Society and Natural Resources, 28:149–164

ISSN: 0894-1920 print/1521-0723 online
DOI: 10.1080/08941920.2014.941447

Routledge
Taylor & Francis Group

The Socioeconomic Determinants of Natural Resource Conflict: Minerals and Maoist Insurgency in India

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This article analyzes a unique district-level data set to demonstrate that mineral abundance increased the probably of Maoist insurgency in India over the past three decades. Nevertheless, we show that this finding must be qualified in two respects. First, mineral abundance has a much stronger effect on the probability of insurgency after the liberalization of the mining sector in the mid-1990s, which precipitated the rapid expansion of mining and related activities. Second, mineral abundance has a much stronger effect on the probability of insurgency in the central Indian tribal belt, where communities have strong symbolic and material links with nature. Our analysis contributes to the broader debate on resource conflicts—which is largely informed by cross-national statistical analyses. It suggests that abundant natural resources do not mechanically increase the probability of insurgency. Rather, economic policy and social structure play a crucial but overlooked role in mediating this relationship.

Keywords civil war, India, liberalization, Maoist insurgency, minerals, mining, naxalites, resource conflict, resource curse, tribal belt

It is widely argued that natural resource abundance increases the likelihood that a country will experience negative economic, political, and social outcomes (see Rosser 2006). One of the main resource curse subliteratures concerns whether or not there is a relationship between natural resource abundance and civil war (see Ross 2004a; 2004b; McNeish 2010). The vast majority of research on this question is based on cross-national statistical analysis, and pays little or no attention to the possible mediating role of social and political variables (le Billon 2001; Rosser 2006). This article contributes to the debate on natural resource conflict by concentrating on one conflict in one country: the Maoist or "Naxalite" insurgency in India.

Orthodox economists see the liberalization of the Indian economy, which began in the early 1990s, as a resounding success (e.g., Wilson and Purushothaman 2003). During the same period, Maoist insurgents became an increasingly strong political force in parts of India.[1] The Maoist Communist Centre and People's War Group were the most important insurgent organizations until they unified to form the

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Communist Party of India (Maoist) in 2004. The insurgent leaders tend to be ideologically enthused, middle-class, upper-caste men whose stated aim is to capture state power through protracted guerrilla war (see Kennedy and Purushotham 2012). In the 1980s the insurgents found mass support among lower-caste landless laborers on the plains of Andhra Pradesh and Bihar. Since the 1990s, insurgent activity has expanded dramatically in mineral-rich areas of central and eastern India that are inhabited by tribal communities—most notably the states of Chhattisgarh, Jharkhand, and Odisha (Kennedy and King 2013). According to the Ministry of Home Affairs, the insurgents currently control 40,000 km^2 of territory—an area similar in size to Switzerland (*Times of India* 2009)—and former Prime Minister Manmohan Singh describes the insurgency as "the single biggest internal-security challenge ever faced by our country" (quoted in Kennedy 2013, 2).

This article uses a unique district-level data set to investigate the relationship between mineral abundance and the Maoist insurgency.[2] To the best of our knowledge only one other study uses a similar strategy. Its findings are inconclusive: "Mining activity under some conditions increases the likelihood and intensity of conflict"—most notably when they control for untouchables and tribal communities (Hoelscher et al. 2012, 143). We analyze a data set that covers a longer period of time—1982–2011, compared to 2004–2010—and a larger area—all 18 major states of India, compared to the 6 states most affected by insurgency—to address three questions: What is the relationship between the abundance of minerals and Maoist insurgent activity in India? Did the relationship change after the liberalization of the mining sector in the 1990s? And was this relationship different in the central Indian tribal belt, where tribal communities have particularly strong symbolic and material links with nature?

Understanding the Connection between Minerals and Insurgency

The Resource Curse and Internal Conflict

Until the 1980s, orthodox economists saw natural resource abundance as beneficial for development (e.g., Balassa 1980; Krueger 1980). But since then it has been widely argued that "natural resource abundance (or at least an abundance of particular types of natural resources) increases the likelihood that countries will experience negative economic, political and social outcomes including poor economic performance, low levels of democracy, and civil war" (Rosser 2006, 7).

Over the past two decades there has been a proliferation in research that analyzes cross-national data sets to investigate the relationship between natural resources and internal conflict. Several influential studies have concluded that natural resource abundance—operationalized as the ratio of primary exports or a specific natural resource to gross domestic product (GDP), or the presence of a particular natural resource—is a strong and significant determinant of civil war onset (Collier and Hoeffler 1998; 2004; 2005; Reynal-Querol 2002; Lujala 2010). However, other studies have refuted this connection or qualified the link between natural resource abundance and internal conflict (see Ross 2004a, 2004b, 2006; Hegre and Sambanis 2006; McNeish 2010). Broadly speaking, the causal mechanisms that link natural resource abundance and internal conflict in cross-national statistical studies are rationalist. Natural resources provide insurgents with economic incentives and opportunities: They are motivated by the desire to either enrich themselves or to

generate the resources necessary to undertake guerrilla warfare—that is, buy arms or pay the rank and file. In addition, because insurgents are assumed to be rational actors, they are most likely to operate in areas where there is little risk of being sanctioned by the state—and it is widely argued that abundant natural resources provide easily accruable rents that sustain weak political structures (see Rosser 2006).

To some extent the rationalist explanation helps us understand the motivations of Maoist insurgents in India. It is estimated that they generate between 15 and 20 billion rupees ($300–$400 million) per year, primarily by extorting money from economic actors ranging from forest produce traders to large mining companies (*Times of India* 2009; Satapathy et al. 2010). The largest source of income is the mining industry. India is the third largest producer of coal in the world, and the fourth largest producer of bauxite and iron ore (Indian Bureau of Mining 2012). Large quantities of these minerals are extracted and processed in areas of central and eastern India that are under insurgent control—and the insurgents have the capacity to severely disrupt these operations. A senior official working for the (state-owned) National Mineral Development Corporation claimed that in 2009 the Bailadila iron ore mines in Dantewara, Chhattisgarh, lost 4.8 billion rupees ($96 million) as a result of Maoist interference, which included attacks on railway tracks and trains, and *bandhs* (general strikes) (Ghosh 2010). With the Indian state unable to guarantee their security, many corporations cut deals with the insurgents. In 2005 ESSAR (an Indian conglomerate) opened a 267-km pipeline to transport iron ore slurry from Dantewara, through Maoist-dominated areas, to the port of Vishakhapatnam in neighboring Andhra Pradesh. The pipeline was subject to a number of attacks, and Vishwa Ranjan, who served as Chhattisgarh's Director General of Police from 2007 to 2011, recalls that "the company's security officer suggested we raise a battalion that they would fund" (Sharma 2011). Ranjan "turned down the suggestion because a force cannot be raised for a private company" (Sharma 2011). Instead, ESSAR agreed to pay protection money to the insurgents in order to guarantee the security of their operations, halting the attacks.[3] The story is similar for smaller scale illegal mining activities, which are widespread in central and eastern India. For example, an illicit mine owner from Jharkhand agreed to pay the insurgents 5% of his $4 million annual revenue after they kidnapped him at gunpoint. He told Miklian and Carney (2010) that "most of the mines in this state are in the forests, so we are easy targets [for the insurgents]... The only way to stop the attacks is to negotiate."[4]

There is a second explanation for the link between natural resource abundance and insurgency: The extraction of natural resources entails land expropriation, displacement, and environmental degradation, which is often accompanied by coercion and insufficient compensation, and this encourages the affected population to side with antistate, anticapitalist insurgents. This causal mechanism is largely ignored by cross-national statistical analyses, but finds strong support among anthropologists and human geographers—as well as journalists and activists—who undertake research on the ground. McNeish (2010, 3) notes: "Over the last decade and a half there has been a dramatic growth in mining activity and connected violent protest in many countries in the global south." This is perhaps most notable in Latin America, where the recent expansion of natural resource extraction has had disastrous consequences for local populations, resulting in resistance and, in some cases, violent conflict (Bebbington 2009; Arellano-Yanguas 2011).

Again, the Indian case provides a fair amount of evidence to support this argument. As Miklian and Carney (2010) note, abundant mineral resources have "been

managed so disastrously that many locals—uprooted, unemployed, and living in a toxic and dangerous environment, due to the mining operations—have thrown in their lot with the Maoists." Since 1951, 3 million people have been displaced as a result of mining and mining-related projects in India and the livelihoods of many more people have been destroyed (Padel and Das 2010, 55). The vast majority of these people receive little or no compensation, and they have very few possibilities to peacefully object to these developments. Consequently, they are open to the influence of the Maoist insurgents, who have an appealing antistate, anticapitalist ideology and provide an organizational framework that is powerful enough to challenge the power of the state and the mining companies—at least at the local level (Kujur 2006; Miklian and Carney 2010; Navlahka and Myrdal 2010; Roy 2010; Kennedy and King 2013). For example, Arundhati Roy (2010) notes how Tata cooperated with local politicians and police to repress dissent and coerce the population into consenting to a steel plant in Lohandiguda, southern Chhattisgarh. The insurgents moved into the area in order to help the local population resist the development "after graffiti had begun to appear on the walls of village houses, saying, *Naxali aao, hamein bachao* [Naxals come and save us]!" (Roy 2010).

Social and Political Variables

The accounts just set out help us understand why some areas are affected by insurgent activity whereas others are not. They have, however, been criticized for explaining insurgent activity "solely in terms of the size and nature of countries' natural resource endowments" when "a consensus is emerging that various political and social variables mediate the relationship" (Rosser 2006, 3). To understand the role played by political and social variables, we must appreciate the manner in which natural resources are politically and socially constructed (le Billon 2001). The transformation of nature into commodities is a highly politicized process that involves, among other things, the definition of property rights and the allocation of profits. The risk that this involves violence is strongly influenced by "the pattern of social relations, as well as the quality and democracy or legitimacy of institutions" (le Billon 2001, 568). It seems apparent that an abundance of natural resources is not a sufficient condition for insurgency: Given favorable social and political conditions, natural resources can be used for peaceful development—as in Norway or Botswana. We next explore how economic policy and social structure mediate the relationship between minerals abundance and Maoist insurgent activity in India.

The Liberalization of the Mining Sector

The greatest change in economic policy in the history of independent India was the liberalization of the economy that began in the early 1990s. From 1947 onward, India's economic strategy placed a strong emphasis on centralized planning, protectionism, import substitution, a large public sector, and strong regulation of private business (Bhaduri and Nayyar 1996). This changed rapidly and dramatically in response to a balance of payments crisis in 1990–1991 and the World Bank's subsequent structural adjustment program. The liberalization of the Indian economy has been implemented with increasing scope and intensity ever since.

This shift in economic policy is apparent in the mining sector. From independence in 1947 to the early 1990s, mining operations were controlled by Public Sector

Undertakings and foreign ownership was limited to 40%. Moreover, the Indian state's policy toward mineral exploitation was conservative. For example, the second Planning Commission report viewed mineral resources as "wasting assets: once they are taken out of the ground and utilised they are lost forever" (quoted in Padel and Das 2010, 191). The liberalization of the Indian economy that began in the early 1990s and in particular the new National Mineral Policy (Government of India 1993) extended the rights of both private domestic and foreign companies to participate in the mining sector, exploit minerals, and expatriate profits. Since then the liberalization of the mining sector has continued to gather pace. In 2008 a new National Mineral Policy was passed and a Mines and Minerals (Development and Regulation) Act was introduced in 2012 (Government of India 2008; 2012). This legislation is designed to make it easier for corporations to extract mineral resources and more difficult for objectors to hold up the process (Government of India 2008; 2012). The assumption underlying this policy shift is that mineral reserves must be extracted quickly for the benefit of society. P. Chidambaram, the former Union Minister of Finance,[5] remarked: "Mineral wealth is wealth that must be harvested and used for the people" (Chaudhury 2009) and "Of what use are minerals, if they cannot be . . . mined and used for producing value-added goods and they remain buried in mother earth for the next million years?" (Dholabhai 2012).[6]

Liberalization has brought about a proliferation of mining activities in rural India—particularly since the turn of the century. As Arundhati Roy (2010) notes: "Over the past five years or so, the governments of Chhattisgarh, Jharkhand, Orissa and West Bengal have signed hundreds of MoUs [memoranda of understanding] with corporate houses, worth several billion dollars, all of them secret, for steel plants, sponge-iron factories, power plants, aluminium refineries, dams and mines." Communist Party of India (Maoist) General Secretary Ganapathy argues that the intention of the Indian state, in alliance with "corporate comprador big business houses," is "to drain the rich mineral and forest wealth" (Communist Party of Nepal (Maoist) 2007, 72). A pamphlet produced by the Dandakaranya Special Zonal Committee went further, stating, "It is against this violence that we have been compelled to answer with 'violence.' Had we not resisted, they would have succeeded in their objective" (quoted in Navlakha and Myrdal 2010).

Mining in the Central Indian Tribal Belt

Historically, the greatest social cleavage in India is between "heterogeneous, differentiated and stratified" Hindu society that inhabited the plains, and "homogenous, undifferentiated and unstratified" tribal communities that lived in hilly, forested areas (Béteille 1986, 311; Xaxa 1999; Padel 2010). The 84 million people who are classified as Scheduled Tribes belong to 698 separate communities that vary enormously in terms of population size, geographic spread, mode of livelihood, social organization, language, and customs (Government of India 2006). Despite their differences, historically tribal communities had one thing in common: "They all stood more or less outside Hindu civilization" (Béteille 1986, 316) or they "continued to be distinct because they escaped colonisation and subjugation" (Xaxa 1999, 3593). In practice, this meant that tribal communities tended to have strong material and symbolic links to the natural world. The forests historically provided them with their primary means of subsistence: They practiced shifting cultivation, hunted, and collected forest produce for food, fuel, medicines, buildings materials, and alcohol, as

well as to exchange with traders from the plains for salt, cloth, and cash (Béteille 1986; Xaxa 1999; Sundar 2007; Padel 2010; Kennedy and King 2013). Over the past two centuries the state gradually increased its control over tribal communities' historic homelands and many tribal people have been alienated from their land. Nevertheless, forest resources continue to play an important role in the tribal livelihoods; for example, the Government of Chhattisgarh (2005, 204) estimates that in Dantewara district 40% of tribal communities' livelihood comes from the forest, while 30% comes from agriculture, 15% from animal husbandry, and 15% from wage labor. Moreover, tribal religions tend to worship the spirits of nature—the trees, mountains, and streams in the areas that they live. One woman who had observed the destruction of holy sites in her village and the surrounding area in order to make way for Lanjigarh refinery in Orissa exclaimed to Padel and Das (2010, 365): "They even destroyed our Gods." Additionally, metals are thought to be sacred substances: to rip up forests and mountains, to ruin springs, and to pollute streams and rivers, in order to extract metals and sell them for profit, is seen as a particularly degenerate act (Padel and Das, 2010). We would expect that because tribal communities tend to have stronger material and symbolic attachment to the natural world, mining activities will be more destructive to their lives and livelihoods, and therefore more likely to lead to violent resistance and insurgency.

Furthermore, in tribal areas the state's role as facilitator of mining activity takes a form that is reminiscent of its colonial predecessor (Sundar 2007; Padel 2010; Kennedy and King 2011). This is not just motivated by economic concerns—it is also related to the view that tribal communities are "backward Hindus" who needed to be forcefully developed into useful citizens (Sundar 2007; Padel 2010; Kennedy and King 2011). Former Minister of Finance Chidambaram sums this view up: "Do you want the tribals to remain hunters and gatherers?" (Chaudhury 2009) and "We are not building museums here, we are building a modern society, a modern state" (Dholabhai 2012). The provisions of the Fifth Schedule of the Indian Constitution (Government of India 1950), as well as later legislation such as Panchayats (Extension to the Scheduled Areas) Act (Government of India 1996) and *Samatha* judgment,[7] should protect tribal communities' rights to their land. But in practice, the spirit of this legislation is subverted and the state uses the colonial-era Land Acquisition Act (Government of India 1894) to expropriate land for development projects that are deemed to be "in the public interest" (Sundar 2007; Padel and Das 2010; Kennedy and King 2011).[8] The state and mining companies use police and goonda violence to suppress protests against these processes. For example, in January 2006, in Kalinganagar in Jajpur, Orissa, police shot 12 tribal people protesting because they were not adequately compensated for an iron ore mining and processing project being built by Tata Steel on their land (Padel and Das 2010). The brutality of the neo-colonial state is perhaps most evident in Dantewara district, southern Chhattisgarh. In 2005, as the state government signed memoranda of understanding with Tata and ESSAR to build steel plants, Salwa Judum—a counterinsurgent militia funded by the state and these mining companies—displaced a quarter of a million tribal people in a process that was accompanied by murder, burning of houses, looting, and sexual violence (Sundar 2007; Navlakha and Myrdal 2010; Roy 2010; Kennedy and King 2011, 2013). Thus, Arundhati Roy (2010) argues:

> If the tribals have taken up arms, they have done so because a government which has given them nothing but violence and neglect now wants

> to snatch away the last thing they have—their land. Clearly, they do not believe the government when it says it only wants to "develop" their region . . . They believe that if they do not fight for their land, they will be annihilated. That is why they have taken up arms.

Mechanism and Hypotheses

It is widely argued that mineral abundance increases the likelihood that an area will be affected by insurgency. This is because mining activity provides insurgents with opportunities to generate income and because mineral extraction negatively affects local communities who then side with antistate, anticapitalist insurgents.

> Hypothesis 1. The likelihood of an area being affected by Maoist insurgent activity will be higher where there are abundant mineral resources.

It is probable that political and social variables will mediate this relationship between natural resource abundance and insurgency. We predict that mineral abundance is more likely to lead to insurgency after liberalization of the mining sector. Liberalization opened mining to private and foreign companies, and closed many of the peaceful channels through which objectors could hold up mining projects. Consequently, it brought about a rapid expansion of mining and related activities in rural areas. This increased insurgents' opportunities to generate resources. It also increased the number of communities aggrieved by planned projects and projects—at the same time as it was becoming increasingly difficult for communities to stop projects through nonviolent means.

> Hypothesis 2. The effect of abundant mineral resources on the likelihood of Maoist insurgent activity will be stronger after the liberalization of the mining sector.

Finally, we predict that tribal communities are more likely than lower caste landless laborers to react to mining projects by siding with antistate, anticapitalist insurgents. There are two reasons for this. First, tribal communities have strong material and symbolic links with the natural world, and are, therefore, more negatively affected by mining projects. Second, the state is more brutal in its treatment of tribal communities who object to mining projects because they are viewed as "backward Hindus" who must be forcefully developed.

> Hypothesis 3. The effect of abundant mineral resources on the likelihood of Maoist insurgent activity will be stronger in areas that are inhabited by tribal populations.

Models and Results

Research Plan

Broadly speaking, there are two main research strategies for studying insurgency. The first concentrates on the national level and involves statistical analyses of cross-national data sets. This is problematic because most internal conflicts occur in limited

parts of a country and can be best explained in terms of subnational characteristics (Kalyvas 2006). For example, in cross-national analyses, natural resource abundance is operationalized as the export value of natural resources or a specific resource type as a proportion of total economic output or total exports, or the presence of a particular natural resource. But insurgent activity is not necessarily located in the same part of a country as the natural resources (Lujala 2010). The second strategy concentrates on the local level and collects ethnographic data on one case or a small number of cases. Such studies provide important insights into the nature of insurgency. But because their spatial and temporal scope is narrow and they necessarily select on the dependent variable, there are obvious limitations to generalizing the findings.

This study concentrates on the interface between political actors and local populations (Kalyvas 2006). In the previous section we generated hypotheses from a close reading of narrowly focused studies that concentrate on the local level, and in the next section we use a unique district-level data set to test the generalizability of these hypotheses. Our strategy allows us to undertake an analysis that is systematic and broad in scope, but that pays close attention to the specific context of this resource conflict. We appreciate that in social reality there is a large extent of local variation regarding the specific causes of insurgency. Nevertheless, our research plan allows us to identify patterns and trends that might be overlooked by narrowly focused ethnographic studies.

To the best of our knowledge, only one other study uses a similar strategy to investigate the relationship between mineral abundance and Maoist insurgency activity (Hoelscher et al. 2012). Our analysis improves on this study in several respects. First, the Hoelscher et al. (2012) sample is limited to six Indian states that have been most affected by insurgent activity. It therefore limits its sample by selecting on the dependent variable. Our sample includes all states regardless of whether or not they have been affected by the insurgency—with the exception of Jammu and Kashmir and the northeastern states that have experienced non-Maoist insurgencies over the past three decades. It covers districts inhabited by 93.5% of the Indian population, compared to just 27.9% in Hoelscher et al. (2012). Second, the present wave of insurgent activity began in the early 1980s and the liberalization of the mining sector began in the 1990s, but the Hoelscher et al. data set only covers the period 2004 to 2010. Our data set covers the period 1982 to 2011, allowing us to investigate how the effect of mineral abundance on insurgency has changed over time and, in particular, the effect of the liberalization of the mining sector.

Variables

The dependent variable in our analysis is the onset of insurgent activity. We documented all fatalities in incidents involving Maoist insurgents that were reported in *The Times of India* (Mumbai edition), India's most widely read English-language newspaper, between 1982 and 2011. There were 1,106 fatal incidents in this period, resulting in 4,698 deaths. We operationalized the onset of insurgent activity in two ways. First, we coded the first year in which there were more than the mean number of conflicts deaths per decade (four) as 1; all further cases in which a district experienced more than the threshold of conflict deaths are dropped; and all cases in which there were fewer than the threshold of conflict deaths are coded as 0.[9] Seventy-two out of 1,111 (11%) districts were affected by onset of insurgent activity.

Second, in order to test the hypothesis that the relationship between mineral abundance and insurgency is different in areas that are predominantly inhabited

by tribal communities, we disaggregate the dependent variable. This method is firmly established in cross-national analyses in which authors seek to test whether two, rather than one, causal pathways explain civil war onset (Sambanis 2001; Buhaug 2006). We operationalize tribal areas as districts covered by the Fifth Schedule of the Indian Constitution, legislation designed to protect tribal communities from being dispossessed of their lands and natural resources in areas they have historically inhabited (Government of India n.d.). Nineteen percent of districts in the sample are located in tribal areas. In this formulation the dependent variable is split into three categories: 0 for districts not affected by insurgent activity; 1 for onset of insurgency in districts not covered by the Fifth Schedule (''Hindu areas''); and 2 for Fifth Schedule districts that experience onset of insurgent activity (''tribal areas''). Forty-five (62.5%) affected districts are in Hindu areas, whereas 27 (37.5%) are in tribal areas.

The key independent variable is the presence of ''important'' (i.e., commercially viable) reserves of bauxite, coal, and iron ore deposits in a district, according to the Indian Bureau of Mining (2011 and other years) *Indian Minerals Yearbook*. Three hundred forty-seven out of 1,194 (29.1%) districts in the sample meet these criteria. Hoeschler et al. (2012) use official revenues from iron ore and coal mining as their dependent variable. We include bauxite because several qualitative studies suggest that bauxite mining and processing is linked to insurgent activity (Kujur 2006; Padel and Das 2010). Moreover, Hoeschler et al.'s (2012) use of official revenue data might be problematic because—as one of the co-authors (Miklian and Carney 2010) notes elsewhere—much of the mining activity in insurgent-affected areas is illegal (and therefore not taxed by the state). What is more, as we note, state-mining company coercion and violence that precede mining activity—rather than the mining activity itself—are often an important source of conflict. Consequently, although a dummy variable for whether or not there are commercially viable quantities of minerals is less precise than mining revenue, it should more accurately capture the mechanisms that link mineral abundance and insurgent activity.

We control for several other variables. First, we include the log-transformed total district population because due to the way that insurgent activity is operationalized, more populous districts are *ceteris paribus* more likely to be affected by insurgent activity (Fearon and Laitin 2003; Collier and Hoeffler 2004; Sambanis and Hegre 2006). Second, we control for the level of development because it has been argued that in less developed areas both state capacity and the opportunity cost of rebellion are lower (Fearon and Laitin 2003; Collier and Hoeffler 2004; Sambanis and Hegre 2006). Cross-national studies would tend to use per-capita GDP, but because these data are not available at the district level we use literacy rates. Third, because state power tends to be weaker in rural areas, insurgents are able to build up base areas in the countryside without interference from the state (Fearon and Laitin 2003; Collier and Hoeffler 2004; Hegre and Sambanis 2006; Kalyvas 2006). We therefore control for the proportion of inhabitants that live in rural areas. The data for these three variables come from the *Census of India* (Government of India 1981; 1991; 2001). Finally, we add a calendar year variable to capture possible changes in the political climate over time.[10]

Results

The results of our analysis are reported in Tables 1 and 2. As the census data we use for independent variables are enumerated decennially, the temporal unit of our

Table 1. Liberalization, mining, and insurgency: Binomial logistic regressions showing odds of Maoist insurgency by district

	1982–2011 (1)	1982–2011 (2)	1982–2011 (3)	1982–1991 (4)	1992–2001 (5)	2002–2011 (6)
Mineral abundance	3.084***	2.921***	3.139***	2.151	2.228	6.392***
	(.836)	(.761)	(.854)	(.973)	(1.107)	(3.085)
Pre/post 1991	—	1.262	—	—	—	—
		(.347)				
Pre/post 2001	—	—	2.000*	—	—	—
			(.662)			
Total population ('000, log)	1.935*	1.908*	1.981*	4.661***	3.721	.963
	(.492)	(.480)	(.505)	(1.873)	(2.659)	(.293)
Literacy, %	.972*	.980*	.970*	.936*	.965*	.978*
	(.011)	(.010)	(.011)	(.025)	(.017)	(.020)
Rural population, %	1.026	1.029	1.025	1.010	1.008	1.051*
	(.016)	(.016)	(.015)	(.019)	(.028)	(.025)
Year	1.034	—	—	—	—	—
	(.020)					
n	1,111	1,111	1,111	339	348	424

Note. Constants are calculated but not reported. Models 1 to 6 are binomial regressions that report the odds of a district being affected by insurgent activity. Significant differences: $^{*}p \leq .05$ (5%), $^{**}p \leq .01$ (1%), $^{***}p \leq .001$ (0.1%).

analysis is decades. The 1981 data are used to explain the insurgent activity in the period 1982 to 1991, and so on. The 1-year lag between independent and dependent variables reduces endogeneity. As the dependent variable is binary we use logistic regression. Table 1 shows the results of binomial logistic regressions in which districts affected by insurgency are coded as 1 and all others are coded 0. We report odds ratio, the exponentiated regression coefficient. In parentheses we specify robust standard errors clustered by district to account for the nonindependence of observations from the same district. In Table 2, we report the results of binomial regressions, as well as the multinomial logistic regression in which affected districts are divided into those in Hindu areas—coded 1—and those in tribal areas—coded 2. In the multinomial regressions we report relative risk ratio, the equivalent of odds ratio for multinomial regression. Again, robust standard errors clustered by district are in parentheses. The third column in the multinomial regression model gives the probability that the estimates for the two alternative outcomes—that is, in tribal and nontribal districts—are statistically different.

Model 1 provides strong evidence to support hypothesis 1: Throughout the whole period, across the whole of India, districts that possess an abundance of bauxite, coal or iron ore were 3.1 times more likely to affected by insurgent activity that those that did not ($p < .001$).

Models 2 to 6 enable us to test hypothesis 2, which predicts that the effect of mineral abundance on the likelihood of Maoist insurgent activity will be stronger after the liberalization of the mining sector. Model 2 includes a pre-/post-1991 dummy variable, which is not significant. Model 3, which includes a pre-/post-2001

Table 2. Social structure, mining, and insurgency: Binomial and multinomial logistic regressions showing odds of Maoist insurgency by district

	Binomial			Multinomial		
	All India			Hindu	Tribal	$p(\beta H \neq \beta T)$
	(7)	(8)	(9)	(10)		
Mineral abundance	3.084***	2.490***	2.529***	1.543	10.903***	<.001
	(.836)	(.657)	(.670)	(.516)	(5.274)	
Tribal district	—	2.368**	2.368**	—	—	—
		(.678)	(.678)			
Pre/post 2001	—	—	1.971*	—	—	—
			(.663)			
Total population ('000, log)	1.935*	2.074**	2.126**	2.496**	1.199	.171
	(.492)	(.534)	(.541)	(.764)	(.528)	
Literacy, %	.972*	.975*	.973*	.980	.958*	.300
	(.011)	(.011)	(.012)	(.012)	(.019)	
Rural population, %	1.026	1.023	1.022	1.035	1.009	.337
	(.016)	(.015)	(.015)	(.022)	(.018)	
Year	1.034	1.033	—	1.021	1.054	.362
	(.020)	(.020)	—	(.025)	(.030)	
n	1,111	1,111	1,111	1,111		

Note. Constants are calculated but not reported. Models 7 to 9 are binomial regressions that report the odds of a district being affected by insurgent activity. Model 10 is a multinomial regression in which the dependent variable is bifurcated into insurgent affected districts where the social structure is typical, respectively, of Hindu and Tribal society. The third column gives the probability that the variable estimates for the two alternative outcomes are statistically different. Signficant differences: $^{*}p \leq .05$ (5%), $^{**}p \leq .01$ (1%), $^{***}p \leq .001$ (0.1%).

dummy variable, shows that districts are two times more likely to experience onset of insurgency after 2001 ($p = .036$). The effect size and significance of mineral abundance remain unchanged. We then run regressions with limited samples: 1982–1991 in model 4, 1991–2001 in model 5, and 2002–2011 in model 6. For the periods 1982–1991 and 1991–2001, there is not a significant relationship between the presence of minerals and insurgent activity—in both cases the odds ratio was just over 2 and the p value about .100. There is, however, a significant relationship between the presence of minerals and insurgent activity in the period 2002–2011: Districts with commercially viable quantities of these minerals are 6.4 times more likely to experience insurgent activity ($p < .001$). These results suggest that mineral abundance only becomes a significant predictor of insurgent activity in the final decade of our analysis—by which time the liberalization of the mining sector, which began in the early 1990s, had resulted in the rapid expansion of mining and related activities.

Models 8 to 10 enable us to test hypothesis 3, which predicts that the effect of mineral abundance on the likelihood of Maoist insurgent activity will be stronger in areas that are inhabited by tribal populations. Model 8 includes a dummy variable for whether or not a district is covered by the Fifth Schedule of the Indian Constitution. It shows that districts with a significant tribal population are more than twice as likely to be affected by insurgent activity as those that are not ($p = .002$). The

effect size of mineral abundance falls slightly, from 3.1 to 2.5, but remains significant at $p = .001$. In model 9, when we include both the tribal belt and the pre-/post-2001 dummies, the effect size and significance of both variables, as well as mineral abundance, remain largely unaffected. Model 10, the multinomial regression model, shows that there is not a significant relationship between commercially viable quantities of bauxite, coal, or iron ore and insurgent activity in Hindu districts. But districts in the tribal belt with abundant quantities of these minerals are 10.9 times more likely to be affected by insurgent activity ($p < .001$). The third column in model 10 demonstrates that the relationship between minerals and insurgency is statistically different on the plains compared to in the tribal belt ($p < .001$). This is because tribal communities have strong material and symbolic links with the natural world, and because they experience the most brutal side of the Indian state, which views them as "backward Hindus" who need to be forcefully developed into useful citizens.

We performed a series of robustness checks. We reran the regressions using alternative specifications of the dependent variable, adding state dummy variables and removing influential cases.[11] The results increase our confidence the findings.

Conclusions

This article investigated the effect of commercially viable mineral resources on the Maoist or "Naxalite" insurgency in India. We analyzed a unique district-level data set covering the period 1982–2011 to investigate the manner in which the relationship between mineral abundance and insurgency is affected by changes in economic policy over time and variations in social structure across space. Throughout the whole period, across the whole of India, districts with important reserves of bauxite, coal, or iron ore were three times more likely to experience the onset of insurgent activity. This supports the resource curse thesis—that is, the argument that mineral abundance is likely to lead to negative economic, political, and social outcomes, such as civil war.

Nevertheless, we demonstrate that this finding must be qualified in two respects. First, the relationship between the abundance of bauxite, coal, or iron ore and insurgency was strongly influenced by the state's economic policy—in this case the liberalization of the mining sector that began in the mid 1990s. This is because liberalization precipitated the rapid expansion of mining and related activities, which in turn resulted in more opportunities for the insurgents to generate income to sustain their activities, as well more displacement and pollution, and therefore more discontented local communities willing to support the insurgents.

Second, the relationship between mineral abundance and insurgency was affected by social structure: Mineral abundance was only a significant predictor of insurgency in areas with a tribal social structure. This is because tribal communities have strong material and symbolic links to nature whereas lower caste landless laborers on the plains do not. The negative effects of mining—displacement and pollution—are, therefore, far more destructive on tribal communities, making them more prone to support the antistate, anticapitalist insurgents. Moreover, because the state sees tribal communities as "backward Hindus" who need to be forcefully developed into useful citizens, it treats them in a particularly brutal manner and it is likely that this increases the likelihood of violent conflict.

Thus, we show that in certain circumstances mineral abundance significantly increases the likelihood that a district is affected by insurgent activity, and that variations in economic policy and social structure are crucial to understanding this

relationship. This provides support for Rosser's (2006) argument that dominant theories for explaining the link between natural resource abundance and insurgency—either rationalist accounts that stress the income generating opportunities or those that stress the negative effects of mining on the local population—are too simplistic. The presence of abundant natural resources does not mechanically increase the probability of an area being affected by insurgent activity. In Norway or Botswana, for example, natural resources have been used to encourage peaceful development. Rather, the presence of abundant natural resources increases the probability of an area being affected by insurgent activity in certain circumstances: first, when economic policy—such as the liberalization of the mining in India that began in the 1990s—leads to increased mining activity; and second, when a community's social structure makes the community particularly prone to the negative effects of mining activity—as for tribal communities, for example, who have particularly strong material and symbolic links to the natural world.

Precisely because our study demonstrates the importance of economic policy on insurgent activity, it has important policy implications. India's mining policy is not static: The liberalization of the mining sector—which makes it easier for corporations to extract minerals and more difficult for the local populations to peacefully object—is an ongoing and intensifying process (Padel and Das 2010). Supporters of this policy argue that the acceleration in mineral extraction will increase GDP and that this will benefit the whole of society: "Mineral wealth is wealth that must be harvested and used for the people," as former Finance Minister Chidambaram puts it. But many people do not share this enthusiasm for the large-scale extraction of minerals, and it has led to violent resistance from local populations—especially in tribal areas. These communities, whose modes of livelihood are based on long-term coexistence with nature, are decimated by the Indian state's myopic economic strategy, which is predicated on the extraction and consumption of unsustainable quantities of resources. At the moment many tribal communities support Maoist insurgents because of their antistate and anticapitalist stance. The insurgents provide tribal communities with powerful allies that are capable of challenging the power of the state and mining companies at the local level in a way that more localized and disparate forms of antimining contentious politics in Latin America, for example, are not (Bebbington 2009; Arellano-Yanguas 2011). Nevertheless, it is not clear that this relationship is beneficial to tribal communities, because it allows the state and mining companies to portray all opposition as Maoist in order to legitimize its bellicose counterinsurgent strategy (Miklian and Carney 2010; Navlakha and Myrdal 2010; Roy 2010; Kennedy and Purushotham 2012; Kennedy and King 2013). It is widely argued that this strategy is not designed just to defeat the Maoist insurgents, but also to force their tribal supporters off their mineral-rich land in order create, in the words of former Prime Minister Singh (2007), an atmosphere that is "conducive to investment" and "rapid economic development." Consequently, tribal communities' support for the Maoist insurgents may not have the desired effect of halting mining activities. Tragically, it might have the unintended consequence of facilitating the extraction of mineral resources.

Acknowledgments

I would like to thank Larry King for helpful comments on earlier drafts of this article.

Notes

1. The first wave of Maoist insurgency occurred between 1946 and 1951; the second wave was from 1967 until the early 1970s; and the third wave began in the early 1980s (Kennedy and Purushotham 2012).
2. The district is the administrative division below the state and the smallest unit of analysis for which all the data are available.
3. This was common knowledge in the local area and was confirmed in U.S. diplomatic cables released by wikileaks (*Times of India* 2011).
4. Mining companies are not merely a source of cash for the insurgents. They are also a source of explosives—a resource that is crucial for the insurgents' strategy, which involves the heavy use of landmines. For example, in June 2009 the insurgents attacked the India's biggest bauxite mine, run by Nalco in Panchpat Mali, Koraput, Orissa, killed 10 police officers, and looted large amounts of explosives and detonators (*The Hindu* 2009).
5. Chidambaram is a former corporate lawyer who represented several mining companies, as well as a former director of Vedanta.
6. India has trillions of dollars of bauxite, coal, and iron ore reserves—several times its annual gross domestic product (Padel and Das 2010; Roy 2010). Nevertheless, the logical flaw in these statements is apparent when one considers that the state receives only relatively small royalties from mineral extraction—for example, between 10 and 50 rupees per metric tonne of iron ore, depending on quality, compared to the international price of up to 7,000 rupees (Navlakha and Myrdal 2010).
7. *Samatha v. State of Andhra Pradesh*, Supreme Court of India (July 11, 1997).
8. The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (Government of India 2013) recently replaced the Land Acquisition Act (Government of India 1894).
9. This is preferable to civil war incidence—coding 1 for cases with more than the threshold of conflict deaths and 0 for those with fewer—where the estimated coefficients are complicated averages of the effect of a covariate on both the onset and the duration of civil conflicts (Fearon 2010).
10. For descriptive statistics and correlation matrix see the online appendix: https://ucl.academia.edu/JonathanKennedy/appendices.
11. The robustness checks are documented in more detail in the online appendix. See note 10.

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