ABSTRACT

Title of Dissertation:	NATURAL RESOURCES, CIVIL CONFLICT, AND THE POLITICAL ECOLOGY OF SCALE
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This dissertation adopts a multi-scalar and mixed methods approach to interrogate the widely observed but underdefined relationship between natural resources and civil conflict. The results of three largely independent analyses are presented, corresponding to three distinct but overlapping epistemological scales and applying analytical methods appropriate to each scale. Cross-country spatial econometric analysis concluded that interstate variation in the incidence of conflict events is explained, in part, by a resource curse mechanism, whereby economic dependence on petroleum rents undermines state capacity and democratic governance, making a state more vulnerable to conflict. The results of a subnational quantitative study of the New People's Army insurgency in the Philippines suggest that the spatial distribution of conflict risk within countries affected by civil war can be shaped by the environmental and socioeconomic impacts of resource extraction. And, a case study of a conflict over magnetite mining in the northern Philippines found that

controversial resource extraction projects can create opportunities for non-state actors to develop alliances with civilian networks, discursively rescale localized disputes over resource governance to align with broader patterns of civil violence, and propagate narrative frames justifying violent collective action. From these results, a political ecology of scale in resource-related conflicts is set forth, arguing that the scalar properties of conflict vulnerability, conflict risk, and conflict opportunity have both epistemological and ontological implications; in particular, it is proposed that extractive enclaves, by fostering overlapping and intersecting scalar configurations of economic, socio-cultural, governance, and biophysical processes, constitute 'natural habitats' for civil conflict in which various actors can renegotiate their relative scalar positions through discursive and violent means to achieve political objectives.

NATURAL RESOURCES, CIVIL CONFLICT, AND THE POLITICAL ECOLOGY OF SCALE

by

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Dedication

This dissertation is dedicated to my wonderful wife, Charlene Wayland, without whose relentless encouragement, indomitable optimism, and insightful perspectives it could never have been written.

Acknowledgements

I would like to thank the members of my dissertation committee for their many comments, suggestions, and criticisms that have, over the course of several drafts, helped whip this dissertation into shape. I am especially grateful to my advisor, Martha Geores, for introducing me to the strange and wonderous world of scale theory in human geography and, even more importantly, for her steadfast confidence in and support of her many graduate students, on behalf of whom I wish her a relaxing, exciting, peaceful, adventurous, and well-deserved retirement.

I would also be remiss not to acknowledge my son, Kai, whose astute observation (at four years old) that the spatial overlap between insurgent activity and extractive industry in the Philippines could be because "maybe people want to get the things in the mines, like diamonds or gold or something" renders approximately two-thirds of this document essentially redundant. My elder son, Jake, is responsible for the color schemes of the maps. All mistakes, omissions, and oversights are mine.

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1. Introduction

Several years ago, while on an extended visit to the rural town in the Philippines where I once served as a U.S. Peace Corps Volunteer, I found myself in discussion with a close friend, the owner of a small restaurant in the town center. The topic of the conversation was an incident that had recently occurred at a nearby quarry, during which members of the New People's Army (NPA), the armed wing of the Communist Party of the Philippines (CPP), had attacked workers and destroyed equipment as 'punishment' for the environmental impacts of the mine. Such attacks are not infrequent in the Philippines and my friend and I were speculating on why extractive industry in his country results so frequently in violence, relative to mine. He suggested that the difference was geographical, that the United States simply has more space for resource exploitation that does not displace or otherwise adversely affect people's land and livelihoods. I countered that there are numerous high-density countries where resource-related violence is not commonplace and many examples of low-density countries where it is.

My friend then argued that extractive industry in the U.S. primarily benefits Americans, rather than international corporations and foreign investors, as is the case in the Philippines. Again, I disagreed, explaining that I was, as part of my job at the time, reviewing a proposal to transport coal from Montana for export to China, one of countless such internationally-financed extractive projects in the U.S. Finally, he proposed an institutional explanation, reasoning that the lack of a transparent decision-making process in resource governance and the ineffectiveness of impact

assessment in the Philippines leave communities affected by mining feeling disenfranchised and aggrieved. Although, as an environmental impact assessment practitioner, I found this last explanation appealing—it was encouraging to think of my profession as critical to the prevention of civil violence—I remained unconvinced. We eventually agreed that the answer must be a multifaceted one and that all of my friend's explanations likely played a role.

This dissertation is, in essence, an extension of that conversation. In the following, I adopt a mixed methods approach—combining spatial econometrics, remote sensing and GIS, and qualitative analysis—to interrogate the relationship between extractive industry and conflict from multiple angles simultaneously. In reviewing the vast literature on this topic, I have often been struck by the extent to which the choice of methods, and the scale at which analyses are conducted, appear to correlate with the conclusions drawn by researchers. In the broadest sense, qualitative studies, interested in scales ranging generally from the body, to the household, to the locality, have tended to support a grievance-based understanding of the resource-conflict linkage, whereas large-*N* quantitative research, in which data are aggregated to the urban, regional, or state scale, most often conclude that economic motivations, including the practical desire of belligerents to exploit resources as a source of financing, are the primary drivers of civil violence (see Le Billon 2012; Ross 2004; Van Der Ploeg & Poelhekke 2016). I wondered if that dichotomy represented an example of what Marston et al. (2005) describe as "a classic case of form determining content, whereby objects, events and processes come pre-sorted, ready to be inserted

into the scalar apparatus at hand" (422) and undertook to conduct a research program that was explicitly inter-scalar in design in order to evaluate that possibility.

The results of the analyses presented below illustrate these epistemological problems of observational scale. Although the cross-country regression results presented in Chapter 2 are suggestive of an intermediate resource curse effect linking economic dependence on resources to civil conflict, the qualitative study in Chapter 4 concludes that resource extraction can, by exacerbating social grievances, create opportunities for non-state actors to form alliances with civilian networks. The quantitative subnational analysis of Chapter 3, meanwhile, suggests that resource extraction can shape the spatial patterns of violence in civil war by exacerbating social inequalities, environmental scarcity, and relative deprivation in communities affected by it. Such findings underscore the importance of explicit consideration of scale in the study of natural resource conflicts and of policy interventions for preventing and mitigating such conflicts.

In conducting this research, however, I have become convinced that scale is not only interesting in the narrow methodological sense that I initially set out to investigate, but also has ontological implications that are critical for understanding how natural resources interact with and contribute to outbreaks of violence. I will argue, in the course of this dissertation, that extractive enclaves represent a 'natural habitat' for conflict, spatial and temporal nodes at which scalar configurations of economic, political, cultural, and biophysical processes intersect and are contested and renegotiated through claims of territorial control, the development of alliances

between actors operating at different levels of spatial organization, and the application of violence.

1.1 Natural Resources and Civil Conflict

1.1.1 Wars of Plunder

The chapters to follow engage with two broad scholarly literatures, the first of which comprises the vast body of work, including research by economists, political scientists, anthropologists, and geographers, examining the relationship between natural resources and armed conflict. It has long been recognized that natural resources can contribute to political violence—the earliest geographies, of Strabo and Ptolemy, were preoccupied with the political and military implications of the geographic distribution of resources and environmental conditions. Military strategists, from Thucydides to Machiavelli, have similarly stressed the importance of resources in shaping the onset and outcomes of conflicts. Throughout history, 'wars of plunder' have been waged repeatedly and on every continent, from the conquest of the Mexica empire by Hernán Cortés in search of gold and silver, to the annexation of the gold-rich Black Hills by the United States from the Sioux beginning in 1876, the decimation of Congo tribes by King Leopold of Belgium's mercenary forces in the 1880s and 1890s to facilitate the extraction and exportation of ivory and rubber, the invasion of nickel-rich Petsamo in Nazi-occupied Finland by the Red Army in 1944, the cooptation of Kuwaiti oil fields by Iraqi forces in 1990, and the ongoing civil war in South Sudan, during which control of oil-producing regions has been a major point of dispute. Indeed, when arable land is included in the list of exploitable natural

resources, it is difficult to identify a conflict in which resources were not a contributing factor.

The strategic importance of petroleum in modern warfare, and to modern economies, is so apparent that the popular term 'oil wars' has become a common descriptor of many conflicts, especially in the Middle East (Le Billon 2012; Klare 2007). There has been increasing scholarly and public interest as well in the potential for future 'water wars,' as expanding populations and industrialization in water-stressed regions contributes to scarcity (Freeman 2001). The association between resources and conflict is not limited, however, to militarily or economically critical resources. The widespread use of alluvial diamonds to finance armed militia groups and national militaries in the civil wars of Angola, Sierra Leona, Côte d'Ivoire, and Liberia, for example, has led to the adoption in the popular lexicon of 'conflict diamonds' and, even more evocatively, 'blood diamonds' (Le Billon 2001a, 2012). Philippe Le Billon, perhaps the foremost modern geographer of resource conflicts, comments upon the popularity of the 2009 film *Avatar*, in which a greedy mining company goes to war against a peaceful tribe of extraterrestrials for control over valuable minerals as illustrating a widespread recognition of and popular fascination with the resource-conflict relationship (Le Billon 2012).

Yet, despite this interest, the specific mechanisms by which that relationship is operationalized remain underspecified; thus, although the causal chain linking resources and conflict appears straightforward in many specific instances, such as the direct selling of diamonds by warlords or the plundering of oil by invading armies, a general theory of resource conflict has remained elusive. The overarching objective of

this dissertation is to begin to address this gap by bringing to bear theories of scale in human geography and a multi-scalar, mixed methods approach that combines qualitative field research with cross-country and subnational regression analysis. The dissertation focuses, as does much of the existing literature, on the relationship between resources and intrastate conflict, rather than wars between states, in large part because these comprise the vast majority of conflicts, and a growing share of conflict-related violence, in the post-World War II period, and especially since the end of the Cold War, trends that seem likely to continue. I discuss in detail the long-standing war between the Philippine government and the NPA, owing to my personal experience living and working in the context of that conflict. However, although the antecedents and evolution of each conflict is unique, I believe that many of the conclusions made herein may be generalizable to other cases of civil violence, as well as some interstate wars.

1.1.2 Greed Versus Grievance

The main point of departure for civil conflict studies from conventional geopolitical theories of war is the introduction of non-state actors, whose motivations, strategies, objectives, and actions are often the primary subjects of inquiry. Historically, most research on civil conflict engaged, directly or implicitly, with the Durkheimian notion of relative deprivation, first articulated by Stouffler et al. (1949) and applied most notably to the issue of civil violence by Gurr (1970). Broadly, relative deprivation theory holds that the experience of grievance at the individual or group level is a function of a perceived incommensurability between a level of wellbeing or value that one expects or is accustomed to and the level that is actually

experienced; numerous studies by political scientists, sociologists, geographers, and psychologists have suggested a link between the experience of relative deprivation, often in terms of unequal or declining access to economic and political opportunities and both organized political violence and social deviance. Homer-Dixon (1994, 1999), engaging with the then largely geopolitical and theoretically underdeveloped environmental security literature (see Myers 1989), applied relative deprivation to link environmental scarcity and resource overuse to violent conflict; in the Philippines, for example, he argued that large-scale land purchases for agricultural consolidation and extractive industry drove small-holder farmers onto increasingly marginalized lands, reducing their production levels and incomes, and thus causing an experience of deprivation that was conceptualized relative to increasing profitability of large businesses and landowners. Much of such early work on the resource-conflict nexus was criticized, in particular by Gleditsh (1998), for failing to conceptually disentangle environmental conflicts—involving degradation of environmental quality and depletion of renewable resources, such as clean water—from conflicts over valuable extractable resources like oil and minerals; Gleditsh was also among the first to identify several key challenges in the study of the relationship between resources and political violence, including the potentially confounding effects of political and economic variables and the issue of reverse causality with which contemporary studies continue to grapple.

The importance of grievances as the predominant motivational driver of belligerents in civil wars was, however, directly challenged by a series of influential quantitative papers by Collier & Hoeffler (1998, 2004, 2005), who report a

statistically significant relationship between economic dependence on the export of primary commodities—especially petroleum—and the risk of experiencing a civil war, which they contrast with the lack of an observable correlation between conflict and either economic inequality or political marginalization of minority ethnic groups, proxies for social grievance. The provocative conclusion that belligerents in intrastate conflicts are motivated primarily by the desire to control valuable resources and that "the true cause of much civil war is not the loud discourse of grievance but the silent force of greed" (Collier 2000, 101) reinvigorated a greed versus grievance debate that dominated much of the quantitative work during the early 2000s (see Ross 2004).

1.1.3 Beyond Greed and Grievance

Collier & Hoeffler's work can also be credited with inspiring, in large part, a set of alternative theories seeking to link economic dependence on natural resources to civil war through an intermediate effect on state-level economies and institutions (Humphreys 2005; Dube & Vargas 2013, Ross 2004; Elbadawi & Soto 2015; Basedau & Lay 2009). Engaging with the broader resource curse literature, proponents of this mechanism have argued that economic dependence on the export of natural resources leave an economy exposed to economic shocks resulting from volatility in the global primary commodities markets or from currency devaluation via 'Dutch disease' (Fjelde 2015; Janus & Riera-Crichton 2015; Ross 2015). Alternatively, reliance on extractive industry may undermine state capacity and decrease institutional quality by incentivizing renterism in the public sector, causing governments of resource-dependent states to become more corrupt and less responsive to their citizens. And, availability of resource rents may also serve to prop

up authoritarian regimes and forestall the transition to democracy by supplying financing for military and police forces (Ross 2001a).

A corollary to the greedy rebels hypothesis, sometimes referred to as the 'opportunity' or 'feasibility' mechanism and developed in part by Collier & Hoeffler (2006) as well as Collier et al. (2009), deemphasizes motivational drivers of conflict entirely and instead focuses on the role played by natural resources as potential sources of financing for rebel groups. In addition to the canonical example of blood diamonds, examples in practice of the opportunity mechanism include the harvesting of timber by the Khmer Rouge in Cambodia (Le Billon 2002), involvement of FARC rebels in illegal gold mining in Colombia (Massé & Le Billon 2017), trade in narcotics by the Taliban in Afghanistan (Cornell 2007), and the extortion of mining operations by the NPA in the Philippines (Santos 2010). The aggregate effect of the opportunity mechanism has been interrogated by Lujala (2010), who finds that the presence of oil, natural gas, and gemstones within combat zones is correlated with the duration of civil wars and Lujala et al. (2005), who find a positive relationship between 'lootable' alluvial diamonds and the start of civil wars, but a negative association between conflict onset and large-scale production of primary diamond deposits.

1.1.4 Political Ecologies of Resource Conflicts

Research in political ecology and related traditions has examined the resource-conflict nexus from a different methodological standpoint. Numerous case studies of extractive projects, particularly in the developing world, have found evidence that disputes over resource ownership and use can interact with notions of cultural identity

and territoriality to produce or reproduce discourses justifying mobilization and violent collective action. Filer (1990) documents how landowner grievances related to gold and copper mining on the island of Bougainville spiraled into a secessionist rebellion in which several local tribes fought against the Papua New Guinean state and one another (see also Thompson 1991, Hilson 2006). Ikelegbe (2005, 2006), Omeje (2005), and Oyefusi (2008) describe how ethnic identity in the Niger delta intersected with mismanaged impacts mitigation and revenue sharing programs to create an 'economy of conflict' around oil extraction in which militant youth organizations perpetrate kidnappings for ransom and direct theft of oil, while state and private security forces have responded with extrajudicial violence against activists and communities. In the Philippines, Holden (2014) argues that grievances related to the militarization of mines and the targeting of anti-mining activists has increased popular support for the Maoist NPA, a process that has been mediated by the historical experience of colonialism and U.S. interventionism (Holden 2012a), as well as discourses of liberation theology (Holden 2012b).

While such case studies invariably invoke social grievances as a major driver of violence, they differ with respect to the role they ascribe to the manipulation of grievance narratives by political actors. At the extreme, Aspinall (2007) argues that grievances related to natural gas extraction in Aceh, Indonesia were largely constructed by leaders of the separatist movement to legitimize violence. Elsewhere, such as in the conflict between the Indian state and Maoist insurgents and between the Philippine government and the NPA, there is evidence that non-state actors actively respond to specific grievances 'on the ground' related to, for example, adverse

environmental impacts of mining on soil and water quality and the militarization of mining areas (Miklian 2012; Holden et al. 2011). Horowitz (2010), Urkidi (2011), Kuecker (2007), and others highlight the importance of less quantifiable grievances, such as the perceived threat to traditional lifeways and local cultures that may be the result of extractive-driven economic development; similarly, Escobar (2006) argues that the ultimate driver of resource-related conflict stems from the incommensurability of economic, ecological, political, and cultural valuation of natural resources, ecosystems and 'nature' in general. Ballard & Banks (2003), noting the preoccupation in the literature on the communities and people affected by extractive industry, observe that the behavior and discourses of the multinational corporations involved in the sector are also important considerations.

Whether mediated by social grievances, systemic institutional effects, or the opportunity mechanism, the linkage between extractive industry and civil conflict is likely to be shaped, at least in part, by the material characteristics of the resources involved. The spatial footprint of extractive activity, for example, which varies from several acres in the case of oil wells to many thousands of hectares in the case of timber concessions, affects the potential for environmental harm and, therefore, the experience of grievance in affected populations; the accessibility, from the perspective of non-state actors seeking to profit from resource extraction, of the resource commodity chain is, meanwhile, the major condition defining spaces of opportunity. Le Billon has gone furthest with respect to considering these implications for explaining how conflicts arise and evolve. In his analysis of the Angolan Civil War, he contrasts the exploitation of decentralized and readily

exploitable alluvial diamonds by the insurgent Union for the Total Independence of Angola (or UNITA) with that of centralized oil resources by the national government (Le Billon 2001a) and shows how these distinct approaches influenced the course of the war. In several other papers, he proposes a general typology wherein specific forms of conflict are associated with certain resource categories. Distinguishing between proximate and distant (relative to power centers) resources and between point and diffuse resources, he observes that proximate point resources, such as oil wells in Chad, tend to be a factor in wars of state control and coup d'etats; proximate distant resources, such as copper in Bougainville, are more often linked with separatist movements; proximate diffuse resources, such as freshwater in the Palestinian territories, tend to lead to rebellion and rioting; and distant diffuse resources, such as diamonds and gold in the Democratic Republic of the Congo, are most often associated with warlordism (Le Billon 2001b, 2005a). Although this specific typology is open to criticism as overly deterministic, it set the stage for a renewed research effort, to which Le Billon has continued to be a preeminent contributor, that explicitly considers the ecological conditions and the political economies within which extractive industry occurs as critical to understanding its relationship to violence.

1.1.5 Overlapping Causal Chains

There is growing recognition in both the quantitative and qualitative literatures that unidirectional theories of greed, grievance, and opportunity are neither necessarily mutually exclusive nor sufficiently nuanced. In many conflicts, it appears that "greed and grievance mechanisms can operate simultaneously" (Holden 2014,

78) and may indeed, when resources are considered in the contexts of the economic and social structures in which they are embedded, "coexist as two sides of the same coin" (Le Billon 2005a, 220). Nevertheless, mapping the specific causal paths that connect resources and the use of violence remains a critical step in the development of policy interventions to avoid or mitigate conflict. While it has been proposed, for instance, that resource-rich governments can utilize rents to prevent insurgency through repression or militarization of resource extraction (Ross 2004), it is also possible that such actions can exacerbate grievances and facilitate mobilization by non-state actors (Holden 2014). While high quality institutions may allow some resource-rich states to overcome the resource curse and utilize rents effectively for development (Ross 2012; Bodea & Higashijima 2016), economic dependence on resources may, by promoting rentierism and corruption, undermine the quality of those same institutions, with implications for both grievances and state capacity (Ross 2015). And, though decentralization of resource governance may have potential to alleviate grievances associated with the externalities of resource extraction (Larson 2002), it may also increase opportunities for non-state actors to exploit resource rents (O'Lear & Diehl 2007). Thus, there is a pressing need for research that, while recognizing the multi-dimensional, context contingent, and inter-scalar relationship between natural resources and civil conflict, seeks to interrogate specific causal mechanisms and their interactive effects (Koubi et al. 2014; Ross 2015).

This study contributes to that effort, using as a starting point the framework proposed by Le Billon (2008, 2012), who, by reframing the various proposed pathways linking natural resources and civil conflict, delineates three broad views of

the relationship—the 'resource curse' argument, which relates armed conflict to economic underperformance and state weakness resulting from dependence on extractive industry; the 'resource conflicts' argument, which focuses on the motivational effect of resources, including their effects on both grievances and the incentive structures of would-be insurgents; and the 'conflict resources' argument, which emphasizes the role of resources in shaping opportunity structures for combatants by providing financing for military activities. The proposed resource curse, resource conflict, and conflict resources mechanisms correspond, in Le Billon's view, to *vulnerability* to, *risk* of, and *opportunity* for conflict, respectively, a formulation that I adopt throughout this dissertation.

In the empirical chapters that follow, I apply methods appropriate for analyses at the cross-country, subnational, and 'local' observational scales to test the applicability of those proposed mechanisms. As hypothesized, however, those analyses lead to markedly different results. Whereas the findings of the cross-country analysis support a vulnerability mechanism whereby economic dependence on resources (especially petroleum) undermines democracy and state capacity, the results of the subnational investigation suggest that resource extraction contributes to conflict risk by exacerbating relative deprivation in affected communities. In a local scale case study of a conflict over mining in the Philippines, on the other hand, while both the vulnerability and risk mechanisms were found to be important contributors to the broad context in which the conflict evolved, the proximate cause of non-state actor involvement was determined to be the opportunity to develop alliances with

grassroots civilian activists. These divergent conclusions can be reconciled, I argue, by applying theories of scale to the study of natural resource conflict.

1.2 Scale and Political Ecology

1.2.1 The Great Scale Debate

The second body of literature to which this dissertation contributes examines the implications of scale in political ecology. In the broader discipline of human geography, scale has long been recognized as among the 'foundational concepts' (Howitt 1998) and its definition and ontological status has, especially since the early 1980s, been the subject of intense debate (see Herod 2010). On the one side, an essentially Kantian view of scale was adopted by idealists like Hart (1982), who dismissed scales as "subjective artistic devices" (21-22) unrelated to physical phenomena and Haggett (1972), who, in his multi-scalar analyses of geographical processes, adopted a scalar scheme based on purely mathematical principles.

This view was challenged by materialist interpretations, including, especially, theories informed by Marxist traditions. At the extreme, Taylor (1981) argued that specific scales—especially notions of the 'global' and 'national'—play specific and even 'natural' roles under capitalism and that the incommensurability between the scales at which socio-economic classes organize and those at which they perceive themselves to exist contributes to the maintenance of world systems. Examining the emergence, rather than function, of scale, Smith (1981) identified a fundamental tension between the need for capital to be fixed in place, in order for accumulation to occur, and the requirement of geographic flexibility to seek out new opportunities for

investment. The production of scales, he proposed, can be traced to the material requirements of production, including the spatial organization of labor, which he argued to be critical to the definition of urban and regional scales, in particular, thus extending Harvey's (1981) notion of the 'spatial fix' to spatial and temporal scales. At the same time, Giddens (1984), while not explicitly engaging with the production of scale, described the 'regionalization' of space into zones of specific types of social interaction as central to the structuration of society; by emphasizing the role of everyday social practice in the production of space, Giddens' work highlights the potential for ongoing renegotiations of concepts of spatial and, by extension, scalar organization, ideas that were later refined by Brenner (2001).

The debate between materialist and idealist conceptualizations of scale, although impassioned, remained grounded in certain commonalities. Both groups recognized that scale is socially constructed—the question at issue was not whether scales are produced, but how, by whom, and to what end. The early 1990s saw a proliferation of papers proposing and commenting upon the use of spatial metaphors to address these issues, of which Howitt's (1998) use of musical scales to explicate his framework of scale as relation is perhaps the most relevant to this dissertation. Howitt proposed that, much as the relationships between and meanings of individual notes change depending on the musical scale, geographical scales can alter the relationships between sites, persons, events, and processes. Using as an example the case of an aluminum mine operated by CRA-RTZ Ltd. at Weipa on Australia's Cape York Peninsula, Howitt observes that the relationship of this site to the various social processes and phenomena of interest to geographers changes with the scale of

analysis, in the same way that the role of the C note is different in the major scale in the key of C than in the minor scale in the key of A-minor. As he explains:

> What is 'significant' about the Weipa mine depends on the scale context in which it is placed—it has a different significance if one is considering its role in producing social, cultural and environmental change within the Weipa locality, than if one is considering its role within the corporate strategies of CRA-RTZ Ltd., or the international geopolitics of either bauxite or aluminum production. None of the possible representations of this mine in these various scale contexts can be treated as more 'real' than the others (56).

The early 2000s saw a number of papers seeking to more precisely define the various terms arising in the scale literature—such as 'politics of scale' (Brenner 2001) and 'scale-jumping' (Sayre 2005)—and challenging the practices by which scale was interrogated (Collinge 2005). Marston et al. (2005) went further than most in this regard, calling for a complete expurgation of scale from the geographer's vocabulary. This proposal was based on the authors' view that scalar descriptions and metaphors generally reinforce a vertically hierarchical epistemology in which 'higher' scales occupy a necessarily privileged position; processes and phenomena that are understood to be 'global' in scale therefore receive more attention and are treated more seriously than those that are 'national,' 'regional,' or 'local.' Thus, they write that:

> Over the past 20 years, political and economic geographers have tended toward macro pronouncements that assigned the global more causal force, assumed it to be more orderly (if not law-like) and less contingent, and, by implication, relegated its other to the status of the case study.

> This is why, we believe, localities researchers more often look 'up' to 'broader restructuring' than 'sideways' to those proximate or even distant localities from which those events arguably emerged (421).

As an alternative, Marston et al. propose a flat, as distinct from both vertical and horizontal, geographical ontology, emphasizing spatial 'sites' and temporal 'events' positioned within a milieu of flows and interactions. Unsurprisingly, their paper generated a wide range of criticisms. Collinge (2006) and Jonas (2006) suggested, respectively, that their proposal essentially repackages Act-Network Theory and Kantian arguments. Others maintained that Marston et al.'s conclusions, rather than equalizing the position of scales, simply served to privilege the 'local' over the 'global' (Jonas 2006). Kaiser & Nikiforova (2008) go further, suggesting that "writing scale out of human geography will help to hide the social constructedness of scales…scales will more easily return to the naturalized, taken-for-granted categories of analysis that they were perceived to be in the past" (537-538) and recommending a post-structural alternative to scale research. Along similar lines, Moore (2008) argued "it is not necessary to retain a commitment to the *existence* of scale in order to analyse the *politics* of scale" (213) and that "denying the ontological reality of scales implies that they are merely inconsequential heuristics in the minds of geographers that 'do no work,' or have no effect in themselves" (213), a potentially dangerous misconception that could lead geographers to leave scale uninterrogated entirely (see also Leitner & Miller 2007).

1.2.2 Political Ecology of Scale

For many years, political ecologists, within geography and elsewhere, did not directly participate in the debate over scale's ontological status, leading to criticisms from, among others, Brown & Purcell (2005) and Manson (2008). As Neumann (2009) observes, however, political ecology has, from its earliest days, implicitly engaged with scalar theories. In what is largely viewed as the foundational works of the political ecology framework, both Blaikie (1985) and Blaikie & Brookfield (1987) distinguish between geographical scale as spatial extent and hierarchies of human organization and emphasize the interactions—though often conceptualized as unidirectional—between political and economic processes at 'higher' and 'lower' levels. Karl Zimmerer's work in the early 2000s represented an important step in political ecology toward more formal engagement with scale theory. In one 2000 paper, he discusses the production of scale in the context of conservation areas and the role of mismatched scales of management and traditional practice in creating land disputes (Zimmerer 2000a). In another, he traces the historical roots and modern transformation of the scales of traditional irrigation in Latin America, emphasizing the joint effects of environmental constraints and political agendas in shaping scales of water governance (Zimmerer 2000b). Recognizing the potential of the field to contribute to scale theory through its relationship with ecology and the environmental sciences, Zimmerer & Bassett (2003) write that "the challenge of political ecology is to integrate the scales of biophysical dynamics into our research frameworks and policy discussions" (289).

Sayre (2005), engaging directly with work by both Kantian idealists and Marxist materialists, seeks to address this challenge by applying scalar theories to ecology, arguing that the problem of scale can serve as a point of unification between physical and human geographies. Distinguishing between the 'epistemological moment' and 'ontological moment' of scale, such that the former refers to the practice of scale-making by observers and the latter to the apparent emergent scalar properties of the observed, Sayre argues that ecology, like human geography, has insufficiently grappled with either component. Following Howitt, he deconstructs ontological scale into component dimensions corresponding to size (denoting spatial extent), level (referring to hierarchically nested units of organization), and relation (describing the structural characteristics of particular scales) and illustrates their use in ecological processes. Thus, just as Singapore and Russia, as states, could be said to occupy the same hierarchical level while filling incommensurable geopolitical roles, so too do an elephant and a pond skater, though inhabiting the same level as individual members of a species, exhibit fundamentally different relationships with the surface of a pond, or with any number of other ecological processes. For Sayre, the conflation of the distinct meanings of scale, aggravated by their interchangeability in everyday conversation, lies at the heart of disagreements over scale and the incongruity between scales of environmental processes and of environmental management (see also Turner 2006, Manson 2008, Sayre 2009).

McCarthy (2005), by contrast, views the production of scale as inseparable from the social production of nature; examining the discourses and practices of environmental NGOs, he calls for greater attention to the increasing role of civil

society and other non-state and non-corporate actors in the production and contestation of scale. Similarly, Swyngedouw (2003, 2004, 2007) and Swyngedouw & Heynen (2003) discuss how unequal distributions of power along dimensions of ethnicity, class, and gender can intersect with ecological processes to produce politically relevant scales. Throughout their work on the political ecology of scale, both McCarthy and Swyngedouw argue that political struggles over scalar relationships offer the most promising context in which to observe and interrogate the production and ontological status of scale. Conflicts over natural resource extraction, for instance, often involve the reframing of environmental and socioeconomic impacts to forge connections between scales for the purposes of mobilization (McCarthy & Prudham 2004). Although the scales at which resources are politically and economically relevant can be discursively reshaped in the context of such conflicts, however, there are limits to the malleability of the biophysical scales at which resources are produced (Bakker & Bridge 2006; Görg 2007; Bolin et al. 2008). Thus, Bolin et al. (2008) write that "environmental disputes necessarily involve an often complex relationship between socially constructed scales and the spatiotemporal scales at which natural material processes are understood to occur" (1497).

Extending these arguments to the extreme case of civil war, the recursive relationship between natural resources and the production of scale may provide a partial answer to what Kalyvas (2000) describes as the "oft-noted but poorly understood puzzle: conflicts and violence 'on the ground' often seem more related to local issues rather than the 'master cleavage' that drives the civil war at the national

level" (364). To the extent that such 'local' issues often involve disputes over access to, control over, or exploitation of natural resources, extractive industry may facilitate the production and renegotiation of political scales through the use of violence.

1.3 Structure of the Dissertation

Because I am interested in exploring both the epistemological and ontological implications of scale, as well as in empirically testing some of the broad claims regarding the relationship between natural resources and civil conflict through multi-scalar analysis, the structure of this dissertation is unusual and warrants some explanation. The following three chapters comprise three largely independent studies conducted using three different methodological approaches at three different analytical scales. Two of these are largely quantitative, relying on the interpretation of the results of spatial econometric analyses of large datasets; the other is a qualitative investigation based on field interviews and case study. The final chapter attempts to explain the divergent findings of the three studies in the context of a generalizable political ecology of scale in natural resource conflicts.

In Chapter 2, I present a cross-country regression analysis of the relationship between the abundance of, economic dependence on, and access to different categories of natural resources. Although adopting a largely conventional approach to quantitative investigation of natural resources and conflict, that study does incorporate some original features, including the use of a spatial panel data model to control for potential spatial autocorrelation, the use of georeferenced conflict events data to account for instances of low-level violence in some conflict-affected countries, and the use of intervening variable and two-stage regression approaches to

investigate the specific causal chains by which the vulnerability, risk, and opportunity mechanisms are manifest. Results suggest that, at the state scale, the clearest pathway from natural resources to civil violence follows that predicted by the vulnerability mechanism and, consistent with previous empirical investigations at this scale, is clearest with respect to petroleum resources.

Chapter 3 describes a quantitative analysis of subnational variation in the use of terroristic violence by the NPA in the Philippines. A spatial probit model was estimated to interrogate the relationship between permitted, unpermitted, and proposed surface mines and the probability of experiencing an NPA-related terrorist attack, across the 1628 municipalities and cities that comprise the country. Again, intervening variable and two-stage regression analyses were used to assess the validity of proposed causal pathways. The results are supportive of a conflict risk mechanism, whereby mining contributes the use of terroristic violence by the NPA through an intervening effect on environmental scarcity and relative deprivation.

Chapter 4 presents a case study of a conflict over resource extraction that occurred in the Municipality of Gonzaga in the northeastern Philippines during and immediately following my tenure there as a Peace Corps Volunteer. Data sources for that study include public statements by activists, officials, businesses, and NPA militants; government documents, NPA propaganda, and social media; and a series of in-depth semi-structured interviews with key informants. In that chapter, I describe how scalar politics were employed by actors on all sides of the conflict, with an emphasis on the development of alliances between anti-mining activists and the NPA in the context of resource extraction.

Finally, Chapter 5 concludes by comparing the results of the three independent analyses and setting forth a political ecology of scale in resource-related conflicts. I first discuss the epistemological implications of scale from the perspective of the observer, offering some conclusions regarding the appropriateness of widely-used analysis scales for studying specific aspects of the resource-conflict nexus. In particular, I argue that the operative scales of the vulnerability, risk, and opportunity mechanisms are largely distinct, although overlapping, and correspond roughly to scales describing states, subnational regions, and localities, respectively. Secondly, I discuss the ontological implications of scale in natural resource conflicts, mapping production of scales of resource extraction, governance, and resistance, as well as their intersections. I propose that extractive enclaves can be conceptualized as nodes of inter-scalar interaction that create opportunities for political actors to renegotiate scalar configurations through violent and non-violent means, making sites of natural resource extraction a 'natural habitat' for conflict.

2. Vulnerability, Risk, or Opportunity? Cross-Country Analysis of Natural Resources and Civil Conflict

As discussed in Chapter 1, although the relationship between natural resources and armed conflict—particularly intrastate conflict—has been of scholarly interest for decades, the specific causal mechanisms by which this relationship operates remain underdefined (see Ross 2004, 2015; Van Der Ploeg & Poelhekke 2016). Past cross-country quantitative analyses have suggested that, though natural resources are generally not the sole cause of armed conflict, their exploitation may, under certain circumstances, facilitate the emergence or increase the intensity of civil violence by altering incentive structures for belligerents (Collier & Hoeffler 1998, 2004; Fearon 2005), by serving as sources of financing for rebel groups and national governments (Collier et al. 2009; Lujala 2010), or through systemic effects on institutions and economies (Østby et al. 2009; Humphreys 2005).

This chapter contributes to that literature by investigating, at the cross-country scale, the three broad mechanisms through which the effect of natural resources on civil conflict has been proposed to operate. It presents the results of a series of spatial panel regressions predicting the incidence of conflict events across a dataset comprising 154 countries at five-year intervals from 1995 through 2010, compiled from state-level statistics, remotely-sensed nighttime lights, and georeferenced events data. Two-stage regression analysis was applied to directly interrogate the applicability of causal chains linking several sectors of natural resources with the incidence of conflict events. Consistent with a resource curse interpretation of the

resource-conflict nexus, results suggest that economic dependence on oil rents increases conflict vulnerability by decreasing institutional quality and undermining democratic governance. The hypotheses that resource wealth increases conflict risk by exacerbating horizontal economic inequality or that resource availability creates opportunities for non-state actors are unsupported by the results.

The original contributions of the study are threefold. First, it employs a spatial regression framework that controls for autocorrelation in the dependent variable between neighboring countries, a consideration that proves to be important, if often overlooked, in the quantitative study of civil war. Second, the analysis utilizes conflict events data as the dependent variable, rather than the more commonly-used binary conflict indicator; although this choice is driven largely by the limitations of the spatial regression framework, it also offers an informative counterpoint to a literature that is dominated by dichotomous variable approaches. Finally, by adopting a two-stage regression approach, the specific causal chains that have been proposed in the natural resource conflict literature are directly examined.

2.1 Background

2.1.1 Vulnerability, Risk, and Opportunity

This study responds to recent calls for more explicit quantitative investigations of the causal pathways linking natural resources and civil conflict and the interactive effects of motivational and opportunity structures (see Koubi et al. 2014). It takes as a starting point Le Billon's (2012) categorization of prevailing theories of the resource-conflict relationship into three broad views that correspond,

respectively, to conflict vulnerability, risk, and opportunity. The first of these, which Le Billon also labels the 'resource curse' mechanism, engages closely with the broader resource curse literature and relates civil violence to economic underperformance and state weakness resulting from dependence on resource extraction. Of particular interest to the present study is the potential contribution of economic dependence on natural resources to government unaccountability and public-sector corruption. There are several key characteristics of extractive industries that make them likely to promote such adverse institutional outcomes. By introducing new, high-profit sources of income into economies, the expansion of natural resource extraction may increase the supply of funds that companies can afford to pay as bribes, which may incentivize officials to request more of them (Knutsen et al. 2017); at the same time, the spatial concentration of natural resources and the geographic inflexibility of extractive industry may make it less prone than other sectors to relocate in response to costs associated with corruption (Vicente 2010; Humphreys 2005). The resulting increased supply of and demand for payoffs from extractive industry may incentivize rent-seeking behavior in the public sector at the expense of responsiveness to citizens; such effects may make state governments less capable of responding to the activities of non-state actors or increase mobilization by exacerbating popular grievances (Minter 2012; Holden & Jacobson 2007; Slack 2012).

The second view that Le Billon recognizes is the conflict risk or 'resource conflicts' mechanism, which refers broadly to the set of theories by which resources contribute directly to the motivations of belligerents in civil conflict, whether by

creating social grievances related to relative deprivation or through a 'greedy rebels' effect. In the context of this mechanism, the unequal distribution of the costs and benefits of resource extraction is a critical consideration. Where the allocation of resource rents or the burden of externalities is perceived to be unfair, grievances may arise among those who see themselves as being on the losing side (Østby et al. 2009; Humphreys 2005; Ross 2004); concentration of resource wealth in the hands of the few may also increase the attractiveness of controlling those resources relative to the situation where benefits are widely shared, thus creating incentives for groups seeking to gain control of the state or to secede from it (Le Billon 2001b; Østby et al. 2009; Wegenast & Basedau 2014; Koubi et al. 2014).

Where the vulnerability mechanism predicts an adverse effect of natural resources on the capacity of the state, the opportunity mechanism predicts that natural resources can increase the capacity of non-state actors. This 'conflict resources' mechanism emphasizes the role of resources in shaping opportunity structures for combatants by providing a potential source of stable financial support. The comparative immobility of extractive industry, the spatial dispersion of its constituent commodity chains, and the remoteness of many extractive sites relative to power centers all contribute to the unique susceptibility of the sector to exploitation by militias, insurgents, armed gangs, and terrorist organizations. Beyond the canonical example of 'blood' diamonds mined from alluvial deposits under the direct control of rebel warlords, many other instances have been documented in which non-state actors utilize natural resources to raise funds, including the kidnapping for ransom of oil workers in Colombia, the extortion of protection money from mining companies in

the Philippines, the direct theft of oil by militants in Nigeria, and the smuggling of timber by revolutionaries in Cambodia, among many others. To the extent that the ability of non-state actors to purchase arms, pay recruits, and obtain food and supplies is typically much lower than that of the state, the availability of natural resources may be a critical limiting factor determining the onset, intensity, and duration of civil war, particularly in the absence of external support (Lujala 2010).

2.1.2 Resource Sectors

The validity of the vulnerability, risk, and opportunity mechanisms is likely to differ across the various sectors of natural resources, owing to their physical and economic characteristics. The analysis presented in this chapter specifically considers the effects of four broad categories of natural resources—petroleum, gemstones, timber, and minerals. Among these, petroleum has been the most widely studied with respect to its relationship to conflict, due in large part to its strategic value as an input for military activities (Ross 2004; Basedau & Lay 2009; Elbadawi & Soto 2015). The classical geopolitical interpretation emphasizes petroleum deposits as a 'prize' for state and non-state actors alike (Klare 2007; Ross 2003, 2012). Alternatively, the propensity for conflict in oil-producing countries may relate to the particularly uneven distribution of rents and impacts in the sector (Ikelegbe 2001, 2005; Isumonah 2004); as Le Billon (2012) writes, "controlled by states, dominated by large companies and employing relatively few people, oil production is often characterized by a highly skewed distribution of financial, social, and environmental costs and benefits" (60) that can result in grievances leading to violence. Relative to other sectors—such as gemstones—oil has typically been thought of as less 'lootable' from

the perspective of non-state actors; a highly capital-intensive industry, scalable petroleum production requires large investments in extraction equipment, processing facilities, and transportation infrastructure that are typically beyond the capacity of non-state actors to independently develop. By the same token, however, the length of the petroleum production chain, the value of capital investments, and the profitability of the resource makes the sector vulnerable to attacks, extortion, and theft, as documented in Colombia, Nigeria, and elsewhere (Le Billon 2012).

Alongside oil, gemstones represent the resource sector that has been most widely implicated as a causal factor in civil conflict. Existing research has focused predominantly on the case of diamonds in the context of the opportunity mechanism, for which abundant anecdotal and some quantitative evidence exists (Le Billon 2008; Ross 2015; Lujala et al. 2005). Although the relationship between other gemstones and conflict is less well known, owing in part to their rarity, emeralds and sapphires have been implicated in conflicts in Colombia and Cambodia, respectively (Lavaux 2007; Le Billon 2005b). Compared with the petroleum sector, there is little quantitative evidence to suggest vulnerability or risk effects that can be directly attributed to gemstone extraction; Le Billon (2012) notes, however, that the traditional state-centered approach to examining the economic implications of these resources is limited insomuch as it fails to "disaggregate economic performances in light of processes of marginalisation (or peripheralisation) and uneven development" or "allow the historic contextualisation of conflicts over resources" (96). Grievances related to environmental impacts, working conditions, revenue sharing, and repression by corporate security forces have indeed been observed in the context of

industrial-scale gemstone mining operations (Ross 2004; Le Billon 2012), while artisanal diamond mining areas have been sites of conflicts over competing claims that may interact and merge with broader patterns of political violence (Hayward 1972). The tendency for national governments to support large-scale gemstone extraction and for local authorities to have established relationships with artisanal, informal, or illegal producers, may also exacerbate friction between these levels of government (Le Billon 2012).

The relationship between timber resources and civil conflict is underspecified relative to both petroleum and gemstones. With respect to the resource curse, the forestry sector has been implicated as having contributed to local and state-level institutional weakness, especially related to the provision of logging concessions as a form of political patronage in timber-exporting countries, including Indonesia, the Philippines, Thailand, Myanmar, Cambodia, Nigeria, and the Democratic Republic of the Congo (Tacconi 2012; Ross 2001b; Laurance et al. 2012; Southgate et al. 2000). Because forests are often highly politicized landscapes, in which changing land use patterns stemming from timber extraction have the potential to exacerbate grievances related to forest-based livelihoods, a resource conflict effect in the timber sector is also plausible (Le Billon 2012). In terms of opportunities for non-state actors, although valuable timber is bulky and difficult to conceal, smuggling of logs does occur, particularly in borderlands and remote areas without strong state control (Vitug 1993; Rustad et al. 2008). The remoteness of many logging areas also makes such projects vulnerable to extortion by rebel groups, who also often make use of forests as hideouts or bases of operations (Le Billon 2012).

Like timber, the role of non-gemstone minerals in civil conflict has been relatively underexamined. There are, however, numerous documented examples of grievances stemming from land acquisition and degradation related to metals mining (Holden 2014; Holden & Jacobson 2007; Wayland & Kuniholm 2016; Filer 1990), as well as ample historical cases of belligerents in both interstate and intrastate conflicts targeting regions with reserves of metals required in military technology (Le Billon 2012; Ross 2004). In addition, emerging empirical evidence exists of a relationship between minerals mining and economic inequality; Addison et al. (2017), for example, analyze nighttime lights and georeferenced mining data from Africa and find that metals mining increases spatial economic inequality in some contexts, while decreasing it in others. As in the case of petroleum, the capital intensity of metals mining may forestall direct production by non-state actors in all but the most stateless environments, but opportunities for extortion of mining companies by rebels abound—as documented in the Philippines (Holden & Jacobsen 2007), the Democratic Republic of the Congo (Berman et al. 2015) and Colombia (Deheza & Ribet 2012)—enabled by the spatial concentration of ores and by the remoteness of the reserves.

2.1.3 Hypotheses

Drawing from the existing literature and, in particular, Le Billon's conceptualization of the vulnerability, risk, and opportunity mechanisms, three hypotheses were developed to be tested in the empirical analysis set forth below. The first hypothesis corresponds to the vulnerability mechanism, emphasizing the potential effect of extractive industry on state-level institutions, and thereby on

conflict. It predicts that the opportunity to profit from resource extraction incentivizes rent-seeking in resource-dependent governments, leading to less democracy and poorer institutional outcomes.

> **H1:** Economic dependence on natural resources increases the incidence of conflict events by undermining state capacity and democratic governance.

The second hypothesis predicts that resource wealth, as distinct from resource dependence, increases conflict risk by creating or exacerbating social inequalities. Historically, empirical studies of intrastate conflict have generally failed to demonstrate a statistically significant relationship between economic inequality, typically measured by the national-level Gini coefficient, and the outbreak, intensity, or longevity of civil wars (Fearon & Laitin 2003; Collier & Hoeffler 2004), a non-finding that has been interpreted by some as evidence against grievances as a cause of civil violence (Buhaug et al. 2014). In recent years, however, there has been an increasing emphasis on horizontal inequalities—inequalities along economic, social or political dimensions between ethnically or culturally defined groups—as drivers of conflict owing to the importance of shared identity in facilitating collective action (Kuhn 2018; Stewart 2008; Wegenast & Basedau 2014). As Koubi & Böhmelt (2014) write:

> Mobilization depends not only on the existence of shared motivations, but also on the availability of collective identity and opportunities for collective action. Groups with shared identities, whether based on race, language or religion, have lower costs of rebellion, since they can more easily recruit from within the identity group, are less burdened by

> collective action problems due to suspicions/mistrust between group members, and can have/utilize cultural symbols and ideals to rally behind (22).

Quantitative studies by those authors and others have found evidence that horizontal inequalities play a significant role in civil conflict generally, and in resource conflicts more specifically. Cederman et al. (2011), Cederman et al. (2013), Ezcurra & Palacios (2016), Deiwiks et al. (2012), and Østby (2017) present compelling empirical evidence that political and economic horizontal inequalities among ethnic groups affect the outset, duration, intensity, and results of conflict. At the subnational scale, Hoelsche et al. (2012) find that conflict events involving the Indian state and the Maoist insurgency are more likely to occur in districts where mining activities coincide with stronger grievances related to socio-economic exclusion of local groups. At the cross-country scale, Østby at al. (2009) report a greater probability of conflict where the presence of natural resources coincides with the experience of relative deprivation among the local population, while Morelli & Rohner (2015) find that the spatial extent of oil extraction in ethnic group territories is related to the onset of war. Drawing from these and similar studies, the second hypothesis proposes that natural resource extraction can increase conflict risk by contributing to horizontal economic inequalities:

> **H2:** Natural resource extraction increases the incidence of conflict events by exacerbating horizontal economic inequalities.

The third hypothesis corresponds to the opportunity mechanism, whereby natural resources expand opportunities for conflict by providing funding for non-state

actors. Under this hypothesis, an intermediate effect of resources on the strength of non-state actors is predicted, such that, controlling for potential motivational factors and state capacity, conflict will be more likely to occur in countries where resources, particularly 'lootable' resources such as gemstones, are available for exploitation, broadly defined, by insurgent groups:

> **H3:** Natural resource availability increases the incidence of conflict events by increasing the strength of non-state actors.

As described in the following section, each of these three hypotheses was interrogated using a two-stage regression approach, whereby potentially intervening variables—quantifying, respectively, state capacity, horizontal economic inequality, and the strength of non-state actors—were instrumented with respect to variables measuring the abundance of and economic dependence on natural resources.

2.2 Methods

2.2.1 Empirical Model

The empirics of this study aim to assess the utility of the vulnerability, risk, and opportunity mechanisms for explaining interstate variability in conflict by testing the three hypotheses described above. In addition to testing for a direct correlation between conflict and resource wealth, resource availability, and resource dependence, therefore, the significance of intermediate relationships between the independent and dependent variables and intervening variables measuring state capacity, democracy, horizontal economic inequality, and rebel capacity, respectively, were also examined.

Although the study adopts the state as the unit of observation, it recognizes also that national borders are not unproblematic containers of civil conflict (Danneman & Ritter 2014; Bara 2017). Therefore, to control for the tendency of fighters, weapons, and violence to spread among neighboring countries (Weidman & Ward 2010; Basedau & Pierskalla 2014; Fearon & Laitin 2003), a spatial autoregressive model was estimated (Ward & Gleditsch, 2018). Temporal dependence in the conflict variable was accounted for by including a random effects parameter, the unbiasedness of which relative to fixed effects was confirmed using a Hausman specification test. Accordingly, the general equation to be estimated takes the form:

$$y_{i,t} = \rho W y_{j,t} + \beta x_{i,t} + \lambda_i + \mu_{i,t}$$

Where $y_{i,t}$ represents the dependent variable in country i in year t; $y_{j,t}$ is the dependent variable in neighboring countries j; $x_{i,t}$ is the vector of explanatory variables; λ_i and $\mu_{i,t}$ represent the country-specific random effect and the country-year error, respectively; and β and ρ are fitted values. The term W represents the spatial weights matrix, a block diagonal matrix that defines the spatial structure of the model; in this study, a standard spatial weights matrix was used, such that, if each row in the matrix represents an observation i and each column represents an observation j, then each entry is defined as 1 divided by the number of observations neighboring observation i, if observation j is among the neighbors of observation i, and zero otherwise. Following Millo & Piras (2012), the equation was estimated by maximum likelihood. The use of a spatial regression approach poses some constraints on the empirical analysis. Most importantly, in the context of the present study, the use of

dichotomous dependent variables in spatial panel models has not been widely validated. Thus, the analysis presented in this chapter diverges from many existing studies of civil conflict by relying on a linear spatial regression model and a continuous dependent variable.

To implement the two-stage regression analysis, each of several intervening variables, corresponding to the causal pathways implied by the vulnerability, risk, and opportunity mechanisms, were instrumented with respect to independent variables measuring resource wealth, dependence, and availability. First, the intervening variables were regressed on the independent variables and several control variables, using the spatial random effects model. The predicted values of the intervening variables from those regressions were then used, along with the control variables, as predictors of the conflict variable. If the causal chain has been correctly specified, and if the assumption that the predicted value of the intervening variable is uncorrelated with either λ or μ is met, then the independent variable is expected to be a significant predictor of the intervening variable in the first stage regression and the predicted value of the intervening variable to be a significant predictor of the dependent variable in the second stage.

2.2.2 Dependent Variable

Most studies of conflict and natural resources rely on binary definitions, whereby a civil war is defined to exist if a given threshold of battle deaths have occurred in a conflict between two well-defined agents—typically a state and a non-state group (e.g. Collier & Hoeffler 1998; Fearon 2005; De Soysa & Neumayer 2007; Lujala 2010). This approach has yielded important insights into the factors that drive

the onset and duration of conflict, but is limited in that it cannot be used as a measure of conflict intensity, and risks excluding low level conflicts that, by persisting for many years, may result in greater overall numbers of deaths than short but intense warfare (Lujala et al. 2005; Koubi et al. 2014). Given these limitations and the absence of established methods for estimating binary choice regressions in the spatial panel context, this study relies on the linear spatial panel model; that choice is made possible by the recent emergence of georeferenced events data, which present opportunities for constructing continuous conflict variables.

The dependent variable for this study was derived from the UCDP/PRIO Georeferenced Event Dataset (GED) and includes all events involving a recognized non-state actor that resulted in at least one casualty (Sundberg & Melander 2013). For each of the four panels, the dependent variable was constructed as the sum of all conflict events occurring within a given country over the five-year periods beginning, respectively, in 1995, 2000, 2005, and 2010 (see Figure 2.1). To account for the dispersion of this variable, it was expressed in natural logarithmic form in the regression models.

2.2.3 Independent Variables

Previous studies of natural resources and civil conflict have used a variety of methods to quantify the abundance, distribution, exploitation, and economic importance of natural resources at the country level. The value of resource rents as a percentage of GDP is perhaps the most common construction (e.g. Collier & Hoeffler 2004; Fearon 2005), although the total or per capita value of resource rents have also been used (e.g. Brunnschweiler & Bulte 2009). The distinction between these

measures is an important consideration in the study of specific causal chains. Under the vulnerability mechanism and H1, economic dependence on natural resources in the economy is the critical variable because the institutional and political effects associated with those theories are likely to be most disruptive in countries in which resource extraction is the dominant industry. On the other hand, the monetary value of resource rents is of greater importance in the context of the opportunity mechanism under H3 because it captures the financial benefits that could potentially accrue to non-state actors. Similarly, to the extent that grievances related to the negative impacts of resource extraction are implicated as issues around which non-state actors mobilize, the extent of extractive industry, rather than its relative contribution to the broader economy, may be of greater relevance to the risk mechanism under H2.

This study examines the effect of resource abundance and dependence independently, using data from the World Bank's World Development Indicators (WDIs). The variables of interest are oil rents, calculated as the difference between the value of oil production and the total costs of production; mineral rents, the value of production for tin, gold, lead, zinc, iron, copper, nickel, silver, bauxite, and phosphate minus the costs of production; and forest rents, or total roundwood harvest volume multiplied by average world prices and a region-specific rental rate (see World Bank 2018a). For the purposes of this study, resource rents were expressed as percentages of GDP in the empirical models testing for a conflict vulnerability effect (see Figure 2.2); for models interrogating the conflict risk and conflict opportunity mechanisms, they were expressed in per capita, purchasing power parity (PPP) terms (see Figure 2.3).

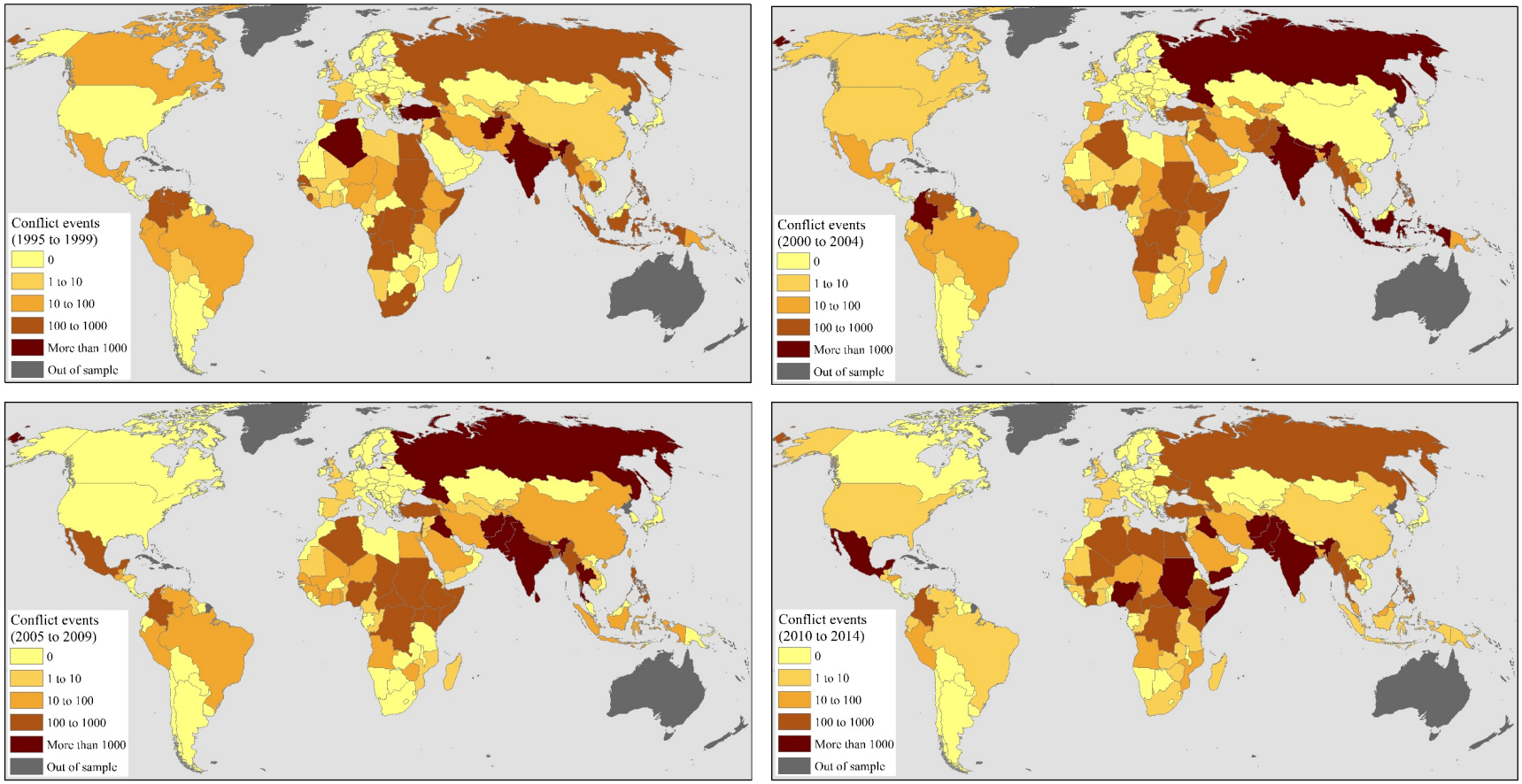

Figure 2.1. Conflict events by country. Source: Compiled from Sundberg et al. (2013).

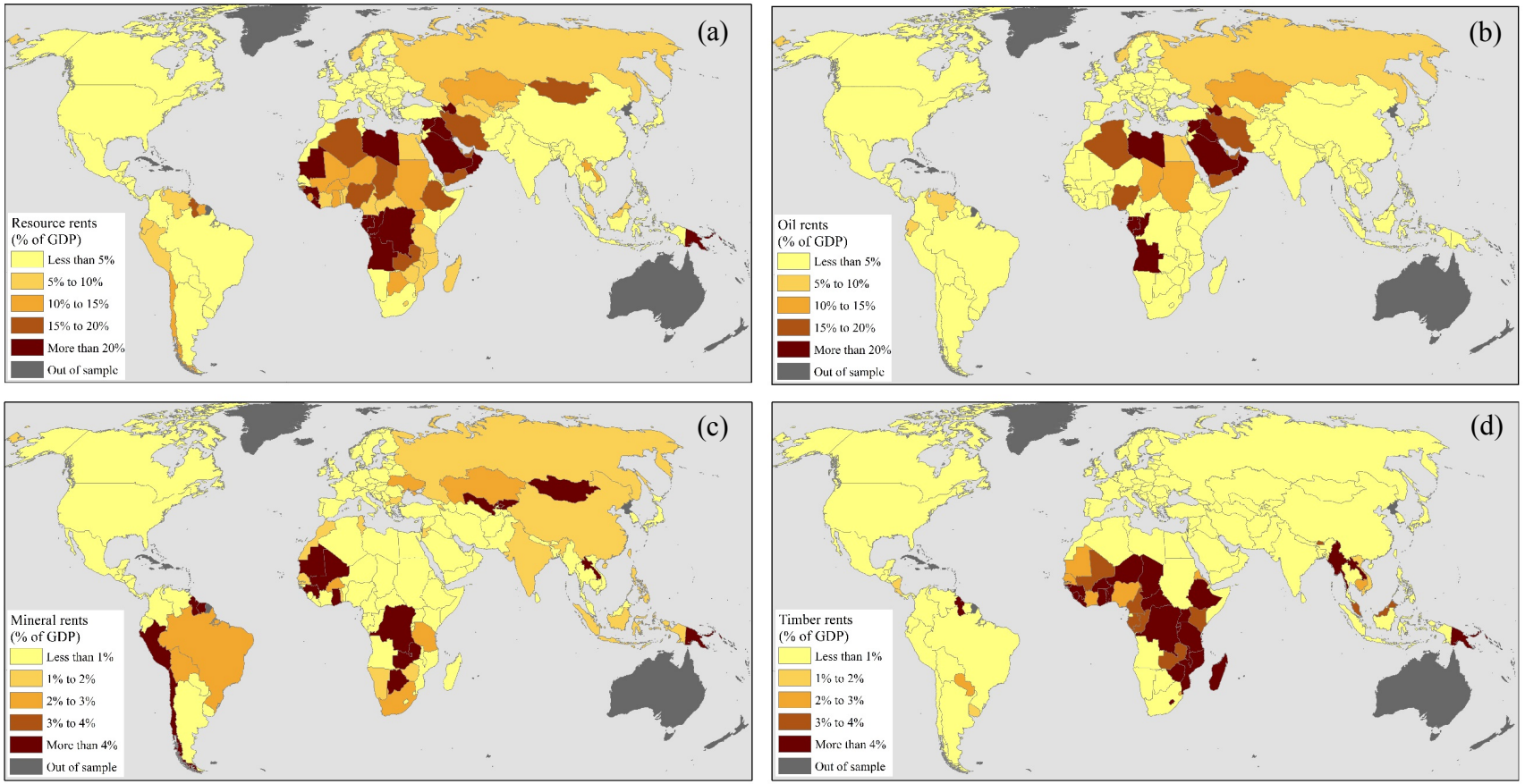

Figure 2.2 Resource dependence by country. (a) Total resource rents as percentage of GDP by country in 2009. (b) Oil rents as a percentage of GDP by country in 2009. (c) Mineral rents as percentage of GDP by country in 2009. (d) Timber rents as percentage of GDP by country in 2009. Source: Compiled from World Bank (2018a).

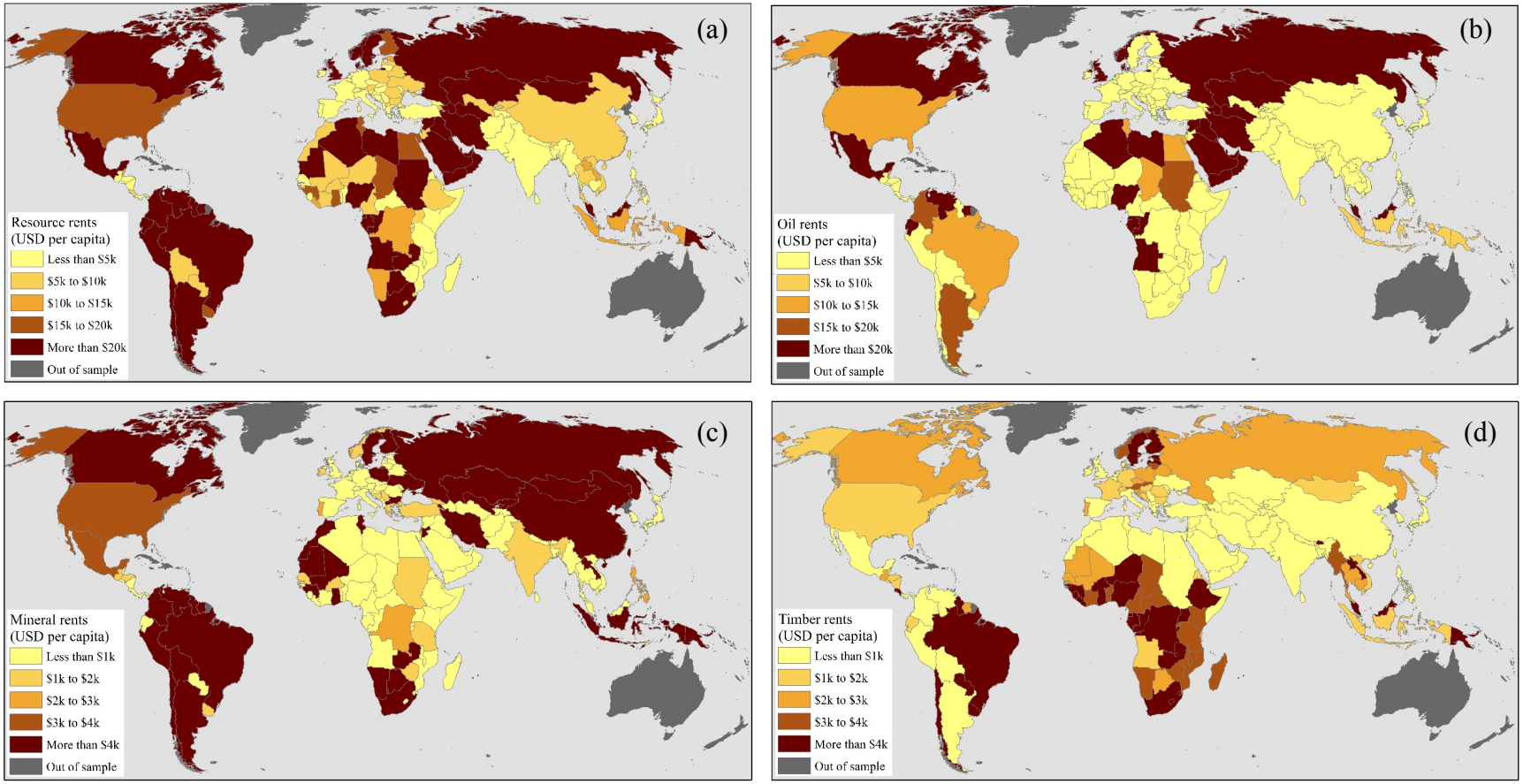

Figure 2.3 Resource wealth by country. (a) Total resource rents per capita by country in 2009. (b) Oil rents per capita by country in 2009. (c) Mineral rents per capita by country in 2009. (d) Timber rents per capita by country in 2009. Source: Compiled from World Bank (2018a).

For some categories of resources, the physical presence of a resource within a geographical area is the most salient feature; this is especially the case for high-value and easily extracted resources that can be exploited directly by non-state actors outside of the regulated economy, as predicted by the opportunity mechanism. To account for this potential effect, a final independent variable of interest was constructed using data on diamond and other gemstone deposits from Gilmore et al. (2005) and Lujala (2009), respectively (see also Lujala et al. 2005). The total number of gemstone deposits, including both primary and secondary diamond deposits, as well as other gemstone deposits, in each country-year was divided by the total land area to generate a variable measuring general gemstone availability.

To partially account for potential issues of endogeneity in the regression analysis, all independent variables of interest described in this section were lagged by one year relative to the start of the five-year period over which the dependent variable was calculated. Thus, in the first panel, for example, the dependent variable was defined as the total number of conflict events that occurred in each country from 1995 through 1999 and the resource dependence, resource wealth, and gemstone availability variables were calculated using 1994 data.

2.2.4 Intervening Variables

Two potential intervening variables were identified to interrogate the applicability of the vulnerability mechanism. The first of these is the World Bank's World Governance Indicators (WGIs) score for corruption control, which measures the degree to which a state government restricts public sector corruption. The corruption control index ranges from -2.5, representing the least effective corruption

control, to 2.5, representing the most effective (see Figure 2.4) and is based on survey data. Because H1 predicts that economic dependence on natural resources incentivizes rent-seeking behavior within state governments, a negative and statistically significant relationship between the resource dependence and the corruption control index is expected under that hypothesis. More broadly, the index may serve as a proxy measure for general state capacity. Accordingly, extensive sensitivity analysis was conducted with other variables from the WGIs, including indices measuring voice and accountability, government effectiveness, and institutional quality. All of those variables are highly correlated with each other and with corruption control and exhibited similar relationships with natural resources and conflict.

The second variable used to test the applicability of the resource curse argument seeks to quantify the level of democracy or autocracy in a given country; this is the widely-used Polity2 score from the Polity IV project (see Marshall & Jaggers 2002), which ranges from -10, representing a strongly autocratic government, to 10, representing a strongly democratic government (see Figure 2.5). Under H1, a negative relationship between the Polity2 score and economic dependence on natural resources is predicted, as dependence on extractive industry is expected to make state governments less responsive to constituents and to make authoritarian governments more stable.

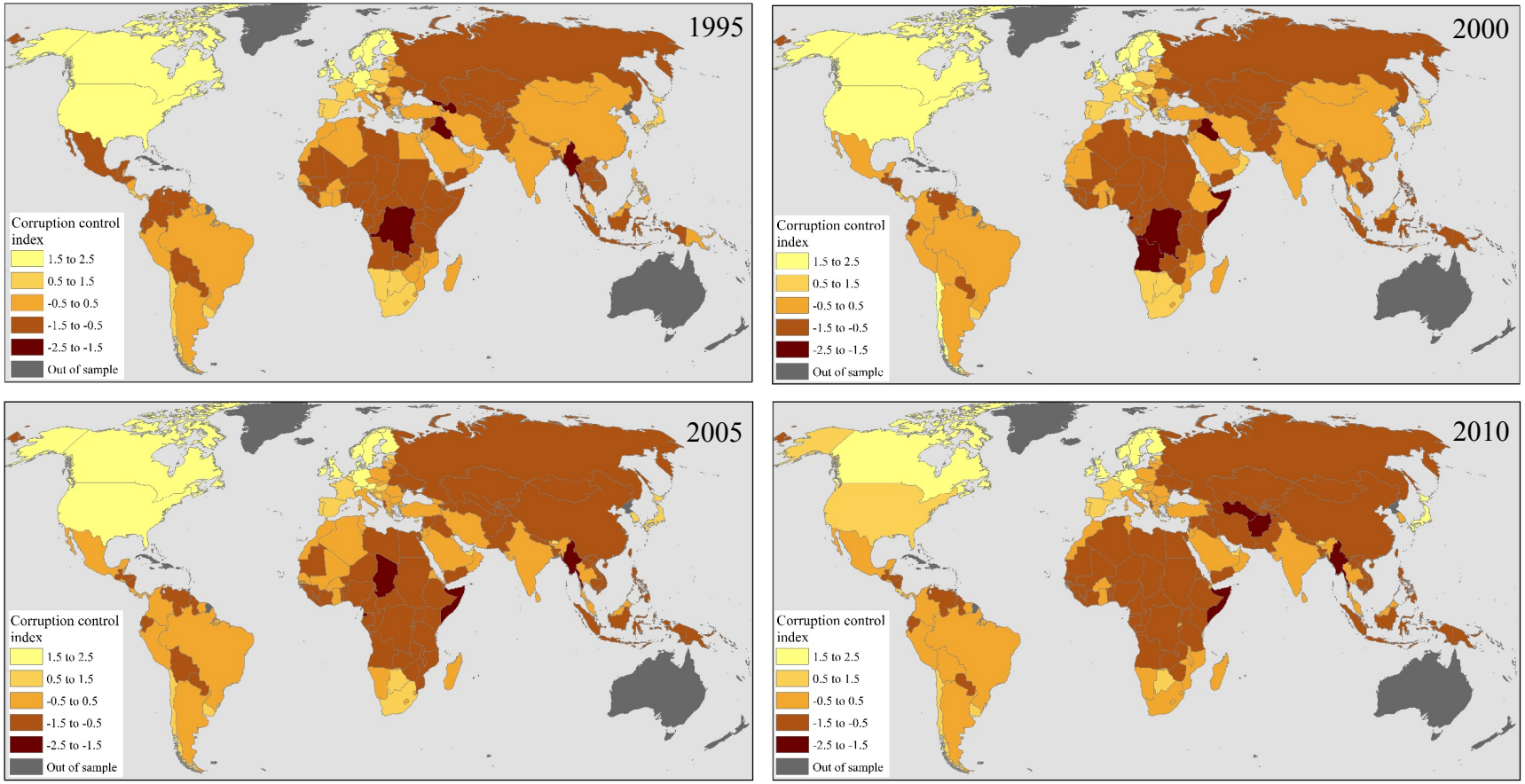

Figure 2.4 Corruption control index by country-year. Source: Compiled from World Bank (2018b).

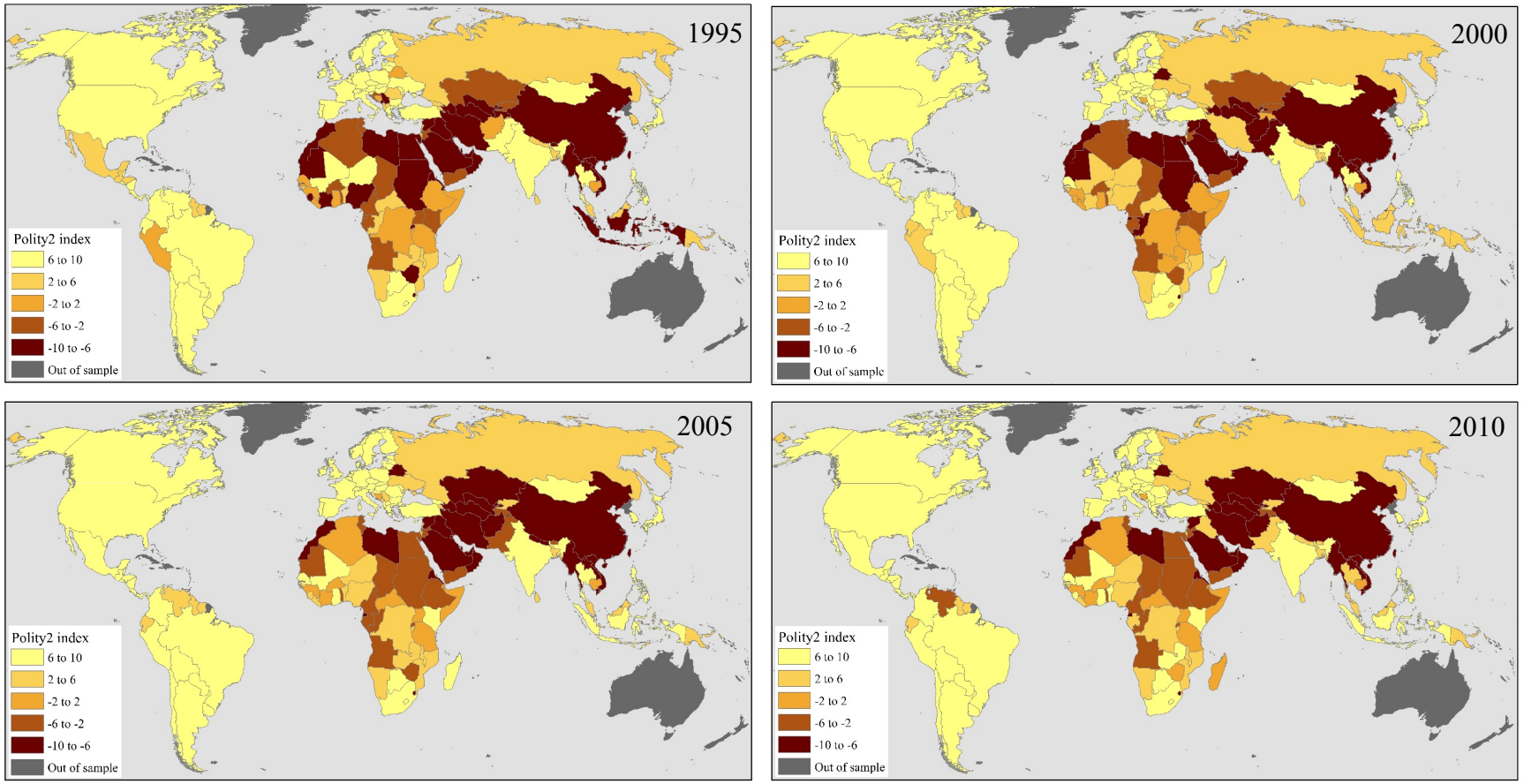

Figure 2.5 Polity2 index by country-year. Source: Compiled from Marshall & Jaggers (2002).

To interrogate the role of grievances under the risk mechanism, this chapter follows Cederman et al. (2013) in developing an index of horizontal economic inequality based on the heterogeneity of per capita economic activity across ethnic groups in a country-year. Polygons representing ethnic group territories were obtained from the Geo-referencing of Ethnic Groups (GREG) dataset (see Weidmann et al. 2010); for each polygon, a measure of per capita economic activity was generated from remotely sensed nighttime lights and raster population data. Nighttime lights data were obtained from the DMSP-OLS time series in the form of annual composites of stable lights from human sources, aggregated to a one square kilometer resolution; light from gas flares, which are a stable light source, but may not be relevant components of economic productivity, were removed by the author using existing masks and by comparing the processed product with high resolution imagery. Similarly processed nighttime lights data have been used successfully elsewhere as a proxy measure of economic productivity and urbanization where alternative data are not available (see, for example, Keola & Andersson 2015, Wu et al. 2013, Zhou et al. 2015); aggregated to the country scale, the intensity of nighttime lights was indeed found to be strongly correlated ($r = 0.934$) with GDP estimates from the WDIs across the time period of interest for this study.

Population data were obtained from the Gridded Population of the World dataset (CIESIN 2016), which estimates global population density at a one square kilometer resolution based on census information and remotely sensed satellite imagery. Because the nighttime lights and population data were collected independently using different methods, it is possible to generate therefrom an

estimate of per capita economic productivity in each ethnic group territory. The utility of various transformations of the population and nighttime lights variables for estimating per capita income were tested; among these, the best fit with country-level per capita GDP was found to be the total nighttime light intensity (sum of digital numbers within a polygon) divided by the natural log of total population (see Figure 2.6).

From the resulting estimate of per capita economic activity in each ethnic group territory, a country-level measure of horizontal spatial economic inequality was defined using Theil's (1967) mean logarithmic deviation method, such that:

$$T_{i,t} = \frac{1}{N_i} \sum \frac{x_{j,t}}{\mu_{i,t}} \ln\left(\frac{x_{j,t}}{\mu_{i,t}}\right)$$

Where $x_{j,t}$ is economic activity per capita in territory j of country i in year t; $\mu_{i,t}$ is average per capita economic activity across all territories country i in year t; and N_i is the number of territories in country i. The final index value $T_{i,t}$ thus represents the heterogeneity in per capita incomes across ethnic groups within each country-year.

Because it measures horizontal, rather than vertical, inequality, the Theil index calculated for each country is not highly correlated with available estimates of the more widely-used Gini coefficient ($r = 0.51$), which quantifies economic inequality between individuals, for the time period examined. As shown in Figure 2.7, however, it appears to be a reasonable predictor of conflict in many cases. In the first panel of the series, the countries with the highest Theil index values were, in order, Sudan, Afghanistan, Chad, and Liberia, all countries in which major civil conflicts occurred between 1995 and 2010.

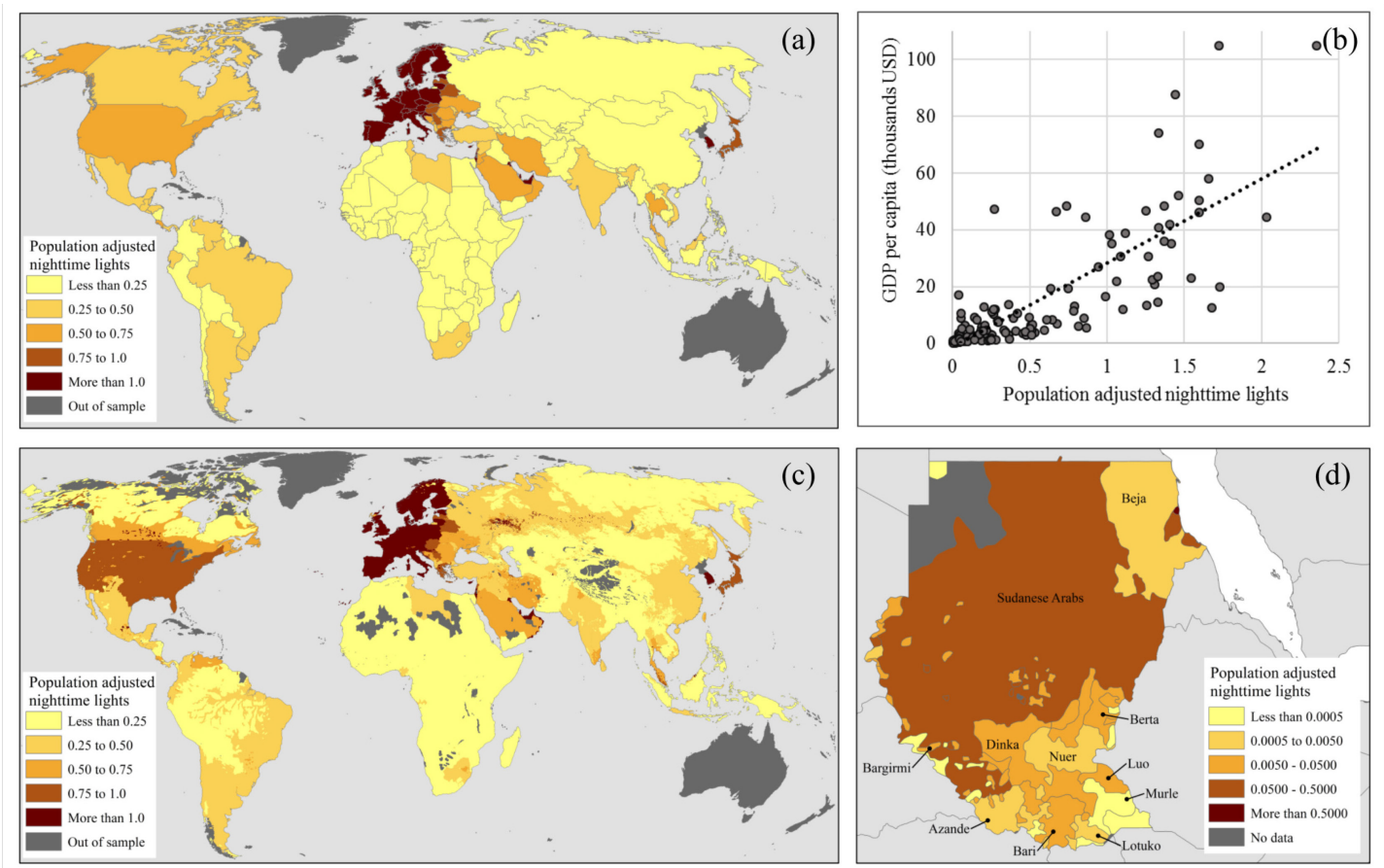

Figure 2.6 Theil index of horizontal inequality calculation. (a) Population-adjusted nighttime lights by country in 2009. (b) Relationship between population-adjusted nighttime lights and GDP per capita by country-year. (c) Population-adjusted nighttime lights by ethnic group territory in 2009. (d) Population-adjusted nighttime lights by ethnic group territory in Sudan in 2009. Source: Author's calculations.

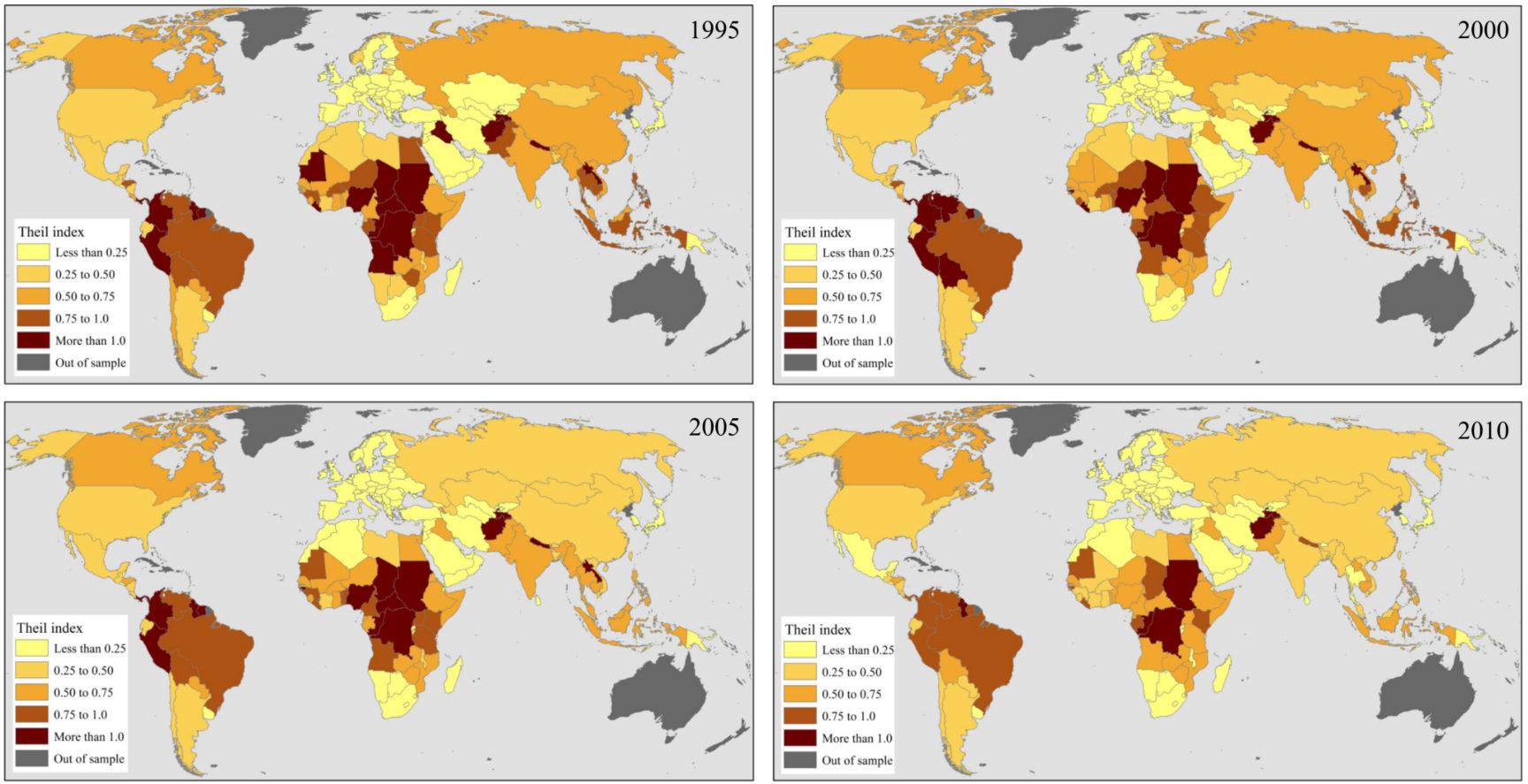

Figure 2.7 Theil index of horizontal inequality by country-year. Source: Author's calculations.

To test the applicability of the opportunity mechanism, the strength of non-state actors was instrumentalized using data from the Non-State Actor dataset (Cunningham et al. 2013), an extension of the UCDP/PRIO Armed Conflict Dataset (see Gleditsch et al. 2002; Themnér & Wallensteen 2012). In the main results presented below, the best available estimate of the active rebel population, summed across all active rebel groups in each country-year, was used as a general estimate of rebel capacity (see Figure 2.8). Extensive sensitivity analysis was conducted using alternative measures of rebel capacity obtained from the NSA dataset, including indices quantifying the ability of rebels to mobilize support, to procure arms, to fight, and to exert territorial control, as well as the NSA's composite measure of the relative strength of rebel groups vis-à-vis the state, which combines these factors. Because NSA data is compiled at the conflict dyad scale, these measures were aggregated to the country level by averaging the values across all active rebel groups in each country-year and, alternatively, by using the highest score across all active rebel groups in each country-year. Neither of these approaches is without limitations; for instance, the presence of multiple non-state actors in one country may either enhance the relative strength of all groups by overtaxing state militaries—as in the case in the conflict between the state and various rebel factions during the 1990s in Burundi (Nilsson 2010)—or weaken those actors through intergroup conflict—such as clashes between the Mong Tai Army and the United Wa State Army in Myanmar (Fjelde & Nilsson 2012). The behavior of non-state actors is complex and beyond the scope of the present study to model comprehensively. For the purposes of examining the broad role of natural resources as a driver of rebel capacity, however, the results of the sensitivity analysis were generally consistent with the main results presented below.

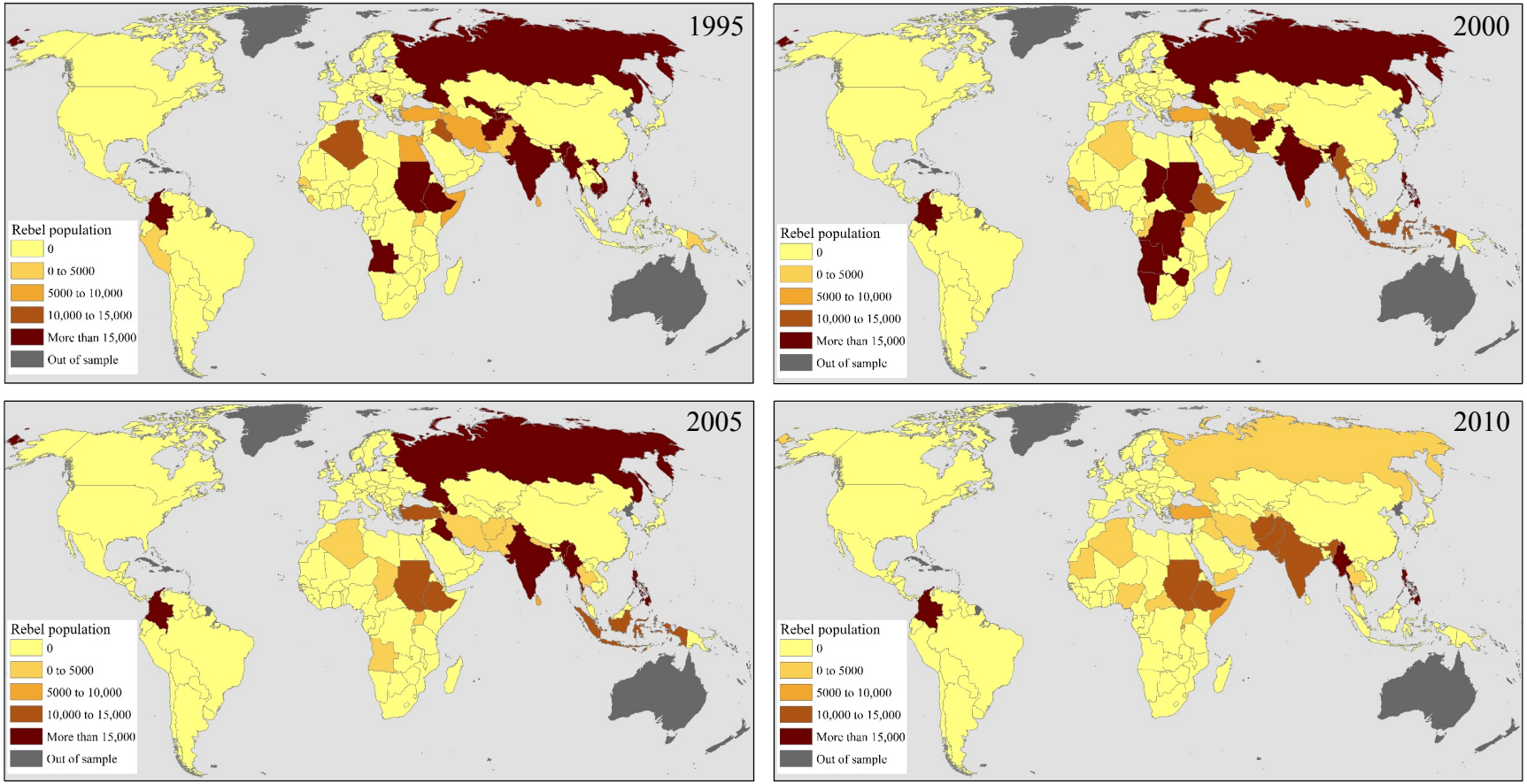

Figure 2.8 Rebel population by country-year. Source: Compiled from Cunningham et al. (2013).

All of the intervening variables—the corruption control index, Polity2 index, Theil index of spatial horizontal economic inequality, and the rebel population variable—were calculated using data for the years 1995, 2000, 2005, and 2010, for the first, second, third, and fourth panels, respectively. Accordingly, by design, these variables overlap temporally with the dependent variable but not with the independent variables.

2.2.5 Control Variables

Although the main regression models are parsimonious, several control variables were included, based on the findings of the existing literature. Total population and average wealth have both consistently been shown to be important predictors of conflict onset and intensity, with the former consistently exhibiting a positive relationship with conflict and the latter a negative relationship. Therefore, total population and GDP per capita in constant (2010), PPP U.S. dollars, both obtained from the WDIs, were included as control variables in all models. As a general measure of environmental scarcity, which may, according to some theories of resource conflict, contribute to conflict by increasing competition for scarce resources, physiographic population density, or persons per unit area of arable land, was also included. However, because this variable never exhibited a statistically significant relationship with conflict or with the intervening variables, it was dropped from the two-stage regression analysis. Like the independent variables of interest, the control variables were lagged by one year relative to the dependent and intervening variables.

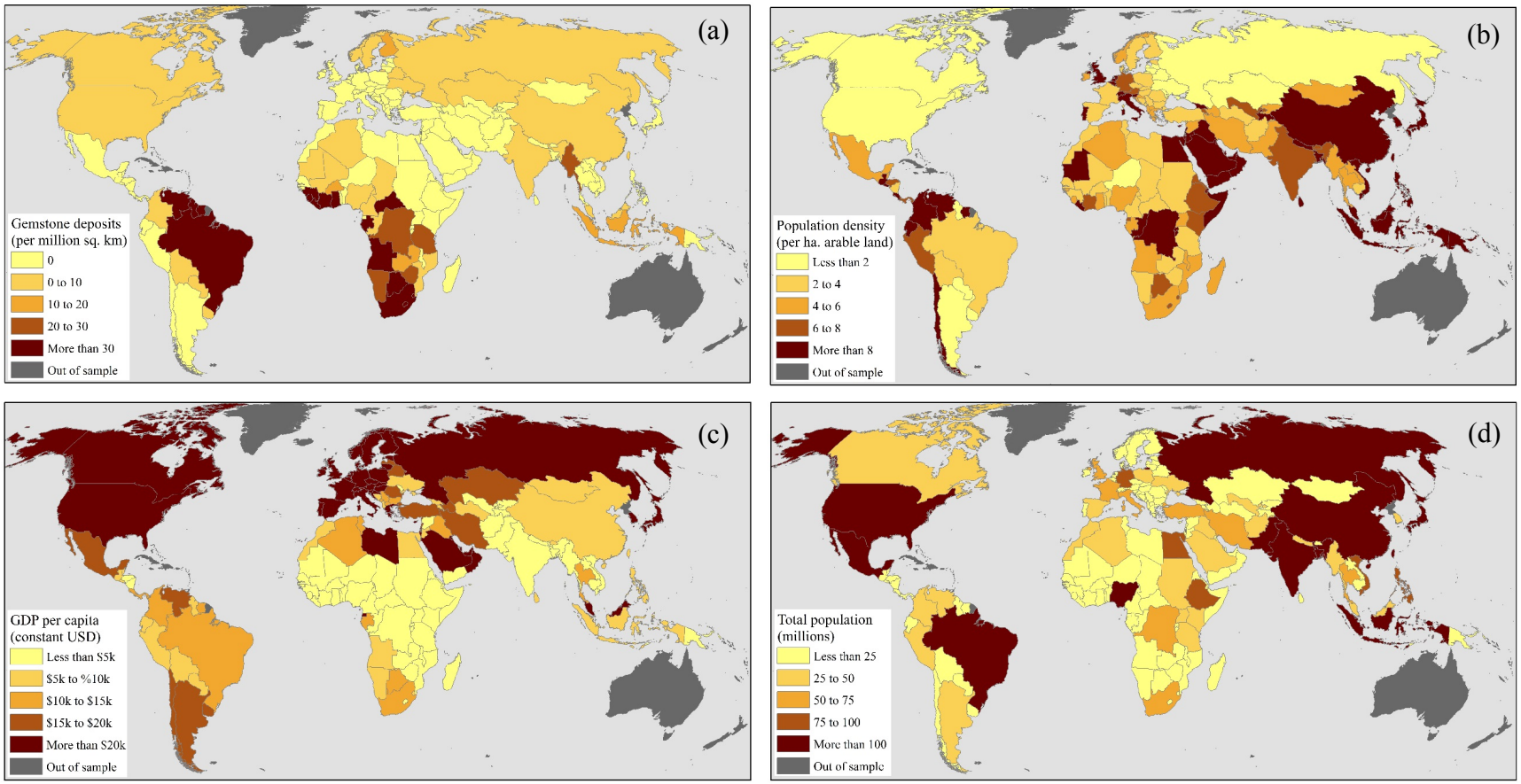

Figure 2.9 Gemstone availability and control variables. (a) Gemstone deposits per land area by country in 2009. (b) Population density by country in 2009. (c) GDP per capita by country in 2009. (d) Total population by country in 2009. Source: Compiled from Gilmore et al. (2005); Lujala (2009); World Bank (2018a).

2.3 Results and Discussion

2.3.1 Preliminary Regressions

The results of the preliminary regressions (Table 2.1) are consistent with previous studies in finding a strong and statistically significant correlation between conflict and oil wealth, such that each additional thousand dollars of oil rents per capita was associated, on average, with an approximately 8.7 percent increase in the number of conflict events experienced over five years (Model 1). Economic dependence on oil was also a statistically significant predictor of conflict; the estimated coefficient of 0.029 implies that each additional percent of GDP attributable to oil rents was associated with an almost three percent increase in the number of conflict events experienced (Model 2). However, both the oil wealth (Model 3) and the oil dependence (Model 4) variables were sensitive to alternative model specifications, becoming insignificant when the intervening variables were included in the regression equation. None of the other resource wealth or dependence variables were significant at traditionally accepted levels.

Among the control variables, population was consistently significant and positive, while physiographic population density was positive but insignificant. The former finding suggests that, consistent with the existing literature, the incidence of civil conflict increases with population; the latter constitutes evidence against an absolute scarcity mechanism unrelated to extractive industry. Although GDP was significant in Model 1 and Model 2, it was insignificant when the corruption control, democracy, horizontal inequality, and non-state actor population variables were included in Model 3 and Model 4; this suggests that, like oil wealth and dependence, income is collinear with one or more of those intervening variables.

Table 2.1 Effect of natural resources on civil conflict.

	Model 1	Model 2	Model 3	Model 4
Dependent variable	Conflict events	Conflict events	Conflict events	Conflict events
Intercept	1.871***	1.487***	0.8331***	0.6473***
	(0.2064)	(0.2067)	(0.1924)	(0.1892)
GDP per capita	-0.0390***	-0.0281***	-0.0058	-0.0031
(thousands USD)	(0.0081)	(0.0070)	(0.0075)	(0.0062)
Population	0.0029***	0.0031***	0.0019***	0.0020***
(millions)	(0.0011)	(0.0011)	(0.0007)	(0.0007)
Physiographic density	0.1185	0.0799	0.0788	0.0806
(thousands per hectare)	(0.2413)	(0.2394)	(0.1855)	(0.1861)
Gemstone deposits	1.792*	1.688*	0.9457	0.6600
(per million hectares)	(0.9632)	(0.9630)	(0.7855)	(0.7937)
Oil rents per capita	0.0830**		0.0139	
(thousands USD)	(0.0353)		(0.0309)	
Forest rents per capita	-1.432		-1.251*	
(thousands USD)	(0.8722)		(0.6972)	
Mineral rents per capita	-0.3347		-0.4251	
(thousands USD)	(0.4288)		(0.3694)	
Oil dependence		0.0290***		0.0095
(rents as % of GDP)		(0.0111)		(0.0094)
Forest dependence		0.0204		0.0180
(rents as % of GDP)		(0.0179)		(0.0146)
Minerals dependence		-0.0169		-0.0116
(rents as % of GDP)		(0.0303)		(0.0258)
Corruption control			-0.4912***	-0.4796***
(-2.5 to 2.5 index score)			(0.1291)	(0.1277)
Polity2 index			0.0050	0.0072
(-10 to 10 index score)			(0.0152)	(0.0154)
Horizontal inequality			0.4935***	0.4113**
(Theil index)			(0.1795)	(0.1796)
Rebel population			0.2977***	0.2990***
(natural logarithm)			(0.0200)	(0.0201)
Spatial lag	0.1856***	0.1970***	0.1470***	0.1524***
	(0.0449)	(0.0442)	(0.0399)	(0.0397)

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$ Standard errors in parentheses

2.3.2 Intervening Variable Analysis

As discussed above, the vulnerability, risk, and opportunity mechanisms predict that natural resource wealth and dependence affect civil conflict through intervening effects on state capacity and democracy, horizontal economic inequality, and non-state actor population, respectively. The results of a second series of spatial random effects regressions include some evidence of such intermediate relationships (see Table 2.2).

Consistent with H1, economic dependence on oil was found to be a significant and negative predictor of both corruption control (Model 5) and democracy (Model 6). Per capita rents from oil and minerals were both significant regressors of horizontal inequality (Model 7), as predicted by H2. And, controlling for horizontal inequality, democracy, and corruption control, the availability of gemstones was positively correlated with the size of the non-state actor population (Model 8), consistent with H3.

Table 2.2 Effect of natural resources on intervening variables.

	Model 5	Model 6	Model 7	Model 8
Dependent variable	Corrupt. ctrl.	Polity2 index	Theil index	Rebel pop.
Intercept	-0.2386***	2.464***	0.372***	1.531***
	(0.0677)	(0.5105)	(0.037)	(0.3831)
GDP per capita	0.0135***	0.0288*	-0.006***	-0.0166
(thousands USD)	(0.0021)	(0.0168)	(0.002)	(0.0152)
Population	-0.0002	0.0001	0.000	0.0030**
(millions)	(0.0004)	(0.0027)	(0.000)	(0.0015)
Physiographic density	0.0020	-0.4699	-0.008	-0.0962
(thousands per hectare)	(0.0583)	(0.5193)	(0.044)	(0.3746)
Gemstone deposits	0.1836	2.456	-0.108	3.140**
(per million hectares)	(0.2153)	(1.987)	(0.177)	(1.576)
Oil rents per capita			0.021***	-0.0525
(thousands USD)			(0.064)	(0.0621)
Forest rents per capita			0.158	-2.439*
(thousands USD)			(0.160)	(1.401)
Mineral rents per capita			0.213***	-0.8512
(thousands USD)			(0.079)	(0.7399)
Oil dependence	-0.0093***	-0.1472***		
(rents as % of GDP)	(0.0028)	(0.0244)		
Forest dependence	-0.0027	-0.0316		
(rents as % of GDP)	(0.0041)	(0.0374)		
Minerals dependence	-0.0091	0.1121*		
(rents as % of GDP)	(0.0065)	(0.0612)		
Corruption control				-0.0638
(-2.5 to 2.5 index score)				(0.2600)
Polity2 index				-0.0985***
(-10 to 10 index score)				(0.0302)
Horizontal inequality				1.165***
(Theil index)				(0.3570)
Spatial lag	0.2507***	0.2152***	0.233***	0.0595
	(0.0440)	(0.0448)	(0.045)	(0.0446)

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$ Standard errors in parentheses

To further interrogate the proposed causal mechanisms, each of the intervening variables was introduced to the model independently to assess its effect on the predictive power of the resource wealth and resource dependence variables (see Table 2.3).

Table 2.3 Effect of intervening variables on civil conflict.

	Model 9	Model 10	Model 11	Model 12
Dependent variable	Conflict events	Conflict events	Conflict events	Conflict events
Intercept	1.316***	1.718***	1.543***	0.1470***
	(0.2096)	(0.2167)	(0.2228)	(0.0398)
GDP per capita	-0.0152*	-0.0264***	-0.0336***	-0.0058
(thousands USD)	(0.0079)	(0.0071)	(0.0080)	(0.0075)
Population	0.0030***	0.0031***	0.0029***	0.0019***
(millions)	(0.0010)	(0.0011)	(0.0010)	(0.0007)
Physiographic density	0.0993	0.0338	0.1086	0.0788
(thousands per hectare)	(0.2351)	(0.2397)	(0.2358)	(0.1855)
Gemstone deposits	1.6812*	1.845*	1.849*	0.9457
(per million hectares)	(0.9531)	(0.960)	(0.9510)	(0.7855)
Oil rents per capita			0.0673*	0.0139
(thousands USD)			(0.0349)	(0.0309)
Forest rents per capita			-1.658*	-1.251*
(thousands USD)			(0.8592)	(0.6972)
Mineral rents per capita			-0.5234	-0.4251
(thousands USD)			(0.4287)	(0.3694)
Oil dependence	0.0190*	0.0179		
(rents as % of GDP)	(0.0114)	(0.0117)		
Forest dependence	0.0164	0.0162		
(rents as % of GDP)	(0.0177)	(0.0179)		
Minerals dependence	-0.0248	-0.0092		
(rents as % of GDP)	(0.0301)	(0.0302)		
Corruption control	-0.5116***			-0.4912***
(-2.5 to 2.5 index score)	(0.1516)			(0.1291)
Polity2 index		-0.0557***		0.0050
(-10 to 10 index score)		(0.0182)		(0.0152)
Horizontal inequality			0.7158***	0.4935***
(Theil index)			(0.2081)	(0.1795)
Rebel population				0.2977***
(natural logarithm)				(0.0200)
Spatial lag	0.1817***	0.1789***	0.1799***	0.1470***
	(0.0443)	(0.0448)	(0.0445)	(0.0398)

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$ Standard errors in parentheses

Although economic dependence on oil was a significant predictor of conflict in the preliminary regressions, it became insignificant when either the corruption control index (Model 9) or the Polity2 index (Model 10) was included, which may be suggestive

of a mediated relationship with those variables. Similarly, the explanatory power of oil wealth is attenuated by the inclusion of the Theil index in the model (Model 11), which may suggest that the effect of oil wealth on conflict is also mediated by an effect on inequalities across groups within each country. Finally, the availability of gemstone deposits, although significant when horizontal inequality, democracy, and corruption control are controlled for, is insignificant in the full model when the size of the non-state actor population is also included (Model 12), evidence of collinearity between the rebel population and gemstone availability variables.

2.3.3 Two-Stage Regression Analysis

Although suggestive of potential linkages between natural resources and conflict along several causal pathways, the results reported above should be treated with caution due to the potentially confounding effects of omitted variable bias and endogeneity, as well as the difficulty in interpreting the direction of causality. Use of the two-stage regression approach may help address some of these issues. As a starting point, the effect of oil resources on the intervening variables was interrogated using known oil reserves per capita as an instrumental variable for oil dependence. The oil reserves per capita variable is a reasonable instrument here because it is not thought to contribute to institutional and governance variables, other than through its effect on oil rents, and thus should not be correlated with the error term; it would be inappropriate, by comparison, to use oil reserves per capita as an instrument in the equations predicting conflict because it is conceivable that known oil reserves could affect belligerent motivations. Next, two two-stage regressions predicting conflict events were estimated, such that the corruption control and the Polity2 indices, respectively, were assumed to be endogenous and were

instrumented with respect to the oil dependence variable (see Table 2.4). To ensure parsimony, physiographic population density, which was never statistically significant in the preliminary regressions, was excluded from the two-stage analysis.

Table 2.4 Two-stage regression of the vulnerability mechanism.

	Model 13	Model 14	Model 15	Model 16
Dependent variable	Corrupt. ctrl.	Polity2 index	Conflict events	Conflict events
Endogenous variable	Oil depend.	Oil depend.	Corrupt. ctrl.	Polity2 index
First stage regression				
Intercept	1.689**	2.442***	-0.3511***	3.905***
	(0.7325)	(0.9030)	(0.0536)	(0.4811)
GDP per capita	0.1155***	0.0532**	0.0285***	0.0310**
(thousands USD)	(0.0301)	(0.0270)	(0.0017)	(0.0150)
Population			0.0001	0.0008
(millions)			(0.0003)	(0.0024)
Gemstone deposits			-0.0168	2.991
(per million hectares)			(0.2614)	(2.140)
Oil dependence			-0.0241***	-0.1964***
(rents as % of GDP)			(0.0029)	(0.0248)
Oil reserves per capita	0.3266***	0.3419***		
(thousand barrels)	(0.0956)	(0.0950)		
Horizontal inequality			-0.2170***	-1.241***
(Theil index)			(0.0580)	(0.4638)
Spatial lag	-3.290***	0.2314	-0.001***	-0.0006*
	(0.7083)	(0.1432)	(0.0000)	(0.0248)
Second stage regression				
Intercept	-0.1593***	6.061***	1.074***	2.200***
	(0.0587)	(0.9185)	(0.2618)	(0.2983)
GDP per capita	0.0196***	0.0705**	0.0068	-0.0261***
(thousands USD)	(0.0040)	(0.0292)	(0.0129)	(0.0069)
Population			0.0027***	0.0029**
(millions)			(0.0009)	(0.0011)
Oil dependence	-0.0433**	-0.7308***		
(rents as % of GDP)	(0.0215)	(0.2330)		
Gemstone deposits			1.251	1.833*
(per million hectares)			(0.9597)	(1.009)
Corruption control			-1.282***	
(-2.5 to 2.5 index score)			(0.4372)	
Polity2 index				-0.1422**
(-10 to 10 index score)				(0.0582)
Horizontal inequality			0.6088**	0.4957**
(Theil index)			(0.2444)	(0.2334)
Spatial lag	0.4645***	-0.2800**	0.0004**	0.0004**
	(0.0974)	(0.1319)	(0.0002)	(0.0002)

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$ Standard errors in parentheses

The results of the two-stage regressions are consistent with the interpretation of the preliminary regression results regarding the applicability of the vulnerability mechanism. That the instrumented oil dependence variable was a significant predictor of both corruption control (Model 13) and democracy (Model 14) suggests that the direction of causality with respect to those variables has been correctly construed. The predicted values of the corruption control variable (Model 15) and the Polity2 index (Model 16) were found to covary significantly with the conflict variable when oil dependence was used as an instrument, which is consistent with a vulnerability mechanism whereby economic dependence on oil contributes to conflict through an intermediate effect on state capacity and democracy.

A second set of two-stage regressions was estimated to interrogate the conflict risk mechanism (see Table 2.5). Again, the basic assumption regarding the direction of causality from oil rents per capita to horizontal inequality was tested by using oil reserves per capita as an instrument for oil wealth. Oil wealth was then used as an instrument for corruption control and the Polity2 index, respectively, to test for an intervening relationship between those variables and the Theil index. Finally, the Theil index was instrumented with respect to oil rents per capita and mineral rents per capita in a model predicting the incidence of conflict events.

Table 2.5 Two-stage regression analysis of the risk mechanism.

	Model 17	Model 18	Model 19	Model 20
Dependent variable	Theil index	Theil index	Theil index	Conflict events
Endogenous variable	Oil rents p.c.	Corrupt. ctrl.	Polity2 index	Theil index
First stage regression				
Intercept	-0.8975***	-0.4823***	3.972***	0.4941***
	(0.2601)	(0.0615)	(0.5226)	(0.0593)
GDP per capita	0.0896***	0.0409***	0.0900***	-0.0057***
(thousands USD)	(0.0076)	(0.0018)	(0.0155)	(0.0020)
Population				-0.0002
(millions)				(0.0003)
Gemstone deposits				-0.0831
(per million hectares)				(0.1889)
Oil reserves per capita	0.2730***			
(thousand barrels)	(0.0278)			
Oil rents per capita		-0.1190***	-0.8971***	0.0166**
(thousands USD)		(0.0088)	(0.0746)	(0.0075)
Mineral rents per capita	-0.2849	0.3715***	3.296***	0.2264***
(thousands USD)	(0.4909)	(0.1373)	(1.166)	(0.0818)
Corruption control				-0.0238
(-2.5 to 2.5 index score)				(0.0332)
Polity2 index				-0.0096**
(-10 to 10 index score)				(0.0037)
Spatial lag	0.7506**	-0.3961***	-3.657***	0.0046
	(0.3506)	(0.0908)	(0.7714)	(0.0084)
Second stage regression				
Intercept	0.1948***	0.1383***	0.2550***	1.130
	(0.0467)	(0.0378)	(0.0479)	(0.7656)
GDP per capita	-0.0011	0.0009	-0.0026***	-0.0163*
(thousands USD)	(0.0023)	(0.0014)	(0.0009)	(0.0097)
Population		-0.0000		0.0029**
(millions)		(0.0001)		(0.0014)
Gemstone deposits		-0.0196		2.178**
(per million hectares)		(0.1541)		(0.9797)
Oil rents per capita	-0.0104			
(thousands USD)	(0.1663)			
Mineral rents per capita	0.1920**	0.1803**	0.1847**	
(thousands USD)	(0.0804)	(0.0814)	(0.0849)	
Corruption control		-0.1206***		-0.2254
(-2.5 to 2.5 index score)		(0.0436)		(0.1807)
Polity2 index			-0.0155***	-0.0540**
(-10 to 10 index score)			(0.0058)	(0.0242)
Horizontal inequality				0.3060
(Theil index)				(1.484)
Spatial lag	0.5399***	0.5391***	0.5332***	0.2267***
	(0.0594)	(0.0583)	(0.0619)	(0.0441)

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$ Standard errors in parentheses

Evidence for the conflict risk mechanism from this analysis, however, is less convincing than for the vulnerability mechanism. Although an effect of corruption control (Model 18) and democracy (Model 19) on horizontal inequality was observed, the predicted value of the Theil index was not found to be a significant predictor of conflict (Model 20), suggesting that the observed relationship between horizontal inequality and conflict is due to the portion of the variance in horizontal inequality that is unrelated to resource wealth.

In a final series of two-stage regression models (see Table 2.6), a number of potential intervening relationships were examined, including the effect of corruption control, democracy, and horizontal inequality on the non-state actor population, as well as the effect of the non-state population on conflict incidence. Evidence of an indirect relationship between resources and rebel capacity was observed, such that both the corruption control index (Model 21) and the Polity2 index (Model 22) were found to be significant predictors of non-state actor population when instrumented with respect to dependence on oil rents, as predicted by the vulnerability mechanism. Consistent with the results above regarding the risk mechanism, the Theil index was not a significant regressor of the non-state actor population when instrumented with respect to oil and mineral rents per capita (Model 23). To directly interrogate the opportunity mechanism and H3, a full model of conflict incidence was estimated, in which gemstone availability and the Theil and Polity2 indices were used as instruments for non-state actor population (Model 24); although non-state actor population was highly significant and positive in the second stage, gemstone availability was insignificant in the first, a finding that constitutes evidence against a direct relationship between resources and rebel capacity.

Table 2.6 Two-stage regression analysis of the opportunity mechanism.

	Model 21	Model 22	Model 23	Model 24
Dependent variable	Rebel pop.	Rebel pop.	Rebel pop.	Conflict events
Endogenous variable	Corrupt. ctrl.	Polity2 index	Theil index	Rebel pop.
First stage regression				
Intercept	-0.3824***	4.372***	0.4535***	1.097**
	(0.0522)	(0.4520)	(0.0385)	(0.4277)
GDP per capita	0.0302***	0.0244*	-0.0075***	-0.0187*
(thousands USD)	(0.0028)	(0.0141)	(0.0014)	(0.0110)
Population	0.0000	0.0003	-0.0000	0.0032**
(millions)	(0.0002)	(0.0021)	(0.0002)	(0.0013)
Gemstone deposits	-0.2195	1.829	-0.0185	2.515*
(per million hectares)	(0.2698)	(2.161)	(0.1806)	(1.513)
Oil dependence	-0.0281***	-0.2194***		
(rents as % of GDP)	(0.0028)	(0.0240)		
Oil rents per capita			0.0212***	
(thousands USD)			(0.0064)	
Mineral rents per capita			0.2430***	
(thousands USD)			(0.0842)	
Corruption control				-0.0683
(-2.5 to 2.5 index score)				(0.2382)
Polity2 index				-0.0808***
(-10 to 10 index score)				(0.0283)
Horizontal inequality				1.228***
(Theil index)				(0.3512)
Spatial lag	-0.0217***	-0.2194***	0.0117***	0.0742
	(0.0063)	(0.0483)	(0.0041)	(0.0695)
Second stage regression				
Intercept	0.3465	1.539***	1.127	0.5016**
	(0.3913)	(0.4548)	(0.9796)	(0.2259)
GDP per capita	0.0167	-0.0204*	-0.0235	0.0005
(thousands USD)	(0.0182)	(0.0104)	(0.0148)	(0.0058)
Population	0.0030**	0.0029*	0.0027*	0.0012
(millions)	(0.0013)	(0.0016)	(0.0016)	(0.0008)
Gemstone deposits	2.589*	3.316**	2.914*	
(per million hectares)	(1.537)	(1.622)	(1.621)	
Corruption control	-1.383**			-0.4457***
(-2.5 to 2.5 index score)	(0.5736)			(0.1260)
Polity2 index		-0.1626**		
(-10 to 10 index score)		(0.0813)		
Horizontal inequality			-0.4570	
(Theil index)			(2.060)	
Rebel population				0.5022***
(natural logarithm)				(0.1086)
Spatial lag	0.1405***	0.1468***	0.1933***	0.1289***
	(0.0388)	(0.0414)	(0.0440)	(0.0386)

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$ Standard errors in parentheses

Taken together, therefore, the results of the two-stage regression analysis are supportive of the vulnerability mechanism predicted by H1. It appears that economic dependence on petroleum resources reduces the responsiveness of states to their citizens, resulting in less democratic governance and increased public-sector corruption. This resource curse effect, in turn, makes states more vulnerable to conflict by increasing mobilization efforts of non-state actors, undermining the capacity of states to respond to insurgent activity, and increasing public support for rebels. Evidence of a conflict risk mechanism mediated by a direct effect of resources on horizontal inequality or an opportunity mechanism mediated by non-state actor population is lacking; although both horizontal inequality and non-state actor population do appear to contribute to the number of conflict events in a given time period, the results of the two-stage regression analysis do not support the causal pathways implied by those mechanisms.

2.3.4 Sensitivity Analysis and Limitations

To test the robustness of the results reported above, the statistical models were repeated under a wide variety of alternative specifications, including the following:

- Alternative dependent variable transformations: In addition to the natural logarithmic transformation of the conflict events variable, other transformations were also tested, including the square root function, the cube root function, and the untransformed dependent variable. Use of these transformations significantly decreased the predictive power of the regression equation and affected the apparent significance of the Theil index, which was generally significant only when the natural log and cube root transformations were used; the significance of the other independent variables and intervening variables were unaffected.

- Spatial fixed effects model: The fixed effects model estimates the effect of explanatory variables on changes in the dependent variable within each country. The method effectively drops from the sample observations that do not vary over time in the dependent variable and cannot be used to compute accurate coefficients for independent variables that change little over time, an effect that is most pronounced in short panels, as is the case here. Under the fixed effects specification, only total population remained a statistically significant predictor of conflict in any of the models.
- Additional control variables: The models were repeated with additional control variables, including the proportion of the country covered by mountainous or forested terrain; the value of exports and imports divided by GDP, as a measure of reliance on foreign trade unrelated to natural resources; the number of politically excluded minority groups, as reported in the Ethnic Power Relations dataset (see Vogt et al. 2015); and change in the normalized difference vegetation index, as a measure of land cover and land use change. None of those variables were consistently statistically significant and their inclusion did not substantially affect the main results.
- Nonlinear relationships: It has been proposed that the relationship between resource rents and civil conflict may take a polynomial form, such that the risk of conflict increases at low levels of economic dependence, through a resource curse or other effect, and decreases at very high levels of dependence, as a result of enhanced military capacity of the state enabled by collection of rents (Collier & Hoeffler 2004; Basedau & Lay 2009). To test for such an effect, all models were re-estimated with the square of the independent variables included as covariates. The squared resource

dependence variables were generally statistically insignificant; however, a polynomial relationship between per capita petroleum rents and conflict was observed, although the squared per capita oil rents variable was significant only at the ten percent level.

There are several potential limitations in the analysis described above that should be noted, including the widely-recognized issue of endogeneity. It is possible, for example, that dependence on natural resource extraction may be a function of conflict, rather than vice versa, as a result of underinvestment in non-resource sectors in areas affected by conflict (Brunnschweiler & Bulte 2008, 2009); alternatively, both resource dependence and conflict may be influenced by an underlying state weakness mechanism (Lujala 2009). The strong correlation between oil rents and both the Polity2 score and the corruption control score, for instance, could potentially be explained not by a resource curse effect on state-level institutions, but rather by a preference among extractive industry for locating in more corrupt or less democratic countries. All three conditions—economic dependence on oil, low democracy, and low corruption control—are also correlated with poverty, which is itself a well-established predictor of conflict.

The empirical analysis utilizes several methods to minimize such sources of endogeneity. The use of lagged independent variables may somewhat address the issue of reverse causality, although, given that most civil conflicts span multiple years, this is likely insufficient in isolation to ensure that endogeneity is controlled for. Examining the steps in the causal chains linking resources and conflict independently and simultaneously through the use of the two-stage regression model should also lend confidence in the results by allowing the underlying assumptions regarding the direction

of causality to be directly tested. That the direction has been correctly interpreted is also supported by the sign of the observed correlation between the independent and dependent variables—all else being equal, firms involved in natural resource extraction, especially those with capital-intensive operations, as is the case in the oil sector, should seek to avoid conflict areas due to threats to equipment, products, and personnel, including the threat of extortion by armed groups, which would result in a negative relationship between resource extraction and conflict, rather than the positive relationship observed.

An additional limitation of this study is that the analysis does not account for the spatial distribution of resources within countries. Recent studies utilizing georeferenced data on natural resource extraction suggest that the location of extraction activities in relation to conflict zones, borders, or state capitals may have important implications for the onset, duration, and intensity of civil violence (Lujala 2009, 2010; Steinberg 2018; Le Billon 2008). Because the variables of interest to this study—especially democracy, corruption control, and horizontal economic inequality—are available in reliable form globally only at the country level, a disaggregated approach is untenable at this time; additional research is therefore recommended to examine the causal paths linking natural resources and civil conflict at higher degrees of spatial resolution using the expanding universe of conflict events data.

2.4 Conclusion

The empirical results presented above support many of the conclusions offered elsewhere in the quantitative literature on natural resources and civil conflict. The findings are clearest with respect to petroleum, for which there is compelling evidence of an effect on conflict through an intervening vulnerability mechanism. Economic

dependence on oil is correlated with both low levels of democracy and poor corruption control, conditions that are, in turn, associated with higher incidences of conflict events. These findings were robust to multiple specifications of the statistical model and are consistent with numerous studies of the potentially politically and socially disruptive implications of petroleum extraction (Ross 2004, 2015; Fearon 2005; Collier & Hoeffler 2004; Lujala 2010).

The uniquely, among resource sectors, robust relationship between oil and conflict is attributable to the experiences of a relatively small group of oil exporting countries—including Saudi Arabia, Russia, Iraq, and Nigeria, among others—for which the sector represents a disproportionate economic driver and a preoccupation of government policy and investment. Owing to its status as a distinctively economically and militarily strategic resource, as well as the capital intensity of its extraction, the degree of state involvement in the petroleum industry is high in such states, with institutional and political implications that may contribute to conflict vulnerability and risk. As Le Billon (2012) observes, "the tight connections that arise between governments and the oil sector often reinforce the institutional weakness of the state vis-à-vis political responsiveness to its citizens" (70-71), thus potentially hindering processes of democratization. It is this close connection also that creates opportunities and incentives for state-level actors to accrue personal financial benefits and dispense political patronage, resulting in the observed relationship between oil dependence and corruption control.

Evidence for a risk mechanism between resource wealth and conflict is less convincing. Although, in the initial regressions, increased rents from oil and mineral

resources were associated with increased horizontal economic inequalities and although horizontal inequalities appeared to contribute to the number of conflict events experienced, the instrumented horizontal economic inequality variable was insignificant as a predictor of rebel population and of conflict event incidence in the two-stage regression models. While this result may call into question the findings of previous studies by potentially suggesting that horizontal inequality is predominantly an outcome, rather than a cause, of conflict, it is also possible that it is the consequence of resource wealth being a poor instrument for the Theil index, an interpretation that is supported by the significance of the corruption control and Polity2 indices as second-stage predictors of horizontal inequality. It seems consistent with both previous research and with the results presented above to conclude that resource wealth affects horizontal inequality only indirectly, through its effects on democracy and state capacity; when those variables are independently controlled for, no intervening relationship between resources, inequality, and conflict is therefore observable. I also do not find strong evidence for an opportunity mechanism linking resource wealth and conflict. Among resource categories, only gemstone availability was correlated with rebel population, and then only under a minority of specifications. Gemstone availability also proved to be a poor instrument for rebel population in the two-stage model. Forest resources, meanwhile, did not evince a statistically significant relationship with conflict or any of the intervening variables examined herein.

Although the original analysis presented in this chapter offers some insights into how the specific causal mechanisms by which various categories of resources contribute to conflict may be disentangled, it is limited to the extent that, like many previous

empirical studies of natural resources and civil conflict, it does not interrogate the utility of policy interventions to interrupt or mitigate these effects. A future research agenda is therefore recommended to examine the effectiveness of efforts to reduce conflict vulnerability, risk, and opportunity in the context of resource wealth and dependence, with an emphasis on the implications of petroleum for state capacity, institutional quality, and democracy.

3. Mining and Violence in the New People's Army Rebellion: Subnational Analysis of Natural Resources and Civil Conflict

In addition to the numerous cross-country regression analyses that have traditionally dominated the vast quantitative literature examining the relationship between natural resources and civil war (see Ross 2004, 2015; Le Billon 2012; Koubi et al. 2014), a growing number of scholars have leveraged the expanding universe of georeferenced conflict events data to interrogate that relationship at the subnational scale (Østby et al. 2009; Lujala 2009, 2010; Berman et al. 2017; Basedau & Pierskalla 2014). To date, however, few studies have sought to investigate how natural resource extraction shapes the use of violence by belligerents in specific conflicts; in particular, there has been a notable lack of engagement between the natural resource conflict literature and the study of terrorism (see, though, Dreher & Kreibaum 2016). As civil wars—such as those in Syria, Iraq, and Afghanistan, as well as lower intensity conflicts in Colombia, Myanmar, the Philippines, and elsewhere—have increasingly come to be defined by terroristic violence, there is potential for greater synthesis between empirical analyses of terrorism and of civil war, including of the role of natural resources, especially at the subnational scale.

Contributing to that effort, this chapter examines the relationship between surface mining in the Philippines and the incidence of terrorist attacks—including assassinations, kidnappings, and attacks on civilian government buildings and private businesses—perpetrated by the NPA in its armed campaign against the Philippine state. A spatial probit model was applied to a dataset comprising 1628 cities and municipalities in the

Philippines to test for a statistical relationship between the presence of mining activity and the probability of experiencing an NPA-related terrorist attack during the years 2012 through 2016. Data on mining activity were compiled from official tenement maps, land classification of multispectral Landsat data, and interpretation of high-resolution satellite imagery, allowing the effect of active and nonactive mining areas on conflict incidence to be independently examined. The applicability of causal chains proposed in the existing literature were specifically interrogated by testing for a tripartite relationship between mining, terrorism, and three intervening variables, including (1) an index of state capacity based on a comparison of remotely sensed nighttime lights data and official tax receipts, (2) an estimate of spatial economic inequality quantifying local heterogeneity in nighttime lights and population data, and (3) a measure of land use change based on the loss of forested area in each municipality or city.

The empirical results suggest that the environmental and socioeconomic impacts of mining, and the inequitable distribution thereof, shapes NPA behavior. Two-stage regression analysis revealed that unpermitted mining activity was associated with increased forest loss and higher levels of economic inequality, variables that, in turn, tended to increase the probability of NPA violence. By contrast, although local state capacity was consistently found to be correlated with NPA-related violence, no impact of mining on state capacity was observed. Because the effect of mining on conflict was found to be driven by unpermitted mining located outside of official concessions, it is plausible that the permitting process may play a role in reducing the negative implications of natural resource extraction in the Philippines. Finally, strong evidence was found that NPA-related conflict events are spatially dependent across neighboring

municipalities and cities, supporting the contention that civil conflict is 'contagious' at the subnational scale.

3.1 Background

3.1.1 Civil Conflict, Terrorism, and Natural Resources

As discussed above, although there is substantial quantitative and anecdotal evidence that the availability and exploitation of natural resources can contribute to the outbreak, intensity, and duration of civil war, the precise causal paths by which this occurs remain underdefined (Van Der Ploeg & Poelhekke 2016; Ross 2015; Le Billon 2012; Lujala 2010). For the sake of simplicity, the analysis presented in this chapter adopts, again, Le Billon's (2012) terminology of vulnerability, risk, and opportunity to conceptualize the various interpretations of the resource-conflict linkage proposed in the existing literature. Thus, where the vulnerability mechanism refers to the theory that economic dependence on natural resources can undermine state capacity, the risk mechanism proposes that extractive industry directly affects the motivations of insurgents, including through its environmental and socioeconomic impacts; the opportunity mechanism, meanwhile, predicts that natural resources shape conflicts by serving as material sources of financing for conflict belligerents.

Through the vulnerability, risk, and opportunity mechanisms, natural resources may not only facilitate the outbreak of conflict, but may also shape its development. Le Billon (2001b) proposes, for example, that different categories of resources are associated with different types of conflict, such that proximate (relative to power centers) point resources tend to lead to coup d'états, distant point resources to secessionist conflict,

distant diffuse resources to warlordism, and proximate point resources to rioting and rebellion. Lujala (2009, 2010) concludes that the spatial distribution of resources with respect to active conflict zones has implications for the intensity and duration of conflict, observing that gemstone and oil deposits within a conflict zone are associated with longer and more severe conflicts; similarly, Buhaug (2002) finds that the presence of exploitable resources in a conflict zone tends to increase the spatial extent of the conflict. Although it seems likely that the distribution and exploitation of resources also has implications for the local manifestations of violence, such as the use of terrorism against either civilian or government targets, relatively few subnational studies have sought to test for such an effect.

The drivers of terrorism in general, and in the context of civil war specifically, have nevertheless garnered increasing scholarly interest in recent years (Findley & Young 2012; Polo & Gleditsch 2016; Piazza 2007). With respect to the role of natural resources, Dreher & Kreibaum (2016) conclude that oil, while contributing significantly to the likelihood of broad-based insurgency, is not a strong predictor of the use of terrorism, which appears to be linked more strongly to political discrimination against ethnic minorities by the state; Lee (2016), however, finds evidence that oil wealth does contribute to terrorism, though this effect is mediated by social and political grievances. As a tactic, existing evidence suggests that terrorism is generally not a particularly effective means of accomplishing political aims (Fortna 2015), in part because resulting civilian casualties may cause the civilian population to abandon support for non-state actors engaging in it (Stanton 2013). However, because it requires fewer resources than large-scale conventional military action, terrorism may be an attractive strategy to non-

state actors that lack local sources of funding or international support (Polo & Gleditsch 2016); thus, Findley & Young (2012) suggest that the increase in terroristic activity in civil wars in recent decades may be related to the end of the Cold War practice of superpowers funding insurgencies that aligned with their political interests. It also appears that the use of terrorism in civil war varies according to the political ideology of insurgent groups (Stanton 2013, Enders et al. 2016, Polo & Gleditsch 2016). Both Stanton (2013) and Polo & Gleditsch (2016), for instance, find that insurgent groups that rely on broad-based civilian support, as opposed to groups with exclusionary constituencies based on ethnic or religious identity, are less likely to participate in terrorism, particularly against civilian targets; the latter paper finds evidence that socialist and Marxist groups, specifically, tended to attack 'hard' government and infrastructural targets, while religious fundamentalists were more likely to target civilians.

Thus, the relationship between natural resources and terrorism in civil conflict is likely highly contingent on local circumstances, including the resource sector at issue, the ideological affiliation of the actors involved, and the relative strength of insurgents vis-à-vis the state. As a result, subnational analysis of that relationship has the greatest potential for identifying the specific mechanisms at work in a given conflict. In the present study, the applicability of the vulnerability, risk, and opportunity mechanisms for explaining the use of terroristic violence is tested in the context of the ongoing conflict between the NPA and the Philippine state.

3.1.2 Civil Violence in the Philippines

The Philippines is home to two of the world's longest-running insurgencies, both of which trace their origin to the experience of colonialism under Spanish, American, and

Japanese occupation. Advocating the succession of the traditional homeland of the Moro minority in areas of the island of Mindanao and the Sulu archipelago in the southern part of the country, various related, though often competing, separatist groups have challenged colonial governments and, since independence, the Philippine state; in its current iteration, the Moro separatist insurgency is represented by the Bangsamoro Islamic Freedom Movement (BIFM), the Moro Islamic Liberation Front (MILF), and Abu Sayyaf, among other groups. At the same time, the NPA has waged an armed revolution along Maoist principles for decades, presenting itself as the heir to Communist guerilla resistance against the Japanese occupation during World War II (Quimpo 2014; Santos 2010). Because the NPA is active throughout the country, whereas the Moro separatist insurgency is regionally-based, the empirics of this chapter are focused on the former group, although the latter's spatial distribution is also considered.

The roots of the NPA insurgency in the anti-Japanese guerilla movement continue to play a role in guiding the group's goals, tactics, and rhetoric today. Following the establishment of the Republic of the Philippines in 1946, the communist Hukbong Bayan Laban sa mga Hapones (the People's Army against the Japanese), otherwise known as the Hukbalahap or Huk rebellion, continued to fight against the then-independent Philippine government. Although, by the mid-1950s, the Huks had been largely defeated by the administration of Ramon Magsaysay, remnant groups remained intact as criminal organizations involved in the extortion of gambling, prostitution, and other illegal and legal businesses (Caouette 2015; Mediansky 1986). The reconstitution of a formal communist insurgency as the NPA in 1969 was the immediate result of intra-party tensions within the Philippine Communist Party (PKP) in the middle to late 1960s that

pitted orthodox leaders aligned with the Marxist-Leninist tradition against a cadre of younger members who identified with the Chinese and Cuban revolutionary experiences and Maoist principles of agrarian-led communism. Mirroring the contemporaneous schism between the Soviet and Chinese Communist Parties, the splinter faction of 'self-made Marxists' was reorganized as the CPP in 1968, on the 75th birthday of Mao Zedong. Under the leadership of José Sison, then an English literature professor at the University of the Philippines, the CPP was explicitly Maoist in its aims and organization (Mediansky 1986; Goodwin 2001; Santos 2010). Practically, the rise of the CPP was marked by a change in emphasis from recruitment among the urban working class to the rural peasantry, following the Maoist model of protracted people's war, whereby "revolution begins in the countryside, expands taking over the cities, and ultimately engulfs the entire country" (Holden 2013b, 30).

Recognizing the value of the CPP's revolutionary narrative and impressed by the new party's political agenda, Bernade 'Commander Dante' Buscayno, leader of a vestigial Huk unit of 72 fighters joined forces with the CPP on March 29, 1969 as the party's armed counterpart (Mediansky 1986; Santos 2010). The NPA's membership grew steadily throughout the following decade, recruiting from among a peasantry increasingly dissatisfied with the regime of Ferdinand Marcos; the group remained, however, from the perspective of the national government, "no more than a nuisance" (Mediansky 1986: 1) until the 1980s, when membership peaked at between 20,000 and 25,000 armed cadets and a series of increasingly brazen attacks on government forces and infrastructure led the Marcos administration to declare martial law to deal with the insurgency (Kerkvliet 1986).

Since Marcos' ouster in 1986, the NPA has waned in strength to fewer than 4000 fighters at present—far too few to directly challenge the Philippine state militarily—yet has persistently managed to avoid complete elimination (Fonbuena 2018). According to some observers, the group's emphasis on local funding opportunities, including the extortion of mining companies and other businesses, at the expense of ideological purity has increased since international recognition of the group as a terrorist organization caused foreign supporters to distance themselves politically and financially (Lagsa 2015; Caouette 2015). A simultaneous change in tactical operations has also been noted, characterized by a growing emphasis in the NPA's propaganda on natural resource extraction in general, and mining projects in particular, as illustrations of what the NPA perceives to be an unjust and violent international capitalist order (Holden et al. 2011; Caouette 2015). Various interpretations of the NPA's attitude toward mining and the motivations behind the rise in NPA attacks on mine sites in recent years have been set forth by, among others, Myers (1989), Homer-Dixon (1999), Le Billon (2001b, 2005b), Kahl (2006), and Holden (2013b, 2014), exemplifying in microcosm the broader scholarly debate concerning the mechanisms linking natural resources and political violence.

3.1.3 Natural Resource Conflict in the Philippines

Natural resource extraction has a long history in the Philippines (Camba 2015). As early as the third century A.D., Chinese histories make mention of the islands as a source of gold, copper, and other metals (Tan 1987); the country later served as a source of timber, metals, and cash crops during more than three centuries of Spanish colonial administration, a pattern that continued under both American and Japanese occupation.

Trade liberalization in the 1990s ushered in a new era of resource exploitation involving foreign corporations, including, especially, American, Australian, and, increasingly, South Korean, Taiwanese, Chinese, and Japanese firms (Holden 2005b; Broad & Cavanagh 1993; Tan 1987). The timber industry, which peaked in the early 1990s, has declined in importance with the loss of the majority of the archipelago's native forests; today, following a country-wide mining ban instituted in 2011, the Philippines is a net importer of timber and the industry accounts for less than half a percent of GDP (World Bank 2018a). The mining industry, however, has continued to flourish, encouraged by incentives introduced by the Mining Act of 1995, which included a four-year income tax holiday; tariff and tax exemptions for capital equipment imports; a provision permitting income tax deductions to be taken by mining companies for operating losses; favorable changes to depreciation calculations for tax purposes; exemptions for mining operations for value-added taxes; and a guarantee of the repatriation of profits and freedom from expropriation (Holden 2005a, 2012a).

As is the case in many developing countries, the mining sector in the Philippines is fraught with allegations of destructive environmental impacts, corruption, and abuses, including the targeting of anti-mining activists by government forces (Holden 2014; Camba 2015); Holden (2014), for instance, estimates that more than 1,330 people involved in anti-mining causes were assassinated between 2001 and 2012, often by "motorcycle-riding men wearing ski masks" (72) with the tacit or explicit approval of government officials. Despite some movement toward reform of the sector under the administration of Rodrigo Duterte, mining remains a highly politicized issue in the

Philippines and one with which broader patterns of civil violence have often become entangled.

In this context, the NPA insurgency and, to a lesser extent, the Moro separatist movement have long been cited by scholars as examples of their (often conflicting) theories of the relationship between natural resources and civil conflict. In an early application of econometric analysis to the study of civil war at the subnational scale, for example, Mitchell (1969) presents evidence that strategically important environmental features, such as mountains and swamps, which may serve as bases of operation for non-state actors, as well as agricultural land tenure arrangements, interacted with variables measuring cultural affinity and historical legacies of conflict to influence the spread of rebel control in Central Luzon during the Huk rebellion (see also Averch & Koehler 1970). Myers (1989) uses the expanding support among the Philippine peasantry for the NPA in the 1980s as evidence for a neo-Malthusian theory of conflict, whereby absolute scarcity of natural resources and ecological services, driven by population growth and resource overuse, pushed "impoverished throngs" into the arms of the militants. Homer-Dixon (1999), by contrast, engaging with models of relative deprivation in the context of rebellion (see Gurr 1970), argues that the ecological marginalization of the Philippine peasantry related to agricultural modernization led to rising public support among this population for the insurgency.

Supporting the vulnerability mechanism, Kahl (2006) links the military and political success of the NPA at its height to declining state capacity to ensure rule of law and provide basic services to marginalized communities, a situation which he attributes, in part, to increasing scarcity of agricultural land, forests, and other renewable resources

and ecological services. Le Billon (2005b), on the other hand, cites the extortion of mining and logging companies by the NPA and Moro separatist groups through the levying of so-called 'revolutionary taxes' as an archetypical example of the conflict opportunity mechanism. Finally, Holden (2005a, 2005b, 2013a, 2013b, 2014) and Holden & Jacobson (2007), emphasizing the experiences of anti-mining movements, suggest that, insofar as mining can become, from the perspective of negatively affected communities, the grounded manifestation of hegemonic neoliberalism, of crony capitalism, or of corrupt and abusive government, especially in the context of militarized mining areas and the targeting of environmental activists by the state, the industry has created opportunities for the NPA to promote a revolutionary narrative justifying violent collective action (see also Le Billon 2005c).

Much of the interest in the NPA's relationship with natural resources stems from the group's seemingly contradictory position as both an outspoken critic and beneficiary of extractive industry. On the one hand, the NPA publicly denounces mining companies, especially those with foreign investment, in harsh terms, as instruments of "imperialist plunder" that "sap the country's natural resources while victimizing workers and peasants" (NPA 2018) and "leaving in their wake pitted grounds and ruined rivers and riverbanks" (Ang Bayan 2014, 5). The sincerity of such statements is somewhat belied, however, by the NPA's financial dependence on the mining industry. Although the NPA has historically levied, under the threat of violence, revolutionary taxes on all manner of businesses, ranging from transportation companies, to hotels, to illegal gambling and prostitution rings, mining operations are particularly vulnerable to such extortion. As Holden & Jacobson (2007) write, "it can take several years, and hundreds of millions of

dollars, for a mining company to find, develop, and begin to mine a major mineral deposit. Once a mining project is developed it cannot be relocated and a mining company has a substantial incentive to pay funds to armed groups in exchange for being allowed to operate" (477). And pay they do, to the tune of millions of dollars per year; Holden (2014) estimates that the mining industry in northeastern Mindanao alone has paid between 340,000 and 450,000 U.S. dollars annually to the NPA, while Snell (2004) reports that a single gold mining project in the Compostela Valley paid more than 1.7 million dollars over three years to various insurgent groups, including not only the NPA, but also Abu Sayyaf, and the MILF. For mining companies, such payments to non-state actors is considered a regular cost of doing business in the Philippines (Snell 2004; Mediansky 1986; Santos 2010).

Despite their unforgiving rhetoric, the CPP and NPA have been somewhat equivocal regarding their official relationship with the mining industry. Demonstrating an apparent internal conflict within those organizations, Holden (2014) recounts:

> On January 7, 2011, the CPP declared that it will not levy revolutionary taxes upon mining companies because they "are beyond the pale of the revolutionary taxation being undertaken by the democratic organs of people's governance." Instead of collecting revolutionary taxes from them, the NPA would rather just see them "booted out" of the country. However, only two days later, on January 9, 2011, Jorge "Ka Oris" Madlos, the NDFP Mindanao spokesperson, admitted that if the NPA cannot drive them away, "they better pay taxes" (78).

Such apparent contradictions leave the NPA's use of violence open to empirical interrogation; in the following, therefore, the drivers of NPA activity, with an emphasis on the role of mining, are examined by applying a dichotomous

spatial regression model to subnational conflict events data and remotely sensed satellite imagery, with the objective of identifying the extent to which the group's behavior aligns with its stated goals.

3.1.4 Hypotheses

The overarching aim of this study is to investigate the causal pathways linking mining and the use of terrorism by the NPA, using data on the operational and legal status of mining projects throughout the Philippines. As explained in detail below, the locations of three classes of mines were mapped by comparing available mining tenements maps with remotely sensed imagery. These are (1) proposed mines, which are those that have been permitted by the national government, but for which no evidence of operations can be observed; (2) permitted mines, which are operational mine sites located within delineated mining tenements; and (3) unpermitted mines, which are operational mine sites located outside of tenement boundaries. The relationship between each class of mine and the incidence of attacks perpetrated by the NPA in each of the municipalities and cities of the Philippines was then investigated using spatial probit regression analysis. The causal chains linking mining and conflict in the Philippines were further interrogated using spatial two-stage probit regression.

Corresponding with the vulnerability, risk, and opportunity mechanisms, three broad hypotheses were tested in the empirical analysis. The first of these holds that the effect of mining is to undermine local government capacity and institutional effectiveness, thus making a community more vulnerable to targeting by the NPA, as proposed by Kahl (2006). Under this hypothesis, communities in which mining occurs may experience lower levels of public sector accountability and transparency as a result

of the distorting effects of resource wealth on local economies. Public sector corruption may increase as a growing supply of potential bribes effectively increases demand for more of them. Over time, local politicians may become incentivized to become responsive to mining companies rather than to citizens. The local government may begin targeting opponents of mining using the formal powers or extrajudicial violence. Lacking faith in official institutions, residents may seek redress or protection from the NPA. The NPA may use violence, in the form of assassinations of local government officials or attacks against government buildings or mine sites as a means of projecting power and legitimacy as an alternative governing authority. The local government may also find itself in direct competition with the NPA for the soliciting of bribes from and provision of protection to mining operations, creating the conditions for conflict.

> **H1:** Mining increases vulnerability to NPA violence by decreasing local state capacity.

In the case of the NPA, this hypothesis would be most strongly supported by a statistically significant relationship between the presence of unpermitted and, especially, permitted mining activity and conflict; because the permitting process for mining activity is known to sometimes be tainted by corruption, a relationship between proposed mines and conflict is also possible. Most importantly, H1 predicts a two-stage relationship between mining, state capacity, and conflict, whereby mining is inversely correlated with state capacity and state capacity is inversely correlated with conflict, controlling for other factors.

The second hypothesis predicts that mining engenders or exacerbates local grievances, which may make individuals more likely to support or join the NPA's cause.

Such grievances may, as per Myers (1989), be related to an absolute scarcity of resources or ecological services brought on or made worse by mining activity or may stem from the unequal distribution of the costs and benefits of resource extraction, as suggested by Homer-Dixon's (1999) model of relative deprivation in natural resource conflicts. Accordingly, two variants of this hypothesis were tested, the first of which relates mining to scarcity. Under H2a, mining and associated activities displace agriculture and other traditional land uses, diminish the provision of ecological services, and drive subsistence farmers onto increasingly marginal lands, resulting in lower and less dependable incomes. The NPA recruits from among these marginalized populations and mobilizes action against police forces, government facilities, businesses, and other local targets.

> **H2a:** Mining increases the risk of NPA violence by increasing environmental scarcity in affected communities.

Because only active mining is anticipated to result in environmental changes that could exacerbate scarcity, the presence of proposed mines would not be expected to contribute to conflict risk under this hypothesis. In addition, a statistically significant relationship between mining and a measure of land use change, and between land use change and conflict, would be expected under this hypothesis.

A different set of predictions corresponds to H2b, which relates mining to social grievances related to inequality and thence to violence. This hypothesis predicts that the costs and benefits of mining are unequally distributed within affected communities, leading to a sense of relative deprivation. Employees of the mines, including those hired locally and migrant workers from elsewhere, may see increased incomes; government officials and employees may become wealthy through accepting bribes from mining

companies; and some land-owners may receive large sums in the form of compensation from mines. Other community members may see stagnant or decreasing incomes as a result of detrimental environmental impacts from mining. Tax revenues collected from mining may also be distributed unequally by local governments as a form of patronage. The NPA may target individuals and facilities in these communities to demonstrate affinity with marginalized groups, develop local alliances, and recruit new members.

> **H2b:** Mining increases the risk of NPA violence by exacerbating economic inequalities in affected communities.

Active mining, rather than proposed mining, would be expected to exhibit a relationship with conflict under this hypothesis. To the extent that the permitting process, which in the Philippines requires a process of informed consent and revenue sharing with local governments, permitted mining may be less likely to contribute to conflict risk under this hypothesis than unpermitted mining, although, given the documented failures of the approvals process, permitted mines may also be implicated in contributing to conflict (see Bravante & Holden 2009). Mining would also be expected to covary with a measure of inequality, which would, in turn, be expected to correlate with the probability of NPA-related violence.

To the extent that an observed relationship between mining and NPA violence in the Philippines is unexplained by either institutional weakness or social grievances, it may be the case that mining serves primarily as sources of financing for NPA activity, as documented by Le Billon (2005b), Holden (2013b, 2014), and others.

> **H3:** Mining incentivizes NPA violence by creating opportunities for financial gain.

The opportunity mechanism is operationalized in the Philippines through the extortion of revolutionary taxes from mining companies at various stages of operations. Backers of mining proposals may be asked to pay the NPA for permission to explore the mineral potential of any area, to begin extraction, or to continue existing operations (Holden & Jacobson 2007; Mediansky 1986). In addition, both large mining facilities and small unofficial operations are at risk for extortion by the NPA, the former because of their larger revenue and the latter because of their lack of security and constrained ability to seek police protection. Accordingly, H3 would be most strongly supported by a finding of a statistically significant relationship between mining of any legal status and the probability of conflict that is not convincingly explained by an intermediate effect on state capacity, environmental scarcity, or economic inequality.

3.2 Methods

3.2.1 Dependent Variable

The events data used in the regression analysis were obtained from the Global Terrorism Database (GTD), which tracks terrorist attacks globally based on media reports (START 2017). To be included in the GTD, an incident must be intentional, must involve violence or the immediate threat of violence, and must be perpetrated by subnational actors. In addition, the incident must meet at least two of the three following conditions: (1) it must be aimed at attaining a political, economic, religious, or social goal; (2) there must be evidence of intent to coerce, intimidate, or convey some other message to an audience beyond the immediate victims; and (3) the action must be outside the context of legitimate warfare activities. Although the GTD excludes many events that occur during

civil conflicts, including riots, violence perpetrated by the state against non-state actors or civilians, and pitched battles, the definition is broad enough to encompass most aspects of irregular warfare perpetrated by the NPA insurgency. The modis operandi of the NPA, as well as of Abu Sayyaf, the MILF, and other Moro separatist groups, all of which are considered to be terrorist organizations by the United States and Philippine governments, include assassinations of political leaders, attacks on businesses and government buildings, and kidnappings for ransom, activities that fit well within the GTD's definition of terrorism.

The GTD contains records for a total of 2848 terrorist events in the Philippines from 2012 through 2016, the most recent five-year period for which the dataset was available at the time of writing. Of these, 1085 were perpetrated by the NPA; Abu Sayyaf and BIFM were responsible for 250 and 320 attacks, respectively, while the instigators of 1107 attacks were unknown. Although the GTD records most events with a very high level of spatial resolution, 27 NPA-related events were eliminated from the sample due to insufficient spatial specificity; for the purposes of this study, all events were included that had a GTD specificity value of 1,2, or 3, meaning that the municipality or city in which the event took place had been positively identified. The dependent variable was constructed as a binary indicator, such that a municipality or city in which at least one NPA-related terrorism event occurred during the time period examined was assigned a value of 1 and those that did not experience such an event were assigned a value of 0. A total of 352 municipalities and cities, about 22 percent of the total sample, experienced at least one NPA-related event from 2012 to 2016.

3.2.2 Independent Variables

Three independent variables of interest were generated using georeferenced and remotely sensed data. To establish the spatial distribution of officially permitted mine sites, maps of active mining concessions were obtained from the Philippines Mines and Geosciences Bureau (MGB) and were manually digitized by the author (MGS 2015). Mapped concessions include Mineral Production Permits (MPPs), Industrial Sand and Gravel Permits (IPs), Mineral Production Sharing Agreements (MPSAs) and Financial or Technical Assistant Agreements (FTAAs), which differ in terms of the type of minerals being extracted and the degree of involvement by foreign investors. Under Philippine law, all mining projects require either an MPP, IP, MPSA, or FTAA, which are approved by the MGB following an Environmental Impact Assessment (EIA) process that, in theory, includes informed consent procedures, extensive public outreach by mining companies, and a detailed analysis of potential environmental and socioeconomic impacts of a proposed project, although the effectiveness of this process in practice has been challenged (Bravante & Holden 2009; Ingelson et al. 2009; Broad 1995).

Concessions data, however, while widely-used as proxy measures for natural resource extraction, do not represent the full universe of mining activity in the Philippines. Some concessions are never fully developed, while small-scale illegal and quasi-legal mining operations are not captured by official concessions data. To identify all active mining sites, therefore, a decision-tree land classification algorithm was applied to a cloud-free composite of multispectral Landsat imagery of the Philippines obtained from the Global Forest Change project (see Hansen et al. 2013) and based on imagery collected circa 2014. Training sites for the land classification included several large-scale

mine sites in north-western Mindanao and on the island of Samar, as well as several small-scale gravel and sand mines in Cagayan province that were visited by the author. Although the classification algorithm was effective at identifying areas of exposed soil and rock, it failed to effectively discriminate between mines and other categories of bare ground, such as river banks, beaches, and landslides. Therefore, the presence of mining activity in the areas identified by the algorithm was manually confirmed by reviewing high resolution satellite imagery. Historical imagery was reviewed to ensure that all active mine sites included in the sample were developed, at least in part, prior to 2012, to partially avoid issues of potential endogeneity in the regression analysis.

The final map of active mine sites was overlain by the digitized concessions data to characterize all mining activity in the Philippines in terms of legal status. Mine sites located within officially designated MPP, IP, MPSA, or FTAA concessions were assumed to fall within the purview of the permit and were designated as permitted mines. Active mining sites located outside of any concession boundary were designated as unpermitted mines, a category that included many smaller-scale gravel and sand mines, as well as some surface mineral mines that appeared to be associated with permitted operations but were located outside of concession boundaries. Finally, concessions in which no active mining was observed were designated as proposed mines. The procedure identified mining areas in a total of 482 municipalities and cities; of these, 84 had at least one permitted operational mine, 256 had at least one proposed mine, and 273 had at least one unpermitted mine. Consistent with Holden & Jacobson (2007), mapping areas affected by mining alongside NPA activity is suggestive of a possible relationship between these two variables (see Figure 3.1).

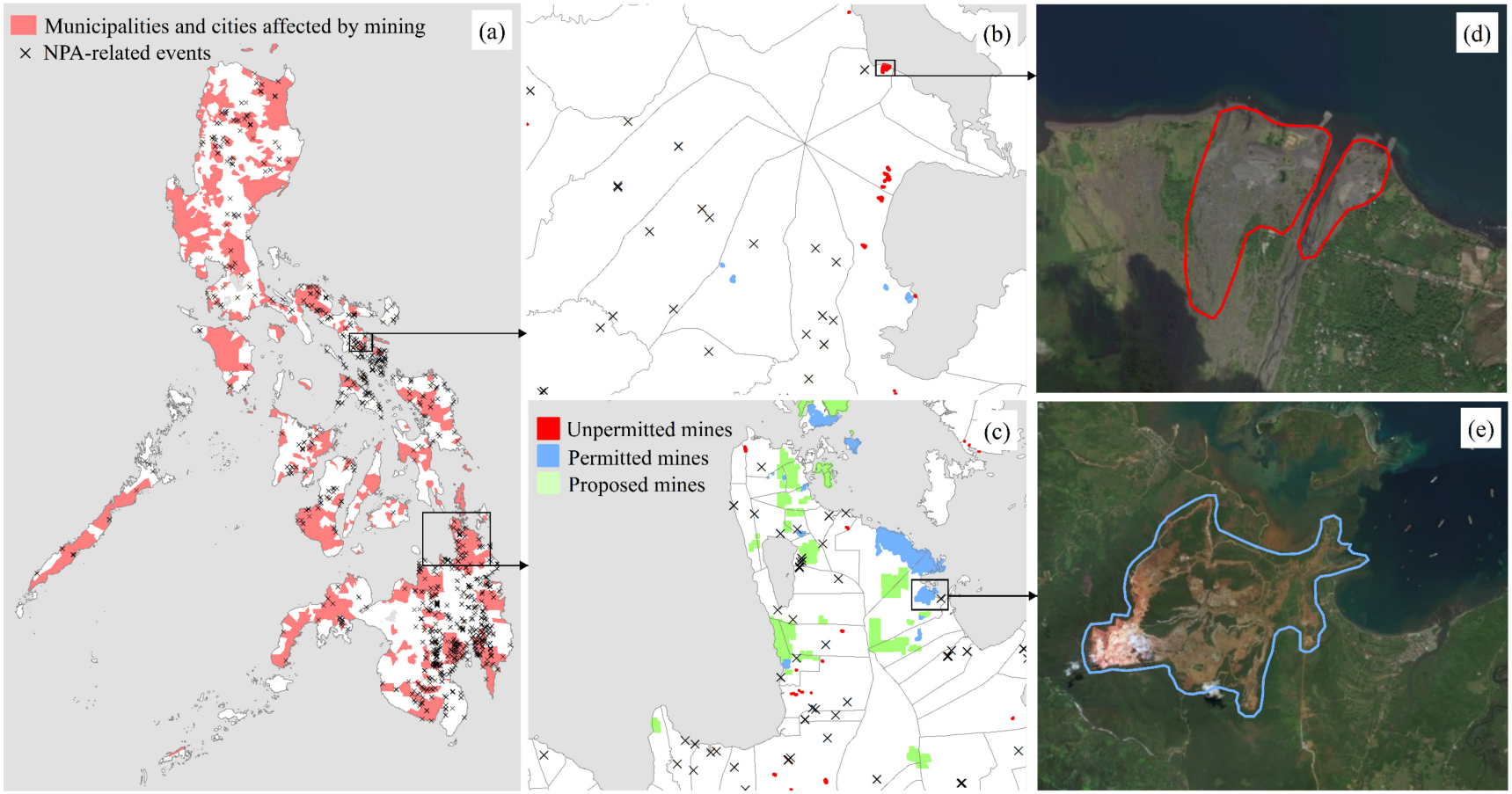

Figure 3.1 Mining and NPA Violence in the Philippines. (a) Mining areas and NPA-related conflict events in the Philippines. (b) Mining areas and NPA-related terrorist events in Bicol. (c) Mining areas and NPA-related terrorist events in southern Mindanao. (d) Unpermitted mine site in Malilipot, Albay. (e) Permitted mine site in Carrascal, Surigao del Sur. Source: Compiled from MGB (2015); Hansen et al. (2013); author's calculations.

3.2.3 Intervening Variables

To test the validity of the hypotheses defined above, three intervening variables were generated that correspond to intermediate steps in the proposed causal chains linking resource extraction and civil violence. The relationship between these intervening variables and the presence of mining activity, as well as between the intervening variables and conflict, was tested indirectly through a series of probit and linear regressions, as described below and directly through a two-stage probit regression approach. The first of these intervening variables, corresponding to the vulnerability mechanism, quantifies the level of state capacity at the subnational level. In the absence of comprehensive survey data measuring government effectiveness in the Philippines, a proxy measure was generated by estimating the relative size of the informal economy in each municipality or city, under the assumption that municipalities and cities with poor corruption control or limited ability to enforce tax collection should tend to underregulate and underreport economic activity.

The size of the informal economy was estimated by comparing remotely sensed nighttime lights data—as a proxy for total economic activity—to tax receipts for each municipality and city. Following Keola & Andersson (2015), DMSP-OLS nighttime lights data were obtained in the form of a cloud-free composite raster dataset corresponding to the year 2012 at an approximately one square kilometer resolution; to exclude ephemeral sources of light, such as fires, the average stable light product was used. Although validation of these data at the municipal level was not possible, due to a lack of available comparison statistics, nighttime light intensity did, when aggregated to the provincial level, exhibit a strong correlation ($r = 0.94$) with estimates of provincial-

level income from the 2015 Family Income and Expenditure Survey (FIES) compiled by the Philippine Statistics Authority (PSA 2016). Examined independently among the component cities of Metropolitan Manila, the most densely urbanized region of the Philippines, nighttime lights intensity was also highly correlated ($r = 0.89$) with total income, but exhibited a distinct slope relative to the rest of the country.

Based on the observed linear relationships between nighttime light intensity and economic activity across provinces and within Metropolitan Manila, an estimate of local-level economic activity was generated for each of the 1628 municipalities and cities of the Philippines. To the extent that this estimate captures all economic activity, a comparison of those estimates to official records should contain information regarding the relative scale of the informal economy and, therefore, of relative local government capacity. Using tax income reported to the national government and obtained from the Bureau of Local Government Finance, an index measuring unreported economic activity was defined as the ratio of tax revenue from local sources to estimated total economic activity (BLGF 2018). The utility of this variable relies on the assumption that municipalities and cities with low index values are those in which a large proportion of the economy is unregulated as result of the inability of the local government to enforce tax collection on businesses, the embezzlement of tax revenues by local government officials, or some combination thereof. To validate this assumption, the index was compared with the best available subnational measure of government effectiveness in the Philippines, the Good Governance Index (GGI), which is compiled by the Philippines National Statistics Office and is available for the years 2005 and 2008 for selected municipalities (see Figure 3.2).

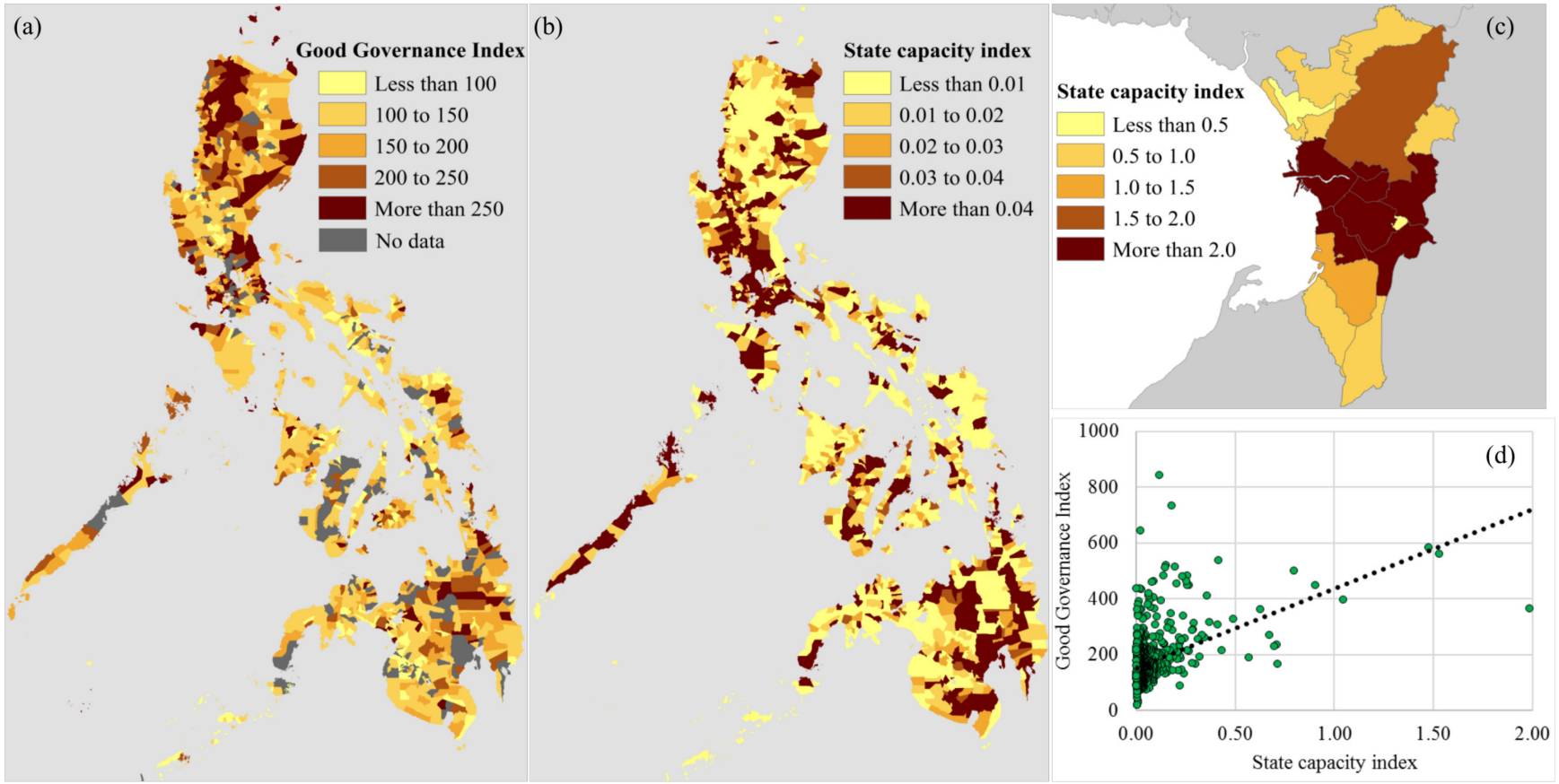

Figure 3.2 Unreported economy index calculation. (a) Good Government Index in 2008 by municipality/city. (b) Unreported economy index for 2012 by municipality/city. (c) Unreported economy index by city in Metropolitan Manila. (d) Linear relationship between GGI and unreported economy index. Source: Compiled from PSA (2011); BLGF (2018); author's calculations.

Although, when compared with the GGI for 2008, the state capacity index evinces only a weak, though statistically significant, positive relationship ($r = 0.325$), much of the discrepancy may be explained by known problems with the GGI related to data availability and manipulation of reported information. First, although the GGI purports to quantify government effectiveness, the measure is based, in part, on several factors, including voter turnout and educational attainment, that do not have a clear relationship with effectiveness. In addition, because some of the statistics used to compute the GGI are collected by local governments, the reported values may not be objectively compiled. Finally, data on certain government functions appear to be missing from the GGI calculations for many municipalities, resulting in inordinately high scores, a problem that is especially pronounced in rural and remote areas of the country. This is the case, for example, for many municipalities in the Cordillera Administrative Region, a relatively poor region that depends heavily on disbursements from the national government.

The state capacity index described above, because it is based on a comparison of official records to remotely sensed imagery, is less subject to the issues affecting the GGI and may, in the absence of other reliable measures, be a useful proxy for local differences in government capacity. Anecdotally, the region with the lowest average state capacity index score—the Autonomous Region of Muslim Mindanao (ARMM)—is well documented as having experienced rampant corruption and political violence; the component cities of Metropolitan Manila, on the other hand, show relatively high scores, consistent with observations that the capital region exhibits comparatively high institutional capacity (Tidwell 2016).

The second intervening variable quantifies spatial economic inequality, as a measure of relative deprivation. To the extent that conflict is facilitated by grievances related to mining activity, these may stem from the unequal distribution of the costs and benefits of mining, and may thus be expressed by increased economic inequality; for example, a mine site that displaces smallholder agriculture in a rural municipality could enrich local backers of the mining project while reducing the incomes of farmers (see Homer-Dixon 1999). Because comprehensive survey data on local incomes is not available for all of the municipalities and cities included in the sample, an original method for estimating subnational inequality based on remotely sensed nighttime lights and land cover data was used. First, a high-resolution map of estimated per capita economic activity was generated by dividing the DMSP-OLS nighttime lights raster dataset by a raster dataset of population from the LandScan project (LandScan 2012). The resulting estimate was aggregated to the scale of the barangay, an administrative division in the Philippines that is approximately equivalent to the village (in rural areas) or neighborhood (in urban areas). A local-level measure of economic inequality was then defined using Theil's (1967) mean logarithmic deviation method, such that:

$$T_i = \frac{1}{N_i} \sum \frac{x_j}{\mu_i} \ln\left(\frac{x_j}{\mu_i}\right)$$

Where x_j is income per capita in barangay j of municipality or city i, μ_i is the mean income per capita across all barangays of municipality or city i, and N_i is the number of barangays in municipality or city i. Calculated using 2012 data for the Philippines, the final Theil index ranges from 0, representing no inequality between barangays, to 5.99, which was the value for the City of Manila (see Figure 3.3).

It is important to note that the resulting metric is a measure of spatial inequality—the variance in per capita income between barangays, rather than between individuals. Although the extent to which this index can be considered a proxy for individual inequality cannot be precisely validated in the absence of survey data, broader-scale measures of inequality do exist for a limited number of years, including the FIES, which reports the average income by decile for a sample of households in each of the Philippines' 16 administrative regions for that year (PSA 2012). From the FIES, a decile ratio measure of income inequality was calculated as the mean income of the top decile in each region divided by the mean income of the lowest decile, which was then compared to the average Theil index value for each region.

The regional Theil index and the decile ratio exhibited a weak, but statistically significant and positive correlation ($r = 0.373$). In addition to the small sample size of available comparison data, the weakness of the observed relationship may be partially explained by the assumption of spatial heterogeneity across economic classes on which the Theil index relies. In many areas, this assumption may be reasonable, insomuch as neighborhoods are often segregated along economic lines; elsewhere, however, the resolution of nighttime lights data may not be sufficient to capture spatial differences, especially in dense urban areas. Nevertheless, in the absence other potential data sources, the final measure offers a reasonable proxy for economic inequality. Moreover, the spatiality of inequality may have special relevance to its implications for civil conflict, owing to its role in facilitating collective action; where economic classes are separated spatially into distinct regions of wealth and poverty, mobilization may be easier to achieve along class lines.

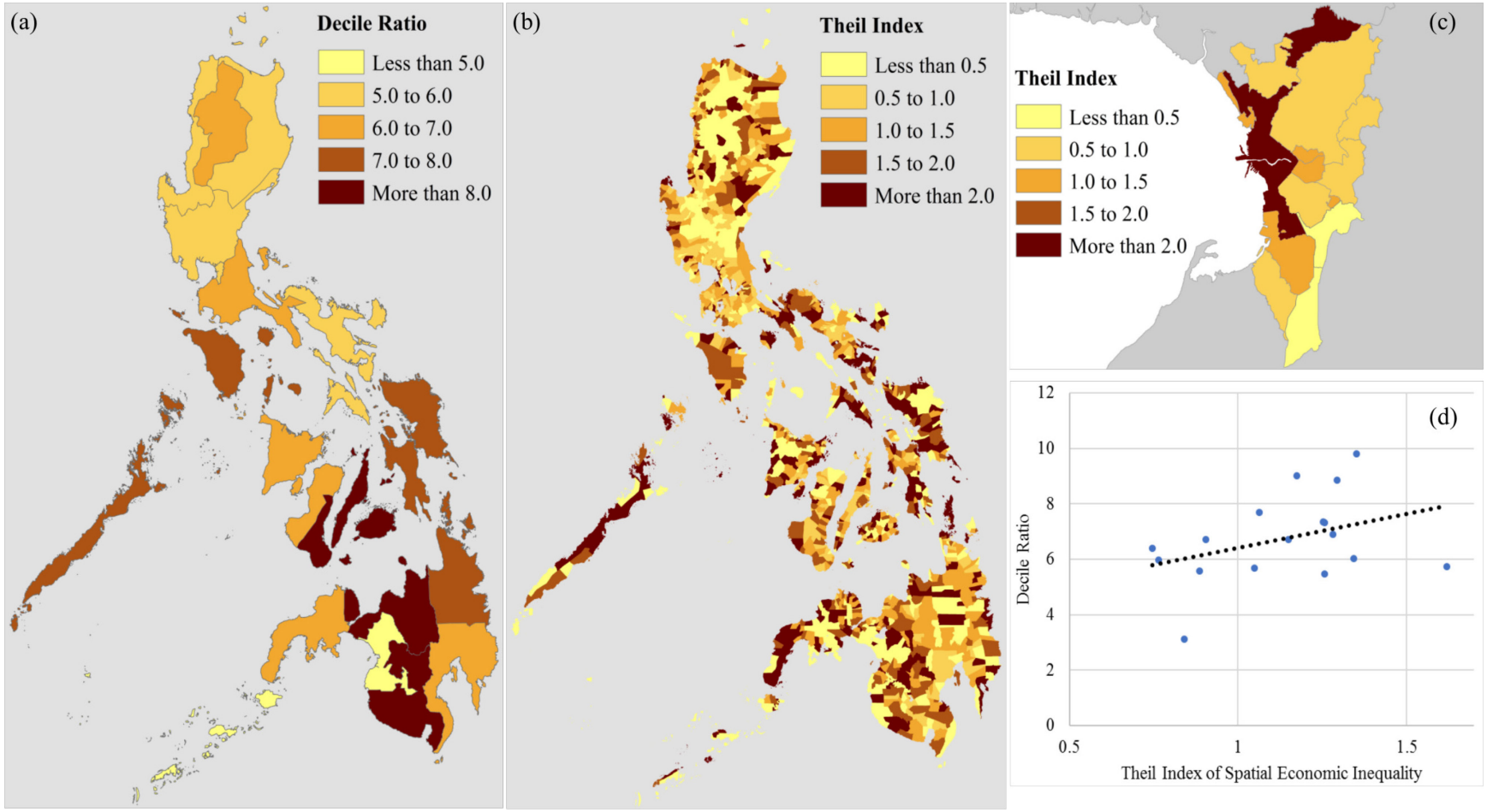

Figure 3.3 Theil index of spatial inequality calculation. (a) Region-level decile ratio of economic inequality based on survey data. (b) Theil index of spatial inequality based on local-level (municipality/city) variation in nighttime light intensity. (c) Theil index of spatial economic inequality in Metropolitan Manila. (d) Linear relationship between the decile ratio and Theil index measures of economic inequality at the regional level. Source: Compiled from PSO (2016); author's calculations.

The third intervening variable is intended to measure the effect of environmental scarcity in each municipality or city, a second potential source of grievances among a community affected by mining under the conflict risk mechanism. The variable quantifies the extent of forest cover loss between 2000 and 2014 in each municipality or city, based on Global Forest Change Project data (see Hansen et al. 2013). Mining activity is hypothesized to potentially have affected forest coverage either directly, where construction of mines and associated infrastructure require the clearing of forests, or indirectly, by displacing other land uses, especially agriculture, thus increasing pressure on forested land. To the extent that mining activity is implicated in bringing about such changes in land use, a mediated relationship between the presence of mine sites, forest loss, and conflict may be observable.

The applicability of each of these three intervening variables—measuring, respectively, local state capacity, spatial economic inequality, and environmental scarcity—for predicting conflict risk was independently evaluated using the spatial probit model described below. Because the three intervening variables are continuous, the extent to which mining activity contributes thereto was interrogated by estimating a series of linear spatial autoregressive models. In this framework, a finding of a statistically significant relationship between mining and conflict incidence that is mediated by local state capacity would constitute evidence in favor of the vulnerability mechanism under H1, while a mediated relationship with either environmental scarcity or spatial inequality would be evidence of the risk mechanism under H2a and H2b, respectively. In the absence of any feasible measure of local variations in rebel group income, it is not practicable to instrumentalize a mediated relationship between mining and conflict

opportunity as predicted by H3. However, it may be possible to attribute any predictive power of mining activity unexplained by the intervening variables to the opportunity presented thereby for profiting from resource rents.

3.2.4 Control Variables

In addition to the independent and intervening variables described above, several municipal-level control variables were included in the regression models. Total population, based on the LandScan dataset, was expressed in terms of 100,000 individuals. Economic productivity per capita was estimated as the sum of nighttime light intensity per 100 persons in each municipality or city. To account for potential differences in conflict risk between rural and urban areas, population density, was expressed in terms of hundreds of persons per hectare. And, to control for the presence of mountainous and forested areas, which may serve as bases of operation for the NPA, two variables were generated measuring, respectively, the proportion of the area of each city or municipality with a slope of greater than 30 percent based on a digital elevation model of Philippine topography and the proportion of the area covered by forest in 2000 based on the Global Forest Change dataset; because these variables were, unsurprisingly, highly correlated with each other, only the former is included in the main regressions reported below, although the latter was substituted in the sensitivity analysis, with similar results.

A final covariate was included to control for the potential interaction between the NPA and other insurgent groups. In areas of Mindanao and nearby islands where Moro separatist groups are active, NPA recruitment and military actions may be hindered by competition with those organizations. Accordingly, a binary variable was constructed that is equal to one if the municipality or city is located in ARMM, the region where

separatist groups are most active, and zero otherwise. To partially avoid potential issues of endogeneity, all control variables were lagged by one year relative to the dependent and intervening variables.

3.2.5 Empirical Model

Although the spatial distribution of conflict at the subnational level is far from systematic—indeed, the apparent unpredictability of conflict events at this scale is a subject of intense academic interest—there is little doubt that countries, districts, and communities located near conflict areas are often at greater risk for experiencing violence themselves (Mitchell 1969; Danneman & Ritter 2014; Bara 2017; Basedau & Pierskalla 2014). To account for potential dependence in the dependent variable, therefore, a cross-sectional spatial autoregressive probit model was estimated, such that:

$$y_i^* = \beta x_i + \rho W y_j + \mu$$

Where y_i* represents a latent dependent variable that is expressed as a binary outcome (i.e. either an NPA-related attack occurred during the time period examined or it did not) for municipality or city i; x is the vector of explanatory variables; μ is the residual error; and β and ρ are fitted parameters. The terms y_j and W represent, respectively, the value of the binary outcome variable in neighboring municipalities or cities j and the spatial weights matrix defining the spatial structure of the model. As in the previous chapter, a standard spatial weights matrix was used, whereby, if each row in the matrix represents an observation i and each column represents an observation j, then each entry is defined as 1 divided by the number of observations neighboring observation i, if observation j is among the neighbors of observation i, and zero otherwise (Ward &

Gleditsch 2018; Wilhelm & de Matos 2013; LeSage 2000; Beron & Vijverberg 2004; McMillen 1992).

A perennial issue that arises in the analysis of the resource-conflict nexus is the potential for endogeneity and reverse causality (Gleditsch 1998). To interrogate causal chains associated with the three hypotheses discussed above, a series of two-stage spatial probit regressions were estimated, in which the independent mining variables were used as instrumental variables for the proposed endogenous intervening variables measuring, respectively, state capacity, forest cover loss, and spatial inequality.

3.3 Results and Discussion

3.3.1 Mining and NPA Violence

The results of a series of preliminary regressions (Table 3.1) indicate a statistically significant relationship between the presence of mining activity at the municipality/city scale and the probability of NPA-related violence (Model 1). This effect appears to be driven by the presence of unpermitted mines; operational permitted mines showed a negative, though statistically insignificant, relationship with NPA-related violence, while the presence of a proposed mine had a positive, but statistically insignificant, effect (Model 2). When the intervening variables are included in the regression equation, however, none of the mining indicator variables are significant predictors of NPA violence (Model 3). The apparent multicollinearity between the independent and intervening variables may suggest that mining contributes to violence indirectly, by an intermediate effect on one or more of the intervening variables, a hypothesis that is investigated below.

Table 3.1 Relationship between mining and NPA violence.

	Model 1		Model 2		Model 3	
Dependent variable	NPA terrorist attack		NPA terrorist attack		NPA terrorist attack	
All mines	0.1640**	(0.0774)				
Unpermitted mines			0.2096**	(0.1030)	0.1889	(0.1209)
Permitted mines			-0.2643	(0.1984)	-0.1637	(0.2012)
Proposed mines			0.1606	(0.1001)	0.0932	(0.1033)
Nighttime lights	-0.1952***	(0.0611)	-0.1805***	(0.0591)	-0.1374**	(0.0606)
Population	0.2215***	(0.0508)	0.2044***	(0.0491)	0.2639***	(0.0592)
Population density	-0.6756**	(0.2634)	-0.6094**	(0.2647)	-0.4751	(0.2940)
High slope area	0.2385*	(0.1312)	0.2524*	(0.1385)	0.3059	(0.1436)
Manila indicator	0.3715	(0.7594)	0.3058	(0.7530)	0.5762	(0.8357)
Moro indicator	-0.2388**	(0.1040)	-0.2321**	(0.0999)	-0.2322***	(0.1032)
State capacity					-0.5586**	(0.2553)
Spatial inequality					0.0845**	(0.0417)
Forest cover loss					0.0244**	(0.0100)
Spatial lag	0.7660***	(0.0237)	0.7640***	(0.0234)	0.7511***	(0.0261)
Constant	-0.3310***	(0.0696)	-0.3370***	(0.0683)	-0.5440***	(0.0975)

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$ Standard errors in parentheses

Among the covariates, total population was highly significant and positive, consistent with findings in the cross-country literature that larger populations are more likely to experience civil violence (Ross 2004). Population density, however, was significant and negative, suggesting that, controlling for total population, urban areas were less likely to experience an NPA-related attack than rural areas. The nighttime lights variable, included as a proxy measure of income per capita, was significant and negative, suggesting that NPA activity was most likely in poorer communities. These findings are consistent with past studies of NPA behavior and the NPA's ideological position, which emphasizes rural-based insurgency as the primary agent of political change. The Moro territory indicator was negative, suggesting that the presence of Moro separatists in this region may deter NPA activity, while the binary indicator for Metro Manila was

insignificant and the extent of high slope area, although positive, was significant only at the ten percent level or below.

To assess the multicollinearity between the independent and intervening variables, sensitivity analysis was conducted by introducing each intervening variable independently (Table 3.2). The inclusion of the state capacity index did not affect the significance of the unpermitted mining variable (Model 4); however, including either spatial inequality (Model 5) or forest cover loss (Model 6) substantially attenuated the explanatory power of unpermitted mining as a predictor of NPA-related violence, which may suggest that unpermitted mining affects NPA behavior through an intermediate effect on one or both of those latter variables.

Table 3.2 Relationship between intervening variables and NPA violence.

	Model 4		Model 5		Model 6	
Dependent variable	NPA terrorist attack		NPA terrorist attack		NPA terrorist attack	
Unpermitted mines	0.2210**	(0.1077)	0.1890*	(0.1043)	0.2078*	(0.1104)
Permitted mines	-0.2037	(0.2018)	-0.2370	(0.2017)	-0.2531	(0.2055)
Proposed mines	0.1394	(0.1100)	0.1317	(0.1026)	0.1196	(0.1087)
Nighttime lights	-0.1661***	(0.0590)	-0.1645***	(0.0603)	-0.1673***	(0.0628)
Population	0.2464***	(0.0548)	0.2133***	(0.0524)	0.2130***	(0.0513)
Population density	-0.5082*	(0.2654)	-0.7206**	(0.2811)	-0.6184**	(0.2653)
High slope area	0.2630*	(0.1363)	0.2789**	(0.1351)	0.2749**	(0.1341)
Manila indicator	0.6473	(0.8138)	0.5394	(0.7908)	0.3723	(0.7922)
Moro indicator	-0.2294**	(0.0958)	-0.2261**	(0.1070)	-0.2300**	(0.1024)
State capacity	-0.4519**	(0.2186)				
Spatial inequality			0.1004**	(0.0422)		
Forest cover loss					0.0252**	(0.0104)
Spatial lag	0.7648***	(0.0231)	0.7657***	(0.0237)	0.7613***	(0.0243)
Constant	-0.3500***	(0.0726)	-0.4571***	(0.0900)	-0.4190***	(0.0774)

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$ Standard errors in parentheses

To investigate the potential endogeneity of the intervening variables, a series of linear spatial regressions was performed in which state capacity, forest cover loss, and

spatial inequality are the dependent variables (Table 3.3). Unpermitted mining was found to be a significant regressor of both spatial inequality (Model 8) and forest cover loss (Model 9). State capacity, however, was uncorrelated with any of the mining variables (Model 7).

Table 3.3 Effect of mining on intervening variables.

	Model 7		Model 8		Model 9	
Dependent variable	State capacity		Spatial inequality		Forest cover loss	
Unpermitted mines	0.0116	(0.0116)	0.1672***	(0.0592)	0.9073**	(0.3716)
Permitted mines	-0.0241	(0.0274)	-0.0883	(0.1037)	-0.2483	(0.6505)
Proposed mines	-0.0086	(0.0164)	0.0972	(0.0619)	0.4522	(0.3884)
Nighttime lights	0.0152*	(0.0092)	-0.1032***	(0.0343)	0.0139	(0.2150)
Population	0.0812***	(0.0055)	0.0725***	(0.0207)	0.1860	(0.1301)
Population density	0.1689***	(0.0348)	0.2959**	(0.1243)	-0.2766	(0.7784)
High slope area	0.0025	(0.0230)	-0.1135	(0.0871)	-3.850***	(0.5596)
Manila indicator	-0.0207	(0.1013)	-1.075***	(0.3819)	-1.387	(2.397)
Moro indicator	-0.0002	(0.0178)	-0.1136*	(0.0675)	-0.7473*	(0.4238)
Spatial lag	0.4688***	(0.0280)	0.4154***	(0.0350)	0.6877***	(0.0223)
Constant	-0.0318***	(0.0116)	0.6472***	(0.0590)	2.698***	(0.3206)

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$ Standard errors in parentheses

These results may be suggestive of a risk mechanism as predicted by H2a and H2b, whereby unpermitted mining increases environmental degradation and spatial inequality, which, in turn, increase the probability of experiencing NPA-related violence. Due to the potential for omitted variable bias, endogeneity, and multicollinearity in these regression models, however, definitive conclusions regarding the validity of the proposed causal chains cannot be drawn therefrom. As an alternative approach, a two-stage spatial probit regression analysis was conducted, whereby each intervening variable was instrumented with respect to the presence of the three classes of mining activity (Table 3.4). A Wald test of exogeneity was conducted for each of the two-stage models to assess the appropriateness of the instrumental variable approach.

Table 3.4 Two-stage regression analysis of mining and NPA violence

	Model 10		Model 11		Model 12	
Dependent variables	NPA terrorist attack		NPA terrorist attack		NPA terrorist attack	
Endogenous variable	State capacity		Spatial inequality		Forest cover loss	
First stage regression						
Intercept	-0.0380**	(0.0161)	0.6389***	(0.0673)	2.827***	(0.3875)
Unpermitted mines	0.0091	(0.0157)	0.1712***	(0.0594)	0.8839**	(0.3718)
Permitted mines	-0.0222	(0.0274)	-0.0899	(0.1037)	-0.2510	(0.6490)
Proposed mines	-0.0094	(0.0164)	0.0952	(0.0621)	0.4794	(0.3886)
Nighttime lights	0.0132	(0.0093)	-0.0957***	(0.0349)	-0.0634	(0.2194)
Population	0.0812***	(0.0055)	0.0791***	(0.0220)	0.0610	(0.1375)
Population density	0.1667***	(0.0351)	0.3419***	(0.1293)	-0.9040	(0.8100)
High slope area	0.0155	(0.0237)	-0.1195	(0.0899)	-3.866***	(0.5584)
Moro indicator	-0.0005	(0.0185)	-0.1053	(0.0699)	-0.7692*	(0.4371)
Manila indicator	0.0350	(0.1015)	-1.061***	(0.3839)	-1.964	(2.405)
State capacity			-0.0915	(0.0866)	1.623***	(0.5410)
Spatial inequality	-0.0034	(0.0062)			-0.0344	(0.1481)
Forest cover loss	0.0020**	(0.0008)	-0.0010	(0.0031)		
Spatial lag	-0.0172	(0.0207)	0.0523	(0.0783)	-0.1514	(0.4900)
Second stage regression						
Intercept	-0.5721***	(0.1038)	-2.131***	(0.4360)	-0.9900***	(0.2633)
Nighttime lights	-0.1025	(0.0661)	0.0121	(0.0733)	-0.1525***	(0.0569)
Population	0.3701***	(0.0953)	0.0956	(0.0695)	0.2587***	(0.0578)
Population density	-0.2565	(0.3478)	-1.154***	(0.3280)	-0.5206*	(0.2995)
High slope area	0.3706**	(0.1452)	0.5858***	(0.1614)	0.8617***	(0.2884)
Moro indicator	-0.2232**	(0.1073)	0.0316	(0.1241)	-0.0982	(0.1135)
Manila indicator	1.027	(0.8233)	2.537***	(0.9361)	0.9181	(0.8622)
State capacity	-1.517**	(0.7366)	-0.3558	(0.2381)	-0.6698**	(0.2651)
Spatial inequality	0.0824**	(0.0419)	1.493***	(0.3673)	0.1058**	(0.0430)
Forest cover loss	0.0138**	(0.0056)	0.0089*	(0.0049)	0.0638**	(0.0305)
Spatial lag	0.7568***	(0.0256)	0.7392***	(0.0267)	0.7627***	(0.0240)
Chi statistic	0.780		5.16**		5.04**	

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$ Standard errors in parentheses

Results of this analysis were again supportive of the risk mechanism. Among the three intervening variables, only the spatial inequality and the forest loss variables were found to be endogenous to the equation, based on the results of the Wald test. Unpermitted mining was again found to be predictive of spatial inequality (Model 11)

and forest cover loss (Model 12) in the first stage of the two-stage regressions, while the predicted values of spatial inequality and forest cover loss variables were significant in the second stage. Interestingly, proposed mining was also a significant predictor of forest cover loss in the first stage regression, which may indicate that the process of opening an area for mining can contribute to environmental scarcity even before mining activities begin, through, for example, the construction of access roads or other infrastructure.

Taken together, the empirical results most strongly support a conflict risk mechanism linking natural resources and civil conflict. Consistent with H2a, the results of the two-stage regression analysis suggest that the presence of unpermitted and proposed mines contribute to environmental scarcity, which, in turn, increases the probability of experiencing NPA violence. As predicted by H2b, unpermitted mining is strongly correlated with both spatial economic inequality, a proxy for relative deprivation, and the probability of experiencing an NPA-related terrorist attack. There is also strong evidence that spatial inequality is endogenous with respect to unpermitted mining as a predictor of NPA violence. By contrast, no evidence was found for a conflict vulnerability mechanism related to localized manifestations of the resource curse as predicted by H1. Although the state capacity index was consistently found to be a significant predictor of the probability of NPA-related violence, the presence of mining in a municipality or city does not appear to correlate with that measure. The two-stage regression corresponding to H1 was also not found to offer additional explanatory power relative to the probit model, suggesting that state capacity is not endogenous with respect to mining.

3.3.3 Linking Mining and Conflict in the Philippines

The results of this study constitute empirical evidence of the widely observed but empirically underspecified relationship between natural resource extraction and civil violence in the Philippines. They also lend insight into the causal mechanisms linking mining and conflict and the role of regulatory context and of material conditions for determining the extent to which extractive industry contributes to civil violence and the paths by which it does so. In terms of the hypotheses specified above, the weight of the evidence is in favor of H2a and H2b, which correspond to the scarcity and relative deprivation interpretations of the conflict risk mechanism, respectively. H1 is unsupported by the results, although this does not preclude a resource curse effect at scales unobservable by the methods applied herein. Similarly, although the results are not supportive of H3, the lack of any ancillary contribution of mining to conflict risk beyond its effects on spatial economic inequality and environmental scarcity does not necessarily disprove the role of the opportunity mechanism in the Philippines. In fact, the lack of a statistically significant relationship between permitted mines and terrorist attacks may actually be an artifact of mining companies habitually buying off NPA aggression in the form of revolutionary taxes. What is clear, however, is that opportunity alone is not sufficient to explain the spatial relationship between violence and extractive industry in the ongoing conflict between the NPA and the Philippine state.

The apparent paradox of the NPA's vocal opposition to mining—which the results suggest is also a driving factor of NPA actions—and its exploitation of mining rents can perhaps be best understood by considering the constraints facing insurgent groups in the Philippines, of which two are of primary importance. The first is financial:

armed groups must raise funds to purchase weapons, vehicles, and food and supplies for fighters. The second involves the level of support among the populace for the group's activities; to remain active, a non-state actor must develop a message that resonates with the population of the territory in which it operates. This is essential not only to maintain a continuing supply of recruits, but also to ensure that locals provide support in the form of material contributions or information, as well as withhold information about rebel activities from the national government and its allies. In some circumstances, a group may become powerful enough within a territory that it can rely on force to ensure the cooperation of civilians; until and unless it can reach this stage of control, however, it must continue to align its messaging and activities with the grievances of the population with whom it interacts (Kalyvas 2000).

With regard to both sets of constraints, the NPA today differs notably from the Moro separatist insurgency and from its own previous incarnations. Whereas groups like Abu Sayyaf and the BILF receive financial support from external actors—namely international Islamic extremist organizations—the support received by the NPA from international groups has diminished in recent decades, leaving the NPA increasingly reliant on its extortion activities to fund its operations. The Moro separatist groups also exert more complete political control over the areas in which they operate, relative to the NPA; in those regions, the separatists can rely upon a shared ethnic heritage with the Moros of Mindanao that distinguishes them and the local population from the Philippines more generally. By contrast, the NPA is active throughout the country and is made up of members of many distinct ethnic groups; their appeal is ideological, rather than cultural, and depends on the group's ability to continuously align with the concerns of local people

(Santos 2010). The NPA's longevity can be largely explained, therefore, by its ability to remain politically relevant—although its core ideology has remained generally constant with respect to antipathy toward capitalism, corrupt governance, and foreign 'imperialists' and 'neocolonialists,' the shifting focus in the NPA's propaganda from the hacienda system to extractive industry mirrors the evolving concerns of many Filipinos.

For the NPA, the controversy surrounding mining provides an important means for addressing both material and political constraints. Mines represent not only a ready source of extortion money, but also an opportunity to signal to local communities affected negatively by extractive industry that the NPA is willing and able to protect their interests. The importance of civilian support suggests, however, that not all mine sites are equally politically valuable targets from the NPA's perspective. Where mining is conducted in a context of environmental marginalization and the inequitable distribution of costs and benefits, it is most likely to exacerbate social grievances and it is in such communities that the NPA's revolutionary narrative, emphasizing resistance of the politically and economically disenfranchised against an entrenched system of crony capitalism and foreign 'plunderers,' is most likely to resonate and that its targeted application of violence against politicians and businesses is most likely to find support. As Holden & Jacobson (2007) observe, "the NPA use the rhetoric of ideology (communism) to galvanize their members, and the MILF use the rhetoric of theology (Islam) to galvanize their members, but in both cases, it is ultimately the poverty and social exclusion that cause the movements to come into existence" (493).

3.4 Conclusion

As Kalyvas (2000) writes, "whereas conventional wars neatly divide space into two well defined and clearly demarcated spaces, irregular wars show up as messy patchworks; the more detailed the map, the messier it looks" (98). Explaining local variation in intensity of violence is an essential step in understanding the dynamics of civil conflicts—how they develop, spread, and persist—and for identifying potential interventions to mitigate them; contributing to that effort, the analysis presented above offers some insights into the dynamics of the NPA insurgency in the Philippines. Supporting a conflict risk mechanism, whereby environmental scarcity and relative deprivation related to the effects of mining creates opportunities for the NPA to engage with civilians around local grievances, the findings are broadly consistent with the observations of Mediansky (1986), Caouette (2015), Holden (2013b, 2014), Holden & Jacobson (2007), and other observers of the NPA insurgency who have noted the organization's ability to adapt to changing circumstances and public attitudes in order to remain politically relevant in Philippine society. Although the effect of mining on NPA violence appears to be adequately explained by this risk mechanism—that is, there is no additional impact of mining activity on conflict when the intervening variables of spatial economic inequality and forest cover loss are controlled for—the dynamics of the NPA's funding stream is such that no definitive conclusions regarding the conflict resources mechanism can be drawn from this finding. It is reasonable to conclude, however, that the role of mining as a source of financing alone does not fully explain local variations in NPA activity; also important is the role of mining as a source of grievances among affected communities. Like similar non-state actors throughout the developing world, the

survivability of the NPA relies in large part on its ability to maintain a sustainable base of support among the civilian population, on whom the group is dependent for recruits, funding, information, and cooperation in the form of nonreporting of NPA activities to government forces (see Weinstein 2007, Kalyvas 2000, Caouette 2015).

The potential policy implications of these findings are twofold. First, they suggest that dismissing the NPA, as the Philippine government has repeatedly done, as 'bandits' and 'criminals' who have abandoned ideology in favor of racketeering and other moneymaking schemes (Lagsa 2015) is to overlook the environmental and socioeconomic implications of resource extraction to which the NPA has established itself as a focal point of opposition. By responding to threats against mines with increased militarization and the targeting of anti-mining activists, mining companies and the government run the risk of further alienating negatively affected populations and thereby validating the NPA's framing narrative in the eyes of local people. Secondly, the results provide some evidence that the process by which mining in the Philippines is implemented is important in shaping its relationship with civil conflict. That only unpermitted mines exhibited a consistently significant relationship with NPA terrorism may indicate that the permitting process itself can play a role in alleviating grievances and preventing resource-related violence. Although such is the implied objective of the informed consent, public engagement, and revenue-sharing requirements of the project review and approvals process in the Philippines and elsewhere, the role of those policies in the context of the relationship between extractive industry and civil violence has been underexamined and perhaps overlooked.

To the extent that the set of objectives, constraints, and opportunities faced by the NPA are not guaranteed to translate to other conflicts, these conclusions regarding the role of natural resources may not be readily generalizable. The approach adopted in this study, however, of leveraging the expanding universe of subnational events data and of methods for quantifying socioeconomic variables at previously unavailable levels of spatial precision does lend itself to replication in other contexts. A future research agenda is therefore recommended to examine the role of natural resources in civil conflicts at multiple scales and under different sets of policy circumstances.

4. Black Sand and the Red Court: 'Local' Analysis of Natural Resources and Civil Conflict

On the morning of April 21, 2014, the municipal employees of Gonzaga, a rural town in the northern Philippines, gathered for the weekly address of Mayor Carlito Pentecostes, Jr. on the steps in front of the newly remodeled municipal hall. As he prepared to begin his speech, several men dressed in military uniforms approached the mayor, greeted him cordially, and shot him fatally in the head and chest. In the days that followed, the NPA claimed responsibility for the killing, announcing via press releases that Pentecostes had been sentenced under Article IV of the CPP's Guide to the People's Court, which imposes the death penalty for "espionage, betrayal and infidelity, killings, arson, rape, embezzlement, violence, and theft of buffalo or other animals." The mayor's crime, according to the NPA, lay in his support of and profiting from magnetite mining in coastal areas of Gonzaga, an activity that, the insurgents alleged, benefited wealthy businesspeople and foreign investors at the expense of the natural environment and the wellbeing of the local community (De Jesus 2014; Gascon 2014).

The Pentecostes assassination, marking the culmination of a debate over mining in Gonzaga that had been evolving and intensifying for years, is one of numerous incidents of civil violence in the Philippines, and throughout the developing world, in which access to, control over, and extraction of natural resources have been implicated as facilitating factors. Although, as discussed in the preceding chapters, the apparent relationship between resources and armed conflict has been widely studied (see Ross 2004; Van Der Ploeg & Poelhekke 2016; Le Billon 2012), the experiences of

communities affected by resource conflict have often been overlooked (Barter 2014; Sorens 2011); at the same time, the broad literature examining resistance movements in opposition to extractive industry has insufficiently engaged with theories of violence (but see Conde 2017; Peluso & Watts 2001; Conde & Le Billon 2017). Emphasizing the development of alliances between militants and civilians, therefore, this chapter presents a case study of mining in Gonzaga, with the objective of mapping the inter-scalar processes by which local disputes over natural resources can become entangled with broader patterns of civil conflict.

4.1 Background

Unlike the preceding chapters, the current study relies on analysis of qualitative data, analyzed through the broad lens of political ecology, within which framework stakeholders are understood not solely in terms of economic rationality, but as social actors who "interpret and reflect on what happens around them and use their knowledge and capabilities to respond to and navigate the conditions of war" (Van Leeuwen & Van der Haar 2016, 95). In the case of magnetite—known locally as 'black sand'—mining in Gonzaga, this approach reveals connections between natural resources and civil violence along multiple dimensions. By examining those linkages in the context of the scalar relationships in which they are embedded, generalizable lessons regarding the role of extractive industry in civil conflict are apparent; in particular, I will argue that, owing to its position as a node of overlapping scalar relationships, natural resource exploitation creates potentially unique opportunities for political actors to renegotiate scalar configurations of power.

In addition to examining the applicability of the vulnerability, risk, and opportunity mechanisms in the conflict over black sand mining in Gonzaga, therefore, the present chapter also engages directly with the political ecology of scale literature summarized in Chapter 1. As Green (2016) writes, "scale is recognised as potentially making an important contribution to political ecology by contributing to analyses that weave together socio-ecological processes and by placing power at the centre of the dynamics shaping access to and control over environmental resources and space" (89). Political ecology, in turn, offers important lessons for understanding scalar relations in resource-related conflicts, among the foremost of which is the recognition that, although the scales at which natural resources are politically and economically relevant can be discursively reshaped, the scales of the biophysical processes that produce resources are not infinitely malleable (Bakker & Bridge 2006; Görg 2007; Bolin et al. 2008; Bulkeley 2005).

Of particular relevance to the present chapter is Smith's (1992) concept of 'scale jumping,' described by Green (2016) as the "transformation of scalar formations through actors being able to use their social power to position themselves within another scale, thus resisting hegemonic structures" (94). More broadly, scale jumping can be thought of as a form of scale production whereby the relationship between actors and processes is intentionally reconfigured to achieve political aims; as Sayre (2005) writes, therefore, "*what is 'jumped,' then is not scales but levels, with the result that a process is rescaled*" (285, italics in original). For example, Haarstad & Fløysand (2007) describe how anti-mining activists in Peru rescaled their oppositional narrative by networking with organizations at national and international levels. Similarly, Marston (2014) discusses

how neighborhood-based water committees in Cochabamba, Bolivia used relationships with government agencies and NGOs to articulate a community-centered alternative to large-scale state-driven water supply. In the case of black sand mining in Gonzaga, various actors, including politicians, anti-mining activists, and the NPA, attempted, with varying degrees of success, to rescale political processes to achieve their desired ends. Supporters of the projects were effective, through the distribution of bribes and political patronage, in coopting the hierarchical regulatory structure governing resource extraction; opponents, by contrast, largely failed to reframe black sand mining as an issue of supralocal relevance. While the concept of scale jumping has most often been discussed in the context of 'upscaling', whereby local actors attempt to bypass the extant scalar hierarchy by forming relationships with national or global networks (Marston 2014; Green 2016; Hoogesteger & Verzijl 2015; Vela-Almeida et al. 2018), the present case study also demonstrates that, in the case of Gonzaga, the NPA engaged in a deliberate process of 'downscaling' in order to insinuate itself as a locally relevant actor.

4.2 Methods

4.2.1 Data Sources

The main data source for this study was a series of twelve in-depth, semi-structured interviews with stakeholders having firsthand knowledge of the mining industry in Gonzaga and the ensuing conflict. Participants included activists, businesspeople, government employees, elected officials, religious leaders, and academics; some had supported mining projects in Gonzaga, while others had been active in the resistance movement. Although no current NPA members could be interviewed,

some informants have had association with the group in the past. To protect participant confidentiality, given the politically sensitive nature of the research topic, all quotations from interview participants in this chapter have been translated by the author and redacted to remove any information that could be used to identify the source. Having spent several years living and working in Gonzaga, I am well known in the community; it should be noted, therefore, that I had preexisting personal or professional relationships with some participants. In general, those individuals with whom I had established relationships were more likely to disclose detailed information about the processes and micro-politics that created the conditions for conflict.

In addition to key informant interviews, I rely also on the results of an interview survey of more than 300 farmers and fisherfolk conducted in 2009 by the local government of Gonzaga, as well as posts on social media by activists and agencies, media reports, speeches by government officials, and propaganda published by the NPA and the CPP, especially the NPA newsletter *Ang Bayan*. Although the main fieldwork for this project took place from June to August 2016, my understanding of the events preceding and during the mining conflict is also informed by my own experience living in Gonzaga from 2008 through 2011, and during visits to the town in 2014, 2015, 2017, and 2018.

4.2.2 Study Site

Gonzaga is a first-class municipality located in northeastern Luzon in the Province of Cagayan, and is approximately 56,743 hectares in area, the majority of which is undeveloped upland forest (see Figure 4.1). The municipality has a population of approximately 38,900 individuals, roughly one-third of whom reside in the urbanized barangays of Smart, Progressive, Flourishing, and Paradise, which together constitute the

town center or Poblacion. A predominantly agricultural community, Gonzaga is heavily reliant on irrigated rice farming, although marine fishing is also an important industry in the coastal villages. Residential and business development is generally confined to the lowland plain between the Sierra Madre mountain range to the southeast and the Babuyan Channel to the northwest and is most heavily concentrated along the national highway that bisects the municipality. Approximately 95 percent of the population are native speakers of Iluko (or Ilocano), and trace their descent to migrants who arrived from the Ilocos region in the nineteenth century; those settlers replaced the native Aeta (or Agta) tribespeople, a remnant of whom continue to practice a traditional hunter-gatherer and swidden agriculturist lifestyle in the mountains (Municipality of Gonzaga 2013).

Resource extraction has been a source of conflict in Gonzaga for at least several decades. In the 1980s, logging in the uplands became a controversial local issue in which the NPA was known to be involved (see Vitug 1993). The more recent dispute over mining dates to 2008, when a Taiwanese-owned mining firm sought and obtained a Department of Environment and Natural Resources (DENR) permit to quarry sand and gravel from the Wangag River, which traces the boundary of the Poblacion. The permit's issuance instigated a campaign of activism in opposition, involving lawsuits, rallies, petitions, and demonstrations. In response to litigation filed by the activist group Save the Wangag River Movement (SAWAREM), the DENR's Mines and Geosciences Bureau (MGB) issued a 'status quo' order in 2010 to halt the implementation of the quarry, but development reportedly continued regardless. The conflict came to a head on the night of December 2, 2010, when an estimated 20 NPA members commandeered a dump truck

and drove it into the quarry site, where they proceeded to hogtie two security guards, commandeer their firearms, and set fire to mining equipment (Nueva 2010).

The 2010 mayoral election in Gonzaga was seen by many locals as a referendum on the issue of mining in the municipality. The incumbent mayor, Rosendo Abad, had been an opponent of the Wangag River quarry, while his opponents, Pentecostes and former-mayor Epifanio Gaspar, were both vocal supporters of mining. Following his eventual victory, Pentecostes fast-tracked the approval of black sand mining projects in coastal barangays; by the end of 2010, permits had been issued for at least four Chinese- and Taiwanese-backed companies to mine magnetite, a number that would continue to grow over the next three years (Panelo 2016). Site visits and a review of satellite imagery confirmed the presence of mines at various times between 2010 and 2014 in eight coastal barangays, several of which were clearly located outside of the boundaries of any permitted mining area, in violation of Philippine environmental and mining laws.

Tax revenue from the local mining industry was widely credited for bringing about positive changes in Gonzaga, including the remodeling of the municipal hall, the expansion of the public market, and the construction of new farm-to-market roads, projects for which the municipality received national news coverage (Lagasca 2013). By 2013, the Pentecostes administration estimated that the town had earned some 300 million pesos (around USD 6.5 million) in taxes from mining, more than triple the revenue from other local sources. Despite the good press, however, many community members, citing impacts to farmland and coastal ecosystems, remained critical of the projects and mobilized in opposition. One prominent activist leader, Esperlita “Perling” Garcia, publicly accused the mayor of abusing his power to break up protests and to

threaten activists; in response, Pentecostes sued Garcia for libel, leading to her arrest and detention in October 2012 (Rodriquez 2012). Running on a largely anti-mining platform, Garcia would go on to unsuccessfully challenge Pentecostes in his 2013 reelection campaign.

The assassination of Pentecostes early in his second term was apparently well planned and precisely timed; the mayors' private bodyguards were reportedly elsewhere when the gunfire erupted and the four policemen on the scene were quickly disarmed and restrained. Witnesses stated that the assailants, who may have numbered as many as 30, reassured onlookers, saying, in Iluko, "*Awan ti rumamraman; ni mayor lang ti kasapulanmi* [No one should intervene; we only want the mayor]." After the murder, they ransacked the municipal hall, making off with cell phones and computers, before commandeering several vehicles and fleeing into the mountains. Handfuls of leaflets were found scattered at the scene, that read, "*Hustisya para iti kaaduan, dusaen dagiti utek ti dayuhan a minas iti Cagayan* [Justice for all. Punish the brains of illegal mining by foreigners in Cagayan]" (De Jesus 2014); several days later, the NPA officially declared its involvement. In the aftermath, the black sand mining operations were discontinued, although proposals for several new projects, including off-shore magnetite mining, have since been submitted.

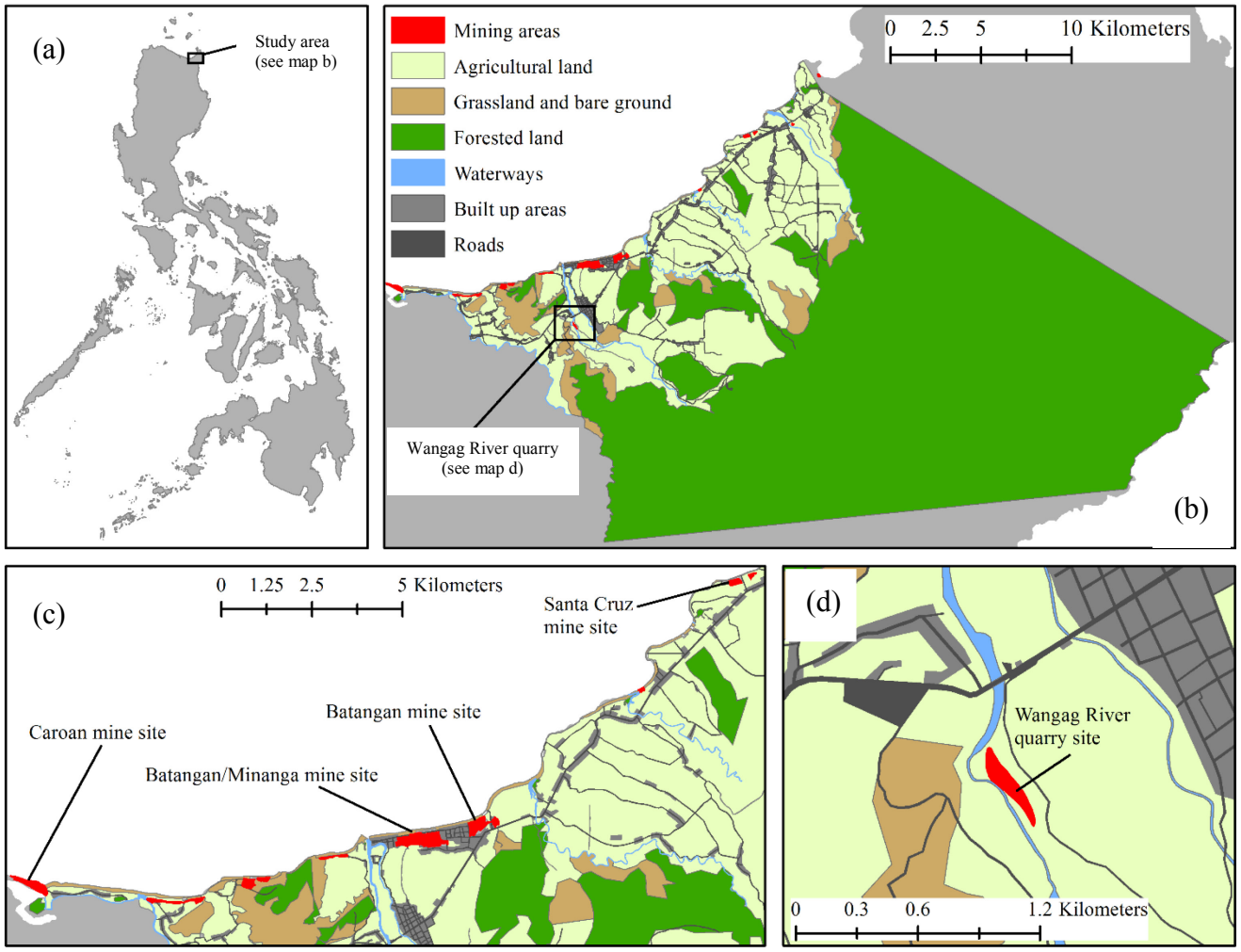

Figure 4.1 Case study site. (a) Location of Gonzaga in the Philippines. (b) Land use in Gonzaga. (c) Location of black sand mining sites in Gonzaga. (d) Location of Wangag River gravel quarry in Gonzaga. Source: Compiled from Municipality of Gonzaga (2013).

It is at this point that the narrative of the conflict over mining in Gonzaga, insofar as it can be gleaned from official and media reports, comes to an end; below, I examine the events as related to me by participants and witnesses. First, I discuss how the local manifestation of the resource curse in Gonzaga increased vulnerability to civil violence; next, I interrogate the role of grievances over the environmental and socioeconomic impacts of mining in exacerbating conflict risk; and, finally, I explain how the black sand mining issue in Gonzaga created opportunities for the NPA in the form of potential alliances with civilian networks. Throughout, I apply the concepts of scale and scale jumping to contextualize the agendas and actions of the political actors involved.

4.3 Results and Discussion

4.3.1 "Here in the Philippines, there is a price for everything"

The conflict vulnerability mechanism links natural resources and civil conflict through extractive industry's systemic effects on economies and institutions; engaging with the broader resource curse literature, it suggests that economic dependence on natural resources may lead to conflict by exposing an economy to price shocks and 'Dutch disease' or by undermining state capacity by incentivizing rentierism and corruption (Le Billon 2012; Ross 2015). Although resource curse scholarship has traditionally focused on its implications at the state level, there has been increasing interest in its localized manifestations (see Kirsch 2014; Horowitz 2009; Knutsen et al. 2017); contributing to that effort, this section contextualizes resource-related corruption in Gonzaga as an exercise in scale jumping, whereby resource governance was rescaled to the benefit of the Pentecostes mayoral administration.

The issue of corruption is a constant theme of political discussions in Gonzaga and was by far the most commonly-cited grievance related to the mining issue; this is consistent with previous studies of Philippine political economy, which routinely identify corruption as a major constraint on development (Bello et al. 2005; Broad & Cavanagh 1993). One of its most insidious forms, according to those interviewed, is the process of vote buying in local elections. Asked why Pentecostes won his 2013 reelection so decisively, despite vocal opposition to mining projects, for example, one informant claimed succinctly that he had "bought the people." The same source, a former campaign worker, described the process by which votes are purchased: candidates allocate budgets, based on population, to barangay level committees, who then approach heads of households and offer cash "gifts," which have reportedly ranged up to 5000 pesos (around USD 108) in recent mayoral elections. Refusing to accept money can be risky for voters because it signals that one does not support a certain candidate, but accepting it carries its own price; as one interview participant explained, "they [elected officials] have already paid you, so now you cannot make a claim on them for services." Failure to deliver votes that have been purchased can, meanwhile, result in the withholding of budgetary funds from a barangay or other forms of retribution. Nor is vote buying the only means by which an election can be purchased; another informant described a meeting in which campaign staffers discussed whether it would be a better "investment" to purchase votes or to bribe election officials to disqualify their opponents.

Through such means, politicians can rescale democratic processes by neutralizing both the political power of voters and the regulatory authority of national level election monitors. They are willing to do so, and to expend exorbitant sums in the process, at least

in part because public office is viewed as holding opportunities for future enrichment. Informants were universally agreed, for instance, that Pentecostes personally profited from black sand mining, through direct payoffs from the companies involved, by skimming from tax revenues, or some combination thereof. Pentecostes also allegedly adopted the role of "fixer" or go-between in the relationship between mining companies and regulators at all levels; in that position, he was purportedly well placed to extract substantial financial benefits for himself and his associates. Comparing Pentecostes' embezzlement to the mining revenue spent on local development projects, one barangay official declared that "he was very good in making propaganda. Without anyone knowing it, the projects that you see are really a very small amount compared to the bigger amount that somebody could have already obtained from that black sand mining."

Informants were similarly in consensus that the approval process for black sand mining in Gonzaga was also tainted by bribery, orchestrated by the mayoral administration, of public officials, especially those responsible for overseeing environmental review of the projects. Under Presidential Decree No. 1151 and related environmental laws, mines in the Philippines are automatically subject to an EIA process that involves actors at multiple levels (see Bravante & Holden 2009), including the DENR's Environmental Management Bureau (EMB), which reviews and approves EIA documentation and the MGB, which licenses and monitors mining operations. Provincial governors also exert substantial political influence on the mining industry through their economic regulatory authority, while municipal governments oversee development and natural resource management planning, as well as business permitting and tax collection. Finally, a policy of informed consent, implemented through the auspices of the barangay

level government, requires that members of a community affected by mining projects be consulted at all stages of planning and implementation. In Gonzaga, however, there is substantial evidence that this EIA process was repeatedly ignored. Numerous interview participants informed me that no meaningful environmental review was conducted for either the Wangag River quarry or the black sand mining projects and, despite a thorough review of records at the municipal hall and at the EMB headquarters in Quezon City, I was unable to locate any EIA documentation related to those projects or individuals with knowledge of their existence.

Nevertheless, clearances were issued by the DENR to several mining firms in Gonzaga during the early days of the Pentecostes administration, certifying compliance with EIA procedures; asked about this discrepancy, one local government employee told me, "our assumption was that it was because of money. They [the DENR] were bribed. They were paid." Although the institutional failings of the EIA system in the Philippines have been documented elsewhere (see Bravante & Holden 2009; Ingelson et al. 2009), the contribution of corruption has not been widely investigated; interview participants, however, expressed little surprise that this process would be tainted by the same issue as most other interactions with the government, from tax collection to the issuance of drivers' licenses. As another local government employee explained:

> It is all coordinated. Coordinated with the DENR, with the barangay officials, with provincial officers. Even if it's illegal, if there is money involved, you can do it in the Philippines. That is how it is here. Look at the director [of the provincial DENR]. He has a beautiful car. How much did that cost? It's the same for all of the positions. Even in the local government, even in the DENR. Because the politicians are directing it. Who appoints the DENR secretary? There are still politics there; it's all politics. They can

> influence all the agencies in the Philippines…That is how politics works here.

Summarizing the view of many participants, another informant stated simply, "Here in the Philippines, there is a price for everything."

Ideally, public outreach by mining companies under informed consent provides a forum in which affected individuals can raise concerns and air grievances. By creating incentives for extractive industry to seek community input and approval, EIA policies can lead to productive outcomes in which locals are engaged in planning, implementation, monitoring, and remediation (see Kirsch 2014; Bravante & Holden 2009). The effect of corruption is to short-circuit these incentive structures, leading companies to focus on supplying bribes at the expense of hearing and addressing community concerns. One foreign businessperson interviewed for this study, for example, described meetings of mining company representatives in which the payment of bribes in exchange for approvals was discussed in the context of regular business costs, with the understanding that the purchased officials would be responsible for dealing with community relations. These implications were not lost upon anti-mining activists, one of whom explained, "at first, I thought I really didn't like the Chinese because they are destroying the environment. But what I've learned is that it is the politicians who are destroying it." Another admitted, "I wanted to kill people during those times—the people who initiated [the project] and who helped those Chinese people to acquire permits to quarry."

The targeted application of bribes, payoffs, and patronage during the black sand mining controversy can be interpreted as an exercise in scale jumping that resulted in the reconfiguration of scalar relations in the regulatory sphere. By buying off provincial and national government officials, the established hierarchical permitting process was

subverted, such that political control of mining projects became rescaled to center on the municipal level, with the mayor widely seen as the foremost actor. Through such maneuverings, local politicians, who often hold simultaneous roles as businessmen and land owners, can become, in Allen's (2017) words, 'masters of scale,' whose "simultaneous nesting at multiple scales…makes them critical agents in the brokering of the 'scalar fixes' that are required, alongside territorial fixes, for large-scale resource extraction to occur" (86). In Gonzaga, in addition to the upscaling of mayoral power, downscaling was also implemented through the distribution of patronage to barangay officials in coastal areas. Because it is at this level that the processes of public consultation within the EIA framework are implemented, the supersession of the authority of the barangays restricted the political voice of households and individuals and, as discussed in the following section, undermined efforts at mobilization against mining projects by their opponents.

4.3.2 Grievances and Mobilization

Through the conflict risk mechanism, grievances related to the control of resources or the impacts of their extraction provide a rationale for engaging in violent action and become focal points around which belligerents rally (Le Billon 2012); especially where control over and use of resources are contested between 'locals' and 'outsiders,' such grievances can "burrow into the seams of social identity, power networks, belief systems and other tightly woven and partly submerged realms of social life" (Suryanata & Umemoto 2005, 751) to produce or exacerbate social cleavages that define broader patterns of conflict (Le Billon 2001b). In Gonzaga, the lack of meaningful environmental review created an informational vacuum into which various actors

projected their own understandings of mining's environmental impacts, socio-economic implications, and interactions with Gonzaganian identity, often accompanied by calls, explicit or implied, to action. For its part, the NPA denounced mining companies in unforgiving terms, accusing them of "slowly killing entire peasant and fisherfolk communities because of the destruction wrought by the mining activities on the uplands, farms and fishing grounds from which the masses derive their livelihoods" and having "unbridledly stolen the province's mineral wealth to the detriment of the environment" (Ang Bayan 2014, 5). Supporters, by contrast, described mining as an environmentally benign path to economic development. Pentecostes, in a 2013 interview, claimed that "We see to it that there is a balance between sustainable utilization of our resources and economic prosperity…From a sleepy town, Gonzaga…is now one of the fastest economically growing municipalities in the province. This is because we are utilizing our natural resources wisely for the benefit of our constituents" (qtd. in Lagasca 2013).

Most community members consulted for this study adopted positions between those extremes. While recognizing the positive implications of mining rents for local development, interview and survey participants raised such potential environmental concerns as land subsidence, soil erosion, intrusion of salt water into rice paddies, sedimentation of coral reefs, and potential interactions with existing natural hazards. One informant, a local business owner, for example, complained, "Before, this was a very natural place, but now you can see, mostly in parts of the seashore, it's no good already. In the place they are mining, no plants can survive...and what if we have some natural problem, like a typhoon or something? Maybe this town will be easily damaged. Maybe, if we have an earthquake, the foundation will not be very strong anymore, so maybe it

will easily collapse." There is emerging evidence that these fears were well founded. Recent remote sensing analysis by Chaussard & Kerosky (2016) concluded that magnetite mining in northern Luzon is indeed linked to greater risk of land subsidence; in an extreme case, residents of Barangay Caroan, which is located largely on a sandbar, have publicly blamed black sand mining for exacerbating subsidence and erosion that have resulted in the submergence of large areas of the village (Panelo 2016).

Many of the grievances related to mining in Gonzaga stem from what interview participants and survey respondents felt to be an incompatibility between a rural, agrarian lifestyle and an extractive economy represented by the mining industry. Gonzaganians largely identify as farmers and fisherfolk, exhibiting pride in a cultural heritage that emphasizes stewardship of the natural environment. Exemplifying this theme, the official town hymn, which is sung at all major public gatherings, reads, in part, "*Nabaknang a kataltalonan, nalitnaw a karkarayan, nalangto a kabakiran. Mangpabaknang ti dulang....Ilokano nga appomi ita sidongmo naitukit kannawidanmi napateg* [Fertile farms, our pristine river, lush wilderness. These are our wealth...Our Ilocano grandchildren instinctively know to defend our precious heritage]." A barangay official explained to me that mining was a particularly contentious issue in Gonzaga because "in other municipalities, they don't have the natural beauty that we have here in Gonzaga. That is why they do not appreciate those things the way we do here."

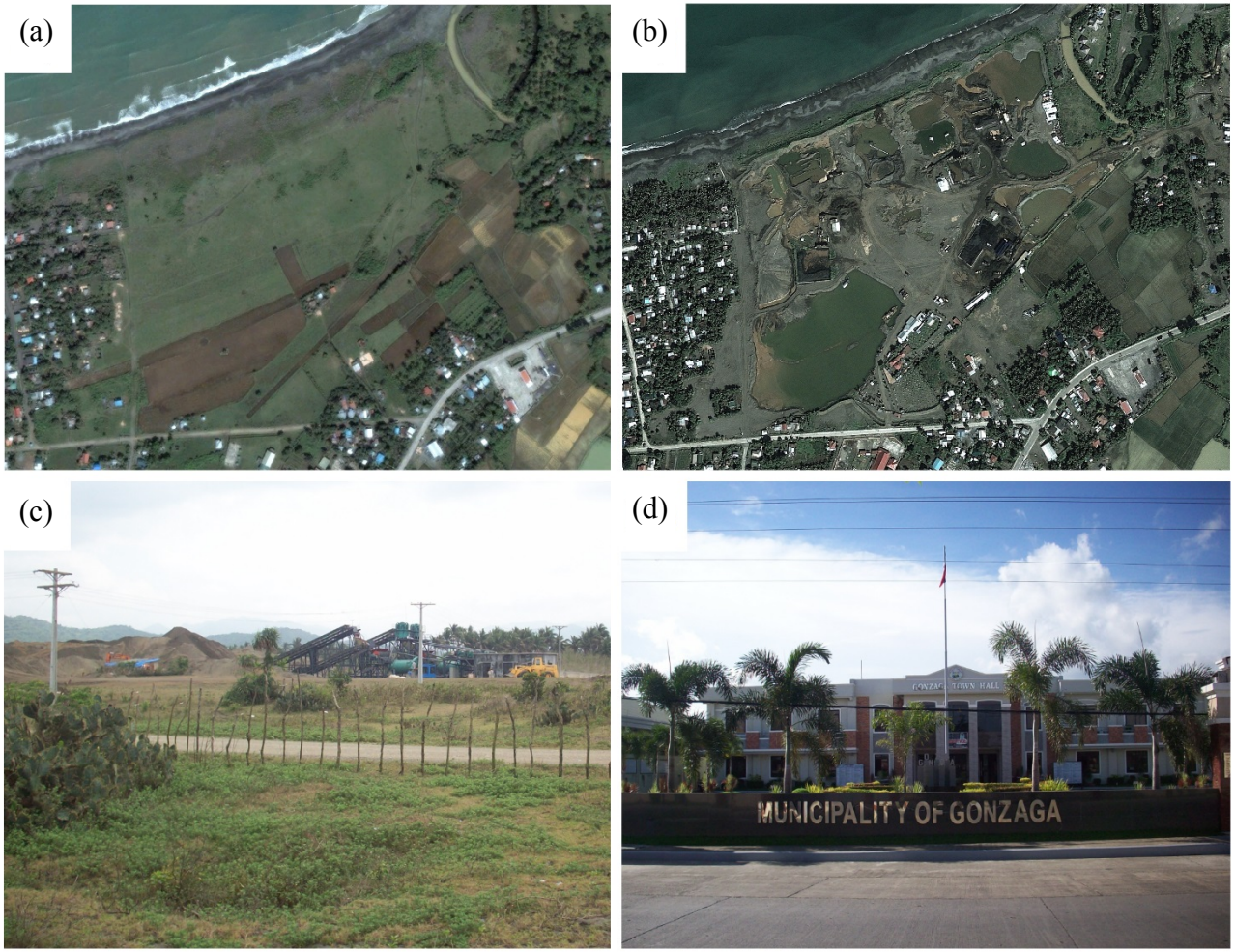

Figure 4.2 Black sand mining in Gonzaga, Cagayan. (a) Shoreline in Barangay Batangan prior to start of black sand mining operations. (b) Shorelie in Barangay Batangan during black sand mining operations. (c) Black sand mine site in Barangay Batangan. (d) Gonzaga municipal hall following mine-funded reconstruction. Source: Google Earth; author's photographs.

Many participants also expressed a sense of relative deprivation related to the perceived inequitable distribution of the observed costs and benefits of mining in Gonzaga. Opponents dismissed many of the projects funded by mining revenues as cosmetic and questioned why public moneys were applied toward the beautification of the town center, rather than investing in livelihood and infrastructure projects in remote barangays. Many also alleged that the mayor had enriched himself and his cronies at the expense of those farmers and fisherfolk whose property and incomes were negatively affected by mining. There is no doubt that, by the time of his killing, Pentecostes had become a wealthy man, constructing a massive new house in the Poblacion, purchasing several new private vehicles, and funding other extravagances that, in a community where many families lack safe drinking water and other necessities, were commented on derisively by interview participants.

Inequality was expressed spatially in the creation of landscapes of exclusion; early in Pentecostes' tenure, for example, a municipality-owned park on the Wangag River, which had long served as an open recreational site, was redeveloped using mining tax revenue as a luxury resort beyond the financial means of most residents to visit. The mines themselves, both at the Wangag River and at black sand deposits, also underwent landscaping processes of conspicuous militarization—barbed wire fences and guard houses were constructed around the sites, which were patrolled by armed guards imported from outside of the municipality (see Figure 4.3). Insomuch as "landscape and landscaping are an expression of power, of material and symbolic capital" (Gold & Revill 2000, 11), such developments express, through the transformation of social space, the exclusion of the poor, and the dissolution of informal community relationships.

The responses of activists to these grievances can be understood as an attempt to renegotiate scalar relations to challenge the rising hegemony of the pro-mining camp by framing the localized mining issue as one of municipality-wide importance. During the Wangag River quarry controversy, leaders of SAWAREM capitalized on the symbolic value of the river to organize resistance efforts involving disparate groups from throughout the municipality. One organizer explained:

> What we did from the beginning—so that the farmers could really appreciate what they were doing—is build *bahay kubo* [nepa huts] along the river. Each farmers' organization had its own kubo…They made a schedule to guard the river. So, they really learned to value and love the river. That's the main purpose. That's why we asked them to put their own kubo.

The activists eventually established a near permanent presence along the quarry's access road, which became lined with signage emblazoned with environmentalist slogans. The space would become the stage for several tense standoffs between SAWAREM activists and quarry personnel that, in turn, served to further unite the broader community in opposition to the project. The Wangag River, already materially important as a source of domestic and irrigation water, increasingly became a symbol of Gonzaganian identity and of resistance to exploitation of the municipality's resources by outsiders. By the time of its eventual abandonment, the quarry enjoyed negligible local support and, amid growing public outcry, was ultimately halted by orders issued by government agencies at multiple levels.

Figure 4.3 Wangag River quarry in Gonzaga, Cagayan. (a) Wangag River resort prior to redevelopment. (b) Wangag River resort following redevelopment. (c) Wangag River quarry site. (d) Signage and bahay kubo erected by SAWAREM activists at the Wangag River quarry. Source: Author's photographs.

The rescaling of power dynamics by opponents of black sand mining was far less successful. Despite efforts of activists to frame the magnetite mining issue as one of municipality-wide significance, opposition remained largely confined to the affected coastal barangays, where it was still far from universal, and among those in the Poblacion who owned land in affected areas. One informant, a government official, opined that "the difference was that the people experienced the product of the [black sand] mining operation, like the [remodeled] municipal hall and others. Many, many projects and programs were initiated, established, or constructed because of that, as a product of the mining. If there hadn't been those projects, maybe people would have shown their opposition."

The mayor's influence at the barangay level, through the distribution of patronage, coupled with his ability to exert political power at the municipal and provincial levels, also contributed to the organizational failure. According to several informants, barangay captains and council members were cajoled or bribed by the mayor into abandoning their support of activists, who over time became less willing to openly oppose the projects. Describing the effect of these developments on the anti-mining movement, a former environmental organizer stated, "Maybe some of the leaders lacked some charisma, or something like that, or dedication. I'm not blaming them, but I think they became less passionate because the barangay captains were being bribed by the mayor. He gave them everything. That's why the black sand mining was not much harder [to accomplish]."

With the supporters of mining holding political power following Pentecostes' election, allegations of threats, harassment, and intimidation of anti-mining activists also

proliferated. One informant claimed that "some companies operating in the municipality hired goons to intimidate those people. So, there was also the element of threat. Not only [against] those who were part of an organized group, but anyone who was against it." Others described protest marches being forcibly dispersed by police, frivolous lawsuits targeted at prominent activists, and other acts of retaliation against opponents. After her unsuccessful mayoral run, Perling Garcia's business permit was, according to several interview participants, revoked by the administration as punishment. Another activist leader, who was also a municipal employee at the time, was reportedly suspended from work by Pentecostes, repeatedly threatened with violence, and challenged personally by the mayor to a gun duel.

At the beginning of Pentecostes' second term, therefore, anti-mining activists faced a difficult path forward. Lacking a resonant collective action frame, mobilization within the broader community had stalled, in spite of mounting grievances within immediately affected areas; meanwhile, the apparatuses of political control having been effectively co-opted by supporters of mining, they found themselves the targets of both legal and physical attacks by the mayor's administration. Supporting Horowitz's (2009) contention that "a government's lack of political legitimacy can lead its citizens to look to another group for leadership in the face of a threat stemming from resource exploitation" (249), the atmosphere of corruption, intimidation, and violence that characterized Gonzaga in late 2013 presented the NPA with an opportunity to insinuate itself into the conflict.

4.3.3 Beyond the Material Conditions of Opportunity

The role of natural resources in creating opportunities for non-state actors has been of scholarly and public interest for several decades (Le Billon 2012). The archetypical example of "blood" diamonds represents only one narrow way in which rebel groups can leverage natural resources for their military or political advantage, however; as Le Billon (2012) writes, "a broader definition is that of the control, exploitation, trade, taxation, or protection of natural resources, which contributes to, or benefits from, the context of armed conflict" (27). The NPA, for instance, while not operating mines directly, does participate in the extractive value chain through the extortion of protection money from mining companies, as well as other businesses (Quimpo 2014; Holden & Jacobson 2007; Rodell 2004). It has been suggested, especially by supporters of black sand mining, that Pentecostes' nonpayment of the NPA's 'revolutionary taxes' lay behind the group's involvement in the controversy. As one municipal government employee explained, "When our former mayor was killed in front of our municipal hall, they claimed that the ones who did that were the people in the forest, the leftists. But, there were rumors also that they killed the mayor because he did not pay the progressive tax to them. But, according to the leaflets they left behind, it was because of mining." For their parts, the Philippine government and military have been skeptical of any but the most venal explanations of the NPA's motivations; officials have publicly decried the group as criminals and terrorists who have "lost their ideology because they shifted to banditry" (Major General Oscar Lactao, qtd. in Lagsa 2015).

Belying such assertions, however, most informants for this study held surprisingly nuanced views toward the NPA's principles and practices. Regarding the imposition of

revolutionary taxes, one informant explained, "You know, they [the NPA] are operating with a very limited budget. How can they operate without a budget? Who will have their back? How can they get food for their members? How can they get money for arms? They need money. So maybe they have two objectives—the real principles of protecting the poor and they also need a share to have a budget for their operations." Reconciling those two objectives is possible by expanding the concept of opportunity in civil war beyond the material conditions of natural resources, to include the opportunities presented in communities affected by controversial extractive industry for insurgent groups to downscale their political influence by developing alliances with local networks. Here, the concomitance of vulnerability, risk, and opportunity mechanisms can be most directly observed—it is the context of intense local grievances and institutional failings surrounding extractive industry that creates opportunities for non-state actor involvement.

Throughout the Philippines, the NPA forms alliances with local organizations and movements by providing specific services—namely, the provision of violent force. Rutten (2000), for instance, describes the development of alliances between the NPA and agricultural labor unions on the island of Masbate:

> Backed by the coercive powers of the NPA, and operating through local union networks, laborers of Milagros were successful in gaining from the planter wage increases and the free use of a small part of hacienda-land for subsistence agriculture. As some workers put it, 'the NPA will defend us when we have problems with the planter,' and 'without the NPA, we will lose our gains and the planter will become despotic again' (233).

Informants in Gonzaga described a similar relationship between activists and insurgents, with the NPA serving as occasional bodyguards for activist leaders,

threatening mining companies that operated illegally, and hearing complaints from community members who felt as though local and provincial officials were ignoring their grievances. As one informant related of a prominent environmental activist, "Pentecostes and his supporters sued him in court and he had to spend all his money. They wanted to kill him too, but the NPA protected him."

Although the development of alliances between local movements and national and transnational NGOs has been documented in many resistance movements to extractive industry elsewhere (Kirsch 2014; Kuecker 2007; Brown & Spielgel 2017; Horowitz 2012; Vela-Almeida 2018; Holden & Jacobson 2008), building and maintaining supralocal activist coalitions has proved challenging in the Philippines. Singh & Camba (2016) describe the functional weakness of the two most prominent national organizations—Alyansa Tigil Mina (ATM) and Kalikasan—stemming from those groups' ideologically diverse and spatially disparate memberships, concluding that "ATM and Kalikasan are, at best, networks of loose social groups and political movements bearing within themselves competing objectives, strategies and organizational interests" (63). The targeting of activists by the government at multiple levels has also exerted a toll on the ability of broader coalitions to maintain a unified front (Holden 2009, 2011). One activist in Gonzaga, the recipient of lawsuits and other forms of pressure by Pentecostes, explained that his was "a typical case in the Philippines. Whenever somebody will stand against the will of the person in power, they resort to filing a case against them to pressure them to stop them from joining or leading that particular group." In stark contrast to the activist networks, however, the NPA maintains a scalar structure with well-defined hierarchical roles and clear political

objectives rooted in Maoist principles. A modular command structure allows for some degree of autonomy for small units of fighters operating under the direction of local committees, which report, in turn, to front, district, provincial, and regional commands and thence to the CPP Central Committee. So-called 'armed propaganda units' and smaller, specialized 'sparrow units' have historically comprised the basic unit of organization in rural and urban areas, respectively, but major activities carried out by these units are directed and approved by a formal chain of command designed to mirror a state-based administration; notably, for instance, targets of NPA assassinations, including Pentecostes, are typically 'tried,' in absentia, in revolutionary peoples' courts composed of high-ranking members who operate within a formalized framework of procedures (Mediansky 1986, Human Rights Watch 2011).

The formation of alliances with the NPA may offer local activists the opportunity to take advantage of the organized scalar structure of the insurgents and their corresponding ability to project political power at multiple levels, through the targeted application of violence and the threat thereof (Holden 2009). Indeed, in the absence of coordinated activist movements or a united coalition of leftist parties, the CPP and the NPA have been successful at presenting themselves as an umbrella organization for resistance to neoliberalism in general (Caouette 2015) and the exploitation of natural resources in particular (Holden et al. 2011). From the perspective of anti-mining activists, an alliance with the NPA is a practical maneuver, necessitated by violence perpetrated against them by mining companies and their supporters; for its part, the NPA utilizes the relationship to ingratiate itself with community members, present itself as a legitimate and powerful protector of the poor, and disseminate a revolutionary narrative frame that

explains resource extraction in the context of the group's broader political agenda. In the words of one activist interviewed for this study, the NPA "wanted to show support, so they could also get support in return…because that [mining] is a social problem, so it is a very good chance to penetrate the masses." This sentiment closely echoes Kalyvas' (2000) observation that alliances in civil war involve "a process of convergence of interests via a transaction between supralocal and local actors, whereby the former supply the latter with external muscle, thus allowing them to win decisive advantage over local rivals; in exchange, supralocal actors are able to tap into local networks and generate mobilization" (383-384).

In Gonzaga, the framing process was enabled by the atmosphere of secrecy, misinformation, and mistrust that surrounded the mining projects, illustrated by the proliferation of rumors throughout the municipality on issues ranging from the environmental impacts of mining, to the involvement of Chinese businessmen in the illegal drug trade, to the identity and motivations of Pentecostes' assassins. Indeed, despite the NPA's claim of responsibility, some have speculated openly about the possibility of a conspiracy and cover-up (Catindig & Lagasca 2014). One alternative version of events holds that Pentecostes fell afoul of provincial level politicians, who contracted the killing. A source with personal relationships to the NPA claimed that the motivation for the assassination lay ultimately in a private dispute between Pentecostes and a high-ranking member of the insurgency. Although interview participants described the conflict over mining as a local one, involving familial connections and personal feuds, however, statements by the NPA present mining as part of a larger structure of domination by a corrupt government in league with "foreign plunderers" and "foreign

monopoly capitalists" (see Holden 2014; Tangi 2015). Through its emphasis on the role of transnational corporations and capital, the NPA discursively rescaled the black sand mining conflict both spatially, by relating it to the NPA's goal of reshaping national policies, and temporally, by linking the extraction of natural resources to historical legacies of colonialism. As the CPP itself has explained, "we expose to the masses the root causes of their problems, we show them who their real enemies are." (qtd. in Tangi 2015, 89).

The NPA presents the violence in which it engages as both justified as a response to the underlying causes of social ills and as evidence of the organization's continued relevance in Philippine society. A major aim of the insurgency is, as Mediansky (1986) observes, "to establish the authority of the NPA as the (often only) source of justice to the local people" (8). In taking responsibility for the assassination of Pentecostes, for example, an NPA spokesman stated, "this is a testament to everyone that no one is above revolutionary justice. No matter how near or far, or how easy or difficult, the Red court empowered by the people will punish the guilty" (qtd. in Visaya 2014). The expression of power inherent in the assassination was not lost on the community. A post on an anonymous Facebook page in support of Garcia's mayoral campaign, for instance, reads, in Tagalog, "*Nakakalunkot kailangan pang makiaalam ang mga NPA para lang masagip ang Sierra Madre laban sa mapanirang kasakiman at kuraptsyon habang walang magawa ang ating pamahalaan para mapatigil at maipatupad ang pangangalaga sa Cagayan laban sa black sand mining* [It is very sad that the NPA has to rescue the Sierra Madre from destructive greed and corruption while our government is helpless to protect Cagayan by stopping black sand mining]."

The close attention that the CPP and the NPA pay to their public image evinces their reliance on civilians, who provide the former with political support and the latter with donations of supplies and with information regarding activities of the Philippine military forces (while also withholding information about NPA activity from the government). Most importantly, the civilian population provides the pool from which new NPA cadets are recruited. In rural communities like Gonzaga, a lack of industry and the modernization of agriculture has created a growing class of young people with few local employment opportunities, with whom the explanations and proposed solutions of the rebels are most likely to resonate (Holden & Jacobson 2007). The NPA paints a picture in which the natural wealth of the Philippines has been plundered by "ruling class dynasties" and their "neocolonial" paymasters, where "the Filipino people are denied the right to make use of the country's mineral resources for domestic industrialization and manufacturing as these are extracted and taken away by foreign mining companies," and where "drawing inspiration from the anticolonial resistance of their forebearers, the Filipino people are determined to achieve national liberation or complete freedom to determine the country's destiny independent of U.S. imperialist dictates and toward socialism" (Ang Bayan 2017, 4) through violent revolution.

The remarkable longevity of the conflict between the NPA and the Philippine state, which has continued, at varying levels of intensity, for more than half a century, speaks not only to the ability of the former to consistently provide a meaningful and resonant narrative frame, but also to systemic institutional and governance failings on the part of the latter. Holden et al. (2011), Simbulan (2016), and others have identified the militarization of mining areas as a major contributor to the NPA's recruitment efforts

among indigenous populations in the Philippines, but the story does not end there. The broader context of corruption, inadequate public consultation, and silencing of opposition creates the conditions under which engagement with the violent collective action of the NPA becomes a rational and practical option; as one activist leader told me, “In fact, I heard that some of the people [involved in the anti-mining movement] even joined them. That’s how desperate they were before. They even joined the New People’s Army.”

4.4 Conclusions

By the summer of 2016, mining in Gonzaga appeared to have all but ceased, to the delight of anti-mining activists. Those interviewed for this study also expressed optimism that the election of Rodrigo Duterte as president of the Philippines would bring about permanent reforms in the mining industry and a possible end to hostilities with the NPA. Especially praised was the appointment of environmental advocate Regina Lopez as DENR secretary, who, by March 2017, had ordered the closure or suspension of 28 mining operations across the country (Gamil 2017). Following pushback from industry, however, Lopez was removed from her post later that year and many of her initial efforts to reform the mining sector have since been rolled back (Dela Cruz 2017); meanwhile, a 2016 ceasefire with the NPA, underpinned by, among other areas of agreement, similar attitudes toward extractive industry, ultimately failed and active hostilities resumed (Romero 2017). Unfortunately, there appears to be little incentive for either of the belligerents in what Holden (2013) calls the “never-ending war” between the NPA and the Philippine state to seek a lasting peaceful solution; for the latter, the conflict provides a ready-made justification for the militarization of mines and the targeting of activists, while the former benefits from its implied association with environmentalists and

people's organizations, which bolsters its image as the defender of the poor and facilitates the formation of alliances with local networks (Holden 2009, 2011, 2014).

As Kalyvas (2000) writes, "it is the convergence of local motives and supralocal imperatives that endow civil war with its particular character and leads to joint violence that straddles the divide between the political and the private, the collective and the individual" (487); the results of this study suggest that natural resources provide a space in which such interactions between the personal and the political occur. Characterized by overlapping, competing, and interrelating political, economic, sociocultural, and biophysical scales, sites of resource extraction are important nodes of scalar renegotiation (Allen 2017), where "actors, organizations and movements 'jump,' 'bend,' and 'reconfigure' scales to undermine and challenge existing arrangements and power relations" (Hoogestegar & Verzijl 2015, 15). From the perspective of grassroots activists, extractive enclaves become grounded manifestations of an exploitative neoliberal economic system; for states and non-state belligerents, they offer a means by which to extract value from that system through tax payments, partnerships, or extortive arrangements; and, for politically savvy actors that, like the NPA, rely on maintaining alliances with civilian networks, they present opportunities to promulgate narratives that incorporate local grievances into a 'master' cleavage justifying mobilization. It is increasingly recognized that, in addition to the material conditions of natural resources, "the pattern of social relations as well as the quality and democracy or legitimacy of institutions determine the risk of conflict and deployment of violence" (Le Billon 2001b, 568) in extractive processes. This study highlights the additional importance of those factors for facilitating the discursive framing of resource governance issues and the

rescaling of localized resource-related conflicts, leading potentially to the prolongation and intensification of civil war; in the words of one informant, “The NPA, what they want is that many people will be against mining, so they can get their sympathy. That’s how they survive. It’s so that people will come to see the NPA as good. So that people will get on their side. So that people will see that they are good for the people. So that they will continue to exist.”

5. Toward a Political Ecology of Scale in Natural Resource Conflicts

The preceding three chapters have examined the multifaceted relationship between natural resources and civil conflict at the cross-country, subnational, and local analytical scales, respectively, using quantitative and qualitative methods typically applied at each scale. As anticipated, the conclusions that can be drawn from the three studies regarding the validity of the vulnerability, risk, and opportunity mechanisms, as delineated by Le Billon (2012) are quite distinct. Whereas the cross-country analysis presented in Chapter 2 supports a conflict vulnerability mechanism, whereby resource dependence undermines state capacity and democracy through a resource curse effect, the subnational analysis in Chapter 3 suggests that resource extraction increases conflict risk through an intermediate effect on inequality. The local case study of Chapter 4, meanwhile, concludes that, although both the vulnerability and risk mechanisms played a role in the black sand mining conflict in Gonzaga, the involvement of the NPA is most convincingly explained by an expanded understanding of the opportunity mechanism, in which the opportunities created by resource extraction for the development of alliances between non-state actors and civilian networks is explicitly considered. Were these analyses conducted in isolation, very different understandings of the resource-conflict nexus would be supported; the use of a multi-scalar and mixed methods approach, however, allows these differences to become the object of reflective interrogation.

Based on a comparison of the results of the three analyses presented above, this chapter sets forth a political ecology of scale for interpreting the resource-conflict nexus.

Following Sayre (2005), I first discuss the epistemological and methodological implications of the results as they pertain to the scale at which empirical analyses are conducted. I then interrogate the ontological status of scale in natural resource conflicts, emphasizing the recursive production and reproduction of intersecting scales of resource extraction, governance, and resistance. Building upon the conclusions of Chapter 4, this analysis is then extended to argue for a reconceptualization of extractive enclaves as nodes of overlapping scalar configurations of political, economic, cultural, and ecological processes at which state and non-state actors renegotiate their relational positions in order to further their objectives. Some implications of this view for assessing the effectiveness of policy interventions and for potential future research initiatives are also discussed.

5.1 The Epistemological Moment of Scale

The first broad set of conclusions that can be drawn from a comparison of the results in the preceding chapters involves the apparently disparate interpretations regarding the relationship between natural resources and civil conflict that has been drawn from the quantitative literature on the one hand and qualitative research on the other. It engages, therefore, with what Sayre (2005) terms the 'epistemological moment' of scale, which is concerned with the observer, rather than the observed. As Sayre explains:

> Scale is an attribute of how one observes something rather than of the thing observed. Cartographic scale is an instance of this, and the point is still more clear on the temporal axis: a study conducted at one point in time cannot yield robust information about processes of long duration or low frequency. Methodologically, then, the emphasis shifts to the spatial and temporal scale of scientific observation, rather than the sheer size or duration of what is

> observed. Scale is inherent in observation (both scientific and otherwise), and the scientific observer must consciously choose a scale (or scales) suited to his or her question, in full recognition of the methodological and epistemological significance of the decision (281).

The multi-scalar analysis adopted in this dissertation offers an opportunity to explore this epistemological significance in the context of natural resources and conflict. The three analyses presented above represent different solutions to the inevitable trade-off between, to adopt Sayre's terms, grain and extent, where the former refers to the level of aggregation of data to a particular resolution and the latter to the spatial and temporal coverage of the analysis. Whereas the cross-country analysis of Chapter 2 maximizes extent at the expense of grain by aggregating conflict and socioeconomic data to the scale of the state, the case study in Chapter 4 maximizes grain but is limited in extent. These choices do appear to influence the apparent validity of the vulnerability, risk, and opportunity mechanisms, a finding from which some potentially provocative inferences can be drawn regarding the respective operative scales of the vulnerability, risk, and opportunity mechanisms. I propose that, although all three mechanisms play a role in explaining the relationship between natural resources and civil conflict, each exhibits a 'natural' scale at which it can be most clearly observed.

In the case of vulnerability, the spatial scale of the natural resource curse effect appears to correspond most closely to that of the state. This is supported by the strong evidence presented in Chapter 2 of a causal chain linking resource dependence in the petroleum sector to decreased democracy and lower institutional quality and, thence, to the incidence of conflict events across countries. This finding is broadly consistent with numerous cross-country studies using alternative model specifications, measures of

conflict, and time periods. By contrast, the analysis of Chapter 3, while concluding that subnational variation in state capacity does partially explain the use of violence by the NPA, finds no evidence of a resource curse effect undermining state capacity. I submit that these divergent findings stem from the preeminence of the state as the central organizational entity through which the resource curse is manifest.

The scalar properties of the vulnerability mechanism emerge from the tendency of natural resource governance regimes to be highly centralized by states, including in terms of regulating the entry of foreign firms, the collection and allocation of resource rents, and environmental and socioeconomic impact assessment and mitigation processes. It may also reflect the role of states as containers of institutional culture that pervades government at all levels. In the Philippines, for example, a widespread culture of corruption in the public sector has been widely commented upon by critics of the state and by academic observers (Bello et al. 2005; Broad & Cavanagh 1993). In conducting the local case study discussed in Chapter 4, I was struck by the fact that, although informants universally identified bribery and abuses of power in the permitting and regulation of mines, they were also quick to assure me that, concerning the issue of corruption specifically, the local experience was not unique, but rather emblematic of the broader Philippine political economy. Interview participants described local politicians' use of power to intimidate anti-mining activists as "typical" for the country, the bribery of public officials as "how it works," and the nonenforcement of environmental laws as "Filipino style." Table 5.1 provides a sample of some such responses, categorized by the theme to which the quotes refer.

Table 5.1 Descriptions of institutional failure in Gonzaga, Cagayan

Theme	Response
Abuse of power	"It is a typical case in the Philippines. Whenever somebody will stand against the will of the person in power, the will resort to filing a case against them to pressure them."
	"As usual, unfortunately, in the Philippines, there's no real enforcement. If the people at high levels jump the system, then the people at the low levels are going to jump the system too."
	"You know, the politicians are controlling everything here in the Philippines."
	"It's not just the mayor. It goes all the way up to the national level."
Bribery of officials	"That is how it works here in the Philippines."
	"They can influence all the agencies in the Philippines."
	"Here in the Philippines, there is a price for everything."
	"Even if it's illegal, if there's money involved, in the Philippines, you can do it."
	"Most government agencies in the Philippines, if not all of them, are really geared up for revenue, not for service."
	"If it involves large sums of money, people are thinking there is illegal corruption going on. From the lowest level to the national level, Filipinos are good at that."
Failure of EIA system	"As usual, unfortunately, in the Philippines, there's no real enforcement [of EIA processes]."
	"Most government agencies in the Philippines, if not all of them, are really geared up for revenue, not for service."
	"Because of 'Filipino style,' they will skip the [EIA process]"

I believe there is also a strong case to be made that the scale of conflict opportunity is much more localized relative to that of conflict vulnerability, affecting the contours of violence within active conflict zones or between individual communities. Little evidence for an opportunity mechanism was observed in either the cross-country analysis in Chapter 2 or the subnational analysis in Chapter 3; however, using the expanded definition of opportunity explained in Chapter 4 revealed this mechanism to have been instrumental in explaining militant involvement in a local dispute over resource extraction. Compared with vulnerability, opportunity in civil conflict varies widely by context and may involve different sectors of resources, or different aspect of the commodity chain, under different circumstances. Armed insurgents exhibit remarkable flexibility and ingenuity in identifying and utilizing potential sources of income, whether these be alluvial diamonds (Angola, Sierra Leone, Congo), stolen oil (Nigeria), rare earth minerals (Congo), timber (Cambodia, the Philippines), narcotics (Colombia, Afghanistan), trafficked antiquities (Syria), extortions of legal and illegal businesses (the Philippines, Colombia), kidnappings for ransom (Colombia, Nigeria), or funds raised from state and non-state supporters abroad (the Philippines, Ireland, Syria). Even during the course of a single conflict, militants may shift the focus of their fundraising activities as circumstances change, as the NPA in the Philippines did following the loss of external support from the Chinese Communist Party in the 1960s. Although the evidence is clear that non-state actors do exploit natural resources directly and indirectly for financial gain, and that resources can and do affect the course of civil conflicts, it is unlikely that the mere availability of exploitable resources is sufficient to explain the outbreak of hostilities. Rather, access to resources, or to the extractive

industry commodity chain broadly defined, seems to shape the contours of violence locally, explaining, in part, why militants choose to utilize violence at particular sites and times. It is not the broad oil, timber, or mineral economy, therefore, that creates opportunity, but the specific well, forest, or mine.

The scale of conflict risk can be placed conceptually somewhere between those of vulnerability and opportunity. Comparison of the results of Chapter 2 and Chapter 3 suggest that the motivational linkages between resources and conflict better explain subnational variation in the use of violence than differences in the occurrence of conflict across countries. Although inequality was a significant predictor of conflict at both of those analyses, evidence of a complete causal chain was observed only at the subnational level, where, at least in the case of the NPA rebellion in the Philippines, it appears to be mediated by an effect of resource extraction on relative deprivation and environmental scarcity. That a similar effect was not observed between countries may stem from the strong intervening effect of the state on the extent of inter-group inequality. States with high quality institutions are capable, it appears, of redistributing resource rents in such a way as to not exacerbate inequalities, while those with low capacity or poor institutional quality do the opposite. Thus, the dominant linkage between natural resources and inequality at the state scale is by way of a resource curse effect; at a given level of state capacity, however, a direct causal effect of resources on inequality becomes observable.

The scalability of social inequality as a driver of conflict is also an important consideration. As discussed in Chapter 3, inequality in the distribution of costs and benefits of black sand mining in Gonzaga was identified as a major contributor to the social grievances that, in the perception of interview participants, drove the escalation of

the conflict. Participants discussed inequality in terms of differences between individuals, families, or, in some cases, between barangays or neighborhoods—such as the grievances related to the allocation of tax revenue from mining in coastal areas to the beautification of the Poblacion. In the subnational study, inter-barangay inequality was instrumented, in the absence of feasible measures of individual inequality, as an explanatory variable mediating the relationship between mining and the application of NPA violence, and was found to have significant predictive power. At the interstate scale, while vertical inequality does not appear to contribute to the incidence or severity of civil conflict, there is mounting evidence, including the results presented in Chapter 2, that inequality contributes to conflict when it corresponds with pre-existing social cleavages, although the effect of resource extraction on horizontal inequality is unobservable at that scale. This explains the consuming objective of the NPA to reframe experiences of relative deprivation along the lines of class-based struggle at a national or international scale, a concern that is shared by non-state actors in conflicts throughout history and around the world.

The picture that emerges, then, is one in which the vulnerability, risk, and opportunity mechanisms operate simultaneously and interconnectedly at distinct, but overlapping and intersecting scales. The resource curse effect shapes conflict vulnerability at the state level, contributing, alongside other socioeconomic factors, to cross-country patterns in the occurrence and intensity of civil war. Within countries affected by conflict, broad patterns of violence are explained, in part, by the regional implications of extractive industry on the experience of relative deprivation between affiliated groups. And, at the highest resolution, individual acts of violence within

broader conflicts are largely a function of opportunity, including opportunities to exploit natural resources for financial gain or to garner civilian support by developing alliances in aggrieved communities.

These scalar patterns may explain not only the differences in results presented in the preceding chapters, but also the broader disciplinal disparities noted at the outset of this dissertation. Cross-country economic studies of the relationship between natural resources and civil conflict tend not to support grievance-based theories not because grievances are an unimportant component of the relationship, but because the analytical scale at which they are conducted aligns with the vulnerability scale. Similarly, local case studies tend to overlook vulnerability effects because the scale at which they are conducted correspond most closely with the scales of conflict risk and opportunity. Failing to take into account the scalar properties of the mechanisms linking resources and conflict can thus lead to misleading and potentially contradictory conclusions. Research that makes an effort to explicitly acknowledge the role of scale may help explain and address these gaps in the existing literature.

5.2 The Ontological Moment of Scale

The second moment of scale, the ontological moment, presents a thornier challenge than does its epistemological counterpart. Here, the emphasis is not on matching the scales of analysis to 'natural' scales of phenomena, but on interrogating and mapping the processes of scale production itself. With very few exceptions—Taylor (1981) and (according to some critics) Marston et al. (2005) among them—scale theorists explicitly recognize that scales are not naturally occurring or deterministically shaped by economic practice. Even at the height of the debate between Marxist materialists and

Kantian idealists referenced in Chapter 1, it remained nearly universally acknowledged that scales of human activity and organization are socially constructed. What was at issue, rather, was how to treat scale empirically, given its cultural, socio-economic, and political conditionality.

In recent years, a general consensus has emerged in the geographical literature, whereby scales are conceptualized as existing in a recursive relationship with the processes they describe; in much the same way as, in the political ecology framework, human action simultaneously shapes and is shaped by the physical environment, human actors both create and are constrained by scalar discourses. They understand themselves to be existing and operating within a scaled environment, and this understanding guides their behavior. The most obvious example of this is the imposition of scalar hierarchies by states as part of the organization of their territories into, for example, to take the case of the Philippines, provinces, municipalities, and barangays. The discursive deployment of scale is not limited, however, to states. As Moore (2008) writes:

> While state classification practices are important, 'lay' actors also play a significant role in sociospatial categorization, frequently subverting or altering official classifications for their own purposes. They utilize narratives to 'interiorize' and 'exteriorize' sociospatial relations and emplot themselves in particular scalar configurations…Narratives, then, are not merely representational forms. They 'place' people and occurrences in space and time, thereby giving spatial and temporal meaning to events and relations (215).

In other words, as I proposed in Chapter 1, scale has meaning because people believe it does and act accordingly; importantly, however, actors also recognize the social constructiveness of scale and seek not only to utilize scalar configurations for their own

ends, but also to reconfigure those arrangements incrementally or paradigmatically to achieve political objectives. Thus, as discussed in Chapter 4, activists in Gonzaga sought first to seek redress of grievances through the hierarchical and formalized apparatus of the state and through the attempted organization at vertically 'higher' levels; only when those efforts failed did they begin to adopt the alternative scaling produced and promulgated by the NPA.

The local case study also supports the conclusions of Moore (2008), Allen (2017), and others that the use of scalar politics is the exclusive domain of neither states nor of other powerful political entities, but are, rather, "deployed strategically by a range of actors in political power struggles" (Allen 2017, 84). As Hoogestegar & Verzijl (2015) observe, "political projects of dominant groups, as well as the strategies of grassroots organizations that aim to challenge or transform the outcomes of these projects have scalar practices that are embedded and sustained in particularly scaled legal, institutional and political contexts and power relations" (15). In this section, I discuss three major scales that shape the political context in which resource-related civil conflict arises and show how their intersection creates spaces where scalar discourses can be deployed and contested.

The first set of scales that is relevant to natural resource conflict comprises scales of extraction. The economic entities involved in extractive industry are organized into explicitly hierarchical units of parent companies and subsidiaries; regional, national, and local offices; and 'levels' of management along which power is intended to flow vertically. Nevertheless, horizontal networks of partnering companies, competitors,

customers, and suppliers are also essential in the global economy. Thus, scales of extraction are hybrid networks comprising both vertical and horizontal relationships.

Scales of extraction are strongly influenced, though not determined, by the material conditions of natural resources and global economic conditions, with important implications for the political economy of civil conflict. Le Billon (2008, 2012) describes the classic distinction between alluvial and primary, or kimberlite, diamond deposits, such that the latter requires larger and deeper mines with significantly more expansive spatial footprints than do the latter. As a result, whereas alluvial diamonds can be extracted by individual miners or small syndicates, primary deposits involve large corporations with substantial capital resources and support from the state. The spatiality of extractive industry goes well beyond the site of extraction, however, as the case of petroleum most clearly demonstrates. Although the ecological footprint of an individual oil well is spatially small, the functional size of petroleum extraction is much broader; in order to be economically viable, an integrated petroleum economy requires massive transportation and processing infrastructure, including pipelines, railroads, specialized ports, and refineries. These capital investments incentivize and require large levels of state involvement in the petroleum industry, with potentially major implications for the manifestation of the resource curse in that sector.

At the opposite extreme, extraction of alluvial diamonds does not require large capital investments or economies of scale for profitability. The functional size of the diamond industry at the point of extraction is spatially limited, potentially resulting in highly localized impacts, but affecting little change to national or regional economies. The extractive scale for this industry most closely corresponds to the scales of conflict

opportunity and may partially explain heterogeneity in non-state behavior conditioned upon a given level of vulnerability and risk.

The extraction of other mineral resources, including primary gemstone deposits, precious and non-precious metals, and stone, occupy scales between the two boundaries represented by petroleum and secondary diamonds; some, including, for example, the largest copper and aluminum mining operations, as well as large kimberlite diamond deposits, have functional footprints large enough to overlap with scales of vulnerability, while others, such as alluvial gold mining, may intersect primarily with scales of risk or of opportunity. This may explain the findings in Chapter 3 that unpermitted mining operations in the Philippines are associated with NPA violence, while permitted operations are not. A possible interpretation is that large extraction projects in the Philippines intersect with scales of vulnerability and affect conflict through a national-level resource curse effect, while smaller, unpermitted mines correspond to scales of risk, and therefore can be observed as contributing to subnational heterogeneity in civil violence. The extractive scale of timber resources, similarly, would be expected to intersect scales of risk and opportunity rather than the of vulnerability. Although the material footprints of timber concessions are spatially large, often encompassing thousands of hectares, the physical and economic infrastructure associated with timber is relatively small. Thus, the potential for a resource curse effect related to timber is limited, particularly at the national level. But, conflict risk and conflict opportunity effects related to timber extraction are very plausible and subnational analyses of timber's contribution to the use of violence in civil war are likely to find evidence of such a relationship.

The second set of scales relevant to the political ecology of resource conflicts are scales of governance and regulation. The trade of natural resources is generally governed at multiple scales through a variety of mechanisms, overlapping at key points with scales of extraction. Like economic processes, regulatory structures "are deeply related to scales, through both hierarchical relations between scales—'(inter)national' regulation of 'localised' processes—and the regulatory specificities of various scales" (Le Billon 2007: 203). The most important of these scales, and undoubtedly the most intensively interrogated, is the scale of the nation-state, and it is well established that the production of the national scale is strongly influenced by the geographic distribution of natural resources and the extractive scales that emerge through their exploitation (Smith 1981; Herod 2010). The clearest examples of this can be seen in the former colonial empires, where borders were drawn to facilitate control and extraction of resources. Subnational administrative units reflect not only the influence of history but also the intentional production of scalar hierarchies by the state. The relationship between extractive scales and governance scales is far from unidirectional, however; as the unique power of the state over access to natural resources within its borders simultaneously shapes the scalar configurations of extractive industry. In addition to controlling access directly, states may also coerce international companies to engage local affiliates, work through local intermediaries, or to partner directly with the state itself; especially in the case of petroleum, many states own or control extractive industry outright. To facilitate such interactions with state-level bureaucracies, therefore, many of the largest transnational corporations thus adopt hierarchical scale structures that intentionally model the state's.

Of increasing interest over the past several decades have been the potential for and design of supranational governance structures to regulate global trade in natural resources. These may take the form of voluntary certifications programs, such as the Forest Stewardship Council's sustainable timber harvesting accreditation, the Kimberly Process for the certification of diamonds, and Fair Trade labelling for agricultural commodities, which have all been cited as models for a self-governing international extractive industry, overseen by global civil society. An alternative approach would leverage trading rules implemented through the World Trade Organization or bilateral and multilateral trade deals to establish enforceable rules for the extraction and trade in natural resources. Lacking the coercive powers of the state, however, such mechanisms are fundamentally weak relative to both states and, arguably, the transnational corporations they seek to regulate.

Serious problems may arise where scales of governance are misaligned with scales of resource use. For example, Zimmerer (2000b) describes the mismatch between the scale at which environmental conditions in Latin America generate irrigation water and the scale at which irrigation systems are organized and regulated as a major cause of social conflict. Allen (2017) discusses how grievances related to mining in Melanesia went unaddressed as a result of a vertical separation of affected communities from the decision-making processes of resource governance. This closely resembles the conflict over mining in Gonzaga presented in Chapter 4, where activists, having failed to obtain redress through the hierarchical regulatory scale, ultimately formed alliances with non-state actors to achieve their goals. Elsewhere, where the spatiality of state monopoly over access to resources does not correspond to their distribution, non-state actors face

opportunities to fill and profit from the role of a mediating entity between extractive industry and the global economy, as exemplified by the control of the narcotics industries in Colombia and Afghanistan by militant non-state actors operating in remote regions beyond the reach of the national government.

A third broad category of scales implicated in conflicts involving natural resources comprises those at which resistance movements operate. These scales are produced, often explicitly, during the process of mobilization, which requires the deployment of inherently scaled narratives and frames, as well as in the process of forming alliances between networks. Because oppositional collective action requires the careful articulation of that which is being contested, including its spatial and temporal scalar characteristics, scales of resistance often form in antithesis to scales of extraction and governance. To quote Moore (2008) again:

> Framing processes, like narratives, provide meaning to events and relations, and in doing so function to both organize experience and guide action. More specifically, 'collective action frames' mobilize support for action by identifying grievances and assigning blame, presenting alternative solutions and strategies, and articulating rationales for ameliorative collective action…framing the spatial and temporal context is central the ultimate success of any political project. (218).

Just as the scales of extraction and governance are shaped, in part, by the geographical distribution of natural resources, scales of resistance are shaped by the distribution of socioeconomic and environmental impacts—including both positive and negative effects—of natural resource extraction. The specific distribution of impacts can create the conditions for strange bedfellows. In the early 2010s, I worked as part of a

team preparing an Environmental Impact Statement for the now-defunct Tongue River Railroad, which would have transported coal from the Powder River Basin in southeastern Montana to markets throughout the U.S. Among the opponents to that project was a coalition of Native American tribes, ranchers, and environmentalists—organizations not typically known for their mutual amicability—united by a shared sense of concern about potential impacts to the environment at multiple scales. The Bougainville rebellion in Papua New Guinea similarly involved a convergence of interests across traditionally rival tribal groups opposed to minerals mining (Filer 1990).

The most effective mobilization efforts, however, are those that coalesce around established shared identities (Kuhn 2018; Stewart 2008; Wegenast & Basedau 2014; Koubi & Böhmelt 2014). One of the most recent examples in the U.S. is provided by the case of the Keystone Pipeline, in which members of the several Lakota tribes garnered support from Native American and other indigenous groups by appealing to a shared cultural heritage and historical legacy of disenfranchisement, leading, ultimately, to some of the largest and broadest-based environmental demonstrations in the U.S. in recent years. Aspinall's (2007) examination of the Acehnese independence movement concludes that grievances related to the inequitable allocation of natural gas rents were framed by political leaders to align with a sense of shared ethnic identity in order to facilitate collective action. Likewise, in a 2016 paper, my coauthor Matthew Kuniholm and I present empirical evidence, based on a series of spatial autoregressive probit models, that communities that were disproportionally targeted by the national government during the Guatemalan Civil War were more likely to mobilize in opposition to mining projects, an

effect that appears to have been amplified in those where the distinct Mayan identity was predominant (Wayland & Kuniholm 2016; see also Baird & Le Billon 2012).

As discussed in Chapter 4, in the same way that the scalar configurations of extraction can provide militant non-state actors with opportunities to reposition themselves to take advantage of flows of global capital, so too do the scalar configurations of resistance create opportunities for such actors to form alliances with local networks. This development of alliances between militants and civilian networks is an essential, if often overlooked, component of civil conflict (Barter 2014). As Sorens (2011) notes, while states can generally have sustainable sources of support on which to depend, "rebel movements typically have to rely on voluntary compliance or 'passive coercion' from the population" (573). Similarly, Kalyvas (2000) writes that:

> There is a tendency to see violence as being externally imposed on unsuspecting and, therefore, innocent civilians—a perspective reinforced by the discourse of human rights and echoed in instrumentalist theories of ethnic conflict according to which individuals are perpetually manipulated by politicians…However, individuals cannot be treated simply as passive, manipulated, or invisible actors; instead, they often manipulate central actors into helping them fight their own conflicts. (390).

From the perspective of non-state actors, therefore, opportunity in civil conflict is not defined as access to financing; potentially even more important to the revolutionary project are opportunities for accessing civilian networks to promulgate political narratives, mobilize public support, and recruit members. The production of scale is critical to this effort and seeking and capitalizing on such opportunities should, accordingly, be viewed as a principal component of non-state actor behavior.

5.3 Extractive Industry as a 'Natural Habitat' of Scalar Reconfiguration

Although the renegotiation of scalar configurations of power is a perpetual exercise, as actors seek, through "processes of scalar struggle to reconfigure power in their own interest" (Green 2016, 95), paradigmatic realignments are observed only periodically; because wholesale rescaling is not uncostly, social actors having, to greater or lesser extents, some degree of investment in any extant frame of reality, such shifts are most likely to occur in response to a crisis point or other stimuli. The primary argument with which I wish to close this chapter is that the exploitation of natural resources provides just such a stimulus, by engendering spaces where upscaling and downscaling of political and economic power occur. Although the role of mines and other sites of natural resource extraction as contested spaces of human-environment interactions has been widely discussed, the importance of these places as nodes of intersecting relational scalar configurations remains insufficiently articulated.

The starting point for this argument is Harvey's observation that a fundamental discontinuity exists between the operative scales of accumulative and political processes, one which is amplified by the increasingly ephemeral nature of global capital. As Harvey (2006) writes, "The capitalist operates more in continuous (relative and relational) space and time whereas the politician is more grounded in an absolute territorial space. On the other hand, capitalist firms come and go, shift locations, merge or go out of business, but states are long-lived entities confined within fixed territorial boundaries" (107). The geographic flexibility of corporations is an important source of power for transnational private industry relative to states and territorially-based non-state actors, as it allows capital to seek out regulatory environments best suited to its purposes. The bargaining

position of transnational corporations is dramatically different, however, in the context of extractive industry. Harvey's (1981) concept of 'spatial fixes' as physical locations in which global capital becomes grounded is starkly manifest in the case of extractive industry, as Allen (2016), observes. Here, the physical extraction of raw materials necessitates interaction with geological and biophysical processes with distinct scalar properties. Ultimately, in short, natural resources must be sought where they occur naturally.

The material conditions of resources also, as discussed above, shape the scales of accumulation, by necessitating a certain spatial extent of extraction, transportation, and processing infrastructure. This is not to say that those scales are deterministic. Economic demand for resources is, to greater or lesser degree, socially constructed. At the extreme, diamonds are often cited as an example of a resource whose value has been shaped not by physical scarcity or by intrinsic demand, but by a cultural context of consumption in the developed world in which the gemstone has become a symbol of romantic love, and by the economic dominance of monopolistic producers. In all but a few edge cases, however, of which diamonds may be an example, biophysical and geological realities do impose meaningful limits on the mailability of most commodity chains. It is difficult to imagine, for example, an advanced economy that did not require a supply of ferrous metals for the purposes of heavy construction. Oil, similarly, has an economic importance that, although amplified by factors like 'car culture,' can be traced to its chemical properties.

This groundedness of extractive industry creates opportunities for other actors engage with global resource commodity chains. Governments at multiple levels do so regularly, either formally, by imposing taxes and revenue sharing agreements, or

informally through accepting bribes. Under conditions of state weakness, insurgent groups find opportunities to extract value through theft of resources or extortion of mining and logging companies; at the extreme, some rebel groups exert sufficient control over resource-rich territories to act as a de facto state and to tax or otherwise control resource production directly. Simultaneously, discontinuities between scales of extraction and of regulation create or foster grievances related to unaddressed environmental and socioeconomic impacts. Even where direct adverse impacts are minor or negligible, mines and other sites of resource extraction can become symbols of broader patterns of oppression, exploitation, or structural violence around which political leaders mobilize collective action. As Le Billon (2012) writes:

> Typically, resource conflicts are articulated through 'scale-specific' actors and issues, for example local communities versus national governments and international corporations, and price differentials between farm-gate and international market prices. Although all actors and issues are both 'local' and 'global,' some are more 'global' than others, with related hierarchical processes of domination and resistance constituting an additional 'layer' in often pre-existing conflicts. In the case of 'conflict commodities,' the prolongation of conflict is also facilitated by the disconnection between local violences and global markets, with the knowledge of violence-tainted commodities having been (voluntarily) limited to particular 'circles' of industry experts whose knowledge may be 'global' but whose interests are often far from 'universalistic' (202)

Extractive enclaves thus become nodes in which scales of extraction, governance, and resistance overlap and interact. Figure 5.1 illustrates this scalar convergence in the case of small-scale mining in the Philippines. In that schematic, most of the levels are populated by formal and informal relationships that extend vertically and horizontally

within scales. Several key points of horizontal interaction between scales also exist, such as between transnational mining corporations and the national Philippine government. In the absence of a well-organized anti-mining movement in the Philippines, there is little direct interaction between the numerous community-based people's organizations and a global civil society; the scales of resistance corresponding to the provincial and national levels are, therefore, dominated by the hierarchical scales of the NPA, organized into front, district, provincial, and regional commands.

Activists in Gonzaga found themselves unable to effectuate change not because vertically 'lower' scales are inherently less important or influential, but because the specific configuration of inter-scalar relationships facilitates interaction between scales only at particular levels, among which the 'local' is not included. It is possible to imagine any number of alternative configurations in which grassroots people's organizations are empowered to directly engage with the scales of extraction; this, indeed is the purpose of informed consent provisions of the EIA process. As discussed in Chapter 4, however, these provisions were subverted by a rescaling of the governance process by the Pentecostes administration, through the application of bribes and patronage, leaving 'local' activists with little opportunity to seek redress of their grievances directly.

For its part, the NPA is largely preoccupied not with producing scales to interact with national or provincial government, but with developing and maintaining alliances at local levels. Interaction with grassroots civilian networks constitutes the major project for the insurgent group, as it is from civilians that the NPA garners political and material support. The NPA relies on civilians to provide the NPA information regarding the activities of government actors and withhold information from the government regarding

NPA activities, both of which are essential to the NPA's use of targeted political violence. It is through civilian networks that the NPA gains access to potential recruits and supplies of funds, food, and arms. Thus, it was the concomitance of a need of the part of activists to access regulatory scales at 'higher' levels and of the NPA to access civilian networks 'on the ground' that created the conditions for interactions between these groups and the resulting resource conflict. Although other conflicts involve different scalar configurations that become similarly challenged by state and non-state actors, I propose that the spatiotemporal convergence of scales within extractive economies is a constant across the cases that helps explain the correlation between natural resources and violence.

As Le Billon (2007) writes, "Arguably, the production of scale is itself part of the production of violence, as it is precisely the (dis)connections between scales that participate in engendering or prolonging conflicts" (202). By this, he means that the distances—spatially, temporally, and conceptually—between the scales of extraction, governance, and resistance are implicated in creating spaces for violent action to occur. The inverse, I propose, is equally true, insomuch as the use of violence in civil conflict is itself a form of scale-making whereby, through the targeted application of force, state and non-state actors attempt to project power at different levels, thus rescaling resource-related processes; in Smith's (1993) words, therefore, "the scale of struggle and the struggle over scale are two sides of the same coin" (101).

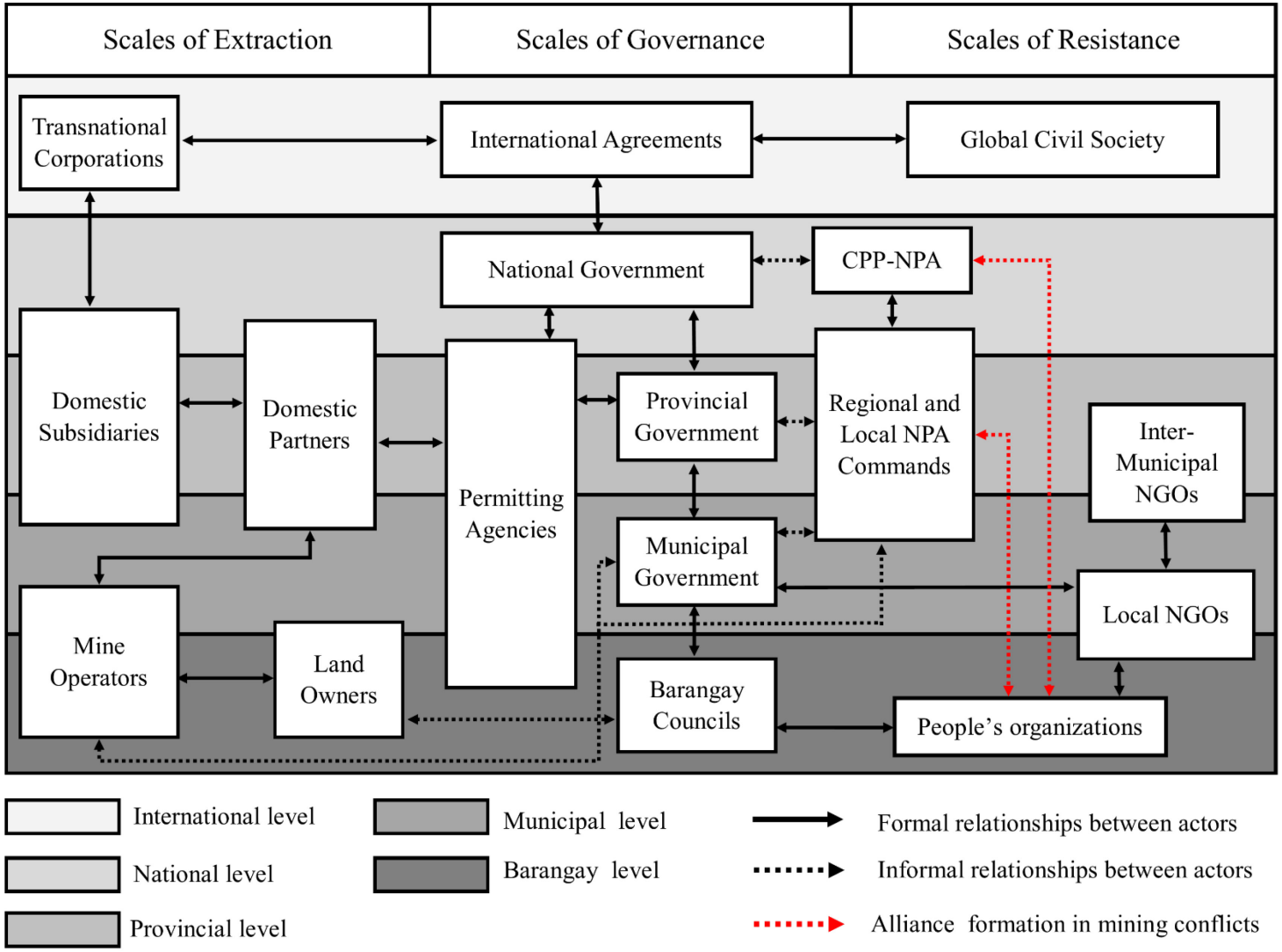

Figure 5.1 Scalar configurations in Philippine mining conflicts.

5.4 Policy Implications

Ultimately, the overarching objective of research on the resource-conflict nexus should be the development and evaluation of policy interventions for preventing, mitigating, and ending resource-related violence. Although there has been some research on this topic, there is a pressing need for inquiries that directly engage with the broader resource conflict literature and the lessons that can be gleaned therefrom. The political ecology of scale in natural resource conflicts can provide a useful starting point for such research, by informing the appropriate observation scales for study and generating hypotheses regarding the likely utility of interventions.

Among the potential policies for addressing resource conflicts, sanctions are the most widely applied and studied. In addition to generalized sanctions, which are imposed as a means of exerting economic pressure on the state, targeted sanctions can be used to influence particular companies or sectors. As Le Billon (2012) notes, sanctions, whether generalized or targeted, are intended to influence conflict through the opportunity mechanism. The Kimberly Process Certification Scheme, for example, was developed to restrict market access for warlords trafficking in conflict diamonds, thus reducing their supply of funds and constraining their ability to purchase weapons, hire recruits, and conduct operations; through that process, diamond-producing states voluntarily commit to monitor their domestic diamond industry and companies in the industry agree to adhere to principles of transparency and to self-regulate their supply chains. The effectiveness of resource-related sanctions, and the Kimberly Process in particular, has, however, been questioned. Enforcement of sanctions policies, particularly in countries with ongoing conflicts and limited institutional capacity where interventions are most

needed, has repeatedly been shown to be lacking. In extreme cases, restricting trade in certain resource sectors may create new opportunities by increasing the profitability of actors willing to engage in the illegal marketplace, as most clearly demonstrated in the examples of narcotics trafficking in Colombia, Mexico, Afghanistan, and elsewhere (Le Billon & Nicholls 2007; Le Billon 2013)

The shortcomings of resource sanctions policies can be explained in terms of a mismatch between the state or regional scales at which sanctions are typically implemented and the highly localized scale at which the opportunity mechanism tends to manifest. Because those policies do not address issues of conflict vulnerability and conflict risk, the implementation of resource-related sanctions may alter the opportunity structures available to non-state actors but is unlikely to eliminate opportunity altogether. A 2017 report by the NGO Global Witness, for example, details the failure of the Kimberly Process to stem the trade in diamonds by rebel groups in the Central African Republic, where entrepreneurial smugglers utilize social media to forge connections between international dealers and warlords well outside the regulatory reach of government monitors (Global Witness 2017). From the perspective of dealers and rebels, while the availability of diamonds creates opportunities, it is the weakness of the state in conflict zones that allows these opportunities to be acted upon. In the words of one trader quoted in the report, the Central African Republic "is a country at war, and where there is war everything is possible" (10). This is analogous to the situation in the Philippines, where the inability or unwillingness of the government to police public sector corruption is instrumental in creating the conditions for opportunistic exploitation, through the leveling of revolutionary taxes, of mineral resources. In order to be effective, policies

seeking to minimize conflict opportunity must be highly targeted and designed in the context of specific conflicts.

For resources whose extraction has the potential to result in broader socioeconomic and environmental impacts, especially those that could interact with identity politics, interventions implemented at the scales of risk have the greatest potential for success. These could include revenue sharing, which has been successfully applied to address a number of resource-related conflicts. A majority of implementing countries, including Angola, Bolivia, Cameroon, Chad, China, Ecuador, Ethiopia, Ghana, India, Madagascar, Mexico, Papua New Guinea, and the Philippines, among many others, use a derivation-based scheme, whereby revenues from the oil, natural gas, and mineral sectors are collected by the national government and subsequently allocated to the regions in which production occurs. Others, including Ecuador, Mongolia, Mexico, and Uganda, apply an indicator-based system, in which resource revenues are disbursed on the basis of need—measured in terms of population, poverty, and other factors—irrespective of where the resources are extracted (NRGI & UNDP 2016).

Revenue sharing has had some documented successes in the mitigation of resource-related conflicts. In Indonesia, for example, resource revenue sharing has been credited with contributing to the successful resolution of conflict in Aceh and West Papua. Mismanagement of revenue sharing initiatives may, however, result in such programs exacerbating, rather than mitigating, the contribution of resource extraction to conflict vulnerability (Le Billon 2012; Le Billon & Nicholls 2007). As the case of black sand mining in Gonzaga demonstrates, revenue sharing has the potential to become a codified means of distributing patronage at multiple levels. For instance, the revenue

sharing regime in Brazil disproportionately benefits Rio de Janeiro, one of the country's wealthiest states; elsewhere, income and public services, including access to piped water, trash collection, and connection to sewage networks have deteriorated even as oil revenue allocations to local governments have increased. Similar schemes in Colombia and Peru have also failed to exhibit measurable positive outcomes, with intense and occasionally violent protests occurring as a result; in the latter country, the derivation-based allocation system led some local political leaders to aggressively seek control of municipalities in which mines were located (NRGI & UNDP 2016).

Accordingly, the effectiveness of sanctions policies and revenue sharing to reduce conflict opportunity and conflict risk, respectively, requires that conflict vulnerability also be addressed. The evidence presented above suggests that the operative scale of the resource curse effect on conflict corresponds most closely to that of the state. There is strong evidence that quality institutions and sufficient wealth can allow an economy to overcome the effects of the resource curse (Mehlum et al. 2006; Le Billon 2012). It is also clear that a country's experience of the resource curse is highly historically contingent, such that resource-dependent countries, such as Norway, Australia, and Canada, that developed resilient and accountably economic and political institutions prior to discovery and large-scale exploitation of their natural resource base do not suffer the deleterious effects of the resource curse to the same extent as those whose institutions arose in an extractive context, as is the case in the Democratic Republic of the Congo, Saudi Arabia, and the Philippines. Such observations, however, do little in the way of suggesting a solution to the resource curse in the countries most adversely affected by it.

Developed countries and international agencies have sought to incentivize capacity-building and reformation of political culture in the developing world by making foreign aid and loans conditional upon changes at the national scale that sometimes include progress along the dimensions of transparency and accountability, but such efforts have been controversial and of debated utility (Ross 2015). Efforts like the Extractive Industries Transparency Initiative and the Natural Resource Charter have aimed to encourage governments to commit to increasing transparency and accountability, but have been widely criticized (Le Billon 2012). In general, however, aside from broad calls to reduce dependence on natural resources by investing in new industries or to increase overall government responsiveness, both of which approaches are made more difficult in an extractive economy, little has been proposed in the way of a permanent cure for the resource curse.

Although solving the state-scale vulnerability mechanism is a daunting proposition, there may be potential for progress by adopting a more incremental approach. The results of Chapter 4, in particular, suggest that localized manifestations of the resource curse are instrumental in shaping the opportunity space for alliance formation between non-state actors and civilian networks; in Gonzaga, ineffectiveness and corruption in the environmental assessment and permitting processes were identified as especially important sources of social grievances. This suggests that voluntary efforts on the part of multinational companies involved in resource extraction could have opportunities to fill in the gaps left by government failures. Such has been the goal of NGOs like Global Witness and Revenue Watch Institute that bring to bear public opinion in the developed world to pressure companies into practices of increased transparency;

extending such projects to include standards for community engagement and informed consent could represent a path forward.

5.5 Concluding Remarks

From oil wars to blood diamonds, the relationship between natural resources and civil conflict has captured scholarly and public attention for decades. Although the existence of that relationship is in little doubt, the causal chains by which it is manifest remain underspecified and open to interrogation. This dissertation has sought to find common ground among the divergent conclusions offered in the existing qualitative and quantitative literature by reframing the resource conflict problem as one of scale. By applying a multi-scalar and mixed methods research design, I demonstrate that the conflict vulnerability, conflict risk, and conflict opportunity mechanisms, as they pertain to natural resources, can operate concurrently at distinct but potentially overlapping and intersecting scales. At the state scale, the resource curse undermines the resilience of economies, the responsiveness of governments, and the quality of institutions, making resource-dependent countries vulnerable to outbreaks of armed conflict. Within vulnerable states, the broad spatial patterns of conflict risk are shaped, in part, by the experience of relative deprivation, including grievances related to the unequal distribution of the costs and benefits of natural resource extraction. At 'local' scales, the nature and timing of specific instances of violence are functions of the opportunities, broadly defined, available to state and non-state belligerents, including opportunities for extracting value from resource commodity chains and for expanding and maintaining support among civilian populations.

Further, the observed correlation between natural resources and civil conflict at multiple scales can, I argue, be partially attributed to extractive industry's role as a natural habitat for the production, contestation, and renegotiation of scalar configurations of power. Where natural resources are extracted, variously scaled economic, political, sociocultural, and biophysical processes intersect, creating nodes of scalar interaction at which actors can discursively rescale their own and others' relative positions. Although, as Howitt (1998) observes, the relationship of a mine or other extractive project to various entities and phenomena changes across scales, its ubiquity in every scale creates potential bridges between them. Thus, extractive projects become, on the one hand, entry points to the global economy for states and non-state actors and rallying cries around which activists and some insurgent groups mobilize support on the other. These findings suggest that future research on the resource-conflict nexus should recognize both the epistemological implications of the analytical scales implied by their methodological approaches—and thus avoid becoming trapped by the choice of scale—and the explicit and implicit production of scale by belligerents and other actors in the context of resource-related violence. Implementation and evaluation of policy interventions intended to mitigate conflict vulnerability, risk, and opportunity should, similarly, be cognizant of the operative scales relevant to the mechanism or mechanisms being addressed.

Natural resources provide the basic materials from which the technologies underpinning modern life are produced. As development continues its march forward, moving the world's population out of poverty and toward a globalized consumerist economy, extractive industry is unlikely to become an obsolete enterprise in the

foreseeable future. Resources' role in civil conflicts will, therefore, continue to be an important subject of academic, political, and public interest in the years to come. As my friend and I concluded in the conversation summarized at the outset of this dissertation, resource-related conflicts are complex problems, but they are not irreducibly so. By allowing the multiple and interrelated linkages between resources and conflict to be disentangled, mapped, and understood, a political ecology of scale framework can and should be a part of the solution.

References

Addison, T., Boly, A., & Mveyange, A. 2017. The impact of mining on spatial inequality: Recent evidence from Africa. World Bank Policy Working Paper 7960.

Allen, M.G. 2017. Islands, extraction and violence: Mining and the politics of scale in Island Melanesia. *Political Geography 57*, 81-90.

Ang Bayan. 2014. NPA punishes Cagayan mining firm. *Ang Bayan.* 7 February 2014.

Ang Bayan. 2017. Duterte's fascist tyranny gives people more reason to wage national democratic revolution. *Ang Bayan*. 26 December 2017.

Aspinall E. 2007. The construction of grievance: natural resources and identity in a separatist conflict. *Journal of Conflict Resolution 51*(6), 950–72.

Averch, H., & Koehler, J. 1970. The Huk Rebellion in the Philippines: Quantitative Approaches. Santa Monica: RAND

Baird, I.G., & Le Billon, P. 2012. Landscapes of political memories: War legacies and land negotiations in Laos. *Political Geography 31*(5), 290-300.

Bakker, K., & Bridge, G. 2006. Material worlds? Resource geographies and the matter of nature. *Progress in Human Geography 30*(1), 5-27.

Ballard, C., & Banks, G. 2003. Resource wars: the anthropology of mining. *Annual Review of Anthropology 32*(1), 287-313.

Bara, C. 2017. Legacies of Violence: Conflict-specific Capital and the Postconflict Diffusion of Civil War. *Journal of Conflict Resolution 62* (9), 1991-2016.

Barter, S.J. 2014. *Civilian Strategy in Civil War: Insights from Indonesia, Thailand, and the Philippines*. New York: Palgrave Macmillan.

Basedau, M., & Lay, J. 2009. Resource curse or rentier peace? The ambiguous effects of oil wealth and oil dependence on violent conflict. *Journal of Peace Research 46*(6), 757-776.

Basedau, M., & Pierskalla, J. H. 2014. How ethnicity conditions the effect of oil and gas on civil conflict: A spatial analysis of Africa from 1990 to 2010. *Political Geography 38*, 1-11.

Bello, W.F., De Guzman, M., Malig, M.L., & Docena, H. 2005. *The Anti-Development State: The Political Economy of Permanent Crises in the Philippines*. New York: Zed Books.

Berman, N., Couttenier, M., Rohner, D., & Thoenig, M. 2017. This mine is mine! How minerals fuel conflicts in Africa. *American Economic Review 107*(6), 1564-1610.

Beron, K.J., & Vijverberg, W.P. 2004. Probit in a spatial context: a Monte Carlo analysis. In Anselin, L., Florax, R.J.G.M., & Rey, S.J. (eds.) *Advances in Spatial Econometrics: Methodology, Tools and Applications*. Berlin: Springer.

Blaikie, P. 1985. *The political economy of soil erosion in developing countries*. New York: Routledge.

Blaikie, P., & Brookfield, H. (eds.). 1987. *Land degradation and society*. New York: Routledge.

Bodea, C., Higashijima, M., & Singh, R.J. 2016. Oil and Civil Conflict: Can Public Spending Have a Mitigation Effect?. *World Development 78*, 1-12.

Bolin, B., Collins, T., & Darby, K. 2008. Fate of the verde: Water, environmental conflict, and the politics of scale in Arizona's central highlands. *Geoforum 39*(3), 1494-1511.

Bravante, M.A., & Holden, W.N. 2009. Going through the motions: the environmental impact assessment of nonferrous metals mining projects in the Philippines. *The Pacific Review 22*(4), 523-547.

Brenner, N. 2001. The limits to scale? Methodological reflections on scalar structuration. *Progress in Human Geography 25*(4), 591-614.

Broad, R. 1995. The political economy of natural resources: case studies of the Indonesian and Philippine Forest Sectors. *The Journal of Developing Areas 29*(3), 317–40.

Broad, R., & Cavanagh, J. 1993. *Plundering Paradise: The Struggle for the Environment in the Philippines*. Berkeley: University of California Press.

Brown, B., & Spiegel, S.J. 2017. Resisting coal: Hydrocarbon politics and assemblages of protest in the UK and Indonesia. *Geoforum 85*, 101-111.

Brown, J.C., & Purcell, M. 2005. There's nothing inherent about scale: political ecology, the local trap, and the politics of development in the Brazilian Amazon. *Geoforum 36*(5), 607-624.

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

Brunnschweiler, C.N., & Bulte, E.H. 2009. Natural resources and violent conflict: resource abundance, dependence, and the onset of civil wars. *Oxford Economic Papers 61*(4), 651-674.

Buhaug, H. 2002. The Geography of Civil War. *Journal of Peace Research 39*(4), 417-433.

Buhaug, H., Cederman, L.E., & Gleditsch, K.S. 2014. Square pegs in round holes: Inequalities, grievances, and civil war. *International Studies Quarterly 58*(2), 418-431.

Bulkeley, H. 2005. Reconfiguring environmental governance: Towards a politics of scales and networks. *Political Geography 24*(8), 875-902.

Bureau of Local Government Finance (BLGF). 2018. LGU Fiscal Data. http://blgf.gov.ph/lgu-fiscal-data/.

Camba, A.A. 2015. From colonialism to neoliberalism: Critical reflections on Philippine mining in the "long twentieth century". *The Extractive Industries and Society, 2*(2), 287-301.

Caouette, D. 2015. Ups and downs of a contemporary Maoist movement: shifting tactics, moving targets and (un) orthodox strategy: the Philippine revolution in perspective. In Feuchtwang, S. & Shan, A. (eds.) *Emancipatory Politics: A Critique*. St. Andrews: Open Anthropology Cooperative Press.

Catindig, R., & Lagasca, C. 2014. Politics behind Cagayan mayor's death, says family. *The Philippine Star* 24 April 2014. http://www.philstar.com/headlines/2014/04/ 23/1314982/ politics-behind-cagayan-mayors-death-says-family.

Cederman, L.E., Weidmann, N.B., & Gleditsch, K.S. 2011. Horizontal inequalities and ethnonationalist civil war: A global comparison. *American Political Science Review 105*(03), 478-495.

Cederman, L.E., Gleditsch, K.S., & Buhaug, H. 2013. *Inequality, grievances, and civil war*. Cambridge University Press: New York, NY.

Center for International Earth Science Information Network (CIESIN). 2016. Gridded Population of the World, Version 4 (GPWv4): Population Density. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). http://dx.doi.org/10.7927/H4NP22DQ.

Chaussard, E., & Kerosky, S. 2016. Characterization of Black Sand Mining Activities and Their Environmental Impacts in the Philippines Using Remote Sensing. *Remote Sensing 8*(2), 100-116.

Collier, P. 2000. Doing Well out of War: An Economic Perspective. In Berdal, M. & Malone, D. (eds.) *Greed and Grievance: Economic Agendas in Civil Wars*. Boulder: Lynne Rienne

Collier, P., & Hoeffler, A. 1998. On economic causes of civil war. *Oxford Economic Papers 50*(4), 563-573.

Collier, P., & Hoeffler, A. 2004. Greed and grievance in civil war. *Oxford Economic Papers 56*(4), 563-595.

Collier, P., & Hoeffler, A. 2005. Resource rents, governance, and conflict. *Journal of Conflict Resolution 49*(4), 625-633.

Collier, P. & Hoeffler, A. 2006. The Political Economy of Secession. In Hannum, H. & Babbit, E. (eds.) *Negotiating Self-Determination*. Lanham: Lexington Books.

Collier, P., Hoeffler, A., & Rohner, D. 2009. Beyond greed and grievance: feasibility and civil war. *Oxford Economic Papers 61*(1), 1-27.

Collinge, C. 2005. The difference between society and space: Nested scales and the returns of spatial fetishism. *Environment and Planning D: Society and Space* 23(2), 189–206.

Collinge, C. 2006. Flat ontology and the deconstruction of scale: a response to Marston, Jones and Woodward. *Transactions of the Institute of British Geographers 31*(2), 244-251.

Conde, M. 2017. Resistance to mining. A review. *Ecological Economics 132*, 80-90.

Conde, M., & Le Billon, P. 2017. Why do some communities resist mining projects while others do not? *The Extractive Industries and Society 4*(3), 681-697

Cornell, S.E. 2007. Narcotics and armed conflict: Interaction and implications. *Studies in Conflict & Terrorism 30*(3), 207-227.

Cunningham, D. E., Gleditsch, K. S., & Salehyan, I. 2013. Non-state actors in civil wars: A new dataset. *Conflict Management and Peace Science, 30*(5), 516-531.

Danneman, N., & Ritter, E.H. 2014. Contagious rebellion and preemptive repression. *Journal of Conflict Resolution 58*(2), 254-279.

De Jesus, J.L. 2014. Mayor's assassination linked to black sand mining controversy. *Philippine Daily Inquirer* 21 April. http://newsinfo.inquirer.net/596156/mayors-assassination-linked-to-black-sand-mining-controversy.

De Soysa, I. & Neumayer, E. 2007. Resource wealth and the risk of civil war onset: results from a new dataset of natural resource rents, 1970-1999. *Conflict Management and Peace Science 24*(3), 201-218.

Deheza, E., & Ribet, U. 2012. Latin America's mining boom: the socio-environmental and security dynamics in the case of Colombia. *The RUSI Journal, 157*(5), 22-31.

Deiwiks, C., Cederman, L.E., & Gleditsch, K.S. 2012. Inequality and conflict in federations. *Journal of Peace Research 49*(2), 289-304.

Dela Cruz, E. 2017. Philippines' Duerte warns miners: 'I will tax you to death.' *Reuters*. 24 July. https://www.reuters.com/article/us-philippines-duerte-mining-idUSKBN1A90XD.

Dreher, A., & Kreibaum, M. 2016. Weapons of choice: The effect of natural resources on terror and insurgencies. *Journal of Peace Research 53*(4), 539-553.

Dube, O., & Vargas, J.F. 2013. Commodity price shocks and civil conflict: Evidence from Colombia. *The Review of Economic Studies, 80*(4), 1384-1421.

Elbadawi, I.A., & Soto, R. 2015. Resource rents, institutions, and violent civil conflicts. *Defense and Peace Economics 26*(1), 89-113.

Enders, W., Hoover, G.A., & Sandler, T. 2016. The changing nonlinear relationship between income and terrorism. *Journal of Conflict Resolution 60*(2), 195-225.

Escobar, A. 2006. Difference and conflict in the struggle over natural resources: a political ecology framework. *Development 49*(3), 6-13.

Ezcurra, R., & Palacios, D. 2016. Terrorism and spatial disparities: Does interregional inequality matter? *European Journal of Political Economy 42,* 60-74.

Fearon, J.D. 2005. Primary commodity exports and civil war. *Journal of Conflict Resolution 49*(4), 483-507.

Fearon, J.D., & Laitin, D.D. 2003. Ethnicity, insurgency, and civil war. *American Political Science Review 97*(1), 75-90.

Filer, C. 1990. The Bougainville rebellion, the mining industry and the process of social disintegration in Papua New Guinea. *Canberra Anthropology 13*(1), 1-39.

Findley, M.G., & Young, J.K. 2012. Terrorism and civil war: A spatial and temporal approach to a conceptual problem. *Perspectives on Politics 10*(2), 285-305.

Fjelde, H. 2015. Farming or fighting? Agricultural price shocks and civil war in Africa. *World Development 67*, 525-534.

Fjelde, H., & Nilsson, D. 2012. Rebels against rebels: Explaining violence between rebel groups. *Journal of Conflict Resolution 56*(4), 604-628.

Fonbuena, C. 2018. AFP vows to reduce by half NPA's 3,700 fighters. 9 January. *Rappler*. Retrieved from https://www.rappler.com/nation/193261-new-peoples-army-strength

Fortna, V.P. 2015. Do Terrorists Win? Rebels' Use of Terrorism and Civil War Outcomes. *International Organization 69*(3), 519-556.

Freeman, K. 2001. Water wars? Inequalities in the Tigris-Euphrates river basin. *Geopolitics 6*(2), 127-140.

Gamil, J.T. 2017. Environmental activists on Duterte SONA: Less talk, more action. *Philippine Daily Inquirer*. 25 July 2017. http://newinfo.inquirer.net/917326/ environmental-activists-on-duterte-sona-less-talk-more-action.

Gascon, M. 2014. Gunmen kill Cagayan town mayor. Inquirer Northern Luzon. 22 April 2014. http://newsinfo.inquirer.net/596270/gunmen-kill-cagayan-town-mayor.

Giddens, A. 1984. *The Constitution of Society: Outline of the Theory of Structuration*. Berkeley: University of California Press.

Gilmore, E., Gleditsch, N.P., Lujala, P, & Rød, J.K. 2005. Conflict Diamonds: A New Dataset. *Conflict Management and Peace Science 22*(3), 257–292

Gleditsch, N.P. 1998. Armed Conflict and The Environment: A Critique of the Literature. *Journal of Peace Research 35*(2), 381-400.

Gleditsch, N. P., Wallensteen, P., Eriksson, M., Sollenberg, M., & Strand, H. 2002. Armed conflict 1946-2001: A new dataset. *Journal of Peace Research 39*(5), 615-637.

Global Witness. 2017. A Game of Stones. London: Global Witness. https://www.globalwitness.org/en/campaigns/conflict-diamonds/

Gold, J.R., & Revill, G. 2000. Landscape, defence and the study of conflict. In Gold, J.R. & Revill, G. (eds.) *Landscapes of Defence*. New York: Routledge.

Goodwin, J. 2001. *No other way out: states and revolutionary movements, 1945-1991*. Cambridge: Cambridge University Press.

Görg, C. 2007. Landscape governance: The "politics of scale" and the "natural" conditions of places. *Geoforum 38*(5), 954-966.

Green, K.E. 2016. A political ecology of scaling: Struggles over power, land and authority. *Geoforum 74*, 88-97.

Gurr, T. 1970. *Why Men Rebel*. Princeton: Princeton University Press.

Haarstad, H., & Fløysand, A. 2007. Globalization and the power of rescaled narratives: A case of opposition to mining in Tambogrande, Peru. *Political Geography 26*(3), 289-308.

Haggett, P. 1972. *Geography: A Modern Synthesis, Second Edition*. New York: Harper and Row.

Hansen, M.C., Potapov, P.V., Moore, R., Hancher, M., Turubanova, S.A., Tyukavina, A., Thau, D., Stehman, S.V., Goetz, S.J., Loveland, T.R., Kommareddy, A., Egorov, A., Chini, L., Justice, C.O., & Townshend, J.R.G. 2013. High-Resolution Global Maps of 21st-Century Forest Cover Change. *Science 342*(6160), 850-853.

Hart, J.F. 1982. The highest form of the geographer's art. *Annals of the Association of American Geographers 72*(1), 1–29.

Harvey, D. 1981. The spatial fix–Hegel, von Thunen, and Marx. *Antipode 13*(3), 1-12.

Harvey, D. 2006. *Spaces of global capitalism*. NewYork: Verso.

Hayward, F.M. 1972. The development of a radical political organization in the bush: A case study in Sierra Leone. *Canadian Journal of African Studies/La Revue Canadienne des Études Africaines, 6*(1), 1-28.

Herod, A. 2010. *Scale*. New York: Routledge.

Hilson, C.J. 2006. Mining and civil conflict: revisiting grievance at Bougainville. *Minerals & Energy-Raw Materials Report 21*(2), 23-35.

Hoelscher, K., Miklian, J., & Vadlamannati, K.C. 2012. Hearts and mines: A district-level analysis of the Maoist conflict in India. *International Area Studies Review, 15*(2), 141-160.

Holden, W.N. 2005a. Indigenous peoples and non-ferrous metals mining in the Philippines. *The Pacific Review 18*(3), 417-438

Holden, W.N. 2005b. Civil society opposition to nonferrous metals mining in the Philippines. *Voluntas: International Journal of Voluntary and Nonprofit Organizations 16*(3), 223-249.

Holden, W.N. 2009. Ashes from the phoenix: state terrorism and the party-list groups in the Philippines. *Contemporary Politics 15*(4), 377-393.

Holden, W.N. 2011. Neoliberalism and state terrorism in the Philippines: the fingerprints of Phoenix. *Critical Studies on Terrorism 4*(3), 331-350.

Holden, W.N. 2013a. Neoliberal mining amid El Niño induced drought in the Philippines. *Journal of Geography and Geology 5*(1), 58.

Holden, W.N. 2013b. The Never Ending War in the Wounded Land: The New People's Army on Samar. *Journal of Geography and Geology 5*(4), 29.

Holden, W.N. 2012a. A Neoliberal Landscape of Terror: Extrajudicial Killings in the Philippines. *Acme: An International E-Journal for Critical Geographies 11*(1).

Holden, W.N. 2012b. Ecclesial opposition to large-scale mining on Samar: Neoliberalism meets the church of the poor in a wounded land. *Religions 3*(3), 833-861.

Holden, W.N. 2013. The Never Ending War in the Wounded Land: The New People's Army on Samar. Journal of Geography and Geology 5(4), 29-49.

Holden, W.N. 2014. The New People's Army and Neoliberal Mining in the Philippines: A Struggle against Primitive Accumulation. *Capitalism Nature Socialism 25*(3), 61-83.

Holden, W.N., & Jacobson, R.D. 2007. Mining amid armed conflict: nonferrous metals mining in the Philippines. *The Canadian Geographer 51*(4), 475-500.

Holden, W.N., & Jacobson, R.D. 2008. Civil society opposition to nonferrous metals mining in Guatemala. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations 19*(4), 325-350.

Holden, W., Nadeau, K., & Jacobson, R.D. 2011. Exemplifying accumulation by dispossession: mining and indigenous peoples in the Philippines. *Geografiska Annaler: Series B, Human Geography 93*(2): 141-161.

Homer-Dixon, T.F. 1994. Environmental scarcities and violent conflict: evidence from cases. *International Security 19*(1): 5-40.

Homer-Dixon, T.F. 1999. *Environment, Scarcity and Violence*. Princeton: Princeton University Press.

Hoogesteger, J., & Verzijl, A. 2015. Grassroots scalar politics: Insights from peasant water struggles in the Ecuadorian and Peruvian Andes. *Geoforum 62*, 13-23.

Horowitz, L.S. 2009. Environmental violence and crises of legitimacy in New Caledonia. *Political Geography 28*(4), 248-258.

Horowitz, L.S. 2010. "Twenty years is yesterday": Science, multinational mining, and the political ecology of trust in New Caledonia. *Geoforum 41*(4), 617-626.

Horowitz, L.S. 2012. Translation alignment: Actor-Network Theory, resistance, and the power dynamics of alliance in New Caledonia. *Antipode 44*(3), 806-827.

Howitt, R. 1998. Scale as relation: musical metaphors of geographical scale. *Area 30*(1), 49-58.

Human Rights Watch. 2011. Philippines: Communist Rebels Target Civilians: New People's Army Should Stop Unlawful Killings, Detentions. Human Rights Watch. 5 October 2011. https://www.hrw.org/ news/2011/10/05/philippines-communist-rebels-target-civilians.

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

Ikelegbe, A. 2001. Civil society, oil and conflict in the Niger Delta region of Nigeria: Ramifications of civil society for a regional resource struggle. *The Journal of Modern African Studies, 39*(3), 437-469.

Ikelegbe, A. 2005. The economy of conflict in the oil rich Niger Delta region of Nigeria. *Nordic Journal of African Studies 14*(2), 208-234.

Ikelegbe, A. 2006. The economy of conflict in the oil rich Niger Delta region of Nigeria. *African and Asian Studies 5*(1), 23-56.

Ingelson, A., Holden, W., & Bravante, M. 2009. Philippine Environmental Impact Assessment, mining and genuine development. *Law, Environment and Development Journal 5*, 1-17.

Isumonah, V.A. 2004. The making of the Ogoni ethnic group. *Africa 74*(3), 433-453.

Janus, T., & Riera-Crichton, D. 2015. Economic shocks, civil war and ethnicity. *Journal of Development Economics 115*, 32-44.

Jonas, A.E.G. 2006. Pro scale: Further reflections on the 'scale debate' in human geography. *Transactions of the Institute of British Geographers 31*(3), 399–406.

Kahl, C.H. 2006. *States, scarcity, and civil strife in the developing world*. Princeton: Princeton University Press.

Kaiser, R. and Nikiforova, E. 2008. The performativity of scale: The social construction of scale effects in Narva, Estonia. *Environment and Planning D: Society and Space 26*(3), 537–62.

Kalyvas, S.N. 2000. *The logic of violence in civil war*. New York: Cambridge University Press.

Keola, S., Andersson, M., & Hall, O. 2015. Monitoring economic development from space: using nighttime light and land cover data to measure economic growth. *World Development 66*, 322-334.

Kerkvliet, B.J. 1986. Patterns of Philippine resistance and rebellion, 1970-1986. *Pilipinas: A Journal of Philippine Studies 6*, 35-52.

Kirsch, S. 2014. *Mining Capitalism: The Relationship between Corporations and Their Critics*. Oakland: University of California Press

Klare, M. 2007. *Blood and oil: The dangers and consequences of America's growing dependency on imported petroleum*. New York: Metropolitan Books.

Knutsen, C.H., Kotsadam, A., Olsen, E.H., & Wig, T. 2017. Mining and local corruption in Africa. *American Journal of Political Science 61*(2), 320-334.

Koubi, V., & Böhmelt, T. 2014. Grievances, economic wealth, and civil conflict. *Journal of Peace Research, 51*(1), 19-33.

Koubi, V., Spilker, G., Böhmelt, T., & Bernauer, T. 2014. Do natural resources matter for interstate and intrastate armed conflict? *Journal of Peace Research 51*(2), 227-243.

Kuecker, G.D. 2007. Fighting for the forests: grassroots resistance to mining in northern Ecuador. *Latin American Perspectives 34*(2), 94-107.

Kuhn, A. 2018. Explaining ethnic mobilization against resource extraction: How collective action frames, motives, and opportunities interact. *Studies in Conflict & Terrorism 41*(5), 388-407.

Lagasca, C. 2013. Cagayan town thrives on black sand mining. *The Philippine Star*. 19 November 2013. http://www.philstar.com/nation/2013/11/19/1258195/cagayan-town-thrives-black-sand-mining.

Lagsa, B. 2015. Communist Party lost 'ideology,' now 'bandits'- Army officials. *Rappler*. 26 December 2015. https://www.rappler.com/nation/117163-cpp-npa-ndf-anniversary-army-mindanao.

LandScan. 2012. LandScan 2012 Dataset. Oak Ridge National Laboratory. https://landscan.ornl.gov/.

Larson, A.M. 2002. Natural resources and decentralization in Nicaragua: Are local governments up to the job? *World Development 30*(1), 17-31.

Laurance, W.F., Kakul, T., Tom, M., Wahya, R., & Laurance, S.G. 2012. Defeating the 'resource curse': Key priorities for conserving Papua New Guinea's native forests. *Biological Conservation 151*(1), 35-40.

Lavaux, S. 2007. Natural resources and conflict in Colombia: Complex dynamics, narrow relationships. *International Journal 62*(1), 19-30.

Le Billon, P. 2001a. Angola's political economy of war: The role of oil and diamonds, 1975–2000. *African Affairs 100*(398), 55-80.

Le Billon, P. 2001b. The political ecology of war: natural resources and armed conflicts. *Political Geography 20*(5), 561-584.

Le Billon, P. 2002. Logging in muddy waters: The politics of forest exploitation in Cambodia. *Critical Asian Studies 34*(4), 563-586.

Le Billon, P. 2005a. The geography of 'resource wars'. In Flint, C. (ed.), The Geography of War and Peace. Oxford: Oxford University Press.

Le Billon, P. 2005b. Resources and armed conflicts. The Adelphi Papers 45(373), 29-49.

Le Billon, P. 2005c. *Fuelling war: natural resources and armed conflicts*. New York: Routledge.

Le Billon, P. 2007. Scales, chains and commodities: Mapping out "Resource Wars". *Geopolitics 12*(1), 200-205.

Le Billon, P. 2008. Diamond Wars? Conflict Diamonds and Geographies of Resource Wars. *Annals of the Association of American Geographers 98*(2), 345-372.

Le Billon, P. 2012. *Wars of plunder: Conflicts, profits and the politics of resources*. New York: Columbia University Press.

Le Billon, P. 2013. *Fuelling war: natural resources and armed conflict*s. New York: Routledge.

Le Billon, P., & Nicholls, E. 2007. Ending 'resource wars': Revenue sharing, economic sanction or military intervention? *International Peacekeeping 14*(5), 613-632.

Lee, C.Y. 2018. Oil and terrorism: Uncovering the mechanisms. *Journal of Conflict Resolution 62*(5), 903-928.

Leitner, H., & Miller, B. 2007. Scale and the limitations of ontological debate: a commentary on Marston, Jones and Woodward. *Transactions of the Institute of British Geographers 32*(1), 116-125.

LeSage, J.P. 2000. Bayesian estimation of limited dependent variable spatial autoregressive models. *Geographical Analysis 32*, 19-35.

Lujala, P. 2009. Deadly combat over Natural Resources: Gems, Petroleum, Drugs, and the Severity of Armed Civil Conflict. *Journal of Conflict Resolution 51*(1), 50-71.

Lujala, P. 2010. The spoils of nature: Armed civil conflict and rebel access to natural resources. *Journal of Peace Research 47*(1), 15-28.

Lujala, P, Gleditsch, N.P., & Gilmore, E. 2005. A Diamond Curse? Civil War and a Lootable Resource. *Journal of Conflict Resolution 49*(4), 538–562.

Manson, S.M. 2008. Does scale exist? An epistemological scale continuum for complex human–environment systems. *Geoforum* 39(2), 776-788.

Marshall, M.G., & Jaggers, K. 2002. Polity IV project: Political regime characteristics and transitions, 1800-2002. University of Maryland.

Marston, A. 2014. The scale of informality: Community-run water systems in peri-urban Cochabamba, Bolivia. *Water Alternatives 7*(1).

Marston, S.A., Jones, J. P., & Woodward, K. 2005. Human geography without scale. *Transactions of the Institute of British Geographers 30*(4), 416-432.

Massé, F., & Le Billon, P. 2017. Gold mining in Colombia, post-war crime and the peace agreement with the FARC. *Third World Thematics: A TWQ Journal*. Advanced online publication, doi: 10.1080/23802014.2017.1362322

McCarthy, J. 2005. Scale, sovereignty, and strategy in environmental governance. *Antipode 37*, 731–53.

McCarthy, J., & Prudham, S. 2004. Neoliberal nature and the nature of neoliberalism. *Geoforum 35*(3), 275-283.

McMillen, D.P. 1992. Probit with spatial autocorrelation. *Journal of Regional Science 32*(3), 335-348.

Mediansky, F.A. 1986. The New People's Army: A Nation-wide Insurgency in the Philippines. *Contemporary Southeast Asia 8*(1), 1-17.

Mehlum, H., Moene, K., & Torvik, R. 2006. Institutions and the resource curse. *The Economic Journal 116* (508), 1-20.

Miklian, J. 2012. The political ecology of war in Maoist India. *Politics, Religion & Ideology 13*(4), 561-576.

Millo, G., & Piras, G. 2012. splm: Spatial panel data models in R. *Journal of Statistical Software 47*(1), 1-38.

Mines and Geosciences Bureau (MGB). 2015. Mining Tenement Maps. http://mgb.gov.ph/2015-05-13-01-44-56/2015-05-13-01-46-18/2015-05-13-02-17-43.

Minter, T., De Brabander, V., Van der Ploeg, J., Persoon, G.A., & Sunderland, T. 2012. Whose consent? Hunter-gatherers and extractive industries in the northeastern Philippines. *Society & Natural Resources 25*(12), 1241-1257.

Mitchell, E.J. 1969. Some econometrics of the Huk rebellion. *American Political Science Review 63*(4), 1159-1171.

Moore, A. 2008. Rethinking scale as a geographical category: From analysis to practice. *Progress in Human Geography 32*(2), 203–25.

Morelli, M., & Rohner, D. 2015. Resource concentration and civil wars. *Journal of Development Economics 117*, 32-47

Municipality of Gonzaga. 2013. Gonzaga Comprehensive Land Use Plan. Local Government Unit of the Municipality of Gonzaga, Cagayan.

Myers, N. 1989. Environment and security. *Foreign Policy 74*, 23-41.

National Consortium for the Study of Terrorism and Responses to Terrorism (START). 2017. Global Terrorism Database. University of Maryland. https://www.start.umd.edu/gtd.

Natural Resource Governance Institute (NRGI) & United Nations Development Program (UNDP). 2016. Natural Resource Revenue Sharing. https://resourcegovernance.org/sites/default/files/documents/nrgi_undp_resource-sharing_web_0.pdf.

New People's Army (NPA). 2018. NPA punishes mining company in Davao Oriental. Press Release. 8 January 2018. Communist Party of the Philippines.

Neumann, R.P. 2009. Political ecology: theorizing scale. *Progress in Human Geography 33*(3), 398-406.

Nilsson, D. 2010. Turning weakness into strength: Military capabilities, multiple rebel groups and negotiated settlements. *Conflict Management and Peace Science 27*(3), 253-271.

Nueva, J. 2010. Rebs face arson raps for torching quarry equipment in Cagayan. GMA News online. 17 December 2010. http://www.gmanetwork.com/news/news/regions/208533/ rebs-face-arson-raps-for-torching-quarry-equipment-in-cagayan/story/.

O'Lear, S. & Diehl, P. 2007. Not Drawn to Scale: Research on Resource and Environmental Conflict. *Geopolitics 12*(1), 166-182.

Omeje, K. 2005. Oil conflict in Nigeria: Contending issues and perspectives of the local Niger Delta people. *New Political Economy 10*(3), 321-334.

Østby, G. 2017. Inequality, the Political Environment and Civil Conflict: Evidence from 55 Developing Country. In Stewart, F. (ed.). *Horizontal inequalities and conflict: Understanding group violence in multiethnic societies*. New York, NY: Springer.

Østby, G., Nordås, R., & Rød, J.K. 2009. Regional Inequalities and Civil Conflict in Sub-Saharan Africa. *International Studies Quarterly 53*(2), 301-324.

Oyefusi, A. 2008. Oil and the probability of rebel participation among youths in the Niger Delta of Nigeria. *Journal of Peace Research 45*(4), 539-555.

Panelo, D.C. 2016. How black sand mining caused the sea to swallow a village. ABS-CBN News. 10 October. http://news.abs-cbn.com/focus/10/10/16/how-black-sand-mining-caused-the-sea-to-swallow-a-village.

Peluso, N.L. & Watts, M. (eds.) 2001. *Violent Environments*. Ithaca: Cornell University Press.

Philippines Statistics Authority (PSA). 2016. Family Income and Expenditure Survey. http://www.psa.gov.ph/tags/family-income-and-expenditure-survey.

Philippines Statistics Authority (PSA). 2011. Good Government Index. http://nap.psa.gov.ph/ggi/default.asp.

Piazza, J. A. 2007. Draining the swamp: Democracy promotion, state failure, and terrorism in 19 Middle Eastern countries. *Studies in Conflict & Terrorism 30*(6), 521-539.

Polo, S.M., & Gleditsch, K.S. 2016. Twisting arms and sending messages: Terrorist tactics in civil war. *Journal of Peace Research 53*(6), 815-829.

Quimpo, N.G. 2014. Oligarchic Rule, Ethnocratic Tendencies, and Armed Conflict in the Philippines. In Howe, B.M. (ed.) *Post-Conflict Development in East Asia*. New York: Routledge.

Rodell, P.A. 2004. The Philippines: playing out long conflicts. *Southeast Asian Affairs 2004*, 187-204.

Rodriguez, J.C. 2012. Arrest over Facebook post teaches lesson, say mayor. ABS-CBN News. 24 October. http://news.abs-cbn.com/-depth/10/23/12/arrest-over-facebook-post-teaches-lesson-says-mayor.

Romero, A. 2017. Palace: Communists have 'distorted' view of Duerte. The Philippine Star. 26 July. http://www.philstar.com/headlines/2017/07/26/1721724/palace-communists-have-distorted-view-duerte.

Ross, M.L. 2001a. Does oil hinder democracy? *World Politics 53*(3), 325–61

Ross, M.L. 2001b. *Timber booms and institutional breakdown in Southeast Asia*. New York, NY: Cambridge University Press.

Ross, M. 2003. Oil, drugs, and diamonds: How do natural resources vary in their impact on civil war. In Ballentine, K. (ed.). *The Political Economy of Armed Conflict: Beyond Greed and Grievance*. Boulder: Lynne Rienner.

Ross, M.L. 2004. What Do We Know About Natural Resources and Civil War? *Journal of Peace Research 41*(3), 337-356.

Ross, M.L. 2012. *The Oil Curse: How Petroleum Wealth Shapes the Development of Nations*. Princeton: Princeton University Press.

Ross, M.L. 2015. What have we learned about the resource curse? *Annual Review of Political Science 18*, 239-259.

Rustad, S.C.A., Rød, J.K., Larsen, W., & Gleditsch, N.P. 2008. Foliage and fighting: Forest resources and the onset, duration, and location of civil war. *Political Geography 27*(7), 761-782.

Rutten, R. 2000. High-cost activism and the worker household: Interests, commitment, and the costs of revolutionary activism in a Philippine plantation region. *Theory and Society 29*(2), 215-252.

Santos, P.V.M. 2010. The communist front: protracted people's war and counter-insurgency in the Philippines (overview). In Santos, S.M. & Santos, P.V.M. (eds) *Primed and Purposeful: Armed Groups and Human Security Efforts in the Philippines*. Quezon City: South-South Network for Non-State Armed Group Engagement.

Sayre, N.F. 2005. Ecological and geographical scale: parallels and potential for integration. *Progress in Human Geography 29*, 276-290.

Sayre, N.F. 2009. Scale. In Castree, N., Demeritt, D., Rhoads, B., & Liverman, D. (eds.). *A companion to environmental geography*. Oxford: Blackwell.

Simbulan, R.G. 2016. Indigenous Communities' Resistance to Corporate Mining in the Philippines. *Peace Review 28*(1), 29-37.

Singh, J., & Camba, A. 2016. Neoliberalism, resource governance and the everyday politics of protest in the Philippines. In Elia, J., & Rethel, L. (eds.). *The Everyday Political Economy of Southeast Asia*. Cambridge: Cambridge University Press.

Slack, K. 2012. Mission impossible? Adopting a CSR-based business model for extractive industries in developing countries. *Resources Policy 37*(2), 179-184.

Snell, M.B. 2004. The cost of doing business. *Sierra Magazine* May/June 2004. Retrieved from: http://vault.sierraclub.org/sierra/200405/terrorism/page1.asp.

Smith, N. 1981. *Uneven Development: Nature, Capital and the Production of Space*. Oxford: Blackwell.

Smith, N. 1993. Homeless/global: Scaling places. In Bird, J., Curtis, B., Putnam, T., Robertson, G., & Tickner, L. (eds.) *Mapping the Futures: Local Cultures, Global Change*. New York: Routledge

Sorens, J. 2011. Mineral production, territory, and ethnic rebellion: The role of rebel constituencies. *Journal of Peace Research 48*(5), 571-585.

Southgate, D., Salazar-Canelos, P., Camacho-Saa, C., & Stewart, R. 2000. Markets, institutions, and forestry: the consequences of timber trade liberalization in Ecuador. *World Development, 28*(11), 2005-2012.

Suryanata, K., & Umemoto, K. 2005. Beyond environmental impact: articulating the "intangibles" in a resource conflict. *Geoforum 36*(6), 750-760.

Stanton, J. A. 2013. Terrorism in the context of civil war. *The Journal of Politics 75*(4), 1009-1022.

Steinberg, J. 2018. Protecting the capital? On African geographies of protest escalation and repression. *Political Geography 62*, 12-22.

Stewart, F. (ed.). 2008. *Horizontal inequalities and conflict*. London: Palgrave Macmillan.

Stouffler, S.A., Lumsdaine, A.A., Lumsdaine, M.H., Williams Jr, R.M., Smith, M.B., Janis, I.L., Star, S.A. and Cottrell Jr, L.S., 1949. *The American soldier: Combat and its aftermath (Studies in social psychology in World War II), Volume 2*.

Sundberg, R., & Melander, E. 2013. Introducing the UCDP Georeferenced Event Dataset. *Journal of Peace Research 50*(4), 523-532.

Swyngedouw, E. 2003. Modernity and the production of the Spanish waterscape, 1890–1930. In Zimmerer, K. and Bassett, T. (eds.) *Political Ecology: An Integrative Approach to Geography and Environment-Development Studies*. New York: Guilford Press.

Swyngedouw, E. 2004. Scaled geographies: nature, place and the politics of scale. In Sheppard, E. and McMaster, R.B. (eds.) *Scale and Geographic Inquiry*. Oxford: Blackwell.

Swyngedouw, E. 2007. Technonatural revolutions: the scalar politics of Franco's hydro-social dream for Spain, 1939–75. *Transactions of the Institute of British Geographers 32*, 9-28.

Swyngedouw, E. and Heynen, N. 2003: Urban political ecology, justice and the politics of scale. *Antipode 35*, 898–918.

Tacconi, L. (ed.). 2012. *Illegal Logging: Law Enforcement, Livelihoods and the Timber Trade*. New York: Routledge.

Tan, S.K. 1987. *A History of the Philippines*. Quezon City: University of the Philippines Press.

Tangi, L.P. 2015. People's War, People's Press: History and Evolution of Ang Bayan (The People), the News Organ of the Communist Party of the Philippines (CPP). *Plaridel 12*(1), 42-72.

Taylor, P.J. 1981. Geographical scales within the world-economy approach. *Review (Fernand Braudel Center) 5*, 3-11.

Theil, H. 1967. *Economics and Information Theory*. Chicago: Rand McNally & Company.

Themnér, L., & Wallensteen, P. 2012. Armed Conflicts, 1946–2011. *Journal of Peace Research 49*(4), 565-575.

Thompson, H. 1991. The economic causes and consequences of the Bougainville crisis. *Resources Policy 17*(1), 69-85.

Tidwell, A. 2016. Duterte, Mindanao, and Political Culture. *Asia Pacific Bulletin 362*. Honolulu: East-West Center.

Turner, M. 2006. Shifting scales, lines, and lives: the politics of conservation science and development in the Sahel. In Zimmerer, K. (ed.) *Globalization and New Geographies of Conservation*. Chicago: Chicago University Press.

Urkidi, L. 2011. The defence of community in the anti-mining movement of Guatemala. *Journal of Agrarian Change 11*(4), 556-580.

Van Der Ploeg, F. & Poelhekke, S. 2016. The impact of natural resources: Survey of recent quantitative evidence. *The Journal of Development Studies 53*(2), 1-12.

Van Leeuwen, M. & Van Der Haar, G. 2016. Theorizing the land–violent conflict nexus. *World Development* 78, 94-104.

Vela-Almeida, D., Kolinjivadi, V., & Kosoy, N. 2018. The building of mining discourses and the politics of scale in Ecuador. *World Development 103*, 188-198.

Vicente, P.C. 2010. Does oil corrupt? Evidence from a natural experiment in West Africa. *Journal of Development Economics 92*(1), 28-38.

Visaya, V. 2014. NPA admits killing mayor over black sand mining. *Philippine Daily Inquirer*. 26 April 2014. http://newsinfo.inquirer.net/597384/npa-admits-killing-mayor-over-black-sand-mining.

Vitug, M.D. 1993. *Power from the forest: the politics of logging*. Manila: Philippine Center for Investigative Journalism.

Vogt, M., Bormann, N.C., Rüegger, S., Cederman, L.E., Hunziker, P., & Girardin, L. 2015. Integrating Data on Ethnicity, Geography, and Conflict: The Ethnic Power Relations Data Set Family. *Journal of Conflict Resolution 59*(7), 1327-1342.

Ward, M.D., & Gleditsch, K.S. 2018. *Spatial regression models*. Sage Publications.

Wayland, J., & Kuniholm, M. 2016. Legacies of conflict and natural resource resistance in Guatemala. *The Extractive Industries and Society 3*(2), 395-403.

Weidmann, N. B., & Ward, M. D. 2010. Predicting conflict in space and time. *Journal of Conflict Resolution 54*(6), 883-901.

Weidmann, N.B., Rød, J.K., & Cederman, L.E. 2010. Representing ethnic groups in space: A new dataset. *Journal of Peace Research 47*(4), 491-499.

Weinstein, J. 2007. *Inside Rebellion: The Politics of Insurgent Violence*. Cambridge: Cambridge University Press.

Wegenast, T.C., & Basedau, M. 2014. Ethnic fractionalization, natural resources and armed conflict. *Conflict Management and Peace Science 31*(4), 432-457.

Wilhelm, S., & de Matos, M.G. 2013. Estimating Spatial Probit Models in R. *R Journal 5*(1), 130-143.

World Bank Group. 2018a. World Development Indicators. https://data.worldbank.org/products/wdi.

World Bank Group. 2018b. World Governance Indicators. http://info.worldbank.org/governance/wgi/.

Wu, J., Wang, Z., Li, W., & Peng, J. 2013. Exploring factors affecting the relationship between light consumption and GDP based on DMSP/OLS nighttime satellite imagery. *Remote Sensing of Environment 134,* 111-119.

Zimmerer, K.S. 2000a. The reworking of conservation geographies: Nonequilibrium landscapes and nature-society hybrids. *Annals of the Association of American Geographers 90*(2), 356-369.

Zimmerer, K. 2000b. Rescaling irrigation in Latin America: the cultural images of political ecology of water resources. *Ecumene 7*, 150–75.

Zimmerer, K.S., & Bassett, T.J. (eds.). 2003. *Political ecology: an integrative approach to geography and environment-development studies*. New York: Guilford Press.

Zhou, N., Hubacek, K., & Roberts, M. 2015. Analysis of spatial patterns of urban growth across South Asia using DMSP-OLS nighttime lights data. *Applied Geography 63*, 292-303.