The Political Economy of Rural-Urban Conflict:

Lessons from West Africa & India

by

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Abstract

This dissertation occupies the intersection between the fields of International Development, Political Economy, and Peace & Conflict Studies to examine how economic networks spanning the rural-urban divide condition conflict dynamics between an urban-based state and its rural-based challengers. In some cases of such violent internal conflict, the combat frontier is messy and erratic, as insurgents target cities as their economic prey. In other cases, the combat frontier is tidy and stable, seemingly representing an equilibrium in which cities are effectively protected from violent non-state actors. What accounts for these divergent outcomes? This question bears special importance in an era characterized by increasingly eroded capacity of states to exercise the famous Weberian monopoly on the use of coercive force.

To explore this question, I did fieldwork in two regions representing these different outcomes. In West Africa (Liberia and Sierra Leone), capital cities became economic targets for rebels, who posed dire threats to the survival of the state. In Maoist India, despite an insurgent ideology aiming to overthrow the state via city capture, the combat frontier effectively firewalls cities from Maoist violence. I interviewed firm managers, traders, and, where possible, locals at risk for rebel recruitment. I employed formal modeling, and qualitative (semi-structured interviews, coding) and quantitative (multivariate and logistic regression) methods to analyze, first, the effects of violence on the structure of rural-urban trade networks, and second, the effects of trade network morphology on the structure of the combat frontier itself.

I found that the trade networks that underpin the economic relationship between rural and urban areas may differ dramatically in their response to, and effect on, the combat frontier, depending on what type of underlying social structure they are based upon. Those based upon ranked, or hierarchical, social structures, were structured in such a way as to facilitate elite-elite trade deals between urban-based traders and rebel commanders that benefited the rural insurgents. By contrast, those based upon unranked, or egalitarian, social structures tended to disallow this sort of deal structure, concentrating profits in

urban areas, destabilizing the combat frontier, and further incentivizing the targeting of cities.

This study then seeks to recast dynamics of violent internal conflict as a dialectic relationship between intensification (production, often in state-controlled urban areas) and extensification (predation, often in rebel-held rural areas). It attempts to reconcile the opposing views that Development processes both drive and undermine violent conflict, and suggests that, in the absence of a monopoly on the use of coercive force, the state may benefit from geographic containment of competitive force by way of these "interstitial economies."

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For Part II, which focuses on Liberia, Sierra Leone, and their productive sectors, I relied greatly on the keen observations of Alice Amsden, who first hinted that civil wars might build firms' in-house technical capacity. I could not even have gotten around or made the

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Part I

A Theoretical Introduction

1. Political Economy and the Rural-Urban Divide

1.1. What's the Issue? What's at Stake?

In the summer of 2003, the rural rebel armies of Liberians United for Peace and Democracy (LURD) and the Movement for Democracy in Liberia (MODEL) converged on the capital city, Monrovia – then controlled by Charles Taylor's government – and began shelling it. Albert (not his real name), whose family had moved from the countryside to the capital during a previous episode of internal conflict, was caught out across the river from peninsular downtown Monrovia when the rebels attacked. There was no way to cross back over the bridge to the relative protection afforded by the Armed Forces of Liberia, and Robert's last name gave him away as a Gola – a small ethnic minority to which Charles Taylor belonged, and for which LURD – a majority ethnic Krahn organization – had little fondness. The combat frontier – so amorphous in the countryside – only fulled coalesced here, around the city. Robert changed name on the spot, living for two months as a homeless, tribe-less, urban refugee, scrounging daily for food and water. But he was one of the lucky ones to survive the Liberian civil war, whilst certain members of his family died when their urban apartment was hit by a mortar.

The wave of violence that washed over the city was overwhelming. Every Liberian who lived through the war knows someone who was killed in it – most likely many. Businesses were targeted relentlessly for their economic value, and many were outright destroyed by rampant looting. And yet, of all the surviving firms that I studied for this dissertation, only a couple of them reported any deaths among their direct employees. Why this apparent discrepancy in the risk of violence among the urban population at large versus those involved with the production of goods? The answer to that question lies in the trade linkages between urban businesses and their rural markets for supplies and customers. Together, production facilities and traders jointly constitute the "production networks" that are the core focus of this study.

2003 was the third time that Monrovia – the political and economic hub of Liberia, housing roughly one-third of its total population – had come under siege by a rebel force. And Liberia is not alone. The world crossed a threshold in 2008: for the first time in history, the majority of its residents lived in urban areas (cf. United Nations Population Division, 2007). Perhaps not coincidentally, in the half century leading up to that benchmark, marked by unprecedented rapid rates of urbanization, wars had devolved from discrete, interstate military contests into messy, internecine conflicts. In fact, of the 110 major conflicts between 1989 and 2000, 103 were considered civil wars (Jeremy Weinstein, 2002). Indeed, a large number of civil wars are coming to be characterized by a military contest between actors based in urban areas on the one hand, and actors based in rural areas on the other (Daniel Esser, 2004, Francois Grünewald and Éric Levron, 2004) – that is, they are wars of country versus city, periphery versus core.

This dissertation occupies the intersection between the fields of International Development, Political Economy, and Peace & Conflict Studies to examine how economic networks spanning the rural-urban divide condition the conflict dynamics between an urban-based state and its rural-based challengers. But important differences exist amongst rural-urban conflicts. In some cases of such violent internal conflict, the combat frontier is messy and erratic, as insurgents target cities as their economic prey. Monrovia in Liberia, Freetown in Sierra Leone, N'djamena in Chad, Maputo in Mozambique, Luanda in Angola, and even Sudan's Khartoum are but a few of the cities in Sub-Saharan Africa alone that have been targeted by rural-based challengers to state authority in the past two decades. Such messy combat frontiers can have disastrous consequences for people and businesses living and operating in their penumbra. In other cases, the combat frontier is tidy and stable, seemingly representing an equilibrium in which cities are effectively protected from violent non-state actors. The Maoist movement in India, and civil wars in countries as disparate as Guatemala and Afghanistan, might be said to characterize this case. The central question of this dissertation is then: **What accounts for these differences in the interface between urban and rural areas?** Radical development disparities exist in many countries between urban and rural areas – a fact that is often seen as fueling rural-urban conflict. But these disparities cannot explain the differences in the conflictual rural-urban interface. The question bears special importance in an era characterized by increasingly eroded capacities of states to exercise the famous Weberian monopoly on the use of coercive force.

To explore this question, I did fieldwork in two regions representing these different outcomes. In West Africa (Liberia and Sierra Leone), capital cities became economic targets for rebels, who posed dire threats to the survival of the state. In Maoist India, despite an insurgent ideology aiming to overthrow the state via city capture, the combat frontier effectively firewalls cities from Maoist violence. I interviewed firm managers, traders, and, where possible, locals at risk for rebel recruitment. I employed formal modeling, and qualitative (semi-structured interviews, coding) and quantitative (multivariate and logistic regression) methods to analyze, first, the effects of violence on the structure of rural-urban trade networks, and second, the effects of trade network morphology on the structure of the combat frontier itself.

Today, the least-developed countries are the least urbanized (though urbanizing quickly – the percentage of Sub-Saharan Africa's population living in urban areas is projected to grow from 37% today to over 60% by 2050 (United Nations Population Division, 2007)), as well as being most afflicted by such rural-urban violence. Violent internecine conflicts have in fact directly caused over 20 million deaths since the end of World War II (James Fearon and David Laitin, 2003), and the number of active conflicts in the world has risen from around 15 in 1946 to 35 in 2008 (reaching a peak in the early 1990s – following the end of the Cold War – of around 55 (Uppsala Conflict Data Program, 2009)). Of the 118 violent conflicts occurring between 1989 and 2004, all but 7 have involved non-state armed actors (Lotta Harbom and Peter Wallensteen, 2005).

States split by a rural-urban conflict are unable not only to consolidate their ostensible monopoly on the Weberian use of coercive force, but also that on taxation. Associated governance problems are thought to retard or warp development processes, thereby sowing the seeds of future violence (Paul Collier and Anke Hoeffler, 2000). What is it about economic relations between core and periphery – and specifically about the types of trade institutions that serve as the interface between the two – that renders state legitimation so problematic? Moreover, how can we influence these rural-urban relations so as to strengthen the legitimacy of the state?[1] A focus on institutions is in line with the growing consensus that economic development trajectories depend largely upon them (see, e.g., Daron Acemoglu et al., 2001, Dani Rodrik, 2003), and that development processes and conflict dynamics are intimately intertwined (though just precisely how remains much debated) (Macartan Humphreys, 2003b). Moreover, a focus on the rural-urban divide is arguably more analytically tractable than a dichotomy of state versus non-state targets that is sometimes made (see, e.g., Ejaz Ghani and Lakshmi Iyer, 2010), given the growing gray areas of non-state actors supported, encouraged or employed by the state on the one hand (e.g., Fabio Armao, 2009a, Diane Davis, 2007), and on the other the number of rebel groups that form quasi-governments that may come eventually to be officially recognized in some way (Claude Bruderlein, 2000).

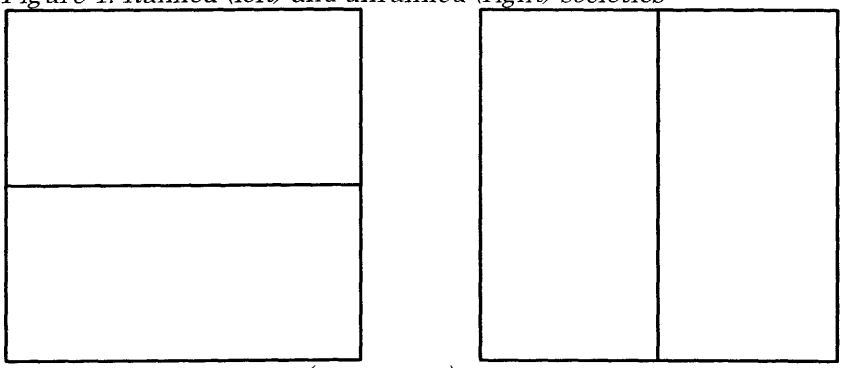
This study therefore seeks to examine the economic relationships between rural and urban areas in countries in which violent conflict has threatened to fracture the state. It is my contention that a focus on the connections and cleavages that characterize the rural-urban relationship in such countries will contribute to our understanding of economic governance more generally, and indeed the nature of the disruptions currently upsetting the scalar consolidation of governance institutions at the level of the nation-state in the early 21st century. I am particularly concerned with the notion of economic (dis)unity as felt at the of the firm, household, and individual levels, and as such, will focus most of my attention on the phenomenon of rural-urban trade during conflict, at the expense of better-studied areas like state political (William Reno, 2003), judiciary (Balakrishnan Rajagopal, 2005), military and police (Diane Davis, 2006) institutions , or rebel organizations (e.g., Nicholai Lidow, 2010, Roger Petersen, 2001, Jeremy Weinstein, 2007) – though I touch on them from time to time.

[1] By asking this question, I am not necessarily taking it for granted that the nation-state can or should be the only, or even the predominant, scalar unit of governance. In an increasingly interlinked world, modes of governance will be required that are able to coordinate civil society groups, corporations, transnational networks, regional cooperation organizations, and other non-state actors that may come to perform some or many of the functions of a state at scales specific to the problems they seek to address. On social movements and transnational NGOs in globalized society, see the seminal article by Lynch (1998) and Rajagopal (2003).

1.2. The Thesis

The overarching thrust of my argument can be stated simply: the trade networks[2] that manifest the economic relationship between rural and urban areas may differ dramatically in their response to, and effect on, the combat frontier, depending on what type of underlying social system they are based upon – and specifically whether those social systems are ranked or unranked (see Figure 1). In a ranked social system, ascriptive identity groups are arranged in hierarchical fashion. In an unranked system, they are arranged in separate, nonhierarchical fashion. Those trade networks based upon ranked social structures facilitate elite-elite trade deals between urban-based traders and rebel commanders that benefited the rural insurgents. By contrast, those based upon unranked social structures tended to disallow this sort of deal structure, concentrating profits in urban areas, destabilizing the combat frontier, and further incentivizing the targeting of cities. In essence, these "interstitial economies" affect not the onset or intensity of the conflict, per se, but its directionality between rural and urban areas. More broadly, this study seeks to recast dynamics of violent internal conflict as a dialectic relationship between intensification (production, often in state-controlled urban areas) and extensification (predation, often in rebel-held rural areas). It attempts to reconcile the opposing views that Development processes either drive or undermine violent conflict, and suggests that, in the absence of a monopoly on the use of coercive force, the state may benefit from geographic containment of competitive force by way of these "interstitial economies."

Figure 1. Ranked (left) and unranked (right) societies



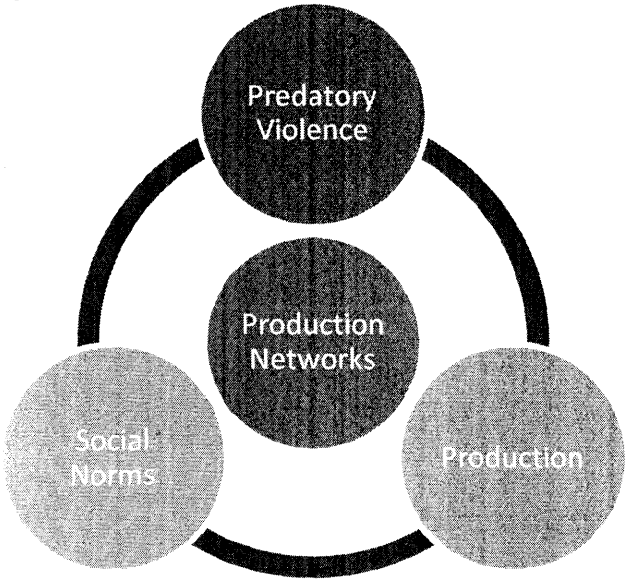
Adapted from Horowitz (2000, p. 22)

Conflict dynamics and development processes have a notoriously circular relationship: they are replete with positive feedback loops, collectively termed the "Conflict Trap"(Paul Collier

[2] Throughout this paper, I will use the terms "production networks" and "trade networks." The two are related but not identical. "Production networks" will be defined to include the hubs of value-added in an economy, such as farms, mills, factories, etc., in addition to the trade linkages between them. "Trade networks" refers only to the linkages between them, be they involved in supplying hubs or distributing products.

et al., 2003). Violence informs the decision calculus of economically productive actors, and consequent economic changes reframe the decisions of violent actors. I want to view this process through the lens of production networks, adding to the simple dyadic (violence-economy) model the factor of social norms (see Figure 2). Production networks are important for study because they represent the hubs and linkages that collectively make up the sources of value-added to be captured, violently or otherwise, by state or non-state actors. Moreover, production networks are not inanimate systems; rather, they are composed of real people coming into real, multifaceted relationships with one another, acting according to self-interest and social norms. These networks are, to borrow a phrase from Balakrishnan Rajagopal, a "terrain of contestation" (Balakrishnan Rajagopal, 2005, p. 183) that structures rural-urban conflict.

Figure 2. A conceptual diagram of production networks at the center of a three-way relationship



This is partly, then, a story of norm-based resilience in the face of overwhelming odds: even as production (and particularly trade) networks splinter and fragment due to violence, they grow in membership and expand the universe of economic alternatives available to the productive economy. Even as the rule of law erodes, trade networks succeed in promoting compliance with a set of standards for a new brand of localized economic activity through social channels. In the absence of vertical enforcement mechanisms coordinating the interface between urban and rural, industrial and agricultural, government and rebel, these horizontal production networks are able to cultivate a degree of interstitial economic order. But just how they do it, and what the effect is on the conflict dynamic, will depend greatly on the social norms that underpin those trade networks.

The idea here is that, given weak or absent state institutions capable of guaranteeing property and contract security through a credible threat of retributive justice, trade and

production networks may rely on social norms to maintain their integrity. Stated as a question, when few "vertical" enforcement mechanisms exist to ensure good behavior, must "horizontal" relationships between actors be characterized, in the words of one economist, as occurring "only in the shadow of conflict" (Jack Hirshleifer, 1994p. 3), or do social norms play a role in structuring relations? Here, I am asking a version of Harold Koh's (2004) question ("Why do nations obey international law?") but reframed for traders: "Why do traders trade in environments conducive to stealing?" Koh sets out five possible reasons for the kinds of rule compliance that is necessary for productive interaction: (1) threat by a coercive power, (2) self-interest, (3) reasons of liberal theory associated with Kantian rule legitimacy and political identity, (4) communitarian solidarity, and (5) legal process (Harold Hongjui Koh, 2004).

The first two reasons might be rephrased as "sticks and carrots," and easily plugged into a cost-benefit analysis. The last three have more to do with the establishment of social norms that may retain a hold on actors whether or not utility payoffs are maximized, and I will add a fourth to that list: teaching and knowledge-sharing can support new forms of productive activity that otherwise would not have occurred. These factors all have their place in this story; indeed to dismiss the rational economic reasons would be to miss quite a large chunk of the story I mean to tell. But I will also argue that the shape of trade networks serve as midwives to *emergent* economic governance processes which piggyback on social relations. In doing so, they actually succeed in changing the calculus of rational actors. And because the trade networks themselves are largely held together through a sense of communitarian solidarity, they way the communities are arranged in society – again, ranked versus unranked – will matter a great deal in determining how they function.

I will contend that, under certain conditions, the traders and businesspeople who populate these production networks even succeed in instilling the norms required for a productive economy – limitations on the unbridled use of force, expectations of cooperation, a measure of good governance – in the violent actors who would overthrow it. In other words, the trade networks I describe act in some measure as facilitators, effecting a kind of Coasian bargain (Ronald Coase, 1960) between urban industry and rural-based insurgents. In this regard, my thesis may serve as a counterpoint – not a rebuttal – to the many fine existing studies that describe war economies as overwhelmingly pathological, geared to the production of more violence, and tied inextricably to the interests and military forces of despotic warlords[3].

Lest one get the idea that this is all a good news narrative, I should also mention at the outset that this coin has a darker reverse face – for if traders in rural-urban networks allow

[3] Seminal examples include Reno (1997) and Pugh and Cooper (Michael Pugh and Neil Cooper, 2004). It has become almost second nature for policymakers to strategize ways of "transforming" war economies in the post-conflict period (see, e.g., Heiko Nietschke, 2003, and Christiana Solomon, 2006), rather than building on possible positive developments that may have occurred in war. This is often due to an exclusive focus on commodity exports and illicit trades (e.g., Philippe Le Billon, 2001, Michael Ross, 2004a).

the productive economy to survive in spite of or even thanks to violent actors, they facilitate the exploitation of the rural areas they serve. In doing so, they may enable the further growth of non-state armed groups. In other words, these trade networks serve as the interface between the two faces of what I will describe later as the intensification-extensification dialectic – giving rise eventually to new forms of localized production knowledge.

Given the circularity of development and conflict processes mentioned above, this study will tackle the issue of economic governance across the rural-urban divide in two principal parts based on radically different cases and parts of the world: Part II examines how violence impacts on rural-urban production networks in Liberia and Sierra Leone, West Africa, and Part III examines how rural-urban linkages in turn impact on the behavior of insurgent groups in Maoist-affected areas of India. The West African cases lend themselves to the study of the impact of violence on production networks because the scale of the violence during the civil wars relative to that of industry was vastly overwhelming – so much so that industry and its associated production networks had to go to enormous, and very evident lengths to survive. This makes it easy for an outside observer to note what changed. Conversely, the Indian case lends itself to the study of the impact of trade networks on violent actors because the local economy is so robust. Maoist India makes a good case study for examining the reverse phenomenon because India has a robust industrial sector that draws on rural inputs, and it has more locally-funded insurgency. This implies that the effects of such rural-urban trade on insurgent groups might be more easily appreciated there than in a countries like Liberia or Sierra Leone, where rebel groups depended more on outside funds through the international sale of smuggled diamonds or illegal timber. Moreover, India, as a fast-growing middle-income country, defies the conventional logic on rural insurgencies as springing up only in poor, economically stagnant countries – and highlights the value of a production network lens to analyze conflict economies.

In the final analysis, the two cases will be compared and contrasted, since West African trade networks are informed by an unranked society, while Indian trade networks are informed by a ranked society. I will argue in the conclusion that this difference accounts for the fact that cities became the principal targets of West African rebel movements, while the Maoist insurgency in India (although rhetorically espousing such a goal) does not prey upon urban targets.

The structure of the study will be as follows. In the remainder of the Introduction (Part I), I will (a) lay out the case for using production networks as a lens on economic governance; (b) make a philosophical argument that a dialectic characterized by the twin processes of intensification and extensification (associated to a certain degree with production and predation, respectively) is at the heart of state consolidation or disintegration; and (c) present a formal model of production and predation in a simulated core-periphery relationship.

Part II, comprising Sections 2-4, analyzes the effect of violent conflict on production networks in Liberia (and, to a smaller extent, Sierra Leone). In Chapter 2, I argue that successful adaptation of production firms to civil war is predicated upon a sort of just-in-time production requiring the strategic dispersal of production networks to avoid predation. In doing so, I also contend that the social norms of family and clan solidarity help to ensure the survival of production firms despite rebel intentions to predate them, as information about possible rebel strikes is transferred through family networks and then widely shared in the urban trade hub. This helps explain why so many firms actually survived the war. In Chapter 3, I argue that trade networks in Liberia, reacting to the threat of violence, tended to induce changes in local production firms in ways reminiscent of state-led industrialization, localizing supply chains and the labor force. In effect, trade networks were able to switch from primarily distribution networks, to a system of supply chains drawing on rural agricultural produce, as well. Moreover, this process is enabled by the production of new knowledge at the factory level. In Chapter 4, I contend that rural-urban trade networks in Liberia and Sierra Leone splintered into radial networks along ethnic lines – and that for this reason, monopolistic rural-urban linkages were exacerbated as networks became increasingly disembedded from one another.

Part III (Sections 5 and 6) examines the effect of production and trade networks on the intensity of violence employed by the Maoist insurgency in India, and on morphology of the combat frontier itself. In Chapter 5, I show that redundant trade networks tend to encourage less violent behavior from rebel groups around the combat frontier – essentially making it "tidier." In Chapter 6, I show that the social ways in which traders are integrated into the local communities they service bear on the character of contestation between urban and rural areas. I describe how the caste system in Maoist India prevents the localization of the trading classes in Maoist-held tribal areas that occurred in Sierra Leone and Liberia, making for less monopolistic rural-urban relations, and a much more abrupt economic transition between government-controlled and rebel-held territories. That "sticking point" contributes to persistent territorial deadlock in India, whereas the morphology of radial trading networks in West Africa allowed for the combat frontier between opposing factions to "slide" from countryside to city.

Part III (Chapter 7) puts the two cases in conversation with one another, comparing and contrasting trade network morphologies. I will re-introduce the state as an explicit actor affecting and affected by these trade networks, point to questions raised by the research, and hint at policy recommendations to come from it.

1.3. Through the Looking Glass: Development Economics to Production Networks

In this study, I will repeatedly stress the importance of the morphology of production networks in allowing local economies to adapt to conflict, as well as in establishing the structural conditions for conflicts to intensify and move in space. These production networks – also sometimes called supply and distribution chains, value-added chains, or

trade networks – enable the sequential procedures by which raw materials are obtained, processed, transformed into a product, and then delivered to the final consumer. They consist fundamentally of nodes and connections: nodes are locations where work is applied to transform the product and add value, while connections are the routes the product must travel geospatially in order to arrive at the next node. It will be my contention that rural-urban conflict is particularly tractable viewed through this lens, as it allows us to see the violent appropriation of goods as a product of different models of rural-urban interface – models that we need not take as immutable, and which policymakers may be able to adjust to head off impending crisis or attenuate ongoing violence.

How does the "production network" lens differ from that normally applied by development economists to the issue of conflict? The rise in the prominence of internecine conflict has prompted one prominent former World Bank economist to declare those nations housing the "bottom billion" income earners to be persisting in a reality of the "fourteenth century: civil war, plague, ignorance," in which the political institutions of the state are "falling behind and falling apart" (Paul Collier, 2007a, p. 3). The same economist describes the rest of the world as belonging comfortingly to one of two families: developed countries (representing roughly the richest one billion people), or those on track to become so (the four billion in between). There are several implicit assumptions in this view – let's call it orthodox development economics – of economic development and governance. First, the country is unquestionably assumed to be the natural unit for assessing economic governance and development. Second, "development" writ large is unequivocally considered an antidote for violent conflict – poor people kill each other[4]. Third, and related to the second, development failures are seen essentially as a function of factors unrelated to development successes, or to the broader processes of economic development occurring across the globe. Thus, some countries can be viewed as atavistic, "fourteenth century" anachronisms, rather than displaying prototypically modern symptoms of global capitalism. Such a view focuses attention on the "Othered" category of "failed/failing states," "weak states" or "fragile states" as the places of origin of the world's worst problems – human trafficking, terrorism, ethnic conflict, genocide – to the exclusion of systemic causes (such as growing industrial demand for raw materials), and elicits in the popular imagination an almost medical desire to "cure" such pathologies[5].

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[4] This remark is rather flippant, but conveys the central point that the poor have lower opportunity costs of conflict than do the rich (see, e.g., Paul Collier, V.L. Elliott, Havard Hegre, Anke Hoeffler, Marta Reynal-Querol and Nicholas Sambanis, 2003). Strangely, this idea has mostly been interpreted to imply that *absolute* poverty causes conflict, rather than poverty *relative* to other countries, groups, or individuals, as most theoretical models of conflict imply (e.g., Jack Hirshleifer, 1991). Neither one of these views takes livelihoods to be at all embedded in a socio-cultural medium that facilitates the process of fulfilling one's wants and needs (e.g., Edward E. Azar, 1990, James Scott, 1976).

[5] See, for instance, Ghani and Lockhart's(2008) aptly-titled *Fixing Failed States: A Framework for Rebuilding a Fractured World.*

The standard development economics view may seem reassuring in some ways: things are bad in failing states, but somewhat remote and ultimately fixable with the right policies and enough international aid. Moreover, the most introspection required on the part of the rich world – or perhaps "industrialized world" is now more apt – is what percentage of rich-world GDP should be channeled to international aid (Jeffrey Sachs, 2005), rather than how the industrialized world's continued economic growth and hegemony may undermine attempts at economic governance elsewhere. This all fits in perfectly with Albert Hirschman's (1981) definition of development economics as rejecting the monoeconomics claim (i.e., not all economies behave in the same way – developing economies require specially formulated policies and aid) while asserting the mutual benefit claim (i.e., international trade is always mutually beneficial, no matter the disparities in income, level of industrialization, etc. that may exist between countries). The production network analysis in this paper takes as its point of departure a suspicion of such monolithic generalizations. An historian might justify this suspicion with an appeal to accuracy regarding the historical relationship between development and violent conflict: the bloodiest episodes in human history occurred in the last three centuries at the hands of industrialized or industrializing powers – the Crimean and Franco-Prussian wars, colonial excesses and genocides worldwide such as occurred in the Congo Free State (see Adam Hochschild, 1999), World Wars I and II, Stalin's brutal command economy industrialization[6], China's Great Leap Forward.

However, the usefulness of a more critical and fine-grained approach goes beyond the avoidance of historical revisionism. The study of the economic interface that conditions rural-urban (or core-periphery) conflict is instructive in two ways. First, it may improve our current understanding of the many ongoing conflicts characterized by rural-based insurgent movements mobilizing against (potentially parasitic) urban power centers – think, e.g., of the conflicts in Eastern DRC, Afghanistan and Pakistan, or the Naxalite insurgency in India. Second, rural-urban conflicts in the least developed countries may represent the beginning of a backlash against the forces of hegemonic economic globalization. Nor does the backlash stop there. Rural-urban conflicts –in the extreme cases, insurgency and civil war – might be seen as a forerunner of the more complex phenomenon described by Davis (2009) and Armao (2009b) wherein transnational non-state armed groups compete in a global marketplace to recruit members into "new imagined communities". What began as rural-based insurgencies across the Global South has become a truly global problem, with now-urban-based non-state armed groups tapping into transnational networks of loyalty and support; undermining the nation-state's traditional monopoly on the use of coercive force, taxation, and therefore its legitimacy and sovereignty; and ultimately destabilizing hopes of peace based on the Westphalian system

[6] An interesting counterpoint is made by historian Timothy Snyder (2010), who argues that the vast numbers of people killed in Eastern Europe before, during and after World War II were not so much casualties of a modern state apparatus, as caught in the middle of a bloody struggle between would-be colonial powers. He emphasizes that the majority of the deaths were people shot in fields, not "processed" in facilities operated by the modernizing state.

of world politico-economic governance as epitomized in its most universal expression, the United Nations (see Douglas P. Fry, 2007).

The threat of the "bottom billion" is not just that these countries might export their problems to their neighbors or even farther – it is that they may be a harbinger of things to come. The threat of becoming a narco- or mafia-state is not limited to poor place like Afghanistan (Thomas Scheich, 2008), or West African countries like Guinea-Bissau (Antonio Mazzitelli, 2007); it is spreading to middle-income countries like Mexico, Serbia and Russia[7], where core-periphery conflicts have simultaneously ejected large populations abroad as refugees or migrants, while concomitantly urbanizing many more domestically[8]. This study then can serve to shed light on the dynamics of economic governance produced during the historical period beginning roughly after World War II and possibly just now seeing the beginning of its end, with the rapid proliferation of transnational non-state armed groups such as drug cartels, mafias, mercenaries, private security forces, and criminal networks.

1.4. A Dialectic: Extensification & Intensification

A key part of placing the following sections in a unifying theoretical framework is to introduce the role of the state, and indeed the mechanisms and processes of economic governance more generally. I would like to approach the topic with a vaguely Althusserian epistemology, in which a material dialectic describes the theory of knowledge as production (Louis Althusser and Etienne Balibar, 1998, p. 24). In Althusserian fashion, the basic dialectic is not between subject and object (as it might be interpreted to be with Hegel or early Marxist writings), since Althusser's reading of Marx's epistemological break rejects that distinction. Rather, I propose that this dialectic takes the form of intensification and extensification, which find their synthesis in the new production of knowledge and its accompanying suite of social norms. Intensification occurs when society seeks to make optimal use of the resources at hand through increases in production efficiencies. The latter in turn requires more raw materials whose extraction promotes the emergence of extensification. In that mode, society becomes a predatory consumer of the reified Other, which it views solely as exploitable resource. Predation in turn is what one economist called "the dark side of the force" (Jack Hirshleifer, 1994) – the flip side of the production coin. The notion of knowledge as production is then complicated by this production/predation dichotomy: extensification provokes a backlash, whereby those

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[7] In fact, recent estimates of the size of "shadow markets" for legal goods alone (i.e., excluding illicit trades) as a percentage of GDP are slightly higher in "transitional" countries (39%) than in "developing" countries (37%), though falling in developed countries (15%) (Friedrich Schneider, 2007).

[8] Collier and Hoeffler (2000) note that the strongest effect of war on the risk of relapse works through diasporas, since rebel organizations are able to tap into transnational sources of funding, typically from expatriate supporters who are financially better off than their in-country counterparts. This phenomenon of diaspora influence is not limited to civil war, nor to economic pull alone – Shain and Barth (2003), for instance, stress the important effects of diasporas on shaping homeland domestic politics.

stripped of their resources and means of livelihood prey upon the production networks of the aggressor. This process finds its synthesis in the production of new knowledge, giving rise to new forms of intensification. I will say more about the choice of epistemology below, in Subsection 1.4.4.

What defines a material dialectic based on the twin processes of extensification and intensification? These terms refer to the processes by which a group attempts to grow its well-being either by (a) appropriating more resources (expansion, or "extensification"), or (b) making more intensive use of existing resources ("intensification" via production or technological change). I argue that state-formation in the modern era essentially crystallizes around, and is made possible by, extreme intensification – traditionally in the form of industrialization – and that the apparatuses at the scalar level of the state are continuously stabilized by way of legal mechanisms promoting the hallmark of intensification (i.e., economic producers and production more generally) over that of extensification (i.e., economic predators and predation more generally)[9]. I argue this is the case despite the fact that, in true dialectic fashion, extensification contains the seeds of intensification and vice versa.[10]

This dialectic network approach focuses our attention on the processes of economic globalization whereby production network nodes are increasingly geographically separated by low-cost connections that have come to catalyze protracted civil conflict and exacerbate the conditions under which the state project and economic nationalism can exist coterminously. This is because economic predation and appropriation are economically preferable to production where large obstructable flows (connections in the production network) vastly outnumber nodes of (and thus opportunity to take part in) production. So the extensification-intensification dialectic takes the form of predation in the one case, and production in the latter. In this way, states whose territories contain many production network nodes to balance network connections are now considered stable (e.g., China), while those with few nodes and high-value connections are unstable (e.g., Sierra Leone's diamond mines and the trade networks established during its civil war), and those with almost no production nodes but very high-value connections have withered away almost completely (e.g., Somalia's state collapse in proximity to the world's most valuable sea trade

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[9] This statement applies only to the peculiar case of the modern nation state. Other state forms have coalesced around economic growth fueled by outwardly-directed extensification in the form of conquest – e.g., empire-building and colonialism. Historical debate continues as to whether the capital influxes from colonialism gave rise to the Industrial Revolution in Britain and Europe, and the beginning of the great successive waves of technological intensification that swept the globe between the late 1700s and the present. If so, this would be a case of an extensification dynamic birthing an intensification dynamic.

[10] Cohen et al. (1981, cited in Mohammed Ayoob, 2007, p. 96) likewise argue that:

> [t]he extent to which an expansion of the state power will generate collective violence depends on the *level* of state of state power prior to that expansion... The lower the initial level of state power, the stronger the relationship between the *rate* of state expansion and collective violence.

route, and the predictable rise of pirate outfits). The fragile state becomes, in essence, a middleman state – reliant for its survival on selling the resources of its periphery. This is a classic form of the extensive state. India is an interesting contradiction, in which many nodes and obstructable connections coexist within the geospatial domain of the state. In any case, peripheral insurrection de facto limits the state's ability to raise revenue through peripheral "fire sales" to big corporations, and may in the particularly successful instances promote local intensification.

1.4.1. Production, Predation & the State

The power and legitimacy of the modern sovereign state on the one hand, and the breadth and depth of economic industrialization on the other, have long been viewed as developing in tandem. The relationship between the state and industry might itself be termed "economic governance," and viewed in contradistinction to that between the state and the so-called "forces of order," which might be termed "physical governance." Even in what W.W. Rostow termed the "pre-conditions for takeoff" in Western Europe, there existed a growing philosophical alliance between the increasingly powerful and centralized absolutist governments on the one hand, and the nascent propensity to leverage scientific knowledge for technological applications (Walter W. Rostow, 1990 [1960]). Francis Bacon asserted that, "...the true and lawful goal of the sciences is none other than this: that human life be endowed with new discoveries and powers." (Francis Bacon, 1985 [1620]) His contemporary and countryman, James I of England famously declared that, "[t]he state of monarchy is the supremest thing upon earth: for kings are not only God's Lieutenants upon earth, and sit upon God's throne, but even by God himself they are called Gods." (King James I, 1609) Nor were these two notions merely concomitant, but found their union in the writing of Thomas Hobbes, that devotee of causal materialism who sought to harness scientific knowledge of the social realm to better govern it – and thus avoid the much trumpeted "war, as of every man, against every man" that our natures would surely bring upon us otherwise. In developing this ideology, Hobbes paved the way for future social engineers like Saint-Simon.

The extensification-intensification dichotomy (if not yet dialectic, per se) was first developed in population biology and agricultural studies. The production-predation split was then stated more explicitly by the economist Vilfredo Pareto[11]. Not surprisingly, Thorstein Veblen, that early proponent of the application of evolutionary biology principles to economics, identified a similar behavioral polarity, describing industrial production (an instance of what I am terming intensification) as being predicated on a private property system initially constituted – in stark contrast to Locke's liberal view of property created through value-adding – through violent collective seizure of resources, and intra-group strife resulting in the private apportionments of the those resources pertaining "organically

[11] Pareto noted that, "The efforts of men are utilized in two different ways: they are directed toward the production or transformation of economic goods, or else to the appropriation of goods produced by others." (Vilfredo Pareto, 1966 [1902])

to the person or user" (Thorstein Veblen, 1934). This appropriative process is what I term extensification.

More recently, the production-predation dichotomy has been developed into a suite of formal static equilibrium models by proponents of Rational Conflict theory like Boulding (1962) and Schelling (1963), as well as proponents of the New Political Economy like Hirshleifer (1991), Grossman and Kim (1995), and Caruso (2008). The tradeoff complicated the standard neo-classical picture, which had taken for granted that resources would be allocated to production, and therefore made an implicit elision between personal and public welfare, at least in the case of private goods – Smith's famous invisible hand would not necessarily go to work optimizing economic systems. It also allowed modelers to endogenize institutions like property rights and contract enforcement, that had previously remained implicit in most models, but whose importance had been highlighted by Ronald Coase's (1960) seminal work in institutional economics. This was a departure arguably more radical even than that between perfectly competitive and oligopolistic markets. While both introduce non-cooperative game theory into economic markets, and thus the possibility for suboptimal welfare outcomes, not even the proponents of sub-optimal market outcomes had ever endogenized property rights. That is, duopolistic competition might result in less total welfare than other arrangements, but the competition was never predatory and always "may the best man win."

Some economists have glossed over the production-predation split, in emphasizing the parallels between market competition and ecological competition, as though the market effectively harnessed the wild urge toward predation (see, e.g., Andrew Lo, 2004). In fact, however, the "natural selection" that takes place among firms in developed world markets is strikingly different from that occurring in biological systems and in war zones for one primary reason: survival in the first instance is not predicated upon adaptation to predation, but *only* adaptation to competition over scarce resources. As Lorenz (1974 [1966]) points out, intra-species aggression – motivated by competition over scarce resources – with the intention of killing is rare[12], whereas interspecies (and economic) predation is specifically designed to kill. But the institutions of property rights and contract enforcement, so critical to the function of developed economies (Stephan Haggard et al., 2008), ensure that "the fittest" in industrial economies is defined solely on the basis of productivity and innovation serving the preferences of the consumer. In effect, the system is geared toward eliminating predation altogether *within the defined parameters of the state's Self* (even if the state may still engage in, and permit subordinate non-state actors to engage in, predation of the Other in, e.g., imperial expansionist endeavors such as those carried out by the Dutch and British East India Companies in the 17th to 19th centuries). When one company acquires another, it cannot be equated with, for instance, one animal eating another, or a rebel group looting an industrial factory, because the

[12] Except in humans who, he contends, have developed killing tools that outstrip their innate intuitive capacity for restraint.

owners and shareholders of the acquired firm are compensated. No such reciprocity – even if the reciprocity is imperfect, as when radical information or power asymmetries exist in the market – is the norm in strictly predator-prey relationships.

As radical a development as conflict models represented, though, the modeling schools nevertheless took the production-predation split as an epistemologically stable distinction, whereby any economic actor at any time had a fundamental choice to make as to how to allocate his resources: to take or to make (and sometimes, to help enforce state order). Nowhere was it acknowledged that predators and producers might grow more or less distinct from one another as institutional arrangements shifted over time. It is that deficiency that the extensification-intensification dialectic will seek to redress.

The basic intensification/extensification model might be said to apply to all human societies, but begins to oscillate more rapidly and powerfully in a capitalist system explicitly designed to maximize growth in a sort of Schopenhauer-ian exercise in "world-eating" expansionism. Predatory expansionism eventually spreads itself too thin to be a threat to those unconquered, and thus must concentrate the resources it has usurped in productive ventures. Sassen's observation that

> ...the formation of the national state destabilized older hierarchies of scale, which typically were constituted through the practices and power projects of past eras, such as the colonial empires of the sixteenth and subsequent centuries and the medieval towns that dominated long-distance trading in certain parts of Europe in the fourteenth century... (Saskia Sassen, 2006, p. 14)

may describe a certain succession of hegemonic societal structures, but fails to distinguish between extensification- and intensification-based structures. Neither can it therefore give an adequate account of *why* certain scalar structures gained the ascendancy at certain times, while being undermined by competing structures at other scales at other times. For instance, long-distance trade routes of medieval Europe and Central and East Asia represented arteries of commodities far outstripping the value-added capacities of local production centers. It is no surprise, then, that that these routes served as highways along which expansionist ("extensifying") and predatory empires grew, such as the Golden Horde and other Mongol empires, even threatening the European and Chinese centers of production and demand that gave rise to the Silk Road trade in the first place.

The end of the age of empire and the ascendancy of nation-state hegemony coincided then not haphazardly with the rise of industrial production, and this fact alone is reason enough to study industrial production in fragile states, and its relation with rural hinterlands. The nation was a natural scalar unit of cohesion for industrial development, specifically before widespread globalization, because the state could have a monopoly on control over the rural-urban supply chains necessary to fuel industrial production. It could therefore facilitate capitalism's inroads into non-capitalist enclaves – even paving its way by creating the necessary urbanizing labor forces by disrupting traditional modes of life (e.g., by way of

the Enclosure Acts in England from 1760 to 1820[13]) or forcibly acquiring the necessary land (e.g., by way of the Mill Acts in the United States of the early 1800s[14], not to mention their modern-day equivalents in fast-developing countries like India[15]) in rural areas. While intensification demanded the forcible reallocation of resources, the state maintained its monopoly on the use of force by effecting the actual extensification itself, rather than allowing industry to do so[16]. Such state-sponsored redistributive violence blurs the distinction sometimes made between *destructive* and *appropriative* violence on the one hand (which is often conflated with violence carried out by non-state actors), and *rule-making* violence on the other (the kind necessary to establish state sovereignty) (Mehrdad Vahabi, 2005), since the state is ostensibly attempting to grow total welfare, but is doing so by destroying the livelihoods of a minority at the expense of its social contract. In essence, the state has chosen to define as "Other" those who do not participate in what Thorstein Veblen would have called the "machine process" and Weber the "spirit of capitalism," thereby throwing a sacrificial bone to the dogs of industry and channeling the drive to extensify. Or in other words, extensification projects became a state monopoly, since it involved the use of force.

The production-predation dichotomy is particularly intriguing when considering that industrial production seems to play a special role in diminishing the role and intensity of conflict. It is a truism in the modern world that violent conflict tends to occur in poor, non-industrialized countries more than rich, industrialized ones (Macartan Humphreys, 2003b). However, industrial production in itself – controlling for the effect of poverty – has a moderating effect on the levels of violence intensity in conflicts. Table 1, Model 8 highlights the results of a preliminary ordered logistic regression analysis using cross-country panel data for 185 countries from the years 1960 to 2006[17]. shows that, controlling for sectoral

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[13] See Polanyi's (2001 [1945]) famous account of the evolution of the "Satanic Mill."

[14] Horowitz (1977Ch. 2) describes a process whereby two very different conceptions of property rights came into conflict during the Industrial Revolution – one conservative and "anti-development," the other validating the appropriation of land for "higher and better" uses associated with boosting the "common weal." The transformation represented a veritable revolution in the doctrine of prescription, and eventually recognized the primacy and priority of developmental property uses even when they inflicted some "externality" on nearby landowners.

[15] Balakrishnan Rajagopal (2005) points out that the development process in India has relied upon massive development projects entailing land appropriation – which might be viewed as a form of internal extensification. Large dam construction, such as that carried out on the Narmada River over the 1990s and early 2000s, displaced hundreds of thousands of tribal people with only the most tenuous connections to the capitalist system. More recently, the Indian Ministry of Rural Development has itself issued a report highly critical of the central government's aggressive land acquisition strategy, which, it claims, has ultimately alienated rural and tribal populations and thereby fueled Maoist violence against the state (Committee on State Agrarian Relations and Unfinished Task of Land Reforms, 2009).

[16] Foucault, however, points out that the state attempts to sanitize its violence and reduce the length of time that such violence is employed so as to minimize its felt weight on the citizenry (Michel Foucault, 1995 [1975]).

[17] Cross-country regressions purporting to predict development or conflict trajectories, including (and perhaps especially) this one, have a number of inherent weaknesses associated with them, including

composition, year, standard macroeconomic indicators, and trade flows, every percentage point rise in the value of manufactured goods as a fraction of total merchandise exports (manpercmerchexp) is associated with a significant 1.3% decrease in conflict-related deaths. Similarly, a twofold increase in the absolute value of manufactured goods produced is significantly associated with a decline in conflict-related deaths of roughly 35%. Contrariwise, a twofold increase in absolute value of agricultural goods and general services is significantly associated with an *increase* in conflict-related deaths of about 44% and 373% respectively.

Table 1. Ordinal logistic regression results for intensity of future violent conflicts first without and then with underlying control models.

Outcome variable: intenfut	Uncontrolled Models				Controlled Models			
Predictor variable:	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8†
manpercmerchimp	-.0116 ***		-.0439 ***	-.0437 ***	-.0069 (NS)	-.0145 ***	-.0151 **	-.0141 **
manpercmerchexp	-.0091 ***		-.0181673 ***	-.0138073 ***	-.0144 ***	-.0076 **	-.0053 *	-.0047 ~
l2mangdp		-.4741 ***	-.4623 ***	-5.358906 (NS)	6.4898 **	3.3230~	-4.5236 (NS)	7.5266 ***
l2manabs		.0984 ***	.2249 ***	.230388 ***	-6.5856**	-3.3984~	-6.5541 ***	-6.2592 ***
l2mangdpl2indgdp					NA	NA	-.2827 *	-.2838 *
l2mangdpyr				.0024281 (NS)	NA	NA	.0062 (NS)	NA
Pseudo-R2	0.0126	0.0162	0.0596	0.0721	0.2541	0.2305	0.2036	0.2314
LR Chi-2 (df)	81.57 (2, 4442)	108.60 (2, 4385)	265.73 (4, 3235)	321.58 (6, 3133)	806.27 (24, 2442)	1022.76 (16, 3105)	1253.66 (11, 4218)	882.98 (16, 2780)
P	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

*Unless specified otherwise, cell entries are estimated regression coefficients and significance levels. ~ denotes 0.05<p<0.10, * denotes 0.01<p<0.05, ** denotes 0.001<p<0.01, *** denotes p<0.001. †: Preferred model.*
Calculations by the author

If we accept that industry conditions the relationship between a state and its citizens, as argued above, then the specific forms industry takes can be thought also to condition the relationship between the state and its internal challengers. If we accept the results of the model above, there are at (the very) least two interpretations:

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the complete lack of causal mechanisms associated with the explanation (see, e.g., Christopher Cramer, 2003, Dani Rodrik, 2003). On causal mechanisms, see Tilly (2001).

1. We might conclude that there is some process or set of production relations particular to industrial manufacturing that discourages violent actors. For instance, it might be hypothesized that because industrial manufacturing has the potential to draw on local rural economies for its raw materials, it encourages mutually beneficial relationships between rural and urban areas. Or again, it could be hypothesized that industrial manufacturing, because it depends on a complex web of supply and distribution chains to be able to add value, violent non-state actors cannot employ violence indiscriminately and still hope to be able to tax or extort them.
2. We might conclude that a stronger industrial sector (relative to the agricultural and service sectors) typically correlates to those countries where populations dependent on non-intensive production methods have already been decimated, as in the case of the United States and Native Americans, Australia and Aborigines, and arguably the ongoing process of tribal eradication occurring in India. The fewer the number of such non-adherents to the capitalist system, the less trouble they can cause.

Nor are these two interpretations strictly mutually exclusive.

1.4.2. A Literature Review on the State's Economic (Un)Doing

A number of political and economic theorists have alighted on economic governance over space as a key factor in explaining state coalescence – and contemporary fissiparous tendencies. Rokkan, for instance, asserts that "we cannot study [variations among political systems]... without looking into the structure of the space over which they exert some control" (Stein Rokkan, 1999, p. 108). Most theorists emphasize the ability of the state to harness the productive capacity of its subjects or citizens, via the coercive use of force to impose the rule of law and raise taxes throughout a geographic territory. Most famously, Max Weber (2004 [1919]) and, more recently, Charles Tilly, have both stressed the monopoly on the use of force as a sine qua non of successful state formation. Tilly describes state-making as intimately linked to war-making (Charles Tilly, 1985); in fact, the funding of war through taxation demands that the state create a reciprocal relationship between the rulers and the ruled by granting rights to its new citizenry (Charles Tilly, 1992). The conditions of sovereignty require that the state have a monopoly on the use of coercive force, such that it is the only entity making claims on its subjects' (now citizens') loyalty.

Other theorists have stressed work and the production side of the state-making equation. In *On the Medieval Origins of the Modern State*, for instance, Joseph Strayer (1970) asserts that only by working together for a long time can a group of people develop the institutions necessary to form a state – that is, by contributing in coordinated fashion to production, and thereby coming into constant contact, facilitated by transportation networks. For Strayer, production is linked to sedentism – a physical arrangement amenable to state control in a way that nomadic societies are not[18]. Like for Tilly, the transition from rulers'

[18] Jeffrey Herbst (2000) contends, in an exception that seems to prove the rule, that dry-land farming practices in Sub-Saharan Africa discouraged investment in irrigation systems and permitted a more footloose sedentism that made it difficult for kingdoms to grow into states. This was because attempts at taxation would simply push populations out of their military and political reach, since

protection of the interests of the elite few to that of the masses is one of the telltale signs of statebuilding – a signpost that happens to culminate in the simultaneous onset of industrialization and the rise of the middle class as a political power[19].

Veblen linked the ideas of force and work in a surprising way. Veblen famously posits that private property is not, as liberals since John Locke have been fond of claiming, justified by the laborer's work being "mixed" with a common good to confer value that the laborer should be entitled to. Rather, Veblen argued that private property originates from a particular group's collective violent seizure of a commons – an act of extensification – which is then parceled out among its members through competition – potentially a drive toward greater resource efficiency and therefore process of intensification[20]. The evolution of private property then essentially represents the ability of a collection of individuals to unify for the purpose of predation, and remain unified once the violence has passed – possibly the beginning of large-scale political institutions that will come to compose the modern state(Thorstein Veblen, 1934). Veblen also postulated that the structure of the state was dictated by the fact that the warrior class in feudal society was able to, and did in fact, subjugate the productive class through conquest – thereby giving rise to lord and the serf, the laird and the crofter, the kshatriya zamindar and the sudra. The newly-formed leisure class is what Ernest Gellner would later term the "warrior-and-scribe ruling class" of inward-oriented "agro-literate" societies, which could vary in their degrees of centralization, "gelding" (measures taken to prevent dynastic leadership), openness, and fusion between the warrior and scribe classes (Ernest Gellner, 2006 [1983], p. 14-16).

The work of Norbert Elias hints at another factor in state-building: rural-urban security. Elias (Norbert Elias, 2000 [1994]) argues that the social mores that began to bind nations together in Europe emanated from centralizing courts, allowing for more intense, proximate relationships. Courts were not necessarily equated with urbanity (an implicit acknowledgement that Gellner's ruler might be more or less centralized), but they were equated with protection. The latter was, in turn, absolutely critical in establishing security for rural-urban trade that would build the hierarchical systems of cities that would come to

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there were minimal sunk infrastructure costs associated with any particular locale. Moreover, the population of Africa was so sparse that proto-states' territories were typically defined more as decreasing concentric circles of overlapping influence, rather than mutually exclusive puzzle pieces in Cartesian space.

[19] This emphasis parallels Stein Rokkan's "basic" model of state formation, which places "inclusion of the masses" as the second of four steps. See below.

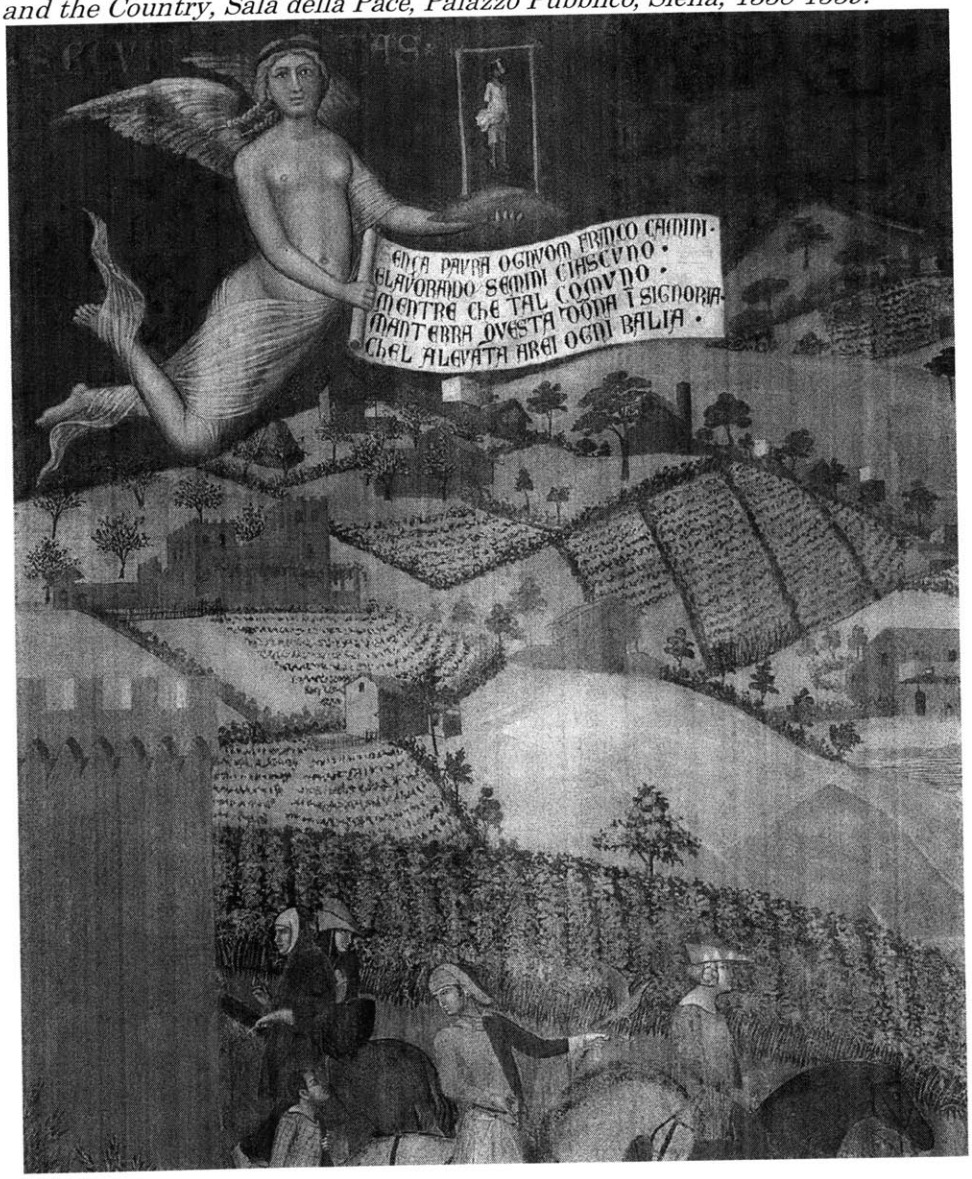
[20] The development of private property from the commons can be conceived of as being primarily efficiency-driven. Demsetz (1967) would have it that the conversion to private property occurs when this captured efficiency is worth more than the cost of establishing such a system – there is in effect an "activation fee." In practice, however, this conversion may occur slowly over time. Ellickson (1993) notes that communal property regimes generate inefficiencies through lack of personal incentives to increase productivity; solve small to medium-scale, spatially-bounded problems; and monitor trespassers and miscreants. Consequently, the more sophisticated methods of risk-sharing are also more efficient than the retention of communal property.

define the modern nation state[21]. This thought is clearly anticipated by Ambrogio Lorenzetti (c. 1290-1348), whose "Allegory of Good Government" (painted at the dawn of a new era of regional and international trade in Europe, following the Dark Ages of restricted knowledge of and contact with the outside world) depicts an angel called Security hovering over traders passing between city and country and carrying a banner promising safety to those living under the rule of law (see Figure 3). It signifies the birth of a (city-)state monopoly on the use of coercive force, used in service of fostering rural-urban mutualism. Moreover, it fits with another central aspect of state-building for Elias, which was the state's monopoly on taxation – based largely on rural-urban trade[22]. In any case, the state-building project once again points to the importance of rural-urban trade routes and the traders who manage that interface.

[21] The city systems view of a unified economic territory came to manifest in economic geography as series of geometric models of city distribution – notably those of Lösch (1954 [1944]) and Christaller (1966 [1933]) – that became known as Central Place Theory. Discussion of the respective economic functions of first-tier versus second-tier cities within national city systems continues (John B. Parr, 2002). Markusen (1999), for instance, has suggested that governments can best foster long-term growth and political peace by reducing economic development disparities between regions. Moreover, she contends that second-tier cities may act as innovation incubators, effectively shielding industries from the type of competition they would have to contend with in metropolises.

[22] It is widely acknowledged that import tariffs continued to serve as the primary source of national state revenues until the introduction of income taxes in the 20th century (see, e.g., Ha-Joon Chang, 2002)See, e.g., Chang(2002).

Figure 3. Ambrogio Lorenzetti, Peaceful Country, detail from the fresco Allegory of Good Government: The Effects of Good Government in the City and the Country, Sala della Pace, Palazzo Pubblico, Siena, 1338-1339.



The nascent state's taxation requirement gave rise to a mutualism between the urban conquerors and the rural-urban traders who resided in the city, and who may (still) benefit themselves from monopolistic or monopsonistic trade relationships with the periphery (Marcel Fafchamps, 2001). As trade routes made greater inroads into rural life and dislodged residents began to urbanize, first colonial war-making abroad, and then the rise of robust urban industry to sop up excess labor in urban areas, stabilized a potentially volatile situation and sealed the compact between industry and the state. This state-industry compact is described at its cooperative best by Peter Evans (Peter B. Evans, 1995).

Today's cities of the Global South – often megalithic and dwarfing the populations of their second-tier counterparts – may increasingly find themselves challenged to provide such security for two reasons. First, the legitimate trade taking place there is often between low-value, inelastic local goods and high-value, elastic foreign-produced goods (see, e.g., Raul Prebisch, 1959). The illicit trades, by contrast, may involve high-value goods that are more elastic, to boot, meaning that as the world's income grows, so does the trade. Moreover, the Southern megacity is often relegated almost to a mere port of call – a place to break import bulk and containerize materials exports – rather than a site of its own value-adding processes. This function undermines the classic urban stability compact between state and industry. Nor is this a clear-cut distinction, but rather a gradient: cities in middle income countries and even the rich world have grown "disembedded" cultures consisting of non-state armed groups that thrive off transnational illicit trades and make non-state sovereignty appeals across global loyalty networks (Diane Davis, 2009). Trade in what Hoselitz would call "parasitic" cities becomes not just an advantage, but a necessity for the local periphery – especially when traditional "autarkic" modes of livelihood have been sufficiently disrupted[23].

How did the state consolidate its legimacy? How is it eroding today? Stein Rokkan's answer to the first question is that the phases of state-building were (1) allocation of resources by a proto-state (usually via urban markets), (2) generative participation in the market (again, usually a rural-urban phenomenon), (3) inclusion of the masses under the protective umbrella of state institutions, and (4) state construction through centralizating institutions. To the second question, Fabio Armao answers: Rokkan's model is now unraveling, self-deconstructing in the reverse of the order originally described by Rokkan himself (Fabio Armao, 2009b). Accordingly, Armao describes four processes that work to undo state legitimacy: (1) state deconstruction through decentralization of government function, (2) expulsion of the masses, (3) parasitical participation, and (4) violent allocation of resources. Armao believes this to be an explanation for Saskia Sassen's claim that "[g]lobal processes and formations can be, and are, destabilizing the scalar hierarchy of the national state." (Saskia Sassen, 2007, p. 14)

This model is conceptually exciting, and a more satisfying framework for violent conflict and state formation than the more popularly held (and optimistic) notion that national states represent a sort of "end of history" equilibrium. The latter interprets internecine struggles in, for example, many African countries, as representative of "growing pains" in a (colonially-delayed) process of state-formation-by-war similar to that which characterized five centuries of European wars, resulting in the Westphalian system, and culminating – at least in Western Europe – in World War II with reverberations to the present day in peripheral struggles in the Balkans and fringe of the former USSR (Mohammed Ayoob,

[23] Hoselitz's (1955) theory of generative and parasitic cities described relations that amounted to positive-sum games between rural and urban areas, and those that were zero-sum games. The latter were found in what Evans (1995) would later call "predatory states" such as Zaire.

2007)[24]. However, Armao's model fails to provide a causal mechanism for the state's deterioration. Why is "decentralization" taking place, and why is it happening now? Why is the process more pronounced in some countries and areas than others? Without answers to these questions, the model takes on a descriptive, but not necessarily a predictive, importance.

The spread of violence in the so-called Global South – and, increasingly, the North – might be seen as a contest for the monopoly on taxation of segments of globalized supply chains. That is, as value-added production has increasingly concentrated first in rich-world and now middle-income urban areas, and Baumol's disease has contributed to the expansion of the service sector in rich-world (and many middle-income) cities, peripheries no longer represent a dispersed productive class, with the powerful warrior or leisure class concentrated and coordinated in cities to keep them in check. As Veblen would say, the "inner relations" of the institutions of the state are now in a process of readjusting to "outer relations" with a new set of economic realities (Thorstein Veblen, 1931 [1899], p. 192). Those economic realities are characterized by increasingly concentrated centers of value-adding processes – or "intensification" – oftentimes external to the geopolitical boundaries of the state itself, which, with each new innovations or increases in productivity, require fewer producers to do the same work and more raw materials sourced from the periphery. Baumol's disease not only boosts the wages of the service sector, but also the prices of these raw materials.

1.4.3. Non-State Armed Actors

Having discussed the relation between the state and intensified modes of production, it makes sense now to turn to the state's rivals. In this era in which the existence of the strong central national state is being less taken for granted, much attention has been paid to so-called non-state (armed) actors in state (de)formation, as these may compete and cooperate with the state in providing public goods, such as security. A large body of theoretical work has focused on these actors as being corrosive to state legitimacy, since they undermine the Weberian mandate of the state to retain a monopoly on the use of violence.

Fabio Armao (2009a) argues, for instance, that as the state finds itself under greater fiscal strain, the incentives to privatize certain of its functions – including security – to non-state actors mount, creating a competitive market for violence and delegitimizing the state on Weberian grounds. Armao notes, too, that "security forces" are by no means neutral actors, simply enforcing sterile and universally acceptable property rights, but rather function to

[24] This is a model that is espoused by the anti-genocide activist John Prendergast. As Armao argues, it would seem to be undermined significantly by the rise of so-called "garden variety" violence, such as that associated with gangs, cartels, mafias, and even Maoist insurgencies in heretofore "stable" and "powerful" states exhibiting modest or even high rates of economic growth. Moreover, if the previous economic development of certain states makes it more difficult for future states to do likewise (as Gershenkron's (1962) critique of the Rostow (1990 [1960]) development model implies), these difficulties may entail problems of political consolidation in the South.

preserve or change the distribution of resources in society. In that sense, Armao's argument is similar to Foucault's own (G. Burchell et al., 1991), charging that the complex of state power is a polyvalent constellation of *savoirs* and functions, many of which are performed above or below the level of the state itself. But though Armao argues that the logic of the state and that of the market, initially united in a marriage of convenience, are destined to collide, it is unclear why that is so unless it be for arms lobbies pressuring politicians who would otherwise promote a government monopoly on violence, to open up the security market to competition – a kind of Olson-esque scenario of special interests playing out in arms market. Nor is it clear *why* the state is finding itself under fiscal strain.

1.4.4. A Note on Epistemology

Why a specifically Althusserian epistemology in analyzing state-building and economic governance? An Althusserian epistemology – in which knowledge informs the production process, which in turn facilitates the construction of knowledge – rejects a simplistic economic determinism and posits the independent but connected universe of *practices*. In this case, rural-urban trade networks in conflict situations can generate and be informed by social norms at the interpersonal level which promote continued local production and knowledge-generation in the face of economic predation and generalized incentives to loot, pillage, and steal. They come to determine who is defined as being "Other" and who as "same" in the battle for supporters between those in nominal control of the state, and their challengers. More enigmatically, they will serve to blur that distinction at key moments, allowing firms to operate that would otherwise have fallen prey to rebel groups, and allowing government apparatuses to fund insurgent groups that the state has sworn to eradicate. Knowledge necessary to generate a more intensive value-added process locally is spurred by the new requirements of the production process, which in turn changes the production process in the post-conflict economy. Specifically in the Liberian case discussed in Sections 2-4, the employment of newly-acquired production knowledge facilitated the formation of networks based largely around the value-added process, rather than ethnic identity.

This framework is largely in keeping with the model of social interaction and boundary negotiation as described by Barth (1998 [1969]). Of course, it has also been argued that economic incentives are the fundamental shapers of ascriptive or ethnic identity (Orlando Patterson, 1975) or decisive factors in determining how salient preexisting ethnic cleavages become (Francesco Caselli and Wilbur John Coleman II, 2006). However, at least two classic problems challenge economic determinism in this case, corresponding respectively to the extensification and intensification processes involved in state-building. First, "extensive" collective action taken to seize resources requires a group to have cohered that can be collectively governed by appeals not only to kinship, but also to shared values, distinctive psychological traits (Vamik D. Volkan, 2008), and collective historical memory (Roger Petersen, 2005). Veblen referred to those societal institutions as "ceremonial" structures, and he saw them as always and necessarily being more or less out of touch with

the demands – or "incentives" – of the present (Thorstein Veblen, 1904). Second, the "intensive" conversion of common resources to private property may require a psychological shift toward the valuation of individual productivity over community integrity (Max Weber, 2003 [1958]).

The choice of epistemology also allows for the genesis of explanations that do not hew rigidly to one philosophical camp or another (John L. Casti, 1989). I am fond of so-called "rational choice" explanations in certain circumstances, but believe that those circumstances are deeply conditioned and limited by behavioral and normative assumptions. Moreover, Althusserian epistemology, while not usually associated with triangulation or mixed methods approaches in the social sciences, certainly in its theoretical conception of "intersecting practices," allows at least for the possibility for methodological ecumenism. Here, I have used qualitative methods when trying to get at causal mechanisms (cf. Charles Tilly, 2001) and social constructions of identity. I have used mathematical models either to guide future empirical research, or to synthesize (and simplify) intuitions already generated empirically. I have used quantitative methods when attempting to test hypotheses involving social constructs – tribe in West Africa, for instance – that seem to be fairly universally recognized (if subject to some flux and uncertainty) within a certain context.

1.5. Production and Predation in a Core-Periphery Model

1.5.1. Introduction

When do cities become the preys of rural-based insurgency, and when do they go untargeted? This paper attempts to construct a simple model of the rural-urban relationship in conflict to theorize when predators will be attempting to prey on the cities, versus when they remain in hinterlands. It takes Krugman's (1991a) core-periphery model as a starting point, in which there are just two regions, A and B (perhaps rural and urban), and two sectors. However, the model is modified such that the sectors are not "manufacturing" and "agriculture," but rather production and predation, after Hirshleifer (1991), both of which can occur in either region or both regions. The predators attempt to appropriate the products of producers, and there are coordination costs involved in establishing a predatory group.

1.5.2. The Model

Let π be the percentage of the total population that steal, so that $1 - \pi$ will represent the percentage of the total population that produces for a living. Now let S_P represent the share of predatory actors that reside in region A, while S_N is region A's share of the total population of the country. S_M governs the share of makers residing in region A, such that the population of region A can be described as

$$S_N = (1 - \pi)S_M + \pi S_P \quad (1)$$

Now let's turn to the concentration of the predators: do they concentrate region A, in region B, or are they shared somehow between the two? First, we include a standard contest success function (CSF) to determine the success of the predators in region A in taking the products produced in region B; it is defined as

$$CSF = \frac{\pi S_P}{(1-\pi)(1-S_M)+\pi S_P} \tag{2}$$

where $\pi(S_P)$ describes the number of predators in region A and $(1-\pi)(1-S_M)$ the number of producers in region B. One could conceivably introduce a coefficient of fighting technology, but for simplicity's sake, that is omitted here. The basic idea is that the share of predators relative to targeted producers will be determinative of predatory success. The CSF thus assumes that no inter-governmental fiscal transfers. The function is bounded between 0 and unity.

Next, we address the targeted production. Let x be the production of the average producer, t the transportation costs associated with delivering each unit of x from one region to the other, and B the fixed cost of establishing a coordinated predatory operations base in either region. We can now say that all predation will be concentrated completely in region A when the loss of revenue due to transportation costs exceeds the cost (B) of setting up an operation in the other region; in notation:

$$\frac{\pi S_P}{(1-\pi)(1-S_M)+\pi S_P} xtS_M < B \text{ , where } t = [0,1]. \tag{3}$$

We see first the CSF discussed above. The second term on the left-hand side of the inequality is the value of transportation costs associated with goods from region B that are contested in region A. The premise here is that the quantity of imports to region A will depend not on the total population in the region, but rather only that portion of the population that produces, and is therefore able to trade for it. On the right-hand side, we have the cost (B) of establishing a base of operations in the other region. Rewriting Equation 3 in terms of S_N requires rearranging Equation 1, such that

$$S_P = \frac{S_N - S_M(1-\pi)}{\pi} \tag{4}$$

We can now substitute (4) into (3) to obtain

$$\frac{S_N - S_M(1-\pi)}{(1-\pi)S_M + S_N - S_M(1-\pi)} xtS_M < B. \quad (5)$$

Finally we can say that

$$S_P = 0 \text{ if } S_N < -\frac{\pi txS_M^2 + txS_M^2 + \pi BS_M - \pi B - BS_M}{txS_M - \pi B}, \quad (6)$$

$$S_P = 1 \text{ if } S_N > 1 + \frac{\pi txS_M^2 + txS_M^2 + \pi BS_M - \pi B - BS_M}{txS_M - \pi B}, \text{ and}$$

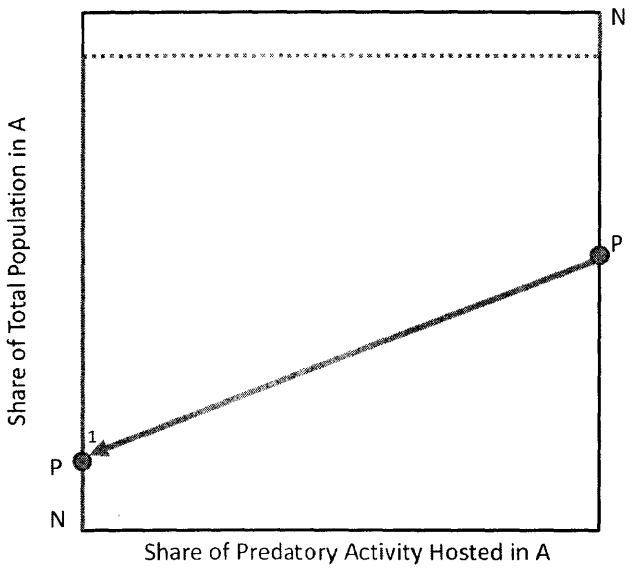
$$S_P = S_N \text{ if } -\frac{\pi txS_M^2 + txS_M^2 + \pi BS_M - \pi B - BS_M}{txS_M - \pi B} < S_N < 1 + \frac{\pi txS_M^2 + txS_M^2 + \pi BS_M - \pi B - BS_M}{txS_M - \pi B}.$$

1.5.3. Discussion

The model has one very interesting characteristic: it can generate multiple equilibria, though it need not. The reason is that there is a circular causation at work in predation, just as in Krugman's manufacturing economy: as long as there is a healthy supply of production to prey upon, predators congregate where there are other predators because their chances of carrying off large prey are better. The following figures demonstrate a growing number of equilibria at different levels of predation and transportation costs.

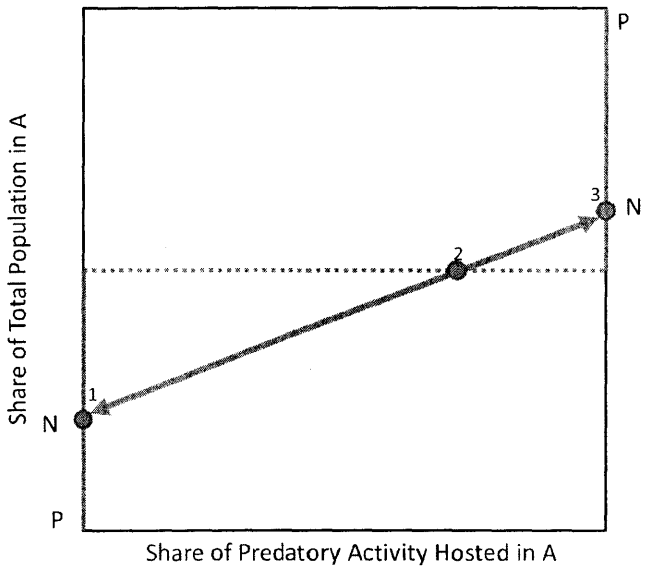
Figure 4 illustrates the model operating with fairly middling levels of predation and high transportation costs (relative to the price of production goods). The line WW represents the relationship between the total population and the number of individuals available for recruitment into predatory activity. The line PP represents the potential for an organized group to form at different levels of population in region *A*. Region *A* is presumed to have less productive capacity than region *B*. Clearly, there is only one equilibrium here (Point 1): no matter how much predatory activity starts out in egion *A*, it will all eventually leave. If we take region *A* to be the hinterland (a realistic assumption, given its minimal share of production at 35%), we can predict that predatory activity will target the cities.

Figure 4. Core-periphery model with low levels of predation and high relative transportation costs



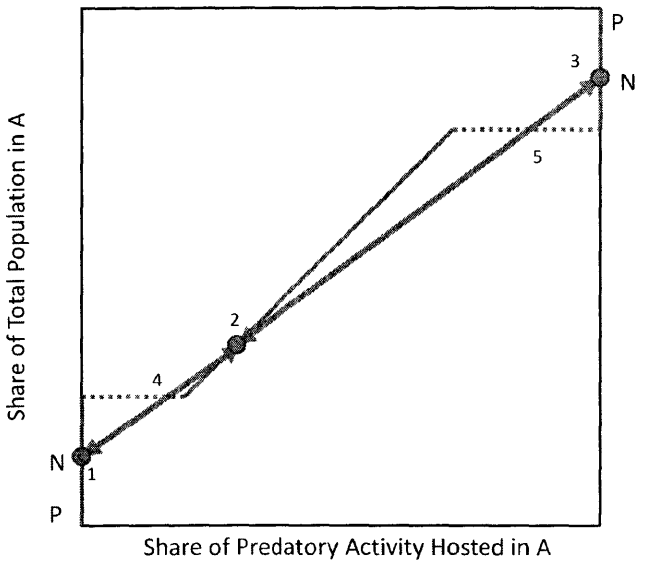
In Figure 5, the levels of predation rise slightly, and the transportation costs fall. Now we can see that there are two stable equilibria (Points 1 and 3), and one unstable equilibrium (Point 2). The model predicts that, unless the share of predatory activity hosted in the hinterland nears 1, the predators will again prey upon the city. However, if the share of predatory activity approaches 1, the model predicts that they will stay there. The intuition here is that the city starts out with too few native predators to allow for the successful usurpation of goods, and so predators will make do predating the city's goods from their base in the hinterland.

Figure 5. Core-periphery model with low levels of predation and high relative transportation costs



Finally, under conditions of high levels of global predation and low transportation costs in Figure 3, we see the possibility for three stable equilibria emerge (Points 1, 2, and 3), while two unstable equilibria appear (Points 4 and 5). Now, the stable split between the two regions breaks down, and predatory actors flourish in both areas. This outcome (Point 2) is in many ways more predictable, and likely gives rise to a neatly delineated combat frontier – centripetal and centrifugal forces are perfectly balanced.

Figure 6. Core-periphery model with high levels of predation and low relative transportation costs



Note that the trend among predators, then, is just the opposite of that described among manufactures in the Krugman model. In that model, lower transportation costs precipitated concentrations of producers in one region or the other. In fact, much recent literature on globalization implies that both may be the case.

The model takes as exogenous the share of predation occurring in an economy ( ). This may be an implicit acknowledgement that the factors involved in incentivizing predatory violence among rebel actors may be quite diverse. As a preliminary listing, they may include tax policy and military wages (H.I. Grossman and Minseong Kim, 1995); the presence of a third, "uncontested" sector, such as manufacturing (Raul Caruso, 2008); the ability of potential local recruits to depend upon traditional modes of livelihood (James Scott, 1976); whether the funding structure associated with the group is top-down or bottom-up (Nicholai Lidow, 2010), whether groups are stationary or roving (Mancur Olson, 2000), and, perhaps a more general statement of the former, whether the group relies primarily on financial or social capital during its formative period (Jeremy Weinstein, 2007).

There are interesting implications of this model for the cases discussed in this dissertation. In the West African cases, higher transportation costs associated with poor infrastructure and radial trade networks may have contributed to the drive to prey on cities. This implication may not directly clash with other accounts of West African violence, but it surely adds another layer to the common perception that rebel activity was fueled by high

values of certain rural goods, like timber and diamonds (Philippe Le Billon, 2001, Michael Ross, 2004a). While that is probably true, the *direction* in which West African rebels were drawn may speak to a rural-urban dynamic at work. In Maoist India, by contrast, transportation infrastructure is comparatively good and trade networks are multi-polar (though caste-segmented). These forces may conspire to create a stable combat frontier more or less removed from urban hubs.

What a formal model leaves unanswered, of course, is (1) whether its predictions are borne out empirically and, if so, (2) what form these transportation costs take in the real world. Do they, for example, simply refer to the quality of the infrastructure? To the structure of the city systems (mono- versus multi-polar)? To the social structure of the rural-urban trade networks? While all of these factors and more may be at work, I will argue that the latter two are key to understanding the marginal directionality of the combat frontier in rural-urban conflicts.

Part II

Violence Acts on Production Networks

2. How Did Production Networks Adapt to Civil War in Liberia?

2.1. Introduction

Industrial manufacturing firms in Liberia can shed important light on the structure of production networks in violent conflict. They serve as important nodes in the value-adding process that supply and distribution networks hook into, and their managers therefore have unique opportunities to observe the ways these networks adapt to, and traverse, the shifting combat frontier. In the broader context of this dissertation, this case study then provides qualitative evidence for the claim that rural-urban trade networks in Liberia – and perhaps in unranked societies experiencing rural-urban conflict more broadly – begin to exhibit exaggerated radial patterns, characterized increasingly by important urban hubs and limited importance of second-tier cities. In terms of the formal model discussed in Section 1.5, the trade patterns described here as increasingly radiating from urban industry provide some mechanism by which the rural-urban trade becomes more monopolistic and monopsonistic in nature, effectively raising transportation costs and, thereby, the likelihood that the city will be targeted as economic prey. Moreover, this pattern also begins to hint at an explanation for the observation (made in the introduction) that firms in Monroiva lost relatively few employees relative to the urban population at large during the civil war: as Section 2.3.3 below will argue, the firm became a nexus of trader knowledge, allowing the firm (and its employees) to predict rebel attacks and avoid them.

Moreover, as noted in the introduction, the relationship between urban industry and the rural hinterland may have important implications for the stability of the state. The consolidation of the state and the legitimation of its sovereignty have historically been tied to the development of industry and rural-urban trade in various ways. While a "weak" or "fragile" state typically also exhibits a weak industrial base, this does not imply that the industrial base itself does not merit attention – perhaps just the opposite, in fact. So while the study of industrial firms in a country whose economy (and civil war) is and was dominated by natural resource and raw materials export, may seem tangential for the purposes of identifying the "fuel" for violent groups, for the purposes of this dissertation it is highly topical.

2.1.1. The Importance of Production Firms

From its inception, development economics has revered the industrialization process. Economists from Smith to Rostow and from Gershenkron to Lewis have emphasized the importance of industrial factories as crucibles in which the division of labor is refined, a labor force is developed, and technical knowledge is generated and shared. And though the poorest countries with weak industrial sectors are also the ones that tend to fall prey to the

so-called "conflict trap," little research on economies in conflict has explored how production firms operate.

Much recent research has focused on those types of "contested sectors" like the extractive industries that can drive and prolong violent conflict. A few examples include Fearon (2005), Humphreys (2005), Karl (1997), Klare (2002), Le Billon (2001), Ross (Michael Ross, 2004b) and Snyder (2004). Furthermore, research on the private sector in conflict has emphasized the vulnerability of capital concentrations and the trade routes that link them – Collier (Paul Collier, 1999), for instance, asserts that capital- and trade-intensive sectors (notably including industrial production and manufacturing) are "war-vulnerable," while sectors like agriculture are not. And a growing body of conflict research seems ready to strike from the agenda study of firm-level economic actors typically characterized by concentrated capital, labor and trade requirements. Rather, it seeks to understand the role of "entrepreneurs" in conflict – a term used alternately for those who innovate in the private sector and those who simply start small, replicative businesses. Regardless of the definition adopted, this "entrepreneurship and conflict" literature connotes economic activity carried out by atomistic individuals, and not by larger coordinated firms.

Many production firms survive and even thrive in the face of violent conflict. The fact that the survivors are, for the most part, producers of inelastic or inferior goods that are expensive to import is not surprising. But the fact that they continue to operate at all may be, given their high capital- and labor-intensiveness. Using the case of Monrovia, Liberia during that country's protracted civil war, I contend that production firms that survive or thrive in violent conflict do so by performing a delicate balancing act between concentrating capital and labor to produce efficiently in the pockets of relative calm, and dispersing them spatially and temporally when the combat frontier approaches one of the production chain components. Such adaptability relies upon rapidly gathering information (via production networks) and processing it (at the place of production).

This essay is structured as follows. In the remainder of the introduction, I first argue that understanding the adaptations of production firms in violent conflict is important because stronger industrial manufacturing sectors generally attenuate the intensity of violent conflicts. Second, I give a brief justification for the production chain dispersal argument from the point of view of previous literature. Third, I briefly describe my research design for the third, empirical section. In the second section, I set out a simple model of constrained maximization that supports the argument. In the third, and largest section, I describe how these dispersal strategies manifested themselves in the case of firms operating in Monrovia, Liberia, during that country's civil war, giving examples from each.

There are good theoretical reasons to seek to understand the adaptations of production firms in the world's poorest and most conflict-affected countries. Caruso's (2008) model of a two-sector economy at war suggests that investment in an "uncontested sector" (i.e., one whose value added is not wholly up for grabs in the struggle) can increase total welfare. Industrial manufacturing is a good candidate for a real-world uncontested sector because

its value-adding mechanisms are sophisticated and primarily knowledge-based (as opposed to the resource extraction industries, for instance, whose value is largely not added, but found). This distinction means that a production firm's entire coordinated production network must be functional in order to generate profit for would-be "taxers". Manufacturing shares the trait of sophisticated, knowledge-intensive value-adding processes with the service sector. However, the manufacturing sector has the potential to buy from, as well as sells to, rural populations. By sourcing its raw materials locally from rural areas, it can link industrial capital concentrations with hinterlands in a mutually beneficial way. By contrast, the service sector in less-developed countries typically only sells to, not buys from, rural areas.

The special place occupied by the manufacturing sector – neither easily appropriated, nor necessarily beneficial to, a narrow urban elite – may in turn place serious limitations on the levels of destructiveness of any profit-maximizing rebel group wishing to capture it. There are at least a couple of possible causal mechanisms that might account for this: the first top-down, and the second bottom-up. First, the potential for taxation (or extortion) by a rebel group may incent rebel leaders to preserve the value-adding processes intact, which become in effect the goose that lays the golden eggs. In the bottom-up scenario, the often-rural support base of the rebel group[25] may erode with diminishing industrial demand for their produce. This reasoning implies the hypothesis that the more an economy's product is generated through industrial manufacturing, the less destructive conflict should be. Given the fact that the recent occurrence of a civil war raises the risk of a country descending into widespread violence within a decade from just 9% to 40% (Paul Collier, 2007b), the adaptations of the private sector during one conflict may bear on the risk and extent of violence the next time around.

2.1.2. Literature Review

This section contributes to an emerging body of work on economies in conflict (Mats Berdal and David M. Malone, 2000, Michael Pugh and Neil Cooper, 2004). There are few precedents to draw in terms of studies of firms in war specifically. Given the lacuna in the conflict literature on organizations in war, it is helpful to begin filling the gap with existing organizational theory literature, which emphasizes the causal link between environment and organizational structure. (In fact, the topic of firms in war may be viewed as a subset of the wider, and better studied, category of organizational adaptation to external change.) Lawrence and Lorsch (1969) posit that vertical organizations are better suited to predictable environmental influences, while horizontal ones are better suited to the unpredictable. Such a theory implies that a wartime business would tend to "flatten" or outsource its hierarchy. March (1991) creates a model in which an organization's adaptability to "turbulence" is a function of the likelihood of turbulence and the rate of

[25] On the increasing tendency of civil wars to pit rural hinterlands against urban centers, see Grünewald and Levron(2004).

acquisition of new information on the environment[26], suggesting that wartime businesses would be willing to pay premiums for information on emerging risks. In an argument that also touches on organizational learning, economist Alice Amsden (2001) asserts that a key component to late-industrializing corporate success is transforming foreign technology into organizational know-how. This raises the question of whether difficulties in sourcing more foreign technology may result in attempts to substitute investments in human capital aimed at improving in-house repair and maintenance services—and a possible ironic effect that damage to physical capital may catalyze this organizational learning.

On the subject Supply Chain Management (SCM), the theory of "dispersal economies" (Yu Li and Karen R. Polenske, 2004) states that distant target markets justify more decentralized distribution networks, and that businesses choose to minimize SCM costs in balancing transportation costs against inventory costs. Therefore, as transportation costs rise, businesses shift their emphasis to geographically dispersed inventory locations. In war, large shipments may be differentially targeted at military checkpoints (especially at the combat frontier), and so militate against large concentrations of stock en route or in situ. In effect, we may infer that as an approaching combat frontier in essence renders distribution and sourcing points behind it progressively farther away, distribution and sourcing networks will decentralize.

2.2. Research Design for the Empirical Study

2.2.1. Case Selection

I chose Liberia as a case study for four primary reasons. First, the Liberian Civil War lasted for 14 years – long enough for businesses to consider the war environment as a status quo, rather than a brief, exceptional period. This consideration is particularly important given the increasing frequency in modern times of low-burning, long-lasting civil wars. From December 1989, when a former government official-turned-rebel named Charles Taylor crossed the Ivorian border at the head of an army, to October 2003, when the United Nations established its Mission in Liberia (UNMIL), Liberia was engulfed in complex series of conflicts collectively termed the Liberian Civil War. The war was characterized by a string of competing factions battling from rural bases to lay siege repeatedly to the political and economic capital, Monrovia.

The second reason for choosing Liberia is that the war was intense enough to do major damage to the economy as a whole and consequently present serious, sustained challenges to the survival of local firms. The war was ultimately responsible for the deaths of anywhere from 5-10% of the total national population of over 3 million, as well as the forced displacement – in many cases, multiple times over – of approximately one-third of Liberians (or roughly 1 million people), 700,000 of whom fled across an international border to become refugees (National Transitional Government of Liberia, 2004). Staggering as

[26] Though March specifically models the rate of turnover, it can be argued that his model more plausibly tests the rate of information gathering.

these numbers are, the true toll of the war also includes one of the most spectacularly precipitous declines in national prosperity experienced by any nation in modern history (Jeffrey Sachs, 2008), greatly weakened state capacity, and war-induced morbidity.

Faced with continuing instability over 14 years, foreign direct investment into Liberia largely dried up during the war. Inflation was estimated at 15% in 2003 and, though it has subsided, continues to erode the purchasing power of most Liberians. As the war drew to a close in 2003, 76% of the population lived on less than US$1 per day, and 52% lived on less than 50 cents (Government of Liberia, 2004). Through war and mismanagement, the Liberian per capita Gross Domestic Product in US dollars plummeted from US$1,269 in 1980 to US$163 in 2005 (a decline of over 87%), as core foreign exchange-earning sectors such as rubber and iron ore came to a virtual standstill. Today, official unemployment stands at an astounding 85% (Ministry of Health and Social Welfare, 2007). Of the 175 countries where the Human Development Index was calculated in 1999, Liberia ranked 174; only Sierra Leone was lower (United Nations Development Programme, 2000) – a country which had experienced a similar and related set of conflicts, but had simply started off poorer than Liberia.

That is not the whole story, though. Despite the carnage and the abysmal macroeconomic indicators, certain industries and certain businesses managed to cope, and even to thrive – even in the capital- and trade-intensive sectors defined by Collier (1999) as "war-vulnerable". These industries predictably tended to produce goods exhibiting low elasticities of demand – staples, necessities, and perhaps a few inferior goods (e.g., candles to replace the electricity that went down in the First Liberian War). Furthermore, the war was not a universal conflagration burning in all parts of Liberia for 14 straight years. Rather, it was a constellation of sporadic violent eruptions, sometimes intensifying, sometimes subsiding. The combat frontier, often very blurry, shifted quickly and sometimes without warning. But it also opened up pockets of relative calm (and, for a business, opportunity) behind it, even as it brought violence to new areas.

The third reason for choosing to study Liberian firms is that peace has been definitively reestablished, the democratic process successfully re-launched, and an extensive international reconstruction effort begun. With the arrival of UNMIL in October 2003, all violence came abruptly to an end, and the UN continues to spend US$750 million annually to support the mission (Jeffrey Sachs, 2008). This situation allows not only for safe investigation, but also clear identification of instances where business adaptations to wartime are retained for non-conflict-related reasons. Fourth, the termination of hostilities was recent enough that many of the current firm managers were employed by the same firms during a substantial part of the war. This is particularly true of the so-called Second Liberian Civil War, between Charles Taylor's government and rebel groups LURD and MODEL from 1999 to 2003.

Finally, Monrovia during the war was a paradigmatic example of a capital city besieged. It is home to a preponderant proportion of the country's industry (and one-third of its

population), which experienced the approach of a combat frontier in 1990-'92 (led by Charles Taylor's NPFL and Prince Johnson's splinter faction, INPFL), and thrice again in 2001-'03 with the advance on the city of LURD from the north and MODEL from the southeast.

2.2.2. Methods

I employed semi-structured interviews to obtain information on business operations before, during and after the wars. I chose this qualitative method because (a) many business records detailing employment levels, etc. were destroyed during the war, and those that were not were difficult to gain access to; (b) no official statistics were gathered on wartime business operations; and (c) even if they had been, the situation changed so rapidly that such snapshots would not be able to convey the dynamic process of adaption through any sort of "comparative statics" analysis.

2.2.3. Firm Selection

I studied 11 Liberian production firms, gathering anywhere from one to three manager interviews at each. Because of the inherent difficulty in finding employees from firms that had not survived the war, firms were necessarily limited (with the exception of Parker Paints) to those that has survived. Therefore, the dependent variable was not taken to be "survival", but rather supply chain structure. The independent variable was the geographic location of the combat frontier in relation to the firm, its suppliers, and its markets.

Potential firms were identified by (a) preliminary examination of a detailed map of Monrovia landmarks compiled by the Humanitarian Information Centre of Liberia, (b) street-by-street driving tour of major business concentrations, and (c) snowball information-gathering during the interview process. Selected firms had to (a) be accessible (at least one manager had to be willing to talk about wartime operations), (b) focus on domestic-serving production, and (c) have been founded before the commencement of (and probably continued operating during) the Second War (1999-2003). Firms were also chosen so as to maximize variation in ownership (local versus foreign) and location. Firm selection was stratified by location, where three sections of Greater Monrovia were identified:

1) *Continuously-held central Monrovia.* While fighting did come to certain parts of central peninsular Monrovia in the First War (1989-1992) and again briefly in April 1996, and although the downtown was shelled during the Second War (1999-2003), central Monrovia never fell to non-government forces (though the government/non-government distinction is blurred at some points during the war).

2) *Northern Monrovia.* This area, which includes the large industrial concentration on Bushrod Island and the Freeport of Monrovia (also on Bushrod Island), is situated across the mouth of the Mesurado River from central Monrovia. Because of its proximity to the city, it has repeatedly been targeted as the main route to the capital by rebel armies, and so all of the long-standing businesses there have had to contend with operating under rebel control.

3) *Eastern Monrovia.* This area consists of the exurban townships scattered around the eastern portion of the lagoon, from Red Light in the southeast to Gardnersville in the northeast. These areas did not come under direct rebel control during the Second War, but government control was eroded here and the GoL was unable to prevent widespread looting and breakdown of civil order.

Such variation was meant to distinguish the strategies employed by three classes of firms: those continuously under government control, those sporadically under rebel control, and those sporadically in an administrative no-man's-land.

2.3. Dispersal Strategies in Production Networks

Intuitively, firms dealing with supply, production and distribution attempt to balance the output of the three and thereby minimize wastage. In predatory environments, firms can balance this equation either by dispersing their inputs to avoid capture, investing in security measures to prevent capture, or simply raising the inputs involved in a certain process to replace the losses associated with capture. Appendix A presents a constrained maximization model in which these intuitions produce a few intuitively appreciable predictions of adaptations to predation. First, it predicts that investment in supply and distribution chain dispersal will rise rapidly at the onset of predation with diminishing returns later. Second, it predicts that the rise will take place in the supply chain when the inputs are valuable, and greatest in the distribution chain when the production process adds most of the value.

These intuitions are borne out by reports from firm managers working in Monrovia during the civil war. First, from the constrained maximization model, we guess that the degree of dispersal will be influenced by the levels of predation. Second, dispersal of economic activity in production network components can take different forms depending on which production network component was affected: specifically, supply and distribution channels tended to disperse spatially and temporally, while production centers, because of their fixed capital requirements, could generally only employ temporal dispersal. Finally, consistent with March's (1991) theory of information throughput in turbulent times, production networks were employed as information-gathering antennae, informing the shape and extent of network dispersal.

2.3.1. Determinants of Predation Levels

The degree of predation in any component of the production process depended on three primary factors:

1) Proximity to the combat frontier;
2) Rebel (and citizen) conduct;
3) Value of the targeted good.

Proximity to the combat frontier

Proximity to the combat frontier was sometimes difficult for firms to gauge, both because the combat frontier was blurry at best, and because it moved very rapidly and often in unexpected ways. The General Manager of RITCO, a firm located on Bushrod Island that fell repeatedly under LURD control during the Second War, described the inability to make contingency plans under such uncertain circumstances:

> You see that war actually becomes something like, um, overnight, they on you [sic], so there is nothing you could do. The only thing you could do is you have to find a means of way [sic] to hide yourself in order to protect your life. Everybody say [sic] to hell with business, only the life [matters]. When you can't make anything, you start from there. You don't think about distributing or what, or production value left in the plant. You don't think about that.

Rebel/Civilian Behavior

The predatory tendencies of rebel soldiers varied dramatically from the First War to the Second, with clear consequences for the private sector. Lidow (2008) argues that the degree of predation among soldiers is a function of top-down versus bottom-up financing mechanisms for militia units, as well as the amount of socialization that goes into their recruiting and training. That is, when militia commanders have control of the purse strings, they can influence more directly the type of behavior their subordinates exhibit. This explanation seems to resonate with business managers, who consistently point out that NPFL and INPFL rebel commanders during the First War had much more influence over their men than LURD and MODEL commanders in the Second War.

Furthermore, predation was associated not just with soldiers of the various warring factions, but also with the civilian population, which participated in looting in areas and times when rule of law was weak. For instance, despite the fact that the Parker Paints production facility was located in Paynesville, an area hit by the NPFL during the First War, owner Philip Parker remarked about the damage looters did to his factory at that time, "to be honest, we lost most of our capital because of civilians." A manager at USTC explained that "[A]nybody could loot. Any civilian who was brave enough could loot. Any soldier who had a little gun could go looting, if the property was not protected." Well-disciplined rebel soldiers might sometimes even restrain the excesses of civilian looters. Speaking of Prince Johnson, the rebel INFPL commander who took over Bushrod Island and the MB facility located there during the First War, one MB manager remarked:

> He was really strong, he was a strong commander, so he had them under control. Disciplined them when they went wrong, so they were afraid of him. They were afraid to harass us civilians and all of that. So the island was better compared to [Government-controlled] central Monrovia and the other side.

Value of the Targeted Good

Valuable goods were obviously more coveted than less valuable, but value depended ultimately on the prices the products would fetch on the local market. Therefore, finished products tended to be targeted by predators more than intermediary ones, which in turn were more targeted than raw materials. In fact, raw materials were mostly left untouched

by looters (though of course some extremely valuable raw materials, such as gold, diamonds, and timber continued to be targeted for their value on the international market). Philip Parker of Parker Paints related that his raw materials were actually jeopardized by the value of their own containers:

> ...When I got back (amazing!), we had lost close to half a million [US] dollars worth of raw materials, you know why? Truly, truly amazing. For the containers! When I got back, the factory was 8 inches floating in pigments, alkaline residues, whatever. Truly amazing. We lost close to half a million dollars. But for the containers, if you believe it. They wanted the empty drums, the plastic drums, so they just emptied US$250 worth of raw materials on the ground so they could sell the drum for $2.

Similarly, the General Manager of CEMENCO remarked:

> What... helped is that there was the raw material that nobody could do anything with. Okay, but the other things, generators, the vehicles, office equipment, and what have you, nothing can plan to protect.

2.3.2. A Typology of Dispersal Strategies and their Competitors

Liberian firm managers described four basic strategies for dealing with increased predation: (1) dispersal (and/or outsourcing), (2) increased throughput, (3) investment in strengthened property rights, and (4) accommodation. Which strategy was chosen depended upon the tendency of predatory groups, whether military of civilian, to loot, and the firm's willingness to expend financial versus social capital (see Table 2). Importantly, dispersal strategies were preferentially employed when firms did not have strong financial resources on which to draw but faced situations where groups had a strong tendency to loot – a situation unfortunately common in Third-World civil wars.

Table 2. Survival strategies of production firms in war, including dispersal

		Rebel/Civilian Tendency Towards Looting	
		Low	**High**
Resources Required of the Firm Predated	**Financial Capital**	Increased Materials Throughput	Property Rights Investments
	Non-Financial Capital[27]	Accommodation	*Spatial and Temporal Dispersal*

Source: the author

The war environment dispersed economic activity in three primary ways: through investment, spatially, and temporally.

[27] Typically social or physical capital.

Increased Materials Throughput

This strategy corresponds to increasing (s, p, d) in Equation 10, above. It simply implies investing more resources in the supply, production, or distribution process in the hopes of meeting previous output standards. This strategy was most often employed in extraordinary cases or crises where the predation was erratic, rare, or unpredictable, making more systematic risk-offsetting strategies too costly to implement on a permanent basis. It most often took the forms of (a) more input goods purchased, (b) greater investment in fixed capital, or (c) more hired staff.

Examples of the first form include NICOM's and MB' repurchase of looted inputs. Another example is the common practice of overstocking production inputs to be able to produce in the event of disrupted supply chains. Overstocking came with its own risks, however, as LISWINCO found out when a stray rocket struck its wood stockpile and the lot went up in smoke. Moreover, investment in fixed capital was most often associated with accommodating oversized supply stockpiles. CEMENCO, for instance, invested in an expanded clinker warehouse.

Increased investment in human resources was often required when damaged equipment forced businesses to adopt more low-tech, manpower-intensive contingencies. An example of this was found at NICOM and RITCO, both of which engineered backup manual production equipment, such as capping machines. RITCO's manager explained:

> When the machines are broken down, what do we do? We go to manual! When the machine it is pumping and it broke down, what do I do? I have to go to manual by using a cup. If it is sealing and it cannot seal then I have to look for the hand machine, hand sealing. So all the time I get the manuals and everything waiting, because not every day is better day. You prepare you in times of war.

Consequently, both firms acquired the in-house capacity to fix most technical problems associated with manual machines and generators. They integrated machinists and technical personnel into their usual production staff. Whilst the larger, foreign-owned firms such as USTC, CEMENCO, and MB already had large repair shops, they grew larger still.

Finally, increased investment in human resources was required simply by high turnover rates among employees. The latter were caused either by deaths among staff or, more commonly, by their physical displacement. The manager of RITCO explained why he was forced to spend so much time and money on retraining:

> We... suffered casualties of about six or five employees... They went to central [Monrovia] for food and they were caught up... in the firing. We compensate[d] their family... nothing we can do... [We hired replacements r]ight away. You know, industry is like a machine. When a part [is] broken, you have to buy it and put it back before you can continue.

Likewise, the finance manager at USTC recounted his frustrations with high turnover:

> [Turnover]'s still high. During the war a lot of our staff had to leave, a lot of them to the United States on various resettlement programs, immigrant programs are still running... We did lose a lot of key staff. And we continue to experience the differences since 2003. You find yourself having to retrain people over and over again... It's gets frustrating working in this environment.

Property Rights Investments

This strategy was simply to reinforce one's own property rights through sheer force or cunning[28]. An example of the first is USTC, which hired a large security force to guard its compound. The manager the Aluminum Factory showed cunning when he safeguarded production machinery by disabling the factory's forklifts, which would have been required to load the large machines onto trucks. The manager of Parker Paints resorted to camouflage:

> You know, one of the things we did, we made the factory look as if nothing was there. You know if you walk there, we put as much junk as possible, so that nobody would assume that there was anything there... Equipment-wise I lost 2 compressors and a couple of motors. But I have all my mills, all my cans, equipment, my welders... we mothballed everything, too, so... we make sure that they aren't hit by rain. Every now and again we fire them up. So I mean we're not too far gone to get started again. It won't take that much.

Accommodation with Predatory Groups

It was common for businesses with large compounds to invite government or rebel contingents to encamp there, using their buildings as barracks. This tactic reduced the risk of predation from other groups and citizens. The manager of Parker Paints explained that:

> You had to be flexible. When ECOMOG was here, you still had rampant crime. We would allow some ECOMOG soldiers who were stationed in the area to use it [the paint factory compound] as a sub-base, so they were there for a while. You know you just had to be creative.

MB hosted Prince Johnson's troops to good effect during the First War, as a manager there describes:

> [We] never had a serious problem with them... There was minor problems with the employees, or maybe sometimes they coming in to get free beer or all of that, but other than that... he [Prince Johnson] had them under control, you know.

However, the protection earned might be withdrawn if and when the guest contingent was forced to evacuate, as LURD forces did from the CEMENCO compound. As the CEMENCO manager explained:

> Yeah, they lived in the yard, so for the time they were there, they were taking care, but when they were about to pull out, they took away everything they could put their hands on: doors, windows, you just name it, everything.

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[28] In terms of the model presented above, private investment in property rights most easily corresponds to (G, H, I) in the foregoing section, since it is in competition with rebel investments in predation.

It is interesting to note that the accommodation strategy was resorted to most often when the combat frontier had passed over the production center, bringing it under rebel control. As Olson (2000) has noted, once the bandits become "stationary" (as opposed to roving to pick off supply and distribution shipments), they tend also to become less predatory – thus providing a possible causal connection between the location of the combat frontier in relation to the production network, and the tendency of a group to loot.

Spatial and Temporal Dispersal

Investment Dispersal. Foreign direct investment tended to flee the country in the war years, of course, but much domestic investment, especially that of local entrepreneurs, sensibly minimized risk exposure through portfolio diversification – a move which may have deprived certain industries of "critical mass" in capital formation. Philip Parker described branching out into other industries in the years leading up to and during the war:

> So I diversified, out of the paint, into other things which I thought, not a big investment, you still make money, and exposure isn't that great basically. I do [engine retooling and] other things. I'm into mining also—small-scale gold and diamond mining. So basically you diversified into businesses where, one, you didn't have too much government interference, and [two,] you didn't have too much exposure.

Temporal Dispersal. Dispersal at the firm level can be classified as either temporal or spatial. To generalize, firms in Liberia spatially and temporally dispersed their supply and distribution networks, and only temporally dispersed their production (because production machinery was largely stationary).

Temporal dispersal diseconomies in the workplace stemmed primarily from the stop-and-go nature of all economic activity during the war. During the First War, for instance, USTC's production was characterized by "very limited operations: off and on." However, temporal dispersal in production not only served to keep production staff safe in times of intensified fighting, but also protected the value added during the production process. By timing the production process exactly so that the finished products could immediately be offloaded to distributors, firms could avoid being targeted for what they produced. Thus the production process itself served as the fulcrum of the entire supply chain, regulating when and how much value was embodied in products. The fittest survivors in that climate were industries that could take 'worthless' raw materials and rapidly produce finished products whenever distributors became available to take the processed goods off of their hands. One of NICOM's managers noted that:

> As we produce, the buyers come..., so we don't keep too much of stock. And it so happened within that time [during the war] we did not have too much finished stock, although we had some stock in process that we got caught up with [one time], but the actual finished stock wasn't much.

Companies were thus forced to forego semi-processed materials (often produced in foreign-owned factories in the formal sector) for less-predated raw materials (sourced by local businesspeople in the informal sector). The owner of LISWINCO explained:

> Until that time [1990, when the NPFL/INPFL closed in on Monrovia], we used to get our wood directly from the [foreign-owned] saw mills. After 1990, people [informal, petty loggers] start using power saws, going to the bush to get the wood, so we would take wood from them.

Spatial Dispersal. Supply and distribution routes that crossed the combat frontier were particularly vulnerable to predation (depending on the value of the good). They therefore tended to splinter into reticulated webs of small routes where poaching and 'taxation' could be minimized through networks of trust. This family of strategies corresponds to increasing the value of (G, H, I) in the model presented in Subsection 0. Dispersed supply and distribution networks required an army of traders with intimate knowledge of geography and the local inhabitants. One manager remarked that "[a] lot of small-scale trading [took place]. People who had never been involved in business before became traders." They thus required more investments in human resources to create redundant networks and coordinate their deliveries. For instance, when NICOM began to source more product inputs locally, its purchasing manager increased the purchasing department's staff from 12 to 16, in order to accommodate the larger number of small shipments it contracted.

Supply/distribution dispersal often implied outsourcing, as well. The small traders that entered the transportation market were generally not directly employed by firms, but rather informal. Firms typically outsourced jobs that were risky, required little skill, and required knowledge of the local social geography. The prototypical examples were distribution and sourcing operations in rural areas. An MB manager explained: "Nobody could venture out there. No business would do that. It was very risky. So we had the people come in to buy." RITCO's manager expanded:

> [A]s a businessman, I will not take a convoy to go across [the combat frontier to distribute]. Immediately it does and they're caught, full of mead. First thing [the rebels will assume] is [that] I have a different intention, have come to spy their arsenals, or worse... to leak information. So I will be either executed, or you know anything they are wanting to do they will do because I have no business to be there. So this is what we do: we sell to the petty vendors within our zone and they rather convey that across, because they know their way out, small small routes that go to come back.

CEMENCO's general manager described the distribution adjustments they made:

> At that time [before the war], we had trucks that conveyed the cement to our distributors in the leeward counties... But those trucks and other equipment was[sic] taken during the 1990 war. Everything was looted. So... we continued to distribute to people in those counties who were qualified, they applied and were selected, and then they were given a distributorship. And they were responsible to transport their own cement to those counties in which they established a distributorship.

Supply routes, however, varied in their dispersal potential: inputs with local substitutes lent themselves to radical supply chain dispersal, while those without required that alternative routes to specialized goods be found, often by crossing international borders to access other ports. Alcoholic spirit flavors, for instance, included some of both types: while RITCO took to sourcing flavors through Côte d'Ivoire and Ghana, NICOM, diversified its product line to deemphasize drinks mixed with imported flavors, introducing the now-

popular "Bitter Cola" cooler. NICOM's production manager explained the rational: "it's produced from cola nuts that can be gotten locally."

Market hyperactivity. Market hyperactivity represents one manifestation of spatial and temporal dispersal of supply and distribution chains. The accepted wisdom asserts that war stifles market activity, as sellers and buyers will not be able or willing to get to and from market with their wares in tow (Macartan Humphreys, 2003b). In the Liberian case, however, market activity was only stifled for brief periods of extreme tension. As fighting subsided, though, markets became if anything hyperactive, where hyperactivity is defined as the processing of many more transactions than actual products produced. At least two factors produced this market hyperactivity: 'the recycling effect' and the 'hot potato effect'.

Recycling occurs when a good is looted and the victim must then re-purchase the same or a similar product on the market. CEMENCO's General Manager explained that during the Second War, "...the only thing was that the trucks that were looted from the place, we had to compensate them [the rebels] to get the trucks from them." In other words, they had to buy their own trucks back from the looters. This pattern was replicated in the cases of many businesses, especially when the product was crucial to the production process and when the only prospective buyer was the original owner. The production manager of NICOM, a spirits manufacturer, related that:

> ...at a certain point in time [during the Second War] the Freeport was also looted, and we found some of our flavors, some of our alcohol [on the market], and we had to re-buy them [from the looters]... Nobody can buy your own thing, so we had to buy our own thing from them, and pay for it twice.

A manager at the national brewery, MB, related a similar anecdote about repurchasing looted equipment from the looters:

> When we got back in there [the brewery], it was devastating. They were there for like two weeks, but when we got in there, almost everything was gone. And when some of the machines they couldn't take away, they would remove the motors from them, so we had to go back on the market try to look for them, and they were reselling them. And nobody could buy them because we had the machines and nobody else had the machines! So nobody could buy the parts, so they resold to us!

The net effect of recycling is obviously to drain the capital resources of businesses and to redistribute it to the appropriative economy.

The hot-potato effect occurred as traders and venders grew less willing to carry finished products for long periods of time (whether to resale or transport them) than raw materials. In effect, as products became more processed (and thus more targeted), the discount rate on any investment concerning them would rise to compensate for the unwanted attention they attracted. This complicates the oft-cited observation that social discount rates rise during war for specific targeted demographics (see, e.g., Leaning, Arie and Stites 2004): while that is true, rates seem to vary also by type of product. This logic informs the entire balancing act between supply, production and distribution. The owner of LISWINCO, a manufacturer

of contract-grade wood and steel products, for example, described how distributors during and even after the war wanted less stock on hand (furniture, in that case), requiring more flexible, just-in-time production:

> Now the stores can take only a certain amount, like 12-15 pieces only. Before, they used to keep 25-50 pieces always in stock. This time, [if] they want something... they will call for it.

The same held true for the looters themselves. Property rights were so routinely violated that whether one had produced a product or simply stolen it, it was safer to get rid of it as soon as possible. As Philip Parker noted:

> It was astounding to see the mentality: rebels would take over a house, strip it bear, sell the doors, the window frames, even the wiring from the walls—everything—and then they would move into it!

Hyperactive markets actually meant that there were many more traders and vendors needed to distribute the same (or a smaller) number of goods. An especially large market grew up at Red Light, a traffic intersection that during the war was under the protection of ECOMOG forces, and which linked the markets of the rural, rebel-held territories with that of urban, government-controlled Monrovia. As a manager at MB described:

> It [Red Light] was kind of a small marketplace, but now it's bigger than Waterside [Market in downtown Monrovia], bigger than everywhere else, because that was the point of contact between the business people on this side and the business people on that side... So they [petty traders] would come, and some people would take the drinks from the factory there, carry there to sell and buy, some would go as far as to the [MB] factory and buy.

Large, active markets kept final goods constantly on the move and safer from predation. Predictably, though, large numbers of transactions heightened transactions costs. These costs tended to be lower than costs inflicted by predation when supply or distribution routes crossed the combat frontier, and thus spatial dispersal increased as the frontier approached.

2.3.3. The Balancing Act

Production as Nerve Center

The tripartite balance between supply, production and distribution was a challenge for firms operating in peacetime as well as in war. However, wartime production demanded more rapid and fine-tuned responses to balance the equation because the situation could change so rapidly, and because there was an imperative not to be caught with processed or finished goods on hand. As explained above, half-processed or fully-processed goods attract unwanted attention from soldiers or civilian looters, and will likely be summarily expropriated if found. Raw materials, on the other hand, are rarely considered valuable on the market. Thus, while excess raw materials can be stockpiled, production and distribution have to remain constantly in lock-step with one another. Because distribution was most often outsourced, production is the variable in the equation that lends itself most easily to control. Thus, the production process must be able to gear up and shut down

quickly in response to opportunities to distribute. As a manager at NICOM explained, daily production during the war was estimated based on the number of petty traders waiting at the compound gates.

The Role of Information

Accurate information about new developments in the war was essential for coordination of all supply chain components. That information was obtained in one or both of two ways: technologically, and through employee networks. During the Second War, foreign-owned firms with capital reserves to draw on invested in expensive satellite internet hookups to monitor constantly updated security websites. Such was the case at USTC, whose finance manager explained, "there were websites you could go and get security briefings on Liberia. Yes, the UN provided that service. Even the US government had that service." Smaller firms used the radio to get information, but manager reported that they did not fully trust radio-broadcast information.

More commonly, firms relied on word of mouth for predictions about the timing and location of upcoming attacks. As a USTC manager related,

> There were some managers that were members of some groups downtown where they get information from. Based on that... some days, they come and say, "Our trucks are not going to town." They may not explain why, but we trust them for that. And it won't be long before you hear [about] something going [on] downtown.

Smaller, less well-endowed firms relied on this second information gathering method more intensively. A manager at NICOM described the daily process of gathering and disseminating information to petty traders:

> We called our fellow workers that live within the vicinity: "What news is downtown? Is there fighting?" At the time, we were not distributing, anyone who wanted to purchase had to come to us, so we were called in emergencies, "How is the situation this morning? Do you think it's safe for us to come to Monrovia?" We'd say, "Okay, everything is calm," and then, "We venture out and come." Sometimes we come maybe one hour, two hours, and then [snaps] thing breaks up again, and then everybody has to go back to his or her hideout.

The ability to rely on technology to gather and diffuse information enabled larger companies to downsize dramatically during the war. A manager at USTC related that "During the war, of course, we didn't even have up to 50 people here [a reduction of about 60% vis-à-vis the prewar workforce]. Basically, production, guys in the garage to drive us. Hardly any distribution." Smaller firms, though, might not be able to downsize as much, as with NICOM, which cut staff by 40%. NICOM, however, was then sourcing locally from petty traders and had a relatively protected location in central Monrovia. Meanwhile, the Manager of RITCO, a firm of about the same size and product line on the intermittently rebel-held Bushrod Island, felt he could not fire any staff at all for risk of losing vital information sources. As he explained,

> When the rebels are grouping themselves together, you know we are all brothers and sisters in the country, so while the young men across there is planning something, he at the same

> time is advising his sister or the brother here that: be careful, we are coming! So at the end of the day, that information is sent to us, and we guard ourselves.

Locally-sourcing companies had the added advantage of being able to ask the petty traders who supplied them about conditions in the areas they had just traversed. LISWINCO's owner, for instance, always made a point to ask traders where they had been and what they had seen and heard.

2.4. Conclusions

I have described in turn why production firm survival is important to countries prone to conflict, why a production network analysis is an appropriate lens to view the phenomenon, how predation selects for dispersed forms of economic activity, how dispersal can help to re-equilibrate the essential balance between supply chain components, and finally how important the constant supply of information is to production firms seeking to coordinate dispersal. I contend that in Liberia, the survival of specific sectors of the economy was not simply determined by trade-intensiveness or capital-intensiveness of the sectors in question. Rather, it was a function of the degree to which firms were able to cope with, and take advantage of, the dispersal that was required of them by environments of high predation. Such a conclusion does not invalidate the binary view, but it does indeed complicate it.

A nuanced view of both peace and war (and all the gray areas between) as a dance between production and appropriation will give policymakers a broader range of options when trying to assure the well-being of civilian populations caught up in conflict. Especially promising possibilities for reduction of conflict destructiveness would seem to include peacetime incentives for production firms in at-risk economies to source their inputs locally, so that they might become accustomed to having redundant and dispersed supply lines. Thus, the economy might not be so easily held hostage by rebel control of a single port or key international routes. Other options might include ways of helping even small businesses and petty traders to become informed about developments in the war (perhaps via radio broadcasts), as well as communicate better with one another via cell phones or walkie-talkies. The latter point is especially critical considering the lock-step coordination between production and distribution that that is required for sustainable production in conflict. A better understanding of the daily distribution potential would allow production managers to turn out as many goods as possible without generating a surplus that could endanger their operations. Such options do not, of course, substitute for strong and determined interventions by a concerned regional and international community. Rather, they complement the tools already at policymakers' disposal, and open the doors to certain preventative and stop-gap measures that can be employed when more dramatic action is uncalled-for or unfeasible.

3. What Do Civil War and State-Led Industrialization Have in Common?

3.1. Introduction

In the preceding chapter, I showed that firms in Liberia during the civil wars increasingly came to rely upon highly dispersed networks of traders to source from, and distribute to, the rural hinterlands. In this chapter, I suggest that these splintered trade networks effectively forced firms to localize many of their inputs and to internalize many of the functions that would otherwise be external – imitating the effects of state-led industrialization in some manner.

It is often argued that the state has a large and beneficial role to play in development by protecting and nurturing immature local industries until they are able to compete on the global market. Whether the argument takes the form of import substituting industrialization (ISI) or state-led industrialization (SLI)[29], a critical underlying assumption is that there exists a state apparatus strong enough to enact and enforce the requisite policies. These import tariffs, effective rates of protection (ERPs), or other exchange controls and quotas (as well as import tariff rebates for SLI industries) (Werner Baer, 1972); firm localization incentives; exchange rate overvaluation; and muscular, state-led development financing. The strong state assumption held in Asia and Latin America of the 1950s-'70s, where countries enthusiastically adopted such policies to the remarkable indifference of rich governments (Alice Amsden, 2007, ch. 5).

The same is no longer true of today's African states, where weak post-colonial governments often stagger under massive debt, contend with powerful forces pushing industrial and trade liberalization, and crucially, struggle (like their colonial and pre-colonial predecessors) to project political power over the full extent of their vast, sparsely-populated territories (Jeffrey Herbst, 2000). Between World War II and 2003, a rash of more than 127 civil wars in 73 different states has resulted in the deaths of more than 16 million people (James Fearon and David Laitin, 2003). These intrastate conflicts are less intense (in terms of deaths per unit time) but last longer than the interstate conflicts that characterized the prewar period. The blending of war and peace, crisis and normalcy, has in many countries produced protracted periods of slow-burning civil war – in short, a new status quo for the affected economies[30]. In such cases, state capacity is often weak, and the

[29] Bruton (1998) points out that the popular term ISI is somewhat misleading, as ISI consisted of a number of policies that extended beyond import substitution. This paper follows his suggestion of using SLI in its place.

[30] Somalia, for instance, has effectively lacked a state since the fall of the Siad Barre regime in 1991. Conflicts in the Democratic Republic of Congo, despite discrete names such as First and Second Congo War, have continued sporadically over time and geographic space since 1994, cumulatively

legitimacy of government may be challenged by rebel factions who control pockets or even large swathes of territory within the nominal national boundaries. For "fragile" states desperately wishing to avoid the fates of their conflict-racked neighbors, the adoption of SLI policies is out of the question, reliant as they are for their own security and longevity on foreign aid, imports, and (in many cases) peacekeeping forces from entities that systematically favor trade and industry liberalization.

What befalls the economy in countries that lose their grip and descend into violence? Using the case of Liberia, I argue that the effects of civil war on the private sector, while overwhelmingly disastrous, can, especially for infant firms that manage to survive, convey many of the benefits (and liabilities) that ISI and SLI policies have had elsewhere. Specifically, the war economy in Liberia mimicked import tariffs, localized the staffs of many companies, raised local content in products, and even spurred on technical learning and knowledge accumulation. All of these outcomes are reminiscent of SLI aims, and are particularly remarkable in light of the fact that they occurred more or less in a vacuum of state institutions (much less state intervention).

I stress that in calling attention to the war's silver lining, I am in no way denying the existence of a very dark cloud. In addition to its dreadful humanitarian impact, the war precipitated falling output, rapid declines of total factor productivity, capital destruction and flight, and labor dislocation and emigration. My intention in calling attention to ways in which a status quo of crisis benefited some companies is not to downplay the horror of the war years, nor to suggest that the war was in any way desirable. Rather, I first wish to dispel the myths of the wartime private sector as purely appropriative (i.e., predatory or exploitative), and of the post-conflict economy as virtual tabula rasa. Second, I wish to highlight the importance of protecting local industries in post-conflict economies. The latter is a mandate that too often goes unnoticed in the postwar drive to attract FDI and donor money.

This paper is organized as follows. In Subsection 3.2, I summarize my research methodology, touching on the history of the Liberian conflict along the way. In Section 3.3, I briefly describe the most widely accepted views on the effects of civil war on developing economies. In Section 3.4, I describe how the war benefited certain industries in ways that SLI policies were originally geared to effect. In Section 3.5, I qualify the similarities between war and SLI with areas in which their effects clearly vary. Section 3.6 argues that such a similarity suggests that post-conflict planners should consider adopting certain temporary SLI policies.

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amounting to the world's deadliest conflict since World War II. Liberia, the country profiled in this paper, has known a combined total of 6 years of relative peace over the past two decades.

3.2. Methods in Context

This paper grew out of a separate, interview-based case study on the ways in which Liberian production firms adapt to a status quo of insecurity (see Chapter 2). The study's research design was deliberately qualitative, and was intended to generate hypotheses rather than test them (as a survey might do). Thus, while case selection was performed to maximize certain independent variables described below, no attempt was made to create a sample size capable of generating statistically significant results.

I chose the case of Liberia to study production firm survival in civil war for a number of reasons expanded upon above (see Subsection 2.2.1). I employed in-depth, semi-structured interviews to obtain information on business operations before, during and after the wars[31]. I chose this qualitative method for four reasons. First, many business records detailing employment levels, wage levels, etc. were destroyed during the war, and those that were not were difficult to gain access to. Second, no official statistics were gathered on wartime business operations. Third, even if statistics had been gathered, the situation changed so rapidly that such snapshots would not be able to convey the dynamic process of adaption through any sort of "comparative statics" analysis. By contrast, an interview can tell a story in dynamic "real-time". Fourth, interviews with key decision-makers in firms may shed light on the grounds on which certain decisions were made, thus hinting at the beginnings of causal connections and hopefully helping to generate theory.

I studied 11 Liberian production firms (and 1 Sierra Leonean firm[32]), gathering from one to three manager interviews at each. Potential firms were identified by (a) preliminary examination of a detailed map of Monrovia landmarks compiled by the Humanitarian Information Centre of Liberia, (b) street-by-street driving tour of major business concentrations, and (c) snowball information-gathering during the interview process. Selected firms had to (a) be accessible (i.e., at least one manager had to be willing to talk

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[31] For the purposes of this paper, the interview included four basic questions, elaborated and adapted as appropriate:

1. Did the effective prices of your inputs rise or fall due to predation, war insurance, or any other war-related reason? How so/why not?
2. Did your firm substitute imported inputs with local products? How so/why not?
3. Did any employees leave or get laid off during that time? How many and what nationality were they? Did you hire any new employees? How many and what nationality were they?
4. Did your firm begin or terminate any operations as a result of the war? If begun, did you have the capacity to perform these operations previously? How did these developments come about, and have these adaptations been retained in the postwar years? Why/why not?

[32] Sierra Leone Brewery was included as a matched pair case for Monrovia Brewery. Being located in the capital of a neighboring state which underwent a related and structurally similar set of conflicts (i.e., rurally-based insurrections that lay siege to the capital) over a similar period of time (1991-2002), both breweries coped with similar problems of predation and disruption in their respective supply chains.

about wartime operations), (b) be production-oriented, and (c) have been founded before the commencement of (and probably continued operating during) the Second War (1999-2003).

For practical purposes, firm selection was stratified by location, where three sections of Greater Monrovia were identified:

1. *Northern Monrovia.* This area, which includes the large industrial concentration on Bushrod Island and the Freeport of Monrovia (also on Bushrod Island), is situated across the mouth of the Mesurado River from central Monrovia. Because of its proximity to the city, it has repeatedly been targeted as the main route to the capital by rebel armies, and so all of the long-standing businesses there have had to contend with operating under rebel control.
2. *Eastern Monrovia.* This area consists of the exurban townships scattered around the eastern portion of the lagoon, from Red Light in the southeast to Gardnersville in the northeast. These areas did not come under direct rebel control during the Second War, but government control was eroded here and the Government of Liberia was unable to prevent widespread looting and breakdown of civil order.
3. *Continuously-held central Monrovia.* While fighting did come to certain parts of central peninsular Monrovia in the First War and again briefly in April 1996, and although the downtown was shelled during the Second War, central Monrovia never fell to non-government forces (though the government/non-government distinction is blurred at some points during the war).

Such variation was meant to distinguish the strategies employed by three classes of firms: those sporadically under rebel control, those in an administrative no-man's-land, and those continuously under government control. In addition to varying location (and hence exposure to violence), firms were also selected so as to maximize variation in ownership (local versus foreign) and supply-chain structure (i.e., locally versus internationally supplied). Table 1 lists the firms where interviews were performed, as well as their location, supply-chain structure, and ownership.

Table 3. Production Firms Selected for Study

No.	Firm	Description	Region*	Local Sourcing†	Local Ownership‡
1	RITCO	Spirits manufacturer	1	0	0
2	NICOM	Spirits manufacturer	3	0	1
3	African Tile	Cement products	2	1	1
4	Salaloe	Cement products	3	1	1
5	USTC	Soft drink bottler	2	0	0
6	Monrovia Breweries	Brewery	1	0	0
7	Sierra Leone Breweries	Brewery	2**	0	0
8	Int'l Aluminium Factory	Metal products maker	2	0	0
9	LISWINCO	Wood products maker	1	1	1
10	AfriCorp	Candle and toilet paper production	1	0	0
11	Parker Paint'	Paint products	2	0	1
12	CEMENCO	Cement manufacturer	1	0	0

* 1 = Sporadic rebel capture, 2 = No-man's-land, 3 = Constant government control
† 0 = Mostly imported inputs, 1 = Mostly locally-sourced inputs
‡ 0 = Foreign ownership, 1 = Local ownership
** Based on the categories of geographic types enumerated above
Source: The author

What percentage of Liberian production firms do the 11 listed above represent? There have been only two audits of industry in Liberia in the past 20 years. The first, performed in 1989-1990 just before the onset of the first war, counted 135 firms, dominated mainly by natural resource extraction operations (e.g., timber, minerals, fisheries, rubber, and cocoa), and a much smaller number of production firms (e.g., food and beverage, paper products, and building materials) (see Table 2). The second, performed by the Ministry of Commerce (2007) three years after the end of war, details no less than 5,186 firms. This much higher number reflects the fact that the table is not filtered based on industry (i.e., services firms are included) nor size. Most of these firms are quite small by tax contribution – the range in this list is from US$3.50-1,125, with a median tax payment of US$35 and a mean of US$165). Unfortunately, few standard categories are employed in the database, and so it is impossible to construct a table similar to Table 2.

Table 4. Number of Liberian firms by Type, 1989-1990

Type	Product	No. Firms	% of Total
Natural Resource Industries	Forestry Products Exports	50	37.0%
	Extractive	28	20.7%
	Fisheries	14	10.4%
	Rubber	11	8.1%
	Palm	5	3.7%
	Cocoa & Coffee	2	1.5%
	Exporters of Wildlife	1	0.7%
	Total Natural Resource Industries	**111**	**82.2%**
Industrial Production/ Manufacture	Food & Beverage	8	5.9%
	Chemical	4	3.0%
	Paper Industry	4	3.0%
	Other Manufacturing	3	2.2%
	Building Materials	2	1.5%
	Exporters of Metal Scraps	2	1.5%
	Cosmetics, Soaps & Detergents	1	0.7%
	Total Industrial Production/Manufacture	**24**	**17.8%**
Total		135	100%

Source: Ministry of Commerce, Republic of Liberia(1989). Calculations by the author

3.3. The Cloud

The topic of economies in conflict is often addressed in one of two ways. First, it is studied in the guise of the war's toll on macro-constituents of the economy. Physical capital is damaged or destroyed. Investment rates drop dramatically as capital flees in anticipation of, during, and after war, depending on the intensity, length and extent of the conflict (Kosuke Imai and Jeremy M. Weinstein, 2000). The population may be displaced, killed (by violence or, more often, war-induced famine and disease), or maimed, and the labor market may be distorted by slavery and forced militia recruitment. Human capital tends to flee if it can, and is not replaced as schools shut down, go unfunded, or are abandoned. Total factor productivity plummets as technological innovation comes to a halt, workers are prevented from accessing the workplace, and transporting and marketing goods becomes more difficult (Macartan Humphreys, 2003b). Collier (1999) notes that sectors that depend heavily on capital and trade are more vulnerable than those that do not. Finally, war tends to exacerbate inflation as many goods become scarce and post-conflict rebuilding entails simultaneous society-wide expenditures on construction and equipment. In sum, civil war is widely seen as having unambiguously deleterious effects on all aspects of the economy, though some suffer more than others.

Second, when conflict results in the toppling or serious weakening of a government, it is viewed as an opportunity to assess the economic benefits and costs of having a state in the first place. Economists examining development in stateless countries (e.g., Tatiana

Nenova, 2004, and Tatiana Nenova and Tim Harford, 2004) often balance the lack of enforced economic institutions (e.g., property rights and contract enforcement) against the benefits of economic deregulation and freedom from rent-seeking. In such a way, Nenova describes that while certain industries have actually benefited from the lack of red tape, the Somali private sector is severely constrained in how far it may develop without a state apparatus. Such an assessment fits with the New Institutional Economics as portrayed by Williamson (2000), who describes tiers of institutions: informal norms, political and legal institutions, governance modes, and common transactions. Absent the second tier of government-supported institutions, transactions continue but are limited in their potential for complexity and long time horizons. Leeson (2008) argues that in the Somali case, the previous government was so given over to rent-seeking that it represented more of a burden than a boon for its economy. In brief, states' economic institutions are needed for long-run development (Daron Acemoglu et al., 2002), though particularly bad states in less-developed countries may actually hamper it. The implication is that war will not likely be good for an economy unless it results in the toppling of a kleptocratic regime.

3.4. SLI and its Resemblances in Liberia

3.4.1. SLI in Historical Context

Following World War II, most developing countries adopted a suite of economic policies geared to promote industrialization collectively termed "Import-Substitution Industrialization" (or, in this paper, "State-Led Industrialization") policies. Generally, their purpose was, as the name implies, to substitute imported industrial goods for industrial goods manufactured domestically, thus building a strong domestic manufacturing sector. They were adopted explicitly and with gusto by large Asian and Latin American countries in the 1950s and 1960s, and spread to Africa and smaller developing countries in the late 1960s (Colin Kirkpatrick, 1987). From very early on, the main arguments in favor of SLI revolved around nurturing "infant industries," and have recently centered on the role of tacit knowledge in this process.

Infant Industry Protection

Developing countries of the post-World War II era were not the first to adopt SLI policies. Most, if not all, countries of the developed world have, at some point during the 18th and 19th centuries, used similar strategies[33]. The early US protected its nascent industries,

[33] Chang notes, for instance, that England itself, the first industrializer and modern bastion of free trade ideology, introduced and even innovated a wide range of international trade tariff (ITT) policies (such as export subsidization and import tariff rebates on imports for exporting industries) from the fourteenth century until the 1846 repeal of the Corn Laws – not coincidentally the time of the second industrial revolution in Britain. Perhaps because Britain was the first industrializer, the political arguments in favor of such policies did not use the infant industry, or "catch-up", argument, as there was no country ahead of them. Rather, protectionists like Malthus tended to assert (in the case of the Corn Laws) that lower prices for corn would stunt industrial growth by reducing agricultural wages and thus industrial demand in a still largely rural country.

justifying the move with the infant industry rationale as first pioneered by Alexander Hamilton and Daniel Raymond (Ha-Joon Chang, 2002)[34]. Later early developers often rationalized the SLI approach with the same argument, contending that it was the country's duty to protect and nurture industrial manufacturing until such point as they were capable of competing internationally.

Dependency Theory

After World War II, many developing countries were flush with foreign exchange from raw materials (Alice Amsden, 2007), but international firms were outcompeting local industries and exchange reserves were dwindling fast. Against this backdrop, Prebisch (1950) and Singer (1950) argued that late-developers could not rely on static comparative advantage to develop. If they did, they would be trapped in the world division of labor, due to rising wages of monopolistic firms in the North and stagnant wages in the south where surplus labor and weak unions were the norm (Henry J. Bruton, 1998). Moreover, low income elasticities of demand for raw materials in the developed world would gradually prompt a secular decline in the terms of trade, thus widening the income gap (Raul Prebisch, 1959). While this secular decline in terms of trade might eventually prompt a 'natural' shift toward industrial investments, Nurkse (1953) also introduced a broader export pessimism underpinned by skepticism that the rich world's markets would be able to absorb all the exports of an industrially developing world. Finally, Keynes' insight that even a perfectly functioning labor market may not clear due to a disconnect between real and nominal wages undermined faith in allocative equilibria (Henry J. Bruton, 1998). To head off the fate of impoverishment, developing countries had to buck the global division of labor by raising the capital/labor ratio, replicating Northern development patterns, and generally investing heavily in becoming industrially self-sufficient.

Tacit Knowledge

A large part of the reasoning behind the infant industry protection argument was the implicit assumption (later made explicit) that knowledge was in part tacit – that is, that it is unable to be codified, converted into information, and transmitted. If knowledge were perfectly codifiable, it would be traded like any other good, following the Heckscher-Ohlin-Samuelson trade model. In the H-O-S model, all firms of in the same industry are assumed to have perfect knowledge, and thus to have equal productivity coefficients. Thus, if one nation's firms are out-performed by another's, it is because they are not exploiting their comparative advantage (e.g., cheap labor). Furthermore, Pareto optimality occurs naturally in the absence of market distortions, and therefore, firms finding themselves outcompeted are advised to lower prices (and therefore wages) rather than invest in the still-maturing asset of human capital. Indeed, Veblen (1922) believed that knowledge in the modern world

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[34] These ideas would later spread to Germany by way of Frederick List (Ha-Joon Chang, 2002), where they would manifest as a concerted effort on the part of financial institutions to nurture and grow the industries in which they had a vested interest (William J. Bernstein, 2008), state investment, and industry-specific subsidies.

would become evermore codifiable as economies shifted toward information-intensive technology and away from learned, artisanal trades.

However, a great deal of empirical evidence (see, e.g., Scott Jonathan Wallsten, 2001) and a growing body of theory, including Schumpeter's early (J. Schumpeter, 1934) theory of economic development as innovation-driven[35], New Growth Theory (see, e.g., Paul M. Romer, 1994) and New Economic Geography (see, e.g., Paul Krugman, 1991b), suggest that modern economies in fact require more, not less, tacit knowledge. This tacit knowledge seems to be generated and transmitted best by people in close proximity to one another. Indeed this fact is cited as one of the very reasons that cities exist in the first place, and why accumulations of capital tend to attract more capital – increasing returns to scale make capital distribution "lumpy" rather than spreading to where other factors of production are cheapest according to the Law of Variable Proportions. Tacit knowledge generates spillovers, then, but the spillovers do not spill very far.

3.4.2. Import Tariffs

The onset of the war in Liberia had certain SLI-like effects on the Liberian economy. These included the mimicry of import tariffs, raising local content of manufactured goods, localization of staff (and, on a market percentage basis, of companies as well), and generally promoting knowledge-accumulation in local industries.[36] It should be noted that while regulations on tariffs, local content, and local staff constituted SLI policy *tools*, knowledge accumulation was a policy *goal*. Import tariffs were used in SLI to "buy time" for infant industries to mature. The Liberian war mimicked tariffs by way of predating imported inputs, thus increasing the price per unit.

Located on Bushrod Island just north of downtown Monrovia, the Freeport was routinely overrun by rebels during the First and Second Wars, both for political and economic reasons. Politically, it was the lifeline of Monrovia where the sitting governments were headquartered. Economically, it was the major source of processed and semi-processed goods, all of which were highly valued and thus often predated. Firms that depended

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[35] Schumpeter's theory has modern echoes in the work of Lester and Piore (2004).

[36] It might also be argued that exchange rate overvaluation was another trait that the war years shared with ISI standard tactics. Collier (Paul Collier, 2007b) notes that high social discount rates favor inflationary financing among wartime governments. The Liberian dollar, whose value was long officially pegged at par with the US dollar (from 1940 to 2005), in reality plummeted during the war, falling 34% in 2001-2002 alone (see www.bankintroductions.com/Liberia) when governments were mainly concerned with military, not macroeconomic, problems. Upward pressure on inflation also came from the private sector, as most local consumers pay in Liberian dollars (though the US dollar is accepted as legal tender) while businesses order inputs in dollar denominations. However, it is difficult to draw a similarity here, since the mimicry of import tariffs applied to all imports, including fixed capital. In SLI, by contrast, exchange rate overvaluation was intended to promote the purchase of just such fixed capital that infant industries needed to get started.

heavily upon imported inputs were forced to contend with (a) erratic periods of input unavailability, (b) looted merchandise, and (c) war insurance, all of which increased the costs of importing.

In the case of sporadic unavailability of inputs, firms with the means could invest in on-site storage facilities for raw materials that would not draw unwanted attention. Monrovia Breweries, for instance, maintained a stock of 6-8 months' worth of barley and hops and reordered 4 months prior to the anticipated time the stock would run out. As a manager at USTC, the local Coca-Cola bottling company remarked: "...the shipment is not frequent enough. To adapt to that, you tend to stock a lot more materials that you won't get locally." Certain stocked materials also demanded more capital intensive storage facilities than others. While CEMENCO, the local subsidiary of a German multinational cement company, could store its gypsum outside, the clinker would coagulate in the rain, and so required a large shed that could house up to 30,000 tons.

In the second case, looting from the Freeport and elsewhere sometimes forced firms to purchase the same imported products more than once. This pattern was replicated in the case of many businesses, especially when the product was crucial to the production process and when the only prospective buyer was the original owner. NICOM's production manager related that:

> ...at a certain point in time [during the Second War] the Freeport was also looted, and we found some of our flavors, some of our alcohol [on the market], and we had to re-buy them [from the looters]... Nobody can buy your own thing, so we had to buy our own thing from them, and pay for it twice.

The net effect of such 'recycling' was obviously to drain the capital resources of businesses and to redistribute it to the appropriative economy.

In the third case of import tariff mimicry, importing firms paid – and continue to pay – war risk insurance on shipments coming to port in Liberia. As the production manager at USTC explained:

> Shipping companies still consider Liberia a war zone. We still pay war risk insurance. Ships coming from the US or Europe to Liberia have much more money per weight [sic] than the same cargo going down south to a place like Nigeria, even though Nigeria is a much longer distance, but it's not classified as a war zone. We have to pay a little bit more...

3.4.3. Local Content

The war generally had the effect of raising local content in domestically produced goods. Predation of goods increased as a function of (a) proximity to the combat frontier, (b) soldier/civilian predatory tendencies, and (c) the value of the targeted good (usually higher for processed goods than raw materials – see Chapter 2). Predation tended to disperse economic activity both spatially and temporally, a strategy that minimized the risk of appropriation. This tactic implied that supply (and distribution) chains splintered into reticulated networks as they crossed the combat frontiers. This spatial dispersal required

an army of traders with intimate knowledge of geography and the local inhabitants. The owner of Parker Paints, a family-run paint manufacturer, remarked that "[a] lot of small-scale trading [took place]. People who had never been involved in business before became traders." Consequently, the number of transactions per unit distance transported increased geometrically, along with transactions costs per unit distance.

In this environment, Monrovia-based industries found it cheapest and easiest to import their inputs via the local Freeport as the combat frontier approached and impeded access to secondary cities. However, once Bushrod Island and the Freeport began to fall sporadically under rebel control and predation increased there, many firms retooled their production to rely less heavily on imported inputs and more on local goods. The local content effect was strongest among firms that (a) were of medium size, and (b) had with some flexibility in terms of the inputs they could accommodate in the production process.

Mid-sized firms were not too small to survive the heavily predatory environment: they had enough stored fat to get them through the lean times. On the other hand, they were more pressured to localize their supply chains than large firms, which could more easily afford to ride out even protracted periods of fighting in the expectation of eventually landing a large import shipment. NICOM, a mid-sized manufacturer of alcoholic spirits, diversified its product line to deemphasize drinks mixed with imported flavors (though it still sourced many of these from neighboring countries), and introduced the now-popular "Bitter Cola" cooler. NICOM's production manager explained the rational: "it's produced from cola nuts that can be gotten locally."

But even mid-sized firms could not cope if their supply chains were inherently inflexible (i.e., had no local substitutes), especially if they suffered any predation of their stocks. Parker Paints lost a US$500,000 stock of pigments and alkaline residues when looters dumped them on the factory floor to obtain the US$2 plastic drums that contained them. Without stock and unable to find local substitutes for any of their inputs, the business closed its doors. As owner Phillip Parker explained:

> You know like I said, Parker Paint is from the heart, but we bring in 95% of our raw materials. Everything we bring, except for water. And our solvents... we buy them locally. Except for water for water-based paints, we bring everything. Everything... [from] the tin to make the cans... [to the] titanium oxide...

The exception to the "Goldilocks" size rule of adaptation (not too big, not too small) is found in large firms with storage capacity which, while more stable and thus less likely to localize their supply chains, could be convinced to do so if their resources had been particularly drained by predation. Such was the case in neighboring Sierra Leone, where the large facility of Heineken-owned Sierra Leone Breweries, brewers of the national Star Beer, was decimated by the rebel Revolutionary United Front (RUF). In the wake of the war, Sierra Leone Breweries has made a conscious decision to localize strategic parts of its supply chain, in cooperation with the Common Fund for Commodities (a UN-mandated body), by sourcing locally-grown sorghum as a substitute for European hops.

Since products that embodied any sort of processing were more highly predated, intermediary industries were soon driven out of the market and low-value inputs preferentially chosen over high-value. The fittest survivors in that climate were industries that could take 'worthless' raw materials and rapidly produce finished products whenever distributors became available to take the valuable goods off of their hands. Companies were thus forced to forego semi-processed materials (often produced in foreign-owned factories in the formal sector) for raw materials (sourced by local businesspeople in the informal sector). The owner of LISWINCO, a mid-size steel welding and wood processing firm producing gates, doors and furniture, explained:

> Until that time [1990, when the NPFL/INPFL closed in on Monrovia], we used to get our wood directly from the [foreign-owned] saw mills. After 1990, people [informal, petty loggers] start using power saws, going to the bush to get the wood, so we would take wood from them.

3.4.4. Staff and Firm Localization

The war environment was also conducive to the promotion of locals in foreign-owned businesses that continued to produce, and (possibly) allowed local firms greater market share than they previously enjoyed. Upon the outbreak of war in 1989, many foreign-owned businesses shut down and evacuated their expatriate staff. They expected to send the staff back as soon as security was reestablished, but were soon unnerved by the longevity of the violence. This was the case with the United States Trading Company (USTC), formerly a diversified importer and bottling company, which immediately went about selling off its Liberian assets upon resuming operations in 1991. Its Coca-Cola bottling division, however, was too large for any local buyer, and so the mountain came to Mohamed: in 1996, USTC replaced much of its expatriate staff with African consultants (both Liberian and from other West African countries) originally seconded to it by Deloitte & Touche. Swiss-managed and foreign-owned Monrovia Breweries implemented a similar set of staff reforms in the wake of the First War, promoting Liberians to managerial roles for the first time.

But while the war gave the Liberian elite the opportunity to manage, it also entailed grave personnel problems. Given the severity of the humanitarian crisis in Liberia, it was not just expatriate staff who evacuated. Large segments of the local labor force also fled the country or were killed, giving rise to high (and expensive) turnover rates. The USTC finance manager described the turnover there:

> It's still high. During the war a lot of our staff had to leave, a lot of them to the United States on various resettlement programs. Immigrant programs are still running, [though] it's slowed down a lot. We did lose a lot of key staff. And we continue to experience the differences since 2003: you find yourself having to retrain people over and over again... It's gets frustrating working in this environment.

The Liberian war also presented sundry opportunities for women to enter business, primarily as traders and retailers – the former often effectively taking over the contracts of foreign-owned transport companies. The production manager at RITCO, an alcoholic spirits manufacturer, described how that firm managed to deliver their drinks across the

combat frontier: "women come across, buy and carry it... when war fighting [sic], the women go search for food and other [things]". NICOM, a similar firm operating on the other side of the combat frontier from RITCO, also dealt almost exclusively with women traders, after discovering that the large shipments made by their Lebanese transport contractor were too liable to interception on the roads. As a manager at Monrovia Breweries explained:

> [A]t the time really aside from sexual harassment and what have you, they [the soldiers] were not really troubling the women as much as they were troubling the men. So the women were free to travel around, [more so] than the men. So most of the business was done by the women. That's why today we even have more women doing business than before the war.

Finally, it is interesting (if inconclusive) to note the success of local firms in entering the alcoholic beverages market. The war spawned a host of mid-sized local alcoholic spirits firms that have grown as much as 500% since the start of the Second War. These are now in heavy competition with one another, whereas prior to the war, there was really only one major player. Meanwhile, foreign-owned Monrovia Breweries is still only operating at 50% capacity five years after the termination of hostilities (down from 89% capacity before the Second War). One possible interpretation is that the mid-sized local firms took advantage of the opportunity to erode Monrovia Breweries' market share. Such an interpretation would broaden the implications of the localization argument from merely staff sourcing at the micro-level to market composition.

3.4.5. Knowledge Accumulation

Bruton (1998) argues that one of the principal downfalls of many countries' SLI policies was their lack of emphasis on learning and knowledge accumulation. This resonates with Amsden (2007, 2001), who argues that firm-level know-how is a prerequisite to sustained industrial growth, and that therefore national governments that have nurtured knowledge accumulation among local firms are the ones that currently boast the most successful exports and the highest capital/labor ratios in the developing world.

While massively destructive of physical and human capital, the Liberian war also kept out most foreign firms and reduced imports, as explained above. This had two principal effects that spurred knowledge accumulation in mid-size firms, even as it wreaked havoc on knowledge accumulation in society at large. The first effect was that these firms, in diffusing their supply chains, also had to learn more about how to process raw materials (e.g., the cola berries in the case of NICOM, or the raw timber in the case of LISWINCO). Furthermore, in going further afield to source inputs that had previously come directly from the Freeport, businesses often learned of new techniques and products that they could then put to use at home. For instance, RITCO's production manager began making trips to Côte d'Ivoire and Ghana to source his ethanol. While there, he discovered new flavor combinations that his Ivorian and Ghanaian counterparts had pioneered with great success in their own markets. Thus, even as RITCO was scaling back production during the war years, it was actually broadening its product line from seven to 14 varieties. The general

manager partly credits his company's tremendous five-fold increase in output since before the Second War to these changes catalyzed by the war.

The second, more important, way that the war encouraged knowledge accumulation was through technical necessity. Whereas previously, firms might easily replace broken equipment with new, imported parts and machinery, the war heightened the risk that expensive equipment would be intercepted en route. Depending on their resources, companies generally used one (or, more often, a combination) of two strategies: (1) simplification of technical processes, and (2) in-house verticalization of maintenance and repair functionality[37].

Whilst the larger, foreign-owned firms such as USTC, CEMENCO, and Monrovia Breweries already had large repair shops, they grew still larger, and rarely needed recourse to the first strategy. Smaller, local firms integrated machinists and technical staff into their maintenance staff, but also simplified processes. RITCO and NICOM both acquired the in-house capacity to fix most technical problems associated with bottling machines and generators (strategy 2). For those devices prone to breakdowns, like the capping machines, staff engineers and machinists manufactured their own manually-operated alternatives as contingency measures (strategy 1). Subsequent to the war, easy access to foreign imports has made replacing broken machinery much cheaper once again (though both firms still keep the manual machines concocted by their engineers). Consequently, these firms have started to de-verticalize, spinning off a couple of local machinist businesses in the process.

3.4.6. Summary of SLI-War Resemblances

In summary, of the three independent variables I attempted to maximize in the research design, the most important in terms of spurring these SLI-like outcomes seemed to be the supply chain structure (i.e., whether supplies were mainly imported or locally sourced) and local ownership, in descending order of importance. The location of the business (proxying for exposure to violence at its production site) did not seem to play a large role. To refine this intuition, I created a table of all the firms; their regional, supply chain, and ownership characteristics (as polychotomous or dichotomous variables); and the answers (as dichotomous variables) to the four basic questions, corresponding to the four studied attributes of SLI. A pair-wise correlation matrix is presented in Table 3.

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[37] Verticalization of firm function is not uncommon in countries with weak institutional frameworks. For instance, Leff (1987) and Khanna (2000) both argue that giant diversified business groups in late-industrializing countries (e.g., chaebols in South Korea) arose in order to internalize many of the institutional functions, such as contract enforcement and property security, normally performed by the state in developed countries. Such arrangements were especially appropriate between industries with strong backward and forward linkages with one another.

While by no means definitive[38], Table 3 is suggestive of certain trends. For one, none of the firm attributes (location, local inputs, local ownership) were significantly correlated to one another with the exception of a positive relationship between local inputs and local ownership. This may suggest that local owners are more connected to local supply chains through social networks, though it could equally suggest that locals tend to own smaller, artisanal enterprises that do not require foreign inputs. Furthermore, location (and ostensibly exposure to violence) did not significantly affect SLI-type trends.

In terms of the effects of supply chain structure, locally-sourcing firms were significantly less likely to report heightened prices in inputs mimicking tariffs. The interviews suggest that this is due to the fact that foreign goods came through easily-targetable point-sources (e.g., the port), were generally high-value, and were subject to war insurance. Locally-sourcing firms were also significantly more likely to use recourse to import substitution when the effective prices of foreign goods rose. And while they were no more or less likely to localize staff (perhaps because they tend to employ mostly Liberians already), they were significantly *less* likely to have developed significant in-house technical capacity than foreign-owned firms. This may or may not be related to the ability of foreign owners to pull knowledge-intensive parts of their supply chain which usually reside in their home country into Liberia. This, then, would constitute a curious case of reverse "brain drain."

The effects of local ownership mimic those of local sourcing, with two intuitively understandable exceptions. First, local ownership is not significantly associated with felt "import tariffs." In fact, nothing in the interviews would suggest that it would be. Second, locally-owned businesses were significantly more likely to localize inputs during the war. Again, this may (or may not) be due to the fact that local owners are more embedded in the social web. It may also be due to possibility that foreign-owned firms could more easily afford capital-intensive security measures, such as radio communications, while locally-owned firms relied more heavily on local staff networks who in turn had access to local markets.

[38] It cannot be emphasized enough that the strength of this study resides not in the sample size, which is quite small and conditions all of the following suggestions, but in the richness of the interviews themselves.

Table 5. Pair-wise Correlations of Firm and SLI Characteristics

	Location	Local Inputs	Local Ownership	Import Tariffs	Import Substitution	Staff Localization	Knowledge Accumulation
Location	1.000	0.200	0.527	0.313	0.428	-0.200	-0.192
		(0.533)	(0.078)	(0.349)	(0.190)	(0.606)	(0.572)
Local Inputs		1.000	0.683	-0.671	0.624	-1.000	-0.810
			(0.014)	(0.024)	(0.040)	(0.000)	(0.003)
Local Ownership			1.000	-0.418	0.607	-0.791	-0.449
				(0.200)	(0.048)	(0.011)	(0.166)

Cell entries are Pearson's correlation coefficients (r) and (statistical significance) (p)
Source: The author

3.5. Caveats

The patterns described in Subsection 3.4 reflect the war's impact on the Liberian economy in particular circumstances that did not hold for all businesses at all times. By and large, the effects of the war may have exhibited some resemblances to those of ISI and SLI policies among production firms that (a) were mid-sized, (b) had flexible supply chains (i.e., could switch to local sourcing), and (c) supplied inelastic goods. If any of these criteria went unmet, the war's effects ranged from the depressing (as in the case of CEMENCO, a large firm with an inflexible supply chain supplying an inelastic good) to the calamitous (as in the case of Parker Paints, a mid-sized firm with an inflexible supply chain making an elastic good).

Predation at the Freeport may have mimicked import tariffs and served as disincentive to importing, but sourcing locally also grew more expensive during the war – oftentimes more so than importing while the Freeport was still free from attack. Furthermore, occasional rebel control of the main port or airport is not necessarily the norm in civil war. While Sierra Leone experienced a similar situation in its port capital, Freetown, the combat frontier in Côte d'Ivoire's civil war never came close to the main port city of Abidjan. The principle that concentrated streams of goods will generally be highly attractive targets, whether in provenance from a port, airport, highway, etc., is an obvious one. However, this applies to intra-country shipments just as much to imports. Moreover, as mentioned above in footnote 36, mimicked import tariffs did not distinguish between imported inputs and fixed capital, nor between imports used for domestic production and those used for export – both critical distinctions in SLI policies.

Local content may have risen in cases where local raw materials could substitute for scarce imports, but predation also hollowed out intermediary industries. Intermediary products

could not be easily and immediately dispersed upon manufacture. Rather, they were destined as specialized inputs for a finite number of other firms, and as such were more easily predated. The case of the timber mills' shutting down is illustrative. Imports may have actually have risen as a proportion of total product inputs, then, where local intermediate industries went out of business and raw materials could not suffice.

The caveats relating to staff localization and knowledge accumulation have already been mentioned. First, while it is true that Liberians and Liberian-owned businesses played a much larger role in the economy proportionally to expatriates and foreign-owned firms than in prewar years, the formal Liberian economy also shrank by 87% from 1980 to 2003. Thus, while Liberian interests may have been proportionately better represented, their absolute numbers diminished. Second and similarly, while the war may have catalyzed local knowledge accumulation in a few islands of industry, it ravaged knowledge accumulation in society at large.

3.6. Conclusions and Policy Implications

Calling attention to similarities between the effects of SLI and civil war on the private sector is not the same as asking why such similarities exist. After all, SLI policies were intentional and goal-oriented, while the war-driven adaptations were survival necessities. This paper's knowledge-accumulation claim in particular suggests that war might, in a not unambiguous way, help to establish the knowledge foundations of a domestically-integrated industrial economy. Such a suggestion clearly runs counter to mainstream conflict economics, which has generally held that while well-funded conflicts between developed countries may spur technological innovation, the possibility for technological breakthroughs benefiting (much less arising in) the private sector is remote in the low-tech civil wars of today's poor countries(Macartan Humphreys, 2003a).

A further question this paper raises is: *If* war indeed galvanizes knowledge accumulation in firms of Less Developed Countries (where production firms tend not to add tremendous value to exports or imports[39]), and *if* civil war is the logical result of few, highly concentrated value streams in the country (e.g., ports and mines), then to what extent does large-scale predation (civil war, *in extremis*) represent a kind of "autoimmune" response on the part of the economy to protect itself from international trade and establish more knowledge-intensive domestic industry? Answering such a question would require establishing an "emergent logic" governing, through organizational and institutional mechanisms, the balance of predation and production in an economy. It is far beyond the scope of the present paper.

This paper may, however, politicize the work of post-conflict economic development in ways not previously seen. Despite some disagreement over the appropriate level of state

[39] Many production firms simply assemble prefabricated imports after the fashion of a constructor set or a kit – an outsourced form of Li and Polenske's (2004) "dispersal economies".

involvement in reconstruction (and Weinstein's (2005) provocative paper on autonomous recovery), much of the post-conflict economic policy literature is prescriptive rather than analytic, and more intended to generate consensus around issues than to problematize them. This trend is in contrast to the longstanding and broad-ranging debate over the role of the state in late industrialization. The post-conflict literature often puts forward strategies for rapid economic growth to head off possible conflict relapse (Paul Collier, 2007b), attracting private investment (largely FDI), leveraging private sector investment for public infrastructure, and boosting export earnings (for war-torn countries, read: selling natural resources) (see, e.g., J. Bray, 2005 and , Mott MacDonald, 2006). It rarely, however, focuses on local firm ownership or production capacity, despite long-standing recognition in theoretical conflict economics of the production sector as the antithetical counterpart to the appropriative economy[40] (see, e.g., Raul Caruso, 2008 and , Jack Hirshleifer, 1994). In fact, a description of the Third World's idolization of FDI during the post-SLI debt crisis of the 1980s rings true as well for cash-strapped post-conflict countries today:

> But indebted Third World enterprises were in desperate need of capital, and this made foreign direct investment look good... [But u]nless a country has its own nationally owned firms, it can't "globalize" in the form of outward foreign investment. If only foreign firms exist in a developing country, the overseas investments of these firms can't redound to the developing country. (Alice Amsden, 2007ch. 8, pt. 4)

Another issue raised by the comparison of war's effects and SLI policies is that of firm competitiveness. SLI policies were seen by the West as producing firms unable to hold their ground when faced with the "level playing field" of free and fair global competition. As many have argued, however, SLI policies have worked to produce export-quality firms when they are gradually phased out over time, allowing international competition to galvanize maturing local industries, while also removing the export stumbling block of rigged exchange rates. Examples of such SLI phase-outs include China, India, Korea, and Brazil.

In the post-conflict context, it behooves policymakers to appreciate the SLI comparison and consider that a rapid and wholesale "investment-friendly" campaign may have similarly disastrous results to rapid trade and market liberalization in state-led industrializers. Even countries that have never before adopted SLI policy frameworks might wish to consider a probationary period during which the state protects its local businesses and allows them to recover from their injuries, consolidate their possible gains (in market share, etc.), and learn to contend with international competition. Furthermore, given the plethora of small suppliers that sprang up during the Liberian War, such a grace period might allow them to consolidate by competing amongst themselves and reaping economies of scale, and to formalize in cases where they have gone "under the radar". Such a policy framework would, however, require government resources that are too often nonexistent in postwar

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[40] Caruso argues that investments in industrial (rather than agricultural, services, or raw materials) production are particularly effective at reducing violence.

countries, for example to offer concessionary business expansion loans through development banks. There are no plans to shift the annual US$750 million budget for UNMIL from peacekeeping to economic development, though such a shift would arguably go farther toward truly stabilizing the country(Jeffrey Sachs, 2008).

It sounds strange to say that firms in a war-torn country may have benefited from protection, considering how vulnerable they were to wanton predation and how powerless the government was to provide even minimal public goods such as security and contract enforcement, much less functional utilities and transportation infrastructure. For those firms lucky and adaptable enough to survive, though, a counter-intuitive form of protection is exactly what the war implied. However, just as the protection patterns described above are not applicable to the entire Liberian private sector (much less to all other post-conflict economies), so too should these policy recommendations be seen not as rival, but as additive to the many other considerations that constitute a post-conflict policy framework.

4. The Ethnic Homogenization of Trade Networks in the Liberian and Sierra Leonean Civil Wars

4.1. Introduction

During the Liberian Civil War, the large market of Red Light grew up on the outskirts of Monrovia. There, under the relative protection of international peacekeeping forces, rural-urban trade liked rural inhabitants with industrial production and imports, and Monrovians with increasingly rare fresh food. In violent conflict, civilians in both urban and rural areas, depend to some extent on the function of trade networks for their welfare. So, too, do urban firms and rural agricultural enterprises. This chapter then seeks to understand the ways in which trade network morphologies shift during a conflict. Chapter 2 was a qualitative study of firm adaptations to civil war in Liberia, and describes a process of simultaneous supply chain outsourcing and verticalization of intermediary industry processing. The dynamic of spatial dispersal described therein both helps to explain why surviving production firms grow in technical capacity even as the economy as a whole becomes less efficient, and also suggests that trade networks may splinter and multiply during conflict, radiating out to hard-to-reach hinterlands. This Chapter examines the same phenomenon, not from the point of view of the firms, but from that of local residents who may become traders.

All of this occurs against the backdrop of civil war. When civil wars erupt, they tend to have contradictory effects on the local economy. On the meso and macro levels, economies in conflict are often hollowed out of intermediary industries (Paul Collier, 1999). The private sector as a whole becomes much less efficient and GDP often declines precipitously (Macartan Humphreys, 2003b). On the positive side, civil war may spur technical learning and knowledge accumulation among local production firms that do survive and benefit from a form of protection they do not usually enjoy (see Chapter 3). On the micro level, war may allow entrée into commerce for segments of the population who normally would be excluded from it, such as women (Krishna Kumar, 2001), and may build a strong sense of clan identity among traders (Patience Kabamba, 2008, Stathis Kalyvas, 2006). However, the violence that accompanies war may also breakdown intergroup social capital (Ashutosh Varshney, 2001).

This chapter scrutinizes the dispersal of production networks via a multiplication of petty traders during civil wars in Sierra Leone and Liberia. First, it argues that violent events during the intertwined civil wars in Sierra Leone and Liberia tended to splinter production networks, such that areas near violent events would host fewer traders, but would be serviced at arm's length by greater numbers of traders. Second, it argues that violent events also tended to have a localizing effect on the composition of traders. That is, while traders as a class are more likely to be cosmopolitan, traders in war become more homogenous with respect to the populations they serve. The overall picture this analysis

paints is that of an economy that grows increasingly reliant upon social networks rather than markets, and characterized by a 'disembedding' of trading networks even as they splinter. It implies that cities become hubs of activity for numerous overlapping, but ultimately separate, ethnic networks serving rural areas.

The rest of this chapter is arranged as follows. In Subsection 4.2, I describe the hypotheses and the theory from which they derive. In Subsection 4.3, I explain the methods employed to create a useable database and build logistic regression control models to predict the fact of becoming a trader. In Subsection 4.4, I build regression models predicting income. In Section 4.5, I discuss the implications of these results for theory.

4.2. Hypotheses

The primary hypothesis is (H_1) that a wartime incident's proximity, violence, and recentness will all affect (interactively) the likelihood of a local becoming a trader. Specifically, it is hypothesized that close strikes will cause trade networks to splinter, allowing traders to dodge the violence. Therefore, controlling for violence intensity and proximity, more recent events are hypothesized to create *more* traders to serve affected areas, since the effects of the violence are presumed to fade over time. However, the question remains: Are the new traders drawn from within or outside of local communities? Simplistically, I postulate that members of a community hit by violence will generally be more focused on immediate survival needs, and therefore expect to see trading increase with distance to the event, and decrease with violence intensity.

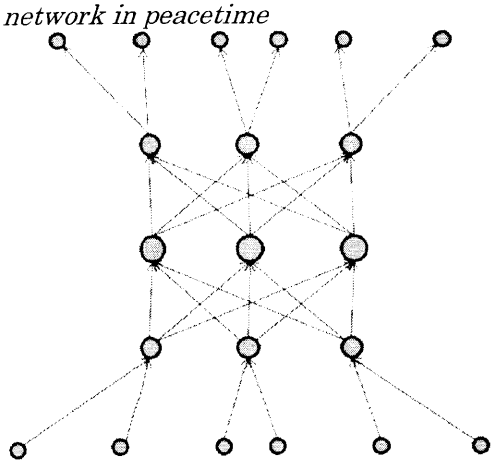
H_1 may test whether violence causes an enlarged set of traders to serve affected communities at arm's length, but it fails to get at the question of social networks. The secondary hypothesis tested (H_2) therefore addresses the relationship between the geographies of trade, conflict, and social structure. Specifically, it posits that, in the context of violence, traders are more likely to be drawn from the same ethnic group as the affected community. Varshney (2001) notes, for instance, that violence tends to break down interethnic "bridging" social capital. Jha (2007) likewise describes how long-distance trade could enhance inter-group social ties, and so H_2 tests the converse, postulating that nearby violence will fragment the trading sector, homogenizing specific networks. Traders, as a generally cosmopolitan class, are hypothesized to reside farther from their ancestral homelands than non-traders, but nearby violence is also hypothesized to militate against such cosmopolitanism.

While the splintering of the network would imply more traders to serve the affected community, the reticulated form of such splintering (i.e., branching out from the urban center to multiple peripheries) might mean nearby violent events select for traders from communities outside the affected area. That is, if all networks were equally splintered, there would be no directional pull on the trader class. But since the fragmentation generally increases with distance from the capital city in the Sierra Leone and Liberia contexts (as might be expected in rural-urban conflict more generally), traders are

hypothesized to have generally sprung up . The intuition behind the violence intensity variable is similar, and the hypothesized relationship between violence intensity and trader likelihood is likewise negative.

The reasoning behind the primary (trade network splintering) hypothesis can be explained by way of production network morphologies. In a non-conflict setting, a simple production network is characterized by the diagram in Figure 7[41]. Raw materials suppliers supply to the nearest processor, which then ships to producers who need specific types of intermediary goods. For instance, in prewar Liberia, timber fellers would ship trees to saw mills, which would then make a variety of cuts, from the high-value (planks and boards) to the less valuable (joists, short bits for furniture and, eventually, saw dust). These mills could then ship exactly what was needed by each industry (export lumber, particle board, furniture) and wastage was limited. For instance, the combat frontier cut LISWINCO, a furniture manufacturer, off from the mills (which subsequently went out of business), forcing the company to buy from petty loggers and process the wood themselves. Wood wastage was then partly mitigated by buying those logs that lent themselves to LISWINCO's products directly from the traders, as shown in Figure 8. (Topher L. McDougal, 2010) One of the downsides was an efficiency decrease due to the multiplication of trade routes to processing. On the upside for the firm, they became adept at operating large saws to process their own timber.

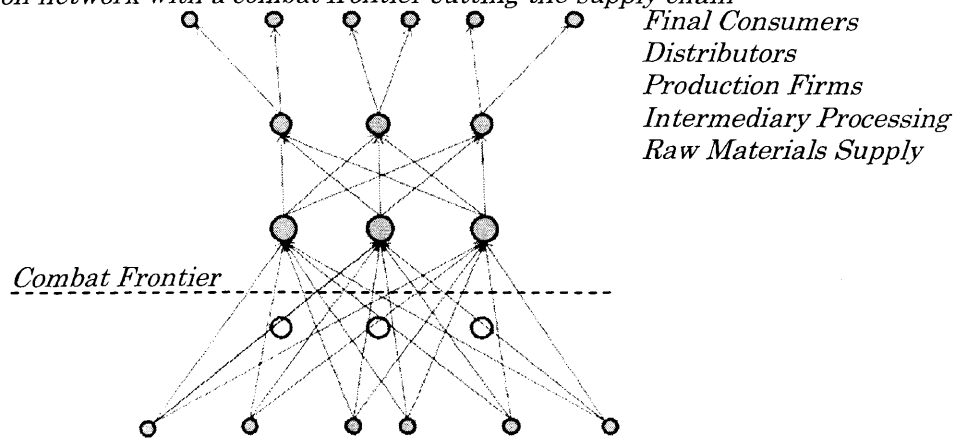
Figure 7. A generic production network in peacetime



Final Consumers
Distributors
Production Firms
Intermediary Processing
Raw Materials Supply

[41] A useful discussion of such supply chain morphologies was given by Jim Delaney (2010).

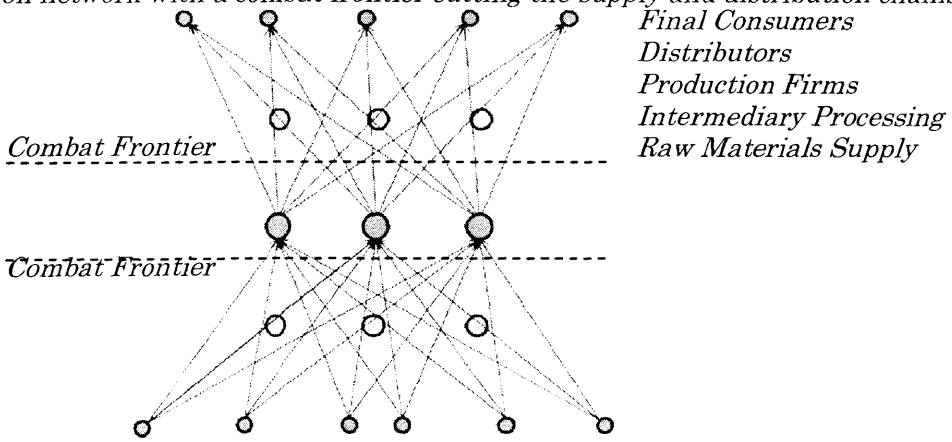
Figure 8. A production network with a combat frontier cutting the supply chain



On the distribution side, networks of traders came to have direct relationships with producers, rather than accessing them at rural distributions centers where the firms used to "break bulk" (as shown in

Figure 9). In this sense, predation by rebel groups did not mimic transportation costs hikes, because the economies of scale in transportation were more than offset by diseconomies of scale associated with detection. For that reason, Li and Polenske's (Yu Li and Karen R. Polenske, 2004) "dispersal economies" applied to the trade routes, but not to dispersed production facilities in linked industries.

Figure 9. A production network with a combat frontier cutting the supply and distribution chains



This trade route multiplication can be easily described with a simple model (in Appendix B), which shows that as the number of processing facilities declines by 1, the number of trade networks rises by the number of production facilities. This multiplication of trade

routes essentially represents a rise in inefficiency – another form of higher transportation costs in our original core-periphery model.

4.3. Predicting Trade as Primary Occupation

The main purpose of data analysis is to look at how the proximity of wartime clashes influenced the structure of trade networks, as proxied by the number of people listing "trader/retailer" as their primary occupation in any given location. The occupation data (as well as all personal information, including demographic and migration information) were collected in a January 2006 cluster survey carried out by the International Rescue Committee in Sierra Leone and Liberia which I helped to administer. Reliance on this survey data implicitly assumes that (a) violence affected the way in which people earned a livelihood, and not the other way around[42], and (b) the occupations adopted during wartime would, to some uncertain degree, carry over into the so-called post-conflict period, when the data was collected. The year of survey data collection – four years after the termination of hostilities in Sierra Leone, and two and a half after the termination of hostilities in Liberia – implies that those who became traders during the civil wars would not instantaneously revert to whatever they had been doing beforehand, but that occupations would be somehow "sticky". The technical details of my methodology in generating the data and then creating logistic regression control models can be found in Appendix C.

4.3.1. Results

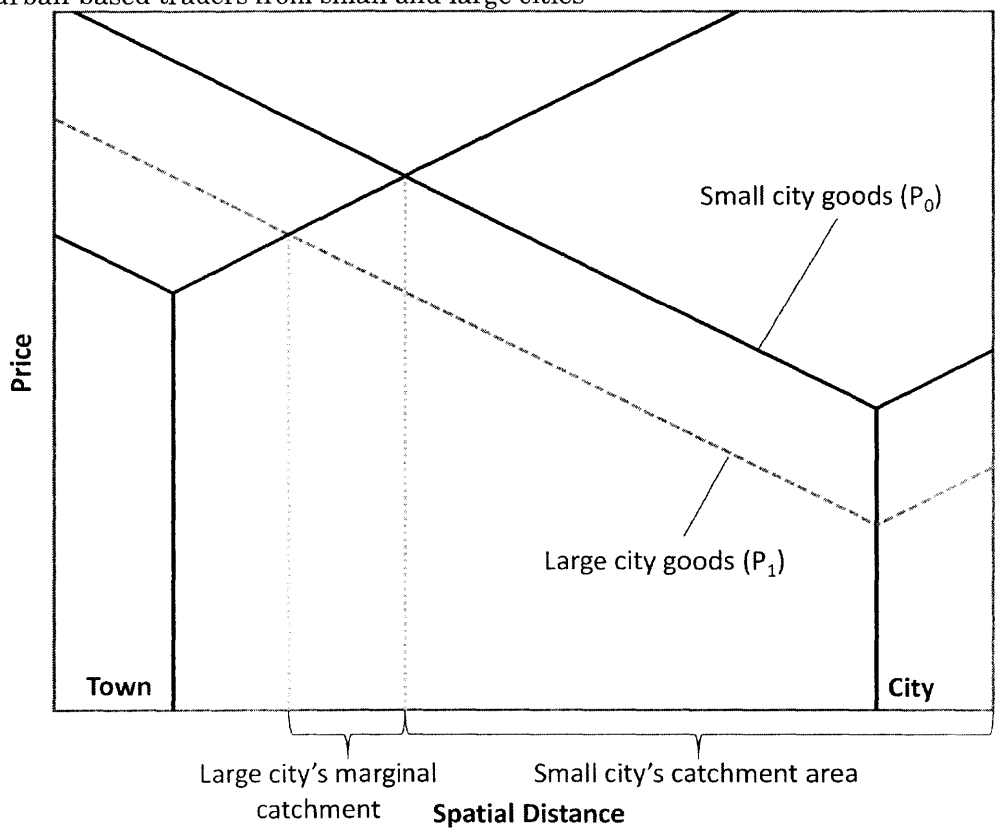
The results for H_1 speak more plainly to the *interaction effects* between the distance, recentness and severity of the closest attack than they do to the effects of those variables themselves. Table 6 shows that time since the attack (`agoev1`) tends, as predicted, to be negatively correlated to the likelihood of becoming a trader: the more recent an event, the more likely one is to be a trader. The variables for distance and severity (`dstev1` and `12casev1`) are more equivocal. However, the interactions between these variables operate as predicted. In the first case (`dstagoev1`), large distances between respondent and event tend to moderate the effects of recent events on trade networks. Likewise in the case of `12casagoev1`, less violent events tend to moderate the effect of recentness on the likelihood of becoming a trader.

The control variables tended to operate as predicted. Longer distances to main roads were associated with a decline in trader likelihood, as were larger populations of proximate cities. The latter phenomenon might be explained by way of competition from urban traders: large urban markets tend to enjoy economies of scale in sourcing, and so the same goods are less expensive than in smaller markets. A simple Hotelling model will show that the breakeven point between buying one's goods from the city versus from a local producer will shift outward in such a case – possibly privileging urban-based traders in the process

[42] For instance, relative dearths of traders may have implied that the traders that did operate in a given area carried more lootable merchandise per person, and so made more attractive targets for the purveyors of violence.

(see Figure 10). This effect is then understandably attenuated by large distances to urban areas. Finally, the distance to the border remained a reliable predictor of being a trader – possibly because in both countries, a centrally located financial and political capital implies that distance to the border is inversely related to distance to the capital. However, a variable for road distance to the capital was intermittently tested and found insignificant.

Figure 10. A Hotelling model of rural-urban trade, depicting catchment areas of urban-based traders from small and large cities



Source: The author

Table 6. Uncontrolled and controlled fixed-effects logistic models predicting the outcome `trade` *as a function of the predictor variables for* H_1

Family	Variable	Uncontrolled Models		Controlled Models	
Predictor Variables		A	B	C	D†
	dstev1	2.81e-3~	5.65e-3	2.85e-3	-.01
	agoev1	3.58e-3	-.13*	-.01^	-.13~
	l2casev1	.12	-.07	-.04	-.99~
Interaction terms					
	dstagoev1		2.02e-4*		2.05e-4~
	dstl2casev1		-1.81e-3^		1.25e-3
	l2casagoev1		1.35e-2*		1.23e-2~
Control Variables					
	l2dstrd1			-.54*	-.54*
	popcty1			-8.26e-07	-4.35e-06^
	dstcty1			.01	.01
	dstpopcty1			2.61e-07^	4.22e-07*
	dst2bdr			.02*	.03*
	Cons-Level 1	-3.25***	-.88	-4.32***	2.27
	Cons-Level 2	2.89e-08	5.36e-11	3.56e-10	3.02e-10
	Pseudo R2	0.02	0.07	0.11	0.14
	P>chi2	0.30	0.18	0.05	0.12
	N	421	421	421	421
	Groups	29	29	29	29
	Log likelihood	-93.67	-88.53	-84.22	-81.54
	Wald	2.25	8.93	15.36	16.72

** Significant at 0.05 level. ** Significant at 0.01 level. *** Significant at 0.001 level. ~ Significant at .10 level. ^ Significant at .15 level.*
Calculations by the author

In order to test H_2 – the idea that violence would produce traders who were more likely to come from the same ethnic group as the local population – the distance of the respondent from his or her so-called "ethnic homeland" (`dsteth`)[43] was added to the control models and tested for an interaction with the proximity of the wartime event (`dstlevt`) using a new term (`dstevldsteth`). This triad of independent variables is included in Models 4C and 4F estimated below (see Table 7).

It is difficult to interpret the coefficients for the independent variables intuitively, since they are interacted. Unlike in Models 3A-3D above, there is a reliably positive association between distance from the violent event (`dstev1`) and the likelihood of being a trader (`trade`). This outcome – fairly robust and, in the case of Model 4C, statistically significant at the

[43] Note that this variable was included as a control variable in the earlier models, but is now included as an independent variable.

$P > 0.01$ level (though attenuated to the $P > 0.1$ level in the controlled Model 4F) – is in line with H_1.

As predicted in H_2, greater distances from one's ethnic homeland are, ceteris paribus, positively associated with trading: traders are a cosmopolitan class. They are also generally found farther from violent events, as predicted in H_1. At the same time, the interaction term – in line with H_2 – is negative, and implies that while traders are generally less local in origin, this "cosmopolitan" factor is *less* salient close to violent events. This may be evidence of ethnic stratification taking place in the trade network – along the lines described in other studies of economies in the context of conflict and weak institutions (see, e.g., Patience Kabamba, 2008, Jamil A. Mubarak, 1997, Tatiana Nenova and Tim Harford, 2004) – where ethnic, clan and other in-group social cleavages grow in saliency as they are used as a guarantor of fair play and predictability. To borrow Rodgers' (2004) term, ethnic trade networks become "disembedded" near violence.

Table 7. Uncontrolled and controlled fixed-effects logistic models predicting the outcome trade as a function of the predictor variables for H_2

Family	Variable	Uncontrolled Models			Controlled Models		
Predictor Variables		A	B	C	D	E	F†
	dsteth	1.81e-3		1.90e-2***	4.91e-4		7.40e-3*
	dstev1		2.48e-3^	6.44e-5**		2.85e-3	1.25e-2~
Interaction terms							
	dstev1dsteth			-7.16e-3**			-4.65e-5~
Control Variables							
	agoev1				-.01	-9.44e-3	-.01
	l2casev1				-.04	3.15e-3	2.38e-3
	l2dstrd1				-.54*	-.55*	-.44^
	dstcty1				.01	.01	.02
	popcty1				-8.26e-07	3.08e-07	-2.36e-07
	dstpopcty1				2.61e-07^	2.50e-07	3.06e-07^
	dst2bdr				.02*	.01~	.01^
	Cons-Level 1	-3.08***	-3.26***	-4.77***	-4.32***	-4.14***	-5.53***
	Cons-Level 2	.271*	2.89e-08	2.29e-06	3.47e-10	3.38e-09	2.60e-10
	Pseudo R2	0.01	0.01	0.08	0.11	0.11	0.15
	P>chi2	0.26	0.13	0.01	0.05	0.05	0.04
	N	411	421	411	421	411	411
	Groups	29	29	29	29	29	29
	Log likelihood	-85.06	-93.67	-78.65	-84.22	-76.33	-72.62
	Wald	1.26	2.25	11.13	15.36	15.45	19.40

** Significant at 0.05 level. ** Significant at 0.01 level. *** Significant at 0.001 level.*
~ Significant at .10 level. ^ Significant at .15 level.
Calculations by the author

4.4. Predicting the Income of Traders

The last analysis involved predicting the income of traders. The idea was to discover a possible reason why violence selected for homoethnic networks. Was it because traders of the same ethnic background had access to more final consumers and local producers? I reasoned that if this "access" hypothesis were the case, homoethnic traders should get more business, and thus have higher incomes. This is not necessary self-evident. An alternative hypothesis might be that heteroethnic traders would be less constrained by social convention to make "fair" deals with locals, and instead exploit their monopoly position to the fullest possible extent.

The number of trader observations ("cases") being very low (N=25), I could not use a control model. The only predictor variables that were consistently statistically significant in this regard turned out to be those of distance from one's ethnic homeland, distance from the nearest violent wartime event, and the interaction term between the two. Income and distance from the nearest violent event could easily be endogenously related – for instance, violent actors might preferentially target more active markets with richer traders– and so I also tested the relationship using a 2-stage least squares analysis, which found no endogeneity whatever.

The relationship between ethnic distance and income is far from straightforward, as Table 8 demonstrates. In Models B and C, the ethnic distance variable coefficient is significant and positive, possibly implying that the heteroethnic traders may in fact take advantage of their position. However, the variable explains none of the variation in income on its own. Moreover, when the interaction term `dstevldsteth` is added, its sign switches and it seems to contribute vicariously in a profound way to explaining variation in incomes. Now, it is clear that heteroethnic traders generally have lower incomes when violent events have occurred nearby (a possible confirmation of the disembedded networks hypothesis), but that their incomes generally rise with the distance from violent events. In other words, homoethnicity is a more valuable trait in a trader when violence has occurred nearby.

Table 8. Fixed-effects regression models predicting weekly income

Variable	A	B	C	D
dstev1	-37.67*		-33.67~	-44.61**
dsteth		12.51***	12.43***	-17.82*
dstev1dsteth				.09***
Cons-Level 1	12660.61***	2458.98	9675.24*	13394.6***
Cons-Level 2	6878.37*	8576.35*	7740.49*	7008.35*
Pseudo R2	.23	0.00	.21	.45
P>chi2	0.00	0.00	.00	0.00
N	22	22	22	22
Groups	12	12	12	12
Log likelihood	-192.81	-200.55	-195.13	-192.81
Wald	55.50	16.21	19.45	55.50

** Significant at 0.05 level. ** Significant at 0.01 level. *** Significant at 0.001 level. ~ Significant at .10 level. ^ Significant at .15 level.*
Source: Calculations by the author

4.5. Discussion

There are a number of distinct limitations faced by this study. For one, the IRC survey was not a comprehensive cluster survey of both countries. At best, it can be described as a cluster survey representative of certain war-affected districts and counties in the two countries – in Sierra Leone, the Western, Western Urban, Kono, and Kenema districts; in Liberia, Montserrado, Lofa, and Nimba counties. Second, the fact of *being* a trader now does not mean that one *became* a trader due to economic conditions during the war. In

other words, no causality can be inferred, but only association ascertained. The causality in this case is implied more by the qualitative interviews with firm personnel managing supply and distribution chains presented in Chapter 2.

There are at least two interpretations of these results. On the one hand, violence in one area could cause the growth of the trading class in relatively unaffected areas, who could then service areas affected by violence. In this scenario, traders are like the air in a balloon: depress one area through violence, and they will spring up in another. If we consider the rural-serving processing or trade hubs in Figure 7, which are subsequently hollowed out in
Figure 9, it seems logical to think that, while the trade networks themselves are proliferating, the system becomes less redundant and more dependent on the central hub (or hubs) where production value is added. Furthermore, considering the incentives for production firms themselves to sync their production and distribution processes so as to avoid being caught out with finished (and therefore high-value) products on hand by predatory actors, it would make sense that the increasing number of traders would base themselves in financial capitals where production (and import receiving facilities) are located.

On the other hand, a more simplistic view of conflict economies might suggest that violence depresses regional productivity, and thereby depresses economic demand for goods purveyed by traders – causing traders to dwindle as a class. Of course, both of these things may also be true at once. One piece of evidence suggesting the simplistic view is not solely at work is that, while never statistically significant[44], the variable for time elapsed since the nearest violent event was consistently negative and fairly stable. This suggests that the longer ago an event occurred, the less likely it is that the respondent will be a trader. The simplistic view (roughly, more conflict → less economic activity) is thus perhaps contradicted, and it is seen that as relative stability returns, the trading profession is less in demand to help goods dodge predation and destruction.

Another piece of evidence supporting the "balloon" view of the trading sector is to be found in the negative sign of the interaction term between distance to violent events and the distance to one's ethnic homeland (`dstevldsteth`). The negative sign implies that the distance from one's ethnic majority homeland starts to matter more and more as the distance to violence decreases. In other words, if great distances from one's ethnic majority homeland are generally associated with a greater likelihood of being a trader, that is less the case when violence is nearby. This result may suggest that, as trade routes proliferate to lessen the chances of interception, those routes still need to interface with local communities served – and that those local communities will have their own, more ethnically homogenous traders to effect that interface. The implications of this study point to this trade interface between local communities and urban hubs as a critical factor in determining citizen welfare in rebel-controlled or contested territories – and just possibly in the resiliency of local communities to conflict more generally.

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[44] At the $P > 0.05$ level.

The splintering of trade networks described here may also have served to segment the rural market, thereby establishing traders with special access to certain regions as gatekeepers to rural distribution. A number of distribution managers in Monrovia-based firms, for instance, described themselves as being at the mercy of the traders when setting their prices during the war – they simply didn't know what sort of profit margins traders were making, and were therefore not in a strong bargaining position to raise prices. They were eager following the war to revert to bulk shipping as soon as possible. The wartime transformation of more open trade networks into more closed social networks seems then to have militated against the monopoly and monopsony power that urban firms tend to enjoy over rural areas in many less-developed countries (Marcel Fafchamps, 2001).

Finally, it is worth noting that the qualities of a successful trader, as described by firm managers, also included their ability to communicate rebel intentions to urban businesses, warning them of impending strikes. This often implied that they either had ties with the rebel movement, good interethnic relations with other urban-based traders who had access to such information, or both. Traders then truly did represent the membrane not only between urban and rural economies, but also between rebels and their intended targets.

Part III

Production Networks Act on Violent Actors

5. Multipolar Trade and Rural-Urban Violence in Maoist India

5.1. Introduction

The rural-urban divide, I have claimed, characterizes many internal conflicts – but how? Abraham Guillen's (1973) writings on the possibilities for Leninist takeovers of the urban-based state by the rural downtrodden in Latin America, long considered passé, seem to resonate with a very contemporary discontent in much of the rural Global South. Such discontent has manifested itself in a number of conflicts, whether they fall into the fuzzy categories – popularized by Ramsbotham et al. (2005) – of Ideological-Revolutionary (e.g., Maoist uprisings in Nepal and India), Factional-Economic (e.g., Liberia, Sierra Leone, Angola, Mozambique) or Identity-Secessionist (the former longstanding Tamil Tiger insurgency in Sri Lanka and South Sudan independence movement).

I have noted, though, that in some cases – e.g., Monrovia, Freetown, Luanda, Maputo – cities are targeted, to use Daniel Esser's (2004) taxonomy, as economic "prey" and the combat frontier is thus hotly contested. In other cases – Hyderabad, Raipur, Kinshasa – cities are important hubs of trade and even violence, but are not targeted by insurgents. In the former cases, rebel groups operate more often as territorial predators, employing violence indiscriminately and causing havoc. In the latter cases, they operate more like alternative governments, creating a social contract with the populations on which they depend, providing public goods and access to trade routes in exchange for "taxes." Moreover, there is great variability not only between different civil wars and rebel groups, but also between different factions of the same movement[45]. To that extent, it had seemed logical for policymakers facing rural-based insurgencies to focus on strengthening so-called "rural-urban linkages" – the movement of people, goods and capital between urban and rural areas[46] – in an effort to promote rural development and (the thinking goes) thereby reduce or eliminate the drivers of violent conflict (ESCAP/UN-Habitat, 2002). But to what extent can variations in violence levels be attributed to the strength of rural-urban linkages? Or does the *shape* of the trade networks that links the two areas also play a role? This paper attempts to answer these questions employing fixed-effects regression models based on GIS-derived variables, and using the case of the Maoist insurgency in rural India.

[45] Weinstein (2007) notes, for instance, that while Peru's *Sendero Luminoso* rebels were generally strategic in their use of violence, their regional Upper Huallaga Valley committee was notorious for its mistreatment of civilians.

[46] For an introduction to the rural-urban linkages literature, see Chapter 6.

5.2. Generating Hypotheses

There have been many sophisticated explanations forwarded of how economic incentives differentially impact the behavior of insurgent groups[47]. Three particularly relevant ones are those of James Scott, Mancur Olson and Jeremy Weinstein. Scott argued that peasant uprisings occur to prevent economic change (often initiated or driven by the urban sector) when it is destroying traditional livelihoods without creating new opportunities (James Scott, 1976). The Scott theory applies primarily to uprising initiation, rather than to intensity per se, but it might be hypothesized that the extent of livelihood destruction might correlate to the intensity of the resulting insurgency. Olson argued that roving bandits have little reason to create a social contract, while stationary bandits have an incentive to provide public goods and thereby enable the economic success of their territory, in which they can share (Mancur Olson, 2000). More recently, Jeremy Weinstein (Jeremy Weinstein, 2007) has argued that initial resource endowments largely determine the organization of the rebel group. Groups with a comparative abundance of economic resources will attract opportunistic recruits and will be less incentivized to invest in disciplinary structures that would restrain their members' excesses. Groups without such resources that must depend more on social capital will tend to attract committed recruits and create social contracts with the populations on which they depend.

Viewed in sequence, these theories exhibit a striking evolving theme: they portray the rebel group as progressively less and less financially tied to the residents of their territory. In Scott's theory, the group composed entirely of peasant residents, and little distinction is made between the rebels and the peasants from which they draw recruits. In Olson's theory, the rebel group – or "bandit" – is already a differentiated actor, but still depends on resident taxation for its funding (whether repeatedly from the same population, or in one-off events from various populations). Finally, Weinstein introduces the possibility that the group may be completely un-tethered to local funding requirements, thereby introducing the potential for complete diametric opposition of local and rebel interests.

Building on these insights, I will approach the insurgency-peasant relationship from the perspective of economic geography, with a particular focus on trade networks (i.e., supply and distribution chains) that (1) link rural and urban areas, and (2) may be more or less dispersed or concentrated. I assume that there is *some* degree of local funding for insurgent groups, and that groups are *somewhat* stationary (i.e., that they rove within a certain large, but bounded rural area). To model rural-urban linkages, I allow for *some* kind of economic relationship existing to varying degrees between rural and urban areas, but allow that

[47] By definition, models which differentiate between insurgents and (in this case, peasant) producers go beyond the simple assumptions of classical conflict economics, which posit that (a) territorial production levels are chosen by the group controlling the territory, and (b) all value produced in the two rival territories is either contestable (as in J. Hirshleifer, 1988) or not (as in Raul Caruso, 2008). Rather than dictating and profiting from territorial production, rebel groups influence production levels through their adopted governance style.

these relationships could conceivably be positive or negative[48]. That is, higher urban production might boost or diminish rural production to different extents in different states. Following Fafchamps (2001), I argue that rural-urban linkages may be conditioned by differential potential for monopsony or monopoly. The potential for monopoly and monopsony are thought to diminish with greater numbers of redundancies within the production network. But unlike in Fafchamps' framework, it is not here the traders who exploit rural buyers and sellers in cases of few redundant rural-urban connections, but rather the insurgent groups, who have can more readily tax traders' profits by blocking passageways.

I have noted elsewhere that firms – the essential units of urban economic production – tend to disperse those elements of their production networks that have come under the most intense predation by rebel groups (see Chapter 2). My argument here then operates in the reverse direction: dispersed production networks discourage rebel groups' violent excesses. Economic goods (or rather, those who carry them) may be better able to dodge strikes and roadblocks when production networks have the potential for dispersal, thus forcing rebel groups to enter into relations with locals based on negotiation and mutual gains. Moreover, as will be argued in Chapter 6, transportation networks that allow for multiple access points to urban markets will tend to diminish monopolistic rural-urban economic relationships, and thereby lower the transportation costs posited as playing a role in shaping the combat frontier in the core-periphery model in subsection 1.5.

I therefore test the following hypotheses:

> H_1: Strong rural-urban linkages will tend to diminish the intensity of the violence employed by insurgent groups, ceteris paribus; and
>
> H_2: Strong potential for production network dispersal will tend to diminish the intensity of the violence employed by insurgent groups, ceteris paribus.

5.3. Background to the Naxal Conflict

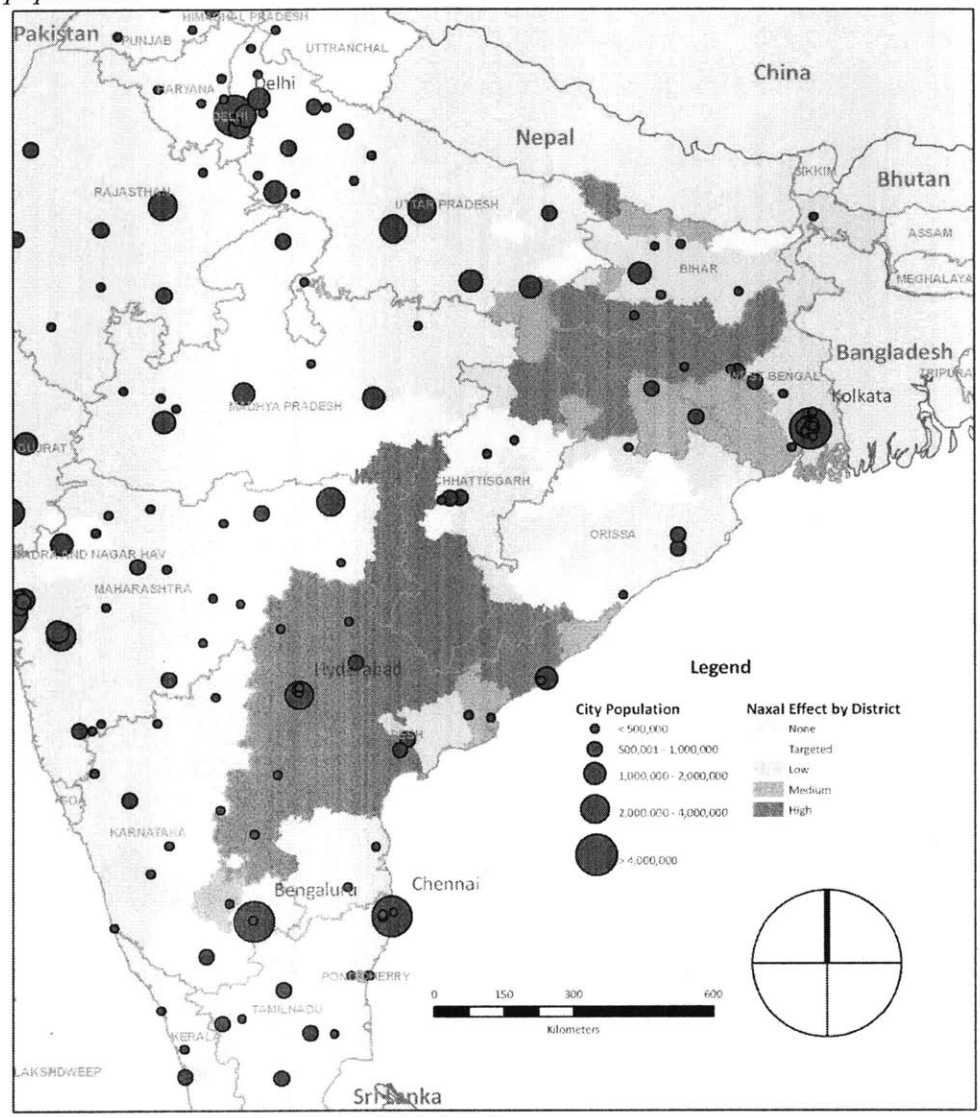
I use the case of the Maoist insurgency in India's "Red Corridor" – also called the "Naxal" or "Naxalite" movement after a peasant uprising in the West Bengal town of Naxabari in 1967 – to test these hypotheses. The Naxals and the fight against them cost the lives of around 1,000 people in 2009 (annualizing an ongoing tally through 24 November), eclipsing the toll from 2006, which had been the bloodiest ever (South Asia Terror Portal, 2009), and reaching for the first time the Correlates of War project's definitional threshold for "war." The Naxal movement first gathered steam in the late 1960s and early 1970s, and was largely stamped out by the Indian government in the following decades. The opening of the Indian economy, however, and the resulting effects of globalization – everything from large-scale development projects like dams and special economic zones that displace marginalized

[48] The possibility for both virtuous and vicious rural-urban circles was recognized over a half century ago by Hoselitz (1955) in an article titled "Generative and Parasitic Cities".

groups to the rapid development of farmland and forests on which tribal and poor people depend – have seen it roar back to life. While historically consisting of an urban intelligencia and a rural peasant base of support, the Naxals and their front organizations today are increasingly finding themselves struggling to remain hidden in urban areas – a trend attested to by the recent arrest of Kobad Ghandy, the South Western Regional Bureau (SWRB) coordinator for the premiere Naxal group, the Communist Party of India (Maoist), or CPI-M, formed in 2004 through the merger of the Communist Party of India (Marxist-Leninist) People's War and the Maoist Communist Centre of India. Ghandy had organized Naxal activity in Tamil Nadu, Karnataka, Kerala and Maharashtra, and was caught living in Delhi on 20 September, 2009 (K. Srinivas Reddy, 2009).

Today, Naxals are present in at least 16 of India's 28 states (Mustafa Qadri, 2009), and 170 of 602 districts (Economist, 2006). They primarily find purchase in the remote and less developed forested belts running generally from the Nepali border in the north to the inland mountains of Kerala and Tamil Nadu in the south (see Figure 11). They draw largely on marginalized tribal people for their recruits and logistical support, where they are often seen as the only force standing up for the rights of the underclass (Sudeep Chakravarti, 2008). While the various Naxal groups disagree on the overarching strategy for eventual capture of the Indian state, most groups have relied upon recruits from the forest areas, with the intention of then spreading to rural agricultural areas, small towns, and, in the final stage, large cities. As such, it is often seen as a classic case of a rural insurgency, even if its primary recruits are often forest-dwellers rather than agricultural peasants.

Figure 11. Naxal-affected areas of India by intensity and major cities by population



Source: Institute of Conflict Management, New Delhi, tageo.com /index-e-in-cities-IN.htm, ML InfoMap, Pvt. Ltd. and U.S. National Imagery and Mapping Agency (NIMA)
Map by the author

The Maoist insurgency makes a good case study for this topic for a number of reasons. First, while Weinstein would consider them unequivocally an economic resource-scarce group and thus to have organized principally around the highly selective use of violence (which is true), there have been some serious excesses in certain areas – 49 police officers killed in Bijapur in March of 2007, 25 civilians killed in a bomb blast in Dantewada district on 28 February 2006, 30 displaced villagers killed (mostly by machete) at a camp in Errabore, Chhattisgarh on 16 July 2006, etc. Which leads to the second point: each Naxal cell, while coordinated at the state, regional and national levels, has particular leadership,

recruits (mostly pulled from local populations), and local resident support structure. Because of their embeddedness in their communities, Naxal tactics differ across space. Third, India has a robust industrial sector that generates rural-urban linkages of a strength not often seen in other conflict-affected countries. Because this study aims to examine the effects of those very linkages on the potential for violence, it makes sense not to choose a country (like Liberia) where many, if not most, industrial inputs are imported. Finally, India is blessed with a thriving civil society, media, and academia, all of which make for ease of access to reliable information that is often lacking in conflict-affected countries in Africa, for instance. This study uses the Oklahoma City National Memorial Institute for the Prevention of Terrorism (MIPT) database of violent events for the study period January 2000-April 2007.

The remainder of the paper is organized simply as follows. Subsection 5.4 discusses the methods employed, and the uninterested reader can skip directly to subsection 5.5. Subsection 5.4.1 covers the variables included in the model, and subsection 5.4.2 builds of a control model. Subsection 5.5 introduces and interprets the results of the model, and presents two parallel models in which the outcome variable is disaggregated into violence and property damage. Subsection 5.6 discusses the results, and puts these statistical findings in conversation with some of the field research I performed in March and April of 2009. Subsection 5.7 discusses implications for development policy.

5.4. Methods

The basic idea behind this paper is to find a proxy for the dispersal potential of production networks around the sites hit by Maoist attacks, and to link that proxy to the severity of the attacks themselves. I chose to use the Indian transportation network, because it is publically available in a geographic information system (GIS) compatible format, and can serve almost any industry equally. I began by creating a GIS and assigning geographic coordinates to all incidents described in a database of violent Maoist events created by the MIPT. I then added the major cities and transportation networks of India[49]. Finally, I set about collecting and deriving a number of possible predictor and control variables at the event, district, and state levels as described below.

5.4.1. Variables for Inclusion

The outcome variable is the severity of the attack carried out. There are at least three ways of measuring severity with this dataset. The first is to assess each kind of violence for which we have measures individually and on its own terms: fatalities, injuries, kidnappings, private property damage, and public property damage. The second is to add

[49] The road layer was authored by ML InfoMap, Pvt. Ltd. for 2002 (http://library.mit.edu/F/?func=find-b&find_code=SYS&request=001235780). The railway layer that was appended to the road layer, as well as the geographic place names layer from which I derived city locations, were authored by the U.S. National Imagery and Mapping Agency (NIMA) for 2003 (http://library.mit.edu/F/?func=find-b&find_code=SYS&request=001322110 and http://library.mit.edu/F/?func=find-b&find_code=SYS&request=001280178 respectively). All GIS files were made available through MIT's geospatial web.

all the violence together using some kind of algorithm for comparability between violence types. The third is to perform a principal components analysis and use one or more of the resulting components as an indicator.

This study will begin with the second type, namely an additive measure of violence and property damage. The rationale behind this choice is twofold. First, it is somewhat intuitive, whereas a PCA would not necessarily be. Second, the destruction of one's house, car, tractor, etc., may affect a family's livelihood just as dramatically as the killing of one of its productive members. I multiplied injuries and kidnappings by 0.5, while fatalities count fully toward the total. Property damage was somewhat arbitrarily counted as a "unit" (i.e., 1) upon the destruction of a building, home, business, power station, vehicle, etc., and 0.5 when the same was said to have been damaged but not destroyed. The outcome variable, the additive result of violence inflicted and property damage caused, required a logarithmic transformation (natural log of total violence and damage plus one) in order to bring studentized residuals plots into rough conformation. The next step break out this index by violence against people versus damage to property. The individual forms of violence (e.g., fatalities, injuries, etc.) were not used because statistical power dropped at that level of disaggregation too dramatically for useful analysis.

The predictor variables are (1) the number of road junctions within a 20-kilometer radius of the attack, and (2) the strength of the rural-urban linkages at the state level. Transportation network junctions are here used as a proxy for the redundancy of possible routes from the event site to an eventual urban or industrial center. While road routes do not perfectly represent the full extent of possible production networks between event sites and urban areas (they neglect walking, air, rail, and shipping possibilities, for instance), they are considered here to account for the bulk of trade that small communities in Naxal-affected districts would likely employ. The variables, arranged by type and listed with their scale and source, are listed in Table 9. Appendix D explains how certain variables were derived.

Table 9. Variables considered for inclusion in the Red Corridor regression model and their respective scales and sources

Type	Variable	Scale	Source
Outcome	Total violence and property damage	Event	MIPT
Predictor	Number of road junctions within 20 Km each event	Event	GIS
	Number of rail junctions within 20 Km each event	Event	GIS
Control	Target (Government v. private citizens; t_priv)	Event	MIPT
	Market/city access: Roads & Rails		
	Length of roads within 20 km of event (l2lenrds)	Event	GIS
	Length of roads per Km², 2000 (rdspa2000)	State	India Stat
	Market proximity		
	Minimum distance (neardst)	Event	GIS
	*Average distance, first three (av3dst)	Event	GIS
	Average distance, all (av100dst)	Event	GIS
	Population of nearest city (nearpop)	Event	GIS
	Average population, nearest 3 cities (av3pop)	Event	GIS
	Average population, neraest 100 cities (av100pop)	Event	GIS
	Rural-Urban Linkages (rulink)	State	ASI/India Stat/Calculation
	Factories' Net Value Added per Population (factvalpp)	State	ASI
	Demographics		
	Population density (popden)	District	GIS
	Rural population, percent (prurpop)	District	GIS
	Rural laborer population, percent (prurlab)	District	GIS
	Forest		
	Percent forest cover, 1988 (pforest)	District	GIS
	Agricultural		
	Non-agricultural lands, percent, 1988 (pnonag)	District	GIS
	Cultivable wastelands, percent, 1988 (pculwst)	District	GIS
	Fallow lands, percent, 1988 (pfallow)	District	GIS
	Net percentage sown (psown)	District	GIS
	Total food crops grown (Kg per population; foodpp)	District	GIS
	Total non-food crops grown (Kg per population; totnonfoodpop)	District	GIS
	State of the conflict		
	Naxals killed (naxkill)	State	India Stat
	Kill ratio: Naxals to police (naxpokill)	State	India Stat
	Weapons reported looted (weaploot)	State	India Stat
	Weapons reported recovered (weaprecov)	State	India Stat
	Year (year)	Event	MIPT
	State (stcode)	Event	MIPT

Source: The author

5.4.2. Building a Control Model for the Additive Violence Index

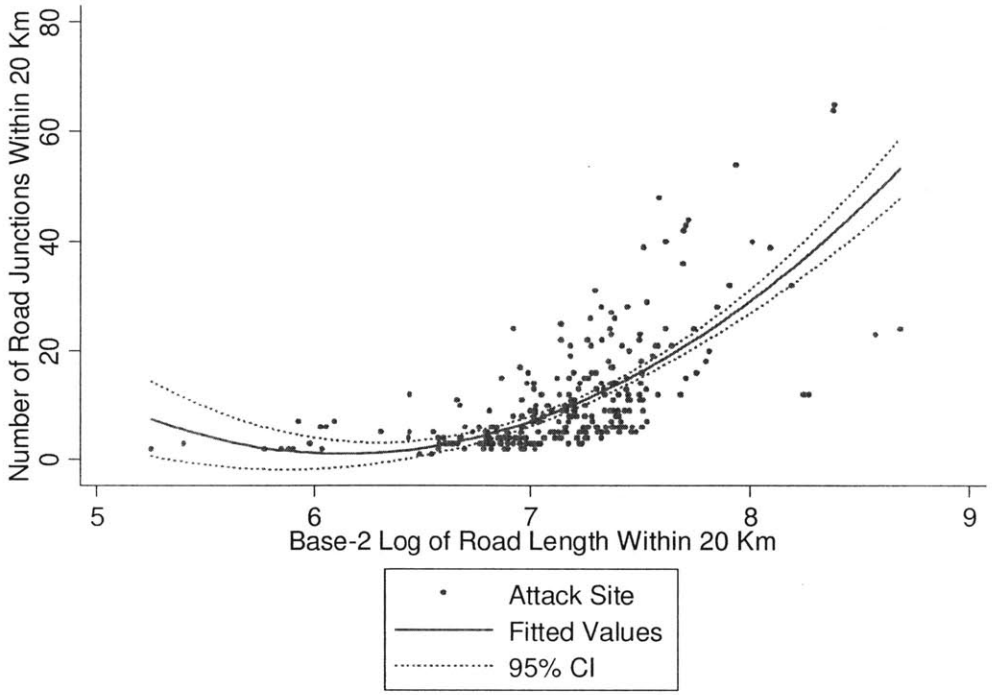
Non-hierarchical control models were built to inform the hierarchical control variables to be employed, since the number of observations in the MIPT dataset is not sufficient to allow for reliable REML estimation of confidence intervals for level 2 and 3 coefficients. The variables included for consideration in the control model-building process were each chosen for theoretical or practical reasons.

The length of roads (lenrds) within 20 kilometers of each event is important to include for two reasons. First, the road junction variable would not reliably proxy for production networks' dispersal potential to the extent that total road length – correlated to road junctions with a Pearson r of 0.69 at the $p < .001$ level – may actually be the crux of the

matter. At one extreme, a 40 km-diameter area may contain many roads that converge at a single interior point, thereby representing a reticulated transportation network radiating out from a single junction. On the other extreme, the same size area may contain a multi-polar network containing many junction[50]. This variability is critical to test the dispersal hypothesis, as it should control for a popular alternative explanation for variation in violence – i.e., that the "infestation" of violent Naxalism in India's Red Corridor is a result of "underdevelopment," a key factor of which is lack of roads. According to this narrative, a lack of roads means that markets are more difficult to reach, and less trade occurs, leading to underdevelopment and lowering the opportunity costs of would-be rebels to participate (see, e.g., Rajat Kumar Kujur, 2009 and , Dinesh Narayanan, 2009). Second, introducing road length may also serve indirectly to control for the population of any given event area, since it might be suggested that larger populations would demand more respect from rural insurgencies than small, more helpless ones. Road length per acre at the state level in 2000 (`rdspa2000`) is included for similar reasons.

[50] Network typologies often include multi-polar and reticulated (as well as hierarchical) categories (see, e.g., Richard Locke, 1995).

Figure 12. Road junctions as a function of road length at Naxal attack sites



Source: the author

Regarding the private citizens target variable (`t-priv`), it might be presumed that attacks would generally be of greater intensity when directed against the government instead of in "disciplinary" actions against local citizens and businesses, in order to keep the movement from falling out of popular favor. This strategy dates back to the earliest models of insurgent violence, most famously expostulated by Che Guevara (1998) and Chairman Mao (Tse-tung Mao, 1961). This variable was, however, predicted to operate in the opposite fashion for a few different reasons. For one, attacks against government and police may meet with much less success than those against more-or-less defenseless civilians. For another, the Maoist insurgency in many parts of India has had to struggle with a pro-government militant group called the *Salwa Judum* which competes with the various Naxal factions for the loyalty of tribal peasants. In such an environment, the peasants are not just varying shades of pro-Naxal, but can, as in Roger Petersen's (2001) framework, act as local proxies for the enemy government. Such is the case in southern Dantewada district, Chhattisgarh, where local tribal people have been repeatedly attacked, displaced, and attacked again by Naxals on the premise that they support the *Salwa Judum*[51].

Greater population density (`popden`) might be associated with greater civilian harm, to the extent that the effects of certain violent means (especially the use of bombs) are not

[51] See, e.g., Economist(2006).

necessarily restricted to those targeted. Larger rural populations (and rural labor populations) – `prurpop` and `prurlab`, respectively – might be expected to be associated with reduced violence per incident, since the maintenance of loyalty in small, rural communities might better be accomplished through the selective and surgical use of violence, rather than the large-scale violence employed when there is little information on who may or may not be supportive of the movement. The percentage of the given district's forest cover is included because forests have often been associated with the viability of rebel movements, whether by scholars like Collier et al. (2003) who point to forested areas' ability to shelter and hide rebels from government forces, or by human rights groups such as the Asian Centre for Human Rights (2007), which point to the vulnerability of forest-dweller livelihoods to the project of economic development, and who are more likely than others to join rebel movements in revolt[52].

There is another family of control variables dealing with agricultural production. The variable of cultivable "wastelands" (`pculwst`) – the Indian government's term for non-improved local government land that can be leased for variable periods to members of socioeconomically disadvantaged groups (see Topher L. McDougal, 2007) – was included because such lands might serve as an "escape valve" for socioeconomic pressure building on local tribal forest-dwellers. This intuition is reinforced by a series of interviews that the author had with tribal forest inhabitants in Karnataka who had progressed from being bystanders in the Naxal conflict, to aiders of the movement, to active participants themselves. The interviewees claimed that economic development of the region played out in a complex, intergenerational pattern of land usurpation by upper-caste landholders perpetrated upon tribals who were continuously driven off of their former improved lands and into forestlands where they were prosecuted for harvesting forest products. A similar logic underpins the inclusion of fallow lands, and an inverse logic that of sown lands. The total food crops grown per population of each district is included because scholars like André and Platteau (1998) have claimed that a version of the Malthusian Trap may act to spur tensions between resource rivals. Conversely, dependence by peasants on non-food agricultural products – cash crops – have long been blamed for setting in motion process of increasing rural indebtedness and economic instability (Hla Myint, 1964). Two polychotomous variables were included to indicate if the event occurred at moderate or high tea and coffee harvest times (`teaharv`, `coffharv`), since many Naxal recruits come from tea and coffee producing areas.

The "state of the conflict" indicators represent those items normally picked up by the media, and need little explanation. The year is included for practical reasons, insofar as the geographical scope of the Naxal movement over the study period (2000-2007) has widened, possibly instigating changes in strategy and hence violence. This might also be seen as a reason to include dummy variables for the states themselves – after all, each state has

[52] The second take on the role of forests in rebel movements is also in concert with James Scott's (1976) idea that the peasants' decision to take up arms is, to a large extent, a way of resisting socioeconomic change that threatens their survival.

dealt with the conflict differently. For instance, in 2004, the Government of Andhra Pradesh used peace talks with the Naxals as a ruse to lure rebels in hiding out into the open, and then proceeded to hunt them down (Sudeep Chakravarti, 2008). By contrast, the Government of Chhattisgarh reportedly nurtured the *Salwa Judum* paramilitary outfit to counter the Naxals (Economist, 2006), while lately Orissa has been employing a grassroots-development strategy (Dinesh Narayanan, 2009). State and district are, however, used as higher-level grouping variables in the later mixed-effects model.

No variables were excluded on the basis of statistical significance. One control model was created for all variables combined (Control A; see Table 10), and one that excluded variables yielding p-values of less than 0.2 through a manual process of elimination with backward glances (Control B). In Control B, `popden` was kept because of the relative stability of its coefficient and because the R-square dipped dramatically upon its removal. Control C contains only those variables yielding p-values of <0.05.

Table 10. Final fixed-effects regression control models estimated for total violence

Variable	H	I	J†
l2lenrds	-.38*		
rdspa2000	.14		
neardst	-2.33e-3		
av3dst	2.14e-3		
av100dst	-2.37e-3*	-1.10e-3*	
nearpop	8.91e-09		
av3pop	-8.04e-08		
av100pop	-1.79e-06		
factvalpp	.69		
t_priv	.45**	.47***	
popden	1.36e-4		
prurpop	1.36e-3		
prurlab	1.79e-3		
pforest	1.13		
pnonag	4.44***		
pculwst	-6.66		
pfallow	2.97~		
psown	.38	-.52*	
foodpp	-1.36e-2		
nonfoodpp	.01		
teaharv	.02		
coffharv	.03		
sgdp	-3.38e-06		
sgdpgrw	3.79		
naxkill	3.11e-3		
naxpokill	.02		
weaploot	-2.65e-3		
weaprecov	1.87e-4		
year	-.11		
_cons event	231.19	2.12***	
_cons district	.17	1.87e-4*	
_cons state	.78	.11*	
Adj-R^2	0.14	0.09	
F/ Wald Chi2	50.67	22.33	
Log Likelihood	-266.60	-257.73	
(df)	(29,131)	(3, 252)	
Level 1/2 Grp No.	5/39	9/50	
P	0.01	0.0001	

Cell entries are estimated regression coefficients, (standard errors) and t-statistics. ~p<0.10, * p<0.05, ** p<0.01, *** p<0.001
Adjusted R-square is not a feature of hierarchical models, and is provided only for reference.
†: Preferred model

5.5. Results

In uncontrolled models estimated for the predictor variables alone (see Table 11, Models 1-3), total violence and damage was found to be significantly related to the variable for road junctions, `jncrd`, and its square. That is, the propensity of rebel groups to use violence is diminished at higher numbers of nearby road junctions, though the response rate slows as the number of junctions within 20 kilometers approaches the parabolic nadir of roughly 27. Railroad junctions did not display any robust or significant relationship to violence and damage inflicted, when controlling for road junctions, and while it was examined further, the results are uninteresting.

The road model was then controlled for, using Control J from above. Again, a quadratic relationship emerged, with a negative but decreasing slope. The same control model was then used to test for an interaction term, `tprivjncrd`, between the target variable, *t*_`priv`, and `jncrd` (Models 5). In fact, this interaction holds up: rebel attacks on *private citizens and property* are much less violent at high levels of road junctions, while attacks targeting non-civilians are less responsive to this production network dispersal potential. (An interaction between the square term `sqjncrds` and `t_priv` was also tested but not found to be significant.) Model 6-6 included `lenrds` to ensure the effects did not disappear when controlling for road length. While statistical significance of `jncrds` and `sqjncrds` was attenuated (though still of greater magnitude and significance than `lenrds`), the interaction term `tprivjncrd` was not. While the square term does not remain statistically significant in Model 5, it remained a robust variable often enough for Model 5 to be considered the preferred model, especially considering the lack of significance of `l2lenrds`.

Table 11. Uncontrolled controlled regression models estimated

Variable	Uncontrolled 1	2	3	4	5	Controlled 6	7	8	9	10†
Predictor Variables										
Event Level										
jncrd	-.05***	-.04***			-.03***	-.02~	-.01			-.02~
sqjncrd	1.05e-3***	8.55e-4***			7.38e-4***	6.02e-4**	5.17e-4*			5.37e-4*
tprivjncrd		-.05*			-.03~		-.04*			-.03^
State Level										
rulink			-1.03	-.62	-.59			-.63	-.40	-.47
rulnktpriv				-1.58**	-1.46*				-1.44*	-1.16~
Control Variables										
Event Level										
t_priv		.91***		1.07***	1.23***	.51***	.85***	.45***	.95***	1.12***
neardst						2.48e-4	2.81	1.29e-3~	-1.21e-3^	- 7.46e-4
l2lenrds						-.14	-.11	-.13	-.11	-.09
Constant	1.51***	1.31***	1.59***	1.37***	1.52***	2.23**	1.95*	2.48***	2.25**	2.13*
District Level										
pculwst						-.68	-.90	-1.52	-2.05	-1.82
psown						-.29	-.24	-.37	-.35	-.16
Constant						.06*	.06*	.04*	.03*	.15
State Level										
Constant			.37*	.33*	.29*			.17*	.12*	.13
sd residual			.77*	.74*	.72*	.63*	.63*	.64*	.63*	.61
Adj-R^2	0.15	0.15	0.06	0.14	0.20	0.11	0.12	0.09	0.11	0.14
F/ Wald Chi2	14.17	16.03	1.56	30.73	53.88	35.24	40.68	20.36	26.97	39.24
Log Likelihood	NA	NA	-396.87	-383.83	-388.98	-266.00	-266.75	-257.05	-254.03	-263.64
(df)	(2, 334)	(4, 332)	(1, 336)	(3, 334)	(6, 331)	(7, 249)	(8, 248)	(6, 250)	(7, 249)	(10, 246)
Level 1/2 Grp No.	NA	NA	11/NA	11/NA	11/NA	43/NA	43/NA	9/50	9/50	9/50
P	X	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00

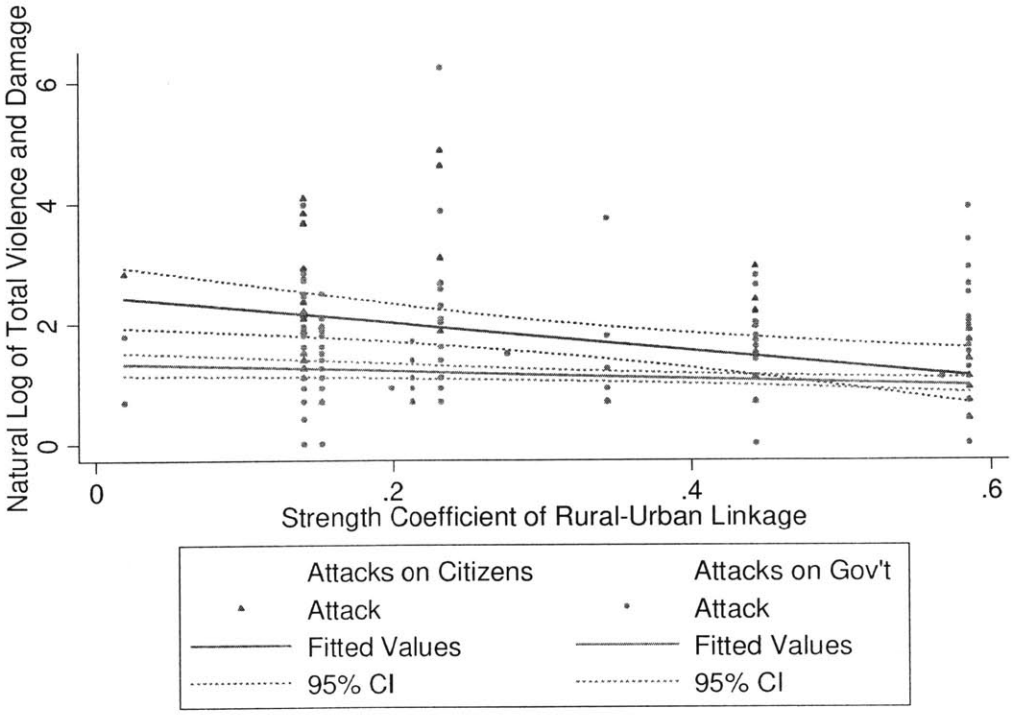
Cell entries are estimated regression coefficients, (standard errors) and t-statistics. ~p<0.10, * p<0.05, ** p<0.01, *** p<0.001

† : Preferred model

Adjusted R-square is not a feature of hierarchical models, and is provided only for reference

The first hypothesis – H_1, positing that stronger rural-urban linkages correspond to lower intensity attacks – is supported by the results. Rural-urban linkages differentially impact violence intensity based on the type of target. Figure 13 shows how the intensity of attacks on civilian targets is around 200% greater in states with the weakest rural-urban linkages versus those with the strongest, while the strength of rural-urban linkages has no statistically significant effect on violence levels employed against government targets at all.

Figure 13. The natural log of total rebel violence and damage inflicted on civilian (blue) and government (red) targets as a function of rural-urban linkage strength



Note: The diagram corresponds to Model 4
Source: the author

Likewise, the second hypothesis – H_2, positing that redundant transportation networks would be associated with reduced insurgent violence and damage – is also supported. For non-citizen targets, if no junctions exist, Model 6-5 predicts that adding one junction will be associated with a decrease in rebel-inflicted violence and damage of roughly 1.95 percent, the second junction with that of 1.9 percent, etc., until a nadir of around 20. For citizen targets, the model predicts that the first junction added will be associated with a 6.4 percent drop in violence, with the effect of treatment not reaching zero until around 64 junctions.[53]

While violence against civilians is typically worse than against non-civilian targets given few road junctions, setting the two equations equal to one another shows them crossing at around 20 junctions. From then on, civilian targets will tend to be less damaged by rebel violence, while non-civilian targets attract *more* violent attacks.

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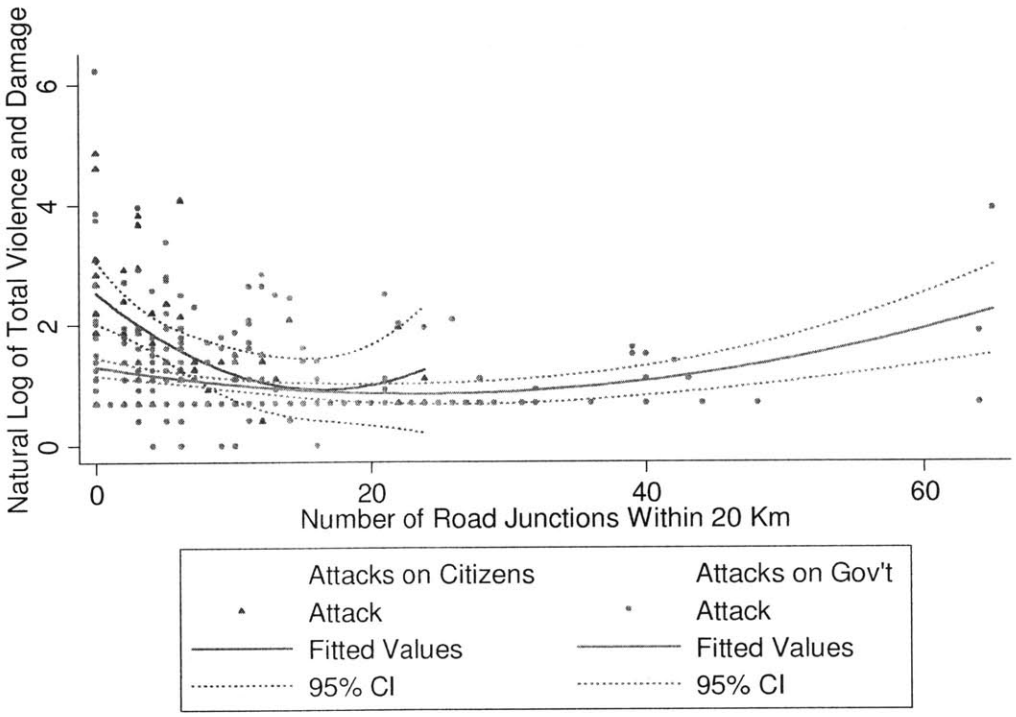
[53] The specific equations are as follows: for private citizens,

$\hat{Y}_{\text{citizen}} = -0.0639\text{jncrd} + 0.0005(\text{jncrd})^2 + 2.0258$, and for non-citizen targets,
$\hat{Y}_{\text{non-citizen}} = -0.0196juncrd + 0.0005(juncrd)^2 + 1.1564$.

Models 6-2 and 6-4 are represented graphically in Figure 14 and Figure 13 respectively. Figure 14 shows how Maoist attacks on civilians tend to be less violent where the number of possible trade connections is greater (especially in areas with very few, which also tend to be smaller and more remote villages and towns). Conversely, attacks on government targets are more violent where the number of possible trade connections is greater (especially in areas with many road junctions, which also tend to be larger towns and cities).

Figure 14. The natural log of total rebel violence and damage inflicted on civilian (blue) and government (red) targets by proximal road junctions



Note: This figure corresponds to Model 5
Source: the author

Finally, in order to disaggregate somewhat the outcome variable (`lnvioldam`), the variable was split into violence perpetrated (i.e., damage to people, or `lntotviol`) and property damaged (i.e., damage to things, or `lntotdam`). The results are summarized in Table 12. Generally, both the magnitude and statistical significance of the relationship between predictor and outcome variables is strengthened in the violence models relative to the original additive index. Conversely, the statistical significance disappears completely in the property damage models, possibly signifying that the property damage component of the original index had an attenuating effect on the models. These relationships are represented graphically in Figure 15. In an interesting note, in the model of violence strong

rural-urban linkages are, ceteris paribus, associated with greater insurgent restraint, while they are associated with *less* insurgent restraint (albeit not statistically significant) in the property damage model. One possible explanation for this observation is that strong rural-urban linkages – again, controlling for production network dispersal – have a broad-based positive impact on rural goods, necessitating a more mutualistic relationship between host populations and insurgents if rebels are to extract support from locals.

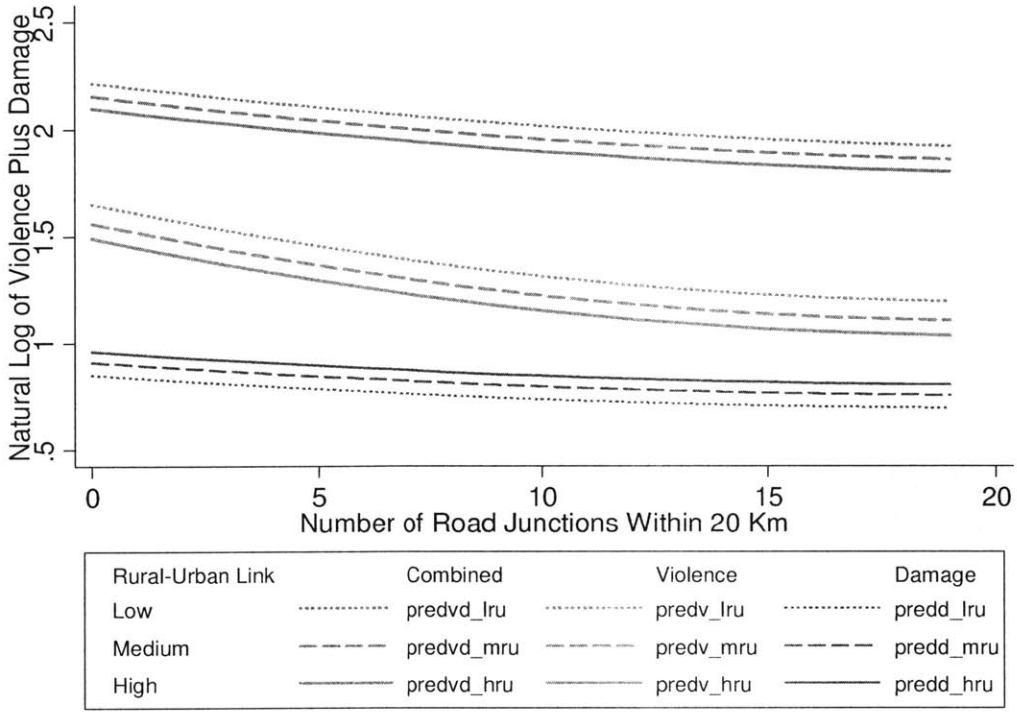
Table 12. Directional relationships (+/ –) and statistical significances for the outcome variables of logged total violence plus damage, violence, and property damage

	Logged Violence + Damage		**Logged Violence**		**Logged Property Damage**	
Variable	**Uncontrolled**	**Controlled**	**Uncontrolled**	**Controlled**	**Uncontrolled**	**Controlled**
Predictor Variables	7-1	7-2	7-3	7-4	7-5	7-6
Event Level						
jncrd	(-) ***	(-) ~	(-) ***	(-) *	(-) NO	(-) NO
sqjncrd	(+) ***	(+) *	(+) ***	(+) **	(+) NO	(+) NO
tprivjncrd	(-) ~	(-) ^	(-) NO	(-) NO	(-) NO	(-) NO
State Level						
rulink	(-) NO	(-) NO	(-) NO	(-) NO	(-) NO	(-) NO
rulnktpriv	(-) *	(-) ~	(-) ^	(-) ~	(+) NO	(+) NO
Control Variables						
Event Level						
t_priv		(+) ***	(+) ***	(+) ***	(-) NO	(-) NO
neardst		(-) NO		(-) ~		(+) NO
l2lenrds		(-) NO		(+) NO		(+) NO
Constant	(+) ***	(+) *	(+) ***	(+) NO	(+) **	(+) NO
District Level						
pculwst		(-) NO		(-) NO		(-) NO
psown		(-) NO		(-) NO		(+) NO
Constant	(+) ***	(+) NO	(+) YES	(+) NO		(+) NO
State Level						
Constant	(+) *	(+) NO	(+) YES	(+) NO	(+) NO	(+) NO
sd residual	(+) *	(+) NO			(+) NO	(+) NO
Adj-R^2	0.20	0.14	0.23	0.21	-0.02	-0.02
F/ Wald Chi2	53.88	39.24				
Log likelihood	-388.98	-263.64	43.79	38.26	2.08	6.75
(df, obs)	(6, 331)	(10, 246)	(6, 220)	(10, 145)	(6, 141)	(10, 107)
P	0.00	0.00	0.00	0.00	0.91	0.75

Cell entries are estimated regression coefficients, (standard errors) and t-statistics. ~p<0.10, * p<0.05, ** p<0.01, *** p<0.001

† : Preferred model

Figure 15. The natural log of total rebel violence and damage (green), violence (red) and property damage (blue) as a controlled function of rural-urban linkage strength



Note: Thick lines indicate statistically significant relationships, thin ones not. Solid lines represent strong rural-urban linkages (75th percentile), dashed lines medium linkages (50th percentile) and dotted ones weak ones (25th percentile). The figure represents Models 7-2, 7-4 and 7-6.
Source: the author

5.6. Discussion

I hope now to put some meat on these statistical bones. I have argued, consistent with my two research hypotheses, that (1) strong rural-urban linkages do in fact lower the intensity of violence employed by the rural Maoist insurgency against civilian people (but not against government targets or property); and (2) highly interconnected areas experience lower levels of violence against people (but higher levels against government). Evidence for the second hypothesis supports the idea that production networks – whether supply- or distribution-oriented, and whether agricultural or non-agricultural in nature – are less prone to predation when they have redundant channels to exploit.

Non-citizen targets do not benefit from the same "dispersal vaccine." I would suggest that this is because the police, government offices, telecommunications infrastructure and public transportation vehicles typically do not offer rebel groups financial targets (though periodically Maoist insurgents have been known to loot from the passengers on board the

trains they attack[54]), but rather military, political, or symbolic ones. The Maoist insurgency in most areas of rural India depends upon the local populations for its logistical and financial support – not to mention the recruits it needs as it attempts to add territory to its sway. They administer *Jan Adalat*, or "people's courts," (Asian Centre for Human Rights, 2007) and levy "taxes" in their territories (Mustafa Qadri, 2009). There is variation in how coercive taxes may be, posited here as being directly related to how violent attacks are. "Surgical" strikes that take out a single person suspected of colluding with the government or opposition groups such as the Communist Party of India – Marxist-Leninist (CPI-ML – a non-violent and legal political party) or the *Salwa Judum* do not necessarily tear at the social fabric of the communities governed, while mass attacks on villages and displacement camps in Dantewada district do. In any case, local individuals (especially traders) and businesses are often the primary means of funding (Devyani Srivastava, 2009) – though external sympathizers also play a role (P. Paul, 2006). This means that while local police and government may have the same dispersal potential as private citizens in highly networked areas, this ability does not restrain the Naxal groups themselves, as it does in the case of private citizens. In fact, Naxal attacks against non-civilian targets become *more* violent given large potential for dispersal – possibly because dispersed networks in such cases serve as advantageous Naxal attack and retreat routes rather than supply and distribution chain pathways.

To put a human face on this process, firms operating in environments of high predation will often outsource their supply and distribution functions to petty traders who know the terrain and the local populations. This was the case, for instance, in Liberia during that country's civil war. Those women were considered less of a military threat by government and rebel soldiers, and so passed less noticed between the two territories. In so doing, they often learned about rebel offensives, and would return to tell their family members – some of whom would be working at production firms – when and where these attacks were to take place. In this way, dispersed production networks facilitated information-gathering and allowed firms to continue to operate with minimal losses to their human resources. To amend a Warren Buffet quote, diversification becomes not only a protection against, but also a remedy for, ignorance. A similar process may well be at work in the Indian context, where dispersed networks allow for fewer surprises against civilians outside of so-called "liberated" (that is, Naxal-controlled) areas.

Certainly, production networks are not the only factor at play in the Naxal conflict – but they may bear on other more well-known features of the conflict. For instance, land tenure and access to forest resources have often been cited as two of the primary reasons for Maoist support among local populations – especially tribal people whose claim to the land is traditional rather than legal, and whose livelihoods have been adversely affected by

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[54] On 24 December, 2005, for instance, Maoists attacked a train between Vijaywada and Raigarh, Andhra Pradesh, and, in addition to killing constables of the Railway Protection Force (RPF), also unburdened them of a cash box containing staff salaries totaling Rs 750,000 (IBN Live, 2005).

extractive industries in Chhattisgarh and Bihar, the installation of special economic zones, and encroaching development (Mallika Joseph, 2007).

In Karnataka, for instance, I interviewed a group of tribal people who had begun to support, and finally ally themselves with, the local Naxal movement – originally an out-of-state implant that failed to take hold in urban centers. The tribal people I interviewed described a process of land usurpation practiced upon them by the wealthy upper-castes. In this process, a tribal person working a plot of land for subsistence would be encouraged by a local agricultural landholder to plant a cash crop – in this case tea or coffee – for sale to him. The rate would be enticing, and the farmer would comply. However, when financial difficulties arise – too much or too little rain, a failed crop, etc. – the farmer might get a loan or advance from the landholder. The farmer would not realize it, but the contract he signed to obtain the loan puts a lien on his plot. Upon the eventual death of the original tribal farmer, the landholder seizes the land legally, and the farmer's sons are forced into a sharecropping position in which their share is quite small. If they then decide they want to work less on the land and exploit forest resources to supplement their livelihood, the landholder may, citing environmental protection laws pertaining to national parks, employ his connections with local authorities – police, lawyers, or park rangers – to prevent the famer's descendants from continuing to harvest forest products. The descendants are thereby relegated to a status of quasi-indentured serf. This general storyline is corroborated by the Expert Group Report to the Planning Commission of India (2008).

The Western Ghats of Karnataka, however, are fairly well networked. The Maoist insurgency there has not dared many brazen acts of violence, but rather has confined itself to small-scale extortion and hit-and-run tactics. The Maoist presence, however, is just strong enough to have the effect of raising agricultural wages, even of those who are not associated with the movement. In essence, the local landholders must compete with their pocketbooks for the hearts and minds of the locals, and the recourse to violence serves as a cudgel in wage negotiations.

In contrast, in a strip of Andhra Pradesh near the Chhattisgarh border, where few roads penetrate, the Maoist insurgency has become fearsome enough to drive wealthy landholders away. Andhra, however, is not Dantewada – it is not yet "liberated." The fighting there has continued for years between Naxal groups and government forces. This back-and-forth has meant that much of the vacated land, although reassigned to new "proletariat" cultivators, has been left as a fallow No-Man's-Land, each side fearing the return of the other.

5.7. Implications for Development Policy

This chapter's findings may have a couple of important policy implications. First, at the most superficial level of transportation planning, it seems that combating the Maoist insurgency and safeguarding the civilian population is *not necessarily* accomplished effectively through transportation projects geared to link rural areas with urban centers –

unless the intention is merely to enable the state to deploy troops more effectively in problematic areas. While better access to large urban markets was typically associated with lower violence levels, the directionality of the relationship (if indeed it is a causal one) and the mechanisms driving the association are far from clear. Roads may be built more easily in areas that are unaffected by Naxal violence, for instance, and Naxal violence may be tempered either by economic growth or the physical "governability" of a region by police – both arguably functions of distance to urban centers by road. Moreover, a strategy of rural-urban road link construction may even exacerbate the situation, driving the interface between those profiting from development and those disenfranchised by it deeper into Naxal territory. While this course of action may eventually bring an end to the violence, it could do so at the expense of the cultural and economic survival of indigenous tribes. Instead, improving connectivity among existing local roads may work better to diminish Naxal violence and make life safer for tribal people. Such a strategy would also be less-resource intensive than large-scale transportation projects, allowing more of them to be implemented. It is possible that the high correlation between kilometers of roads built in an area and the number of junctions has in the past confused analysts as to the variable of interest. The Expert Group to the Planning Commission of India (2008), for example, explained Naxal activity partially as a function of road length in affected districts.

Secondly, supporting rural non-farm industries in order to diversify production networks sectorally in rural areas, thereby lessening the areas' trade-dependence on remote urban centers, would also seem a wise strategy. This has been the Government of Andhra Pradesh's approach to development in the Araku Valley on the border with the highly Naxal-affected Orissa district of Malkangiri. There, the state government has long supported a suite of programs including agricultural extension (instructing locals on agricultural techniques to grow coffee effectively), forest product development (helping local tribes with the harvesting, processing and marketing of forest-derived products through the Girijan Co-op Corporation), and coffee production (founding a nonprofit cooperative coffee bean processing facility with the ability to achieve economies of scale in the drying, roasting and marketing processes). Though surrounded by Naxal activity, the Araku Valley itself is untouched by Maoist violence. Locals more often support the (legal) communist party, CPI-ML, and the tourist industry thrives.

Finally, promoting the local sourcing of urban industries would also seem, a priori, to lessen the threat of Naxal violence against citizens – though not against government forces. In effect, such an industrial policy would not further military goals of the Indian state in the short term, but would bolster the human security of its citizens, eventually contributing to a potential recognition of state legitimacy in Naxal-affected areas.

In closing, it should be noted that while this paper presents an argument that a certain phenomenon is taking place, it does not propose a causal mechanism to explain it. At least two different stories might be told to explain the reduction in violence in the presence of dispersed production networks: one top-down, the other bottom-up. In the first story,

leaders of Naxal outfits would realize that there are more revenues to be generated by reining in their organizations' coercive violence – as it is less effective in that environment – and taxing individuals and businesses in negotiated exchange for some public good (security, or land access, e.g.). In the second story, would-be Naxal supporters at the grassroots level simply have fewer challenges to their livelihoods in situations of dispersed production networks, and so do not support the sort of more radical violence that extreme disenfranchisement would breed. Such might be the case in the Araku Valley, for instance, where local tribal people simply do not suffer the kinds of economic traumas at the hands of capitalism and its government facilitators that would be required to justify the risk of involvement – and investment – in a violent organization. A survey targeting the traders engaged in rural-urban trade would be necessary to find out which, if either, story is occurring, and if so, why and how.

6. Trade Networks and the Combat Frontier: The Case of India with a Backward Glance at West Africa

6.1. Introduction

I have argued in Chapter 5 that redundant rural-urban linkages select for more restrained insurgent behavior at attack sites in Maoist India. I suggested that a rationalist economic analysis might view this phenomenon as being driven by shifting bargaining differentials between the Maoist Naxals and traders serving the area. Presumably, such traders would have an easier time "dodging" Naxal taxes – but I admitted that the causal mechanism would be impossible to uncover without some in-depth qualitative research. In this chapter, I will argue that the answer to this question turns indeed on bargaining power between traders and Naxals, operating in a fascinating way: Naxals have more power to strike profitable deals for rural exports when there are many traders available (and thus markets open) to them. This means that towns exhibiting strong rural-urban linkages may indeed halt Naxal expansion, but also benefit Naxal coffers and solidify their territorial control. Moreover, I will argue that the reason for this is only partly "rational economic" and partly to do with a set of social norms based on the caste system and mapped onto rural-urban trade networks.

The fundamental issue here is: How does the shape of a production network actually influence the relationship between the state and non-state groups? That relationship manifests itself nowhere so vividly as at the combat frontier. The combat frontier in Sierra Leone and Liberia was fuzzy and unpredictably dynamic at best, and utterly meaningless at worst (see Chapter 1). By contrast, the most striking features of the combat frontier in India's Red Corridor are its stability and neatness. It is generally a tidy, semi-permanent division of territory, universally recognized by locals on both sides (as will be described below). This distinction – neat versus messy – has important implications for the local economy, as well as for civilian welfare. Neat combat frontiers allow (most of the time) for businesses and civilians to make plans to avoid violence. The businessmen described in this chapter, for instance, know exactly where the frontier is, and what the protocols are for those who seek to cross it without coming to harm. Those interviewed for Chapter 2, by contrast, complained that a messy frontier made them entirely reliant on petty traders to navigate the violence.

One hypothesis for explaining the messiness of combat frontiers might be that restrained use of force among rebel groups is associated with discrete territorial delineation, while groups employing wanton violence are more likely to produce an environment of unstable territorial definition. The argument might go something like: Restrained groups develop in circumstances in which financial capital is relatively scarce and social capital relatively abundant – requiring them to operate in mutualism with local populations and appeal to recruits on ideological grounds (Jeremy Weinstein, 2007). This sort of organization might

be effectively tied to one territorial area for its support, and therefore better reflect and respect local needs and wishes – in other words, exhibit the characteristics of Olson's (2000) "stationary bandit," rather than his "roving bandit."

However, this hypothesis may explain rebel behavior within their own territory better than the geographical interface between the rebel group and the state. For one, Subsection 5.3 explains how Naxal cells, while ideologically motivated, greatly reliant on local support, and largely restrained in the use of violence within their territory, nevertheless employ tactics that vary greatly in their level of violence when they choose to attack targets outside of their control or on their territorial fringes. Moreover, intense violence need not necessarily be associated with a messy combat frontier[55], or vice versa. Finally, explanations relying on the behavior of rebel organizations and/or government military organizations may, despite their very real analytical insights, miss the underlying (and ongoing) economic relationship between the two territories, between rural and urban.

As an alternative – or rather a supplemental – argument, this paper contends that the morphology of the combat frontier, and specifically the difference between messy versus neat combat frontiers, is at least partially explained by the constitution of the production networks that cross them, which are in turn partly products of underlying social systems. The social structure of society seems to have a counter-intuitive effect on combat frontiers. When conflict occurs in a society composed of identity groups with equal status and mutually exclusive territories ("vertically cleaved societies"), the frontier is often strangely messy – as was the case in Liberia and Sierra Leone, or Eastern Democratic Republic of Congo. By contrast, when conflict breaks out in a society with overlapping and hierarchical identity groups, the result is often an unexpectedly tidy delineation – as in the case of Maoist Chhattishgarh, India[56]. Why should this be so, when common sense would suggest the reverse? It will be my contention that the difference between messy versus tidy combat frontiers is at least partially explained by the constitution of the production networks that cross them, which are in turn partly products of underlying social systems.

As argued in Chapter 4, in Sierra Leone and Liberia, radial rural-urban trade networks took form with increasingly homo-ethnic spokes. That is, rural-urban trade linkages came to be characterized by homogeneous ethic compositions that had a base in the metropole and a distribution network among their rural clan. In India, the rural-urban spokes

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[55] Kalyvas (2006) contends, for instance, that the eruption of violence in civil war is mainly a function of the relative control of contested territories, since an erosion in, say, state control produces an upsurge in defectors to the other side and a concomitant decrease in denunciations of those defectors. When the two meet – at around the 25% and 75% state control marks – the greatest violence occurs, since there the greatest number of denunciations will be considered accurate by the ruling power. The implication for our purposes is that when control is perfectly contested and power equally balanced (i.e., when territorial control is at its messiest), violence is actually lower than when there is a predominant – but not absolutely dominant – ruler.

[56] Naxals find their foot soldier recruits almost exclusively in the tribal communities. And while it is true that Naxal-held territory often overlaps to a significant extent with tribal forest lands, tribal people are distributed throughout the region.

themselves are very much segmented by caste, with each trader going only part of the way toward the final market. The social structure dictates that different castes come into competitive commercial contact with one another: typically local tribal people acting as local petty traders, low-castes serving as middlemen, and upper-castes acting as long-distance links to urban markets. This dichotomy between homo-ethnic and ethnically segmented trade networks represents a form of Donald Horowitz's (2000) distinction between vertically and horizontally cleaved societies, applied to rural-urban linkages.

This chapter will use semi-structured interviews of traders in Chhattisgarh and Andhra Pradesh, India, located on either side of the combat frontier, in order to construct a portrait of rural-urban trade in Naxal-affected India. 30 interviews with local traders living near the combat frontier were obtained – slightly over half of which (17) operated in government-controlled territories and slightly under half of which (13) operated in Naxal-held territories. The idea of this sampling strategy was to develop an idea of how one side communicated with the other: theory generation, in other words. The single-case study approach allows for a testing of the hypothesis that the trade network is caste-stratified by function. This methodology does not strictly allow for identification of antecedent conditions (Stephen Van Evera, 1997, pp. 53-55) – horizontally- versus vertically-cleaved societies, in this case – but I will draw tangentially on previous qualitative interviews with traders in Liberia.

This chapter will be organized in the following manner: first, in Subsection 6.2, I lay out a few basic ideas about rural-urban linkages, arguing in particular that small towns generate rural-urban linkages when more of the profit margins associated with rural-urban trade are spent there, galvanizing the formation of non-farm industries. In Subsection 6.3, I argue that caste conventions have segmented rural-urban trade networks and made the largest profit margins gravitate toward towns near the combat frontier, where upper-caste long-distance traders interface with tribal local traders. In Subsection 6.4, I argue that this form of rural-urban trade lends itself to a certain stability of territorial claims, and even goes some way toward explaining why Naxal attacks in towns that are redundantly connected to multiple urban areas are generally less violent than in those connected via few routes. Finally, I conclude with some reflections on the generalizability of the findings and policy implications.

6.2. Rural-Urban Linkages

Rural-urban linkages are increasingly recognized as playing a critical function in rural development, replacing policies that treated rural and urban development as separate issues. At a time dubbed "the end of cheap food"(Economist, 2007), the agricultural sector's multiple functions cannot be overstated: boosting economic activity, enhancing livelihoods and reducing poverty, and providing environmental services (World Bank, 2008). On the other hand, the spatial density of economic activity confers both pecuniary and non-pecuniary benefits to non-farm industries, and is crucial to long-term growth (Paul Krugman, 1991a). The challenge, then, is thought to be in linking the economic advantages

stemming from concentration to the often-dispersed activities in the rural sector (Hugh Emrys Evans, 2001, 1992, Cecilia Tacoli, 1998).

"Rural" and "urban" economies, can be defined either spatially (e.g., using a density threshold) or sectorally (e.g., by farm and non-farm industry concentrations). Similarly, rural-urban linkages may also span physical distances or sectors (Cecilia Tacoli, 1998). However, rural and urban economies are increasingly interwoven at the household and regional levels, with a growing heterogeneity of livelihood strategies including both sector diversification, and spatial dispersion and migration. For this reason, designing development programs holistically at the regional level has gained strong support among both academics and policymakers (Saiful Momen, 2006).

Given few rural-urban linkages, rural agglomerations might be seen simply as distribution centers for goods and services from higher-order cities or as way stations for rural products destined for the urban sector. Such a view (taken, e.g., by Jan Hinderlink and Milan Titus, 2001) sees the utility of small towns as a substitute for other, more efficient means of linking the countryside with higher-order cities, such as highway networks. However, given the existence of strong backward and forward rural-urban linkages, rural agglomerations – especially those with manufacturing and processing clusters – are thought to retain and recycle value added within the region (Peter Lanjouw and Gershon Feder, 2001). Rising agricultural wages may give rise to more non-farm industry and attract labor to towns. This in turn raises the demand for farm products and generates farm inputs. The resulting rural-urban endogeneity is termed the "virtuous circle" (see Hugh Emrys Evans, 1992, Xavier Irz et al., 2001, John Mellor, 1976), but might theoretically develop into a vicious one if productivity in one sector were falling rather than rising. The five most important requisites for jumpstarting the virtuous circle are:

1. Having an (actually or potentially) strong agricultural export base (Hugh Emrys Evans, 1992);
2. Having an (actually or potentially) strong local manufacturing and processing industries to create jobs up- and down-stream (Xavier Irz, Lin Lin, Thirtle Colin and Steve Wiggins, 2001);
3. A mix of agricultural products destined for export (out of the region) and local consumption to buffer against price shocks (Hugh Emrys Evans, 1992),
4. Ensuring access to land for the poor[57] (Xavier Irz, Lin Lin, Thirtle Colin and Steve Wiggins, 2001, Saiful Momen, 2006); and
5. Favorable and stable macroeconomic policies and market prices for outputs (Xavier Irz, Lin Lin, Thirtle Colin and Steve Wiggins, 2001).

Given these requisites, urban agglomerations with strong connections to the agricultural sector are thought to be able to convey a number of benefits that extend beyond those of

[57] This recommendation derives from two facts: first, large landholders tend not to use their holdings as efficiently as "middle" farmers (though neither do very poor subsistence farmers), and second, that large landholders can bypass local markets, selling directly to higher-order cities and decreasing local retention of value added.

mere goods and labor linkages between rural and urban areas[58]. In fact, most if not all of those requisites are met in many Naxal-affected rural areas in India. But interestingly, while the potentially strong local manufacturing and processing industries tend to be located in government-administered India, the access to land for the poor is increasingly guaranteed in Naxal-held areas. These strange bedfellows then make for what Sanyal (1991) has termed "antagonistic cooperation."

The existence of local upstream and downstream industries is not only the cause of local capital recycling, but also its effect – contributing to a circular, "cumulative" causation like that described by Gunnar Myrdal (1957). To that extent, processes that encourage trade profit margins to be spent in rural areas of agricultural production may themselves catalyze such strong rural-urban linkages. Long-range traders are typically based in urban hubs, and their profits are likely to be spent there as well. By contrast, small local traders are more likely to spur the growth of rural non-farm industries. Such industries in Naxal-affected India include both upstream and downstream examples. Examples of upstream industries in higher-level urban areas include Om Agro Biotech, a producer of fertilizers headquartered in the third-tier city of Cuttak (Katak), Orissa (population of just over 500,000 according to the 2001 Census of India) whose products are distributed in Naxal borderlands by one of the questionnaire respondents. Small to medium cities such as Kondagaon and Jagdalpur in Bastar, Chhattisgarh are known for artisans who work with forest products. More local still are the service industries – hotels and restaurants – that have begun to spring up in small trading towns. One trader in Bade Dongar, Chhattisgarh, describes how "[m]any tribal people run hotels, so nowadays people have started doing business in villages, also." Another trader commented that "[m]any tribal people get educated so they also run shops, cycle stores etc in villages."

Permanent economic activity in small towns militates against the phenomenon described by Fafchamps (2001) whereby rural-urban trade connections become principally characterized by monopoly and monopsony. Nowhere is this countervailing force demonstrated as clearly as in the difference between market towns in government-controlled territory versus those in Naxal-held areas. Whereas in Fafchamps' hypothetical village, agricultural producers must sell their produce to a truck that periodically arrives from the city, producers near government-controlled towns in Bastar have constant access to small shop owners that can

[58] Rural-serving urban agglomerations may serve three primary functions, according to Lanjouw and Feder (2001): (1) creating or correcting missing or imperfect markets (examples of which low access to credit, information asymmetries, monopoly/monopsony trade arrangements with urban areas (Fafchamps 2001), weaker enforcement of legal institutions in rural areas (and especially of property rights), speculation, free-riding on growth, and drags on efficient land use (UNFPA 2007)); (2) conveying positive externalities to other parts of the local economy (by reducing population burdens on large urban areas, coordinating rural non-farm economic activity in dense areas, and encouraging agricultural innovation through decentralized experimentation (UN Millennium Project 2005)); and (3) achieving socioeconomic distributional objectives (by diversifying economic activity in order to provide employment close to home, thereby keeping families and communities together, smoothing economic shocks, and retaining value added and jumpstart the rural-urban virtuous circle of economic growth; and by providing services efficiently to non-farm and farm industries).

coordinate transport for regional export. As one trader explained, "...the small shop owners [in small towns] sell the grain to traders in Bade Dongar. Some have links in cities so they also supply at least one *metador* [small truck] in a week." Another trader describes how

> Nowadays, you can see small grain or provision shops in every village. They also work as *galla* [small traders]. For many people, it's the nearest place to exchange or sell. He [the shop owner] also trades in weekly markets so that he keep stocks at shop. Later on, he sells it at a higher price.

Such possibilities are much less the norm in Naxal-held territories. One trader explained the monopsony power of traders in Naxal-held territories:

> For example, take the case in [the Naxal-held town of] Udandbeda. Villagers sell their *mahua* [forest seed used in the production of soap, detergents, fuel oil, and edible products]... for Rs 8 or 9 here [in government-held Bade Dongar]. But at Udandbeda, it is not more than just Rs 5. Villagers get more money here than in the Naxal-controlled area. That means bigger commissions for businessmen [traders] but losses for villagers... [P]eople can't bargain over there.

This price disparity across the combat frontier is mentioned time and again by various traders, and seems to be the defining feature of the economic landscape in Naxal-affected areas. As another trader put it, "...there is [a price] difference. Tribals do not get proper rates in Naxal[-controlled] markets. The disparity is heightened by the Indian government's subsidized purchase of grains in local *mandi*, or grain societies. In fact, as one trader noted,

> ...grains can not be sold on the open market; it's illegal. Grains are sold only in LAMPUS or mandi because of differences in price rate. Government has fixed the rates according to paddy variety.

But the same trader pays the correct rates in the outside markets." The resulting profit margin is the economic engine of many of the small "border" towns, and is split three ways, between local traders, long-distance traders, and Naxals. In this way, a government scheme originally intended to incentivize rural food production and support farmers is captured by Naxal leadership. Moreover, local government officials tasked with purchasing rural products can be pressured by threat of Naxal violence to raise the going rates – a form of "protection payment" paid to the Naxal leadership. One trader explained:

> Say, for example, Government purchases *tendu* leaves. Naxals demand... such and such amount. 100 leaves make one bunch. Suppose one bunch costs Rs 1.0 (One) but here the farmer gets Rs 0.75 [75 Paise]. Now, Naxals demand that the *tendu* collector should get around Rs. 110. When government agrees to raise the amount, the Naxals take a commission of Rs. 10 and give Rs. 100 to the people

6.3. Cleavage and Commerce

Tribals are almost universally acknowledged by traders to be routinely taken advantage of in business deals. One trader stated baldly:

> the fact is that Tribals are highly exploited by the upper-class and outsiders. Middle men and big traders, too, exploit them very much... They are illiterate and innocent, so traders and outsiders misuse and misbehave with them.

The exploitation is often effected by way of information asymmetries in market rates, and the trade-by-weight barter system on the basis of which most local markets operate. One trader explained that fluctuations in market prices are often exploited by traders in the know:

> Suppose one kilogram of mango flakes is sold in exchange of one or two kg of onion, depending on rate. Rates are not fixed, it's always changing. Here, traders are much cleverer than villagers... [When] the rate of dry products in the market rises, villagers don't realize it... Only traders can know about this.

Another oft-used way for traders to get more for less is to rig the weights or rejigger the math:

> Many villagers do not understand the weight system, especially women – and you can see most of the time women do marketing. Here, if traders can cheat non-Tribals, they can easily [do the same to] Tribals. Traders cheat by weight.

The social hierarchy is woven into the composition of trade networks. Tribals are effectively barred from participating in long-distance trade – even if they occasionally work as local traders or in the local service sector. Lower castes are often found as local traders or "middle men" who sell to "big traders," while the upper-caste *Marwaris*[59] largely perform long-distance trade in Chhattisgarh. One Tribal producer of *mahua* explained the cartel-like nature of long-distance trade: "They are of strong social status. They are united commercially." One long-distance trader described the same phenomenon from the inside, noting that he could purchase products neither at too low a price, nor too high:

> We traders are all united, and if someone breaks the rules, then the trader community does not behave gently, so it's difficult to break the local trading system. We have to work and live within the system. And there is another risk that if you raise the rate then the seller can move to another trader or middlemen. So I must be careful.

The exceptions largely confirm the rule: one *adivasi* (i.e., tribal) long-distance trader operating out of Kondagaon explains that he had an uncommonly privileged urban upbringing:

> My story is bit different: it's true that I am Tribal, but I was born and brought up in Kondagaon, among the upper-caste, big trader society. I am educated and learned the technique of business – but the traders who live in villages and forest areas do not dare to ask right things or price [sic].

This same trader claimed to have direct access to tribal producers that most big traders did not have, thanks to his own ethnic identity. Well connected in urban hubs and in rural areas, he was able to capture a larger profit margin than many big traders.

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[59] These originate from Rajasthan and boast a number of business titans in their caste ranks, including Laxmi Mittal and Ruia brothers of the Essar Group

Upper-caste, long-distance traders operating in rural towns often come to assemble large networks of middlemen and small traders who go to Naxal-affected areas for them. As one small trader explained:

> Udendabeda [village] is far away and is Naxal-controlled, so there small traders or middle men [are able to get] lower prices and Bade Dongar is government controlled market, here they raise the price. So, the cost of *mahua* in Udendabeda is Rs 7 and in Bade Dongar is Rs 9. So middle men or small traders purchase goods at lower prices and sell them at high prices. So, in Udendabeda, villagers are not getting [the going] price.

These local traders have access to Naxal-affected tribal areas that long-distance traders desire. As one local *adivasi* trader commented, "Yes, it is complete tribal area and we have good relations with them. Since I myself am tribal so our relations are good with everybody." Long-distance traders also purchase trading rights in Naxal territories from Naxal leadership for their contract traders. One small trader described the deal:

> Yes, they pay, especially... big traders. They have arrangements with Naxals. As you know, middlemen work for big traders. There is an understanding between Naxals and [long-distance] traders that if my middlemen will purchase, do trading or bring forest products from your area, I will pay all, let him work freely... [I d]on't know exactly [the amount they pay for each contractor] but not less than Rs 5-6,000.

When asked to whom such large payments were made, the trader responded: "To the direct head" of the local Naxal cell.

In addition to securing trading rights for local contract traders, long-distance traders tend to serve as petty traders' access to credit, in exchange for low prices on forest products – an arrangement that effectively incentivizes local traders to search out and exploit remote tribal populations who are less likely to be familiar with market rates. One petty trader described the situation this way:

> And sometimes middlemen or small traders borrow money from the big main traders so at that time main traders put a condition that only if they sell the items at such and such a rate will I lend you money. So, they go interior areas and purchase in lowest rate as big traders have had suggested.

In this way, trade networks are solidified through mutual economic advantage, even while clearly segmented along caste lines. All petty tribal traders interviewed acknowledged this dichotomy with some version of the following quote: "They [long-distance traders] come from Narayanpur[60] and are mostly non-tribal. We have good relations with them."

6.4. Segmentation and Stability

The Naxal combat frontier exists in a state of punctuated equilibrium. Aside from occasional, dramatic attacks by Naxals on police outposts (see, e.g., Srivastava (2009)), attacks by state-backed Salwa Judum militia on perceived Maoist sympathizers (Devyani Srivastava, 2010), and major government military offensives such as those carried out

[60] A small town of indeterminate population due to Naxal threats to census workers.

under the banner of Operation Green Hunt (see, e.g., The Economic Times (2010)) – all of which may dramatically shift the frontier one way or the other – the line is mostly stable and recognized. One Bastar-based trader easily recounted which local towns were on the government side of the line (Benur, Chheribeda, Bade Dongar) and which were on the Naxal-controlled side (Chinganaar, Edka, Khadka, Kulanaar), as well as on which days of the week each town's market took place. Another trader noted that there is no overlap or gray area in terms of sovereignty: "...there is no effect of government activities in Naxal-controlled areas. It is [sic] completely controlled by Naxals."

The crisp frontier is a boon to both Naxals and long-distance traders, and is maintained largely through the barring of *adivasi* from long-distance trade. If more *adivasi* were allowed into the cadre of the long-distance trade networks, the profit margin in small border towns would likely shrink. This, in turn, would blur the combat frontier by making elite-elite deal structures more difficult. Instead, tribal people are restricted to local-serving functions, and even those involved in "trade" are more involved in storage and coordination than in transport. As such, attacks on cities are indeed trumpeted by Naxal leadership as the final stage of the Maoist uprising – but they are for the time being largely confined to symbolic, and not economic, attacks such as bombings and sabotage. The Naxal struggle is, then, a counter-entropic one, striving as it does to keep prices from equalizing across the border (and exploiting the caste system to do so) so that the discrepancy can be capitalized upon. In the cases of Liberia and Sierra Leone, by contrast, the major price discrepancy was between the producers and the traders based in urban areas – eliminating the potential for a stable rural-urban combat frontier.

For this reason, the slow dissolution of caste-based barriers to various occupations noted in Subsection 6.2 (and for which reason one trader optimistically stated, "So right now there is no such caste-based occupation [in town]; therefore everyone is free to work as per their ability and skill"), are likely to contribute eventually to a blurring of the conflict lines and a gradual dismantlement of the physical organization of violence along polarized government-Naxal lines.

How do these patterns explain more restrained military tactics in areas connected via multiple routes to urban areas (or, conversely, more violent attacks in areas with fewer such redundant connections)? Moreover, why do Naxals tend to destroy transportation infrastructure built within the territory that they claim as their own? Part of the answer to the second question surely lies in the common wisdom: roads and bridges allow security forces easy access to Naxal-affected areas (Vivek Deshpande, 2010). This fits with the observation that more redundantly connected attacks sites host *more* violent Naxal attacks when the target is a government one. But attacks on civilian targets are *less* violent under the same circumstances (see Chapter 5). The interviews suggest that sites in "multipolar" networks – that is, towns that are served by a number of different urban areas – will have a larger number of long-distance traders, who will consequently have less bargaining power

vis-à-vis Naxal cell leaders when settling on a price for trade access[61]. In other words, there is a clear expansionist incentive for the Naxal group when dealing with poorly-connected towns where traders have more bargaining power (and trade routes are relatively cheaply monopolized), while there is greater incentive for an established frontier in well-connected towns where Naxals may not have to resort to force to get the kinds of deals they desire. This intuition will be expanded upon in Chapter 7.

[61] One trader noted the many different towns that long-distance traders in his village hailed from: "People come from Kondagaon, Kanker, Keshkal, Dhanora, Benur and Narayanpur, and also from very far places. Sellers come from nearby but buyers come from distant places."

Part IV

Conclusion

7. Interstitial Economies

7.1. Summary

I initially stated the overarching thrust of this paper was that production networks in rural-urban conflict situations draw on social norms in order to promote continued local production, knowledge-generation, and interstitial economic order in the face of economic predation and generalized incentives to loot, pillage, and steal. I also stated that, in so doing, they affect the form of the conflictual rural-urban interface itself. Now I would like to summarize briefly the evidence-based sections so that they flesh out the meaning of those characterizations.

Part II was generally geared to showing how production networks adapt to rural-urban violence. Chapter 2 argued that production centers in Liberia generally reduced their risk of predation by coordinating their production processes with the timing of their distribution networks. The latter, in turn, multiplied and splintered: many petty traders – mostly women, and of heterogeneous ethnic makeup – replaced the truck distribution methods that had proven more economical in times of peace. These networks were largely constructed along ethnic lines, so as to ensure a certain baseline level of trust within the network, as well as to ensure that the traders could gain access to the rural areas in which they distributed. These clan and family ties made it difficult for violent actors to loot effectively, because companies would receive warnings of impending attacks through their extended network of distributors – an occurrence that one would expect to be exceedingly rare if the calculus of rebel soldiers was solely determined by economic gain, and not also by social bonds. When rebels overran Monrovia's industrial district, for instance, managers at a local metal works company had advanced word of the attack through the petty traders who supplied their raw timber products. They were able to lock down their facility and give their employees advance notice to make arrangements for their families to hide. It is worth noting that in India, where rural-urban trade networks are not homoethnic, Maoist rebel (Naxal) attacks on urban areas are often seen to come "out of the blue."

Chapter 3 again used the example of the Liberian Civil War to make parallels between the effects of civil war on the economy, and the purported effects of Import Substitution Industrialization policies. It argued that the risk of predation of imported goods by violent actors and looters at the major ports of entry had the effect of localizing production chains. Moreover, those firms that were better able to plug into local trade networks were more likely to use locally-sourced products. It seems that the distribution networks described in Chapter 2 can also become supply chains.

Chapter 4 attempts to marshal evidence for the thesis that violence in the Sierra Leonean and Liberian contexts did indeed tend to produce trade networks that are ethnically homogeneous in composition. The implication is that these networks in the West African

context rely upon an ethnically-based sense of solidarity to ensure trust. This is not a new observation, but as Chapter 6 later points out, it may not hold in all cases.

Part III turned the tables: instead of production and trade networks being affected by violence, it investigates how they in turn affect conflict dynamics. Chapter 5 uses the case of Maoist India to argue that towns and villages that were better networked tend also to be the target of less violent attacks. The chapter postulates that this phenomenon might be because rebels in those areas are less able to control the trade routes to and from the towns, and are therefore less able to "tax" the trade by means of coercion. Instead, the chapter posits that some type of mutually beneficial deal is struck between rebels and traders in those areas.

Chapter 6 was intended to flesh out the causal mechanisms hinted at in Chapter 5. It contended that the social norms that structure society at large deeply inform the way trade networks operate. It noted that the hierarchical form of the caste-based Indian society gave rise to trade networks in which a certain caste-based division of labor arose, such that lower-castes and tribal people dealt with local trade, and higher-castes engaged in long-distance trade. This segmentation, it was suggested, contributes to an orderliness of the combat frontier – by enforcing the caste bar on tribal people in long-distance trade, long-distance traders ensure that local populations have little ethnically "direct" trade access to urban areas, and that the trade that does take place between Naxal-held hinterlands and government-controlled cities remains in the hands of an elite few. Those elite long-distance traders can then strike deals with Naxal cells for trade access, thereby incentivizing Naxals to firmly hold onto their own territory, while discouraging them from taking over such profitable towns.

Moreover, this mechanism, it was suggested, might help explain the phenomenon described in Chapter 5 whereby well-connected towns are less violently targeted by rebels. Well-connected towns on the outskirts of government-controlled territory tend to have more upper-caste traders, such that their bargaining power vis-à-vis Naxal cell leaders is more limited than in poorly-connected towns. A corollary of this hypothesis was also mentioned, namely that when there is access to multiple urban hubs, the profit margins on rural-urban trade naturally shift outward from the city toward the hinterland, thereby undermining the rebel drive toward urban centers.

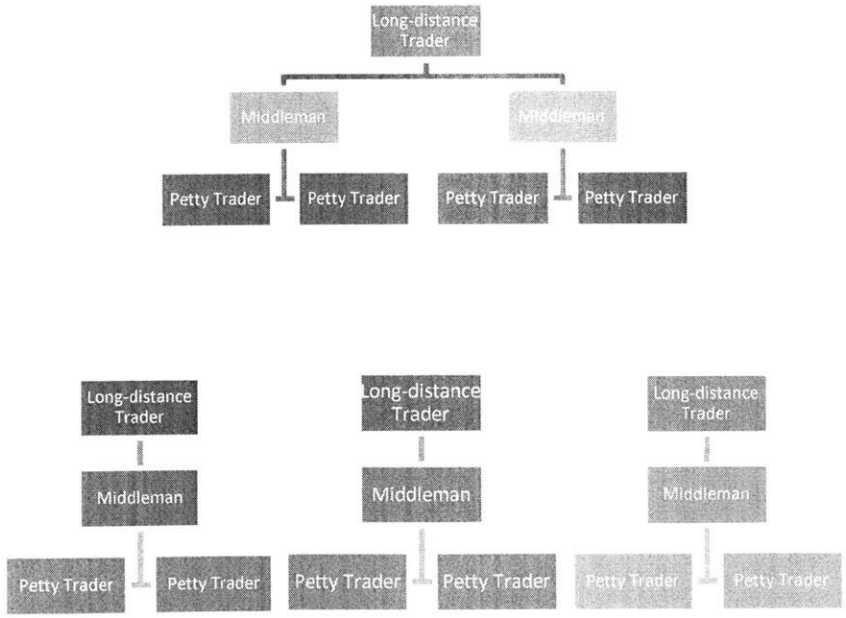
Taken together, the preceding sections hopefully paint a portrait of production networks as living, protean entities that interact in sometimes complex ways with violent actors, productive actors, and social norms. The latter may configure production networks, and thereby influence the form of the conflict itself and the very distinction between urban and rural, state and non-state. In some ways, the focus here on such social mores as clan solidarity and the caste system in state formation echo Elias' own (Norbert Elias, 2000 [1994]), and might also resonate with some ideas of religious mores as central to the consolidation of the state (cf. Edward Luttwak, 1994, Peter Van Der Veer and Hartmut Lehmann, 1999).

I intend now to draw out the implications of Chapter 6 more fully, putting them in comparative perspective with the lessons from West Africa.

7.2. Trade Networks and Society in Comparative Perspective

I have argued broadly that the morphology of the rural-urban linkage – that is, how its constituent members are organized to interact – influences the shape, and indeed the very existence, of a combat frontier. Moreover, I have argued that the social institution of caste in rural India dictates that rural-urban trade spokes be ethnically segmented by caste. In other words, there is ethnic heterogeneity within in Indian trade networks, while in the cases of Liberia and Sierra Leone during their respective civil wars, rural-urban trade networks increasingly exhibited ethnic homogeneity within radial networks, and ethnic heterogeneity between networks (see Figure 16). To some extent, this might be attributed to the fact that Indian society is ranked, while West African society is largely unranked (Donald Horowitz, 2000).

Figure 16. Trade network occupations in ranked (top) and unranked (bottom) societies

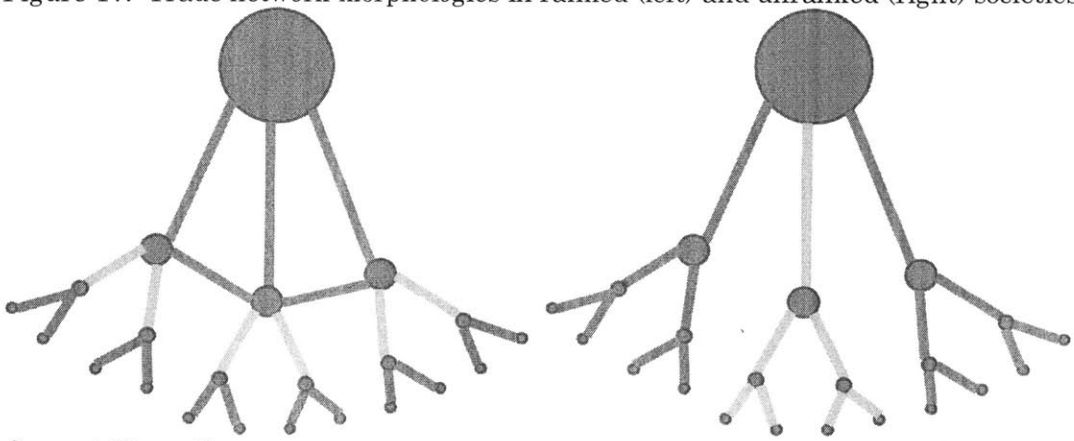


Note: Colors correspond to ethnic identity
Source: The author

Moreover, the ethnic composition of trade networks does not just bear on the ability of insurgent leaders to make comprehensive trade deals with a discrete cadre of long-distance

traders. It also means that ranked-society trade networks may be better able to exploit redundant transportation networks, since there is no taboo against long-distance trade amongst second-tier cities. By contrast, the radial trade networks that formed in the unranked society of West Africa seem to exacerbate monopsonistic and monopolistic relationships between rural and urban areas, since interethnic trade becomes more risky.

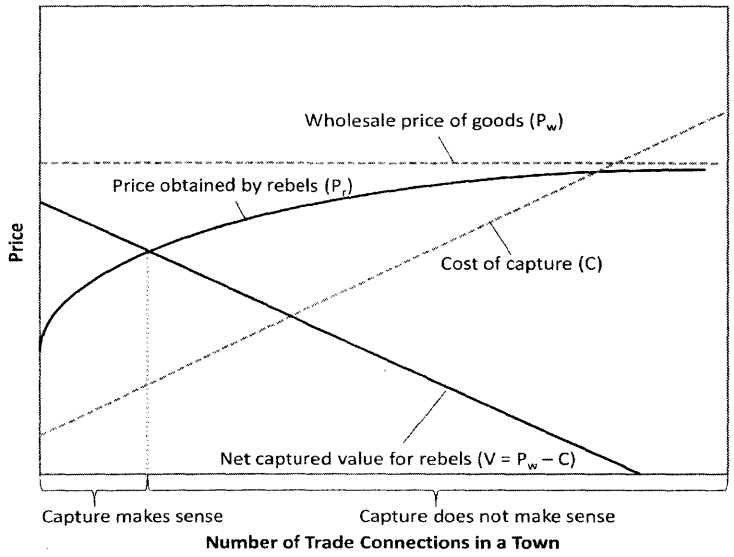
Figure 17. Trade network morphologies in ranked (left) and unranked (right) societies



Source: The author

In Chapter 6, I argued that towns with in multiple long-distance traders were less likely to incentivize rebel territorial expansion, since rebels are able to make better trade deals. The idea is that rebel territory expands until it reaches these well-connected towns, then settles into greater equilibrium. In Chapter 5, I suggested that the cost of patrolling dispersed trade networks might also discourage rebel groups from attempting to target such well-connected towns. Figure 18 suggests a model of how these two factors – cost of trade route capture, on the one hand, and benefits of trade with increasing bargaining power – might play out as a function of trade connections. The price that rebels are able to obtain through the sale of forest products ( ) rises asymptotically toward the wholesale price obtainable in a city minus transportation costs ( ) as more and more trade connections are established in a given town. Meanwhile, the cost of capture of the town's trade ( ) increases linearly with the number of its trade routes. The net value of capturing the town ( ) might then be represented as . When , capture of the town makes sense to the rebels. When , trade with the town without capturing it makes sense. Obviously, the price of forest products only rises further with subsidized government prices paid by *mandis*. Note that higher prices for agricultural goods decreases the incentive to capture a town but also benefits the rebel organization financially, while lower prices draw rebels closer to the cities.

Figure 18. Diagram depicting the relative value to a rebel group of capturing a town versus doing business with its traders, as a function of the number of trade connections to urban areas it represents



Source: The author

The model described in Figure 18 suggests that high prices for agricultural goods will diffuse the drive to capture towns and cities, but at the cost of funding the rebel organization and hardening the combat frontier. The ironic outcome, then, is that a so-called Leninist-Marxist movement would rely for its funding first upon the continued social exclusion of its own constituents from the wider economy, and second upon a close economic relationship with the very upper-caste elements that exclude the former. The mechanisms described in Chapter 6 then finally suggests an answer to the central question initially posed in the introduction: What explains the physical form of the rural-urban divide in conflicted nations? I propose here that the social construction of the production networks themselves (at least partially) dictate the morphology of the divide.

One reason that a simplistic equilibrium analysis presuming a unitary decision maker might be appropriate in this case is the organization of the Naxal cells themselves. Naxal organizations are hierarchical, with cell leaders making deals with elite traders directly. Lidow (2008) notes that when funding for rebel organizations is top-down controlled, the organization itself is much better able to maintain internal discipline and expect subordinates to follow the orders of commanders. He notes that when individual soldiers or petty officers are responsible for funds collection and upstream remittance, organizational cohesion suffers. Even in cases where organizational cohesion does not hold, though – as in the Liberian case – there is still a profit motive for rural-based rebels considering targets up the urban hierarchy when those towns have monopsonistic and monopolistic relations with the metropole (i.e., when there are fewer trade linkages with large urban markets).

This paper then identifies two variables that, together, may bear on the interface between government and rebel territory. The first is Horowitz's (2000) distinction between ranked and unranked social structures. The influence of India's caste system in organizing ethnically segmented trans-frontier trade networks has been explored in some detail in Chapter 6, while the phenomenon of homo-ethnic networks in the case of vertically-stratified Liberia and Sierra Leone was discussed in Chapter 4. This chapter suggests that ranked societies lend themselves to ethnically segmented rural-urban trade networks, which in turn tend to produce neater combat frontiers because of their potential for elite-elite trade negotiations. Conversely, unranked societies lend themselves to ethnically homogenous trade networks, and therefore messier combat frontiers.

The second variable, previously discussed above and in Chapter 5, is that of mono-polar versus multi-polar rural-urban trade networks. This chapter suggests that when cities have a mono-polar relationship with the hinterland, rebel groups will be incentivized to expand along trade networks "upstream" where the profit margins are greatest. When there are numerous cities in trading relations with a hinterland, they may serve as trade hubs, but the profit margins migrate downstream to rural areas and there are fewer economic incentives for rebel groups to capture urban centers. To use Daniel Esser's (2004) terminology, in the first instance, the city is economic prey; in the second, a hub. Table 13 arranges these variables in a 2x2 matrix and gives a possible example of each combination.

Table 13. Conflict typologies by cleavage orientation and rural-urban dynamic

	Mono-Polar Economy Urban profits	**Multi-Polar Economy** (Potential for) Rural profits
Unranked Social Structure Homo-ethnic Trade Networks	I. Messy combat frontier; city as prey *Ex. Liberia, Sierra Leone, Somalia, Afghanistan*	II. Messy combat frontier; cities as hubs *Ex. Eastern DR Congo*
Ranked Social Structure Hetero-ethnic Trade Networks	III. Neat combat frontier; city as prey *Ex. Nepal ?*	IV. Neat combat frontier ; cities as hubs *Ex. Chhattisgarh, India; Côte d'Ivoire*

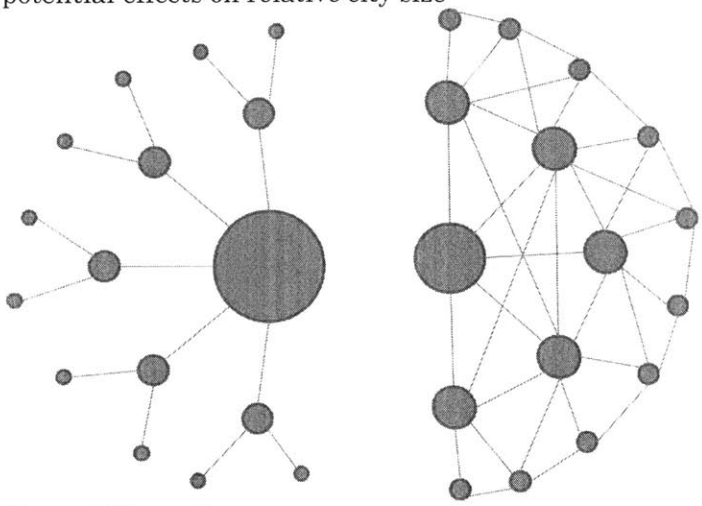
Table 13 gives examples of each permutation. Liberia and Sierra Leone (quadrant I) exhibited messy combat frontiers, and their respective capital cities became the targets of

various rural-based rebel movements. Maoist India (quadrant IV), by contrast, exhibits a neat combat frontier and cities play the part of beneficial trade hubs – essential to have access to, but not necessarily where the greatest profit margins are. The other two quadrants have not yet been mentioned: an example of II might be the various conflicts in the Eastern Democratic Republic of Congo, in which homo-ethnic trade networks (composed of the Nande and the competing Gegere) (Patience Kabamba, 2008) were allied with military groups (the RCD-ML, and the Ugandan-supported UPDF of General James Kazini and the UPC of Thomas Lubanga, respectively). Such military-commercial alliances have led to years of messy warfare. Commercial access to major urban markets was crucial for traders, such as when the Nande seized a political opportunity in 2002 to reestablish ties with Kinshasa. (Timothy Raeymaekers, 2004) But cities were the hubs and not the targets of violence in the East. Quadrant III is tentatively occupied by Nepal, which is economically dominated by Kathmandu, and in which a hierarchical society produced ethnically segmented trade networks producing a neat delineation between government and rebel-held territories[62].

This dissertation begs a number of questions that is does not attempt to answer. First, do mono-/multi-polarity and social structure interact and, if so, how? They may not simply be two intersecting variables, despite Table 13; they may very well be endogenously related. For example, at the very least we have seen how the social structure of radial trade networks in unranked societies might militate against the full benefits of a multi-polar city system. Considering how ranked-society trade networks may concentrate trade profits in smaller cities and towns, it is conceivable that, in the long run, these more integrated patterns produce more a more multi-polar economy with a more equal distribution of city sizes (see Figure 19). Do multi-polar trade patterns contribute to the economic vitality of smaller cities and towns? Does economic vitality of the latter itself permit multi-polar trade to continue? Are the two endogenous?

[62] I considered, but ultimately decided against, placing Rwanda in this category. Despite a clearly monopolar economy based around a political and economic capital, Kigali, that predictably became the target of the Tutsi rebel advance (Marijke Verpoorten and Pieter Serneels, 2010), the existence of a ranked social system, and a neatly defined combat frontier, the complexities associated with the preceding genocide, international intervention, and the shockingly compressed timeline all militate against an easy categorization.

Figure 19. Radial (left) and integrated (right) trade patterns, and their potential effects on relative city size



Source: The author

In any case, there are appreciable differences in city distribution among the cases listed as "mono-polar" and "multi-polar" in Table 13. If one examines city size according to a modified rank-size methodology (cf. Hsin-Ping Chen, 2004, Xavier Gabaix, 1999) – associating the city's logged population rank with a logged population percentage measure[63] – those regions defined as falling in the "multi-polar" category clearly exhibit very different curves than the "mono-polar" regions (see Figure 20). Note that the curves are highly impacted by what cities are and are not considered part of the economic region. For instance, Kinshasa was left out of the Democratic Republic of Congo data because it is so far removed from the war-ravaged eastern regions – but given better transportation infrastructure, it might be more plausibly included, rendering the city system more mono-polar and, potentially, the conflict more geared toward its capture.[64]

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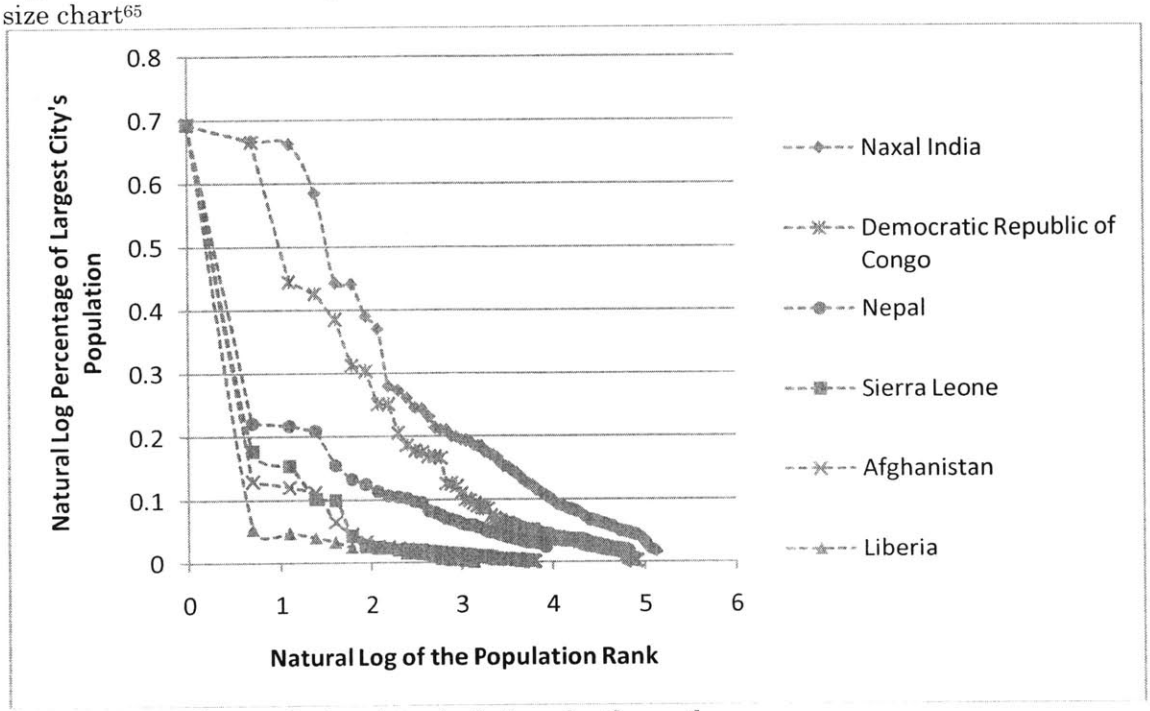
[63] That is, for city in region , the index will is calculated ———— , where is the population of the largest city in the region.

[6464] What this discussion neglects is the economic role of the cities concerned. Hoselitz (1955), for instance, placed great importance on the city as being either generative or parasitic – where cities in the former category benefit the hinterland by drawing on rural inputs for positive-sum industrial production, while those in the latter category draw down the savings of the hinterland through a zero-sum interaction over time.

Figure 20. Selected multi-polar (blue) and mono-polar (red) city systems in a modified rank-size chart[65]



Source: www.citypopulation.de; calculations by the author.

Second, the social structures that inform trade network morphology must themselves be historically-informed. Klass (1980) hypothesizes that the subcontinent's heterogeneous mix of ecological zones was particularly conducive to differentiated methods of food production, and resource extraction. He contends that the various tribal groups can be considered proto-jatis (proto-castes) which, as agricultural surplus developed and increased, were gradually rearranged in a hierarchical system. Tribal "closure," or cohesiveness, may have partly been a countervailing response to the numerous large-scale states spanning many ecological zones. If Klass is correct, then the establishment of the caste system equates to the "horizonalization" of what had essentially been, in Horowitz's terminology, a vertically cleaved society whose pillars had been linked geographically through trade. By contrast, Herbst (2000) argues that states in West Africa were traditionally limited in their capacity to exert coercive force because of a dry-land agricultural system that implied less sunk costs for farmers and therefore greater ease of mobility. There may then be a sense in which the stability of the modern Indian state benefits from foregoing political entities able to structure society in a way that persists over time – a social version of Acemoglu, Johnson and Simon's (2002) political institutions narrative.

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[65] Kinshasa has been dropped from Eastern DRC cities (due to its extreme distance), while cities in Burundi, Rwanda, southwest Uganda, and northwest Tanzania were added to account for the trans-border nature of economic trade in the region. Naxal India includes all cities in Naxal-affected states with the notable exception of Mumbai, which, like Kinshasa, is far-removed from the violence in the east of Maharashtra.

7.3. Managing Coercive Violence

States exhibit varying levels of capacity to counter challenges to their monopolies on the legitimate use of coercive force. In many cases, a true monopoly is impossible, and the state will attempt to manage its competition. Its strategies for doing so are typically a combination of sticks and carrots: the threat or actual use of military force, on the one hand, and the promise of public services, inter-government transfers, political offices or other handouts, on the other. The next subsection will address the use of mass violence as a state-identity process. First, though, this subsection will briefly address the use of carrots.

The Indian federal government has tried to promote rural welfare through a number of schemes. The Mahatma Gandhi National Rural Employment Guarantee Act of 2005 (MGNREGA) guarantees 100 days of minimum-wage labor per year to adult members of rural households. The Scheduled Tribes and Other Traditional Forest Dwellers Act (also called the Forest Rights Act) of 2006 meant to secure access to forests and their resources of those tribal people who have typically relied upon them for their livelihoods. Thousands of government-run cooperative marketing structures, among which are counted the wholesale market grain societies, or *mandis*, are meant to guarantee good prices for grains and special commodities in rural areas.

However, in practice, all of these schemes are manipulated at various levels of local government in practice, and many even enable the very insurgency they are supposedly designed to undermine. Traders interviewed for Chapter 6 cited how infrastructure projects that employed tribal people through the MGNREGA on the construction of local roads were only allowed to go forward outside of Naxal-held territory. If the argument I have made above is correct, the resulting better-networked rural towns would, among other things, give Naxal leaders better bargaining power vis-à-vis long-distance traders – and therefore more profit in controlling trade flows across the combat frontier.

The Forest Rights Act has also been perverted by powerful, often upper-caste interests in many ways. Bijoy (2010) has noted, for instance, that many claims filed under the act are arbitrarily rejected, land titles are unilaterally reduced in size without reason, community rights are routinely ignored, and the power the act confers upon Gram Sabhas (village-level governments) is often expropriated by higher levels of government. The implementation failures directly contribute to the spread of Naxalism itself. Naxal recruits interviewed for this dissertation in Karnataka also explained how lawyers for large plantation holders often bullied them into a form of intergenerational bonded labor by appropriating their lien-compromised land on the one hand, while suing them for trespass in national park land on the other. Their commons diminishing, the tribal people caught between plantations and restricted-access park land found Naxalism an appealing way to bully the plantation owners back (see Chapter 5).

Finally, as mentioned in Chapter 6, the high prices paid for grain and specialty commodities by government societies benefits Naxal outfits. Traders reported that as long as Naxals didn't show up in town dressed in their guerilla garb, they could sell the produce from their region. In effect, Naxals in border areas may be directly subsidized by the government in its attempt to win rural populations over.

The carrot metaphor may then not be quite right. These government schemes may really be more like bones thrown to a growing dog – the dog won't bite you in the short-term, but is growing larger and stronger in the long-term. "Development," then, may not be as effective a policy response to insurgency as plain old "good government."

7.4. State Identity and Mass Violence

Production networks may then serve to structure the process of differentiation and compartmentalization described in the introduction – designating the "Other" (the object of extensification) and the "Same" (the object of intensification) in the process of constructing or deconstructing a national identity (cf. Benedict Anderson, 1983). In this way, they arguably play a crucial part in transcending the duality of the question: Do forms of mass violence constitute the essence of modern civilization or rather a "breakdown of civilization?" The dynamic of rural-urban trade that underpins the modern nation state may simultaneously generate and reject the possibility for mass violence (cf. Abrham de Swaam, 2001), but may generate different levels of stability depending on the social construction of the production networks involved.

Oftentimes, the state is able to straddle this polarity by outsourcing violent processes to lower levels of government, paramilitary groups, or private enterprise. Such outsourcing may be seen as necessary in overcoming the handicaps associated with respecting human rights and civilian well-being during asymmetric warfare (Aaron Karp, 2009). For instance, when the Indian Air Force contemplated air strikes to counter Naxal insurgents in Chhattisgarh, the Federal government was compelled to nix the idea, arguing that there is no practical way of distinguishing insurgents from ordinary citizens in forest areas (The Economic Times, 2009). Instead, despite negligible or retrograde progress in battling the Naxals at the state level, the federal government continues to grant states immense discretion in setting their own agendas, makes extensive use of paramilitary forces (as many as 75,000 conscripts) in "Operation Green Hunt", and has allowed Chhattisgarh to continue to support vigilante armies like the Salwa Judum and harass pro-tribal civil society groups like Himanshu Kumar's Vanvasi Chetna Ashram (which was razed by Chhattisgarh state police in May 2009) – even whilst high courts condemn them and the Congress government has backed away from public shows of support (Mukul Kesavan, 2009). In other cases, such as in Sierra Leone and Liberia, state military played a direct and prominent role in the commission of mass atrocities – both in direct conflicts with rebel forces, and against their own civilian populations (Jean-Paul Azam, 2006, David Keen, 2003).

While a number of explanations have been, and might be, forwarded as to why states react differently to internecine military threats, it is tempting to wonder whether one factor is the nature of the rural-urban insurgency itself. That is, a state facing a rural-based rebel operation drawn to the metropole and capturing progressively larger towns and cities – the West African rebel movements described herein, for instance – may be seen to pose more of an existential risk to the modern, urban-based state. Chakravarti (2008) notes, by contrast, that despite the rapid expansion of the Naxal movement in recent years, the fact that the areas captured remain largely "backward" and rural has guaranteed that literate, urbane Indians – those, in effect, most associated with the modern industrial state project – remain more or less ignorant of, and unconcerned with, the slow erosion of government control within its own heartland. Until, that is, a train is bombed or an iron ore mining operation shut down. If this supposition is correct, the ironic implication is that the inequitable caste system, woven into the very fabric of the world's largest democracy, is partly responsible for the stability of its internal split and, by extension, the hypocrisy of its vicarious responses. On the other hand, the equal status between tribes in West African society may, in the form of rural-urban trade networks, contribute somewhat to the region's instability and puposeful government participation in human rights abuses.

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Appendix A: Supply Chain Management in a Predatory Environment

Supply Chain Management (SCM) is typically conceived as the process of integrating three components of the supply chain, or production network: supply, production, and distribution. It is intuitively obvious that in the long-run, the amount of finished goods a firm distributes cannot exceed the amount it produces, nor can the amount produced exceed the amount sourced. Expressed symbolically:

$$S \geq P \geq D, \tag{7}$$

where S is the amount of material successfully supplied to the production process, P is the amount of material successfully processed during production, and D is the amount successfully distributed as final goods. Furthermore, it is intuitively clear that the long-run Pareto optimal solution for a profit-maximizing firm will be to set all components at par with one another:

$$S = P = D. \tag{8}$$

In this way, the firm is neither sourcing more than it can process, nor processing more than it can distribute. This is an important, if obvious, point, when revenue is only generated upon distribution.

If we now assume for the sake of simplicity that the amounts of materials successfully supplied, processed and distributed are linear functions of combined material and labor inputs (s, p, d respectively, which firms choose) and production coefficients (σ, π, δ respectively, which firms are assumed for the moment to take), then we may define the Pareto optimal equation in 8 as

$$s\sigma = p\pi = d\delta, \text{ where } s + p + d \leq 1, \text{ and } (0,0,0) \leq (s,p,d) \leq (1,1,1). \quad (9)$$

Unconstrained, this equation simply tells us that in Pareto optimality, (s,p,d) vary with the inverse of (σ,π,δ).

If we now consider the productivity coefficient to be the multiplicative product of a technological parameter measuring productivity and a measure of freedom from the risk of predation (A_i and ρ_i, where $0 \leq \rho_i \leq 1$)[66], we get the following equation:

$$sA_S\rho_S = pA_P\rho_P = dA_D\rho_D, \text{ where } (0,0,0) \leq (s,p,d) \leq (1,1,1). \quad (10)$$

If we now allow that firms recognize that dispersed economic activity decreases predation, we can see that firms do not take (σ,π,δ) unequivocally, but rather can disperse their activities spatially and temporally to raise the production coefficients[67]. Alternatively, the firm can choose to shift its expenditure on capital and/or labor. To see this, we can reasonably posit that the chance that an input will escape predation may be expressed as an increasing function of the measure of dispersal of economic activity ((G,H,I) for activities (S,P,D) respectively) and a decreasing function of the efforts to predate or to "tax" goods by rebels, government or civilians (r_i):

$$\rho_i = \frac{(G,H,I)}{r_i+(G,H,I)} \text{ for } i = (S,P,D), \quad (11)$$

where $(0,0,0) \leq (G,H,I) \leq (1,1,1)$ and $s + p + d + G + H + I \leq 1$.

Given the form of (11), the value of ρ_i is bounded between zero and unity. Since we have established that (G,H,I) are associated with opportunity costs and diseconomies of scale, they can in essence be treated factors of production. Treating r_i as a constant and

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[66] The described function for each supply chain component now begins to resemble a Cobb-Douglass production function of the form $Y = AL^{\alpha}K^{\beta}$, except for the addition of ρ_i to model the risk of predated inputs, the combination of the labor and capital terms in one, and the exclusion of the input elasticities as exponents.

[67] Firms also recognize that choosing high-value inputs in any process heightens the risk of predation, and so may try to substitute low-value inputs into each process.

abbreviating the production functions as $f(s,G)$, $f(p,H)$, and $f(d,I)$, we might construct cost equations to be minimized:

$$\left.\begin{array}{ll} \min_{s,G} Cost_{supply} = s\varphi + G\gamma & \\ \min_{s,G} Cost_{production} = p\chi + H\eta & \text{such that } f(s,G) = f(p,H), f(p,H) = f(d,I), f(s,G) = f(d,I), \text{ and } s + p + d + G + H + I \leq 1 \\ \min_{s,G} Cost_{distribution} = d\psi + I\iota & \end{array}\right\} \quad (12a), ((12b), ((12c)$$

In these cost equations, (φ, χ, ψ) represent the marginal costs of the supply chain inputs (e.g., wages and rents in the case of labor and capital), whereas (γ, η, ι) represent the marginal costs of economic activity dispersal in each component. Given the constraints, we can write the Lagrangian function for the supply component as follows:

$$\mathfrak{L}(s,G,\lambda_1,\lambda_2,\lambda_3) = s\varphi + G\gamma - \lambda_1[f(p,H) - f(s,G)] - \lambda_2[f(d,I) - f(p,H)] - \lambda_3[f(d,I) - f(s,G)] - \lambda_4(s + p + d + G + H + I - 1) \quad (13)$$

which will have the first order conditions

$$\frac{\partial \Omega}{\partial s} = \varphi + \lambda_1 f_s + \lambda_3 f_s - \lambda_4 = 0, \tag{14a}$$

$$\frac{\partial \Omega}{\partial G} = \gamma + \lambda_1 f_G + \lambda_3 f_G - \lambda_4 = 0, \tag{14b}$$

$$\frac{\partial \Omega}{\partial \lambda_1} = f(s, G) - f(p, H) = 0, \tag{14c}$$

$$\frac{\partial \Omega}{\partial \lambda_2} = f(p, H) - f(d, I) = 0, \tag{14d}$$

$$\frac{\partial \Omega}{\partial \lambda_3} = f(s, G) - f(d, I) = 0, \text{ and} \tag{14e}$$

$$\frac{\partial \Omega}{\partial \lambda_4} = s + p + d + G + H + I - 1 = 0. \tag{14f}$$

14c-14f simply represent the production constraints. 14a and 14b can be rearranged to show that the minimum cost will occur when the marginal cost of output due to increasing inputs and dispersal are at parity:

$$\frac{\varphi}{f_s} = -\lambda_1 - \lambda_3 = \frac{\gamma}{f_G}. \tag{15a}$$

The same operation can be performed for the other two supply chain components to yield

$$\frac{\chi}{f_p} = \lambda_1 - \lambda_2 = \frac{\eta}{f_H}, \text{ and} \tag{15b}$$

$$\frac{\psi}{f_d} = \lambda_2 + \lambda_3 = \frac{\iota}{f_I}. \tag{15c}$$

These in turn can be rearranged to imply that the summed marginal costs of output for inputs in all supply chain components is equal to zero at optimality:

$$\frac{\varphi}{f_s} + \frac{\chi}{f_p} + \frac{\psi}{f_d} = 0 = \frac{\gamma}{f_G} + \frac{\eta}{f_H} + \frac{\iota}{f_I}. \tag{16}$$

It may also be helpful to recall Equations 14a and 14b in their expanded forms:

$$\frac{\partial \Omega}{\partial s} = \varphi + \lambda_1 \left[A_S \left(\frac{G}{r_s+G}\right)\right] + \lambda_3 \left[A_S \left(\frac{G}{r_s+G}\right)\right] - \lambda_4 = \varphi + \left(\frac{A_S G}{r_s+G}\right)(\lambda_1 + \lambda_3) - \lambda_4 = 0, \text{ and} \tag{17a}$$

$$\frac{\partial \Omega}{\partial G} = \gamma - \lambda_1 \left[sA_S r_S \left(\frac{1}{(r_s+G)^2}\right)\right] + \lambda_3 \left[sA_S r_S \left(\frac{1}{(r_s+G)^2}\right)\right] - \lambda_4 = \gamma - \left(\frac{sA_S r_S}{(r_s+G)^2}\right)(\lambda_1 - \lambda_3) - \lambda_4 = 0. \tag{17b}$$

In words, greater investment in sourcing production factors (capital and labor) may be precipitated by (a) increasing marginal input costs, (b) rising technological sourcing productivity, (c) greater investment in dispersal, (d) falling efforts to predate goods, (e) greater importance of the disjuncture between supply and production, and supply and distribution, and (f) falling importance of the budget constraint. Likewise, greater investment in dispersal may be associated with (a) greater marginal dispersal costs, (b) falling investment (or inability to invest further) in inputs, (c) falling technological productivity, (d) rising efforts to predate goods, (e) greater importance of the disjuncture between supply and production, and (f) falling importance of the disjuncture between supply and distribution and of the budget constraint. Notice, then, that rising predation in the supply chain is inversely related to investment in the supply process (e.g., hiring truck drivers). Therefore, the rate at which predation decreases such investment diminishes as predation rises. That is, the response is sharpest at the onset of predation, less as it worsens. The effect of predation on dispersal investment is more equivocal. Dispersal

investment (e.g., paying more petty traders) will tend to grow with more predation (again diminishing at higher levels of predation) if it is more important to maintain the sync between supply and distribution than it is between supply and production. However, dispersal investment will tend to shrink with predation if it is more important to main the sync between supply and production than between supply and distribution. The former would tend to be the case when the inputs are relatively valuable, the latter when the inputs are relatively low-value.

Appendix B: The Multiplication of Trade Routes

If we take only the supply chain side of the production network, then the number of trade routes in peacetime, T_{pt}, necessary to service f production firms from s raw materials suppliers, by way of p processing plants may be described as

$$T_{pt} = fp + p\frac{s}{p} = fp + s.$$

During wartime, however, the number of trade routes T_{wt} may be described as

$$T_{wt} = fs.$$

Clearly, the difference between the two scenarios, Δ_{wt-pt}, is

$$\Delta_{wt-pt} = T_{wt} - T_{pt} = fs - fp - s. \tag{18}$$

This equation may easily be partially differentiated to show that

$$\frac{\partial(\Delta_{wt-pt})}{\partial p} = -f, \tag{19}$$

$$\frac{\partial(\Delta_{wt-pt})}{\partial f} = s - f, \text{ and} \tag{20}$$

$$\frac{\partial(\Delta_{wt-pt})}{\partial s} = f - 1. \tag{21}$$

Equation (19) shows that as the number of processing facilities declines by one, the number of trade routes in the system will rise by the number of firms, f. This represents the rise in inefficient trading linkage in war, due to the need to stay free from predation. Note that the model would apply even in the absence of actual intermediary processing – for instance, in the case in which small towns merely serve as way stations that coordinate the collection of rural-produced exports and facilitate "breaking bulk" of import shipments. That is, there are more trade routes, but they may less frequently find a nexus in the small towns that link industrial centers with rural production in conflict-affected areas.

Appendix C: Methodology of Chapter 3

I began preparing my dataset by creating a GIS and assigning geographic coordinates to all survey respondents, whose responses constitute the dependent variable and personal and demographic information. I also assigned created a geographic shapefile representing all wartime incidents described in the Political Instability Task Force Worldwide Atrocities Dataset for the two countries (N=59). Those incidents with unclear coordinates were assigned to specific coordinates using PITF or corroborating descriptions of event locations. I then added the major cities and transportation networks of the Mano River Basin states[68].

Next, I set about deriving a number of possible geographic independent and control variables at the village (cluster) level. Road access included three variables: the number of road junctions within 20 kilometers of the village, the distance of the closest road junction, and the average distance of all road junctions within 20 kilometers. The first of these in particular – the logged number of road junctions (`l2rdjnc`) – I have described in Chapter 2 as a proxy for the degree of potential production network dispersal in a given location. The closest cities were determined via a "closest facility" network analysis, as was the distance from any given location to the nearest international border.

Finally, I georeferenced and then traced two maps of ethnic composition (one for Sierra Leone[69], the other for Liberia[70]). While ethnic homelands have fuzzy boundaries that often overlap, I interpreted the associated discrete shapes to be areas of dominant or predominant demographic majority. I was then able to cross-reference these shapes with the self-ascribed ethnic groups of survey respondents and, using the road network, estimate how far each respondent was situated from his or her ethnic "homeland (`dsteth` and `sqdsteth`). This might serve as a proxy for distance migrated, or simply a rough proxy for how far out of one's ethnic "comfort zone" one is. In any case, these variables were used as predictor variables for H_2.

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[68] The road layer was authored by ML InfoMap, Pvt. Ltd. for 2002 (http://library.mit.edu/F/?func=find-b&find_code=SYS&request=001235780). The geographic place names layer from which I derived city locations was authored by the U.S. National Imagery and Mapping Agency (NIMA) for 2003 (http://library.mit.edu/F/?func=find-b&find_code=SYS&request=001280178). All GIS files were made available through MIT's geospatial web.

[69] The map most used for this purpose was:

US Central Intelligence Agency. 1969. Ethnic Groups [of Sierra Leone]. Map No. 58962 1969. Accessed online, 15 March 2010, at http://www.lib.utexas.edu/maps/sierra_leone.html.

When clarification was needed, I consulted:

Sierra Leone Information System. 2006. Ethnic Groups of Sierra Leone (map). SLIS Map Code 02, 16 November 2006.

[70] The map used for Liberia was:

Humanitarian Information Centre for Liberia. 2003. County District and Clan Administrative Boundaries. Map catalog code: LIB046, 04 November.

The analysis enabled by this preparatory GIS work employed a multi-level logistic regression model, wherein data were grouped not by geographic location (dst1evt).

Building a control model

Preliminary control models for H_1 and H_2 were first estimated by separating out thematic families of variables:

A. demographic variables, including logged household size (lnnohh), age (age and sqage), sex (female), religion (christian and muslim), and domestic partner (cohab);

B. the elapsed time since the closest major wartime event occurred at the time of the survey (agoev1), and the logged casualties associated with it (l2casev1);

C. migratory variables, including the time since one last migrated (lastmig) and the logged distance from one's "majority ethnic homeland" (l2dsteth), explained below);

D. road access variables, including the logged road junctions within 20 kilometers (l2rdjnc), and logged distance to the nearest road (l2dstrd1);

E. proximal city variables included distance to the capital city and its square term (dstcap and sqdstcap), logged city distance and its square term (dstcty1 and sqdstcty1), population (popcty1), and the interaction term (sqdstcty1popcty1), and the same – city distance (logged this time to preserve a linear relationship – l2dstctyav5), population (popctyav5), and interaction term (l2dstpopctyav5) – with averaged data from the closest five cities (E_2); and

F. distance to the border and its square term (dst2bdr and dst2bdr).

Each control variable was included for testing for a reason. In the demographic variables, the logged number of household members (l2nohh), was thought to bear on the likelihood of becoming a trader because, to the extent that a large family maintains a coordinated distribution of labor, a given member might be more likely to be assigned to sell the families produce or buy in bulk for its members. By contrast, a small family's members might be more engaged in generalized work (household chores, agriculture, etc.) that they would be less likely to be able to devote the time to trade and retail. Sex (female) was included ambivalently: women in African societies tend not to be as involved in business, but they also may enter trade disproportionately to men during times of war. Age and its square term (age and sqage) were included to account for the often-observed quadratic trend that describes the likelihood of any professional activity as rising in early life and then dipping as retirement age nears. Cohabitation (cohab) was put in the mix because it was thought that single people would be more footloose and able to live the life of a trader than those with family ties. The variables for religion were included to account for any potential religious ethics that would militate against (or facilitate) the spirit of trade. As it turns out, these two variables (christian and muslim) were consistently negative across all models, implying that Christians and Muslims are less likely to get into trading in Sierra Leone and Liberia.

In terms of controlling for wartime events, I included a variable representing the time since the closest violent wartime event occurred at the time of the interview (agoev1). I would also have included its duration (and possibly an interaction term between the two) but for the fact that the duration in the PITF database was available for only a handful of events. For migration controls, I included a variable for time since last migrated at the time of the interview (lastmig).

Variables for the logged number of road junctions within 20 kilometers (l2rdjnc), and the logged distance of the nearest major road (l2dstrd1) were also included. The first was meant to control for the ability of local traders to find redundant ways to or from their village, and thus possibly avoid interception by armed groups (thereby lowering the disincentive to become a trader). The second was meant to represent the ease of access to the transportation network, since the easier the primary access, the less of a monopoly (and lower monopoly profits) local traders might have (Marcel Fafchamps, 2001), and therefore the less incentive to become a trader. The third was included to account for the incentives a generally good transportation network can provide traders (already controlling for the monopoly issue, above).

The closest city distance (dstcty1), population of the closest city (popcty1), and interaction term (dstpopcty1) variables were designed to control for the "felt" size of the nearest market to which local exports, and from which local imports, would come and go. The interaction term was dropped because of consistent lack of statistical significance. The same variables, this time calculated for the closest five cities (l2dstctyav5, popctyav5, dstpopctyav5), were tested so as to account for the stability of the trade network to shocks via redundancy. In both sets of cases, it was guessed that the farther the city was, the more incentive there would be for locals to reap monopoly profits by going into trade, and that the larger the city, the more likely it would be for the trader to find the goods required back home and find a market for regional exports. Finally, the distance to the international border variable (dis2bdr) was included because it was thought that, owing to the relative difficulty of buying and selling across the border on a regular basis, there would be a de facto smaller market as one approached the border, discouraging the trading profession.

Table 14. Coefficients for the outcome trade from the preliminary fixed-effects logistic regression control models estimated for the dependent variable trade

Family	Variable	A	B	C	D	E
Demography	l2nohh	.40^				
	female	.01				
	age	-2.45				
	sqage	.18				
	cohab	-1.00^				
	christian	-1.47~				
	muslim	-1.56^				
Migration	lastmig		-.05			
Road access	l2rdjnc			.63**		
	l2dstrd1			-.31~		
	dstrdav5			.20		
	sqdstrdav5					
Closest cities	Dstcap				-.02*	
	dstcty1				-.01	
	popcty1				-1.31e-06	
	dstpopcty1				4.68e-07*	
	l2dstctyav5				3.88~	
	popctyav5				1.02e-3*	
	L2dstpopctyav5				-1.83e-4*	
International border	dis2bdr					.01**
	Cons 1	5.977	-2.59***	-5.40^	-18.89	-3.55***
	Cons 2		.31*	1.21e-06	9.16e-10	2.43e-10
	P>chi2	0.24	.74	0.05	0.02	0.00
	Pseudo R2	0.05	0.00	0.05	0.11	0.05
	N	420	421	421	421	421
	Groups	NA	29	29	29	29
	Log likelihood	-90.17	-94.78	-89.78	-84.16	-90.25
	Wald	NA	0.69	7.74	16.90	9.22

Source: Calculations by the author.
* Significant at 0.05 level. ** Significant at 0.01 level. *** Significant at 0.001 level. ~ Significant at .10 level. ^ Significant at .15 level.

From the preliminary control models, a series of four final control models was estimated, as represented in Table 15. This time, inter-family interaction variables were tested: most notably `popctyav5rdjnc`, which tests for interactions between the average population of the nearest five cities and the number of road junctions in the vicinity. This variable is included because it is thought that as the potential market size grows (representing both demand for local export goods, and a source of imports), the benefit of having redundant access to these markets (proxied by road junctions) will also grow. Model F includes all possible control variables, minus the average city variables (D_2), which proved less relevant than the nearest city variables in Table 1. Model G includes only those variables for which

$P > 0.1$ after a process of manual elimination with backward glances. Model H is a variant of G that insists on retaining those variables with that a priori would seem to have the greatest bearing on the success of trade: the migration variables may bear on how well integrated the interviewee may be in local social networks, while the city distance and population variables may serve as a measure of the connectedness of the area to markets and their size. More importantly, however, predicting the trade profession as a function of distance from a violent event

Table 15. Coefficients for the outcome `trade` *from the fixed-effects logistic regression control models estimated for the dependent variable* `trade`

Family	Variable	A	B	C†
Demography	l2nohh	.49^		
	female	-.01		
	age	-5.09^		
	sqage	.38		
	cohab	-.82		
	christian	-1.75~		
	muslim	-2.01~		
Migration	lastmig	-.10		
Road access	l2rdjnc	.54		
	l2dstrd1	-.52	-.47*	-.52*
	dstrdav5	.39		
Closest cities	dstcap	-4.72e-3		
	dstcty1	-.03		-1.16e-07
	popcty1	-5.64e-06		1.20-3
	dstpopcty1	6.49e-07~		1.39e-07
	l2dstctyav5	5.21		
	popctyav5	1.19e-3		
	L2dstpopctyav5	-2.16e-3		
International border	dst2bdr	.06~	1.40e-2***	1.47e-2**
	Cons_Lev 1	-23.38	-4.02***	-4.35**
	Cons_Lev 2			
	Pseudo R2	0.20		
	P>chi2	0.21	0.0034	0.0096
	N	420	421	421
	Groups	29	29	29
	Log likelihood	-76.26	-87.13	-85.91
	Wald	23.76	11.37	15.19

*Source: Calculations by the author. * Significant at 0.05 level. ** Significant at 0.01 level. *** Significant at 0.001 level. ~ Significant at .10 level. ^ Significant at .15 level.*

Appendix D: The Derivation of Certain Variables in Chapter 5

The number of road junctions was a simple matter in GIS: network layers (including routes and junctions) were built from the Indian roads layer, and the event points were used to generate a near table, listing all of the junctions from the network dataset within 20 kilometers. The distance of 20 kilometers was used because it yielded a greater variation of junction point densities than 10 kilometers without drawing excessively on shared junction points between events, as 40 kilometers did.

To generate a control for the length of roads in that radius (`12lenrds`), the roads were split according to the 20-kilometer buffer areas around each event in the GIS, their lengths were recalculated, and then their attribute tables were spatially joined to the buffer file itself, so that the IDs of each event are associated with the roads in its buffer zone. The minimum distance to (`neardst`), and population of (`nearpop`), the nearest city; average distance to (`av3dst`), and populations of (`av3pop`), the closest three cities; average distance to (`av100dst`), and populations of (`av100pop`), the closest 100 cities, were created in the GIS. These market access proxies were derived by creating an origin-destination cost matrix, in which the network hierarchy (highways increasing access most, then secondary roads) was employed to derive the minimum-cost routes from each event to each city. The resulting table of transportation costs was then linked to a table of population figures for each city to obtain a rough idea of the size of each market being accessed.

The control variable for rural-urban linkages (`rulink`) was less straightforward to calculate. Following Fan, Chan-Kang, and Mukherjee(2005), I posit that the rural-urban linkage can be estimated with a regression model according to the form:

$$AG_{i,t} = f(FO_{i,t-1}, GSDP_{i,t}, GDP_t),$$

where AG_{it} is the growth of the rural agricultural sector in region i at time t, $FO_{i,t-1}$ is the lagged factory output from that region, and $GSDP_{i,t}$ is the gross state domestic product. In fact, $AG_{i,t}$ was found to be related to the squares of $FO_{i,t-1}$ and $NSDP_{i,t}$[71], such that the model can be stated:

(22)

$$AG_{i,t} = \beta_0 + \beta_1 FO_{i,t-1} + \beta_2 FO_{i,t-1}^2 + \beta_3 NSDP_{i,t} + \beta_4 NSDP_{i,t}^2 + \beta_5 GDP_t + \varepsilon_i + \vartheta_{i,t}.$$

[71] Factory output was based on the Ministry of Finance data from the Annual Survey of Industries, 1999-2006. NSDP was calculated based on the datasets "State-wise Growth Rate of Net State Domestic Product (NSDP) at 1993-1994 Prices in India, 1994-2005" "State-wise Growth Rate of Net State Domestic Product (NSDP) at 1999-2000 Prices in India, 1999-2008", compiled and made available by IndiaStat from Ministry of Agriculture data. GDP growth rates for India were obtained from the IMF's International Financial Statistics online database.

A non-hierarchical model was used in practice, which can be stated as:

(23)

$$AG_{i,t} = \beta_0 + \beta_1 FO_{i,t-1} + \beta_2 FO_{i,t-1}^2 + \beta_3 NSDP_{i,t} + \beta_4 NSDP_{i,t}^2 + \beta_5 GDP_t + \beta_6 YR_t + \vartheta_{i,t},$$

where YR is the year. The results of that regression suggests that all terms are significantly associated with agricultural production, and that, holding all other factors constant, $AG_{i,t}$ is at its maximum value when factory output grew at a rate of 15.7% per annum the previous year.

I used the non-hierarchical model to derive estimates for each state in the Red Corridor. I used the same model as specified in Equation (23, though I added dummy variables indicating observations from each state, as well as an interaction term for the dummies and $FO_{i,t-1}$, such that

(24)

$$AG_{i,t} = \beta_0 + \beta_1 FO_{i,t-1} + \beta_2 FO_{i,t-1}^2 + \beta_3 NSDP_{i,t} + \beta_4 NSDP_{i,t}^2 + \beta_5 GDP_t + \beta_6 YR + \beta_7 ST_i + \beta_8 (ST_i * FO_{i,t-1}^2) + \vartheta_{i,t},$$

where ST_i represents the state in question. Because the object is not to determine $AG_{i,t}$, per se, but rather to determine the relationship between $FO_{i,t-1}$ and $AG_{i,t}$, I then added β_1 and β_8, as those terms are in the same units, since $ST_i = (0,1)$. The results are presented in Table 16. $\beta_1 + \beta_8$ represents the state's rural-urban linkage strength, using the variables $FO_{i,t-1}$ and $AG_{i,t}$ as proxies for the output of the urban and rural economies respectively. There are numerous potential problems with using such proxies. First, factories (as required by $FO_{i,t-1}$) do not exist solely in urban areas. Second, factories may become more productive without translating that productivity into urban welfare by way of wages (i.e., profits to management may rise). Moreover, the agricultural sector is not the only component of the rural economy, though reliance on $AG_{i,t}$ as the outcome variable assumes that it is. In any case, other possible outcome variables (such as poverty incidences) had too limited data availability to fit the bill.

Table 16. Regression coefficients for β_1, β_2, β_8 and $\beta_1 + \beta_8$.

State	β_1	β_8	$\beta_1 + \beta_8$	β_2
Andhra Pradesh	.197 ^	.388 ^	0.586	-.689 **
Bihar	.225 ~	-.074	0.152	-.673 *
Chhattisgarh	.235 ~	-.095	0.140	-.712 **
Jharkhand	.165	.278 ^	0.443	-.636 *
Karnataka	.215 ~	.062	0.277	-.704 **
Kerala	.232 ~	-.034	0.199	-.734 **
Madhya Pradesh	.341 **	-.424 **	-0.083	-.786**
Maharashtra	.227 ~	.006	0.233	-.726 **
Orissa	.217 ~	-.003	0.214	-.693 *
Tamil Nadu	.170 ^	.397 ^	0.567	-.631 *
Uttar Pradesh	.232 ~	-.213	0.019	-.731 **
West Bengal	.233 ~	.111	0.344	-.742 **

* Significant at 0.05 level. ** Significant at 0.01 level. *** Significant at 0.001 level. ~ Significant at .10 level. ^ Significant at .15 level.

Source: Calculations by the author