journal of peace RESEARCH

Journal of Peace Research
48(5) 571–585

DOI: 10.1177/0022343311411743
jpr.sagepub.com
SAGE

Mineral production, territory, and ethnic rebellion: The role of rebel constituencies

Jason Sorens

Department of Political Science, University at Buffalo, SUNY

Abstract

Several possible relationships between natural resources and civil conflict have been hypothesized and tested in the literature. The impact of resources on conflict should depend on the circumstances of the group that (potential) rebels see themselves as representing and depend upon for support. While 'lootable' resources such as alluvial diamonds have been shown to increase the likelihood of insurgency, among territorially concentrated ethnic groups looting by rebels recruiting from the group is counterproductive because it imposes negative externalities on the rebel constituency. However, local mineral abundance could encourage rebellion indirectly, by promoting the development of secessionist objectives, since autonomy or independence would allow the rebel constituency to enjoy a larger share of the benefits flowing from mineral revenues. On the other hand, mineral abundance could encourage the government to exercise greater surveillance and control over potentially restive minority populations. On balance, then, mineral abundance should affect ethnoregional conflict primarily by encouraging ethnic rebels to adopt limited, territorial-autonomy objectives as opposed to governmental objectives. This hypothesis is tested with a new, global dataset of substate mineral production. Local mineral resource abundance is indeed negatively associated with governmental conflict among ethnoregional groups and positively related to secessionist or territorial conflict. Moreover, it is the total value of mineral production that matters, not specific types of minerals such as oil or diamonds. The net effect of mineral abundance on the total risk of intrastate conflict onset among ethnoregions is essentially zero.

Keywords

internal conflict, natural resources, secession

Introduction

The 'resource curse' refers to a cluster of observed, cross-national relationships between natural resources on the one hand and poor economic performance, state weakness, political corruption, and civil conflict on the other. A voluminous literature has sprung up to theorize and test how various indicators of natural resources (endowments, production, exports, etc.) correlate with these undesired outcomes.[1] The first findings of a relationship between resources and conflict were comparatively recent. Collier & Hoeffler (1998, 2004) found that primary product exports correlated parabolically with the onset of civil war, Fearon & Laitin (2003) found that oil exporting countries were more likely to see civil war onset, and Fearon (2004) found that rebel contraband smuggling caused civil wars to last longer. These early accounts stressed 'greed' and 'state power' explanations of the resource–war link, explicitly downplaying the role of ethnic 'grievance'. However, there are numerous alternative explanations for the resource–conflict link (Ross, 2004a,b, 2006). Therefore, since then, scholars have

[1] Sachs & Warner (1995) uncovered the original resource curse in GDP growth, but this finding has recently been challenged (Brunnschweiler & Bulte, 2008).

Corresponding author:
jsorens@buffalo.edu

tried to refine data and empirical techniques to test different theories.

This article develops a theory to show how different causal processes operate under varying domain conditions. In brief, it argues that among territorially concentrated ethnic groups, rebel looting of minerals is usually counterproductive because it tends to impose negative externalities on the rebel constituency, but local mineral resource wealth encourages secessionist politics among such groups by increasing the collective benefits of fiscal autonomy, and secessionism in turn promotes rebellion. If governments maintain tighter control over resource-rich regions dominated by ethnic minorities, then local resource abundance would not necessarily encourage ethnic conflict in general (secession and non-secessionist). These arguments require testing on new datasets of mineral resource extraction at the level of substate, ethnically distinctive regions ('ethnoregions'), in order to avoid problems of ecological inference that plague existing research.

The article's contributions are threefold. First, it contributes theory and evidence to support the common intuition that local mineral abundance encourages the emergence of secessionist conflict; however, the effect is not very large. Unlike previous findings based on more limited and less appropriate, country-level data, it is shown that total mineral resource value matters, not just petroleum production. Second, it is shown that local mineral resource abundance does not increase the risk of ethnic conflict overall, because it may reduce the risk of looting wars and conflicts over the government. When it comes to conflict by geographically concentrated ethnic groups, the 'greed, not grievance' paradigm is wrong. Finally, the article introduces a large new dataset on substate production of hydrocarbons, metals, and diamonds that will be useful for other applications.

The next section reviews the literature on mineral resources, ethnicity, secession, and intrastate conflict. The third section develops the theory of how resource abundance affects rebel constituencies, drawing on previous research on the determinants of individual-level recruitment into and material support for insurgency. Hypotheses on the links between resources and ethnic rebellion specifically are derived. The fourth section presents the data used to test the hypotheses, including the results of the data collection effort on country and substate mineral resources. The fifth section presents and discusses the empirical results, and the sixth section concludes.

Mineral resources and ethnic rebellion: Theories and findings

The two dominant explanations of the resource–conflict nexus ignore ethnicity altogether. Collier & Hoeffler (1998, 2004) argue that mineral resources are lootable, providing rebels with a private incentive to use coercion to establish control over extractive sites, presumably under conditions of incomplete information about relative state–rebel capabilities that generate deterrence failure. Fearon & Laitin (2003) argue that mineral resource dependence encourages rent-seeking and corruption, inhibiting a state's ability to prosecute counterinsurgency effectively. These two explanations are complementary, since a clearly strong state will be able to deter most private looting: the motive might exist, but the opportunity does not. de Soysa & Neumayer (2007: 201) note that if resource rents do *not* encourage corruption and state weakness, then very high resource rents should allow government to 'constrain' rebels, resulting in a parabolic relationship between resources and likelihood of civil war. They find that energy rents monotonically increase the risk of minor armed conflict but not major civil war onset, while mineral rents have no effect, generally supporting the state capacity argument. Likewise, Humphreys (2005) finds that conflict onset responds more to past natural resource production than the potential for future production, implying that resources affect conflict by 'hollowing out' the state over time. However, he notes that the state weakness explanation does not account for the entire effect of resources on conflict. Lujala, Gleditsch & Gilmore (2005) provide some direct evidence that 'lootable' diamond deposits strongly promote ethnic war, while 'non-lootable' deposits may even prevent civil war onset. Complementarily, Snyder & Bhavnani (2005) argue that the revenue implications of mineral extraction matter, with industrial production of minerals allowing governments to tax extraction effectively and fund a large enough military to deter insurgency.[2] Welsch (2008) finds that agricultural productivity has an opposite and larger effect on conflict than mineral resources, capturing opportunity costs of conflict. Fjelde (2009) finds a negative interactive effect of political corruption and oil production on

[2] Some authors misinterpret Fearon & Laitin's logic and their own regression results. To the extent that resources increase GDP per capita, they also increase state revenue-raising capacity. But if GDP per capita is controlled, why should resources have any additional positive effect on state capacity? One argument is that mineral extraction is more easily taxed than agriculture, industry, and services.

conflict, suggesting that corruption makes co-optation easier in resource-rich states.

Collier & Hoeffler (2002) present some evidence that oil exporting can predict whether a civil war will be secessionist or non-secessionist. Le Billon (2001) argues that the need for foreign direct investment to exploit the resource makes the presence of oil resources particularly important for predicting secessionism. Ross (2004b) infers that lootable resources promote non-secessionist conflict, while non-lootable resources promote secessionist conflict. In a comparative case study of Aceh, Riau, and East Kalimantan, Aspinall (2007) argues that existence of oil resources could only generate conflict when it interacted with collective ethnic difference and a history of violence, generating a sense of grievance in the local population. Nevertheless, it is interesting that even in the case of Riau, the governor has made secession threats (*Jakarta Post*, 2000).

The problem with interpreting the 'oil effect' as primarily a secession-inducing phenomenon is the ecological fallacy. The fact that oil exporters tend to have more secessionist conflicts does not necessarily indicate that territorially concentrated ethnic minorities are more likely to develop secessionist objectives when their region produces oil. The substate location of oil production is simply not tested in most country-level studies. One exception is Østby, Nordås & Rød's (2009) study of inequality and civil war, which finds that in sub-Saharan Africa, regions with oil and secondary diamond production, combined with 'relative deprivation', are more likely to experience new civil war.

In perhaps the most comprehensive study to date of the effects of oil, gas, and diamond production on conflict, Ross (2006) addresses an important endogeneity problem in some of the previous research (low-level conflict can cause resource dependence, as a percentage of GDP, to increase prior to measured civil war onset) and examines some of the relevant temporal and spatial variation. The central statistical findings are that exogenous indicators of oil, gas, and diamond wealth are robustly related to civil war onset, but that these effects are largely limited to the post-1970s period. In addition, rents from onshore oil and gas production and from secondary diamond production are related to separatist civil war onset in particular. However, of 22 separatist civil wars in petroleum-producing countries, just 13 wars occurred in petroleum-producing *regions*, while none of the eight separatist civil wars in diamond-producing countries occurred in diamond-producing regions. Thus, we have some preliminary evidence that oil and gas production increases the risk of separatist conflict, while the statistical result on secondary diamond production appears to be spurious.

However, it remains unclear why lootable resources would not promote *all* kinds of intrastate conflict, separatist and non-separatist. After all, owners of an extractable resource enjoy rents, whatever their political objectives. To understand why resources affect non-territorial and territorial rebellions differently, we must understand how insurgents depend on their constituencies, and how resource looting affects those constituencies.

Ethnic constituencies, resources, and the conduct and objectives of rebellion

When a political faction first considers launching a revolt against the state, its prospects for total victory are generally extremely low. There is a vast asymmetry of power between most states and most actual or potential rebel groups within their borders (Buhaug, 2006). Most states have successfully created a coercive apparatus that ensures ongoing funding and a degree of citizen cooperation. Rebel movements typically have to rely on voluntary compliance or 'passive coercion' from the population, at least until they have established territorial control and become a 'quasi-state' themselves. In a case study of the Tamil Tigers, Lilja (2009) finds that the rebel movement only began to use violence against civilians during the late stages of the conflict, and with adverse consequences, as 'Colonel Karuna' defected to the government citing Tiger discrimination against Eastern Tamils and played a key role in the Tigers' ultimate defeat (BBC News, 2007). Kalyvas (2008) finds that ethnic defection (collaboration with the state) becomes more likely when a rebel movement uses violence against co-ethnics. Rebel movements depend on their constituencies particularly to provide 'passive support' in the form of non-betrayal, food, shelter, and information.

Some rebel armies, by contrast, could be characterized as nothing more than criminal gangs writ large, organized essentially for the extraction of plunder from the productive economy and lacking a constituency beyond the militants themselves. These rebellions may be particularly likely under conditions of abundant deposits of minerals not requiring significant capital investment for extraction ('lootable resources'), but there are nevertheless disadvantages to this mode of rebel organization. Weinstein (2005) analyzes the problem of rebel recruitment in environments with lootable resources. The pecuniary benefits of joining a rebel army may be high, allowing the rebels to recruit more easily, but joiners motivated by private gain will be less committed and disciplined than recruits who join a rebel army in a resource-poor environment. Social ties such as ethnicity can make promises of future rewards more credible. It is also possible that ethnicity reduces monitoring and sanctioning costs for rebel leadership (Fearon & Laitin, 1996), increases passive support in the rebel constituency, and provides 'nonpecuniary benefits' to participation in rebellion (Gates, 2002). Eck (2009) finds that minor armed intrastate conflicts are more likely to escalate to war intensity when combatants are mobilized on ethnic lines.

This article's theoretical contribution is to introduce ethnic constituencies as a strategic player in would-be rebels' decisionmaking and to derive implications for the resource–rebellion link among territorially concentrated ethnic minorities. Broadly speaking, a territorially concentrated ethnic minority is one that enjoys demographic dominance (at least plurality status) over a well-defined substate territory. Previous research has found that ethnopolitical groups that are more territorially concentrated (Gurr, 2000) or that possess a regional base (Toft, 2003) are more likely to rebel than other ethnopolitical groups. In particular, only territorially concentrated groups can hope to establish institutions of territorial autonomy or independence. By way of evidence for this claim, it is noteworthy that minority nationalist movements that have initially lacked a sufficient territorial base have sought to create one either through immigration (e.g. Israel) or through expulsion of ethnic strangers (e.g. Bosnian Serb Republic, Abkhazia). This article makes two further claims about the distinctiveness of territorially concentrated ethnic groups: (1) these ethnic groups are more adversely affected than the rest of the country by looting of mineral resources within their territory; (2) these groups can potentially establish political control over taxable mineral production within their territory, but only with autonomous institutions.

Economists typically model internal war as a negative externality imposed on the domestic economy (e.g. Welsch, 2008). When an ethnic group is territorially concentrated, armed conflict on its home ground disproportionately affects its own members. By contrast, an ethnic or ideological movement drawing on a constituency making up only a minority of the population throughout the country suffers only a small share of the destruction occasioned by war. In other words, territorial minorities usually internalize more of the costs of rebellion than do widely dispersed groups. Since ethnic rebel movements depend on at least passive support from co-ethnics (Weinstein, 2005; Lilja, 2009), and violent destruction of life and property by insurgents provokes co-ethnics to defect to counter-insurgent operations (Kalyvas, 2008), ethnic rebellions are particularly unlikely to 'loot' resources when the surrounding area is dominated by co-ethnics, and the availability of lootable resources provides a weaker motive for rebellion than would otherwise be the case.[3]

It might seem that if territorially concentrated ethnic groups internalize more of the costs of rebellion, then the net benefits of rebellion in general would be lower for territorially concentrated ethnic groups, and thus territorially concentrated ethnic groups would rebel less often than territorially dispersed ethnic groups. However, the evidence shows concentrated groups rebelling much more often than dispersed groups (Gurr, 2000; Saideman et al., 2002; Toft, 2003; Walter, 2006a; Weidmann, 2009). Why is this?

There are essentially two answers to this question. One is that the *benefits* of rebellion are also higher for ethnic groups that demographically dominate an identifiable region of the country. For these groups, there is the prospect of controlling an independent state or autonomous region. Widely dispersed groups could rebel only in the hope of taking control of the state as a whole, which is generally a more difficult objective, and the objective is more difficult the smaller the proportion of the population the dispersed ethnic group comprises (Buhaug, 2006; Buhaug, Cederman & Rød, 2008). The other argument is that concentrated groups face lower collective action costs (Gurr, 2000; Weidmann, 2009). Either argument suggests that concentrated minorities rebel more frequently than non-concentrated minorities, but the relevant point for this article is that rebels purporting to represent concentrated ethnic groups are less likely to be motivated by the presence of lootable resources, since they will tend to internalize more of the costs of attacks on the productive infrastructure of the region.[4]

Nevertheless, mineral resources might matter for concentrated ethnic groups in another way. The higher the total future value of *taxable* mineral and energy resources *within the local region*, the higher will be the net benefits of independence or far-reaching fiscal autonomy, since

[3] 'Looting' in this sense needs to be distinguished from smuggling of contraband (e.g. drugs, timber), which does not necessarily impose economic costs on the surrounding population.

[4] Of course, if the vicinity of mining operations is settled mostly by ethnic strangers, then looting will impose fewer costs on the rebel constituency. The relationships drawn here are general, not universal.

Table I. Reduced form rebellion game

		G	
		S	$\sim$S
	G	$p(v-c^F)-(1-p)c^D, p(v-c^F)-(1-p)c^D$	$-c^D, 0$
	A	$(1-\pi)r-c^F, \pi r-c^F$	$-c^D, 0$
F	**L**	$r-c^F, -c^F$	$-c^D, 0$
	P	0,0	

an autonomous government could use severance taxes to benefit the local population, while the central government is likely to redistribute such revenues throughout the country (Ross, 2004a; Aspinall, 2007). Thus, ethnic minorities concentrated in regions rich in mineral and energy resources are more likely to rebel with secessionist aims than other ethnoregional minorities.

Why do ethnoregional groups seek autonomy, rather than simply a central policy requiring expenditure of mineral revenues in their source regions? It is easier for the central government to renege on such a policy than for it to abolish a regional parliament or conquer an independent state. Thus, a commitment problem underlies secessionism.[5]

Another way for minority groups to solve this commitment problem is simply to take over the central government and rule it in their own interest. Given the vast asymmetry of power between governments and rebels, however, this objective is usually out of reach. Rebels scale their demands down to their achievable objectives (Buhaug, 2006; Jenne et al., 2007). If central governments are particularly likely to crack down on rebels in resource-rich regions (Walter, 2006b), then there is another reason why local resource abundance would correlate positively with autonomist rebellions but negatively with conflicts over power at the center.

This theory can be formalized (Table I). Assume two strategic actors, ethnic faction F and regionally concentrated ethnic constituency G. F can make one of four moves: governmental rebellion (**G**), autonomist rebellion (**A**), looting rebellion (**L**), or peace (**P**). Governmental rebellion aims to take control of the central government, autonomist rebellion aims at control of an ethnic territory, and looting rebellion aims at expropriation of resources. For each of the rebellion decisions, G has to decide whether to support (**S**) or not ($\sim$**S**). To capture the notion that small-scale autonomist and looting rebellions are more likely to succeed than struggles for central government control, assume that if G supports **A** or **L**, the rebels win, while if G supports **G**, there is a lottery over the outcome, with probability of victory p ($1 > p > 0$). If G decides not to support a rebellion, it fails. Table I gives the moves and payoffs for the two players. I now describe and justify the payoffs.

The value of victory in a looting rebellion equals, for the rebels, the present value of the future stream of optimized mineral revenues, denoted r (> 0), minus a fixed cost of conflict c^F (> 0). With defeat the rebels suffer only the cost of defeat c^D ($> c^F$). **L** always imposes the cost of fighting on G, and they obtain no benefit from rebel victory; therefore, they are better off not supporting the rebellion and watching it fail, in which case the ethnic faction prefers peace. Looting wars are never expected among territorially concentrated ethnic groups.

Instead, rebels can share the mineral revenues with their constituency, that is, move **A**. The proportion of r shared with G is denoted $\pi(1 > \pi > 0)$, where F rationally sets π infinitesimally larger than the equality $\pi = c^F/r$ subject to $\pi \leq 0.5$. The higher is r, the less the rebels have to share, and the more likely autonomist rebellion is relative to peace.

The benefits of victory in governmental rebellion depend on the value of holding office at the center, v ($> r > 0$). Taking control of the central government is the best possible outcome for F and G, but again, victory is not assured. Importantly, assume that $p = f(r), dp/dr < 0$. Whether (**G**,**S**) is an equilibrium or not depends on whether $p(v - c^F) > (1 - p)c^D$ (constituency support is the binding constraint). The logic here is that the more resources in the region, the more harshly the government will respond to rebellion and the lower its chances of success (Walter, 2006b). Per Buhaug (2006), however, governmental conflicts are more sensitive to central government power than are territorial conflicts. In other words, central government monitoring and deterrence strategies in resource-rich regions should encourage ethnic rebels to eschew grandiose goals (taking control of the center) in favor of more limited goals (taking control of an ethnic periphery).

To summarize the conclusions of the model, the likelihood of autonomist rebellion (formally, that (**A**,**S**) is a subgame perfect equilibrium), relative to peace, is increasing in r, while the likelihood of governmental rebellion is decreasing in r, and looting rebellion never occurs. The faction never rebels without the support of its constituency. If we were to complicate the model by assuming that autonomist rebellion also yields a

[5] Acemoglu & Robinson (2006) deploy a similar argument to explain why middle and lower classes demand popular majoritarian institutions at revolutionary moments rather than a new policy of downward redistribution within an authoritarian regime controlled by the upper classes.

lottery, even with constituency support, and that the probability of success also declines in *r*, but less rapidly than the probability of governmental success does, then the first conclusion would weaken. It then becomes indeterminate whether the likelihood of autonomist rebellion rises or falls in *r*.

> *Proposition 1:* The value of mineral resource production within a region demographically dominated by an ethnic group out of power at the center correlates positively with the risk of autonomist rebellion.

> *Proposition 2:* Looting within the region is never the principal incentive for rebellion among ethnoregional minorities, and to the extent that rebels are rational and unitary actors, in-region looting never occurs in ethnoregional rebellions.

> *Proposition 3:* The value of mineral resource production within a region demographically dominated by an ethnic group out of power at the center correlates negatively with the risk of governmental rebellion.

The next section introduces the dataset for analysis and operationalizes these concepts into testable variables.

Mineral resources, secessionism, and conflict onset: Data and methods

The theory developed here suggests that local mineral resource abundance promotes self-determination objectives in ethnoregions, which in turn promote rebellion, while looting incentives in ethnoregions are minimal.

How ought 'ethnoregion' to be defined? Using conflict zones is appropriate for models of the effects of local mineral abundance on conflict duration (Lujala, 2010), but it is inappropriate for modeling conflict onset, since conflict zones cannot be defined until they exist. Since the theory is about ethnic groups that lack power in their existing state but could establish political control over the territory that they inhabit, the units should be peripheral territories demographically dominated by ethnic groups out of power at the center, large enough to serve as the territory of an independent state. The ethnoregion is operationalized as an ethnopolitical group's regional base as defined in the MAR database at www.cidcm.umd.edu/mar. Regional base (variable name 'GC2') is defined as 'a spatially contiguous region larger than an urban area that is part of the country, in which 25 percent or more of the minority resides and in which the minority constitutes the predominant proportion of the population'. As Toft (2003) shows, this variable predicts self-determination revolts extremely well. Indeed, there are no cases of armed self-determination movements (defined below) among groups lacking a regional base. Groups that politically control the state (dominant minorities) and groups largely comprised of post-1945 immigrants and their descendants are never secessionist in this dataset and are therefore also excluded.

The ideal research design would estimate two equations, a regression model of ethnoregional support for substantial autonomy or independence on local mineral resource abundance and another of ethnic rebellion on ethnoregional support for autonomism and local mineral resource abundance, with the autonomism channel expected to increase rebellion risk and resource abundance expected to decrease rebellion risk when autonomism is controlled. Unfortunately, the level of popular support for autonomy cannot be directly observed in most countries.

Instead, I draw on the research designs of Buhaug (2006) and Walter (2006a), but with ethnoregions as defined above as the units of analysis. Buhaug's approach is to use multinomial logit to estimate the determinants of intrastate territorial and governmental conflict onset. The UCDP/PRIO Armed Conflict dataset (Gleditsch et al., 2002) is the source of the conflict data and defines conflicts according to 'incompatibility', and in the version used here (4-2007) the two categories of incompatibility – territory and government – are mutually exclusive. Territorial conflict mostly captures autonomist and secessionist conflicts, but it also includes irredentist conflicts.[6] However, some governmental conflicts have a territorial aspect as well (e.g. the Southern Sudanese Civil War, 1983–2005). I have left these codings intact so as to leave the coding procedure completely independent of the author's judgment. There are 101 intrastate territorial conflict onsets and 83 intrastate governmental conflict onsets in the estimation sample. Walter's approach is to examine the determinants of armed self-determination movement onset, drawing on the data developed by Khosla (2005). There are 51 armed self-determination movement onsets in the estimation sample.

[6] Since irredentist conflicts could become autonomist or secessionist, I have retained the UCDP/PRIO coding throughout, except that Northern Ireland's territorial conflicts have been recoded as governmental, because in this unique case the irredentists actively oppose decentralization to the region, as they are a local minority. Similarly, I have recoded Northern Ireland as lacking an 'armed self-determination movement'.

To create the dependent variable, I match 'intrastate' and 'internationalized intrastate' conflicts in the Uppsala/PRIO dataset to ethnopolitical groups in the Minorities at Risk (MAR, 2005) dataset, principally on the basis of Eck's (2009) determinations of ethnic mobilization. The full procedures for determining conflict onset and for matching the conflicts to ethnic groups are available in the online Data Appendix. The theory predicts that local mineral resource abundance would promote territorial conflict but not governmental conflict, which might however be stimulated by resource abundance in the country as a whole. Assigning armed self-determination movements to MAR ethnoregions was quite simple, since the original source (Khosla, 2005) is organized in precisely that manner. Theory predicts that local mineral abundance should be positively correlated with armed self-determination movement onset.

The main concern with using the MAR data is a possible selection bias problem: since MAR theoretically excludes groups without either political organizations dedicated to advancing group interests or ongoing discrimination or systematic differential treatment by their government, the frequency of rebellion may be higher among MAR's ethnopolitical groups than among ethnic groups at large. Therefore, regression models of rebellious collective action on the MAR dataset may suffer from attenuation of the coefficient estimates (bias toward zero).[7]

This possibility is easy enough to test. Sorens (2010) develops a dataset of about 650 non-MAR ethnic groups. Using the intrastate conflicts coded in the Uppsala/PRIO Armed Conflicts dataset, I matched them to ethnic groups from the Sorens (2010) dataset as well. Merging the MAR and non-MAR datasets, I then created a dummy variable for selection into the MAR dataset and, using a probit link, regressed it on the intrastate territorial and governmental conflict variables, as well as a set of basic controls provided in the Sorens dataset: dummies for world regions, ethnic identity basis, group population, country population, GDP per capita, a dummy for possession of a regional base, group percentage of country population, and dummies for the stated MAR thresholds for group and country populations. Since selection does not change over time for any group, I use the between-effects estimator, averaging values of the independent variables for each panel. The regression shows that both territorial and governmental conflict are strongly statistically significant and positive predictors of MAR selection. Therefore, it may be useful to correct for selection bias.

Almost all published research on the resources–conflict nexus employs state-level data. Testing this article's theory with purely state-level data is impossible, since we need to know whether mineral resources are concentrated in areas where ethnic minorities are demographically dominant. Recently, Thieme, Rød & Lujala (2009)[8] have produced a georeferenced dataset of global oil and natural gas deposits and their estimated production histories, while Gilmore et al. (2005) have done the same for diamond deposits. These datasets have some missing data and do not contain price information, which can however be obtained from other sources. Time-series data on other minerals are currently unavailable, but Walter (2006b) used CIA maps to count the number of listed mineral assets in different regions of each state. The main drawback of Walter's approach is that it does not give production amounts or weight different minerals by their economic value. Another limitation is that because the variable does not change over time at all, it is not suited for time-series analysis.

This article uses a new dataset on substate mineral production. Drawing on a variety of sources, including the Thieme, Rød & Lujala (2009) and Gilmore et al. (2005) data, this dataset contains annual information on mine production volumes, international prices, and the product of the two (value of mineral production) from 1950 to 2006. The codebook and full dataset are available on the author's website, www.acsu.buffalo.edu/~jsorens. The variable of interest for this study consists of annual estimates of the total value of mine production of raw metal ores, diamonds, and hydrocarbons, in constant 1998 US dollars, for each substate ethnoregion. The total value is created by summing values of mine production for the following minerals: natural gem diamonds, natural industrial diamonds, tin, silver, iron, gold, tungsten, nickel, copper, titanium in ilmenite or slag form, titanium in rutile form, molybdenum, chromium, tantalum, manganese, antimony, uranium, coal, zinc, lead, crude petroleum and natural gas liquids, and natural gas. Before inclusion in the regressions, this total mineral resources variable is divided by ethnic population to create a variable of per capita values and then logged.[9] Thus, it is a true measure of resource abundance rather than of resource *dependence* (resources

[7] Selecting on the dependent variable can be advantageous, reducing data collection costs. Then estimation techniques are necessary to correct for the intentional bias in data collection (King & Zeng, 2001: 138). Two such techniques are used in this article.

[8] See also Lujala, Rød & Thieme (2007).

[9] Before logging, 1 is added.

divided by GDP or exports) and largely avoids the latter's endogeneity (Humphreys, 2005; Ross, 2006).[10]

The ethnoregional resources variable enjoys face validity. The seven highest-scoring ethnoregions (minority groups) on per capita mineral resource production in 2003 are the Kalahari Desert (San Bushmen) of Botswana ($169,531), Sakha (Yakut) in Russia ($48,081), Eastern Saudi Arabia (Shi'is) ($20,002), Interior Lowlands of Ecuador (Lowland Indigenous Peoples) ($17,911), Sarawak (Dayaks) in Malaysia ($9,219), Northwest Argentina (Indigenous Peoples) ($8,728), and Sabah (Kadazans) in Malaysia ($7,379). These regions are all recognizable as globally important mineral-producing territories. Interestingly, none of these regions has ever developed a significant secessionist movement. However, some secessionist regions do score highly on resource value, including Cabinda, Iranian Arabistan, Katanga, Scotland, Bougainville, Xinjiang, Nuba Mountains, Aceh, and West Papua.

The regional resources variable should be negatively related to governmental conflict onset and positively related to territorial and self-determination conflict onset. A parabolic association is also tested by including the square of the logged per capita resources variable. Some of the recent research (Ross, 2006) asserts that only oil and gas production, not mineral resources more generally, affects civil war and secessionist conflict specifically. There is no strong theoretical explanation for this finding, since the present value of the future stream of *all* mineral revenues should be associated with the economic benefits of autonomy or independence. Nevertheless, I test this possibility by breaking out the value of oil and gas production.

In addition to resource production value, I try other measures intended to capture the presence of lootable minerals. Thus, I use the Gilmore et al. (2005) database of diamond deposits to create two variables measuring the proportion of diamond deposits in the ethnoregion and country as a whole that are 'secondary' and therefore easily lootable, which are then multiplied by the values of regional and countrywide diamond production divided by group population to create estimates of the per-group-member value of lootable diamond production in the region and the country as a whole. Ethnoregional rebels may be enticed by the prospect of looting outside their region. UNITA's diamond looting operations took place outside the home region of the ethnic group from which they heavily recruited: the Ovimbundu, concentrated in the resource-poor west-central part of the country.[11] If the theory is right, lootable resources in an ethnoregion should not be related to conflict.

Now that the key regressors and regressands have been described, the control variables will be listed.[12] To measure group capability and thus propensity to make territorial rather than governmental claims, the following variables are included: logged group population from MAR, a dummy for geographic noncontiguity of the ethnoregion with the rest of the country, a dummy for ethnoregions near countries where the ethnic minority is the dominant or majority group ('irredentist potential') (Cetinyan, 2002), a dummy for groups who are either the largest group in the country or the second largest group if the largest is less than 60% of the population ('relative size'), a dummy for groups constituting a plurality but not a majority in their regional base, a dummy for country-years under Soviet domination, logged country GDP per capita, a dummy for ethnoregions with more than 50% of their territory above 1,000 meters elevation, a dummy for 'anocracy' (Polity IV 2007 scores between –5 and 5), a dummy for the existence of an armed self-determination movement among ethnic kin in a neighboring country, and a three-point indicator of intrastate armed conflict intensity involving other groups (ethnic or ideological) within the same country from UCDP-PRIO.[13] To measure grievances that might stimulate secessionism the following controls are included: the Polity indicator of regime type ('democracy' minus 'autocracy'), dummies for official-level economic and political discrimination from MAR, and the MAR indicator of lost autonomy.[14] Finally, decade dummies are included, as well as temporal dependence controls (peace years and three cubic splines) suggested by Beck, Katz & Tucker (1998).

[10] Endogeneity in the opposite direction might be a concern if, when conflict outbreak can be foreseen, investment in mineral production declines. To remedy this possible problem, this article reports results using six-year moving averages of resource production (present year and previous five years). I have run models with different periods for the moving average, from one (a simple lag) to six, with virtually identical results.

[11] I have also tried using dummies for regional and country production of hydrocarbons as measured in Lujala, Rød & Thieme (2007), but these variables are never significant.

[12] All control variables except Soviet domination are lagged one year, except in the first year of a country's entry into the dataset. Data sources, descriptive statistics, and full descriptions are in the online Data Appendix.

[13] The highest value recorded for any conflict in a country-year is used.

[14] Walter (2006a) suggests that this last variable may be endogenous, but its exclusion does not affect the results.

Table II. Multinomial logit models of ethnic territorial and governmental conflict, 1950–2003

	Model 1		*Model 2*	
	Terr'l conf.	*Gov'tal conf.*	*Terr'l conf.*	*Gov'tal conf.*
Variable	*Coef. (Std. Err.)*	*Coef. (Std. Err.)*	*Coef. (Std. Err.)*	*Coef. (Std. Err.)*
Log resources per capita	0.088 (0.047)**	−0.116 (0.074)*	0.120 (0.052)**	−0.122 (0.079)*
Sec. diamonds: region			−0.38 (0.32)	0.18 (0.19)
Sec. diamonds: country			−0.04 (0.08)	−0.07 (0.10)
Logged group pop.	0.27 (0.08)***	−0.07 (0.12)	0.24 (0.08)***	−0.07 (0.12)
Noncontiguity	0.97 (0.34)***	1.07 (0.82)	0.83 (0.34)**	1.16 (0.79)
Irredentist potential	0.26 (0.29)	0.18 (0.42)	0.20 (0.28)	0.16 (0.44)
Relative size	−0.91 (0.44)**	1.12 (0.34)***	−0.86 (0.45)*	1.09 (0.34)***
Democracy	0.029 (0.018)*	0.003 (0.027)	0.027 (0.017)	0.002 (0.026)
Political discrim.	0.94 (0.29)***	1.71 (0.33)***	0.90 (0.28)***	1.70 (0.33)***
Economic discrim.	0.21 (0.33)	−0.25 (0.36)	0.24 (0.33)	−0.23 (0.36)
Lost autonomy	0.30 (0.11)***	−0.08 (0.21)	0.30 (0.12)***	−0.09 (0.21)
Soviet domination	†	1.19 (0.60)**	†	1.14 (0.60)*
Regional plurality	0.18 (0.33)	−0.27 (0.40)	0.14 (0.32)	−0.25 (0.40)
Conflict elsewhere	0.46 (0.15)***	0.37 (0.20)*	0.49 (0.15)***	0.38 (0.21)*
Self-det. movement: kin	0.89 (0.41)**	−0.43 (0.46)	0.79 (0.41)*	−0.45 (0.47)
Log GDP per capita	−0.53 (0.18)***	−0.28 (0.17)	−0.56 (0.19)***	−0.25 (0.19)
High elevation	−0.59 (0.25)**	0.29 (0.33)	−0.58 (0.24)**	0.30 (0.35)
Anocracy	0.26 (0.27)	0.51 (0.29)*	0.29 (0.27)	0.52 (0.28)*
McFadden's adjusted R^2	13.6%		13.4%	
	Model 3		Model 4	
Log resources per capita	0.097 (0.055)**	−0.068 (0.102)	0.086 (0.133)	0.051 (0.209)
(Log resources per capita)^2			0.0003 (0.016)	−0.028 (0.031)
Oil & gas (region)	−0.01 (0.06)	−0.09 (0.13)		
Logged group pop.	0.27 (0.09)***	−0.06 (0.12)	0.27 (0.09)***	−0.09 (0.12)
Noncontiguity	0.98 (0.34)***	1.18 (0.82)	0.97 (0.34)***	1.24 (0.83)
Irredentist potential	0.25 (0.29)	0.13 (0.44)	0.26 (0.29)	0.15 (0.42)
Relative size	−0.92 (0.45)**	1.12 (0.34)***	−0.91 (0.44)**	1.15 (0.34)***
Democracy	0.028 (0.019)	−0.002 (0.029)	0.029 (0.018)*	0.005 (0.027)
Political discrim.	0.94 (0.29)***	1.72 (0.33)***	0.94 (0.29)***	1.69 (0.33)***
Economic discrim.	0.21 (0.33)	−0.26 (0.36)	0.21 (0.33)	−0.26 (0.36)
Lost autonomy	0.30 (0.11)***	−0.09 (0.21)	0.30 (0.11)***	−0.09 (0.21)
Soviet domination	†	1.28 (0.63)**	†	1.22 (0.59)**
Regional plurality	0.19 (0.33)	−0.25 (0.39)	0.19 (0.33)	−0.28 (0.38)
Conflict elsewhere	0.46 (0.15)***	0.38 (0.20)*	0.46 (0.15)***	0.37 (0.20)*
Self-det. movement: kin	0.89 (0.41)**	−0.42 (0.46)	0.88 (0.41)**	−0.46 (0.45)
Log GDP per capita	−0.52 (0.19)***	−0.27 (0.18)	−0.53 (0.18)***	−0.27 (0.17)
High elevation	−0.60 (0.26)**	0.28 (0.33)	−0.59 (0.25)**	0.31 (0.34)
Anocracy	0.27 (0.27)	0.53 (0.30)*	0.26 (0.27)	0.52 (0.29)*
McFadden's adjusted R^2	13.4%		13.5%	

Tests two-tailed except on 'log resources per capita'. Decade dummies, temporal dependence parameters, and constant not reported. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$; †presence perfectly predicts absence of this type of conflict onset. N (groups): 7,211 (228).

To model intrastate conflict type (territorial and governmental), multinomial logit is initially used, since the dependent variable is nominally coded. The coefficient estimates reported for these models should be interpreted as the effects of each variable on the likelihood of onset of each type of conflict relative to no conflict onset. In all models, group-years in which conflict is ongoing are dropped, because the coding of the dependent variable does not permit the onset of another conflict for an ethnic group while one is already occurring. Next, maximum likelihood is used to estimate selection-corrected models with a probit link, the standard solution in the

Table III. Probit selection models of intrastate conflict

	Terr'l conflict	*Terr'l conflict*	*Terr'l conflict*	*Gov'tal conf.*	*Gov'tal conf.*	*Gov'tal conf.*
Variable	*Coef. (Std. Err.)*	*Coef. (Std. Err.)*	*Coef. (Std. Err.)*	*Coef. (Std. Err.)*	*Coef. (Std. Err.)*	*Coef. (Std. Err.)*
Log resources per capita	0.037 (0.018)**	0.049 (0.020)**	0.038 (0.022)**	−0.043 (0.026)**	−0.044 (0.027)*	−0.010 (0.034)
Sec. diamonds: region		−0.15 (0.13)			0.08 (0.07)	
Sec. diamonds: country		−0.023 (0.034)			−0.029 (0.034)	
Oil & gas (region)			−0.001 (0.03)			−0.030 (0.043)
Logged group pop.	0.12 (0.03)***	0.11 (0.03)***	0.12 (0.03)***	−0.04 (0.05)	−0.04 (0.05)	−0.05 (0.05)
Noncontiguity	0.30 (0.16)*	0.26 (0.16)	0.31 (0.16)*	0.53 (0.29)*	0.55 (0.28)*	0.14 (0.37)
Irredentist potential	0.16 (0.12)	0.13 (0.11)	0.15 (0.12)	0.09 (0.16)	0.09 (0.17)	−0.01 (0.18)
Relative size	−0.30 (0.16)*	−0.28 (0.17)*	−0.30 (0.17)*	0.44 (0.13)***	0.43 (0.13)***	0.42 (0.13)***
Democracy	0.004 (0.007)	0.003 (0.007)	0.004 (0.008)	0.002 (0.010)	−0.002 (0.010)	−0.004 (0.011)
Political discrim.	0.35 (0.12)***	0.34 (0.12)***	0.35 (0.12)***	0.69 (0.13)***	0.69 (0.13)***	0.67 (0.13)***
Economic discrim.	0.11 (0.14)	0.13 (0.14)	0.11 (0.14)	−0.11 (0.15)	−0.10 (0.15)	−0.12 (0.16)
Lost autonomy	0.16 (0.05)***	0.16 (0.05)***	0.16 (0.05)***	−0.03 (0.07)	−0.03 (0.07)	−0.03 (0.07)
Soviet domination	†	†	†	0.49 (0.26)*	0.47 (0.26)*	0.55 (0.26)**
Regional plurality	0.05 (0.13)	0.03 (0.13)	0.05 (0.13)	−0.11 (0.15)	−0.09 (0.15)	−0.22 (0.15)
Conflict elsewhere	0.18 (0.06)***	0.19 (0.06)***	0.18 (0.06)***	0.15 (0.08)*	0.16 (0.08)**	0.15 (0.08)**
Self-det. movement: kin	0.35 (0.19)*	0.30 (0.20)	0.35 (0.20)*	−0.02 (0.19)	−0.03 (0.20)	−0.05 (0.19)
Log GDP per capita	−0.12 (0.07)*	−0.13 (0.08)*	−0.12 (0.08)*	−0.16 (0.07)**	−0.16 (0.07)**	−0.20 (0.07)***
High elevation	−0.25 (0.10)**	−0.25 (0.10)**	−0.25 (0.10)**	0.14 (0.13)	0.14 (0.13)	0.12 (0.13)
Anocracy	0.13 (0.11)	0.15 (0.11)	0.13 (0.11)	0.20 (0.11)*	0.20 (0.11)*	0.26 (0.12)**
N (uncensored)	17561 (7139)	17561 (7139)	17561 (7139)	17633 (7211)	17633 (7211)	17633 (7211)
ρ	0.42 (0.25)*	0.42 (0.24)*	0.42 (0.25)*	−0.16 (0.13)	−0.16 (0.13)	−0.16 (0.13)

Tests two-tailed except on 'log resources per capita'. Decade dummies, temporal dependence parameters,and constant not reported. *p < 0.1, **p < 0.05, ***p < 0.01; †presence perfectly predicts absence of this type of conflict onset.

Table IV. Rare-events logit models of armed self-determination movement onset

	Model 1	*Model 2*	*Model 3*	*Model 4*
Variable	*Coef. (Std. Err.)*	*Coef. (Std. Err.)*	*Coef. (Std. Err.)*	*Coef. (Std. Err.)*
Log resources per capita	0.049 (0.058)	0.097 (0.061)*	0.074 (0.079)	0.060 (0.163)
(Log resources per capita)^2				−0.0009 (0.021)
Sec. diamonds: region		†		
Sec. diamonds: country		−0.03 (0.09)		
Oil & gas (region)			−0.03 (0.09)	
Logged group pop.	0.09 (0.13)	0.07 (0.12)	0.10 (0.12)	0.09 (0.14)
Noncontiguity	1.35 (0.55)**	1.21 (0.53)**	1.36 (0.54)**	1.35 (0.55)**
Irredentist potential	0.64 (0.40)	0.58 (0.39)	0.62 (0.41)	0.64 (0.40)
Relative size	−0.63 (0.52)	−0.51 (0.51)	−0.63 (0.52)	−0.63 (0.52)
Political discrim.	0.66 (0.32)**	0.62 (0.32)*	0.66 (0.32)**	0.65 (0.32)**
Lost autonomy	0.30 (0.12)**	0.31 (0.12)***	0.30 (0.12)**	0.30 (0.12)**
Regional plurality	−0.47 (0.49)	−0.53 (0.48)	−0.45 (0.49)	−0.46 (0.49)
Conflict elsewhere	0.67 (0.17)***	0.70 (0.17)***	0.67 (0.17)***	0.67 (0.17)***
Self-det. movement: kin	0.69 (0.55)	0.56 (0.56)	0.72 (0.54)	0.69 (0.55)
Log GDP per capita	−0.45 (0.17)***	−0.50 (0.18)***	−0.44 (0.17)***	−0.44 (0.17)***
N	6701	6371	6701	6701

*p < 0.1, **p < 0.05, ***p < 0.01; †presence perfectly predicts lack of armed self-determination movement onset.

literature. The second-stage results, reporting the coefficient estimates of interest, are shown here, along with tests of $\rho = 0$, where ρ is the correlation between the vector of selection and the vector of the dependent variable of interest (conflict onset). (I have also modeled intrastate conflict onset with rare-events logit, with no differences in the results of hypothesis testing.) Finally, armed self-determination movement onset, which is much rarer in the dataset, is modeled with rare-events logit, which also corrects for selection bias (King & Zeng, 2001).[15] Robust standard errors are clustered on ethnoregions.

Results and discussion

Table II presents the multinomial logit equations of intrastate armed conflict onset without selection correction. The first model includes only a logged per capita resource production variable. The second model adds variables for regional and country production of alluvial or secondary diamonds. The third adds variables for regional oil and gas production. The fourth drops the individual mineral variables and adds the square of logged per capita resource production variable to test for a parabolic relationship between local resource abundance and territorial conflict.

In the first model, the coefficients on logged resources are in the expected direction (positive in the territorial conflict equation, negative in the governmental conflict equation) and statistically significant, but only at an unusually relaxed threshold for governmental conflict. In the second model, the results on general resource production hold steady, while alluvial diamond production is not associated with conflict. A joint test of the two diamonds variables accepts the null. However, there are only two cases of territorial conflict onset in a secondary diamond-producing region in the entire dataset, and they are interdependent: the Katanga and South Kasai secessions in 1960. In the third model, oil and gas production actually enters the equations negatively, although not close to statistical significance.[16] Finally, in the fourth model adding the square of logged resource production does not much improve the fit of the model and causes the standard errors on the logged resource production variable to increase markedly. In general, the results

[15] The correction for selection bias requires that the proportion of '1' codes on the dependent variable in the population of interest be specified to at least a range of values. The range selected here is 0.002–0.0035, where 0.002 equals the proportion of *measured* self-determination onsets in the entire population, and 0.0035 is half the proportion in the sample. The assumption here is that a few Type II errors have been made in the source. For instance, the Katanga and South Moluccas revolts are not counted.

[16-] A variable for oil production alone was also employed, with no difference in results, except that this variable was statistically significant and negative in the territorial conflict equation.

on territorial conflict are stronger, in the sense of narrower confidence intervals, than those on governmental conflict.

Table III presents equivalent models in the Heckman probit equation, omitting the parabolic model for reasons of space (results are similar to above). Selection bias seems to be a factor in the territorial conflict equations, and the results are substantively similar. However, a joint test of the statistical significance of the coefficients on regional and national alluvial diamonds production in the territorial conflict onset model now narrowly rejects the null at the 90% confidence level.

In every model with the partial exception of the last model of Table II, general mineral production is associated positively with territorial conflict onset and negatively with governmental conflict onset. On the control variables, group population, geographic noncontiguity, armed secessionist kin, and lost autonomy are consistently associated with territorial but not governmental conflict, while relative size and anocracy increase the risk of governmental but not territorial conflict (relative size actually reduces the risk of territorial conflict, consistent with Buhaug, Cederman & Rød [2008]). Political discrimination and conflict elsewhere in the country provoke both types of conflict, while GDP per capita reduces both types of conflict, but especially territorial. Mountainous terrain oddly *reduces* ethnoterritorial conflict, while countries that were under Soviet domination had almost no territorial conflict but more governmental conflict than otherwise expected.

To get a sense of the substantive impacts involved, I used the Tomz, Wittenberg & King (1999) program CLARIFY 2.1 to generate expected probabilities of territorial and governmental conflict at different values of mineral resource production. Based on the Model 1 equation from Table II, when all other independent variables are held at their medians (except that anocracy is set to 1, corresponding to the median value of democracy) and resource production is set to zero, the probability of territorial conflict onset in a given year is 0.0016% and of governmental conflict onset in a given year is 0.0036%. When total resource production is increased to its 90th percentile value, corresponding to the Bakongo of Angola in 1987, the risk of territorial conflict onset rises 0.0013 percentage points, almost doubling, and that of governmental conflict onset falls 0.0018 percentage points – 50%. Both effects are statistically significant. The coefficients in all the models suggest that for ethnoregional groups, mineral resource production within the home region does not affect the likelihood of conflict in general. It simply affects the type of conflict that is likely to happen.

Table IV presents results for rare-events logit models of armed self-determination movement onset. The four model specifications track those from Table II: baseline model, with secondary diamond production added (national only, since regional secondary diamond production is perfectly associated with an absence of recorded self-determinationist conflict), with regional oil and gas production added, and with the square of logged resource production added. Some control variables from previous models are discarded, since degrees of freedom become a serious concern with self-determination conflict onsets so rare.

These results are somewhat consistent with those on intrastate territorial conflict onset. Resources have a positive effect on this kind of conflict but only reach a very relaxed standard of statistical significance in one specification. Geographic distance, political discrimination, lost autonomy, and conflict elsewhere in the country encourage the launch of armed self-determination movements, while GDP per capita reduces this risk. There is a suggestion of a parabolic relationship between local resource abundance and conflict onset, but large standard errors rule out any definitive conclusions. Based on Model 2, the probability of self-determination onset when all other independent variables are set to their medians and resources to zero is 0.0015%. Increasing resource production to its 90th percentile value increases the risk of onset by 0.0017 percentage points.

To sum up, the positive relationship between resource abundance in an ethnic group's homeland and that group's participation in territorial conflict/armed self-determination movements is consistent across specifications and is quite strong when territorial conflict onset is the dependent variable. By contrast, the negative relationship between homeland resource abundance and *governmental* conflict onset is equally consistent, but weaker, generally meeting only highly relaxed thresholds for statistical significance.

What do these results tell us about the theoretical model? The model assumed that the support of ethnic constituencies is essential to the success of ethnic rebels, and that when the constituency is territorially concentrated, looting is counterproductive. Therefore, no looting conflicts should happen among territorially concentrated ethnic groups. An examination of conflicts occurring in secondary diamond-producing regions reveals that in none of the cases did an ethnic army loot diamonds in its home region, although looting was sometimes related to conflict onset. For instance, the Kamajor militia drawn from Mende hunters that participated in the Sierra Leone civil war during the years 1992–1998 was organized 'as a means of self-defense for eastern and southern communities' against the depredations of the Revolutionary United Front (RUF), which had seized diamond mines in their territory (Brown, 2005; Uppsala Conflict Data Program, n.d.).

It was also assumed that central governments would use more surveillance and repression in resource-rich regions, which would make it more difficult for a rebel army to become strong enough to challenge for influence at the center. Thus, resource abundance would be negatively associated with conflicts in which rebels made claims on the central government. The data generally support this hypothesis. Furthermore, the assumption that governmental conflicts are particularly sensitive to relative government–rebel capabilities receives strong support, since size of the ethnic constituency relative to the leading ethnic group is positively related to governmental conflict but negatively to territorial conflict, and since anocracies, generally thought to be less stable, see more governmental conflict but no more territorial conflict.

Finally, it was assumed that rebels could win the support of their constituency by promising to share the future revenues from mineral resource production with civilians, by means of an autonomous or independent civilian government. Thus, resource-rich ethnic homelands should be more likely to see territorial/self-determination conflicts. The evidence supports this hypothesis, and the estimated effects are sizeable, though fairly uncertain. The particular type of mineral does not appear to matter, which is exactly what theory would predict.

The substantive effects reported from these models suggest that local resource abundance does not increase the risk of conflict overall. This discovery clashes with the conventional wisdom on mineral abundance and conflict. Why do these results differ? The central reason is the domain condition applied in this article: only specifically ethnic conflicts in ethnically distinctive substate regions are considered. Resources could nevertheless encourage non-ethnic, ideological insurgencies or general banditry. Previous studies have struggled with problems of ecological inference, since they have been unable to measure the location of resource production relative to that of minorities that might launch nationalist rebellions. While recent studies of conflict duration have begun to examine the effect of resources within the conflict zone (Lujala, 2009, 2010), this study is the first to use subnational resource data to predict conflict onset.

Conclusion

This article makes three principal contributions. First, it advances our knowledge about the circumstances under which resource abundance does and does not encourage civil conflict. It has often been assumed that resource abundance in ethnically distinctive regions promotes secessionism, which often proceeds through militant means. This effect can be discerned in the data, but its magnitude is rather uncertain. The finding here complements research suggesting that natural resource production in secessionist conflicts can increase the severity of those conflicts (Lujala, 2009). Second, it finds a limited kind of 'resource blessing': resource abundance may discourage ethnic rebellions with non-territorial aims in ethnically distinctive regions, and ethnic rebels almost never engage in looting in their own region. The latter finding is commonsensical but provides an important qualification to the 'greed not grievance' paradigm as a general explanation of domestic conflict. The former finding, that resources discourage conflicts over government influence, is more interesting. The reason for this relationship may be that only rebels with high capability aim so high, and resource abundance decreases rebel capability by attracting the ministrations of the state's police power. Finally, the article introduces a new global dataset on mineral production by year at the substate level, including both volumes and international prices. Possible future uses include analysis of the relationship between resources and ethnoterritorial decentralization, of the likelihood that minorities in resource-rich regions will suffer more discrimination, and of the effects of resources on conflicts among non-state actors.

An important lesson of this study for conflict researchers is that examining conflict dynamics at the substate, regional level is critical to a complete understanding of the sources of conflict. Despite our best efforts, country-level research on the 'resource curse' cannot differentiate between all the possible causal mechanisms by which natural resources might generate conflict.

Future research could advance on these findings by considering conditioning variables. For instance, if resource abundance provides incentives for establishing economic autonomy in a peripheral region, then perhaps if such autonomy already exists, conflict is less likely to break out. On the other hand, if a previously mineral-scarce autonomous region sees the discovery of large new deposits, then the central government may try to revoke or limit autonomy, provoking local opposition. Another possibility is that past mineral production in a country undermines central government effectiveness somehow, as other scholars have argued. A complete model of mineral production's effects on intrastate conflicts would then have to incorporate both country-level and regional indicators of mineral production.

Replication data

The dataset, codebook, do-files, and data appendix for the empirical analysis, which was conducted in Stata 9.2, can be found at http://www.prio.no/jpr/datasets and at http://www.acsu.buffalo.edu/~jsorens/.

Acknowledgements

The author thanks Wesley Boling, Fait Muedini, Anna Diakun, Haydee Izaguirre, and Kunchok Youdon for valuable research assistance and anonymous reviewers for helpful comments. Standard disclaimers apply.

References

Acemoglu, Daron & James A Robinson (2006) *Economic Origins of Dictatorship and Democracy*. Cambridge: Cambridge University Press.

Aspinall, Edward (2007) The construction of grievance: Natural resources and identity in a separatist conflict. *Journal of Conflict Resolution* 51(6): 950–972.

BBC News (2007) Breakaway rebel will not disarm. 20 July (http://news.bbc.co.uk/2/hi/south_asia/6909193.stm).

Beck, Nathaniel; Jonathan N Katz & Richard Tucker (1998) Taking time seriously: Time-series–cross-section analysis with a binary dependent variable. *American Journal of Political Science* 42(4): 1260–1288.

Brown, Pervenia P (2005) Blood diamonds. Worldpress.org, 13 December (www.worldpress.org/africa/2193.cfm).

Brunnschweiler, Christa N & Erwin Bulte (2008) The resource curse revisited and revised: A tale of paradoxes and red herrings. *Journal of Environmental Economics and Management* 55(3): 248–264.

Buhaug, Halvard (2006) Relative capability and rebel objective in civil war. *Journal of Peace Research* 43(6): 691–708.

Buhaug, Halvard; Lars-Erik Cederman & Jan Ketil Rød (2008) Disaggregating ethnic conflict: A dyadic model of exclusion theory. *International Organization* 62(3): 531–551.

Cetinyan, Rupen (2002) Ethnic bargaining in the shadow of third-party intervention. *International Organization* 56(3): 645–677.

Collier, Paul & Anke Hoeffler (1998) On economic causes of civil war. *Oxford Economic Papers* 50(4): 563–573.

Collier, Paul & Anke Hoeffler (2002) The political economy of secession. Unpublished manuscript, 23 December.

Collier, Paul & Anke Hoeffler (2004) Greed and grievance in civil war. *Oxford Economic Papers* 56(4): 563–595.

de Soysa, Indra & Eric Neumayer (2007) Resource wealth and the risk of civil war onset: Results from a new dataset on natural resource rents, 1970–1999. *Conflict Management and Peace Science* 24(3): 201–218.

Eck, Kristine (2009) From armed conflict to war: Ethnic mobilization and conflict intensification. *International Studies Quarterly* 53(2): 369–388.

Fearon, James D (2004) Why do some civil wars last so much longer than others? *Journal of Peace Research* 41(3): 275–301.

Fearon, James D & David D Laitin (1996) Explaining interethnic cooperation. *American Political Science Review* 90(4): 715–735.

Fearon, James D & David D Laitin (2003) Ethnicity, insurgency, and civil war. *American Political Science Review* 97(1): 75–90.

Fjelde, Hanne (2009) Buying peace? Oil wealth, corruption, and civil war, 1985–99. *Journal of Peace Research* 46(2): 199–218.

Gates, Scott (2002) Recruitment and allegiance: The microfoundations of rebellion. *Journal of Conflict Resolution* 46(1): 111–130.

Gilmore, Elisabeth; Nils Petter Gleditsch, Päivi Lujala & Jan Ketil Rød (2005) Conflict diamonds: A new dataset. *Conflict Management and Peace Science* 22(3): 257–292.

Gleditsch, Nils Petter; Peter Wallensteen, Mikael Eriksson, Margareta Sollenberg & Håvard Strand (2002) Armed conflict 1946–2001: A new dataset. *Journal of Peace Research* 39(5): 615–637.

Gurr, Ted R (2000) *Peoples Versus States*. Washington, DC: United States Institute of Peace.

Humphreys, Macartan (2005) Natural resources, conflict, and conflict resolution: Uncovering the mechanisms. *Journal of Conflict Resolution* 49(4): 508–537.

Jakarta Post (2000) People's Congress votes for Riau independence. 2 February (http://www.thejakartapost.com/news/2000/02/02/people039s-congress-votes-riau-independence.html).

Jenne, Erin K; Stephen M Saideman & Will Lowe (2007) Separatism as a bargaining posture: The role of leverage in minority radicalization. *Journal of Peace Research* 44(5): 539–558.

Kalyvas, Stathis N (2008) Ethnic defection in civil war. *Comparative Political Studies* 41(8): 1043–1068.

Khosla, Deepa (2005) Self-determination movements and their outcomes. In: Monty G Marshall & Ted

Robert Gurr (eds) *Peace and Conflict 2005.* College Park, MD: Center for International Development and Conflict Management, University of Maryland, 21–27.
King, Gary & Langche Zeng (2001) Logistic regression in rare events data. *Political Analysis* 9(2): 137–163.
Le Billon, Philippe (2001) The political ecology of war: Natural resources and armed conflicts. *Political Geography* 20(5): 561–584.
Lilja, Jannie (2009) Trapping constituents or winning hearts and minds? Rebel strategies to attain constituent support in Sri Lanka. *Terrorism and Political Violence* 21(2): 306–326.
Lujala, Päivi (2009) Deadly combat over natural resources: Gems, petroleum, drugs, and the severity of armed civil conflict. *Journal of Conflict Resolution* 53(1): 50–71.
Lujala, Päivi (2010) The spoils of nature: Armed civil conflict and rebel access to natural resources. *Journal of Peace Research* 47(1): 15–28.
Lujala, Päivi; Nils Petter Gleditsch & Elisabeth Gilmore (2005) A diamond curse? Civil war and a lootable resource. *Journal of Conflict Resolution* 49(4): 538–562.
Lujala, Päivi; Jan Ketil Rød & Nadja Thieme (2007) Fighting over oil: Introducing a new dataset. *Conflict Management and Peace Science* 24(3): 239–256.
Minorities at Risk Project (2005) *Minorities at risk dataset*. College Park, MD: Center for International Development and Conflict Management (www.cidcm.umd.edu/mar/).
Østby, Gudrun; Ragnhild Nordås & Jan Ketil Rød (2009) Regional inequalities and civil conflict in sub-Saharan Africa. *International Studies Quarterly* 53(2): 301–324.
Ross, Michael L (2004a) How does natural resource wealth influence civil war? Evidence from 13 cases. *International Organization* 58(1): 35–67.
Ross, Michael L (2004b) What do we know about natural resources and civil war? *Journal of Peace Research* 41(3): 337–356.
Ross, Michael L (2006) A closer look at oil, diamonds, and civil war. *Annual Review of Political Science* 9: 265–300.
Sachs, Jeffrey & Andrew M Warner (1995) Natural resource abundance and economic growth. NBER working paper no. 5398.
Saideman, Stephen M; David J Lanoue, Michael Campenni & Samuel Stanton (2002) Democratization, political institutions, and ethnic conflict: A pooled time-series analysis, 1985–1998. *Comparative Political Studies* 35(1): 103–129.
Snyder, Richard & Rhavi Bhavnani (2005) Diamonds, blood, and taxes: A revenue centered framework for explaining political order. *Journal of Conflict Resolution* 49(4): 563–597.
Sorens, Jason (2010) The politics and economics of official ethnic discrimination: A global statistical analysis, 1950–2003. *International Studies Quarterly* 54(3): 535–560.
Thieme, Nadja; Jan Ketil Rød & Päivi Lujala (2009) The petroleum dataset codebook, version 1.1 (www.prio.no/CSCW/Datasets/Geographical-and-Resource/Petroleum-Dataset).
Toft, Monica Duffy (2003) *The Geography of Ethnic Violence: Identity, Interests, and the Indivisibility of Territory*. Princeton, NJ: Princeton University Press.
Tomz, Michael; Jason Wittenberg & Gary King (1999) CLARIFY: Software for interpreting and presenting statistical results (http://www.stanford.edu/~tomz/software/software.shtml).
Uppsala Conflict Data Program (n.d.) UCDP database (www.ucdp.uu.se/database).
Walter, Barbara F (2006a) Information, uncertainty, and the decision to secede. *International Organization* 60(1): 105–135.
Walter, Barbara F (2006b) Building reputation: Why governments fight some separatists but not others. *American Journal of Political Science* 50(2): 313–330.
Weidmann, Nils B (2009) Geography as motivation and opportunity: Group concentration and ethnic conflict. *Journal of Conflict Resolution* 53(4): 526–543.
Weinstein, Jeremy M (2005) Resources and the information problem in rebel recruitment. *Journal of Conflict Resolution* 49(4): 598–624.
Welsch, Heinz (2008) Resource abundance and internal armed conflict: Types of natural resources and the incidence of 'new wars'. *Ecological Economics* 67(3): 503–513.

JASON SORENS, b. 1976, PhD in Political Science (Yale University, 2003); Assistant Professor, University at Buffalo, The State University of New York (2005–); interests: secessionism, federalism and decentralization, ethnic discrimination. Forthcoming book: *Secessionism* (McGill-Queen's).