Does Crime Pay Enough? Diamond Prices, Lootability and Ethnic War

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Abstract

Natural resources are thought to be at the root of many civil conflicts, but no consensus has emerged on the mechanisms at play in the resources-conflict relationship, and some question whether such a relationship exists. This paper compares the state prize variant of the greed theory with the lootability approach. We employ a time-series cross-sectional design to analyze how secondary diamond production, primary diamond production, and diamond price influence the onset of ethnic wars in 48 Sub-Saharan African countries between 1960 and 2010. Our results suggest that purely additive models are unlikely to reveal the relationship between diamonds and ethnic conflict. We find some support for the lootability mechanism, but our findings better support the hypothesis that natural resources increase the value of the state and therefore encourage rebels to try to capture state power. Our findings also point to resources' potential to bolster government capacity.

Introduction

A major conundrum in comparative politics is why abundant natural resources, which one would normally expect to confer wealth upon a country, appear to be associated with negative outcomes such as authoritarianism, poor economic performance and civil conflict. This phenomenon is often referred to as "the resource curse." According to Ross (2015), "The resource curse might be defined as the adverse effects of a country's natural resource wealth on its economic, social, or political well-being" (p. 240). Natural resources are thought to be at the root of many of the civil conflicts in different regions of the world, and a multitude of studies has been conducted on the resources-conflict connection. Indeed, many studies claim to show that it is greed fueled by a desire to capture natural resource rents that leads people to rebel, and until recently the idea that it is greed not grievance that drives civil wars dominated the literature. Scholars have identified many mechanisms thought to underlie the relationship between natural resources and conflict, and research has turned toward empirically testing these mechanisms (e.g., Bazzi & Blattman, 2014; Humphreys, 2005; Ross, 2006) and examining the factors thought to mediate this relationship (e.g., Elbadawi & Soto, 2015; Janus & Riera-Crichton, 2015). No consensus has emerged on the mechanisms at play in the resources-conflict relationship, and some question whether such a relationship even exists (Ross, 2015).

This paper contributes to the literature on the mechanisms underlying the relationship between resources and ethnic civil wars. In particular, we measure and test one of the key mechanisms identified in this literature, a resource's level of lootability. "Lootability" refers to the ease with which resources can be acquired and converted into wealth or exchanged for other valued items and is thought to shape the incentives and strategies of both the government and rebels in a number of ways (Basedau & Wegenast, 2009; Le Billon, 2008; Snyder & Bhavnani, 2005). We compare the lootability approach to another variant of the perspective, the "state prize" approach, according to which abundant natural resources make the state a desirable prize in the eyes of potential rebels (Fearon, 2005). We employ a time-series cross-sectional design to analyze how secondary diamond production, primary diamond production, and diamond price influence the onset of ethnic civil wars in 48 Sub-Saharan African countries for the 51 years between 1960 and 2010. We find some support for the lootability mechanism with regard to the onset of ethnic civil wars.

However, secondary diamond production and primary diamond production influence the likelihood of ethnic war onset in a similar manner. Thus, our findings better support the variant of the greed perspective, which posits that economic factors drive civil wars (Collier & Hoeffler, 1998; 2004), contending that natural resources increase the value of the state and therefore encourage rebels to try to capture state power. We borrow the language of Bazzi and Blattman (2014) and refer to this argument as the "state prize" approach. Our results also suggest that purely additive models are unlikely to reveal the relationship between diamonds and ethnic conflict. The successful exploitation of both primary diamonds and secondary diamonds would generally seem to bolster a government's ability to quell rebellions, supporting the state capacity perspective, according to which abundant natural resources strengthen a government and make it less vulnerable to insurrections (Snyder & Bhavnani, 2005). It is the combination of diamond production and rising prices that appears to heighten the risk of ethnic civil war.

Africa is the ideal context to examine the link between lootability and conflict. Africa has seen more civil conflict over the past decade than any other region of the world and also comprises some of the world's most resource-rich countries. Given the concentration of natural resources and conflict in Africa, relatively few quantitative studies on this topic have focused on Africa (Basedau & Wegenast, 2009). Solving the intellectual puzzle of why copious natural resources are often a detriment in the African context has important implications in the real world.

Many of the resource-rich countries, such as Chad, Nigeria, Sierra Leone, Angola and the Democratic Republic of the Congo, fare very poorly on the Human Development index and have experienced devastating civil wars. Is resource abundance really at the heart of the conflict that has characterized some African countries? If resources are behind this conflict, it is important to know why that is the case. This paper focuses on the relationship between resources and ethnic civil war. If the wealth generated from natural resources could be channeled into infrastructure and public goods instead of conflict, such wealth could significantly improve the quality of life for people in these countries. Gaining an understanding of the forces behind the link between conflict and resources is critical if there is to be any hope for natural resources to constitute a blessing not a curse in these countries.

We focus on ethnic civil wars for a couple of reasons. Lujala, Gleditsch, and Gilmore (2005) find that secondary diamonds are linked to the onset of only ethnic civil conflicts, not

other forms of conflict. Moreover, most conflicts in Africa are connected to ethnicity (Osaghae, 1999).

Natural Resources and Conflict

How are natural resources thought to promote civil conflict? A number of mechanisms are thought to explain the resources-conflict relationship. Natural resources are thought to influence the behavior of the two key belligerents in civil wars, the government and the rebels. The greed perspective has held sway in the literature. The looting of natural resources allows rebels to finance their rebellion. The greed perspective is probably most strongly associated with the work of Collier and Hoeffler (1998, 2004) who argue that civil war is grounded in economic factors. They find a robust positive relationship between natural resource exports and civil war, which they interpret as supporting the greed mechanism. As Humphreys (2005) points out, however, this finding could support a number of other different mechanisms linking civil war and natural resource exports. Moreover, many have criticized Collier and Hoeffler's operationalization of natural resources exports and the fact that it includes both renewable resources, such as agricultural products, and non-renewable resources, such as oil (e.g., Fearon, 2005; Ross, 2006).

Renewable resources are thought to be related to conflict in a different way than non-renewable resources. Indeed, Welsch (2008) finds that agricultural abundance has a strong negative association with conflict, while non-renewable resources have a positive association with conflict. Welsch (2008, p. 504) embraces the "opportunity cost perspective, focusing on the relative rather than the absolute payoffs to be gained from production and resource appropriation." Participating in a rebellion will lead one to forgo less income when the price for agricultural products falls. The factor determining the effects of commodities prices on conflict is the amount of labor required to produce the respective commodity (Dube & Vargas, 2013). As we discuss in detail below, lootable resources are easy to extract and have "high value-to-weight ratios" (Ross, 2003b, p. 34). Agricultural products are not easily extracted as their extraction requires significant amounts of time and effort. Moreover, their value-to-weight rations are generally low. Thus, many renewable resources, such as agricultural products, are clearly not very lootable. The opportunity cost perspective is consistent with the greed perspective in that both contend that material interests determine whether people will join the rebels.

A related argument that is encompassed by the greed perspective is that the desire to capture natural resource rents is a strong motivation for rebels to attempt to take over the state; that is, natural resources render the state an attractive "target" or "prize" (e.g., Fearon, 2005). Although a number of other mechanisms connecting resources and conflict have been proposed, the findings of recent studies offer some support for this variant of the greed explanation. For example, Dube and Vargas (2013) examine the effect of commodity price shocks on civil conflict in the municipalities of Columbia. Dube and Vargas's results support the idea that the price shocks of different commodities do not have the same effects on conflict. Increases in the international price for oil elevate the likelihood of conflict while increases in the price of coffee tend to decrease it. Price shocks of coal and gold, like those of oil, have a positive relationship with conflict. On the other hand, price shocks for other agricultural products, such as sugar, banana, palm, and tobacco, like those of coffee, have a negative effect on conflict; that is, increases in the prices for these agricultural products decrease the likelihood of conflict in the municipalities that produce these products (2013).

They interpret the finding that increases in the prices of oil, gold and coal are positively associated with conflict in the municipalities that produce these products as supporting the "rapacity effect": price rises increase the incentive to fight over resources. On the other hand, the negative relationship between increases in the price of agricultural products and conflict reflects the opportunity cost effect. In addition, Ross (2006) finds that both onshore and offshore oil rents as well as primary diamonds are all positively associated with civil war onset. He notes that these findings provide some limited support for the "state-as-target hypothesis" (2006, p. 288). Bazzi and Blattman (2014, p. 3), however, do not find support for "the state prize logic" in their study of the relationship between export price shocks and conflict.

Natural resources are thought to encourage potential rebels to engage in conflict with the state for a number of other reasons. First, the inequitable distribution of natural resources rents is likely to give rise to strong grievances, which become the driving force behind insurgencies. Second, when resources are concentrated in a particular region populated by a distinct ethno-cultural group, they are likely to stimulate secessionist projects in that region (Le Billon, 2008). The results of Sorens' (2011) study support this argument. He finds that "local mineral abundance" (i.e., mineral wealth concentrated in a region dominated by an ethnic minority) has a positive relationship with secessionist conflict and a negative relationship with governmental conflict. Of course, Sorens' (2011) results are consistent with the greed perspective. Third, nonstate actors may attempt to promote conflict and chaos as such a state of affairs allows them to more easily loot natural resources. The same could apply to governmental actors. In other words, for some, war pays (de Soysa & Neumayer, 2007).

Another stream of the literature emphasizes the effects of abundant non-renewable natural resources on government (Basedau & Lay, 2009; Humphreys, 2005). Natural resources are thought to influence the incentives and behavior of those in government in ways that ultimately encourage conflict. As Le Billon (2001, 2008) notes, resource wealth is thought to contribute to government vulnerability. This vulnerability is related to the "rentier effects" of non-renewable natural resource wealth. Natural resource wealth diminishes a government's motivation to create an environment in which prosperity can emerge. Because the government does not need to tax the citizens, the relationship between the citizens and the government may be attenuated. Moreover, resource rents undermine institutional strength. The existence of natural rents encourages corruption among those with access to such rents (seeLe Billon, 2001, 2008; Fearon, 2005; Ross, 2001).

The relationship between natural resource rents and corruption has empirical support. For example, based on their study of 30 countries that export oil, Arezki and Brückner (2011) find that increases in corruption accompany increases in oil rents. In their study of Sub-Saharan Africa, Arezki and Brückner (2011) find that rises in resource rents result in rises of corruption, especially in less democratic countries. Corruption has negative effects on a government's capacity, economic performance and legitimacy (Anderson & Tverdova, 2003 inter alia; Rose–Ackerman, 2008; Seligson, 2002). Low government capacity influences the calculus of potential rebels as low capacity undermines a government's ability to suppress threats and rebellions. In addition, government control of natural resource rents is likely to result in adverse selection. Those most interested in self-enrichment as opposed to public service will be attracted to government. As other scholars have observed, members of

government are also likely to compete for greater shares of the rents, further undermining state capacity.

Thus, abundant natural resources result in both government vulnerability and a reason for rebels to want to capture the power of the state. Government vulnerability increases the likelihood that rebels will meet with success when challenging the state, and the greater the natural resource rents to be had, the greater the reward for taking control of government. Hence, abundant non-renewable resources are likely to stimulate conflict both because of their influence on the behavior of those in government and would-be insurgents (Le Billon, 2001).

Of course, there is another version of the resource story when it comes to resources and government capacity. According to this version, natural resources can strengthen a government, rendering it less vulnerable to insurrection (e.g., Snyder & Bhavnani, 2005). The rents from natural resources can be used by the government to finance clientelistic networks and achieve elite accommodation. Moreover, the government may channel some of these rents into creating and maintaining security forces that can suppress rebellions. Natural resource rents can also be used to placate potential insurgents. In addition, the government could invest some of the rents in public goods, which would boost government legitimacy (Basedau & Lay, 2009). (These mechanisms are described in detail in Ross' (2001) examination of the relationship between authoritarianism and oil in the Middle East.) Arezki and Gylfason (2013) find support for this argument. Their results show that increases in resource rents are associated with an increase in government spending. Moreover, they find that in Sub-Saharan Africa, higher resource rents are associated with a lower probability of civil conflict, not a greater one. The results of Bazzi and Blattman's (2014) study of the relationship between commodity prices and conflict also support the state capacity mechanism. They find no relationship between commodity prices and the onset of civil war but they find that increases in the price for oil and minerals are linked to shorter wars with fewer fatalities (2014).

Lootability and Conflict

Another important consideration that is mentioned frequently in the literature is lootability. Lootable resources are thought to be especially likely to promote conflict. "Lootability" refers to the ease with which resources can be acquired and converted into wealth or exchanged for other valued items. Snyder and Bhavnani (2005, p. 565) succinctly define lootable resources as "high-value goods with low economic barriers to entry". A resource's degree of lootability is thought to influence the likelihood of conflict as well as the type of conflict which occurs (Basedau & Wegenast, 2009; Le Billon, 2008; Snyder & Bhavnani, 2005). Lootable resources are easily extracted by rebels and used to fund their insurgency. In the words of de Soysa and Neumayer (2007, p. 203), "Lootable natural resources, therefore, supply the motive (private gain) and the opportunity (finance of large enough force) for organizing violence." Thus, the lootability thesis could be considered a variant of the greed perspective since greed is clearly posited to be one of the motivators for perpetrating violence.

The lootability theory has found mixed support in the literature. Ross (2006) notes that lootable resources are connected to violence at the country level and cites Weinstein's (2006) study which finds that rebels are less disciplined and more violent when lootable resources abound. (Sorens (2011) provides some nuance to this claim noting that rebels with the goal of

secession do not loot in their home regions.) Moreover, government soldiers are less likely to be disciplined and may be tempted to pursue resources rather than provide security or suppress insurgencies. In contrast, those resources that require industrial infrastructure to exploit and that are concentrated in one area, often referred to as point resources (Le Billon, 2008), are difficult for non-governmental forces to capture. Indeed, it is probably the government that is best able to produce such resources. Thus, point resources might serve to strengthen the government for the reasons discussed above. On the other hand, as noted, the existence of such resources could provide the motivation for rebels to try to take over the state.

Indeed, some non-renewable resources which have a low level of lootability have been found to be positively associated with conflict. For example, a number of studies find a positive association between oil and conflict (e.g., de Soysa & Neumayer, 2007; Fearon & Laitin, 2003; Fjelde, 2009; Humphreys, 2005). Rebels can disrupt the operations surrounding point resources and demand payment to cease doing so, which renders some of these point resources, such as oil, lootable. Thus, sabotage and extortion can be viable strategies for rebels (Ross, 2003a cited in Le Billon (2008), 2006). The results of Ross' (2006) study indicate that both onshore and offshore oil rents have a positive relationship with the onset of civil war. As noted in the literature, offshore oil is perhaps one of the least lootable resources as sabotage is not even a strategy available to rebels.

Diamonds have also received a great deal of attention in the literature. Alluvial or secondary diamonds are considered one of the most lootable resources in the world. Kimberlite or primary diamonds, on the other hand, have a low level of lootability. Lujala et al.'s (2005) study provides perhaps the strongest support for the lootability theory. They find that secondary diamonds are positively associated with the onset of ethnic wars as well as the incidence of civil war while primary diamonds render these phenomena less likely (2005). In contrast, Ross (2006) finds that primary diamonds have a robust positive relationship with the onset of civil war while the link between secondary diamonds and civil war is much more tenuous --results that clearly contradict the lootability thesis. Despite the mixed support for the lootability theory, lootability is cited as a factor that has a major influence on the likelihood of conflict in most works on the resource-conflict link. Clearly, the lootability theory requires closer examination.

We propose a twofold approach to measuring lootability. First, we follow much of the existing literature by designating a particular resource to be more lootable than others (e.g., Sorens, 2011). In our paper we examine both primary and secondary diamonds. Of those two types of diamonds, we contend that primary diamonds require greater infrastructure to extract. Primary diamonds depend on deep shaft mining techniques that require heavy equipment, supplies, engineering expertise and organization. As such, we consider that they are less lootable. Secondary diamonds in contrast can be extracted by relatively unskilled workers collecting diamonds from the surface. Engineering expertise and heavy equipment are not required. This process makes it easier for loosely organized groups to set up diamond extraction and start getting diamonds to market to finance conflict.

Second, we will examine the price of the resources. Past scholars have suggested that lootability is partly a function of the value of a resource (de Soysa & Neumayer, 2007; Le Billon, 2008). De Soysa and Neumayer (2007, p. 216) make the explicit argument that, "…the lootability of a resource should be a function of the value of the resource on the world market." The logic is that holding value equal, a small item is a better candidate for financing

a rebellion than a large item. For example, one can transport hundreds of thousands of dollars' worth of diamonds in a 100kg crate small enough to be flown out of a small airstrip in a plane or packed out on the back of a mule. However, a similar dollar value of timber would require large trucks and passable and secure roads to drive them on. Similarly, holding weight equal, increasing the price of a resource should increase its lootability. Thus, the difference in value relative to weight has important implications for the ability of rebel groups to exploit the resources.

Including price has three advantages. First, it will allow us to directly measure the causal effect of the theorized mechanism underlying the lootability approach. Previous analyses of lootablity have relied on subjective assessments of particular resources. These assessments bury the actual theorized mechanism in the judgement of the researcher, undermining their validity. There are two ways to replicate such studies. One approach would depend on accepting the original researcher's assessment of lootability of a resource and testing that resource's effect on conflict in other contexts. Alternatively, one could try to reevaluate the judgement of a particular resource's lootability in the same context. Both of these approaches have limits. By including price, we expose the theorized mechanism (the high value of the resource) to objective analysis. In doing so, we are engaged in hypothesis testing that can more easily be replicated.

The second advantage of focusing on price is that it allows us to examine the within resource effects of changes in price (e.g., high prices for diamonds versus low prices for diamonds). The typical approach to testing lootability is to assert that this resource is more lootable than that one and see if there is a statistically significant and positive effect of the amount of the lootable resource and conflict. We can test the relationship between changes in price and conflict within different resources one at a time. That is, if the lootability theory is valid, we should expect resources to increase their deleterious influence on conflict as they become more valuable. In other words, holding a particular resource constant, its bad effects should increase as its price increases.

Finally, by including the price of diamonds in our analysis we can compare the lootability argument to the “state prize” argument. The “state prize” approach postulates increasing conflict in response to increasing value of resources, regardless of lootability. The lootability argument expects that conflict will increase only when lootable resources' prices increase. We discuss these competing expectations in more detail below.

The basic lootability argument is that resources that tend to be easy to extract and are valuable will be more likely to be used as financing for intrastate conflict (e.g., Snyder & Bhavnani, 2005). The most common way to test this argument is to hypothesize that diamonds, for example, are more lootable than oil.

- H1: The presence of diamond production in a country will be associated with increased probability of the onset of a war in that country.

We are interested in the effect of the lootability logic within resources. To determine if a lootable resource becomes more pernicious as its price increases, we examine the interaction between production and price in both primary diamonds and secondary diamonds. Primary or kimberlite diamonds, must be mined in deep shaft mines. In contrast, secondary or alluvial diamonds, which have been washed into stream beds, can be more easily extracted. The infrastructure requirements of these two different types of diamonds have implications for the

ease with which rebel groups can exploit the diamonds to finance violent conflict (Le Billon, 2008; Lujala et al., 2005; Snyder & Bhavnani, 2005). When a rebel group is faced with the need to control a kimberlite mine, they must control the mine itself, the expert personnel needed to operate the mine, and road access to the mine to keep it supplied with equipment. Alluvial diamonds can be panned for in streams or dug from deposits much closer to the surface. Given the value of the diamonds, neither type of diamonds needs much transportation infrastructure to ship the diamonds to market. But kimberlite diamonds require a much greater control over population and territory than do alluvial diamonds.

For these reasons, we believe that the presence of primary diamonds will not be associated with the increased likelihood of the onset of war in a country but that secondary diamonds will be. We also test the logic of lootability within each of these resources. That logic suggests that as the price of diamonds increases, the conflict encouraging effect of the presence of diamonds should be enhanced. Because primary diamonds require a great deal of infrastructure to extract, we contend that a significant increase in conflict inducing effects for primary diamonds is most consistent with the "state prize" approach discussed above. Indeed, the "state prize" approach leads to an expectation that price will increase the conflict encouraging effects of both kinds of diamonds.

- H2a: As the price of diamonds increases, the conflict encouraging effects of both primary and secondary diamonds will be exacerbated.

In contrast to the "state prize" approach, the lootability approach leads to expectations that price changes would increase conflict encouraging effects only for easily acquired and transported resources. In our analysis this applies to secondary diamonds but not primary diamonds. This leads to a related hypothesis for lootability.

- H2b: As the price of diamonds increases, the conflict encouraging effects of secondary diamonds only will be exacerbated.

Lootability is also a function of the difficulty of getting a resource to market. Thus, contextual characteristics are likely to influence the ease and desirability associated with looting natural resources. To examine this aspect of the lootability argument, we examine the road density of a country and the cost of exporting goods from a country. There are two ways to look at the potential relationship between the costs associated with getting the natural resources to the market and civil war. On the one hand, when a country has a more complete road system, it is easier for everyone to get their products to market. Thus, a good road system could facilitate rebels' ability to reach the market with their goods, thereby lowering the cost of trade in natural resources and making such economic activities more attractive.

On the other hand, a better road system is likely to be associated with higher government capacity, and governments with high levels of capacity are able to quell rebellions more easily than those with low levels of capacity. In addition, dense road systems augment the ability of government forces to reach the rebels and crush their insurgencies. Thus, following this logic, better road systems would be associated with less civil conflict. This relationship has not been widely tested in the literature, and the findings of those studies that do examine this relationship are not fully consistent. For example, Buhaug and Rød (2006) find that road density has a negative relationship with territorial conflict but is unrelated to governmental

conflicts. In contrast, Raleigh and Hegre (2009, p. 231) find that armed conflict is less likely in areas without well-developed road systems (i.e. areas without "dual lane/divided highways, other primary roads, or road connectors within urban areas." We believe that higher levels of road density will generally be associated with less civil conflict as being out of the reach of the government renders resources more lootable.

- H3: Countries with more complete road systems will be less likely to have civil conflict than those countries with less complete road systems.

Similarly, low export costs may imply that rebels incur lower costs in getting their goods to market and thus low export costs could heighten rebels' incentives to loot. In contrast, it could be the case that easy access to legitimate routes to trade makes the illicit trade in lootable goods less attractive. That is, when it is not costly to engage in legitimate export activities, people will be more likely to pursue the legal export business as opposed to illicit trade.

- H4: Export costs will be negatively associated with the onset of civil war.

Data and Methods

We employ a time-series cross-sectional design to analyze how the presence of secondary diamond production, primary diamond production, and diamond price influence the onset of ethnic civil wars in 48 Sub-Saharan African countries between 1960 and 2010. We include every Sub-Saharan African country-year for which we have data on all of the independent variables in our study. Our unit of analysis is the country-year. Most variables are available only since the formal independence of the respective countries. Using the Gleditsch and Ward (1999) list of independent states, we see a wave of independence declarations in Sub-Saharan Africa between 1950 and 1980. Thus, the resulting panel is unbalanced with an average of 45.7 year observations per country.

We test our hypotheses against one discrete dichotomous dependent variable: the onset of ethnically driven armed intrastate conflict. The coded data was obtained from the Ethnic Power Relations project (EPR, v.3.01) (Wimmer, Cederman, & Min, 2009) which bases its coding strategy on the PRIO/Uppsala Armed Conflicts Data Set (N. P. Gleditsch, Wallensteen, Eriksson, Sollenberg, & Strand, 2002; Pettersson & Wallensteen, 2015). Because our dependent variable is dichotomous, we use a logit random-effects estimator which groups the observations by countries.

The analysis uses cubic polynomial splines to control for time dependencies because it is reasonable to assume that all time-series exhibit some time dependencies and we know that standard errors might be hugely underestimated as a result (Beck & Katz, 1997). Commonly used techniques tackling time dependencies in models with binary dependent variables and cross-sectional time-series data are year fixed effects, or year dummies, and cubic splines. These techniques were introduced to political science by Beck, Katz, and Tucker (1998). We decided against year fixed effects because this technique is subject to various problems (Beck et al., 1998) in addition to requiring many degrees of freedom and being prone to separation problems (Carter & Signorino, 2010a). Instead, we follow the recommendations by Carter and Signorino and use cubic polynomial splines in order to approximate the time hazard

function, allowing a non-monotonic hazard and avoiding the problems of higher and even polynomials. We chose cubic polynomial splines (Carter & Signorino, 2010a) over natural cubic splines (Beck et al., 1998) because they are easier to implement and shown to perform just as well. We obtained the splines by creating a time counter starting in 1960, adding one for every additional year. In order to decrease the potential instability of the results due to large maximum values of time cubed (e.g. $t_{2011}^3 = 52^3 = 140.608$) (Carter & Signorino, 2010a), we divided the squared spline by ten and the cubed spline by 100.

Since the regressors of the splines are meaningless by themselves, we do not report the estimated coefficients and standard errors for the splines in the result tables. Further, while it is certainly possible to plot and interpret the time, or hazard, function, it is also controversial (Beck, 2010; Carter & Signorino, 2010b). We decided not to interpret the hazard function because we do not see a theoretical reason to do so: Time is not hypothesized to be an independent explaining variable, but controlling for time dependency is necessary to minimize potential bias of the estimated standard errors of our main explanatory variables.

Main Explanatory Variables

The hypotheses require testing the effect of an interaction between diamond production and diamond price on the onset of ethnic civil wars. We proxy diamond production with dummy variables for the presence of both primary and secondary diamond production. This diamond production data is from the Diamond Dataset by Gilmore et al. (2005) and Lujala, Gleditsch, and Gilmore (2005). We use their dummy variables (PDIAP and SDIAP) indicating the presence of production of primary and secondary diamonds respectively.

An advantage of our dataset is the availability of diamond price data which affects the attractiveness and lootability of diamonds. The Mineral Yearbooks of the USGS report annual import data on US imports of rough and uncut natural gem quality diamonds (also including cheap-gem and near-gem qualities). The data lists quantities in carats and worth in nominal US dollars for the imported diamonds by country. Obviously, not all diamonds exported by, for example, Israel were produced in Israel, hence calculating country specific diamond prices to control for differing qualities of diamond mines between countries is problematic. However, assuming that the US is a major importer of rough uncut diamonds, one can expect the US to pay (or even set) the world price which other countries would pay as well. In other words, our assumption follows standard economic theory that arbitrage will level prices among buyers worldwide. Thus, we aggregated the quantities and worth of US diamond imports by year and calculated a yearly world average price for rough and uncut diamonds in US dollars per thousand carats. Using the Penn World Tables' (PWT) output-side real gross domestic product (GDP) price level, we transformed this nominal measure into real 2005 US dollars. The price level of the output-side real GDP is the quotient of purchasing power parities (PPP) and the nominal exchange rate (Feenstra, Inklaar, & Timmer, 2015, pp. 3154–5). The PPP term makes values comparable across time, while the exchange rate term makes them comparable across countries.

As argued above, the lootability of diamonds is also affected by the physical and institutional environment. We use the percentage of roads which are paved as a proxy for how quickly goods can be moved and the costs of exporting in US dollars per container. Both variables were supplied by the World Bank's Africa and World Development Indicators respectively. The cost of exporting refers to all fees in US dollars required to export one 20-

foot container. In order to make this monetary variable comparable to the other ones in our data set, we obtained the nominal export cost and converted it to real 2005 US dollars by dividing the values by the PWT's price level of the output-side real GDP.

The percentage of paved roads and the cost to export measures are fairly new variables and are available only for 10 to 20 years, depending on the country. However, they exhibit few variation across time within countries. Therefore, we used the earliest measure and extended it back in time until the respective country's independence. Since we are interested in generalizable between-country effects without the goal of making predictions for the sample or beyond, and because of its similarity to popular treatments of fractualization measures as constants over time in the peer-reviewed literature, this treatment seems reasonable until better measures are available.

Controls

Aside from the variables linked to lootability, we include three variables that have been found to be related to armed conflict as controls: The gross domestic product (GDP) per capita in million real US dollars, population size in millions, and ethnic diversity. We use natural log transformations of GDP per capita and population after adding one, as is common practice to reduce the positive skewness of the measure. We calculated GDP per capita in order to increase comparability across countries with GDP and population data from the Penn World Tables (v. 8.1) (Feenstra et al., 2015). Ethnic diversity is proxied by the number of politically relevant ethnic groups as provided in the EPR data set.

Further controls include the combined revised Polity IV score, the number of bordering states with societal major episodes of political violence, and the number of peace years. The former two are from the Center for Systemic Peace. We calculated the latter as the number of years elapsed since the last conflict onset as coded in the PRIO/Uppsala Armed Conflicts Data Set. We include this variable to account for the possibility of previous armed conflicts increasing the possibility of further armed conflicts in the future. Similarly, we control for neighboring countries with violent conflicts to account for potential spatial dependencies between neighbors. We include a table with descriptive statistics for all our variables in an appendix at the end of this paper.

Results

The results of our empirical analysis support the underlying logic of the state prize approach as opposed to the lootability approach. The main empirical results are presented in table 1 below. We ran five models with various combinations of primary and secondary diamond production and interactions between those variables and the price of diamonds. In all four models in which primary diamonds (PDIAP) are included, we find a negative relationship between their presence and the likelihood of the onset of an ethnic conflict in that country. When not interacted with price, the result is significant at the .10 level. When the price interaction is included, the significance rises to the .01 level. We find significant evidence that the presence of primary diamonds reduces the likelihood of onset for ethnic conflicts. This finding provides support for the argument that natural resources can boost government capacity.

Table 1: The Effect of Diamond Production on the Onset of Ethnic Armed Conflict

	(1) β/SE	(2) β/SE	(3) β/SE	(4) β/SE	(5) β/SE
PDIAP	-1.208+	-1.262+		-4.066**	-4.172**
	(0.675)	(0.674)		(1.552)	(1.533)
SDIAP	-0.187	-2.080*	-2.427*	-0.185	
	(0.451)	(0.972)	(0.977)	(0.451)	
Diamond price	0.001	-0.001	-0.001	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
PDIAP *				0.004*	0.004*
diamond price (real2005USD)				(0.002)	(0.002)
SDIAP *		0.003*	0.003*		
diamond price (real2005USD)		(0.001)	(0.001)		
% roads paved	-0.035	-0.034	-0.027	-0.036	-0.032
	(0.022)	(0.022)	(0.021)	(0.022)	(0.020)
Cost to export	0.000*	0.000*	0.000*	0.000*	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
no. ethnopolitically relevant groups	0.154*	0.157*	0.127*	0.152*	0.147*
	(0.067)	(0.068)	(0.064)	(0.068)	(0.066)
Controls suppressed	Yes	Yes	Yes	Yes	Yes
Polyn. Splines effects	Yes	Yes	Yes	Yes	Yes
χ^2	463.521	453.845	470.839	454.180	453.746
BIC	500.177	502.616	499.176	502.627	495.317
N	1772	1772	1772	1772	1772

Dependent variable: new ethnic civil war onset (dummy). All explaining variables are lagged by one year; change variables indicate change since the last year; PDIAP = dummy coded 1 if production of primary diamonds in country-year; SDIAP = dummy coded 1 if production of secondary diamonds in country-year; BIC = Schwartz's information criterion. Estimation technique: logit cross-sectional time-series with standard errors clustered by country in parentheses. Unbalanced panel, 1960-2010.
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

In two of the four models in which we included the presence of secondary diamond production, we found a negative relationship between the presence of secondary diamond production and the onset of ethnic conflict. In both models the relationship was significant at the .05 level. As with the result for the primary diamonds, these results argue strongly against our first hypothesis. The sign is the opposite of that expected in H1, that the presence of diamond production in a country will be associated with increased probability of the onset of a war in that country, and the results are consistently significant.

Taken together these two results might also be seen as evidence against the state prize approach and the lootability explanations of civil war. However, the underlying logics of both the state prize approach and the lootability theory depend on the value of the resource. Even a relatively portable resource like diamonds should become more conflict inducing when its value increases. This is the basis of the two variants of hypothesis 2, H2a and H2b.

To test the effect of changing value on the conflict inducing or reducing effects of the presence of diamond production in Sub-Saharan African countries, we interact the presence of primary and secondary diamond production with the price of diamonds. In all the models

in which such interactions were included, we found that increases in price lead to a shift in the effect of both types of diamond production in a conflict inducing direction. In other words, while the presence of diamond production by itself seems to be peace inducing, the peace inducing effect is undermined when diamond prices increase. That this effect is observed with regard to both primary and secondary diamonds indicates support for H2a but not H2b. In short, our results support the "state prize" approach more than the lootability approach.

Our third hypothesis is designed to shed light on the ability of the state to impose its will throughout the state's territory. We expect that a more extensive road network would be negatively associated with the onset of ethnic conflict. Our results show no significant relationship between road network and the onset of ethnic conflict. It is possible that road networks cut both ways. On the one hand, roads enable the state to gain access to and control regions of the country. On the other hand, roads may also enable potential rebels to smuggle lootable goods and resources out of the country to finance their activities.

Our fourth hypothesis also addresses an element of the lootability theory. When the costs to legally export goods increase, it will increase the profitability of and incentives to engage in smuggling. To shed light on this we include the cost to export in all of our models. In each model, our statistical results show that as the costs of export increase and the likelihood of the onset of ethnic conflict also increases. This relationship is significant at the .05 level in all five models. However, the coefficient is extremely small, less than .001, which suggests that we have reason to expect that the cost to export, in its current proxy, has no effect on the onset of ethnic armed conflict.

Discussion

The broad conclusion of our findings is that the "state prize" approach seems to be a better predictor of how ethnic conflict emerges than the lootability approach. We find that diamond production of both primary and secondary diamonds is associated with decreased onset of ethnic wars. This finding would tend to support the state capacity perspective. As noted, some claim that the rents from natural resources can strengthen a government in a number of ways and thus make it is less susceptible to insurgencies. We also believe that this may be because the presence of diamonds provides an incentive for the state to establish a presence in the diamond producing areas. This additional attention may take the form of increased state control (more police, more military, etc.) and/or an increase in public spending on infrastructure in the region. Both of these features may lead to our finding a negative relationship between diamond production and the onset of ethnic wars.

Our finding that the extent of the road system is also negatively associated, albeit not significantly, with the onset of ethnic conflict is consistent with our speculative explanation for the diamond production result. Roads are both a symbol of and a necessary condition for effective government in a region. Roads carry police and the military to potential trouble spots. Roads also carry economic opportunities that may defray the incentives to oppose the state. It may be the case that governments build roads to areas with diamond production in order to establish control over that territory. If that is the case, it would explain both basic results. However, the lack of significance for our roads variable may indicate from roads making it easier for smugglers to get lootable resources to market.

However, when we interact diamond production with the price of diamonds, we find that as price increases the peace inducing influence of diamond production is diminished. That

this finding is present with both types of diamonds is consistent with the "state prize" approach. Our findings suggest that as the price of both primary and secondary diamonds increases, their usefulness as a revenue stream supporting ethnic conflict increases. The two types of diamonds are a good test for comparing the "state prize" approach to the lootability argument because while primary diamonds are infrastructure intensive, secondary diamonds are not. Furthermore, the profitability of both types of diamonds are particularly sensitive to effects of price. They are small and portable and when prices increase, greater amounts of value can be extracted and exchanged for the tools of war with less effort.

Our results build on previous examinations of commodity price shocks, particularly Ross (2006). We make two contributions. First, we examine both primary and secondary diamond production and find that price interacts with both in similar ways. Primary diamond production requires more infrastructure and may therefore be thought to be less lootable. However, secondary diamonds are the classic lootable commodity. That we find that increasing diamond prices have a conflict inducing influence on both types of diamonds supports the lootability approach.

Second, we frame our analysis in the context of comparing the "state prize" approach to the lootability argument. Like past analyses of lootability we distinguish between two resources, primary and secondary diamonds based on our assessment of whether they are lootable or not. By including price, we are able to see variation in the lootability of a commodity over time and directly test an important component of the lootability mechanism. As prices increase, the amount of value that can be transported for a given amount of effort increases. In short, when prices increase, the value of that commodity as loot should also increase. Furthermore we can examine the effects of price in both a lootable and infrastructure intensive resource. Our findings show that the effect of diamonds on the onset of ethnic conflict moves in a conflict inducing direction as the price of diamonds increases. This is consistent with the logic of lootability. However, that this effect occurs in both primary and secondary diamonds is contrary to the expectations of the lootability approach and consistent with the "state prize" approach.

Our findings also point to a series of new research questions regarding the relationship between commodity prices and government authority and effectiveness. For example, further research could examine the costs incurred by the state protecting valuable resources. Our findings that the presence of diamonds are negatively associated with the onset of ethnic conflict interacts with our lack of a significant roads result to encourage further research. Taken together these two results suggest an intriguing relationship between lootable resources, conflict, and institutionalization. A specific examination of institutionalization's effects on conflict is beyond the scope of our current analysis. However, our findings certainly underscore the desirability of further research in that area.

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Appendix

Table 1: Descriptive Statistics

	min	max	mean	SD	N
Ethnic civil war onset dummy	0	1	0.0265	0.161	1772
primary diamond production	0	1	0.226	0.419	1772
secondary diamond production	0	1	0.387	0.487	1772
diamond price (real2005USD)	197.8	1315.6	553.5	200.2	1772
% roads paved	0.800	54.90	16.56	10.15	1772
Cost to export	463	5500	1738.7	995.7	1772
no. ethnopolitically relevant groups	0	13	4.792	3.082	1772
Population (millions, ln)	0.329	5.047	2.045	0.966	1772
PolityIV	-10	9	-2.853	5.693	1772
GDP pc, ln	5.225	9.823	7.251	0.719	1772
GDP pc change	-60.22	139.9	1.297	10.10	1772
no. bordering states with societal MEPV	0	6	1.022	1.174	1772
no. peace years	0	49	12.07	11.72	1772

Change variables indicate change since the last year; pc = per capita; diamond price = yearly average of US import price for rough and uncut diamonds in real 2005 USD; population numbers in million; GDP measures are in million real chained PPP, constant 2005USD, and per capita; societal MEPV = civil or ethnic major episode of political violence.

Table 2: The Effect of Diamond Production on the Onset of Ethnic Armed Conflict

	(1) β/SE	(2) β/SE	(3) β/SE	(4) β/SE	(5) β/SE
PDIAP	-1.208+	-1.262+		-4.066**	-4.172**
	(0.675)	(0.674)		(1.552)	(1.533)
SDIAP	-0.187	-2.080*	-2.427*	-0.185	
	(0.451)	(0.972)	(0.977)	(0.451)	
Diamond price	0.001	-0.001	-0.001	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
PDIAP * diamond price (real2005USD)				0.004*	0.004*
				(0.002)	(0.002)
SDIAP * diamond price (real2005USD)		0.003*	0.003*		
		(0.001)	(0.001)		
% roads paved	-0.035	-0.034	-0.027	-0.036	-0.032
	(0.022)	(0.022)	(0.021)	(0.022)	(0.020)
Cost to export	0.000*	0.000*	0.000*	0.000*	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
no. ethnopolitically relevant groups	0.154*	0.157*	0.127*	0.152*	0.147*
	(0.067)	(0.068)	(0.064)	(0.068)	(0.066)
Population (millions, ln)	0.306	0.322+	0.268	0.323+	0.355*
	(0.192)	(0.193)	(0.192)	(0.193)	(0.178)
PolityIV	0.042	0.047	0.044	0.046	0.046
	(0.035)	(0.035)	(0.034)	(0.034)	(0.034)
GDP pc, ln	-0.665***	-0.588***	-0.581***	-0.620***	-0.641***
	(0.130)	(0.135)	(0.135)	(0.133)	(0.123)
GDP pc change	0.025*	0.026*	0.027*	0.024*	0.024*
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
no. bordering states with societal MEPV	-0.143	-0.137	-0.169	-0.105	-0.109
	(0.157)	(0.159)	(0.157)	(0.161)	(0.160)
*no. peace years	-0.000	-0.000	-0.002	0.001	-0.000
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Polyn. Splines effects	Yes	Yes	Yes	Yes	Yes
χ^2	463.521	453.845	470.839	454.180	453.746
BIC	500.177	502.616	499.176	502.627	495.317
N	1772	1772	1772	1772	1772

Dependent variable: new ethnic civil war onset (dummy). All explaining variables are lagged by one year; change variables indicate change since the last year; PDIAP = dummy coded 1 if production of primary diamonds in country-year; SDIAP = dummy coded 1 if production of secondary diamonds in country-year; pc = per capita; ln = variable is transformed with the natural logarithm; population numbers in million; GDP measures are in million real chained PPP, constant 2005USD, and per capita; price variables are in real 2005 USD via transformation using PPPs with US2005=1; societal MEPV = civil or ethnic major episode of political violence; BIC = Schwartz's information criterion. Estimation technique: logit cross-sectional time-series with standard errors clustered by country in parentheses. Unbalanced panel, 1960-2010.
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001