Special Data Feature

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Funding rebellion: The Rebel Contraband Dataset

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Abstract

We introduce a new dataset measuring if and how rebel groups earn income from the exploitation of natural resources or criminal activities. The Rebel Contraband Dataset makes three contributions to data in this area. First, it covers a wide range of natural resources and types of crime. Second, it measures rebel engagement in these activities over time. Third, it distinguishes among different strategies that rebel groups employ, such as extortion and smuggling. Theory suggests that reliance on natural resource wealth should lead rebels to mistreat civilians, but cross-group research using existing data does not find support for this relationship. We replicate an earlier study using data from the Rebel Contraband Dataset and conclude that there is a consistent relationship between natural resource exploitation and civilian victimization. Future research can use the dataset to explore questions about the onset, location, severity, and outcomes of civil conflicts.

Keywords

civil war, crime, natural resources, resource curse

Introduction

Extensive literature establishes a relationship between natural resources and conflict, including its onset (Collier & Hoeffler, 2002; Fearon & Laitin, 2003; Ross, 2012), duration (Collier, Hoeffler & Söderbom, 2004; Fearon, 2004; Lujala, 2010), intensity (Addison, Le Billon & Murshed, 2002; Lujala, 2008), and recurrence (Doyle & Sambanis, 2000; Rustad & Binningsbø, 2012). Scholars have highlighted how resource characteristics (such as 'lootability') and motivating factors (such as ethnic exclusion) increase the likelihood of violence (LeBillon, 2001; Lujala, Gleditsch & Gilmore, 2005; Ross, 2006; Snyder, 2006; Asal et al., 2016). A related body of research shows that the resource endowments of rebel groups influence their strategies and behavior (Weinstein, 2005), with groups that rely on natural resources or foreign support being more likely to abuse civilian populations (Weinstein, 2007; Cohen, 2013; Wood & Kathman, 2015).

Despite the wealth of research on resources and conflict, knowledge in this field has been limited by data availability. Many studies rely on state-level data about the presence and/or volume of natural resources within a country and assume that armed groups operating there have access to these resources to fund their rebellions. A few more focused datasets make important contributions by providing information about the exploitation of resources in specific conflicts (Fearon, 2004; Rustad & Binningsbø, 2012) or the location of high-value resources vis-à-vis conflict sites (Lujala, 2010), but they are limited in scope and/or temporal variability. To this point, it has not been possible to analyze the relationship between resources and conflict dynamics with global time-series data at the level of the rebel group.

We build on the work of scholars such as Rustad & Binningsbø (2012), Lujala (2010), and Fearon (2004), and introduce the Rebel Contraband Dataset (RCD), which measures rebel groups' exploitation of natural resources and their involvement in organized criminal

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activities annually from 1990 to 2012. A key advantage of the RCD is that data are collected at the level of the rebel group. Country-level datasets are sometimes used to infer that a rebel group in a resource-rich country has access to those resources, even though it might not operate in the same region or might otherwise be prevented from exploiting the resources. The M23 rebel movement operated in resource-rich eastern Democratic Republic of Congo, for example, but never controlled mining areas, relying instead on external support and criminal activities for funding (Seay, 2014). Recent datasets move to the subnational level by using geographic information to overlay conflict zones with natural resource locations (Lujala, 2010), but are not designed to directly measure if rebel groups in these areas actually profit from the resources. Furthermore, there is almost no systematic data on if and how rebels profit from criminal activities that do not include natural resources.

Another advantage of the RCD is its temporal disaggregation. Existing datasets show whether resources were exploited in a conflict, but do not vary over the duration of the conflict. Fearon's (2004) contraband measure, for example, indicates whether contraband such as diamonds and opium were used at any time during a given civil war between 1945 and 2000. Similarly, data from Rustad & Binningsbø (2012) show whether one of three natural resource-conflict mechanisms was at stake over the duration of a given conflict episode from 1946 to 2006. In comparison, our data are broken down by year and cover a larger portion of the post-Cold War period (1990–2012). A rebel group's funding strategies may change over time, and a group that exploits natural resources in one year may rely more heavily on other funding streams such as crime in the next year. Our data capture which funding strategies were used in each year that a rebel group was operating.

Unlike existing datasets that combine all high-value natural resources into a single measure (Fearon, 2004; Rustad & Binningsbø, 2012) or focus on a single resource such as diamonds or oil (Gilmore et al., 2005; Lujala, Rød & Thieme, 2007), the RCD also disaggregates by resource and criminal activity. It has separate variables for 26 specific natural resources – everything from gold and opium to zinc and cocoa – and residual categories for lesser known minerals, gems, and agricultural products. These disaggregated data should allow the more robust testing of arguments that link the physical characteristics of resources, or the manner in which they are extracted, to conflict outcomes (Ross, 2003). For example, Le Billon theorizes that 'the motivation and funding of conflict is facilitated because primary commodities are often highly amenable to taxing and looting. This lootability arises in part from the fact that resources, and in particular extracted ones, are often easily accessible to government and rebels alike with minimal bureaucratic infrastructure' (Le Billon, 2001: 569). The RCD will allow researchers to develop operational definitions of and create variables measuring the degree to which resources are lootable, and use this transformed data to answer specific research questions. In a similar vein, Auty (2001) distinguishes between point and diffuse resources; researchers could use the dataset to operationalize these concepts.

The RCD also introduces a new typology that measures *how* resources were exploited by rebel groups, including through extortion, smuggling, or theft. The intuition is that the manner in which rebels profit from resources may influence their interactions with the government or with non-combatants, which in turn could also influence conflict dynamics. And a final advantage of the RCD is that it moves beyond natural resources to another major source of illicit funding: crime. Once again, at the rebel group level for each year of its operation, our data indicate the group's involvement in criminal activities that generate funds to support its operations. These include kidnapping for ransom, piracy, human trafficking, stealing humanitarian aid, and non-natural resource-related extortion and smuggling. All told, the dataset suggests that rebel groups are very creative when it comes to financing their operations, and that they raise funds through a variety of strategies and mechanisms.

Dataset details

The unit of analysis in the RCD is the rebel group-government dyad in a given year. This project utilizes the Uppsala Conflict Data Program (UCDP) Dyadic Dataset version 1-2013 (Harbom, Melander & Wallensteen, 2008; Allansson, Melander & Themnér, 2017) to obtain the dyad-year, making the RCD easy to combine with other datasets. The UCDP Dyadic Dataset includes information on actors involved in armed conflict that resulted in at least 25 battle-related deaths in a given year, where at least one of the actors is a government (Themnér, 2013). The RCD includes each of these dyads from the years 1990 to 2012, as well as dyad-years in which the 25 battle-related death threshold was not met but that fall between such years.

There are two main groups of variables: natural resource variables and crime variables. The natural resource variables, in turn, include two aspects: the

strategy by which the armed group earns income, and the natural resource from which it earns income. A total of 26 resources are coded, including timber, drugs such as coca and opium, and minerals such as gold and coltan. There are four strategies by which groups can exploit these resources: extortion, theft, booty futures, and smuggling. *Extortion* occurs when a group employs violence or the threat of violence to earn money from the production of natural resources. Extortion is a continuous process, as opposed to sporadic, and often requires an ongoing relationship with the producers. It includes activities such as forcing workers to extract resources, or protecting illegal loggers from police forces in exchange for a portion of the profits. *Smuggling* occurs when a group earns funds by working with, or coercing, others who illegally transport natural resources out of the zone in which they are extracted to more distant markets. *Theft* occurs when a group steals natural resources with the goal of profiting from their subsequent sale. In comparison to extortion, it does not require ongoing contact with producers. *Booty futures* occur when a rebel group sells another actor the right to exploit a natural resource in the event that the group gains control of the resource. The group earns income in the present time period in exchange for allowing the other actor to use the resource in the future (Ross, 2012). Each variable is coded 1 for a year in which the rebel group used a given strategy (extortion, smuggling, theft, or booty futures) to exploit a specific resource and 0 for a year in which it did not use that strategy with respect to a specific resource. The strategies are not mutually exclusive, and a group may use all (or none) of them in any given year. In some cases, reports suggested that a rebel group engaged in a particular strategy sporadically or that it earned very modest sums. Our general rule was to code a resource-strategy variable as equal to 1 only when there was reasonably strong evidence that the group earned a significant fraction of funding in this manner.

The second group of variables measure rebel group involvement in criminal activities that do not involve natural resources. *Theft* includes large-scale theft, such as bank robberies. *Extortion* occurs when groups demand payment in exchange for protection from outside parties or from the group itself. Establishing roadblocks to 'tax' passersby is one example. *Human smuggling* involves illegally transporting people across borders, while *Smuggling* involves transporting other goods that are neither natural resources nor people. *Humanitarian aid* indicates that the group extorted aid organizations or intercepted the aid itself to profit from its resale. *Kidnapping international* occurs when rebels kidnap people for ransom, and at least one of the victims is foreign. *Kidnapping* includes other instances in which it is not established that at least one of the victims is from outside the country. Groups may engage in *Piracy*, in which they commandeer sea vessels and seek payment for their release. This does not include piracy in the form of violating intellectual property rights, which is included in the variable *Crime-other*. This final category includes other criminal activities not captured in the above categories.

We also sought to measure the amount of income that a group earned in a particular year (*Amounts*) from each natural resource exploitation strategy and criminal activity. In many cases, however, we were unable to find reliable estimates of income; rebel groups typically do not want to publicize the amount of money they earn through illicit activities. For this reason, the dataset also includes a dichotomous variable for each natural resource exploitation strategy and criminal activity (*Funds*) that indicates if the group likely earned more than $5 million in a particular year from that activity. Where possible, the dataset also indicates the first order administrative district and more specific geographic areas in which the rebel group used the funding strategy. Finally, the categorical variable, *Certainty*, provides a qualitative estimate of the degree of certainty in each coding of a natural resource exploitation strategy or criminal activity. It identifies observations in which we are sufficiently confident that a particular activity is occurring to include it in the dataset, but in which we face some uncertainty about the start date and end date, if the rebel group (rather than another actor, such as a criminal organization) was involved, or the number and credibility of the sources of information on which coding decisions were based. Researchers can use this variable to exclude observations with lower levels of certainty if doing so suits their specific needs.

The coding process involved teams of four people: a faculty lead, a doctoral student responsible for data management, and two trained student coders. These coders worked independently to identify and read relevant documents and code the variables discussed above. They consulted a wide range of sources, including United Nations reports, research bulletins, media accounts, and scholarly books and articles. After each coder assigned values to variables for a given dyad, the team met to review findings, discuss discrepancies in the coding, and jointly agree on the final value for each variable. We did not use a formal system of measuring intercoder reliability. A key challenge was finding relevant and credible sources, and coders often obtained different source material, making it difficult to directly compare their coding decisions. The dataset includes a document, running to

Table I. Natural resource funding strategies

	Number of dyad-years	*Percent*
Any strategy	689	47.62
Extortion	439	30.34
Theft	46	3.18
Smuggling	490	33.86
Booty futures	8	0.55

Total number of dyad-years = 1,447.

hundreds of pages, that contains detailed notes of all coding decisions and bibliographies of all sources. Researchers can use this document to assess the credibility of the coding decisions and update the data to suit their individual research needs.

After an initial sample of countries was coded, we sent the data to country experts for feedback and verification. The experts verified much of the specific information that we had coded, and in some cases, offered recommendations on how to organize and present the data for easier use by researchers. Their recommendations also helped us streamline and improve the data collection process. The full codebook, which includes details on the data collection process, coding rules, and other information, is available in the Online appendix to this manuscript.

Descriptive statistics

In this section, we offer some basic descriptive statistics from the Rebel Contraband Dataset as well as a summary of some of the most important information available for individual conflicts. The entire dataset includes 1,447 dyad-years. Table I breaks down the data by natural resource funding strategies. In 689 observations, or roughly 48% of the dyad-years, the rebel group in the dyad exploited natural resources through extortion, smuggling, theft, and/or booty futures (termed 'any strategy'). Looking more closely, we see that two strategies were especially common: about 30% of dyad-years involved extortion of the production of natural resources, while nearly 34% involved smuggling resources. By comparison, large-scale theft of natural resources (3%) and booty futures (less than 1%) were relatively rare.

Table II presents pairwise correlations of the strategies, and suggests that there is little correlation among them. The largest is between extortion and smuggling, but even this is fairly low at 0.31. The information in Table II indicates that organizations engaging in one strategy are not necessarily engaging in the other strategies. In particular, while there would seem to be a natural link between extortion of natural resource production and smuggling of those resources, the data confirm that many groups extort producers of the resources and then transfer the resources to buyers outside the organization who arrange for their transit to consumers. This affirms our belief that there are important conceptual differences across the various strategies.

Table II. Pairwise correlations: natural resource funding strategies

	Extortion	*Theft*	*Smuggling*	*Booty futures*
Extortion	1.00			
Theft	0.23	1.00		
Smuggling	0.31	–0.05	1.00	
Booty futures	0.01	0.15	0.03	1.00

Table III. Criminal funding strategies (non-natural resource)

	Number of dyad-years	*Percent*
Any strategy	771	53.28
Extortion	547	37.80
Theft	192	13.27
Human trafficking	47	3.25
Smuggling	192	13.27
Humanitarian aid	45	3.11
Piracy	22	1.52
Kidnapping	192	13.27
Kidnapping international	120	8.29

Table IV. Top ten natural resource types by frequency

	Number of dyad-years	*Percent*
Opium	236	16.31
Timber	174	12.02
Cannabis	125	8.64
Coca	115	7.95
Oil	109	7.53
Gold	105	7.26
Agriculture	87	6.01
Drugs	81	5.60
Tea	80	5.53
Alluvial diamonds	77	5.32

Total number of dyad-years = 1,447.

Table III lists the criminal funding strategies in the data which are *not* related to natural resources. More than half of all observations (53%) involve some kind of criminal strategy. Non-natural resource-related extortion accounts for the most frequent funding strategy in the entire dataset (38%) – more frequent than any of the natural resource funding categories.

Returning to the natural resource data, Table IV shows information about the specific resources that are

Table V. Natural resource funding strategies by region

	Europe		*Middle East*		*Asia*		*Africa*		*Americas*	
	Groups	*Dyad-years*	*Groups*	*Dyad-years*	*Groups*	*Dyad-years*	*Groups*	*Dyad-years*	*Groups*	*Dyad-years*
Extortion	2	6	3	33	30	221	22	114	3	65
Theft	0	0	2	10	0	0	10	36	0	0
Smuggling	15	46	7	69	22	237	17	69	4	69
Booty futures	1	2	0	0	0	0	4	6	0	0

exploited by rebel groups. The table lists the top ten most frequently exploited resources in the dataset. There is tremendous diversity in the types of resources that provide significant funding for rebel groups around the world. Although there are 26 specific resources coded in the data, no single resource accounts for more than 16% of observations.[1] Perhaps surprisingly, the most commonly exploited resource is opium, with rebel groups earning funding from it in 236 dyad-years. If we combine opium, cannabis, coca, and 'drugs' (cases where the specific type of drug is unclear), around 29% of observations involve at least one kind of drug activity. The next largest category is timber, which appears in roughly 12% of observations. The top ten also include some categories that are not commonly mentioned in discussions of natural resource exploitation in conflict situations, such as tea and general agriculture, that is, high-value crops not included in the other categories. At a minimum, the diversity apparent in the data suggests that focusing narrowly on a single category or a few categories, as many cross-national analyses do, misses a great deal of potentially useful information.

One concern with using data on natural resource exploitation is the possibility that such activity may be driven largely by a small number of rebel groups. The activity also might be confined to a handful of countries or regions, which would limit cross-national applicability of any findings. Table V, however, suggests that many groups around the world are engaged in natural resource exploitation. European rebel groups are heavily involved in natural resource smuggling, with 15 groups accounting for 46 dyad-years of smuggling activity. In the Middle East, a small number of groups is responsible for relatively frequent extortion, theft, and smuggling of resources. Asia and Africa account for the majority of activity, with 30 Asian rebel groups and 22 African groups extorting natural resources of some kind. Asia has more activity overall than Africa (458 vs. 225 dyad-years), but Africa accounts for the greatest breadth of activity; it is the only region where all four types of activity have taken place within our temporal period. Taken together, the information in Table V suggests that researchers should be able to make more general claims about natural resource exploitation, but that there also are important regional differences in the data.

Finally, Table VI provides descriptive information from observations in the dataset from the Democratic Republic of the Congo (DRC) as an example. It shows each group that appears as part of a dyad with the DRC government, the years they appear in the data, and their specific resources and funding strategies (for brevity, we list only the natural resource strategies here). Even this snapshot of the data suggests that there is sufficient variation along all these dimensions to provide researchers with useful evidence to test a variety of hypotheses.

Fearon's (2004) data have been widely employed in studies investigating the influence of rebel finances from natural resources. They measure 'reliance by the rebels on income from production or trafficking in contraband' (p. 284), defined as 'finances from contraband such as cocaine, precious gems, or opium' (pp. 283–284). A natural question, then, is: how do Fearon's (2004) cases compare to those included in the RCD? Table VII makes this comparison. The first column lists the country in which a conflict occurs; the second lists the rebel group(s) Fearon (2004) identified as engaging in contraband finance; the third lists the natural resources identified in Fearon (2004); and the fourth identifies all resources and exploitation strategies for the

[1] The full list of 26 natural resources includes animal (such as ivory), bauxite, cannabis, cassiterite, charcoal, coal, cobalt, coca, cocoa, coffee, coltan, copper, diamonds (alluvial), diamonds (primary), gold, iron, mercury, oil, opium, rubber, tea, timber, tin, titanium, wolframite, and zinc. The dataset also includes five residual categories for agriculture, drugs, gems, minerals, and other natural resources not already listed.

Table VI. Natural resource funding strategies in the Democratic Republic of the Congo

Group	*Years active*	*Resources*	*Strategies*
Alliance of Democratic Forces for the Liberation of Congo-Zaire (AFDL)	1996–97	Gold (1997); Alluvial Diamonds (1996–97); Copper (1997); Cobalt (1996–97); Timber (1996–97); Zinc (1997)	Extortion/Theft/ Booty futures
Rally for Congolese Democracy (RCD)	1998–2001	Timber (2001); Alluvial Diamonds (2000–01); Gold (1998–2001); Coltan (1998–2001); Cassiterite (1998–99); Tin (1998–99)	Extortion/Theft/ Booty futures
Movement for the Liberation of the Congo (MLC)	1998–2001	Alluvial Diamonds (1998–2001); Gold (1998–2001); Coffee (1999–2001); Coltan (1998–2001); Timber (1998–2001); Tea (1998–2001)	Extortion/Theft
National Congress for the Defense of the People (CNDP)	2006–08	Coltan (2008); Charcoal (2006–08); Animal – cattle (2006–08)	Extortion
Bunda dia Kongo (BDK)	2007–08		
M23 Movement	2012	Gold (2012); Minerals (2012); Coltan (2012); Cassiterite (2012); Animal – ivory (2012)	Extortion/Smuggling

corresponding groups in the RCD.[2] In all cases except one, the RCD identifies the groups listed in Fearon (2004) as relying on drugs or precious gems for income.[3] This suggests that its measurement and coding procedures are similar to his. Importantly, however, the RCD goes beyond Fearon (2004) by capturing rebel reliance on a wider range of resources, indicating the exploitation strategy used for each, and accounting for changes over time in resource exploitation strategies.

Using the data

We next demonstrate how the Rebel Contraband Dataset can be used to sharpen analysis of rebel group behavior and conflict outcomes. We do so via a replication of Model 2 reported in Table I of Salehyan, Siroky & Wood (2014; hereafter referred to as SSW). SSW build on the analysis of Weinstein (2007) and other work in the resource mobilization tradition, which holds that rebel organizations that are able to secure funds without the support of the population they claim to represent are more likely to harm civilians. SSW's focus is on how external support for rebels influences their use of violence against civilians. Consistent with Weinstein (2007), such support should be associated with greater rebel violence against civilians. However, when the support is provided by a state with a democratic government, the rebels have incentives to restrain such violence. SSW assess these propositions in a series of negative binomial regression models in which the unit of analysis is the rebel-government dyad-year, the dependent variable is one-sided violence (casualties) against non-combatants committed by the rebel side, and various measures are used for external support for the rebels, including whether support is provided by democratic states.[4]

The models in SSW also include several control variables. For our purposes, the variable of greatest interest is lootable resources, which is a binary measure indicating gemstone or illicit drug production in the area within which the conflict takes place (see SSW, 2014: 646). Although not central to their analysis, SSW argue that '[i]f Weinstein's theory is correct, variables accounting

[2] The two datasets cover different time periods: Fearon (2004) covers 1946–2000, while the Rebel Contraband Dataset covers 1990–2012. The fourth column of Table VII lists a resource if the corresponding group profited from it in any year covered by the RCD, though the dataset itself includes temporal variation. In a working paper using data from the RCD and similar covariates to those included in Fearon (2004), and covering 1990 to 2009, we replicated his key finding that conflicts in which the rebel side is funded by natural resources have a longer duration.

[3] The exception is the groups listed as 'Karens' in Fearon (2004). We matched this to the Karen National Union (KNU) in the UCDP list of conflict actors.

[4] For reference purposes, the original hypotheses from the SSW (2014) study are available in the Online appendix to this manuscript. Here we report a replication of their key results in Model 2 (SSW, 2014: 649). Table A1 in the Online appendix repeats this exercise for the remaining five models reported in SSW Table I. In each of these models, the RCD measure of loot has a positive and statistically signification relationship with rebel violence against civilians.

Table VII. Comparison of Fearon and RCD

Country	*Rebel groups in Fearon (2004)*	*Resources identified in Fearon (2004)*	*Natural resources and strategies identified in Rebel Contraband Dataset (RCD)*
Afghanistan	Mujahideen	opium, gemstones	Hizb-i-Islami: smuggling (opium); Jam'iyyat-i Islami-yi Afghanistan: extortion (gemstones)
Afghanistan	Taliban	opium	smuggling (opium, timber); extortion (opium)
Angola	UNITA	diamonds	extortion (diamonds)
Burma/ Myanmar	Karens	unclear	KNU: extortion (timber, other natural resource [lead]), smuggling (timber)
Cambodia	Khmer Rouge	gemstones	extortion (timber, gemstones); smuggling (timber, gemstones)
Colombia	FARC, ELN	coca	FARC: extortion (coca, gold, coffee, oil, coltan), smuggling (coca); ELN: extortion (coal, gold, oil, coca), smuggling (coca)
Democratic Republic of the Congo	RCD	diamonds	booty futures (gold, tin), extortion (coltan, diamonds, gold, timber), theft (cassiterite, coltan)
Democratic Republic of the Congo	AFDL	diamonds	booty futures (cobalt, copper, diamonds, zinc), extortion (gold, diamonds), smuggling (cobalt, timber)
India	Northeast rebels	opium, gemstones	ULFA: extortion (tea, oil); NDFB: extortion (tea); DHD-DW: extortion (tea); GNLA: extortion (coal); PWG: extortion (cannabis, timber); CPI-Maoist: extortion (agriculture, cannabis, coal, iron, timber, opium); smuggling (opium); PULF: extortion (tea); UNLF: extortion (tea); smuggling (gems, gold); ATTF: extortion (tea); NLFT: extortion (tea); NSCN-IM: extortion (timber); smuggling (opium, timber)
India	Kashmir	cannabis, opium	smuggling (cannabis, opium)
Indonesia	GAM	cannabis	extortion (cannabis, oil)
Liberia	NPFL	diamonds	extortion (iron, rubber, timber), smuggling (diamonds, gold, timber)
Peru	Sendero Luminoso	coca	extortion (coca), smuggling (coca)
Senegal	MFDC	cannabis	extortion (agriculture, cannabis, charcoal, timber), theft (animal, agriculture)
Sierra Leone	RUF, AFRC	diamonds, opium	RUF: extortion (agriculture, coffee, cocoa, diamonds, opium, titanium); AFRC: extortion (diamonds)
Turkey	PKK	coca, opium	extortion (cannabis, opium), smuggling (cannabis, coca, opium)

for lootable resources and foreign support should both be statistically significant and similar in effect' (p. 646). In presenting their statistical results, the authors are puzzled that the loot variable is not significantly related to rebel violence against civilians and suggest that the finding 'may result from measurement error because the indicator used here captures only whether lootable resources were present in the conflict area and not whether the rebel group actually used them' (p. 650). Another reason for this result may be that the indicator used in SSW only accounts for a small number of natural resources, which as we have seen make up only a modest share of all rebel reliance on contraband funding.

The RCD is designed to address exactly these concerns. In Table VIII, we first replicate Model 2 of Table I of SSW using their measure of lootable resources (*SSW Loot*). We then report results from an identical model in which we substitute a dummy variable from the RCD (*RCD Loot*) that takes a value of 1 if the rebel group earns funds from the extortion, smuggling, theft, or sale of booty futures of any natural resource in a given year. In the first model, *SSW Loot* does not have a statistically significant relationship with rebel violence against civilians. This finding is identical to the one reported by SSW. However, in the second model, the *RCD Loot* measure has a positive and statistically significant relationship with such violence. Thus, as expected, using a more precise measure of rebel exploitation of natural resources, we find that groups that earn funding from natural resources are more likely to use violence against civilians.

Table VIII. Replication of Table I from Salehyan, Siroky & Wood (2014)

	SSW Model 2	*RCD Model 2*
Support	0.648*	0.467†
	(0.278)	(0.278)
Democratic support	–0.573*	–0.578†
	(0.281)	(0.321)
War	2.090*	2.124*
	(0.364)	(0.391)
SSW loot	0.308	
	(0.234)	
RCD loot		0.826*
		(0.281)
Government violence	0.155*	0.171*
	(0.063)	(0.065)
Territorial control	–0.564*	–0.795*
	(0.276)	(0.332)
Fighting capacity	1.501*	1.608*
	(0.402)	(0.404)
Population	0.150†	0.160†
	(0.078)	(0.086)
Democracy	0.218	0.130
	(0.304)	(0.308)
Duration	0.023	0.032
	(0.021)	(0.022)
Rebel violence $_{t-1}$	0.003	0.003
	(0.002)	(0.002)
Constant	–1.074	–1.425
	(1.352)	(1.411)
Observations	1,007	1,007
Wald χ^2	206.9	242.3
Prob > χ^2	0.000	0.000
Alpha	17.34	17.06

Negative binomial regression coefficients with robust standard errors clustered on dyad in parentheses. * $p < .05$, † $p < .10$ (two-tailed test).

Conclusions

Like all efforts to measure social phenomena, the Rebel Contraband Dataset has limitations. It is likely that the dataset misses some cases in which rebel groups earned income from a particular source. It also is possible that the dataset counts rebel criminal activity or exploitation of natural resources that did not occur. We think this latter error is less likely than the former, as the process of collecting the data emphasized the importance of multiple sources of information; when judgments needed to be made, we erred on the side of not counting activities we were uncertain had occurred. The use of an explicit measure of certainty should allow researchers to determine the level of certainty that is most appropriate for their research projects, and to only include observations that meet this threshold.

Other opportunities exist to use the RCD to address important research questions. This is the first dataset to determine directly if rebel organizations earn income from natural resources or crime in a systematic, global fashion. The data also might prove useful in determining if such activities influence other forms of rebel behavior, such as the treatment of civilians more generally (Weinstein, 2007), foreign intervention in civil wars (Findley & Marineau, 2015), the duration of conflicts (Fearon, 2004), and the cohesion and fragmentation of violent organizations (Bakke, Cunningham & Seymour, 2012). A key advantage of the dataset is that it allows disaggregation across exploitation strategies and types of natural resources and criminal activities for a large sample of rebel groups, permitting the testing of nuanced hypotheses that involve the interaction of multiple characteristics.

Replication data

The dataset, codebook, and do-files for the empirical analysis in this article, along with the Online appendix, can be found at http://www.prio.org/jpr/datasets, as well as the authors' project website at http://civilwardynamics.org/.

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