolent Rule*; resource base = *Alluvial Diamonds*; resource distribution = *Point Source*. We subsequently vary A'’s fiscal policy, the resource base and distribution in experiments 2 and 3. Results from an ANOVA indicate that the variance in conflict onset across group sizes ( $n_A$ ) for each experimental condition (*Fixed and Variable Salience*) is larger than the within-outcome variance, or the variance obtained when both group size and salience are held constant:  $F_{Fixed} = 133.852$  ( $p < 0.0001$ );  $F_{Variable} = 243.043$  ( $p < 0.0001$ ). A pair-wise comparison of means across experimental conditions, now holding group size constant, yields the following results:  $F_{n_A = 15} = 125.444$  ( $p < 0.0001$ );  $F_{n_A = 25} = 6.871$  ( $p < 0.05$ );  $F_{n_A = 35} = 56.726$  ( $p < 0.001$ );  $F_{n_A = 45} = n.s.$ ;  $F_{n_A = 50} = 56.526$  ( $p < 0.001$ ).

#### 4. Experiments and Results

Using the ABM described above, we run three experiments to illustrate how the effect of minority rule *could* be shaped by varying levels of ethnic salience (experiment 1), different fiscal policies (experiment 2), and finer-grained specifications of natural resource profiles (experiment 3). In all three experiments (Tables 3–5), we record *localized conflict onset* as the percentage of cells on the landscape that experience at least one conflict event during a model run and assume that the minority ethnic group A holds power. Rather than coding civil war onset as 1 for the entire landscape when any cell experiences conflict, we utilize a disaggregated measure precisely because standard coding practices obscure the notion that conflict need not affect a given territory uniformly; the notion that civil war is a sub-national event (Hegre et al., 2009; Lubkemann, 2005; Raleigh et al., 2009; Raleigh and Hegre, 2009; Weidmann and Kuse, 2009; Weidmann and Ward, 2008).<sup>17</sup>

##### ***Experiment 1: Group Size, Ethnic Salience, and Conflict Onset***

Our results, reported in Table 3, indicate that the effect of minority rule on conflict onset is sensitive to the specification of ethnic salience. When ethnicity is assumed to be fixed and highly salient for all individuals across all groups, conflict onset *increases* with the size of the minority in power ( $n_A$ ), peaking at 38% when the groups are close but not yet equal in size ( $n_A = 0.45$ ), and declining thereafter. When ethnic salience is permitted to vary as a function of relative income, however, the

<sup>17</sup>These papers all rely on ACLED, the Armed Conflict Location and Event Dataset, which provides coordinates for the exact location, date, and other information pertinent to battle events occurring during a civil war. The dataset tracks rebel activity and provides details about transfers in territorial control, the locations of bases, and one-sided violence.

Table 4. Group Size, Fiscal Policy, and Conflict Onset

Size of Group A	Conflict Onset (s.d.)								
	Benevolent Rule			Robbery			Territorial Control		
	Revenue		Conflict Onset (s.d.)	Revenue		Conflict Onset (s.d.)	Revenue		Conflict Onset (s.d.)
A'	B'		A'	B'		A'	B'		
$n_A=0.15$	1024.86	0.00	0.00 (0.00)	0.00	914.80	0.34 (0.00)	0.00	906.25	0.47 (0.03)
$n_A=0.25$	1041.30	0.00	0.00 (0.00)	0.00	921.94	0.27 (0.01)	744.54	1.69	0.56 (0.05)
$n_A=0.35$	1040.30	0.00	0.00 (0.00)	21.89	885.42	0.27 (0.01)	798.93	0.13	0.48 (0.05)
$n_A=0.45$	1061.88	0.00	0.00 (0.00)	367.24	628.07	0.22 (0.03)	853.32	0.15	0.38 (0.06)
$n_A=0.50$	1056.47	0.00	0.00 (0.00)	504.28	532.66	0.21 (0.02)	917.48	0.00	0.35 (0.03)

A', B' represent the leaders of ethnic groups A and B respectively, changes in fiscal policy apply to A' alone, and Revenue denotes the mean value at  $t = 2000$ . Results from an ANOVA indicate that the variance in conflict onset across group sizes ( $n_A$ ) for each experimental condition (Robbery (rb) and Territorial Control (tc)) is larger than the within-outcome variance, the variance obtained when both group size and salience are held constant:  $F_{rb} = 243.043$  ( $p < 0.0001$ );  $F_{tc} = 98.592$  ( $p < 0.0001$ ). A pair-wise comparison of means across experimental conditions, now holding group size constant, yields the following results:  $F_{rb,tc, n_A=15} = 778.7$  ( $p < 0.0001$ );  $F_{rb,tc, n_A=25} = 814.03$  ( $p < 0.0001$ );  $F_{rb,tc, n_A=35} = 440.99$  ( $p < 0.0001$ );  $F_{rb,tc, n_A=45} = 196.03$  ( $p < 0.0001$ );  $F_{rb,tc, n_A=50} = 486.90$  ( $p < 0.0001$ ).

non-monotonic relationship between group size and war onset no longer holds. Rather, conflict onset varies *inversely* with the size of the EGIP, peaking at 34% when a large ethnic majority ( $n_B = 0.85$ ) is excluded from power. Thus, explicit assumptions about ethnic salience at the individual level—whether salience is fixed and significant for all individuals or permitted to vary across individuals—may have noteworthy implications for levels of conflict onset under minority rule.

### Experiment 2: Group Size, Fiscal Policy, and Conflict Onset

Could fiscal policy influence the relationship between minority rule and civil war onset? Our results, reported in Table 4, point to the absence of conflict under *benevolent rule*—when the minority EGIP effectively invests in the economy, in coercive power, and engages in no theft. Under this policy, the minority regime enjoys widespread support, has sufficient resources to suppress rebellion from co-ethnics and nominal ethnic rivals, and effectively excludes the leadership of the MEG from revenue accumulation.

This prudent fiscal policy stands in marked contrast to our default policy of *robbery* characterized by ineffective economic management—the absence of investment and military spending—high levels of theft, and a paucity of resources to secure peasant support and suppress rebellion. Under these conditions, conflict onset peaks at 34% when  $n_A = 0.15$ , driven largely by the fact that the kleptocratic minority regime is unable to accrue any revenue until its population share reaches 35%, beyond which point—and despite greater revenue retention by the minority EGIP—levels of conflict onset fall to only 21% as the two groups approach parity.

And as evidenced by the even higher level of conflict onset (peaking at 56% when  $n_A = 0.25$ ), a minority regime playing the “ethno-nationalist card” is likely to be involved in more conflict than a minority EGIP that contends itself with self-enrichment (as in the case of robbery). Thus, when the primary objective of the minority EGIP is *territorial control*—characterized by a high level of spending on coercive power and a moderate level of investment in the economy—we find that beyond a population share of 15% the regime in power retains the bulwark of all revenue. We do, nonetheless, observe a moderate decline in the likelihood of conflict to 35%, as the size of the minority increases and the groups approach parity.<sup>18</sup>

### ***Experiment 3: Group Size, Resource Base, and Conflict Onset***

The results of our final experiment, reported in Table 5, suggest that conflict onset under minority rule varies both with the natural resource endowment and its distribution. In an agrarian economy, the size of the minority in power has a non-monotonic effect on conflict onset: onset equals 22% when the minority comprises 25% of the population, rises to 31% when the minority comprises 35% of the population, and falls again to 27% when the minority comprises 45% of the population. This stands in marked contrast to the secular decline in conflict onset in our baseline economy (characterized by alluvial diamonds and a point-source distribution) as the size of the minority increases.

Holding our baseline resource type constant and varying the distribution from point-source to diffuse suggests that the location of resources significantly increases the level of conflict onset for almost all values of  $n_A < 0.45$  (from 27% to 40% when  $n_A = 0.25$ ; from 27% to 35% when  $n_A = 0.35$ ), beyond which conflict levels remain largely unchanged. And lastly, we find that the resource distribution has important implications for revenue: that the minority EGIP’s ability to capture revenue from alluvial diamonds is curtailed when the resource distribution is diffuse, even when the minority is sizeable ( $n_A = 0.45$ ).

Results from these experiments demonstrate that the impact of ethnic minority rule on the incidence of civil conflict *could* be far more nuanced than posited by recent scholarship: (i) the relationship is sensitive to the specification of ethnic salience—when ethnicity is assumed to be equally salient for all individuals, conflict

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<sup>18</sup> We ran a sensitivity analysis of the results in Table 4, repeating the experiment using agriculture as the resource base (see Table A2, Appendix A: [http://plutomail.huji.ac.il/~miodownik/MioBhavCMPS\\_AppendixA](http://plutomail.huji.ac.il/~miodownik/MioBhavCMPS_AppendixA)). Our results are in line with patterns reported in the article. With respect to revenue, the EGIP retains all revenue under *benevolent rule*, its total share generally increasing with  $n_A$ . *Robbery* results in the majority of all revenue going to the MEG, decreasing with  $n_A$ . And *territorial control* results in the lion’s share of revenue going to the EGIP, again increasing with  $n_A$ . With respect to conflict, *benevolent rule* is characterized by the absence of conflict onset, with higher levels of conflict under *robbery* and still higher levels under *territorial control*. Comparing the results of Tables 4 and A2, we find that in an agricultural, relative to an alluvial diamond economy: total revenue accrued by the EGIP is lower (with the exception of one cell, robbery,  $n_A = 0.15$ ); under *robbery*, conflict is less likely when  $n_A < 0.35$ , and more likely when  $n_A \geq 0.35$  and the division of revenue is skewed in favor of the MEG as with  $n_A = 0.50$ ; and under *territorial control* we observe higher levels of conflict onset.

Table 5. Group Size, Resources, and Conflict Onset

Size of Group A	Conflict Onset (s.d.)								
	Agriculture			Alluvial Diamonds–Point Source			Alluvial Diamonds–Diffuse		
	Revenue		Conflict Onset (s.d.)	Revenue		Conflict Onset (s.d.)	Revenue		Conflict Onset (s.d.)
A'	B'		A'	B'		A'	B'		
$n_A = 0.15$	0.00	924.09	0.25 (0.00)	0.00	914.80	0.34 (0.00)	0.00	915.29	0.32 (0.04)
$n_A = 0.25$	0.00	893.43	0.22 (0.00)	0.00	921.94	0.27 (0.01)	0.00	884.34	0.40 (0.00)
$n_A = 0.35$	0.00	884.06	0.31 (0.01)	21.89	885.42	0.27 (0.01)	0.00	881.91	0.35 (0.05)
$n_A = 0.45$	0.00	888.60	0.27 (0.00)	367.24	628.07	0.22 (0.03)	0.00	876.54	0.22 (0.00)
$n_A = 0.50$	169.65	613.26	0.24 (0.01)	504.28	532.66	0.21 (0.02)	17.32	849.63	0.20 (0.01)

A', B' represent the leaders of ethnic groups A and B respectively, whereas Revenue denotes the mean value at  $t = 2000$ . Results from an ANOVA indicate that the variance in conflict onset across group sizes ( $n_A$ ) for two of the three experimental conditions (Agriculture (ag) and Alluvial Diamonds-Diffuse (ad)) is larger than the within-outcome variance, the variance obtained when both group size and salience are held constant:  $F_{ag} = 1264.48$  ( $p < 0.0001$ );  $F_{ap} = 243.04$  ( $p < 0.0001$ );  $F_{ad} = 272.55$  ( $p < 0.0001$ ). A pair-wise comparison of means across experimental conditions (with Alluvial Diamonds-Point Source given by ap), now holding group size constant, yields the following results: (1)  $F_{ag,ap,n_A=15} = n.s.$ ;  $F_{ag,ap,n_A=25} = 527.15$  ( $p < 0.0001$ );  $F_{ag,ap,n_A=35} = 152.41$  ( $p < 0.0001$ );  $F_{ag,ap,n_A=45} = 90.79$  ( $p < 0.0001$ );  $F_{ag,ap,n_A=50} = 76.40$  ( $p < 0.0001$ ); (2)  $F_{ad,ap,n_A=15} = 7.654$  ( $p < 0.01$ );  $F_{ad,ap,n_A=25} = 3265.3$  ( $p < 0.0001$ );  $F_{ad,ap,n_A=35} = 83.03$  ( $p < 0.0001$ );  $F_{ad,ap,n_A=45} = n.s.$ ;  $F_{ad,ap,n_A=50} = 13.16$  ( $p < 0.01$ ); (3)  $F_{ag,ad,n_A=15} = 86.87$  ( $p < 0.0001$ );  $F_{ag,ad,n_A=25} = n.s.$ ;  $F_{ag,ad,n_A=35} = 16.44$  ( $p < 0.0001$ );  $F_{ag,ad,n_A=45} = n.s.$ ;  $F_{ag,ad,n_A=50} = 214.58$  ( $p < 0.0001$ ).

onset *increases* with size of the minority EGIP, peaking when the rival groups are close but not yet equal in size; and when ethnic salience is permitted to vary across individuals as a function of relative income, conflict onset *decreases* as the size of the minority EGIP approaches that of the majority MEG; (ii) variation in fiscal policy—the regime’s spending and investment decisions—shapes the effect of minority rule on civil war onset, eliminating war risk entirely under *benevolent rule*, increasing it under a corrupt or kleptocratic regime that engages in *robbery*, and increasing this risk still further under an ethno-nationalist regime that seeks to expand *territorial control*; and (iii) the natural resource endowment and its distribution have implications for levels of conflict onset, directly affecting the ability of the minority EGIP to capture resource rents or revenue.

## 5. Discussion

Can ethnic minority rule effectively increase the risk of civil war onset? We respond to this question with a qualified “yes” based on our analysis, which demonstrates how the effect of minority rule on the incidence of civil war *could* be shaped by different specifications of ethnic salience, variation in fiscal policy, and changes in natural resource profiles. In short, we expect these factors to affect both the nature of minority rule and the likelihood of conflict onset, to effectively confound the relationship.

We believe that minority rule is an important and, until recently, understudied factor in the civil war literature. Measures of ethnic polarization—to take one prominently used proxy for the catch-all category of “ethnicity” in recent scholarship on civil war—pay far too little attention to the structure of power relations between ethnic groups.<sup>19</sup> Stated alternatively, we note that even measures coding minority rule at the elite or aggregate level show significant differences in the *conditions* that give rise to and later *characterize* violence in civil wars.

In an effort to elucidate *how* the relationship between minority rule and conflict may be conditioned by other, largely “unmeasured determinants of civil war risk” (FKL: 192) we conduct a set of exploratory agent-based experiments. Our experiments examine how variation in ethnic salience, government fiscal policy, and the resource profile affect the likelihood of conflict when a large share of the population is excluded from power. Some patterns observed in these experiments coincide with empirically grounded theoretical expectations, while others suggest hypotheses that require empirical confirmation, subject to data availability.

To recapitulate, our experiments yield three central findings. The first experiment demonstrate that the effect of minority rule is highly sensitive to the specification of ethnic salience, with conflict onset *increasing* with size of the minority EGIP when salience is fixed and *decreasing* when salience is permitted to vary. The former finding suggests that the risk of violence rises with the level of ethnic polarization (Montalvo and Reynal-Querol, 2005), whereas the latter suggests just the opposite: the larger the minority in power, the greater its ability to “buy out” the support of co-ethnics and members of excluded groups in an effort to secure control. A larger minority also implies a smaller excluded majority, though this depends more specifically upon the number and political relevance of ethnic groups within a state.

A second experiment addresses the relationship between fiscal policy and conflict. In particular, how revenue is spent clearly affects the well-being of the population at large, members of both the minority and majority ethnic groups. Even minority-led regimes that spend prudently, examples of what we refer to as *benevolent rule*, enjoy widespread support across the ethnic divide, whereas regimes that engage in high levels of theft tend to experience greater levels of violent opposition, facing challenges that increase proportionately with the size of the excluded majority. And when the primary objective of the minority EGIP is *territorial control*—characterized by high levels of military spending—the level of conflict rises higher still, relative to that in minority-led regimes characterized by uncontrolled self-enrichment.

Our third experiment suggests that the specification of finer-grained resource categories clearly influences the resource–conflict relationship. As such, minority-led regimes that depend on lootable natural resources are more prone to conflict than similarly structured regimes that depend primarily on agricultural revenue. In addition, the likelihood of conflict is likely to be higher if resource distributions are diffuse, bringing into sharper focus the ability of leaders to capture resource rents or revenue.

A logical next step involves subjecting these findings to empirical scrutiny. Large-N datasets face problems of over-aggregation with respect to the “ethnicity variable”,

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<sup>19</sup> See the special issue of the *Journal of Peace Research* 45(2) (2008) on polarization and conflict, edited by Esteban and Schneider, and Cederman and Girardin (2007).

although surveys like the *Afrobarometer* now specify measures of ethnic salience at the individual level (also see work by Eifert et al., 2007; Bratton et al., 2010). With respect to fiscal policy, developing less aggregated, time-variant measures of spending, investment, and taxation would shed light on the *conditions under which* minority-rule is likely to be challenged by excluded majorities on economic grounds. And finally, the increasingly widespread use of disaggregated data on the location of resources, their characteristics and control over time, together with the use of geographic information systems, moves us even closer towards nuanced micro-level theories.

We duly acknowledge that our contribution to recent research assessing the conflict probability of marginalized ethnic groups is largely theoretical and remains suggestive at best. Our exploratory analysis nonetheless calls for richer theorizing about the causes and consequences of civil war—a plea, if you will, for scholars to *continue* breaking new ground, to explore the complexity of conflict, civil war being no exception to complex causes and dynamics, and to find novel ways to study precisely those questions and issues that evade “rigorous empirical analysis” both at the macro- and micro-levels.

## References

- Alesina, Alberto F., and Eliana La Ferrara. 2005. Ethnic diversity and economic performance. *Journal of Economic Literature* 43(3): 762–800.
- Anderson, Lisa. 1987. The state in the Middle East and North Africa. *Comparative Politics* 20(1): 1–18.
- Ardant, Gabriel. 1975. Financial policy and economic infrastructure of modern states and nations. In *The Formation of National States in Western Europe*, ed. Charles Tilly, pp. 164–242. Princeton, NJ: Princeton University Press.
- Auty, Richard M. 2001. *Resource Abundance and Economic Development*. Oxford: Oxford University Press.
- Azam Jean-Paul. 2001. The redistributive state and conflicts in Africa. *Journal of Peace Research* 38(4): 429–444.
- Backer, D., R. Bhavnani, and C. Bodea. 2010. Does associational membership influence political violence in Sub-Saharan Africa? Working paper.
- Banks, Steven. 2002. Tools and techniques for developing policies for complex and uncertain systems. *Proceedings of the National Academy of Sciences of the United States of America* 99: 7263–7266.
- Bates, Robert. 1974. Ethnic competition and modernization in contemporary Africa. *Comparative Political Studies* 6(4): 457–484.
- Beblawi, Hazem, and Giacomo Luciani, eds. 1987. *The Rentier State*. London: Croom Helm.
- Bennett, Scott. 2008. Governments, civilians, and the evolution of insurgency: Modeling the early dynamics of insurgencies. *Journal of Artificial Societies and Social Simulation* 11(4): <http://jasss.soc.surrey.ac.uk/11/4/7.html>.
- Bhavnani, Ravi, Dan Miodownik, and Jonas Nart. 2008. REscape: An agent-based framework for modeling resources, ethnicity, and conflict. *Journal of Artificial Societies and Social Simulation* 11(2): <http://jasss.soc.surrey.ac.uk/11/2/7.html>.
- Bonabeau, Eric. 2002. Agent-based modeling: Methods and techniques for simulating human systems. *Proceedings of the National Academy of Sciences of the United States of America* 99: 7280–7287.
- Brass, Paul. 1997. *Theft of an Idol*. Princeton, NJ: Princeton University Press.

- Bratton, Michael, Ravi Bhavnani, and Tse Hsin Chen. 2011. Voting intentions in Africa: Ethnic, economic or partisan? *Afrobarometer Working Paper* no. 27.
- Buhaug, Halvard, and Päivi Lujala. 2005. Accounting for scale: Measuring geography in quantitative studies of civil war. *Political Geography* 24(4): 399–394.
- Buhaug, Halvard, and Jan Ketil Rød. 2006. Local determinants of African civil wars, 1970–2001. *Political Geography* 25(3): 315–335.
- Buhaug, Halvard, Scott Gates, and Päivi Lujala. 2009. Geography, rebel capability, and the duration of civil conflict. *Journal of Conflict Resolution* 53(4): 544–569.
- Canessa, Enrique, and Rick L. Riolo (2006) An agent-based model of the impact of computer-mediated communication on organizational culture and performance: An example of the application of complex systems analysis tools to the study of CIS. *Journal of Information Technology* 21(4): 272–283.
- Cederman, Lars-Erik, and Luc Girardin. 2007. Beyond fractionalization: Mapping ethnicity onto nationalist insurgencies. *American Political Science Review* 101(1): 173–185.
- Cederman, Lars-Erik, Halvard Buhaug, and Jan Ketil Rød. 2009. Ethno-nationalist dyads and civil war: A GIS-based analysis. *Journal of Conflict Resolution* 53(4): 496–525.
- Cederman Lars-Erik, Andreas Wimmer, and Brian Min. 2010. Why do ethnic groups rebel? New data and analysis. *World Politics* 61(1): 87–119.
- Cioffi-Revilla, Claudio, and Mark Rouleau. 2010. MASON RebeLand: An agent-based model of politics, environment, and insurgency. *International Studies Review* 12(1): 31–52.
- Collier, Paul, and Anke Hoefler. 2004. Greed and grievance in civil war. *Oxford Economic Papers* 56(4): 563–595.
- Collier, Paul, Anke Hoefler, and Måns Söderbom. 2004. On the duration of civil war. *Journal of Peace Research* 41(3): 253–273.
- Conte, Rosia, Rainer Hegselmann, and Pietro Terna, eds. 1997. *Simulating Social Phenomena* (Lecture Notes in Economics and Mathematical Systems). Berlin: Springer-Verlag.
- Eifert, Ben, Miguel Edward, and Daniel N. Posner. 2007. Political sources of ethnic identification. Paper presented at the conference on Micro-Foundations and Mass Politics in Africa, Michigan State University, 12–13 May.
- Epstein, Joshua. 2002. Modeling civil violence: An agent-based computational approach. *Proceedings of the National Academy of Sciences* 99(3): 7243–7250.
- Esteban, Joan, and Debraj Ray. 2008. Polarization, fractionalization and conflict. *Journal of Peace Research* 45(2): 163–182.
- Esteban, Joan, and Gerald Schneider. 2008. Polarization and conflict: Theoretical and empirical issues. Introduction to special issue. *Journal of Peace Research* 45(2): 131–141.
- Fearon, James D. 2004. Why do some civil wars last so much longer than others? *Journal of Peace Research* 41(3): 275–302.
- Fearon, James D., and David D. Laitin. 2003. Ethnicity, insurgency, and civil war. *American Political Science Review* 97(1): 75–90.
- Fearon, James D., Kimuli Kasar, and David D. Laitin. 2007. Ethnic minority rule and civil war onset. *American Political Science Review* 101(1): 187–193.
- Gates, Scott. 2002. Recruitment and allegiance: The microfoundations of rebellion. *Journal of Conflict Resolution* 46(1): 111–130.
- Gleditsch, Nils P., Peter Wallensteen, Mikael Eriksson, Margareta Sollenberg, and Håvard Strand. 2002. Armed Conflict 1946–2001: A new dataset. *Journal of Peace Research* 39(5): 615–637.
- Gurr, Robert. 1970. *Why Men Rebel*. Princeton, NJ: Princeton University Press.
- Harbom, Lotta, and Peter Wallensteen. 2007. Armed conflict, 1989–2006. *Journal of Peace Research* 44(5): 623–634.

- Hechter, Michael, and Dina Okamoto. 2001. Political consequences of minority group formation. *Annual Review of Political Science* 4: 189–215.
- Hegre, Håvard, and Nicholas Sambanis. 2006. Sensitivity analysis of the empirical literature on civil war onset. *Journal of Conflict Resolution* 50(4): 508–535.
- Hegre, Håvard, Gudren Ostby, and Clionadh Raleigh. 2009. Poverty and civil war events: A disaggregated study of Liberia. *Journal of Conflict Resolution* 53(4): 598–623.
- Kapferer, Bruce. 1988. *Legends of People/Myths of State: Violence, Intolerance, and Political Culture in Sri Lanka and Australia*. Washington, DC: Smithsonian Institution Press.
- Karl, Terry Lynn. 1997. *The Paradox of Plenty: Oil Booms and Petro-States*. Berkeley, CA: University of California Press.
- Laitin, David. 1998. *Identity in Formation: The Russian-Speaking Populations in the Near Abroad*. Ithaca, NY: Cornell University Press.
- Le Billon, Philippe. 2001. The political ecology of war: Natural resources and armed conflicts. *Political Geography* 20(5): 561–584.
- Le Billon, Philippe. 2005. *Fuelling War: Natural Resources and Armed Conflicts*. New York: Routledge.
- Lemarchand, Rene. 1996. *Burundi: Ethnic Conflict and Genocide*. Cambridge, MA: Woodrow Wilson Center Press.
- Levi, Margaret. 1988. *Of Rule and Revenue*. Berkeley, CA: University of California Press.
- Lim, May, Richard Metzler, and Yaneer Bar Yam. 2007. Global pattern formation and ethnic/cultural violence. *Science* 14(317): 1540–1544.
- Lowi, Miriam. 2004. Oil rents and political breakdown in patrimonial states: Algeria in comparative perspective. *Journal of North African Studies* 9: 83–102.
- Lubkemann, Stephen C. 2005. Migratory coping in wartime Mozambique: An anthropology of violence and displacement in 'fragmented wars'. *Journal of Peace Research* 42(4): 493–508.
- Lujala, Päivi. 2010. The spoils of nature: Armed civil conflict and rebel access to natural resources. *Journal of Peace Research* 47(1): 15–48.
- Lujala, Päivi, Nils Petter Gleditsch, and Elisabeth Gilmore. 2005. A diamond curse? Civil war and a lootable resource. *Journal of Conflict Resolution* 49(4): 538–562.
- Mahdavy, Hossein. 1970. The pattern and problems of economic development in rentier states: The case of Iran. In *Studies in the Economic History of the Middle East*, ed. M. A. Cook, pp. 428–467. Oxford: Oxford University Press.
- Montalvo, José G., and Marta Reynal-Querol. 2005. Ethnic polarization, potential conflict, and civil wars. *American Economic Review* 95(3): 796–816.
- Moore, Mick. 2004. Revenues, state formation, and the quality of governance in developing countries. *International Political Science Review* 25(3): 297–319.
- Parunak, Van Dyke, Robert Savit, and Rick Riolo. 1998. Agent-based modeling vs. equation-based modeling: A case study and users' guide. In *Proceedings of Multi-Agent Systems and Agent-Based Simulation (MABS '98)*, eds Jaime S. Sichman, Rosaria Conte, and Nigel Gilbert, pp. 10–25. Berlin: Springer.
- Posner, Daniel N. 2004. Measuring ethnic fractionalization in Africa. *American Journal of Political Science* 48(4): 849–863.
- Prunier, Gerard. 1995. *The Rwanda Crisis: History of a Genocide*. New York: Columbia University Press.
- Raleigh, Clionadh, and Håvard Hegre. 2009. Population size, concentration and civil war: A geographically disaggregated analysis. *Political Geography* 28(4): 224–238.
- Raleigh, Clionadh, Andrew Linke, and Håvard Hegre. 2010. Introducing ACLED: An Armed Conflict Location and Event Dataset. *Journal of Peace Research* 47(5): 651–660.
- Reynal-Querol, Marta. 2002. Ethnicity, political systems, and civil wars. *Journal of Conflict Resolution* 46(1): 29–54.

- Ross, Michael. 2001. Does oil hinder democracy? *World Politics* 53(3): 325–361.
- Ross, Michael. 2006. A closer look at oil, diamonds, and civil war. *Annual Review of Political Science* 9: 265–300.
- Schumpeter, Joseph. 1991. The crisis of the tax state. In *Joseph A. Schumpeter: The Economics and Sociology of Capitalism*, ed. Richard Swedberg, pp. 99–140. Princeton, NJ: Princeton University Press.
- Skocpol, Theda. 1979. *States and Social Revolutions: A Comparative Analysis of France, Russia and China*. New York: Cambridge University Press.
- Snyder, Richard. 2006. Does lootable wealth breed disorder? A political economy of extraction framework. *Comparative Political Studies* 39(8): 943–968.
- Snyder, Richard, and Ravi Bhavnani. 2005. Blood, diamonds, and taxes: Lootable wealth and political order in Sub-Saharan Africa. *Journal of Conflict Resolution* 49(4): 563–597.
- Tambiah, Stanley. 1986. *Sri Lanka: Ethnic Fratricide and the Dismantling of Democracy*. Chicago, IL: University of Chicago Press.
- Tambiah, Stanley. 1996. *Leveling Crowds: Ethnonationalist Conflicts and Collective Violence in South Asia*. Berkeley, CA: University of California Press.
- Thies, Cameron G. 2010. Of rulers, rebels, and revenue: State capacity, civil war onset, and primary commodities. *Journal of Peace Research* 47(3): 321–332.
- Tilly, Charles. 1990. *Coercion, Capital, and European States, AD 990–1992*. Cambridge: Blackwell.
- Uvin, Peter. 1999. Ethnicity and power in Burundi and Rwanda: Different paths to mass violence. *Comparative Politics* 31(3): 253–271.
- Weber, Max. 1978. *Economy and Society*, ed. Guenther Roth and Claus Wittich. Berkeley, CA: University of California Press.
- Weidmann, Nils B., and Doreen Kuse. 2009. WarViews: Visualizing and animating geographic data on civil war. *International Studies Perspectives* 10(1): 36–48.
- Weidmann, Nils, and Michael D. Ward. 2008. Spatial-temporal modeling of civil war: The example of Bosnia. Paper prepared for the GROW-Net Conference, Zurich.
- Weinstein, Jeremy M. 2005. Resources and the information problem in rebel recruitment. *Journal of Conflict Resolution* 49(4): 598–624.
- Wimmer Andreas, Lars-Erik Cederman, and Brian Min. 2009. Ethnic politics and armed conflict: A configurational analysis of a new global data set. *American Sociological Review* 74(2): 316–337.
- Yates, Douglas. 1996. *The Rentier State in Africa: Oil Rent Dependency and Neocolonialism in the Republic of Gabon*. Trenton, NJ: Africa World Press.

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