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Crime, Contraband, and Property Rights: Explaining Variations in Violent Crime Rates

A dissertation submitted in partial satisfaction of the  
requirements for the degree Doctor of Philosophy  
in Political Science

by

Jeffrey Jonathan Paris

2012



## ABSTRACT OF THE DISSERTATION

Crime, Contraband, and Property Rights: Explaining Variations in Violent Crime Rates

by

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Doctor of Philosophy in Political Science

University of California, Los Angeles

Professor Barbara Geddes, Co-Chair

Professor Michael L. Ross, Co-Chair

Violent crime affects quality of life on an individual level and development on a national level (Kleiman, 2009), and could be the most important factor in determining whether many low and middle-income countries develop stable governments and implement effective economic policies. I propose a political and natural resource based explanation of the variation in crime rates in order to overcome the lack of connections between macro-level statistical data and causal mechanisms identified up to this point. My explanation involves the dynamics between state strength, property rights formation and enforcement, and the specific nature of criminal markets.

When the state is weak crime rates usually increase due to the state's inability to enforce property rights, including the inability to control contraband markets (or adequately taxing legal markets), and the inability to effectively punish defectors. Property rights are established through a political bargaining process between actors that generally depends on the capacity for violence

of interested parties (DeSoto, 2000; Umbeck, 1981). Well-defined and enforced property rights reduce transaction costs, and therefore reduce levels of violence (Anderson and Hill, 2003). The specific properties of markets, including the resources they are based on, can shape the market environment, including legality, and affect the resulting “institutions of extraction” (Snyder, 2006, 952). Lootable resources make property rights harder to enforce and interact with the state’s ability to provide the rule of law, especially in the case of prohibitions.<sup>1</sup> Illicit markets engender violence because normal business disputes are often settled with violence (Kleiman, 1993, 104-107, 115).

My hypotheses examine the relationship between the production of lovable products, while controlling for other factors commonly attributed to crime. My analysis suggests that, all else being equal, the production of lovable resources increases crime rates, while the enforcement of property rights, whether by a state, non-state actor, or community, reduces violent crime rates. To test my hypotheses I use a mix of statistical analysis, case studies based on archival research, and structured interviews. Cross-national data was collected through archival research and existing databases, spanning over seventy countries and fifty years. Local level data comes from fieldwork in Colombia, and includes quantitative data for every municipality in Colombia over a span of nine years, and qualitative data for several regions critical to testing my hypotheses.

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<sup>1</sup> Lovable products are high in value, have low barriers to market entry (Snyder, 2006, 946), and are easily transportable.

The dissertation of Jeffrey Jonathan Paris is approved.

Mark Kleiman

Arthur Stein

Barbara Geddes, Committee Co-Chair

Michael Ross, Committee Co-Chair

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2012

For my parents.

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## CHAPTER 1: INTRODUCTION

Violent crime has increased dramatically in the developing world over the last several decades (Fajnyzlber et al. 2002ab), leading to considerable human suffering. Not only does violent crime affect economic growth and development on a national level, it could be the most important factor in determining whether many low and middle-income countries are able to develop effectively into prosperous, stable democracies. Even in wealthy countries, the cost of crime is very high. In the United States the economic cost of violent crime is about one trillion dollars per year (Kleiman, 2009, 2), or just under ten percent of annual GDP. However, the cost of crime might be an even larger percentage of economic output in developing countries where increasingly connected criminal networks contribute to overwhelmed central governments that are unable to counteract the negative effects of illicit organizations within their borders. These criminal networks are often allied with insurgent and terrorist organizations, and the lawless environment they instill can become a breeding ground for instability and crime that spreads to other countries. My research examines the intersection of violence, contraband markets, and government effectiveness, with the goal of highlighting some of the possible causes of violent crime and understanding why nations have differing crime rates.

### *The Study of Violent Crime in Political Science*

The study of violent crime is an important part of political science for two reasons. First, crime is political by definition, and political currents often dictate the classifications of what is legal and illegal activity (Andreas and Nadelmann, 2006, 17-21). Second, forming a monopoly of force, in the form of order and security, is one of the primary reasons for a state to exist (Weber, 1946). High crime rates can threaten this monopoly of force, and, in extreme cases, pose existential threats to the state. Although the related topics of civil war and corruption are



receiving attention in political science literature, the connection between crime and institutional factors has rarely been researched in a systematic fashion. The lack of analysis of violent crime in political science is surprising because the *legitimate* use of force is a key distinguishing characteristic of a modern state (Tilly, 1985).

The state's role in limiting violent crime has both domestic and international aspects. I suggest that some factors related to transnational crime help explain the variation of violent crime rates within countries. Transnational criminals, as well as insurgents and terrorists, look for weak states to provide safe havens and funding sources for their organizations. These lawless areas can also become a breeding ground for criminal activities that spread instability to other countries. However, international criminal organizations largely exacerbate existing domestic phenomena, such as the ability to earn large profits in illicit markets, the organization of criminal groups, and the technology of violence. Transnational criminal connections therefore increase levels of violence and contraband within countries, often leading to inundated, incapacitated central governments and weak states. Thus, violent crime has both national security and global development implications.

### *The Motivating Question of This Dissertation*

The specific puzzle I examine in this dissertation is the variation in violent crime, both between countries and over time. These differences are not fully explained by national-level socioeconomic factors, levels of democracy, or numbers of police per capita. Although political scientists have no general theory of violence in society, I suggest that examining a very specific part of violence in society, such as murder rates, is a good starting point because other types of violent crime frequently correlate with murder rates (Lynch, 2004, 14-15; Fajnzylber et al., 2000; 2002ab). Since the crime of murder has such a clear and similar definition between countries,

murder rates are the most reliable method of cross national crime comparisons. Thus, I test several hypotheses regarding violent crime both at the cross-national and local level. I have two major goals for my analysis; first, to explain why countries have such disparate crime rates; second, to elucidate possible causal mechanisms leading to violent crime.

### *My Theoretical Framework*

I propose an institutional and natural resource based explanation of the variation in crime rates in order to explain a causal aspect of crime that has not been previously discussed. My findings suggest that there is a connection between violent crime and property rights enforcement that has three key elements: the strength of the actors involved (including the state), the specific nature of the market around which crime is centered, and property rights enforcement in that particular market. When the state is ineffective, or weak, crime rates increase because of the lack of a reliable third party to settle disputes or punish transgression. Natural resource production and state weakness tend to go together empirically and provide increased opportunities for extreme profits by potential criminals. Additionally, the state's ability to combat crime depends on its capacity to allocate resources effectively and implement specific anti-crime policies. Weak states, therefore, constitute an important part of any explanation of differences in violent crime rates.

Second, the specific resources that markets are based on can also shape the resulting market structure and institutions (Snyder, 2006), such as property rights and legality of product. This is especially true in the production of lootable resources, in particular gems, gold, and narcotics. Lootable products are high in value and have low barriers to market entry (Snyder, 2006); they are also easily transported and often facilitate the creation of contraband markets. These products increase the cost of business because of the opportunity for rents (extreme

profits) and the ease of theft and spillover of product and money. Lootable products also make the laws regarding property rights more difficult to enforce, especially in the case of prohibitions. The illicit markets associated with loutable products are similar to legal markets, but the laws of supply and demand interact with the properties of individual products and prohibitions to create a unique market environment (Kleiman, 1993, 101-107). Such illicit markets can engender violence because normal business disputes are often settled through violence due to the lack of enforceable contracts.

Property rights are important in decreasing violent crime rates because they decrease the cost of doing business. Property rights help designate who may use resources and how those resources may be used, and they can be important determinants of economic prosperity (Anderson and Hill, 2003, 14). Well-defined and enforced property rights, either by a community or state, reduce the cost of gathering information and enforcing contracts regarding business transactions, thereby reducing the cost of doing business. When business transactions are conducted relatively easily, violence becomes a less attractive option. When the cost of business is high due to inefficiencies in the market, violence is often perceived as a more cost-effective method of solving disputes than normal legal channels. This is especially true when laws are difficult to enforce, either due to the characteristics of the market or because of a lack of state strength.

These property rights are originally established through a bargaining process between actors who often possess different capacities for violence. The relative capacity for violence of interested parties is critical to determining the outcome of this process. In developed countries, however, they are established through laws imposed by a government with a monopoly on violence. Thus, the enforcement of property rights can be a top-down imposition of externally

developed laws by a strong actor, through the codification of locally established norms, or done informally by a community. In some cases, state and non-state actors compete to supply the property rights that allow them to tax production. In my dissertation, I show that the lack of property rights enforcement in lootable resource markets explains some of the variation in cross-national violent crime rates.

### *Criminal Organization*

In addition to the link between lootable resources and property rights, the degree of organization in criminal groups affects crime rates. The organization of criminal groups is critical to the study of crime, but has received relatively little attention.<sup>2</sup> The formation of criminal syndicates has profound consequences for the variation in crime rates for two reasons. First, the capacity for control of individual criminals is greater at increased levels of organization, thus decreasing levels of disorganized violent crime. Second, along with greater organization of individual criminals comes an increased capacity for violence at the group level, thus increasing the capacity for organized violence against the state or other non-state actors. More highly organized groups might, therefore, constitute a greater threat to the state, while not necessarily leading to higher levels of violent crime.

Standard market explanations for crime do not account for the economies of scale and the development of criminal organizations. According to neoclassical market theory, firms are a response to failures in standard markets (Englander, 1988, 340).<sup>3</sup> Economies of scale in the production of violence create incentives for forming increasingly complex security arrangements in order to aggregate capabilities and provide a higher capacity for violence (Weber, 1997, 326), and maximizing violence is a means of maximizing profit. The absence of written contracts and

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<sup>2</sup> Notable exceptions are Levitt and Vankatesh (2000), Gambetta (1988; 1993), and (Leeson, 2007).

<sup>3</sup> Economic theories of crime are similar in some ways to economic explanations of the international environment, such as Waltz (1979, 89-91), that do not account for the hierarchy in international politics.

increased uncertainty surrounding property rights enforcement in illicit economies contributes to a higher demand for protection and the propensity for violence (Gambetta, 1988; Schvarts, 2001, 31).<sup>4</sup> Thus, we should expect criminal organizations to form in order to overcome the high cost of business experienced in criminal markets. These organizations try to develop a monopoly of force within territories or activities in order to capture the benefits of supplying predictability and contract enforcement that allow for economic exchange in illicit markets and weak states (Schvarts, 2001, 12, 31). Various non-state organizations will compete for a monopoly of force when governments do not provide it. The net balance of the cost of forming an organization and the cost of doing business as individuals in a market determines whether interaction takes place through a market or some hierarchical organization (Weber, 1997; Williamson, 1981). In the world of crime, forming a hierarchical organization means that criminals balance the cost and benefits of committing crimes individually with those of forming a criminal syndicate.

Criminal organizations generally follow the same principles of organization as non-criminal organizations. It is difficult to replace an individualized market with a hierarchical institution that regulates transactions (Waltz, 1979, 111), whether it is a state or a criminal organization. The size of criminal gangs is dependent on a cost-benefit analysis between the improved efficiency in economies of scale versus the increased bureaucratic cost of operating a large organization (Weber, 1997, 329). In the case of organized crime, the benefits of increased organization lead to a higher capacity for violence. However, this benefit is limited by diminishing returns and the fact that an organization becomes more difficult to control as the size

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<sup>4</sup> The one possible exception in the literature occurs when everyone has an equal capacity for violence and capacity of resource production (Umbeck, 1981). Umbeck analyzes the California Gold Rush and finds these conditions to hold. Even if this is an accurate analysis of this time period, I see this as an anomaly and a historical example that is rarely encountered. It is unclear to me how violence does not benefit from economies of scale. Umbeck (1981) is also primarily concerned with conflict at mining sites, and not what happened during transportation to cities or retail stores.

increases. Additionally, an organization's capacity to commit credibly to agreements with civilians (controlling for the principal-agent problem) is also a factor in the level of organization (Weinstein, 2007, 164-175),<sup>5</sup> because part of a criminal organization's power is derived from its ability to survive within the community. The effects of economies of scale are especially true in the absence of an effective government (Hobsbawn, 1959, 30-51; Weinstein, 2007, 127-140), and thus organized crime plays a larger role in supplying public goods in weak states.

### *Colombia as a Case Study*

My dissertation analyzes variations in cross-national crime rates and the role of property rights enforcement, and is linked directly to the analysis of domestic crime rates and indirectly to the effects of transnational crime. I use Colombia as a case study that allows me to evaluate competing mechanisms on a sub-national level, where implications of my hypotheses might be more easily observed. Focusing on local-level analyses in a single country facilitates research from a methodological standpoint by helping to control for variables that might vary from country to country. If I can use evidence collected in Colombia to uncover the mechanisms involved in how quality of governance relates to crime and contraband markets, these findings can be applied to other countries and regions.

Colombia consistently has one of the highest murder rates in the world (UNODC, 2009). It also has traditionally had one of the best economies and one of the strongest democracies in South America, while producing and exporting a variety of legal natural resources, including oil, gold, gemstones, and a number of agricultural products. Despite a long running civil war, only a

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<sup>5</sup> Mancur Olson addresses this idea in his 1991 paper "Dictatorship, Democracy, and Development." *The American Political Science Review*, Vol. 87, No.3 (Sep., 1993), pp. 567-576. However, in this paper Olson does not address levels of violence in society or force in economic relations, nor does he specifically address property rights. He is concerned mostly with development in a state of zero or little governance versus a state of some, generally undemocratic, governance.

small fraction of the extremely high levels of violent crime in Colombia can be attributed to the civil war, even during its most violent periods (Gaviria, 1998, 9). Perhaps more importantly, the instability generated by the long running civil war helped foster the largest cocaine market in the world. The conflux of civil war, high crime, democracy, a strong economy, and natural resources in one country provides the unique opportunity to control for multiple variables and to further analyze factors that might contribute to high violent crime rates.

### *Chapter Outlines*

The outline of the dissertation is as follows. Chapter Two is concerned with statistically assessing competing mechanisms on the variation in crime rates between countries, as well as motivating my hypotheses.<sup>6</sup> I argue that a government's, or other actor's, ability to manage the production of lootable resources affects violent crime rates for two reasons.<sup>7</sup> First, the production and transportation of lootable resources generates high transaction costs due to the characteristics of these markets. When the cost of conducting business is high and no organization is able to enforce property rights or the rule of law, the probability of violence increases. Second, lootable resources facilitate illicit markets and contraband, which increase levels of violence. Property rights enforcement, even if informal, reduces transaction costs in the production and transportation of these resources and thus can reduce levels of violence. Thus, the presence of lootable resource markets tends to increase violent crime rates, whereas a state or organization's ability to enforce property rights can reduce violent crime rates, both across countries and across the production of different types of lootable resources.

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<sup>6</sup> The spread of criminals and criminal technology is a secondary cause of differences in crime rates between countries. Other factors must be present in countries in order to facilitate the spread of transnational organizations and illicit markets. Even though I do not address transnational crime in this study, I contend that the study of violent crime within countries has import for other scholars' understanding of how crime spreads between states.

<sup>7</sup> I use Snyder's (2006, 946) definition of lootable products as those that are high in value and have low barriers to market entry. To this, I add the condition that the products are easily transportable, or have a high value to volume ratio.

Chapter Three elaborates on the theory and causal explanations suggested by the statistical results in Chapter Two. In this chapter I more clearly elucidate the causal mechanisms at play between violent crime, transaction costs, and property rights. I demonstrate that property rights enforcement in potentially highly profitable markets can help explain some of the variation in cross-national crime rates. Although a theoretical chapter usually precedes quantitative research, in my dissertation it comes after my cross-national quantitative analysis because the cross-national analysis is used to provide the justification for my theoretical framework. I explain the structure of lootable resource markets, specifically focusing on why the properties of certain markets, including lootability, rents, and prohibitions, can make them more prone to violence. I believe the correlation between mineral resource production and violent crime is due to the difficulty in enforcing property rights in the production of lootable resources. The enforcement of property rights negatively affects violent crime rates by decreasing transaction costs.

Chapter Four tests the hypotheses that I developed in Chapter Three with both quantitative and qualitative local-level data in Colombia in order to more closely examine variations in violent crime rates than is possible in cross-national studies. I highlight several aspects of lootable resource markets in Colombia central to my argument regarding transaction costs and property rights and their relationship with violent crime rates. To test my hypotheses I use a mix of multivariate regression analyses over time and case studies. My study also relies on case study analysis and original fieldwork to explore the direction of causation and to assess several competing mechanisms that large-N statistical analyses cannot evaluate. I then interpret the results by focusing on the impact of factors, such as mineral resource production, not commonly considered in the study of crime. Specifically, I explore the connection between violent crime, socio-economic variables widely believed to affect crime rates, natural resource



production, and property rights enforcement. The preliminary findings confirm the results of the cross-national study and suggest that the effects of lootable mineral resources on crime are distinct from those of other resources, and increase violent crime rates due to the specific nature of resource markets. As described in previous chapters, the illicit markets often associated with lootable resources tend to generate high levels of homicide. Additionally, property rights enforcement, even if informal, can help reduce transaction costs in the production and transportation of lootable resources, and can reduce violence.

The Conclusion contains a brief overview of the research from every chapter. I also include an explanation of how my research fits into the current literature. Additionally, I develop paths for future exploration for both quantitative and qualitative research. All tables, figures, and appendices are contained in each chapter.

## CHAPTER 2: EXPLAINING VARIATIONS IN CROSS-NATIONAL CRIME RATES

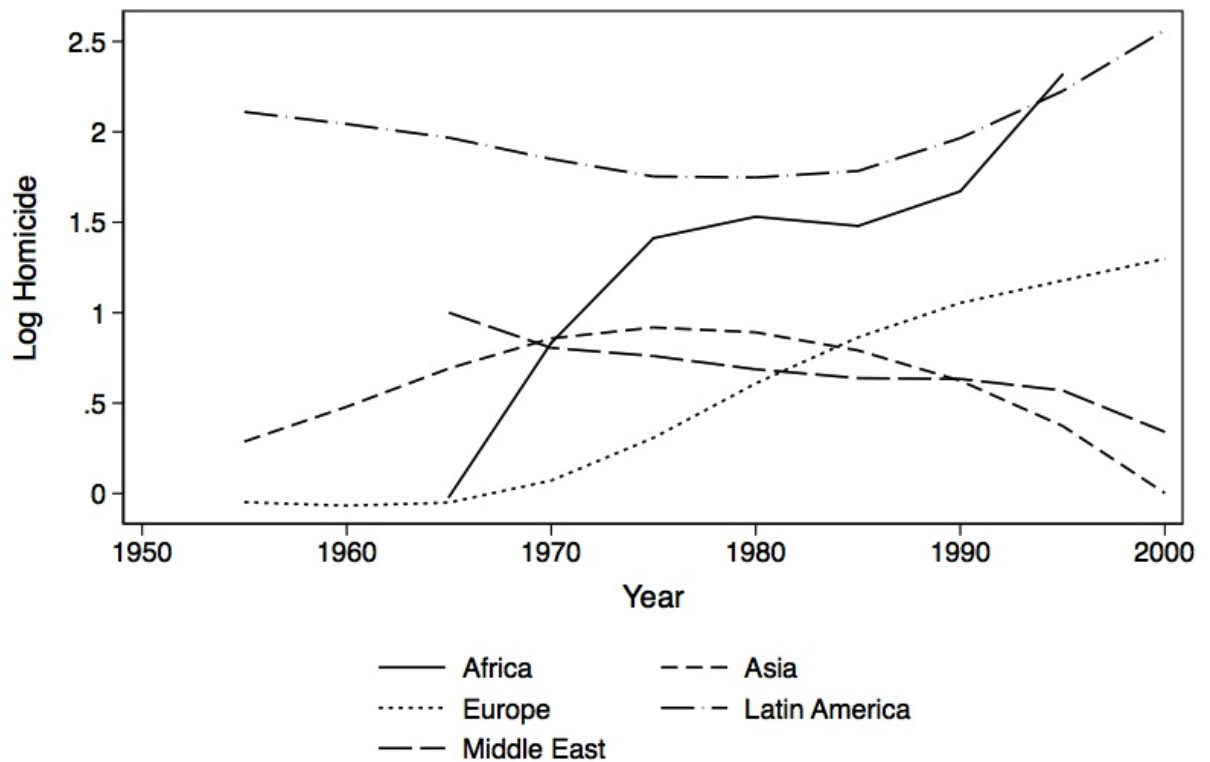
Violent crime increased dramatically on a global level between 1950 and 2000, with countries in the developing world bearing most of the cost (Fajnzylber et al. 2002ab; Naim 2005; UNODC 2004; 2007).<sup>8</sup> Despite attention in the popular media, however, there are still many questions surrounding the underlying causes of crime and the high degree of variation in crime rates across nations.<sup>9</sup> Influential studies (e.g. Fajnzylber et al. 2002ab) examine cross-national crime data in order to highlight relationships between common theoretical explanations of crime and violent crime data. Fajnzylber et al. (2002b) conclude that inequality exacerbates crime rates while economic growth reduces them. Other studies note the correlation between crime rates and factors such as economic growth, the number of police per capita, and education levels, yet causal explanations for violent crime remain wanting due to the difficulty in identifying causal mechanisms. Moreover, extant studies of crime rates have largely overlooked institutional factors, such as the enforcement of property rights, which plausibly explain variation in violent crime across states. This is especially important given that the variation of between-country violent crime is almost three times the within-country variation over time, and regions have widely disparate crime rates, as shown in Figure 2.1. This paper suggests that some of the variation in violent crime rates can be explained by variables that affect property rights, such as specific types of natural resource production, that many studies of violent crime ignore.

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<sup>8</sup> Violent crime is usually defined as homicide, attempted homicide, assault or battery, sexual assault, and armed robbery, including carjackings.

<sup>9</sup> See Fajnzylber et al (2000; 2002ab), Lederman et al. (2002), and Lynch (2004) for previous discussions and analyses of cross-national crime rates.

**Figure 2.1**  
**Variations In Log Homicide Rate By Regions**



Source: Fajnzlber et al (2002b)

I argue that a government's, or other actor's, ability to manage the production of lootable resources affects violent crime rates for two reasons.<sup>10</sup> First, the production and transportation of lootable resources generates high transaction costs due to the characteristics of these markets for such goods. When the cost of conducting business is high and no organization is able to enforce property rights or the rule of law, the probability of violence increases. Second, lootable resources facilitate illicit markets and contraband, which increase levels of violence. Property rights enforcement, even if informal, reduces transaction costs in the production and

<sup>10</sup> I use Snyder's (2006, 946) definition in defining lootable products as those that are high in value and have low barriers to market entry. To this, I add the condition that the products are easily transportable, or have a high value to volume ratio.

transportation of these resources and thus can reduce levels of violence. Thus, the presence of lootable resource markets tends to increase violent crime rates, whereas a state's or organization's ability to enforce property rights can reduce violent crime rates, both across countries and across the production of different types of lootable resources.

The chapter begins with an overview of the major theoretical approaches to the study of violent crime. I then explain how natural resource production influences violent crime rates. To test my hypotheses, I use a multi-method approach combining cross-sectional time series regression analyses and qualitative case information. Homicide rates, widely recognized as the best method of measuring crime rates across nations (Fajnzylber 2002ab, Lynch 2004), serves as the dependent variable. The analyses of qualitative data explore the direction of causation and assess competing mechanisms that large-N statistical analyses are ill suited to evaluate. In the discussion of results, I focus on the impact of factors not previously considered in the study of crime, outline the possible mechanisms involved, and highlight paths for future research.

## **EXPLANATIONS FOR VIOLENT CRIME**

Theories for criminal behavior are often divided into two categories: those focusing on individual economic motivations and those focusing on sociological motivations (Bushway et al. 2004; Fajnzylber et al. 2002ab). The sociological perspective can be further divided into grievances stemming from social interactions (Echenique et al. 2007), social exclusion arguments (Gurr 1970), and social capital arguments (DiIulio 1996; Freeman 1985; Fajnzylber et al. 2002ab). Statistical evidence (Fajnzylber et al. 2002b, Neumayer 2005) offers tentative support for economic explanations over those prioritizing social grievances, but grievance mechanisms add useful insight, especially concerning causal explanations.

The economic explanations of crime typically rely on individual-level cost-benefit analyses of criminal behavior, originating from Becker's (1968) study. The benefit of crime minus the opportunity cost (foregone income from legal labor) is weighed against the cost, or penalty (multiplied by the probability of capture). Following this line of reasoning, criminal behavior can be modeled with supply and demand curves, as outlined by Cook (1986). Supply is affected by the amount of plausible targets and the deterrent mechanisms present, while the number of potential criminals affects demand for crime. Similar to other service markets, such as corruption (Treisman 2000, 406), price and supply are determined by the number of buyers and sellers (criminals and victims, in the case of crime) and by the conditions under which the market operates.

The distinctions, however, mask the fact that both economic and sociological motives are comprised of the same underlying factors; both involve some aspect of a cost-benefit analysis and social cohesion or grievances. In fact, evidence seems to indicate that grievances and a general disregard for social norms are necessary preconditions to violence even when motivated by economic opportunity (DiIulio 1996, 20-21; Thoumi 2003, 64-68). Thus, many commonly cited factors in crime studies, such as economic growth, inequality, police per capita, education level, and urbanization, may alter an individual's cost-benefit calculus while at the same time affecting the state of underlying grievances. The contribution of this paper is to highlight the complementary role that political factors play in shaping variation in cross-national crime rates.

Drawing from the economic literature, economic growth increases the opportunity cost of crime by providing more and better paying jobs, while inequality decreases the opportunity cost of crime by reducing the relative value of targets, thereby generating opposite effects on overall crime rates (Fajnzylber et al. 2002a, 1324, 1343-44; Fajnzylber et al. 2002b, 26-27). Both

economic growth and inequality could plausibly engender social grievances and affect social relations, though the associated causal mechanisms of these measures are less clear.<sup>11</sup> For example, increased wages from legal employment could increase the opportunity cost of crime. However, increased average wages could also increase the attractiveness of the targets, which leads to questions regarding the opportunity cost of crime in the criminal market. The standard economic explanation assumes that criminals are much poorer than their targets (Ehrlich 1973, 538-540). In fact, criminals' targets typically come from within the same socio-economic strata (though still potentially poorer) and crimes usually occur within several miles of a target's home,<sup>12</sup> which raises issues of social cohesion. An alternative explanation is that in countries with greater inequality, individuals have a more pessimistic outlook regarding future income through legal channels, due to either legal constraints, unequal wages, or social stigma, thus lowering the opportunity cost of crime versus legal employment (Cook 1986; Fajnzylber et al. 2000, 1324; 2002b, 25). An equally likely scenario is that inequality is related to lower levels of police protection and a lack of government services in specific neighborhoods, which leads to increased crime as police and residents are overwhelmed in high crime areas (Kleiman 2009, 5, 86; Wilson 2004, 539).<sup>13</sup>

An alternative explanation, developed in this paper, is that the quality of governance creates variation in crime rates. A government is responsible for providing services to its

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<sup>11</sup> Although the GDP growth-violent crime correlation is robust in cross-national analysis, it does not explain U.S. crime rates well. The U.S. underwent some of its highest violent crime rates when the economy was growing in the 1960s and 1970s. This indicates that there is a high amount of variation, and other variables might be more important than growth in explaining violent crime.

<sup>12</sup> Much of my information on this topic is the result of conversations with public policy professor and crime expert, Mark Kleiman, in 2007.

<sup>13</sup> Additionally, influences on an individual's decision to engage in criminal activity are not in a direct, one to one relationship with factors that influence crime rates nationwide. A more detailed explanation of the cross-level inference problems associated with comparing individual rationale to commit crimes with aggregate crime data is outside the scope of this paper. For an excellent discussion of forming individual rational models from aggregate data, see Gary King "A Solution to the Ecological Inference Problem" (1997).

citizens, including security and protection, and the extent to which it does so can have a direct bearing on a potential criminal's opportunity costs. Corrupted government may also indirectly exacerbate violent crime rates, both by driving down economic development (Treisman 2000, 429) and by decreasing the ability of governments to distribute benefits. More importantly, corruption negatively impacts the legal institutions needed to deter crime, thereby decreasing the likelihood of punishment. Government effectiveness is typically measured by bureaucratic efficiency, including the ability to supply public goods and social services, or levels of taxation (Fearon and Laitin 2003; Ross 2001b; Skocpol 1979; Tilly 1985).<sup>14</sup>

The persistence of illicit markets is a second explanation for crime. Contraband, and narcotics markets in particular, have been blamed for spikes in violence in recent decades (Wilson 2004). Although several characteristics of drug markets—such as intoxication effects and the necessity to obtain money to buy drugs—are important in the study of violent crime, the existence of a black market is often cited as the most damaging aspect of illegal drugs (Boyum and Kleiman 2004, 332). The illegal drug trade generates super-profits that tend to exacerbate physical contestation; they also drive up the amount of firearms in a given area, which tends to increase the number of murders (Lynch 2004, 17).<sup>15</sup> High amounts of violent offenders in a given area can overwhelm police and create a feedback loop that further increases crime rates (Kleiman 2009, 5, 49-65, 103). For example, the influx of cash and guns related to the crack trade appears to have been a significant positive predictor of crime in the U.S. during the late

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<sup>14</sup> Government effectiveness as measured by bureaucratic efficiency or the level of social services provision is a different issue than the level or quality of democracy in a country. To see how the need or ability to tax a population affects the level of democracy, see Ross (2004c). For an analysis of how democracy affects social service, see Ross (2006b).

<sup>15</sup> Although the relation between guns and violent crime is not well understood, research in the U.S finds a correlation between murder rate and the number of guns per family, and firearms per capita are thought to be a major factor in the difference between homicide rates between the U.S. and Europe (Cook 2004, 291-330; Lynch 2004, 17). For a brief discussion see Kleiman (2009, 136-148).

1980s and early 1990s (Blumstein 2004, 466; Greenwood 2004, 77-79). This connection between drug markets and crime could indicate a weak local or regional government, incapable of providing effective rule of law or necessary investment in public goods needed to deter potential criminals. It could also indicate the predation of specific resources by certain groups or individuals, which leads to increases in violent crime.

Civil war is a third political factor commonly associated with increases in violent crime (UNODC 2007). Civil war may decrease a government's ability to supply vital services and enforce property rights, and may also harm social cohesion, which would increase transaction costs. Additionally, civil war might increase the prevalence of illicit markets, as Ross (2004b) demonstrates for the narcotics trade. Violent crime can spread through proximity and association with combatants as locals learn how to use guns and other technologies of violence, as well as the increased normalization of violence and harmful psychological affects associated with combat (Arana 2001; Bourgois 2001). Additionally, conflict can exacerbate unemployment by deteriorating legitimate business opportunities and reducing the education level of young men, once again lowering the opportunity cost of crime (Blattman and Annan 2010; Fuentes 2005).<sup>16</sup> However, many of these factors should also be present in interstate conflicts, and there does not appear to be a corresponding increase in violent crime after foreign wars. If violent crime is a function of transaction costs and property rights, as I argue, civil war should affect violent crime by making property rights harder to enforce, eroding social cohesion, and increasing transaction costs.

To summarize, recent statistical research finds a correlation between murder rates and both economic growth and inequality cross-nationally (Fajnzylber et al. 2000; 2002ab), as well

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<sup>16</sup> Often times the unemployed include ex-rebels, as well as former members of the security apparatus. This may mean they are better armed and better trained than other members of society (Arana 2001).



as a correlation between criminal behavior, the number of police per capita, and incarceration rates in the U.S. (Kleiman 2009; 93-116; Levitt 1997; 2002; 2004). Thus, there has been some progress in explaining individual criminal behavior over the last few decades, but relatively little progress in explaining why nations face differential crime rates (Wilson 2004, 537). The previous discussion is meant to demonstrate some of the limitations of the standard economic theories of crime.<sup>17</sup> The quality of governance and the specific properties of lootable resource markets, however, may play an important complementary role and may help to further an understanding of the causal mechanisms surrounding violent crime.

## **THEORY**

In the following sections I provide a brief overview of my argument to explain variation in crime rates, which I elaborate on in the following chapter. My theory incorporates two concepts from the political science literature: natural resource production and property rights. First, I draw on the civil war literature that links natural resource production to civil conflict (Humphreys 2005; Sambanis 2004; Ross 1999; 2001b; 2006; Collier and Hoeffler 2004a; Fearon and Laitin 2003), in order to generate analogies with the commission of individual-level crime. Second, I incorporate the economic theories of transaction costs and property rights that contribute to the connection between violent crime and natural resource production. The mechanism I propose concerns the dynamic between state strength, the market structure for specific products, and the enforcement of property rights.

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<sup>17</sup> There are also modifications of the standard rational actor model that provide useful insight into criminal behavior and close the gap between so called economic and sociological theories of crime. It is possible that the inability to accurately calculate future costs and benefits might lead certain people to commit criminal acts in the first place. Criminals might love risk, as well as have high sunk costs in the business of crime. Additionally, they usually have limited future opportunities in the legal sector (Kleiman 2009, 71-85). I sidestep this debate by assuming that both common economic and sociological theories of crime can fit a general type of cost-benefit analysis and are intertwined with values and beliefs. The goal with any model is to explain driving concepts and major trends of behavior.

## *NATURAL RESOURCE PRODUCTION*

Collier and Hoeffler (2004a) stipulate that natural resource dependence increases civil conflict because resources are relatively easy targets for rebels. Thus, insurgents use resource predation to fund their operations. This implies that those resources to which criminals can gain access, such as drugs, onshore oil, and alluvial diamonds, would correlate with an increase in conflict, regardless of state capacity. Fearon and Laitin (2003, 81), in contrast, argue that natural resource dependence increases conflict by fostering a weak state, not by providing easy targets for rebels. States that rely on non-tax revenue are unable to manage the economy or to provide an adequate level of social services and infrastructure for a given level of income, due to the lack of need to develop an effective bureaucracy. The implication is that resource rents should go hand in hand with both decreases in state capacity and increases in conflict. However, the rentier state (which consumes natural resource revenues but does not develop an effective bureaucracy) does not exclude robust military or police capability. In fact many oil dependent states are often able to heavily invest in a strong security apparatus (Ross 2001b).

Other resource-conflict arguments focus on the unique role of contraband, including lootable resources, such as conflict diamonds and narcotics.<sup>18</sup> Fearon (2004) demonstrates that lootable contraband funding leads to longer conflicts by providing easy funding sources. Ross (2004a) finds that contraband production leads to increased conflict duration due to their lootability. The illicit nature of contraband generally helps the non-state actor more, so the effects of illicit products might be different than those of other natural resources, such as oil.

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<sup>18</sup> Technically, contraband could be any product produced outside of the legal sector. Products that have low value per volume, not easily transportable, and face high barriers to entry are typically not worth the cost of production. Therefore, the most common contraband tends to be lootable products, but the designation of contraband and lootable resources are often conflated in the literature.

## *DEVELOPMENT OF A NEW HYPOTHESIS OF VIOLENT CRIME*

In this overview I provide a framework that justifies my statistical models of natural resource production and violent crime. Evidence suggests a connection between violent crime and the production of lootable resources, primarily because lootable resource production and associated black markets lead to high transaction costs between buyers and sellers in the market, and difficulty in enforcing property rights. The explanation involves the dynamics between state strength, the qualities of lootable resource markets, and the enforcement of property rights. First, when the government is ineffective, crime rates increase because of the lack of a reliable third party to settle disputes between buyers and sellers. Second, the specific characteristics of resources that markets are based on, such as lootability and supply and demand, shape the resulting market structure, including property rights and legality of the product. Lootable products, such as alluvial gems, gold, and narcotics, are high in value and have low barriers to market entry (Snyder 2006, 952), increasing the cost of business due to the opportunity for theft and the difficulty in enforcing property rights laws. Ease of theft and lack of property rights increase the spillover of product into other sectors of society and increase the possibility of illicit markets.

Third, enforced property rights, by the state or some other entity, help coordinate how and when resources may be used. When the cost of business is high, violence is often perceived as a more efficient way of solving disputes than normal legal channels. Sometimes these phenomena combine in a “Boomtown” effect, where weak governance combines with an influx of poor young men to form an environment where property rights are further eroded and government services more difficult to provide. In this case, it is not necessary to have a black market in lootable product to experience increased levels of violent crime. For example, natural

gas boomtowns in the U.S. can have damaging social effects that lead to increased levels of crime.<sup>19</sup> However, when the product is lootable, violent crime will be much higher—fieldwork I have conducted in emerald and gold mining regions in Colombia confirms this. Thus, violence, instead of being dependent on the magnitude of production, might be more related to where and how business transactions take place. Clearly defined ownership, either by a government or a community, reduces the cost of acquiring information and enforcing contracts, thus reducing the cost of business and making violence a less attractive option.

The critical intervening variable between property rights and violent crime is transaction costs, or the cost of doing business. When the cost of business is high, violence is more likely because it is a cost-effective, viable alternative. The cost of business is higher when laws are difficult to enforce, due to either the characteristics of the market or because of a lack of state presence. This is because violence might be perceived as the most efficient method of resolving disputes. When no powerful actor is able to provide the public goods that decrease transaction costs associated with buying and selling, cheating can ensue between actors and increase the likelihood of violence. Relatively high amounts of lootable resource production often occurs in countries with low state capacity, where governments lack the ability to supply public goods and keep violent crime rates low. Property rights, importantly, can reduce transaction costs by making it easier to conduct business. Thus, the connection between violent crime and lootable resource production is plausibly explained by the high transaction costs and the difficulty of enforcing property rights in these markets, especially in the absence of a strong state.

Transaction costs tend to be particularly high in natural resource markets, especially mineral resource markets, due to the specific properties of these markets: uncertainty in market

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<sup>19</sup> See, for example, Alexander Fuller, “Boomtown Blues,” *The New Yorker*, February 5, 2007.

conditions, asset specificity, the frequency or homogeneity of transactions, and informational asymmetries between buyer and seller (Williamson, 1973; 1981; 1985; Weber, 1997).

Lootability and legality of resources also increase transaction costs. There is a high degree of uncertainty, including price and supply volatility, in the mineral resource markets (Ross 1999; 2001a; Sachs et al. 1995). Additionally, assets tend to be specific (Ross 2001a), and cannot be shifted easily to other locations or industries due to their function and cost. The frequency and homogeneity of transactions can also vary greatly. This is especially true in the informal markets, where buyers and sellers change rapidly depending on a host of factors. Information asymmetries are also quite common, and are one reason that the prices of raw production material are fractions of the price of the refined products sold at retail. Lootable resources in particular should increase many of these factors because of the ease of market entry for gem and drug suppliers (Snyder 2006, 946) and spillover products, thus increasing the frequency of illicit markets.

Lootable resource markets do not have to be illegal to increase transaction costs. However, when a product is illegal, legally enforceable contracts are not an option and the difficulty of enforcing agreements further increases transaction costs.

Thus, variation in violent crime rates can be viewed as a function of the relationship between property rights enforcement and the production of lootable resources. Lootable products increase the cost of business because the opportunity for extreme profits is higher and the laws regarding property rights are more difficult to enforce. When the state has little influence and is unable to enforce property rights, it leaves room for competition among other actors over rents. When the cost of business is high due to inefficiencies in the market, violence is often perceived as a more cost-effective method of solving disputes than normal legal channels. Transaction costs are affected by the specific nature of the resource markets, including monitoring costs,

uncertainty, asset specificity, and homogeneity of interactions, legality, and lootability of the product. Property rights decrease transaction costs but are difficult to enforce, especially for a lootable products, without the help of a strong actor or accepted norms of cooperation. The conflux of these factors leads to an overall market structure conducive to violent crime. The key point is that resources in and of themselves are not a cause of violent conflict; rather, it is this market structure in which resource markets are embedded generally and the enforcement of property rights specifically. In the following section, I demonstrate that lootable resource markets, which go along with high transaction costs and a lack of property rights enforcement, are associated with violent crime. Causal explanations are difficult for a variety of reasons, such as endogeneity or directionality of causation, ecological inference, and poor data quality. However, I develop my theories to a degree in this chapter and then test them empirically with cross-national data.<sup>20</sup>

## **DATA AND METHODS**

Appropriate model selection is an impediment to our understanding of the mechanisms involved in violent crime. This includes the use of the Generalized Method of Moments (GMM) estimator, which is the most common estimator used in cross-national crime analysis, such as Fajnzylber et al. (2002ab).<sup>21</sup> The GMM analysis uses fixed effects at the country level, which rely on temporal variation in independent variables within countries. Temporal variation is not common among some of the independent and control variables in the study of crime, however, such as ethnolinguistic fractionalization (ELF) and measures of inequality. In fact, many of the factors affecting crime rates are difficult to uncover because their within-country variation is

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<sup>20</sup> In Chapter four I use an extended example of a lootable resource market in a specific setting, including concrete details about property rights enforcement, in order to make my argument more clear.

<sup>21</sup> Fajnzylber et al. (2002ab) also use OLS regression and compare the results with the GMM model.

near zero. Perhaps more importantly, the use of fixed effects at the country level also negates the ability to conduct between-country comparisons. Additionally, fixed effects increase standard errors and increase the number of variables for a given amount of data.

Many studies, including Fajnzylber et al. (2002ab), also use the lagged dependent variable as an explanatory variable. The inclusion of a lagged dependent variable on the right side controls for auto-correlation and tests for path dependence, or the historical effect of the variable being measured. However, the addition of the lagged variable as a predictor variable can mask effects of other explanatory variables. Also, using the lagged homicide rate on the right hand side is equivalent to using the change in homicide rate as a dependent variable. This is a different question than examining predictors of murder rates.<sup>22</sup>

I highlight these shortcomings in models of violent crime for several reasons. The first is to provide evidence for the need for further research on violent crime. The second is to help explain the choice of statistical models in the analysis that follows. Third, these shortcomings serve as a caution against overstating the relationships between crime and any new factors that we might introduce. The statistical analysis of violent crime is difficult, and there is no single best choice for model specification. However, a robust model can aid in the identification of key factors related to violent crime between countries. Below I explain the model choice used in this analysis, providing justification for the methodology and operationalization of variables.

#### *STANDARD MODELS OF VIOLENT CRIME*

The first models test several common predictors of crime. These predictors include standard economic variables, such as economic growth and inequality, as well as variables measuring education levels and urbanization. Additional variables are added controlling for deterrence and geographic factors common in the few cross-national studies of crime that exist.

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<sup>22</sup> For an earlier similar critique, see Collier and Hoeffler, 2004b.

*Dependent Variable:* This study tests several predictors of homicide rates. The dependent variable is logged murder per 100,000 people. The data include 188 countries over 50 years, though some are eliminated from the regression analysis as a result of missing values. The dependent variable is logged to reduce the skewness and is identical to the dependent variable used by other cross-national studies of violent crime, such as Fajnzylber et al (2002ab).<sup>23</sup> Underreporting of crimes is common in underdeveloped areas, and there are problems arising due to different legal systems and cultural traditions (Fajnzylber et al. 2002b, 8). Murder rate is widely recognized as the best method of measuring crime across nations because its definition is common across most countries, and it is classified as a serious crime in every country (Fajnzylber et al. 2002a, 1326; Lynch 2004). Additionally, murder rates are usually good proxy measures for other kinds of crime across nations, such as armed robbery (Lynch 2004, 14; Fajnzylber et al. 2002b). Despite small sample sizes in crime data, the UN and WTO databases provide useful information regarding homicide rates.<sup>24</sup> I partially overcome data limitations by combining the UN and WHO measures of homicide, taking the average when both measures are available, in order to obtain a more complete measure dependent variable. I include pooled data from 1950 to 2000.

*Baseline Model:* The regression analysis for all models is conducted using a Prais-Winsten feasible generalized least squares (FGLS) model, assuming an AR1 process in the disturbances. This provides OLS parameter estimates with panel-corrected variance estimates.<sup>25</sup>

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<sup>23</sup> I owe special thanks to Daniel Lederman for providing me the data from his 2002 paper, "Does Inequality Cause Violent Crime?". The data from Fajnzylber et al. (2002b) originally comes from the World Bank, unless otherwise stated.

<sup>24</sup> Although police statistics are considered more accurate than survey data for violent crimes, it is easier to compare survey data cross-nationally because it is collected on an incident basis, which controls for some of the aggregation problems associated with classifying similar crimes in cross-national comparisons (Lynch 2004, 12-17).

<sup>25</sup> A good case can be made for using a Poisson distribution model. However, my primary concern is controlling for autocorrelation and the FGLS model selected is the best model for this purpose. The results lead me to believe the



No within-panel correlation is permitted, and only correlation among observations at the same period and in different panels is used. I also run a Generalized Least Squares (GLS) and Poisson regression on each model as a general robustness check. Results are consistent in most cases, except when mentioned in the discussion.<sup>26</sup>

It should be noted when interpreting the regression coefficients that it is difficult to control for endogeneity. In fact, several of the regressors (i.e. GDP growth) almost certainly have an endogenous relationship with the dependent variable, homicide rates. The best manner to effectively address endogeneity is through careful qualitative analysis. Fortunately, in research on natural resources, the endogeneity issue is attenuated to some degree because resource location (though not levels of production) is generally fixed. I take as a given that crime rates are path dependent and slow to change. I do not include the lagged dependent variable on the right hand side of the equation in order to better test for the affect of other predictors. I also do not use fixed effects in order to compare between country variations and to overcome the limitations discussed previously. Lagged variables are introduced in specific models to mitigate this endogenous relationship, but this is only a partial fix. Hence, it is problematic to infer causality from the estimated coefficients in this study. Results are consistent between the lagged variables and non-lagged variables unless specifically mentioned.

I use a standard set of variables in every model, adopted from Fajnzylber et al. (2002a). In each new model, a separate set of regressors is added to the original baseline variables. The independent variables in the baseline model measure development, educational attainment, urbanization levels, and economic performance aggregated by country-year. All data come from

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Prais-Winsten adjustment adequately addressed the auto-correlation problem. In the few models where data limitations do not allow for the Prais-Winsten FGLS model, I use a standard GLS model, checked with a Poisson model, and indicate this in the results tables. The fact that results are generally consistent between FGLS, GLS and Poisson models means that autocorrelation is not severe.

<sup>26</sup> In addition, I conduct bivariate regressions with all variables and results are generally consistent.

the World Bank World Development indicator Database.<sup>27</sup> Education is measured by the average years of schooling of the adult population. Real growth rate of GDP is used as a measure of economic activity and is calculated as a percentage. The Gini coefficient is used as a measure of inequality. A measure of average income, the natural log of GNI per capita, is used as a proxy for general level of development, and this figure is converted into constant \$US 2000. The urbanization level is defined as the percent urban population of a country.

I next combine several variables hypothesized to affect violent crime rates in addition to the standard socio-economic factors into one single model. The selection of these factors is motivated by the results of the few studies on cross-national crime (Fajnzylber 2000; 2002ab; UNODC 2006; 2007). First, I include the number of police per 100,000 inhabitants, which proxies the probability of being caught, but not severity of punishment.<sup>28</sup> This variable was obtained from the Fajnzylber et al. (2002b) dataset. To test for the affects of ethnic diversity on crime rates, I use the updated Ethno-Linguistic Fractionalization (ELF) measure from 1985 from Treisman's (2007) dataset.<sup>29</sup> I then add a dummy variable for Latin America to proxy for the cultural and institutional affects of Latin America on violent crime rates, given that Latin America is consistently the most violent region in the world as measured by homicide. The following are descriptions of four models that test political hypotheses regarding violent crime.

## NEW MODELS OF VIOLENT CRIME

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<sup>27</sup> All of the data from the World Bank used in this study were obtained from the authors of the Fajnzylber et al. 2002b study.

<sup>28</sup> For a more in depth discussion of the comparison between punitive sentencing policies in the U.S. and Europe, see Lynch (2004, 23-41). For example, most U.S. states have a legal death penalty, and while propensity to incarcerate for homicide is similar to Europe, the length of the sentence imposed and time served for homicide is greater in the U.S. (Lynch 2004, 40).

<sup>29</sup> Ethnolinguistic fractionalization, 1985, is the probability that two randomly selected individuals from a given country will not be from same ethnolinguistic group. This data is originally from Philip Roeder (2001). Ethnolinguistic fractionalization indices, 1961 and 1985 (<http://weber.ucsd.edu/~proeder/elf.htm>), originally downloaded from Quality of Government Database, at Quality of Government Institute, Goteborg University.

The following models test three new models of crime based on largely political variables. These models account for the quality of government, civil war, and natural resource dependence, while controlling for the core predictors outlined earlier.

*Government Model:* The quality of government model tests the effect of the quality of government services on crime rates. In order to test the effect of corruption, the World Bank World Government Indicators (WGI) measure of control of corruption is used.<sup>30</sup> Measures that vary over time are not included because they did not exist before the mid 1990s. I used the average of scores obtained between 1995 and 1999. An additional government performance model uses the “Polity 98” score for democratic rights as a measure of democracy, taken from Ross’s (2001b) study.<sup>31</sup> To this, I add a measure of infrastructure and government effectiveness also obtained from Ross (2001b). Infrastructure is proxied by the number of telephones per thousand people. Tax revenue is used to proxy the government’s penetration into society.<sup>32</sup>

*Weak State Model:* It is important to distinguish between lootable resources’ affect on government capability and the properties of lootable resources that would affect violent crime rates independently from a decrease in government services. The Weak State model tests the effect of oil revenue and the government’s ability to buy more repressive measures and violent

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<sup>30</sup> Obtained from Treisman’s (2007) dataset, World Bank control of corruption index from various years, from Aggregate Governance Indicators 1996-2005, downloaded by Treisman 13 Oct, 06. I only used the data from 1995-1999 in this study (<http://www.sscnet.ucla.edu/polisci/faculty/treisman/Pages/publishedpapers.html>).

<sup>31</sup> Downloaded March 2011, <http://dvn.iq.harvard.edu/dvn/dv/mlross>. This variable indicates a country’s regime type. A 0 is a perfect autocracy and 10 is a full democracy. This measure is a composite of the Polity Data, combining the measure for democracy and autocracy, and converting to a 0-10 scale. Gurr and Jagers, using World Bank “World Development Indicator” Database, compiled the original dataset. For countries with populations over 1 million that are missing data, Ross (2001b) uses Freedom House Data, combining the measures for political rights and civil liberties, and converting the result to a 0-10 scale. These countries are Austria, Cameroon, Democratic Republic of Congo, Libya, Sierra Leone, and Switzerland.

<sup>32</sup> Downloaded in March 2011. <http://dvn.iq.harvard.edu/dvn/dv/mlross>. Tax revenue is the percentage of government revenue raised through taxes on goods, services, income, profits, and capital gains. Data was originally collected by the IMF. Phones is the number of telephone main lines per thousand people. The data are derived from the International Telecommunications Union (ITU), *World Telecommunications Development Report*.

crime rates. In this model, I include a measure of the value of mineral wealth per capita from Ross (2006a),<sup>33</sup> as well as military spending per GNP and military membership as a percentage of the total labor force, to measure the affect of repression on crime rates. I control for civil wars, both with a dummy variable and a measure of conflict intensity, and for the cold war. Military spending and personnel variables were obtained from Ross (2001b).<sup>34</sup> I use a dummy for ongoing civil war, created through archival research, relying heavily on Collier and Hoeffler (2004a) and Lujala (2009). I also create a variable for civil war intensity measured as the number of conflict deaths, from Lujala (2009).<sup>35</sup>

*Predation Model:* This model tests the availability and production of lootable resources on crime rates. Again, the presence of lootable resources proxies the existence of increased transaction costs. In the resource predation model, I use a dummy variable for narcotics and gemstone production and transportation, with codings based on case study research. Lootable resources include drug production, gemstone production, the previously discussed oil and gas value per capita variable, and a variable representing agricultural exports. Gem and drug production data come from several qualitative and quantitative sources, including Lujala (2009 - including supplemental information), Leiteritz et al. (2009), Cornell (2007), and the U.S. Department of State official classification.<sup>36</sup> From the same qualitative data, I create separate variables for drug production and transportation and for alluvial (secondary) gemstone production and primary (deep shaft) mineral production.<sup>37</sup> The agricultural variable comes from

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<sup>33</sup> Downloaded in March 2011. <http://dvn.iq.harvard.edu/dvn/dv/mlross>.

<sup>34</sup> Downloaded in March 2011. <http://dvn.iq.harvard.edu/dvn/dv/mlross>. Originally from the Arms Control and Disarmament Agency (ACDA) of the U.S. government, and cover 1985-1995.

<sup>35</sup> Downloaded in March 2011, data in the data set is from the Uppsala conflict study. <http://www.sv.ntnu.no/iso/Paivi.Lujala/default.htm>

<sup>36</sup> <http://www.state.gov/p/inl/rls/rpt/149722.htm>

<sup>37</sup> I use armed robbery data from 1970 – 1994 as a robustness check on all models. In general, the results are consistent. However, missing data on the dependent variable make this only a mediocre check.

Ross (2001b), and is the export value of all edible agricultural commodities as a percentage of GDP.<sup>38</sup>

## RESULTS AND DISCUSSION

*Baseline Model:* As shown in Table 2.1, Model 1 both growth and inequality remain significant with the expected signs. This is consistent with the major findings of earlier studies (Fajnzylber et al. 2000; 2002a, 1343; 2002b, 25).<sup>39</sup> GDP growth is statistically significant at the .05 level, and a one percent increase in GDP is associated with 4.5 percent decrease in the homicide rate.

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<sup>38</sup> See Ross “Does Oil Hinder Democracy, 2001, 359. The variable is title “Food” in this paper. Accessed March, 2011

<sup>39</sup> I replicate the Fajnzylber et al. (2002b) results. My results are generally consistent with the model study, however, the results vary somewhat depending on whether the UN or WHO homicide data is used. In the replication I use WHO data to remain consistent with the original. In my new models I combine the measures to develop a more complete data set.

**Table 2.1**  
**Statistical Results for Baseline and Quality of Governance Models**

	Model 1	Model 2	Model 3
GDP Growth	-4.514 (2.053)**	-3.297 (2.419)	-1.693 (1.275)
Inequality	0.051 (0.010)***	0.023 (0.011)**	0.041 (0.009)***
Education	0.002 (0.058)	0.030 (0.060)	-0.027 (0.037)
Urbanization	0.001 (0.006)	-0.007 (0.006)	0.007 (0.003)***
Income	-0.121 (0.105)	-0.003 (0.081)	0.091 (0.152)
Police Per Capita		-1.350 (0.447)***	
Ethnic Fractionalization		1.011 (0.237)***	
Latin American Dummy		0.684 (0.244)***	
Democracy			0.259 (0.088)***
Interaction Democracy – Income			-0.028 (0.012)**
Corruption			-0.509 (0.093)***
Tax Earnings			-0.000 (0.014)
Infrastructure			0.002 (0.000)***
Constant	0.069 (0.0687)	0.277 (0.636)**	-0.479 (0.903)
Groups	62	52	55
R-squared	0.250	.311	0.375

Coefficients in the table report the estimated effect of a one-unit change in the independent variable on log mean war deaths. Standard errors are in parenthesis. Estimations performed using STATA 10. \*p<.1; \*\* p<.05; \*\*\* p<.01

In discussing the statistical analysis of murder rates, it is helpful to establish a baseline rate of comparison in order to talk in concrete terms. A murder rate of 10 out of 100,000 is a mid-range value on a global level. To add a comparative perspective, this is about the average of Mexico's crime rate over the last three years, twice that of the U.S. murder rate, and about a quarter the murder rate in Brazil and Colombia. With a murder rate of 10 per 100,000 people, a

decrease of about 4.5 percent is equivalent to 45 fewer people murdered per year in a population of 10 million, approximately the size of Chicago or Sweden. A murder rate of 100 per 100,000 people, a very high range value, is on par with that in some of the most violent cities in the world, such as Caracas, Venezuela and Guatemala City, Guatemala.<sup>40</sup> If we use 100 per 100,000 as a baseline, then a change of 4.5 percent would decrease the murder rate by 4.5 people per 100,000 per year, or 450 per 10 million, which would be more than one murder a day in a city the size of Bogotá. Colombia experienced about 4 percent growth in GDP in 2010.<sup>41</sup> All else being equal, this would lead to a decrease of about 19 percent in the murder rate per year. Using the high baseline of 100 murders per 100,000 people, this level of economic growth would lead to 1900 fewer murders per year in a country the size of Colombia.

As seen in Table 2.1, Model 1, inequality is statistically significant at the .01 level, and an increase of 1 (going from perfectly equal to perfectly unequal) in the Gini index of inequality correlates to a 5 percent increase in the homicide rate. A 5 percent increase in the murder rate, using the high baseline of 100 per 100,000 people, in a city of 10 million people, would mean 5000 more murders per year, or almost 15 per day. The standard deviation of the Gini coefficient is about .1, so going from a country like Canada to Estonia, or Thailand to Norway, might decrease murder rates by .5 percent. This would increase murder rates by 500 people per 100,000 per year in the high baseline example. The scatter plot between homicide rates and the Gini coefficient (in Figure 2.2 below) helps to visually illustrate the correlation. This correlation is

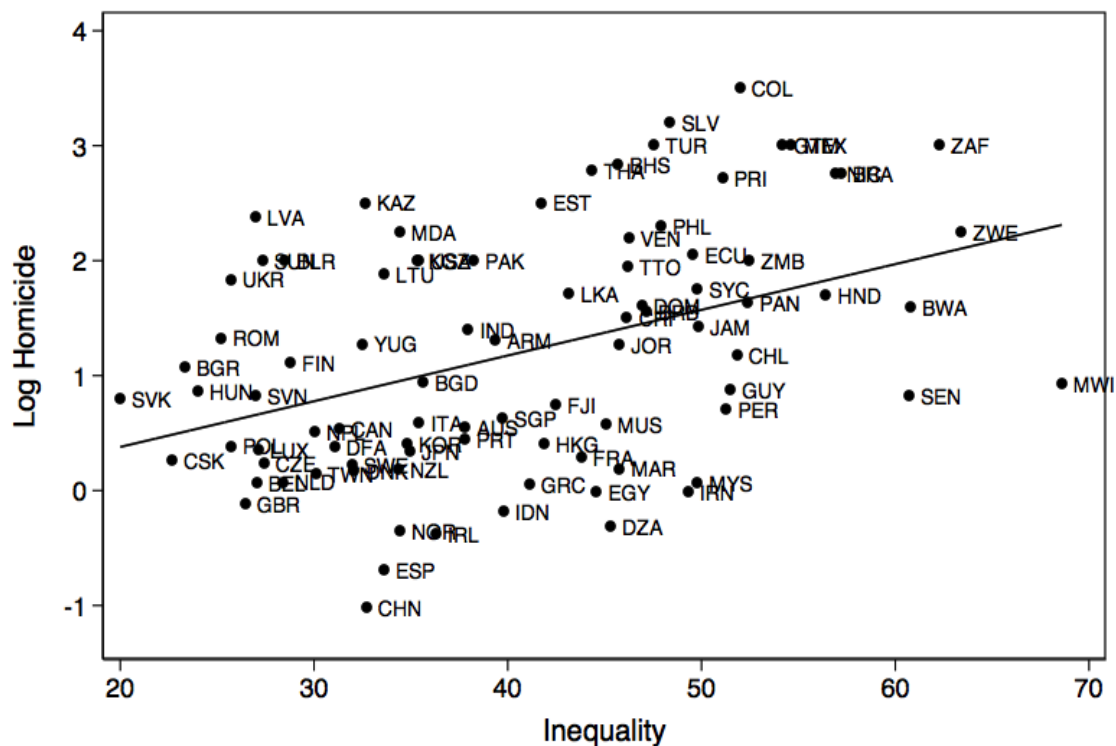
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<sup>40</sup> Recent homicide data is very difficult to obtain and not as reliable as older data. These murder rates are estimates obtained from various sources, including the Economist <http://www.economist.com/blogs/americasview>, FBI statistics at [http://www2.fbi.gov/ucr/cius2009/data/table\\_01.html](http://www2.fbi.gov/ucr/cius2009/data/table_01.html), United Nations [http://www.unodc.org/pdf/Colombia\\_Dec06\\_en.pdf](http://www.unodc.org/pdf/Colombia_Dec06_en.pdf), and newspapers, <http://www.telegraph.co.uk/news/worldnews/southamerica/venezuela/3184293/Venezuelas-murder-rates-surpass-Colombias-under-Hugo-Chavez.html>.

<sup>41</sup> This is according to the World Bank Development Indicators: <http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG>

robust and consistently the most significant predictor of violent crime across all models.<sup>42</sup> GDP growth and inequality remain consistently significant, with the expected signs, across most models.<sup>43</sup>

**Figure 2.2**  
**Homicide Rates vs. Inequality**



Source: Fajnzlber et al (2002b)

What does emerge as the key finding is that the overall affect of GDP growth and inequality are important, but leave much of the variation in violent crime between countries to be

<sup>42</sup> Again, the core variables are included in all regressions.

<sup>43</sup> Of course these stylized examples assume all other variables in the model remain equal, which is almost never the case (Jervis 1997, 75-87). The interaction of variables is complex and difficult to assess in even the simplest models. The basic idea of regression is to isolate the substantive impact of one variable while holding all others constant, and this is the only objective way to determine the relative importance of an individual variable. The examples mentioned also assume uniform changes across the entire country, which would not be the case.



explained. Thus, what are often stipulated as the most important variables in predicting violent crime have, in fact, small substantive effects. The results for the baseline variables remain consistent across the quality of governance, weak state, and predation models, with GDP growth and inequality remaining highly significant, but with small effects. Education, urbanization, and income usually remain insignificant. Furthermore, if an education does not lead to increased chances for gainful employment, it could just increase grievances of those young males who fail to find jobs. In this sense, increased schooling would not necessarily decrease levels of crime. Unfortunately, some schools might be more like prisons that incarcerate young offenders between the hours of eight and three, and expose them to other students in an at risk cohort.

As mentioned earlier, the next three additional variables, police per capita, ELF, and geographic region (dummy) variables, summarize several commonly used predictors of murder rates. Police per 100,000 is used to proxy the probability of being captured, and results show that the number of police per capita reduce homicide cross-nationally.<sup>44</sup> As shown in Table 2.1, model 2, the number of police per capita is statistically significant, but (as I will demonstrate via comparison below) has a small substantive effect. Results are generally consistent when number of police is added with the baseline model only, with a bivariate regression, and when the variable is lagged by one time period. However, it is important to remember that a very large increase in the number of police results in only minimal changes to the violent crime rate. The ELF measure is also statistically significant at the .01 level, but with a small substantive effect, especially when considering that this variable changes very slowly over time. An increase of 1 percent in ELF increases the murder rate by about 1 percent.

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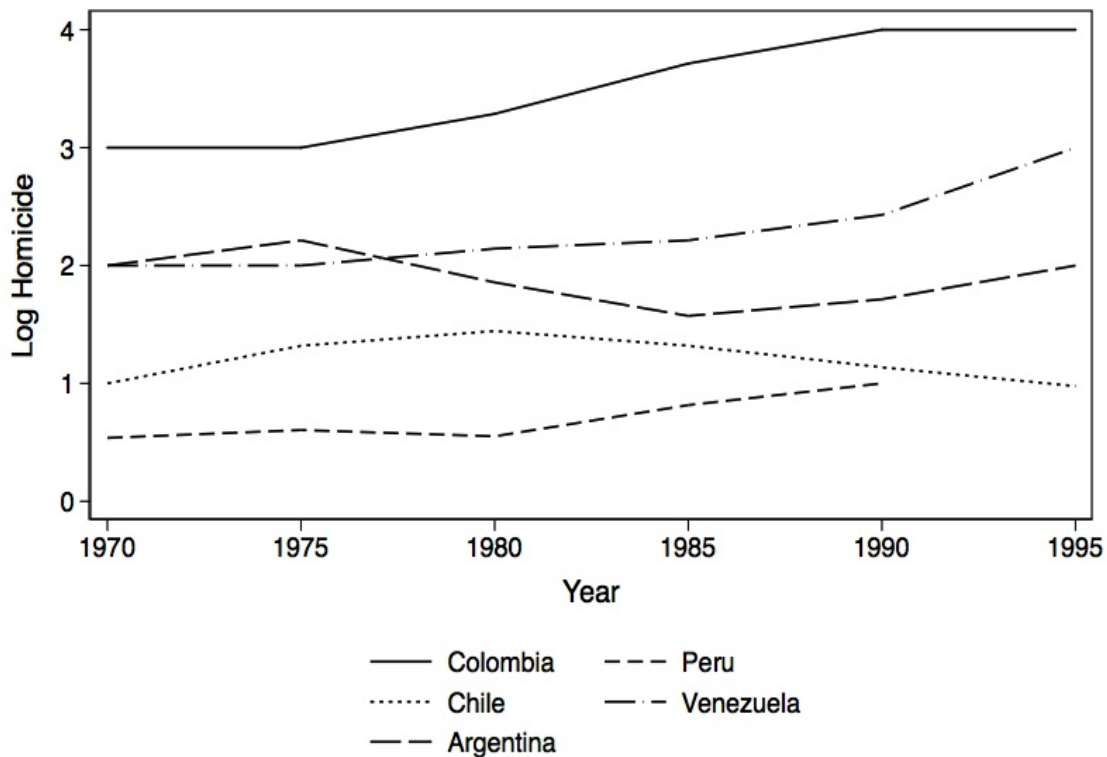
<sup>44</sup> Endogeneity is particularly difficult to control for in this measurement because, as crime rates increase, countries are likely to hire more police and increase the severity of punishment (Levitt 2004, 439). If this is true, my results probably understate the real effect. I add lagged variables for both the number of police and capital punishment. Both remain significant and do not significantly alter the coefficients for other variables.

The geographic dummy variable for Latin America is significant at the .01 level (Table 2.1, Model 2), which supports previous findings (Fajnzylber 2002b) and echoes the visual evidence shown above in Figure 2.1. By way of interpretation, just being located in Latin America, controlling for the core variables, increases the murder rate by 68 percent. Results are generally consistent when the regional dummy variable is added with the core model only and with a bivariate regression. This is a substantively significant increase in murder rates. All else remaining equal and using the low baseline model of 10 murders per 100,000 per year, this would account for an increase of 680 homicides per year in a population of 10 million. Using the high baseline of 100 per 100,000, this would account for 6800 more people murder per year in a population of 10 million. In fact, violent crime in many Latin American countries is responsible for more deaths per year than many ongoing civil wars. Venezuela, for example, with a murder rate of 50 per 100,000 and population of about 30 million, has an annual death rate from violent crime of 15,000 people. If we assume the violent crime rate has remained relatively constant over the last five years, the total amount of deaths would be roughly 75,000, or about double that of Mexico's battle against drug organizations in the same time period.

Several generalizations can be ascertained from the results of these regression models. First, although inequality and GDP growth are always significant, the overall substantive effect is relatively small. Second, there is little evidence that measures of average education, income, or urbanization affect crime rates. Third, the affect of police per capita and ethnic diversity are statistically significant, but substantively small. Fourth, geographical dummies reveal that Latin America is a very violent region, even controlling for inequality. There is also significant variation in violent crime rates between countries within the same region, as shown for Latin

America in Figure 2.3.<sup>45</sup> Below I examine several new, largely political hypotheses regarding violent crime that may provide further insight into these regional variations in crime rates and the small substantive impact of commonly cited factors.

**Figure 2.3**  
**Variation in Homicide Rates Within South America**



Source: Fajnzilber et al (2002b)

## NEW MODELS OF VIOLENT CRIME

These models differ from the previously discussed models for three reasons. First, the following models deal with largely political questions by incorporating variables that account for natural resource production and the quality of institutions and governance. Second, many of the

<sup>45</sup> Other interesting geographical trends also appear in the data. Eastern Europe, which is largely driving the increase in crime in Europe seen in Figure 1, has high levels of violent crime with low levels of inequality. Africa has high levels of violent crime and very high levels of ethnic diversity.

variables have substantively large effects. Third, in some cases they begin to highlight causal pathways.

*Quality of Government Model:* The democracy variable is positively significant at the .01 level using the FGLS model, shown in Table 2.1, model 3. Results are consistent when a democracy variable is added with the baseline model only, in a bivariate regression, and when the variable is lagged by one time period. Statistical significance remains when including “average quality” inequality data, which expands the sample, or when using a GLS regression and Poisson regression. This is evidence that there is some effect of the level of democracy, and regime type more generally, on violent crime. An increase of 1 unit on the 0-10 scale of democracy increases the murder rate by about 26 percent, meaning more democracy leads to higher murder rates. All else remaining equal and using the low baseline model of 10 murders per 100,000 per year, a 1 unit increase would account for an increase of 260 homicides per year in a population of 10 million. Using the high baseline of 100 per 100,000, this would account for 2600 more people murder per year in a population of 10 million. Thus, going from completely undemocratic to completely democratic in a country with a murder rate of 10 per 100,000 would increase murder rates by 2600 people per year in a population of 10 million. Of course, this affect would be offset by any gains in growth and decreases in inequality that tend to go along with democracy.<sup>46</sup>

In theory, democracy should reduce inequality, and developed countries are more equal than less developed countries.<sup>47</sup> However, Latin America, which is almost entirely democratic, has much higher levels of inequality than the Middle East, which is almost entirely non-

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<sup>46</sup> Economic growth is connected to democracy, but the connection and causal direction is not clear (Boix and Stokes 2003; Geddes 1999; Heo and Tan 2001). Democracies generally seem to outperform non-democracies economically over the long term, and in some categories other than economic growth (Siegle et al. 2004). For a counter example, see Ross (2006), “Is Democracy Good for the Poor?”.

<sup>47</sup> On this issue, see Acemoglu and Robinson (2006), for example.

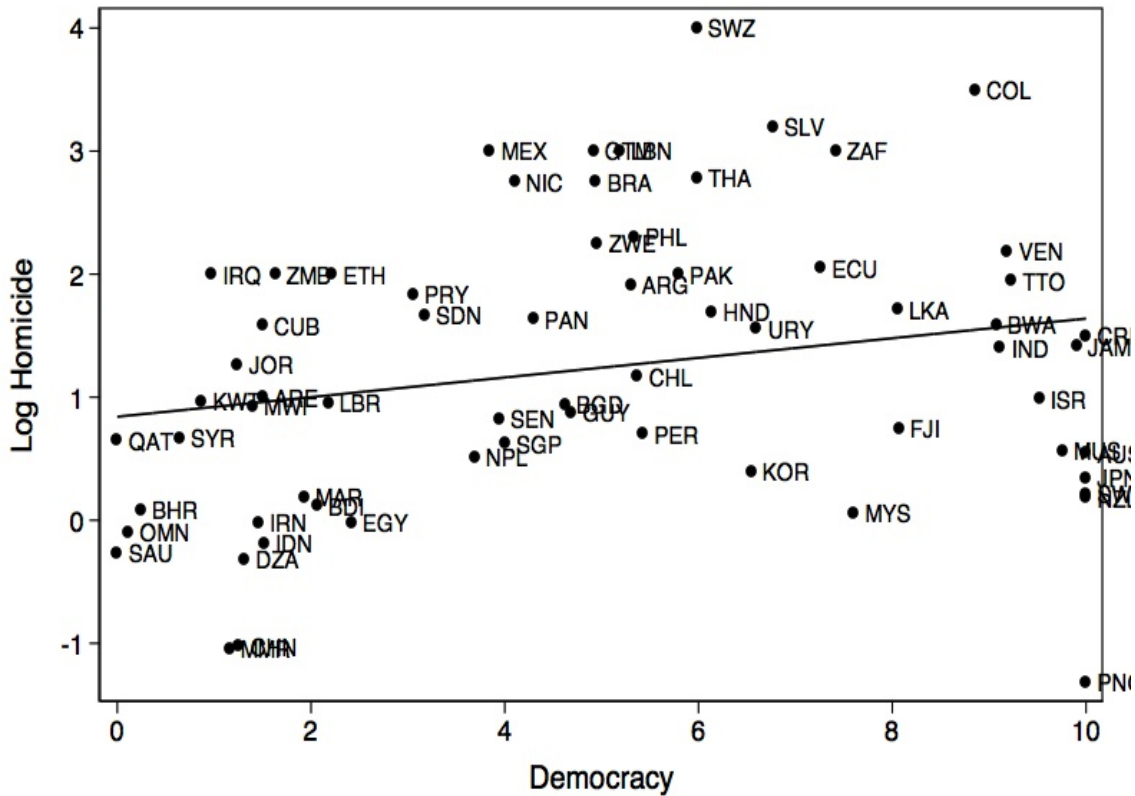
democratic.<sup>48</sup> Due to rich countries' relative equality, this relationship suggests there might be an interaction effect between democracy and income as it relates to violent crime. When an interaction variable is added there is a significant interaction between democracy and income with the expected negative sign. The bivariate relation between homicide and democracy in low and middle-income countries is shown in Figure 2.4. The fact that democracy might lead to less violent crime among rich countries while leading to higher violent crime among poor countries is interesting and deserves further attention. However, it is important to note that under authoritarian regimes the overall level of homicides committed on civilians might be just as high as under newly democratized poor countries because the state security forces can kill people under the auspices of imposing order.<sup>49</sup> Additionally, crime data is very difficult to obtain under authoritarian governments. Thus, definitional and data availability problems make comparing overall murder rates between authoritarian and newly democratic states.

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<sup>48</sup> Gini levels can be found at the World Bank World Development Indicator web page <http://data.worldbank.org/>, and democracy rankings can be found at Freedom House <http://www.freedomhouse.org/template.cfm?page=1>. Accessed October 7, 2011.

<sup>49</sup> For example, it is estimated that Colombia, which has been a democracy for most of the last fifty years, experienced about 61,000 "forced disappearances" committed by government forces. This was reported by COHA "Forced Disappearances in Colombia", November 11. Accessed November 2, [www.coha.org/forced-disappearances-in-colombia/](http://www.coha.org/forced-disappearances-in-colombia/). The actual Colombian government web site that keeps track of these figures is [www.caracol.com.co/nota.aspx?id=1539219](http://www.caracol.com.co/nota.aspx?id=1539219).

**Figure 2.4**  
**Homicide Rates vs. Democracy in Developing Countries**



Source: Fajnzlber et al (2002b), Ross (2001b)

The World Bank measure of corruption is significant at the .01 level, but with the opposite sign than expected.<sup>50</sup> The results, in Table 2.1, Model 3, show a 1 unit increase in the World Bank Government Indicator Corruption Index decreases the murder rate by about 51 percent. The results are scaled from -2.5 to 2.5, so a 1-unit change is 20 percent of the total range. This is about one standard deviation, and so represents a large change in corruption rankings. The results are consistent when the corruption variable is added with the core model only, in a bivariate regression, and when the variable is lagged by one time period, and show a

<sup>50</sup> Additionally, this variable has high levels of missing data due to limited data collection on the independent variables before the 1990s.

substantively significant decrease in murder rates. However, much of this large result is due to the scaling of the survey results.<sup>51</sup>

It seems intuitive that corruption levels should positively correlate with crime rates. The results are surprising since Treisman (2000; 2007) finds that levels of perceived corruption correlate negatively with economic development, which also correlates negatively with crime rates. Additionally, corruption could affect suggested deterrent factors such as police and judicial effectiveness. A plausible explanation for the negative connection between corruption and crime is that economic growth increases opportunities for corruption and the perception of corruption, while at the same time diminishing crime through the economic growth mechanisms. This suggests that white-collar crime has no affect on violent crime rates (but still has a high social cost). The fact that corruption is negatively associated with crime rates might also indicate that corruption and crime have different causes. At this point, the effect of corruption on crime is difficult to unpack and merits further research.<sup>52</sup>

*Weak State Model:* This model is intended to measure the affect of oil revenue, a commonly suggested cause of state weakness (Fearon and Laitin 2003), on the government's ability to control violent crime and thereby distinguish between lootable resources' deteriorating affect on state capacity and the degree to which it causes for high transaction costs, weak property rights enforcement, and illicit markets. The weak state model is comprised of the original core variables plus military spending per GNP, military personnel as a percentage of the labor force, tax revenue, and the value of oil and gas per capita. Results, except for oil and gas

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<sup>51</sup> For more information on how this variable is measured, see [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1682130](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1682130).

<sup>52</sup> If corruption and crime have different causes, it implies that corruption, as typically measured, has to do with legitimate business people bribing officials in order to make more money, and therefore has little or nothing to do with homicide. Another possibility is that higher corruption leads to lower reported crime rates because people don't report crime when they think criminals can buy their way out, or pay off police.

value, are generally consistent when each variable is added with the baseline model only, in a bivariate regression, and when the lagged by one time period. The results for the weak state model are shown in Table 2.2, Model 1. The most interesting aspects of this model are that oil and gas revenue per capita is not significant, military personnel as a percentage of the labor force is statistically significant at the .05 level, and civil war intensity appears to predict murder rates, albeit with a small effect. The fact that tax revenue is positively correlated to murder rates is somewhat of a mystery. It seems reasonable to expect that countries that are able to tax their citizens at a higher rate would have more money to spend on anti-crime measures and would have more impact on state apparatuses. However, in advanced democracies that collect taxes there may also be institutions in place that protect civil liberties and make it more difficult for the government to implement strong anti-crime policies.



**Table 2.2**  
**Weak State Crime Model**

	Model 5+	Model 6
GDP Growth	-2.000 (2.104)	-5.702 (2.148)***
Inequality	0.065 (0.014)***	0.046 (0.010)***
Education	0.000 (0.072)	0.007 (0.055)
Urbanization	0.007 (0.008)	0.003 (0.005)
Income	-0.047 (0.099)	-0.089 (0.101)
Tax Revenue	0.029 (0.010)***	
Oil and Gas Revenue per capita	0.000 (0.000)	0.000 (0.000)***
Civil War Intensity	0.000 (0.000)*	
Civil War (dummy)		
Cold War	-0.015 (0.063)	
Military Spending Per GNP	0.009 (0.036)	
Military personnel % labor force	-0.097 (0.052)*	
Food Exports		0.014 (0.004)***
Gem Producer		0.585 (0.119)***
Drug Producer		0.470 (0.153)***
Constant	-2.066 (1.103)*	-0.420 (0.725)
Groups	47	55
R-squared	0.691	0.353

Coefficients in the table report the estimated effect of a one-unit change in the independent variable on log mean war deaths. T statistics are in parenthesis. Estimations performed using STATA 10. \*p<.1; \*\* p<.05; \*\*\* p<.01 +GLS Regression was used in this model due to data limitations on the military spending and personnel variables. A Poisson regression was used as a general robustness check. Additionally, other variables were added to the core model using FGLS regression and results were consistent.

The results in this study show that an increase of 1 percent of military personnel as a percent of the labor force decreases the murder rate by about 10 percent. While military personnel as a percentage of the labor force is negatively related to and highly predictive of murder rates, military spending per GNP is not.<sup>53</sup> This may indicate that spending on big weapons systems is not as effective in lowering crime as government agents with small arms in the streets. This finding is consistent with the cross-national data on numbers of police per capita, and supports the claim that deterrence factors negatively affect crime rates in underdeveloped countries. The results for the Cold War dummy variable are also as expected. During the Cold War, repression appears to be higher and crime rates lower.

According to the weak state hypothesis, when the state becomes reliant on rents from fuel exports, the quality of bureaucracy and its ability to provide necessary services deteriorates (Fearon and Laitin 2003, 81). The alternative hypothesis is that resource production, once initiated, can become a source of funding for criminal gangs through theft of product and the extortion of companies and workers.<sup>54</sup> Either the resultant weak state or ability to predate natural resources might lead to higher crime rates. Results from the weak state model (Table 2.2, Model 5) indicate that there is little weak state effect directly related to hydrocarbon production. The fact that military personnel per capita is significant means that government's deterrent capacity in relation to violent crime may not deteriorate and can play some role in alleviating violent crime. Income and economic growth are insignificant in this model, which also seems to contradict the standard weak state hypothesis.<sup>55</sup> The distinction between lootable resource

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<sup>53</sup> Although higher military spending might also indicate a higher number of guns in a particular country, it does not necessarily measure the number of guns that ordinary citizens or potential criminals have access to, and is therefore probably not a good measure of the effect of guns on crime rates.

<sup>54</sup> Fearon (2004) and Ross (2004b) find this to be the case for insurgents.

<sup>55</sup> Fearon and Laitin (2003) state that income is just a proxy for state strength, but this is a vague definition of state strength and might actually measure something else.

predation and a weak state is difficult in the case of crime, but the Fearon and Laitin (2003) concept of a weak state lacks the specificity necessary for testing because it does not distinguish between military and judicial capacity, and a weak bureaucratic capacity.<sup>56</sup> The ability of the state to enforce property rights may play a special role in reducing crime, which specifically reflects on the credibility of contracts in the private sector and the security of investments.<sup>57</sup> When no single actor can ensure property rights, violent competition may ensue.

Civil war, measured by a dummy variable, is not a significant predictor of crime, while civil war intensity, using rates of average log combat deaths per year, is significant at the .1 level, as shown in Table 2.2, model 1. It is highly significant at the .01 level when added by itself to the baseline variables and in a bivariate regression. When lagged variables are added for both measures of civil war, results remain consistent.<sup>58</sup> In light of recent research (UNDOC 2007), it seems intuitive that civil war increases violent crime rates. However, given the commonality of causes between crime and civil war, the ability to detect an independent effect of civil war is difficult. The bivariate relationship between civil war intensity and murder rates is shown in Figure 2.5. Although the relationship is positive, there is a high amount of variation within the sample of cases. For example, Pakistan and Yemen had relatively low murder rates, while Russia and Colombia had high murder rates while undergoing civil wars.<sup>59</sup> A government only needs to decrease murder rates in the population under its control during a civil war to maintain public

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<sup>56</sup> For other interesting examinations of the weak state hypothesis, see Humphreys (2005), Ross (2006) and Weinstein (2007), especially pages 309-311.

<sup>57</sup> A second issue is whether the government itself is bound by the rule of law. This might be related to violent crime rates and would reflect in the level of democracy.

<sup>58</sup> Coefficients are difficult to interpret, but it is easiest to compare to hypothetical countries as a ratio for a baseline. If the murder rate ratio between country A and country B (or one country in two different time periods) is 1.2, a 1 percent change in the log death rate of civil war would increase murder rates by .001 percent. While this might seem like a small substantive effect, most civil wars vary greatly in intensity (Lujala 2009) and the largest are orders of magnitude more intense than the smallest. If civil war intensity increases by 100 percent in Country B, or the civil war in country B is twice as intense as country A, murder rates would increase by 1 percent.

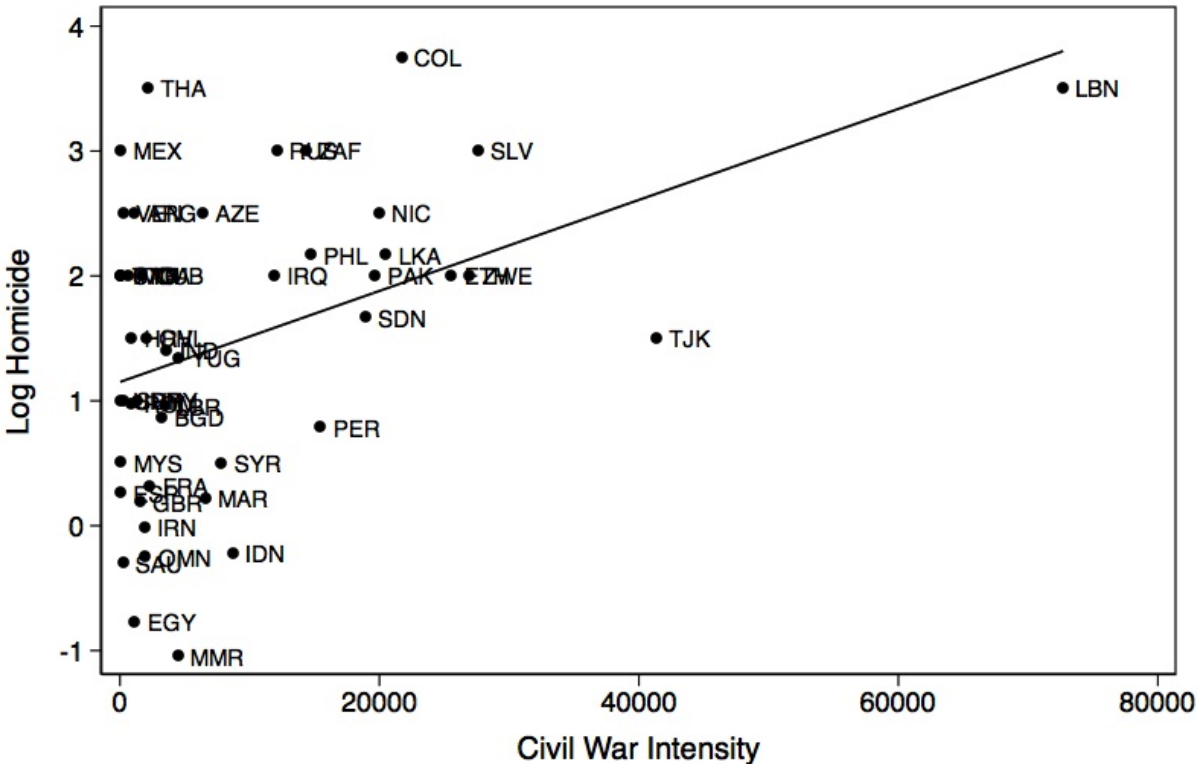
<sup>59</sup> Additionally, China had one of the most deadly civil wars in history shortly after World War II, but, if data can be trusted, probably has relatively low violent crime rates.

order. Insurgents must do the same in areas of their control if they wish to win public support. With two relatively strong combatants able to control civilians under their control, crime rates could remain low during civil war. Of course, the two sides might compete with each other to supply public goods in areas of contestation.<sup>60</sup> Local level crime data analyzed in conjunction with local level civil war intensity data can lead to further insights. It may be that the most important effect from civil war is a decrease in state capacity and the destruction of social and political institutions in specific locations, leading to higher crime rates.

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<sup>60</sup> It is difficult to obtain murder data from many countries engaged in civil war, and it is even more difficult to separate political violence from criminal violence. Many natural resource dependent countries also suffer from high incidents of civil war. However, as previously stated, it is estimated that only 15 percent of the murders that occurred in the 1990s in Colombia, the most violent period in recent history, can be attributed to civil war (Gaviria 1998, 9).

**Figure 2.5**  
**Homicide Rates vs. Civil War Intensity**



Source: Fajnzlber et al (2002b), Luajala, (2009)

## LOOTABLE RESOURCE MARKETS AND VIOLENT CRIME

As shown in Table 2.2, model 2, the effects of various kinds of natural resource production on violent crime rates matter. In fact, most of the countries with the highest murder rates produce at least one type of lootable resource and many produce multiple lootable resources, as shown in Table 2.3. This includes oil and gas, gemstones, narcotics, and a measure of agricultural exports. Results are consistent when the variables are added individually with the core model only and in bivariate regressions. I also run regressions in this model controlling for civil war, non-linear affects of income, and a Latin America dummy variable. Adding these

variables does not significantly change the outcome, and results are generally consistent.<sup>61</sup>

Classification as a drug or gem producing country, as well as the hydrocarbon value measure, are all significant at the .01 level. The results in this study show that going from a non-drug producing country to a drug producing country increases the murder rate by 47 percent. All else remaining equal and using the low baseline model of 10 murders per 100,000 per year, this would account for an increase of 470 homicides per year in a population of 10 million. Using the high baseline of 100 per 100,000, this would account for 4700 more people murder per year in a population of 10 million. The results in this study show that going from a non-gem producing to a gem producing country increases the murder rate even more, by about 59 percent. All else remaining equal and using the low baseline model of 10 murders per 100,000 per year, this would account for an increase of 590 homicides per year in a population of 10 million. Using the high baseline of 100 per 100,000, this would account for 5900 more people murder per year in a population of 10 million.

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<sup>61</sup> The Latin American dummy variable is positively significant and has a large substantive effect on murder rates, but the variables for gem and drug production remain significant at the .1 level, while their coefficients decrease by about 20 percent. The oil production value variable loses significance.

**Table 2.3**  
**List of Countries by Homicide and Resources**

	<b>COUNTRY</b>	<b>INEQUALITY</b>	<b>DRUG PRODUCER</b>	<b>GEM PRODUCER</b>	<b>OIL PRODUCER</b>
1	Colombia	High	Yes	Yes	Yes
2	Slovenia	Med	No	No	No
3	Turkey	Med	Yes	No	Yes
4	Guatemala	High	Yes	No	Yes
5	South Africa	High	No	Yes	No
6	Mexico	High	Yes	No	Yes
7	Bahamas	Med	Yes	No	No
8	Thailand	Med	Yes	Yes	Yes
9	Nicaragua	High	Yes	No	No
10	Brazil	High	Yes	Yes	Yes
11	Puerto Rico	High	No	No	Yes
12	Estonia	Med	No	No	No
13	Kazakhstan	Low	Yes	No	Yes
14	Latvia	Low	No	No	No
15	Philippines	Med	No	No	Yes
16	Republic of Moldova	Low	No	No	No
17	Zimbabwe	High	No	Yes	No
18	Venezuela	Med	Yes	Yes	Yes
19	Ecuador	Med	No	No	Yes
20	Belarus	Low	No	Yes	Yes

Source: Department of State International Narcotics Control Strategy Reports; Fajnzlber et al (2002b); Lujala (2009)

In this model, the results show that producing a dollar more per capita (in constant 2000 dollars) of oil increases the murder rate by about .014 percent. This is a relatively small substantive increase in murder rates. All else remaining equal, a 1 dollar increase leads to a .014 percent increase in murder rates, and 1.4 more murders per year using the low baseline model of 10 murders per 100,000 per year, and an increase of 14 murders per year using the high baseline of 100 per 100,000 in a population of 10 million. Interestingly, agricultural exports are significant in the joint model, but not when added individually. In the joint model, an increase of one percent in food exports leads to an increase in murder rates of 1.4 percent, or 14 people per year out of a population of 10 million using the low baseline and 140 per year using the high baseline. The change in murder rates associated with hydrocarbons, which are semi-lootable products and agricultural products, which are non-lootable due to low value per volume ratio, is much less than that of gemstones and narcotics. These results fit the major hypotheses and mechanisms suggested in this paper.

A real world example can help put this in more concrete terms. If a country made a large oil discovery, like that of the Tupi oilfield off of the coast of Brazil, we can calculate the increase in murder rates, all else remaining equal. The Tupi oilfield is estimated to provide 70 thousand barrels of oil per day in the end of 2011.<sup>62</sup> With an average price per barrel of oil of 80 dollars and a population in Brazil of 200 million, this would be equal to about \$10.22 per person.<sup>63</sup> Thus, all else remaining equal, the crime rate should increase by about .14 percent. Given Brazil's current murder rate of about 40 people per 100,000, a .14 percent increase leads to an increase of 5.6 murders per 100,000 people. With a population of 200 million, 5.6 more murders

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<sup>62</sup> This is according the Brazilian Ministry of Energy.  
[www.mme.gov.br/spg/notiicas/lista\\_destaque/destaque\\_0029.html](http://www.mme.gov.br/spg/notiicas/lista_destaque/destaque_0029.html)

<sup>63</sup> Price of oil is the average price per barrel in 2010 according to the U.S. Energy Information Administration's (EIA) at [www.eia.gov/dnav/hist](http://www.eia.gov/dnav/hist). The population data for Brazil comes from the CIA at [www.cia.gov/library/publications/the-world-factbook/geos/br.html](http://www.cia.gov/library/publications/the-world-factbook/geos/br.html).



per 100,000 leads to a total of 11,200 more murders in 2012.<sup>64</sup> Of course, the Tupi oil fields are offshore, and in this case, the mechanism would be an increase in transaction costs and decrease in government services (like security) due to a “Boomtown” effect, with the influx of poor, young, male migrants.<sup>65</sup>

Latin American is one of the most violent regions in the world. Is there something unique about Latin America that makes it especially prone to high murder rates? An examination of the evidence reveals important findings. First, Latin America is one of the most unequal regions in the world, possibly due to historical property distribution and institutional factors.<sup>66</sup> Second, most countries in the region are reliant on natural resource production for export. Several of the countries in the region, such as Colombia and Brazil, are significant producers of gemstones. Additionally, many countries in the region are involved in narcotic production and transportation. There are other regions of the world with a higher ratio of countries that produce gemstones, but few others that have so many countries involved in the drug trade. This is undoubtedly related to the fact that Latin America is so close to the U.S., historically the largest market for illegal drugs. However, Canada is much closer to the U.S. and has a relatively low murder rate, and Europe is also a large drug market while neighboring regions are not as violent as Latin America. Additionally, Latin America democratized in the 1980s, and many of these governments are ineffective at providing public goods to their population and lack control over

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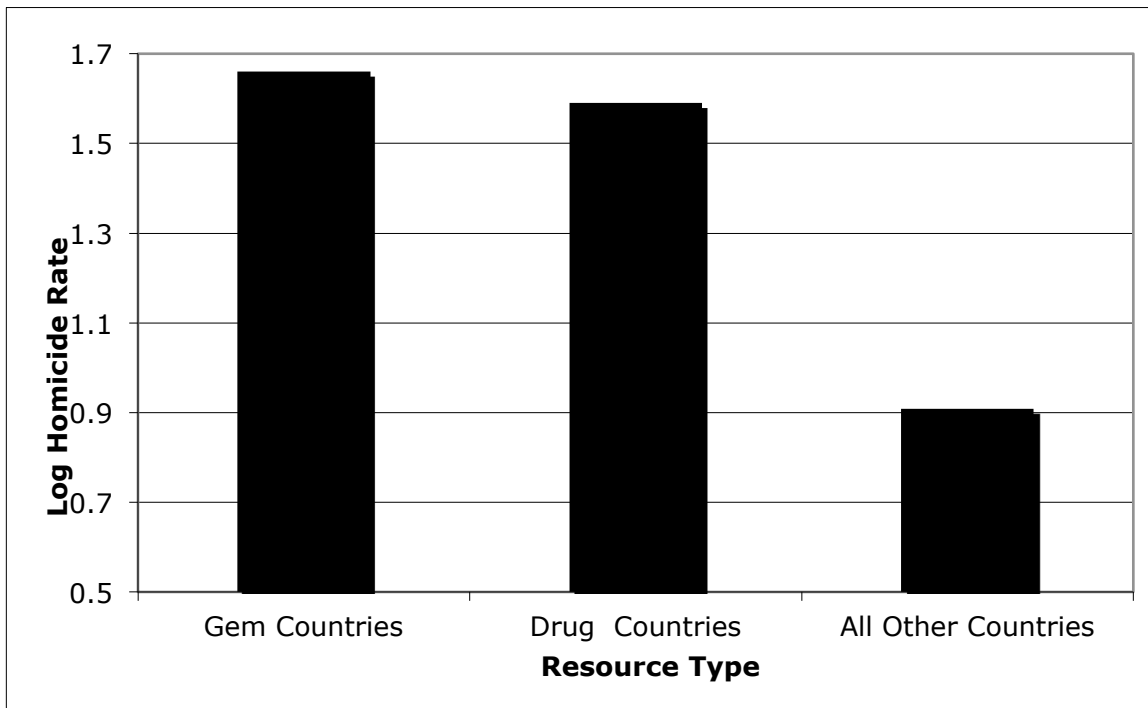
<sup>64</sup> Of course, realistically not everything will remain equal. Increased oil and gas revenue might change GDP growth and inequality, as well as other variables like police or military personnel. Income is insignificant in this model, so GDP per capita, even if increased, is not a factor. This crude example also assumes a uniform increase across the country, which will not be the case. Regions receiving the benefits (and costs) of oil exploration will be the ones affected.

<sup>65</sup> I would like to thank Claudio Ferroz for pointing this out to me in the case of Brazil. He feels this phenomenon is pronounced in the port of Macae, Brazil. Professor Ferraz also finds an increase in crime rates as oil royalties increase in certain Brazilian municipalities (“Does Oil Make Leaders Unaccountable? Evidence from Brazil’s Offshore Oil Boom”, Ferraz and Monteiro 2010), and he attributes this to a lack of government services, what I call a “Boomtown” effect.

<sup>66</sup> For studies of institutional development, see Sokoloff and Engerman (2000) or Acemoglu, Johnson, and Robinson (2001). I test several additional institutional and long-term historical factors, such as religion and legal system, and find either no effect or inconclusive results.

parts of their countries. Other than proximity to the U.S., it is not clear what unique characteristic Latin American has that might lead to these conditions above and beyond other regions of the world. The most promising explanation is that the high murder rates in Latin America are primarily the result of lootable resource production. The effects of lootable mineral resources on homicide rates seem to be distinct from other, non-lootable resources, such as agricultural products, as shown in Figure 2.6.

**Figure 2.6**  
**Mean Homicide Rate in Lootable Resource Producing Countries**



Source: Department of State International Narcotics Control Strategy Reports; Fajnzlber et al (2002b); Lujala (2009)

The results of this analysis indicate that the production of lootable resources can explain much of the variation in violent crime rates between countries, especially because the effects are substantively large and consistent with much of the research on the effects of fuel exports and

drug production on civil war (Collier and Hoeffler 2004a; Fearon 2005; Fearon and Laitin 2003; Ross, 2004a; 2006a). Their production and involvement in subsequent contraband markets can increase violent crime rates due to the nature of these specific economies.<sup>67</sup> Illicit markets tend to generate high levels of violence because disputes in illegal markets are outside of any legal framework and typically settled through violence (Kleiman 1993, 101-102). Additionally, contraband producers have incentives to be as equally well armed as competitors, increasing the amount of guns in a given area (Boyum et al. 2004, 335). These markets also tend to be located in poorer countries that have less state capacity, and are often endogenous to and exacerbated by civil conflict (Ross 2004b). The results from all statistical models are shown combined in Figure 2.7. While several variables have statistical significance, the variables for lootable resource production (along with the geographic variable for Latin America) have the largest substantive effect. In a country like Colombia, that is a drug producer, gem producer, and oil producer, the effects of these lootable resources on violent crime can be devastating. If Colombia was not already a producer of these products, the combined effect of these three industries in Colombia would increase murder rates by over 100 percent. The murder rate in Colombia in 2000 was about 100 per 100,000, and the population was about 40 million. Thus, it seems safe to posit that these industries contributed to a substantial number of deaths in what was the most violent country in the world at one time.

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<sup>67</sup> For example, the crack cocaine trade is thought to be largely responsible for the high crime rates of the 1980s in the U.S. (Wilson, 2004).

**Figure 2.7**  
**Outcomes of Common Statistical Predictors for Murder Rates**

MODEL	VARIABLE	SIGNIFICANT	MAGNITUDE
<i>CORE</i>	GROWTH	YES (-)	SMALL
	INEQUALITY	YES (+)	SMALL
	EDUCATION	NO	
	URBANIZATION	NO	
	INCOME	NO	
<i>SUMMARY</i>	POLICE PER CAPITA	YES (-)	SMALL
	DIVERSITY	YES (+)	SMALL
	LATIN AMERICA	YES (+)	LARGE
<i>GOVERNMENT QUALITY</i>	DEMOCRACY	YES (+)	SMALL
	INTERACTION – DEMOCARCY/INCOME	YES (-)	SMALL
	CORRUPTION	YES (+)	LARGE
	TAXES	YES (+)	SMALL
	INFRASTRUCTURE	YES (+)	SMALL
<i>WEAK STATE</i>	TAXES	YES (+)	SMALL
	OIL AND GAS REVENUE	NO	
	CIVIL WAR ONSET	NO	
	CIVIL WAR INTENSITY	YES (+)	SMALL
	MILITARY SPENDING PER GNP	NO	
	MILITARY PERSONNEL PER LABOR FORCE	YES (+)	SMALL
<i>PREDATION</i>	FOOD EXPORTS	YES (+)	SMALL
	OIL AND GAS REVENUE	YES (+)	SMALL
	GEM MARKETS	YES (+)	LARGE
	DRUG MARKETS	YES (+)	LARGE

Source: Department of State (1990-2000); Fajnzlber et al (2002b); Ross (2002); Lujala (2009)

There is a fine line between lootable and non-lootable mineral resources, and fieldwork and case study analyses can produce findings that counter common assumptions. Oil and natural gas are commonly thought of as non-lootable resources (Ross 2003). However, due to conflicts over production sites, the extortion of energy companies, and the existence of pipelines to transport the product to market, they might have qualities more similar to those of lootable resources. Deep shaft gems and precious metals might also behave like lootable minerals due to the characteristics of the production process. Miners can steal a significant amount of product from mine shafts, making it essentially lootable once they exit the mine and attempt to sell the product. Additionally, once the product is brought to the surface through the production process, a large amount is often discarded with waste materials and byproduct. This creates a situation equivalent to that of an alluvial gem field.<sup>68</sup>

The classification of transportation and production markets is important in explaining market environments because they may possess different levels of property rights enforcement and lootability of resources. The value per volume ratio, and thus the lootability, of drugs increases as it becomes refined and distributed. Thus, the market end of drug production is much more violent than the harvesting of coca and poppy plants. However, it is difficult to distinguish between countries involved in the transportation, production, and consumption of narcotics. Many countries, such as Afghanistan and Colombia, are self-contained markets comprising production, transportation, and consumption aspects. Additionally, increasing incomes in many developing countries, such as Brazil, contribute to larger domestic markets for illegal drugs.<sup>69</sup> As production of coca and opium are reduced in the original producer countries, production

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<sup>68</sup> This data was collected during interviews conducted by the author during fieldwork sponsored by the UCLA International Institute.

<sup>69</sup> For more information, see the U.S. Department of State Bureau for International Narcotic and Law Enforcement Affairs, "International Narcotics Control Strategy Report," March, 2011 (available for all years from 1996-2012), and the UNODC "The Globalization of Crime – A Transnational Threat Assessment," 2010.

might shift to new transportation and consumption countries, complicating the classification of countries into distinct categories. While only a few countries are self-contained markets during the timeframe of the statistical analysis of this study, this phenomenon will likely increase as developing world income rises.

The analysis of lootable resource markets and property rights enforcement can bridge the gap between common cross-national, socioeconomic correlations to crime and individual level analysis, thus helping to elucidate causal mechanisms. When the state is unable to supply public goods and the rule of law, competition between actors over profits increases, as does the prevalence of illicit markets. Lootable products increase transaction costs because the opportunity for extreme profits and theft are higher. Transaction costs are also affected by the specific nature of the resource markets, including monitoring costs, uncertainty, asset specificity, homogeneity of interactions, and prohibitions of the product. The “Boomtown” phenomenon surrounding resource production, specifically the influx of unemployed young males to already poor areas, increases these factors. When the cost of business is high due to inefficiencies in the market, violence is often perceived as a cost-effective method of solving disputes. Property rights, even if informal, help constrain actors in the production and transportation of valuable contraband and can reduce violence. However, they are difficult to enforce, especially for lootable products, without the help of a strong actor or accepted norms of cooperation. The conflux of these factors leads to an overall market structure that has a high propensity for violence.

Resources in and of themselves are not a cause of violent conflict; rather, it is this market structure in which resource markets are embedded that is the key factor. In order to get at a useful explanation of why lootable resources lead to higher rates of violent crime, it is necessary

to examine how lootable resource markets function and actually provide revenue to criminals. Instead of being related to the magnitude of production, they may be more related to where and how business transactions take place. It is the nature and environment of markets related to specific resources that can increase transaction costs. These factors can lead to violence, especially in the absence of a strong actor that can supply security.

## **CONCLUSION**

The puzzle I address in this chapter is variation in violent crime rates, both between countries and over time within a country. This topic is important to the study of political science and government in general for two reasons. First, the effects of violent crime are incredibly damaging to a society and severely hinder development. Second, there are few answers for the large differences in cross-national crime rates, and these differences are not fully explained by national-level socioeconomic factors commonly attributed to causes of crime. My study focuses on previously overlooked institutional variables in order to further our understanding of violent crime and advance causal explanations.

In the analysis of violent crime, this study does four things. First, I analyze the statistical correlations and mechanisms surrounding common theories of crime. The findings suggest that common socioeconomic variables, particularly GDP growth and inequality, do correlate with rates of violent crime within countries relatively well, however, the effect is surprisingly small. Consequently, these findings do little to advance cross-national explanations. Additionally, the mechanisms associated with these statistical correlations are not satisfying. Second, this study proposes several new factors, such as institutional variables and lootable resource production that might affect violent crime rates. Some of these, including type of past colonization and type of

legal system, had little or no affect on violent crime rates. However, other factors, such as the production of drugs and gems, have a significant affect on violent crime rates. The primary results of this analysis indicate that the effects of lootable resources are substantively large and explain a significant amount of the variation in cross-national crime rates. The findings also suggest that the effects of lootable mineral resources on crime are distinct from other resources, such as agricultural products.

Third, I highlight possible causal pathways connecting lootable resources to violent crime. In order to do this, the paper presents a political explanation for variation in crime rates based on state strength, the specific characteristics of markets, and property rights enforcement. When the state is weak and products lootable, crime rates should increase. Natural resource based contraband markets usually exist where the state is weak and provide the opportunity for rent extraction. Additionally, the locus of available options to combat crime depends on the state's ability to effectively allocate resources and implement anti-crime policies.

The specific properties of markets can shape institutions of extraction, including legality. Involvement in lootable resource markets that often result from mineral resource production can increase violent crime rates due to the nature of specific illicit economies. The more profitable illicit markets tend to generate high levels of homicide because disputes in illegal markets are outside of any legal framework and typically settled through violence. Property rights enforcement can bridge the gap between common cross-national, socio-economic correlations to crime (such as income and inequality) and individual level analysis, thus helping to elucidate causal mechanisms. Additionally, property rights, even if informal, help constrain actors in the production and transportation of valuable contraband and can reduce violence. This is because property rights reduce transaction costs, and therefore reduce levels of violence. Additionally, if



the state establishes property rights, it has the option to shut down or highly regulate that particular market.

Finally, I highlight two important paths forward in investigating the link between violent crime and property rights. The first is to more clearly outline the theoretical connection between property rights, lootable resources, and violent crime. The second is to test the hypotheses with imputation data and instrumental variables, which will demand both increased knowledge of social capital or social cohesion in communities and refined methodological techniques.

### **CHAPTER 3: THE THEORETICAL CONNECTION BETWEEN VIOLENT CRIME AND PROPERTY RIGHTS**

Violent crime is an important topic in the Political Science field because of its damaging effects on the economic, political, and social aspects of society. High levels of violent crime can lead to a breakdown of social order, and the resulting insecurity has a tremendous affect on the quality of life of individuals, as well as an incredibly high economic cost (Kleiman, 2009, 27).<sup>70</sup> One of the major shortcomings in criminal research is the lack of clear causal pathways between proposed causes of crime and explanations of cross-national variations in crime rates. In this chapter, I hope to overcome some of these shortcomings by describing several possible mechanisms between the production of lootable resources and variations in violent crime rates.

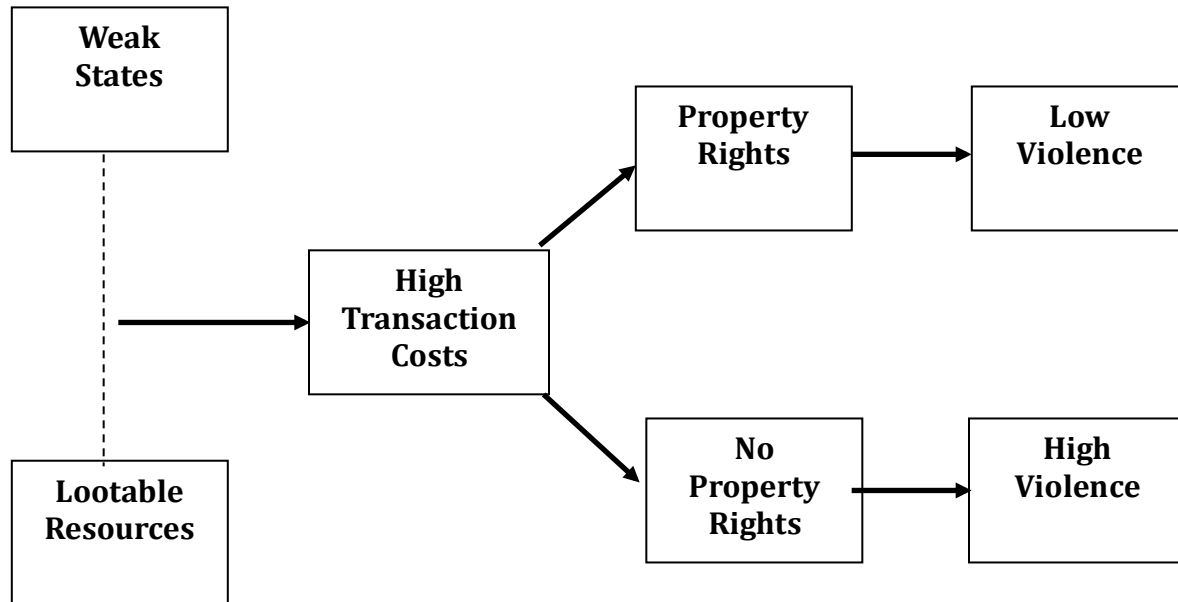
Building on existing theories of criminal behavior, transaction costs, and natural resource production, I develop a theoretical explanation for the correlation between property rights and violent crime. In the second chapter of my dissertation I analyze several hypotheses regarding the causes of variations in cross-national violent crime rates, finding a correlation between commonly proposed socio-economic explanations and murder rates. I also propose a new model of violent crime, finding a correlation between mineral resource production, such as narcotics and gemstones, and violent crime rates. I believe the correlation between mineral resource production and violent crime is due to the difficulty in enforcing property rights in the production of lootable resources. The enforcement of property rights reduces violent crime rates by decreasing transaction costs. My explanation for some of the variation in violent crime rates is important because it advances the field of research on violent crime by offering an explanation for the variation in crime rates between countries and new possible causal mechanisms involved.

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<sup>70</sup> The cost might be as high as one trillion dollars, according to Kleiman (2009, 2).

In this chapter I more clearly elucidate the causal mechanisms at play between crime, transaction costs, and property rights. Following a brief review of scholarship on the analytic approaches to the study of violent crime, I describe in more detail the key conceptual underpinnings of my theory as the relationship between state strength, loutable resources, property rights enforcement, criminal organization, and social cohesion in communities. First, I situate my research in the context of previous scholarly categorization of violent crime in both social and political contexts. Second, I explain the structure of loutable resource markets, specifically focusing on why the properties of certain markets, including lootability, rents, and prohibitions, can make them more prone to violence. Third, I discuss property rights enforcement, with a special focus on explaining how they can decrease transaction costs and levels of violence. Fourth, I examine how criminal organizations sometimes overcome transaction costs and establish property rights in their areas of control, and how this affects levels of violence. Fifth, I discuss how social cohesion in close-knit communities can decrease levels of violence due to their ability to cooperate and enforce property rights. Below (Figure 3.1) is a diagram that illustrates my theory, which I then elaborate on in the following sections.

**Figure 3.1**  
**Theory Overview**



### **Categorizing Violent Crime: Context for Theory**

Before delving into the theoretical relationship between transaction costs, property rights, and violent crime, it is necessary to place the study of violent crime in the appropriate analytical context. Violent crime is only one measure of violence in society, and murder, or intentional homicide, is one type of violent crime. Homicide is generally considered the best measure of the overall level of violent crime in society for two reasons. First, homicide is consistently categorized across countries. Second, other violent crimes, such as assault, armed robbery, and rape, often correlate with homicide rates (Lynch, 2004). However, it is difficult to relate violent crime rates to values or beliefs regarding violence in society. For example, the fear of being a victim may or may not reflect the actual threat of violent crime, and the behavior modification resulting from this fear of crime can reduce the incidence of crime even if the actual threat is still

high. Although societal constraints on violence are probably the single most important factor in inhibiting violent behavior, social attitudes regarding violence are difficult to measure and there are many other factors that can affect violent crime rates. Focusing on murder rates as the unit of measurement simplifies the conversation and makes quantitative analysis easier by allowing researchers to focus on one measure.

Considerable advances have been made in the study of violent crime, especially crime in the U.S., over the last several decades. Recently, there is renewed focus on crime in other parts of the world due to rapidly increasing crime rates in some regions and concern with globally connected contraband markets. It helps to create a simple topology of the study of crime in order to understand the theoretical foundation on which my analysis is based. I divide the study of violent crime into transnational, individual-level, society-level, and organizational areas of analysis.<sup>71</sup> The level of analysis and scope of research often dictates which aspect to focus on. The analytical framework I use to form my theory of violent crime and property rights is based on the synthesis of individual level incentives (often called the economic model of crime), regime capacity or state strength, and the organizational aspects of crime. Although there is significant overlap, focusing on these concepts simplifies the theoretical basis of my analysis. I do not directly cover the international aspect of violent crime in this chapter due to space limitations. However, leaving out transnational aspects of crime does not affect the analysis because international linkages between criminal groups serve to exacerbate internal domestic phenomena, as opposed to introducing entirely new phenomena.

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<sup>71</sup> This is how McClintock (1998) divides the study of civil conflict, and is also applicable to the analysis of violent crime.

### *The Economic Theory of Crime – Individual Motive*

In my analysis of the variations in crime rates between countries and regions, I use a general rational actor assumption as a starting point for my theoretical analysis, similar to other studies of crime (Einstadter et al., 1995; Kleiman, 2009; Levitt, 2002). This analytical framework is important because it is the underpinning of my theories of violent crime. Any rational actor model should start with the tradeoff between economic opportunities and the cost and probability of punishment. As outlined in chapter two, the economic perspective of crime uses an individual-level, cost-benefit analysis of criminal behavior, drawing on Becker's (1968) study. Criminal behavior is explained by the same market conditions under which other, "normal" market behavior functions. The benefit, minus the opportunity cost (foregone income from legal labor), is weighed against the cost, or penalty, times the probability of being captured. Following this line of reasoning, Cook (1986) models criminal behavior with supply and demand curves. Demand is affected by the amount of plausible targets and the deterrent mechanisms at their disposal, while supply is affected by the amount of potential criminals. Government policies can reduce supply through social services that make crime more cost prohibitive and reduce demand by creating a deterrent threat.<sup>72</sup>

Although this economic model of crime explains large trends in criminal behavior, two basic critiques of it exist. First, a significant number of criminals do not adhere to strict rational actor assumptions on an individual level (Kleiman, 2009, 71-82).<sup>73</sup> Second, there is at times a disconnect between statistical proxies for individual incentives, such as economic growth (used

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<sup>72</sup> As stated in chapter two, deterrence is the concept that undesirable behavior can be affected by the threat of punishment (Levitt, 2004). What this specifically entails depends on the unit of analysis, but in the context of this study can include any expected punishment from government agents.

<sup>73</sup> For example, a cost-benefit analysis of burglary in the United States reveals that in 2008 burglary paid approximately \$22 per day in prison (Kleiman, 2009, 69). Such a low payoff indicates that burglaries are not worth the penalty, and yet they still occur in large numbers.

to estimate opportunity costs), and cross-national crime data, as highlighted in chapter two. For example, the U.S. experienced some of its highest violent crime rates while undergoing periods of very solid economic growth in the 1960s and 1970s, and relatively harsh sentencing laws in the U.S. during the 1980s (which might be expected to raise the cost of punishment, coincided with the highest violent crime rates in the developing world (Lynch, 2004). In other countries as well, such as Colombia, the common economic models of crime fail to explain variations in trends over time and between regions (Thoumi, 2003).

These critiques might cast doubt on the efficacy of a rational actor model of crime; however, there are reasons to believe it is still a useful tool for the study of criminal behavior. First of all, several small adjustments to the rational actor assumption, such as introducing the possibility of inaccurate risk perception, can help reconcile some of the observed behavior to the actual outcome of cost-benefit analysis.<sup>74</sup> In addition, the fact that every criminal does not always adhere to a strict cost-benefit analysis when making a decision about criminal activity does not mean that we should completely reject the rational actor model as a useful tool. As long as many criminals make rational calculations, an argument based on individual incentives will explain some of the variation in crime rates.

Second, as illustrated in chapter two, while still using a rational actor assumption, there are other factors that help explain the observed variation in cross-national crime rates that are often left out of empirical studies that claim to test economic models of crime. These include the presence of illicit markets, which can affect the profits to be made from crime, and state strength,

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<sup>74</sup> Shortcomings of the rational actor model can be classified into four general categories; peer group perception, risk perception, uncertainty evaluation, and effects of timing of and fixed costs of punishment. For an excellent discussion of the shortcomings and a justification of the rational actor assumption, see Kleiman (2009, 71-82). As Kleiman states, his analysis also excludes any innate pleasure from committing a crime, such as the satisfaction of exercising power over someone, as explained by Katz, "Seductions of Crime: Moral and Sensual Attractions in Doing Evil (New York: Basic Books, 1988).

which influences the opportunity cost of crime and the likelihood of being caught. Furthermore, evidence does indicate that economic variables, such as GDP growth and inequality, do explain a good deal of the variation in crime rates cross-nationally (Fajnzylber et al. 2002a, 1324, 1343; Fajnzylber et al., 2002b, 26), and punishment rates in the U.S. do affect the variation in crime rates over time (Cook, 1986; Kleiman, 2009; Levitt, 1997; 2002, Wilson, 2004). The response of criminals to changes in the cost of punishment and the benefits and opportunity costs associated with crime, and the general correlation to national level statistical proxies for these element in individuals' utility calculation, reflects a general adherence of crime to the laws of supply and demand. Thus, in describing broad trends in criminal behavior, the rational actor model is a useful tool. As I illustrate in the following sections, state strength, the presence of specific types of markets, and criminal organization can explain a significant part of the remaining variation in cross-national crime rates.

#### *The Political Opportunity for Crime – Regime Capacity*

The ability of the state to enforce the rule of law within its borders, including property rights, increases the likelihood of punishment for criminal behavior and the availability of opportunities in the legal economy, while decreasing the availability of profits to be made in contraband markets. The theories that focus on regime capacity, or state strength, are based on research by Huntington (1968), Skocpol (1979), and Fearon and Laitin (2003), and stipulate that the state allows an opening for violence to occur due to poor bureaucratic management or the lack of capacity to enforce deterrent policies. According to these theories, violence is more likely when the state suffers an exogenous economic shock or external conflict (Tong, 1991, 21), or becomes dependent on natural resource production (Fearon and Laitin, 2003), which decreases state capacity. Whether by exogenous shocks, natural resource dependence, or historically weak



institutions, bureaucratically or militarily weak states should see higher levels of violence. This might be especially true when states see dramatic changes in key market structures after the introduction of lovable resource markets.

The ability to define and measure state strength has remained elusive.<sup>75</sup> The locus of available options to combat crime depends on the state's ability to allocate resources and implement specific deterrent policies, including the ability to deter the formation of contraband markets. The state is also responsible for social services that might address the "root causes" of crime. However, while services such as education probably have some effect on levels of crime (if it is a quality education in a safe school), it is a much more indirect effect than police or prison funding, and very difficult to measure (Kleiman, 2009, 32).<sup>76</sup> In addition, the state's ability to provide any social services is dependent upon the ability of the government to provide security and an effective rule of law. In this study the state's capacity is mostly concerned with enforcing the rule of law in order to deter violence.

The state is responsible for supplying the rule of law and other public goods that allow business to take place. Property rights enforcement is a key part of the state's ability to enforce the rule of law and a key distinction between strong states and weak states. The enforcement of property rights includes the ability to successfully regulate or prohibit products deemed to have a high social cost, such as narcotics, and eliminate or downsize corresponding illicit markets.

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<sup>75</sup> On the parsimonious end of the measurement spectrum, some studies have measured state strength by using only national income (Fearon and Laitin, 2003), while others have used more nuanced definitions that try to measure state penetration into society (Skocpol, 1979). Both types of measures of state strength have merit; however an improved definition can aid in the analysis of crime.

<sup>76</sup> If the purpose is strictly reducing crime rates, it seems to be more efficient to increase police and prison funding in the U.S. This is partly due to the lack of clear understanding on the relationship between education levels and crime, as well as the fact that, at least in the U.S., the education budget in most U.S. cities is many times that of the police budget.

When the state is able to enforce property rights, we typically see little violence.<sup>77</sup> However, in developing countries the state often lacks a monopoly on violence over much of its territory, and other actors step in to fill this void, usually resulting in violent competition.<sup>78</sup> The ability of individuals and organizations to exist outside of the reach of the state apparatus depends on the relative capabilities of actors, and the level of cooperation between them. An organization's ability to cooperate with the state often depends on the degree to which they are politically, as opposed to economically, motivated. When these actors compete with each other, violence tends to be high. Thus, the private formation of property rights is the result of a potentially violent negotiating process between actors of varying levels of capability (DeSoto, 2000; Umbeck, 1981).

It is important to note that the ability to enforce property rights makes no distinction between democratic and authoritarian governments, although the enforcement of property rights might be an important component of democracy. A strong authoritarian government might be able to enforce property rights among citizens while lacking checks on its ability to confiscate property from citizens. This is a critical distinction, but my dissertation is more concerned with crime among citizens or against the government agents, not by the government against citizens. However, it is probably the case that as countries transition to democracy, the volume of market transactions increases before an effective system of property rights enforcement is established by the new government (Schvarts, 2001, 17-20).<sup>79</sup> Thus, as demonstrated in chapter two, democratic

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<sup>77</sup> At times, such as during the crack epidemic in the U.S. during the late 1980s, rents could be so high as to make crime worth the cost at times, even within a strong state. Additionally, the state may not be able to implement policies to curb crime, even when strong enough to do so due to the structure of government and society, especially if there is a priority placed on individual liberties.

<sup>78</sup> Private military actors are often a way of outsourcing the monopoly of violence by the state (Reno, 1998, 70), but these organizations often become powerful enough to challenge the state and resist its control.

<sup>79</sup> This is just one of many possible problems when analyzing the effect of regime type on crime rates. Authoritarian governments might rule over countries with very low levels of violent crime, however high levels of state perpetrated violence. This is a definitional problem, but one that must be resolved before overall levels of violence

transitions could have an effect on violent crime rates. However, the focus on this chapter is the relationship between the enforcement of property rights in loutable resource production and levels of violent crime, and regime type does not directly factor into this analysis.

### *The Organization of Crime*

The study of organized crime has received much less attention than the study of individual crime, with a few exceptions, such as Gambetta (1988; 1993), Leeson (2007), Levitt and Venkatesh (2000), and Reuter (1983). Similar to actors in other markets, criminals may form organizations in order to increase capabilities for both security and profit maximization due to the economies of scale in the production of force. Much of the current literature on organized crime does not directly address the issue of hierarchy in organization, property rights, or the variation in frequency or intensity of violence. I use an economic analysis of criminal organization, similar to that which Weinstein (2007) uses to analyze insurgency and Weber (1997) uses to analyze international security relations in order to address these issues and improve our understanding of the connection between violence and property rights.

I define organized crime as “any long-term arrangement between multiple criminals that requires coordination and involves agreements that, owing to their illicit status, cannot be enforced by the state” (Leeson, 2007, 1052). I add to this that in a weak state, even licit markets may lack contract and property rights enforcement. According to rational actor assumptions, organized crime, similar to individual crime, is the outcome of a cost-benefit analysis, which includes possible financial rewards and possible punishments (Einstadter et al., 1995). Criminal organizations, therefore, fit into concepts and categories of crime previously discussed.

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between regime types can be easily compared. In addition, crime statistics are very difficult to obtain in authoritarian countries. Not only are these countries usually poor or middle income and lack the infrastructure for keeping records on homicides, they also have an incentive to limit access to data and are more easily able to do so than democracies.

However, the standard market explanations for crime do not explain the formation of criminal organizations, as will be highlighted in subsequent sections.

The formation of organizations plays a fundamental role in the connection between violent crime and property rights. The production of violence responds to economies of scale, and a monopoly of force is required to protect property rights within areas of control and construct agreements organizations in close proximity (Schvarts, 2001, 10).<sup>80</sup> Thus, the rewards to a criminal firm are greater if they can monopolize the use of violence and develop a system of property rights enforcement within their territory. However, property rights agreements outside of an official legal framework (or within a weak state) are inherently unstable, and when one actor obtains an advantage in the technology of violence or technology of production (with which an actor can buy or hire the capacity for more violence), the arrangements are likely to break down. The instability is especially marked in lootable resource markets due to the fragile market institutions and difficulty in enforcing property rights. Figure 3.2 below helps lay out various aspects of the relationship between transaction costs and organizational costs. The highest levels of violence should be in markets with high transaction costs and high organizational costs. Note, however, that even in the presence of highly organized crime, the potential for episodic inter-group violence can be high. I examine criminal organizations in more detail in the following sections.

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<sup>80</sup> When referring to internal governance, and not civilians within zones of influence, the monopoly of force is used to primarily punish defectors, independent of control of territory. An example of this is the organizations of pirate ships during the seventeenth and eighteenth centuries. Pirates were organized, but not in the business of protection or seeking a monopoly of force over a given area. However, they did need to organize efficiently to maximize profit, limit internal dissent, and minimize predation by leaders. They did this through a democratic system of self-governance, including checks and balances and constitutions. Pirate leaders also had a monopoly of force on their ships in order to enforce a system of property rights to divide the loot (Leeson, 2007, 1051). Thus, even when a monopoly of force over a given territory is not a key goal, the enforcement of property rights is still important.

**Figure 3.2**  
**Organization Costs vs. Transaction Costs**

	Low Organizational Costs	High Organizational Costs
Low Transaction Costs	(Periodic Low Violence) Organized Violence, Low Threat	(Constant Moderate Violence) Random Violence, Moderate Threat
High Transaction Costs	(Periodic High Violence) Organized Violence, High Threat	(Constant High Violence) Random Violence, High Threat

### *Social Capital and Violent Crime*

Social capital helps reduce crime rates by decreasing transaction costs and helping organizations enforce property rights. Social capital is often left out of standard explanations of the study of crime and the formation of organizations. In fact, the failure to account for social capital may be an important part of the failure of standard neoclassical market explanations, especially in regards to the formation of organizations (Greif, 1989, 865). Social capital is defined as “The set of rules, norms, obligations, reciprocity, and trust embedded in social relations, social structures, and society’s institutional arrangements that enables members to achieve their individual and community objectives” (Lederman et al, 2002, 509). Social capital, usually measured by levels of interpersonal trust, is shown to reduce violent crime rates in several studies (DiIulio, 1996; Lederman et al., 2002). However, these studies examined the effect of society-wide levels of social capital and not the specific role of social capital in organizations. I bring in a new analysis that relates social capital to the formation of organizations in order to help further clarify mechanisms involved when analyzing variations in

violence, especially in lootable resource markets. I stipulate that social capital and cohesion in organizations can help enforce property rights and decrease violent crime by decreasing transaction costs.

The necessarily brief overview provided in this section attempts to place the study of violent crime in a broader theoretical context of violence, governance, organization, and social capital. Violent crime is one specific type of violence in society and can be analyzed within the same analytical categories as other types of violence. The factors involved in analyzing violent crime are complex; however, focusing on the individual level factors that provide motive, regime capacity that affects the opportunity costs, and the organizational - communal aspects necessary to respond to economies of scale, simplifies the analysis into three distinct categories. In the following sections I further examine the concepts outlined above and aspects of lootable resource markets, transaction costs, and property rights that contribute to the unique market environment.

### **Characteristics of Lutable Resource Markets**

In order to establish a link between property rights and violent crime, it is necessary to examine how the specific market environment can make property rights more difficult to enforce and lead to violence. As previously discussed, the level of violence generally depends on the strength of actors involved, including the state. However, it also depends on the nature of the market environment in which actors participate, which is related to the properties of the specific product, including lootability, and legality (Snyder, 2006, 952). These factors, in turn, affect monitoring and enforcement costs, thus increasing the costs of doing business (transaction costs) in resource markets. High transaction costs mean that violence becomes a more attractive option.

#### *Lootability*

Lootability makes property rights harder to enforce and interacts with the state's ability to provide the rule of law, especially in the case of prohibitions. I define lootable products as those that "are high in value and have low barriers to market entry" (Snyder, 2006, 946).<sup>81</sup> The type of commodity involved influences many aspects of the market formed, including relations with the government (Andreas et. al, 2006, 643). The characteristics of a market lead to a unique market environment, with its own institutions. Snyder (2006, 952) calls the interaction of the market environment with state capacity to enforce agreements "institutions of extraction" for individual markets. The most important aspects of any institution of extraction are the formation and control of property rights, which can be supported by a state, non-state actor, or community. However, lootable products, through spillovers, ease of theft, and by facilitating black markets, increase the cost of doing business and make property rights enforcement difficult. These problems are exacerbated when no single actor has a monopoly of force. For example, the very high value to volume ratio, or lootability, of cocaine (Thoumi, 2002, 105) contributes to its more damaging effects and generates higher levels of violence than the marijuana industry. Similarly, many low value products (such as agricultural products) are easily transportable, but do not produce the same dynamics as high value products. The high profits, low barriers to entry, and ease of smuggling of lootable products create an uncertain business environment with negative consequences for many aspects of society (Thoumi, 2002, 107). Thus, lootable resource markets have a unique dynamic, generating high transaction costs that can lead to increased levels of violence.

### *Rents*

Although I define lootable resources as those from which actors can extract rents, it is still worth discussing the aspect of rents in resource production. Rents are defined by Ross

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<sup>81</sup> Another way to say this is lootable products are those with a high value to volume ratio (Thoumi, 2002).

(2001a, 10) as “Supernormal profits in excess of the normal cost of extracting or producing a good, which includes normal profit.” He then goes on to specify three different types of rents; scarcity rents, differential rents, and monopoly rents. Scarcity rents come from control of a resource that is in demand and has inelastic supply curves. Differential rents come from the control of resources that are of unusually high quality or low extraction costs. Monopoly rents come from a monopoly or oligopoly supplier. The type of rents extracted depend on the supply and demand, but lootable resource markets can exhibit any combination of these three rent types. These resources cannot typically be reproduced and their value is not competed away through normal competition. The decision to divide rents peacefully or through violence depends on transaction costs in the market (Anderson and Hill, 2003, 12-14). Thus, the rents accrued during the booms common in natural resource markets should increase transaction costs and levels of violence.

### *Prohibition*

Legality is an important distinction that affects the type of market environment formed, typically making products scarcer and increasing their value.<sup>82</sup> Prohibition decreases the size of the legal market, but in so doing, it creates a black market (Kleiman, 1993, 102).<sup>83</sup> Black markets include both the criminalization (smuggling) of legal products as well as prohibitions on the sale of products (Andreas et. al, 2006, 643). Illicit markets are similar to legal markets, but the standard economic relationships of supply and demand interact with the properties of individual products and prohibitions to create a unique market environment (Kleiman, 1993, 104-107, 115).

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<sup>82</sup> Prohibition essentially acts as a tax on the prohibited product, and taxation is the best way to decrease consumption of a product (Kleiman, 1993, 104-115).

<sup>83</sup> According to Kleiman, the debate on prohibition should not center on whether it “works,” but whether another set of rules would produce a better mix of outcomes (Kleiman, 1993, 102).



Most importantly, prohibition increases transaction costs due to the lack of enforceable contracts or third party oversight in illicit markets.

Illicit markets usually lead to increased levels of violent crime. The reason that illicit markets can engender violent crime because normal business disputes are often settled with violence (Kleiman, 1993, 60-61). According to Gambetta (1993, 129-134) the difficulty of contracting and the uncertainty of enforcing property rights increase the need for a use of force. It is not necessary for a product to be illegal to generate high transaction costs and violence, however, illegality does increase transaction costs and levels of violence. A prohibition can dramatically alter a market and the resultant black market increases both the danger and profitability of lootable resource production.<sup>84</sup> Additionally, legal enforcement and the economies of scale in the production of violence incentivize the formation of organizations in contraband markets (Gambetta, 1993, 129-134; Kleiman, 1993, 70, 101, 144-149).<sup>85</sup> Thus, state decisions about legality can directly affect levels of violent crime.

Although prohibitions make violence more likely, illegal markets do not necessarily lead to high levels of violence. Snyder and Duran (2009a) find that when the state is complicit in contraband production or shipment, violence can remain low because the government has the same enforcement responsibilities in the formally illegal market as it does in legal markets, reducing transaction costs. Afghanistan in the late 1990s, Bolivia, Mexico before 2006, and Peru are examples of countries that produce illegal narcotics with relatively low levels of violence surrounding drug production (Andreas, 2004, 650).

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<sup>84</sup> Many activities that are illegal, such as cocaine and heroin trading, were legal in the early 1900s and became illegal fairly recently (Andreas, 2004, 647; 2006, chapter 1). The prohibition of these products probably decreased social costs but increased violence and policing costs.

<sup>85</sup> “Syndicatelize” might be more appropriate, as the cartels cannot really control global production and price levels (Thoumi, 2003, 6, footnote 5).

In Afghanistan, the Taliban controlled the heroin trade, making it de facto legal, and supplying some level of public goods. In Bolivia and Peru there is large scale production of coca leaf, but not coca paste. Coca leaf in its natural form is not a lootable product because its value to weight ratio is fairly low. Growing coca leaf is also legal in Bolivia, demonstrating that government decisions about prohibitions affect levels of violence. The Sendero Luminoso managed coca production in Peru during certain periods, allowing them to supply public goods and reduce violence. Additionally, the cocaine markets are in Colombia, where the refinement and distribution takes place. Finally, Mexico did not transport high levels of cocaine until the late 1990s, and violence has steadily increased in areas of drug transportation over this time. It is only when drug gangs began to seriously threaten the power of the state that the central government, encouraged by the U.S., began to combat them in earnest. Additionally, the existing market arrangement between the dominant political party of the time (the PRI) and the drug gangs broke down due to the electoral victory of the competing PAN party (Synder and Duran, 2009b). So, while prohibition does not guarantee higher levels of violence, especially when the state is complicit, it usually does increase transaction costs and therefore levels of violence.

In summation, lootable resource markets tend to have high transaction costs and facilitate informal markets that usually lead to higher levels of violence. Lootable products, due to their high value and transportability, make enforcing property rights more difficult and facilitate illicit and informal markets due to the large profits and ease of theft. Prohibitions by the state exacerbate these phenomena, which are even greater in a weak state. The level of violence surrounding prohibited products or services is related to “the nature of the commodity, ease of production, concealment and transport, the availability of legal substitutes, and nature and levels of consumer demand” (Andreas, 2004, 648). These illegal and criminalized markets of lootable

products generate a unique business environment that can have negative long-term effects on society (Thoumi, 2002; 2003). Perhaps the most important negative consequence is the higher levels of violence corresponding to lootable resource production.

### **Property Rights Enforcement in Relation to Transaction Costs**

The increased costs of business lead to violence when business disagreements are costly or difficult to settle by other means. Property rights can reduce transaction costs and are an important part of a market's structure. Thus, the connection between violent crime and resource production seems to be due to the high transaction costs and the difficulty in forming and enforcing property rights in these markets. Transaction costs are especially high in the absence of a strong state.

#### *Transaction Costs in Mineral Resource Markets*

There are several specific market factors that affect transaction costs. I use Williamson's (1985, 20-21) definition of transaction costs as the "ex ante costs of negotiating and safeguarding an agreement... [and the] ex post cost of haggling... set up, and running costs of government structures ... and "bonding" costs of effecting secure commitments."<sup>86</sup> The characteristics that contribute to transaction costs are uncertainty (Williamson, 1985, 59-60; 1981, 1549), asset specificity - the degree to which transaction specific investments are incurred (Williamson, 1979, 239; 1981, 1548; 1985, 54; Weber, 1997), the frequency of transactions (Williamson, 1979, 256-249; Weber 1997, 330),<sup>87</sup> and informational asymmetries between buyer and seller (Williamson, 1973). To this I add the lootability and legality of resources. These six factors are generally

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<sup>86</sup> This is the same definition that Weber (1997, 328) uses in her paper on international alliances, and is adaptable beyond the purely economic sphere.

<sup>87</sup> In the transaction cost literature, the frequency of transactions seems to be synonymous with the homogeneity of transactions in the marketplace. The main concept is the number of similar business transactions that one undertakes lowers transaction costs.

present to high, but varying, degrees in lootable resource markets and increase monitoring and enforcement costs.

Although every market is unique, the general factors relating to transaction costs are reasonably consistent across most types of mineral, and especially lootable, resource markets. There is a high degree of uncertainty, including price and supply volatility, in mineral resource markets (Ross, 1999; 2001a; Sachs et al., 1995). Additionally, assets in natural resource markets tend to be specific (Ross, 2001a, 5), and cannot be shifted easily to other locations or industries.<sup>88</sup> The frequency and homogeneity of transactions varies greatly depending on the mineral, the date, and the technology used in extraction and transportation. This is especially true in the informal markets, where buyers and sellers change rapidly depending on a host of factors.<sup>89</sup> Information asymmetries are also quite common, and are probably one reason that the prices of raw production material are fractions of the price of the refined products sold at retail. Lootable resources in particular should increase many of these factors because of the ease of market entry (Snyder, 2006, 946) and spillover of lootable products, which both increase monitoring and enforcement costs. Additionally, when a product is illegal, contracts are not an option and the difficulty of enforcing an agreement increases (Kleiman, 1993).<sup>90</sup> The degree to which these factors are present in any specific market should determine transaction costs.

Transaction costs influence levels of violence. As the cost of doing business and resolving disagreements becomes higher, violence becomes a more cost effective option.

Transaction costs are present in any market; however, illegal market transactions and otherwise

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<sup>88</sup> The lack of “bequeathability” is also a cause of conflict (Snyder, 2006, 954). It essentially makes resources non-transferable between actors, and is similar to asset specificity discussed by Williamson. This should increase transaction costs.

<sup>89</sup> This insight comes from fieldwork conducted by the author, primarily in Colombia. These issues will be explored regarding Colombia further in the subsequent chapter.

<sup>90</sup> It is not necessary that a product be illegal to generate high transaction costs, but illegality does make a product more profitable and facilitates black markets, as will be discussed later.

legal transactions in a weak state are more costly because they include the cost of enforcement. This lack of enforceable contracts and high monitoring costs increases transaction costs dramatically. As transaction costs increase, rents tend to increase, and there is agency loss, or increasingly divergent interests among business parties (Kleiman, 1993, 115).<sup>91</sup> The resolution of these business disputes is often through violence. The objective for actors that wish to decrease violence and secure control is to develop governance structures or institutions that make conducting business, or transactions, less costly (Weber, 1997, 328). Organizations, or firm based transactions, and the organization of criminal groups are discussed below.

### *Property Rights Enforcement and Violent Crime*

If violence is a result of transaction costs, then well-defined and enforced property rights can decrease levels of violence by lowering transaction costs. The enforcement of property rights is critical to a functioning economy and conducting business transactions (Gambetta, 1993, 78-80). I define property rights as “A method of assigning to particular individuals the authority to select, for specific goods, any use from an unprohibited class of uses” (Eggertson, 1990). Fundamentally, property rights provide a clear method of dividing assets, in both formal and informal settings, as well as access to the appropriate market, thus lowering the enforcement and monitoring costs of conducting transactions. Not only can formal property rights and laws increase economic growth (North and Weingast, 1989), indirectly reducing crime by providing employment, they also affect levels of violence by designating who may use resources and how they may be used (Anderson and Hill, 2003, 4-7, 14). When ownership and rules of use are clearly understood and enforced, transaction costs are decreased. Where property rights are

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<sup>91</sup> For example, the ineffectiveness of the Colombian government to reduce transaction costs is associated with the drug trade of the 1980s and 1990s and high levels of violence. There was a general decline in public trust, increased corruption, and speculative business practices that increased the cost of doing business (Thoumi, 2002, 111), resulting in an increase in violence.

difficult to enforce or disputed, transaction costs tend to be higher. Thus, a strong system of property rights could be crucial in lowering transaction costs, limiting access to illicit markets, and decreasing levels of violent crime.

Property rights are established through the political bargaining process between actors in specific markets.<sup>92</sup> The extent to which the government fails to protect property rights provides the opportunity for other strong actors to enter the market (Gambetta, 1993; Schvarts, 2001, 20). Control of territory and resources gives an actor the ability to extract rents. While the state wants to hold onto rents, other non-state actors also desire these rents. Where no single actor controls territory and resources, it can be beneficial to compete over them through violence. The result of this competition means that the formation of property rights can be a top down imposition of externally developed laws by a strong actor, state or otherwise, or the codification of locally accepted norms among more equally capable actors (DeSoto, 2000).<sup>93</sup> For example, in Communist Russia, property rights were effectively enforced by the state and there was no organized crime of significance. In post-communist Russia, the expansion in private transaction was not met by the ability of the state to enforce property rights, and crime rates increased drastically as mafias struggled for control of both licit and illicit markets (Schvarts, 2001, 22). When property rights are enforced by the state, community, or other organization that has a

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<sup>92</sup> Transaction costs might be an important factor in the bargaining process when property rights are defined and formed (Anderson and Hill, 2003, 14). There is no easy way to evaluate this relationship, and endogeneity might exist in any one instance. However, transaction costs do not appear out of nowhere, and this paper assumes that property rights must come first in any analysis of transaction costs.

<sup>93</sup> Umbeck (1981) feels that this process generally depends on three factors: the capacity for violence of interested parties, economies of scale in the technology of production, and the productivity of the land on which the commodity is produced. However, the technology of violence is by far the most important aspect of the three. The productivity of land and economies of scale of production are factors in the ultimate profitability and structure of the market, however, those that can produce more product in a given time (or have more valuable product to begin with) are able to hire more “violence,” or buy competitors, and may be able to help pay for better technology of violence (either through arms purchase or hiring those that possess and know how to use them). Thus, factors other than relative capacity for violence are initially important in so far as they provide income and incentive to increase the capacity of violence of the actors involved.

monopoly of force in a given area, violent competition is minimized. This market structure can break down in the absence of a strong state; the subsequent shift in the relative balance of power between actors can result in a return to violence.

My explanation for the variation in violent crime rates involves the relationship between property rights enforcement and transaction costs. Transaction costs lead to violent crime by making the resolution of disputes through violence a more attractive option. The production of lootable resources in a weak state increases transaction costs because of the inherent properties of lootable resources and the lack of third party oversight for dispute resolution. The conflux of state strength and product type leads to an overall market environment, of which the most important aspect in reducing violence is property rights. Property rights can be established through the bargaining process of interested actors, and reduce violence because they provide a clear method of the division and use of resources, as long as all parties stick to the rules. Lootable products can make property rights harder to enforce and interact with the state's ability to provide the rule of law, especially in the case of prohibited products. The specific properties of illicit products create unique contraband markets that generate even higher transaction costs that lead to a greater propensity for violence. Consistent with Snyder (2006), a key finding is that resources in and of themselves are not a cause of violent conflict. Rather, it is the market environment in which resources are embedded that is important. Property rights are an important part of this framework because they decrease transaction costs and therefore levels of violence.

### **Criminal Organizations and Property Rights**

In this section I focus on the formation of criminal organizations in the market of criminal activities. I first examine why organizations form due to market inefficiencies in

security and profit maximization. Second, I study the optimal size of organizations and how the size of criminal organizations might affect levels of violence. Third, I relate the study of criminal organizations to the enforcement of property rights.

### *Formation of Organizations and Market Inefficiencies*

Standard market explanations do not account for formation of criminal organizations. According to neoclassical economic theory, firms, or organizations, are a response to failures in markets due to the effects of economies of scale and transaction costs (Englander, 1988, 340). Similar to purely legal economic markets, economies of scale in the production of violence lead to the aggregation of capabilities through the formations of organizations (Weber, 1997, 326).<sup>94</sup> Criminal organizations, which cannot rely on third party oversight (usually, but not always, a government) form to overcome the high cost of business between individual criminals, and are influenced by the relative costs of market-based transactions versus firm based transactions (Dick, 1995, 28). Criminal organizations in illicit markets desire to develop a monopoly of force in order to supply the public goods, including property rights, which allow for market exchange in both licit and illicit markets. In the absence of government control, when the state itself is weak, criminal organizations can even enter areas of licit commerce. Thus, we should expect criminal organizations to form in order to overcome the frequently high transaction costs experienced in criminal markets or markets that lack third party oversight.<sup>95</sup>

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<sup>94</sup> Many economic theories of crime are similar to economic explanations of the international environment, such as Waltz (1979, 89-91), and do not account for hierarchy.

<sup>95</sup> There are two main reasons for organizations to form in order to overcome high transaction costs. The first main reason is for defense from external enemy organizations. The first explanation for violence between organizations is that violence arises out of bargaining failures, and the inability to enforce agreements, combined with hidden information (Fearon, 1995). The other explanation for violence between organizations is a geographic argument based on the control of economically or strategically valuable territory (Weinstein, 2007, 209). The second main reason organizations form is in order to overcome high transaction costs, in order to enforce order and provide public goods within areas of control. Violence within organizations is primarily about overcoming collective action and principal-agent problems (Weinstein, 2007, 40, 135). Weinstein's (2007) argument is primarily one of adverse selection and market share for potential insurgent recruits, where leader's choices are constrained by the natural



### *Organizational Efficiency*

The optimal size of a criminal organization is based on the level of coordination that is necessary to monopolize force in a given area and extract resources or taxes. The fact that organizations form in order to bring transaction costs down does not directly address the issue of organizational size or efficiency (Weber, 1997, 325-328). Different organizations have comparative advantages and specializations in different kinds of markets, and the optimal size of an organization that threatens the state might be different than that of a criminal group interested in controlling lootable resource markets. Economies of scale that overcome transaction costs should determine the size of the criminal organization. When organizations are unable to form, it indicates that organizational costs are prohibitively high. Organizational costs are defined as “the need to arrange and order individual tasks, to coordinate across those tasks, and to adapt to contingencies” (Dick, 1995, 30). Such things as low social capital, organizational complexity, ethnic diversity, and high monitoring costs might increase organization costs.<sup>96</sup> The tradeoff between organization and transaction costs determines whether transaction takes place through individual market interactions or within organizations (Weber, 1997, 329 – footnote 17). However, it is difficult to form a hierarchical structure to replace market transactions (Waltz, 1979, 111; Weber, 1997, 329). Thus, the economies of scale in organizational size are limited by diminishing returns in the cost of organizing and producing an optimally sized organization.

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resource endowment presented to them. Since this explanation includes violent insurgent groups that often rely on contraband markets for financial support, there is no reason to think that criminal groups would also organize hierarchically for many of the same reasons. Weinstein (2007) is primarily concerned with levels of violence committed by members of insurgent groups against civilians in their areas of control, not in the intensity of conflict between organized groups. While a disorganized (undisciplined) organization might be more prone to violence within its sphere of control, a more organized (disciplined) force might have a greater capability to inflict violence on other groups. However, neither explanation describes the variation in the levels of organizational control or levels of violence (Weinstein, 2007, 210).

<sup>96</sup> Informal workers who migrated in and out of production regions in boom times, for example, might contribute to increased violence by decreasing social capital and eroding business relationships.

Organized crime, and other non-state actors, should play a larger role in supplying public goods and be relatively more powerful when there is little central government. In the absence of a legitimate government for contract enforcement, the control of members of an organization and civilians in their areas of control becomes even more difficult (Weinstein, 2007, 41).<sup>97</sup> Thus, the economy of scale for the organization of non-state actors is more important in a weak state. However, groups must still arrange themselves in order to overcome transaction costs, even if the mechanisms for control are more difficult to implement (Weinstein, 2007, 128-129). Evidence does in fact indicate that criminal groups generally organize themselves hierarchically (Andreas et al., 2006; Gambetta, 1993; Naim, 2005; Schvarts, 2001).<sup>98</sup> However, levels of control, due to a lack of contract enforcement, are generally poorer than in strong states.

When organizations do develop to overcome transaction costs, violence usually decreases. If no organization is formed then the criminal market determines the outcome of interactions and the level of violence is higher. While overall levels of violence should be lower if organizations form, the capacity of violence by organizations is higher than that of individuals because of the economies of scale involved in the production of force. Over a given timeframe it is very difficult to measure the effects of non-organized violence versus the effects of less frequent but more intense conflict between organizations. However, it is necessary to account for

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<sup>97</sup> Insurgent groups are hierarchically organized “because they are shaped by leaders, peer monitoring is difficult, and competition is intense” (Weinstein, 2007, 134). This explanation ignores coercion, which seems to be a factor in criminal organization (Gambetta, 1991; Schvarts, 2001).

<sup>98</sup> The degree of hierarchy has always been debatable, and might be changing. Several theories of crime now use the “network” analogy for modern criminal organizations, describing their organization as “decentralized processes and nebulous connected scattered cells and agents” (Garzon, 2010, 33-36). However, the network analogy seems to be an underdeveloped concept at this point. Most “network” theories do not explain variations in the degree of interconnectedness, and what environments or factors lead to different levels of hierarchy. Additionally, all of the described organizations, such as Colombian cocaine cartels and Al-Qaeda, started out as relatively centralized, hierarchically organized groups. After governments targeted them and their leadership they splintered and became less hierarchical. It is debatable whether or not the groups are more profitable and effective now in a more decentralized form than before. In fact, a careful reading of Thoumi (2003) seems to indicate that cocaine cartels were more profitable in earlier, more hierarchically organized forms. At any rate, hierarchical organization is definitely present on a local level, even if criminal organizations are set up more as loose affiliations between locations or cross-nationally.

violence between groups because a large increase in violence may reflect a battle over territory, as opposed to a decrease in property rights enforcement and the erosion of control within an organization. Overall, there should be less violent periods when criminal organizations form, but when violence does occur, it will usually be much more intense.

### *Criminal Organizations and Enforcing Property Rights*

Property rights enforcement is essential to produce a functioning economy and allow for profit maximization, and property rights enforcement requires a monopoly of force. A monopoly of force usually requires an organization, whether that group operates in the formal or informal sector (Schvarts, 2001, 10).<sup>99</sup> Thus, the rewards to a criminal firm are greater if they can monopolize the use of violence within their territory and develop a system of property rights. However, property rights agreements outside of an official legal framework (or within a weak state) are inherently unstable, and as soon as one actor obtains an advantage in the technology of violence or production (with which an actor can buy or hire the capacity for more violence), the arrangements are likely to break down.<sup>100</sup>

Various organizations will try to supply the public goods when governments are unwilling or unable to do so, including community organizations, insurgents, and criminal

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<sup>99</sup> When referring to internal governance, and not civilians within zones of influence, the monopoly of force is used to primarily punish defectors, independent of control of territory. An example of this is the organization of pirate ships during the seventeenth and eighteenth centuries. Pirates were organized, but not in the business of protection or seeking a monopoly of force over a given area. However, they did need to organize efficiently to maximize profit, limit internal dissent, and minimize predation by leaders. They did this through a democratic system of self-governance, including checks and balances and constitutions. Pirate leaders also had a monopoly of force on their ships in order to enforce a system of property rights to divide the loot (Leeson, 2007, 1051). Thus, even when a monopoly of force over a given territory is not a key goal, the enforcement of property rights is still important.

<sup>100</sup> The one possible exception in the literature occurs when everyone has an equal capacity for violence and capacity for resource production (Umbeck, 1981). Umbeck analyzes the California Gold Rush and finds these conditions to hold. Even if this is an accurate analysis of this time period, I see this as an anomaly and a historical example that is rarely encountered. It is unclear to me how violence does not benefit from economies of scale. Umbeck (1981) is also primarily concerned with conflict at mining sites, and not what happened during transportation to cities or retail stores.

organizations. Mafias, or highly organized criminals, are more likely to develop in societies without an effective government (Hobsbawn, 1959, 30-51). The Mafia can actually fill a void in society when the government is unable to provide security and the protection of property rights (Gambetta (1988). As Thoumi (2002, 106) points out for the Colombian cocaine industry, the non-state actors involved fill the role of the state in production areas, actually set up their own system of laws, and occasionally supply limited social services. In exchange, they tax production in their area of control. Organized crime is especially likely to enter illegal markets because of the absence of written contracts and uncertainty surrounding property rights enforcement, contributing to increased demand for protection (Gambetta, 1988; Schvarts, 2001, 31). Thus, organizations form to overcome transaction costs and allow for security and profit maximization, and are especially vital to market exchange in illicit markets and weak states.

In summary, criminal organizations form in order to overcome transaction costs, (for both defense and profit maximization) however, difficulties in controlling increasingly complex organizations introduce economies of scale in organization size. Contracts can reduce transaction costs and agency loss, however, in illegal or informal environments there are no contracts, and this results in high transaction costs and agency loss. Adding to this is the fact that many aspects of the rational actor assumptions do not hold in the world of crime and punishment because of bounded rationality and opportunistic behavior, further increasing transaction costs (Kleiman, 2009; Grief, 1989; Leeson, 2007). The increase in transaction costs not only increases violence between organizations, but also increases violence within organizations. A monopoly of force is usually achieved through the formation of an organization due to the increasing returns of scale in the production of violence, and a monopoly of force is necessary to enforce property rights and allow for a functioning market. However, these market institutions are much less stable than

formal markets in strong states. The instability is especially marked in lootable resource markets due to the fragile market institutions and difficulty in enforcing property rights.

### **Social Capital and Levels of Violence**

Social capital reduces levels of violence because it reduces the cost of doing business within a particular group by increasing trust, community ties, and the homogeneity of transactions through accepted norms. Although in the previous section I addressed how criminal organizations enforce property rights within the organization, my research shows that other types of community organizations also can develop mechanisms of property rights enforcement. In this section, I first discuss how social capital within organizations can reduce transaction costs, help enforce property rights, and decrease overall levels of violence. Second, I examine the varying levels of violence within certain organizations, and show that even purely profit driven groups often establish some level of social capital. Third, I demonstrate how the characteristics of natural resource markets might influence levels of social capital and violence within organizations. Fourth, I provide some testable hypotheses for the next chapter.

#### *How Social Capital Decreases Violence*

The principal-agent problem, or diverging interests of leaders and followers, makes some type of hierarchical system of control necessary. Organizations are especially difficult to control when involved in illicit markets or weak states, where there are no formal contracts. However, organizations with high levels of social capital can implement the necessary hierarchy to avoid agency loss, making it easier to cooperate (Weinstein, 2007, 136-138). Additionally, shared cultural and ethnic ties can increase social capital within the ethnic group, but can make it harder to develop trust across groups (Anderson and Hill, 2003, 15-16). Thus, social capital can help

establish norms of cooperation, setting up an informal system of property rights enforcement, which should alleviate many of these problems of control and decrease violence.

Social capital can decrease transaction costs through two pathways. First, it reduces transaction costs by increasing trust, thus solving commitment problems, and aiding dispute resolution. Second, social capital reduces transaction costs by helping to overcome collective action problems, limiting the desire to break formal and informal rules (Lederman et. al., 2002, 514). Both of these mechanisms can help enforce property rights in a community or organization. Informal methods of property rights enforcement generated by social cohesion can be important factors in the level of violence of a community or organization (Anderson and Hill, 2003, 7), and communal, or traditional, methods of property rights enforcement decrease violence surrounding lootable resource production. Social capital has the effect of “making organizations more efficient and reducing the likelihood of violence due to social conflict (Lederman et al., 2002, 514).<sup>101</sup> The importance of a system of communal norms in decreasing violence is greater for organizations that operate in the informal sector or in a weak state because of the absence of formal contracts (Weinstein, 2007, 133). As a result, social capital can play a vital role in levels of violence in weak states.

#### *Levels of Social Capital within Different Organizations*

There is a spectrum of interests and motivations among informal organizations, ranging from the purely politically driven to the purely profit driven. The level of social capital varies greatly between different communities, mafias, and other non-state actors (Cornell, 2007;

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<sup>101</sup> It is also important to point out that increased social capital could increase the effectiveness of criminal organizations in breaking the law. Lederman et al. (2002, 515) states that when social capital increases on a societal level, it is crime reducing, while when it increases on a group level it is crime increasing. I believe a more accurate explanation is that it depends on the orientation of the organization’s leaders. If they are aligned with the state, then the groups increased social capital will be crime reducing. If they are aligned with criminal interests, then the group’s increased social capital will lead to more efficient criminals.

Weinstein, 2007; Schvarts, 2001). However, even if the primary motivation is profit, leaders have incentives to impose a minimal form of government (Olson, 1991).<sup>102</sup> One prominent typology of criminal organization describes certain criminal organizations as “clans” based on kinship and social status (Standing, 2003, 12-17).<sup>103</sup> In this view, mafia type organizations may redistribute wealth and attempt to aid the poor, attempting to increase the quality of life in their areas of control (Paoli, 2001). While the efficacy and long-term benefit may be debated, mafia protection may provide a service in the absence of a strong government or high levels of social cohesion by facilitating economic exchange and substituting for social capital (Gambetta, 1993, 2) - while possibly prohibiting its development at the same time. Criminal organizations are not separate from communities and can also rely on community ties and local networks to facilitate organizations (Coleman, 1990).<sup>104</sup> Thus, even profit motivated organizations can exhibit some level of social capital.

### *Social Capital and Lootable Resource Production*

While social capital and the associated methods of property rights enforcement decrease violence, norms of reciprocity and cooperation become harder to enforce as involvement in the production or marketing of loutable resources increases. This is the result of two phenomena. First, the “boomtown” effects bring lots of young, single males with no community ties into the

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<sup>102</sup> Mancur Olson addressed this idea in his 1991 paper “Dictatorship, Democracy, and Development.” (*The American Political Science Review*, Vol. 87, No.3 (Sep., 1993), pp. 567-576). However, in this paper Olson did not address levels of violence in society or force in economic relations, and did not specifically address property rights. He was mostly concerned with development in a state of no, or very little governance, versus a state of some, generally undemocratic, governance.

<sup>103</sup> For an excellent overview of the literature on criminal organization, see Standing, Andre. 2003. Monograph 77: Rival Views of Organized Crime. The Institute for Security Studies. Accessed July, 2009. <http://www.iss.co.za/pubs/Monographs/No77/Content.html>

<sup>104</sup> For example, the Sicilian mafia uses symbols, sacred ceremonies, and other secret codes of conduct (Gambetta, 1993, 127), and the Russian Mafia was initially dependent on a shared identity, and created their own language, hierarchy, rules and laws. In fact, in pre-Second World War Russia, criminal gangs actually viewed themselves as acting in the best interest of the poor (Schvarts, 2001, 16-18).

low-skill labor market. This often happens without a corresponding increase in government services (Ferroz, 2011). In lootable resource production areas, the community ties that affect individual behavior are often absent, thus removing an important source of the norms against violent behavior (see, for example Fuller, 2007). Second, the increased opportunities for theft and profit make cooperation more difficult.<sup>105</sup> Although shared values and ethnic ties decrease transaction costs within the group, when rents and lootability are high, communal constraints are often not enough to enforce agreements (Anderson and Hill, 2003, 15-16).<sup>106</sup> Illicit markets, such as the narcotic industry in Colombia, can erode traditional family and community structures, replacing traditional systems of authority and societal control. The erosion of the social fabric is long lasting and has severe negative consequences for society, such as low levels of interpersonal trust and social cohesion (Thoumi, 2002, 107-108, 112).<sup>107</sup> For example, criminals in Colombia seem to be much more willing and effective (brutal) in the use violence than other drug organizations, and the drug trade probably played a strong role in this phenomenon (Thoumi, 2003).<sup>108</sup> Thus, the production of lootable resources, both through boomtown effects and their profitability and transportability, decrease social capital in affected regions.

Entry into the lootable resource market results in the same dynamics between groups as it does within groups. The increased competition between groups is a result of the difficulty in enforcing agreements between groups due to the inherent qualities of lootable resources. Thus,

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<sup>105</sup> While control is more difficult when a group is involved in the production of lootable resources, profits will increase. These profits can increase a group's capacity for violence, allowing them to acquire more territory and resources. Thus, there are offsetting affects from increased revenue and decreased control.

<sup>106</sup> Lootable resources funded groups might have lower levels of social capital because it is easier for them to mobilize without strong social ties and personal trust (Weinstein, 2007, 134).

<sup>107</sup> There is some level of endogeneity between the violent Colombian culture and the emergence of Colombia as the center of the cocaine trade. Colombian organizations were able to out-compete their Chilean and Cuban rivals through being better at violence. However, involvement in the cocaine trade has almost surely increased these violent tendencies and improved these organizations' ability to commit violence (Thoumi, 1995, 2003).

<sup>108</sup> One additional factor might be due to the violent history of Colombia and the existence of violent organizations developed during the political violence of the 1950s. It is hard to control for directionality and ascertain which factors came first, violence or lootable resource markets.



even disciplined groups become more violent in order to compete. Case study evidence seems to indicate that the Sendero Luminoso in the Upper Huallaga Valley of Peru initially chose targets selectively, then progressively became more random in their violent attacks as they became more involved in the drug trade, while still not changing core beliefs (Weinstein, 2007, 210-258; especially 251-257). Additionally, the highest murder rates in Colombia's modern history happened when the FARC became firmly involved in the cocaine trade in the 1990s, even though they still exhibit some level of social capital, as mentioned above.<sup>109</sup>

While lootable resources can decrease social capital and increase violence in most cases, it is not a foregone conclusion that every organization involved in lootable resource production is violent. In some cases, communities that produce lootable resources can exhibit high levels of social capital and low levels of violence. For example, communal ties among Lebanese diamond traders enforce property rights among themselves in Sierra Leone (Snyder, 2006, 956). Additionally, Maghrebi traders (who traded in all kinds of goods) in the ancient middle-east during the eleventh century established a community of traders to overcome transaction costs and capture efficiency gains from social capital.

While many organizations may exhibit decreased social capital after entry into the drug trade, it does not necessarily drastically alter their core values and beliefs (Cornell, 2007; Gonzalez, 1994; Palmer, 1994 - see for example, 259-274; Strong, 1992, 96-124). The FARC, a leftist guerilla group in Colombia, whose level of political motivation has decreased with its emergence as a player in the drug trade, might still retain higher levels of social capital than many drug gangs. They actually have complex systems of taxation in coca production areas,

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<sup>109</sup> Murder data comes from a variety of sources, including the Colombian government statistics Bureau (DANE) and various sources at the UNODC, including raw data and the report "Violence, Crime, and Illegal Arms Trafficking in Colombia," December 2006. According to Thoumi (2003, 103 – for example) and others, the FARC had initially become involved in 1982 but became much more entrenched in the 1990s due to the depression in the subsistence economy and other factors.

generating as much as \$100 million per year. In exchange for taxes, they provide protection from crime in their areas of control and even negotiate on behalf of the peasants with drug syndicates for better wages to workers and prices for coca paste (Weinstein, 2007, 291-294). Other organizations involved in the drug trade, such as Afghanistan's Taliban and Peru's Shining Path, can adhere to dogmatic ideologies and discipline soldiers.<sup>110</sup> So, while entry into lootable resource markets decreases social capital to some degree and makes community ties more difficult to enforce, many organizations and communities are able to maintain relatively high levels of trust and some level of their original shared beliefs and norms of reciprocity. However, this will usually be lower than previous levels of social capital or levels of those organizations not involved in lootable resource production.

In sum, cooperation in informal organizations outside of government control can lead to efficiency gains that a pure market might not capture. Ethnic and community ties make developing the necessary levels of trust and reciprocal behavior easier over time. The resulting high social capital organization is a "form of economic institution and depends on a reputation for honesty, developed through an ex-ante linkage between conduct and future revenue" (Greif, 1989, 858-859). There is a spectrum of motivations and levels of social capital in non-state actors, including purely profit driven groups. Although an organization can rely on ethnicity or ideology, at a minimum all that is necessary to form some level of social capital within an organization is a desire for repeated interactions and continued business (Greif, 1989, 866-867). Thus, other non-state actors, such as mafias and lootable resource funded insurgents, can institute some level of social capital and decreased transaction costs, although they are usually much less effective than a state. Entry into lootable resource markets decreases levels of social capital

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<sup>110</sup> In the next chapter, I examine how community ties seem to decrease violence in gold production regions of Colombia.

because of the high profits involved and ease of theft. However, some organizations are able to maintain relatively high levels of social capital and correspondingly low levels of violence, even when involved in the production of lootable resources.

### **Testable Hypotheses**

There are several hypotheses that come out of the previous discussion. I focus on the following three because they have particular relevance to the literature and represent a new perspective on the study of violent crime. I test these hypotheses on Colombia in the following chapter.

*Hypotheses 1:* When there is no strong state or non-state actor, incentives for competition make violence more likely.

The absence of a monopoly of force to enforce property rights leads to the prevalence of black markets, increased transaction costs, and organizational costs. These increases in the cost of doing business and the difficulty in forming organizations increase levels of violence. In countries where a single entity, such as the government, is able to enforce property rights and control or reduce illicit markets, violence should be low. Violence should be higher in regions where individual criminals and organized criminals compete over control of illicit markets. In control regions, where variables of state strength do not vary and natural resource production does vary, violence levels should vary depending on resource production. This should also be true of boomtowns surrounding resource extraction, areas where property owners attempt to clear out peasants through force, and areas of peasant relocation.

*Hypothesis 2:* Violence should be higher in areas of lootable resources.

Property rights are harder to enforce with lootable resources than non-lootable resources. This is due to higher monitoring costs for the government and other actors, and greater incentives

for defection of communal and legal property rights by individuals. This means that areas of deep shaft minerals or agriculturally based products should have lower levels of violence than alluvial minerals. Additionally, when production is capital intensive and it is possible to capture sufficient profits, then an investor is willing to pay more to protect property rights. It is more difficult for investors to capture profits in lootable markets, such as those of drug production and alluvial gemstones. Transaction costs in markets can be high with low levels of violence, but this requires organizations to form that overcome these transaction costs. In many cases, organizational costs are prohibitively high. This is especially true in lootable markets where the incentive for personal gain is high. In areas where valuable criminalized and illicit markets and resource boomtowns exist, violence should increase.

*Hypothesis 3: Property rights enforcement decreases violent crime rates.*

Levels of violence should vary in lootable resource production regions based on property rights enforcement. Property rights enforcement should decrease transaction costs and corresponding levels of violence. When governments, communities, or organizations can form to overcome the normally high transaction costs in resource markets, they enforce property rights. In areas where the production is done on a communal level, property rights are easier to enforce, keeping violent crime rates low. However, if levels of social capital are high, crime rates should be lower than areas that produce similar resources but lack high levels of trust and norms of cooperation.

## **Conclusion**

In this chapter, I elucidate some possible causal mechanisms for an institutional and natural resource based explanation of the variation in violent crime rates. The high transaction

costs and difficulty in enforcing property rights in lootable resource markets contribute to the high rates of violence associated with their production. Lootable resources facilitate illicit markets and these contraband markets are larger and more frequent where the state is weak. Additionally, the locus of available options to combat crime depends on the state's ability to effectively allocate resources and implement specific anti-crime policies. Therefore, lootable resource markets and higher levels of violent crime will usually occur in weak states.

The specific properties of markets, including the resources they are based on, rents, prohibitions, and lootability, can shape the market environment. These properties increase transaction costs and make property rights harder to enforce. They also decrease the state's ability to provide the rule of law, especially in the case of prohibitions. The resulting illicit markets can engender violent crime because normal business disputes are often settled with violence due to the increased transaction costs and lack of enforceable contracts.

Property rights are established through the political bargaining process between actors. Thus, the formation of property rights can be a top down imposition of externally developed laws by a strong actor, or the codification of locally accepted norms. Property rights affect levels of violence because they help designate who may use resources and how those resources may be used. Well-defined and enforced property rights generally reduce transaction costs, and therefore reduce levels of violence.

Organizations in criminal markets form in order to overcome the transaction costs and as a response to the economies of scale in the production of violence. A monopoly on violence allows an organization to ensure its security, but also maximize profit by providing public goods in its area of control. Criminal and other non-state organizations exhibit varying levels of organizational control and capacities for violence, which may be decreased by entry in a lootable

resource market. Communities and organizations have a range of social capital, and even purely criminal, profit motivated organizations exhibit some level of social cohesion. Social capital helps organizations enforce property rights by increasing trust and norms of reciprocity. Entry into lootable resource markets can decrease norms of reciprocity and trust. However, even if trust is decreased to a degree, communities and organizations with high levels of social capital retain relatively strong community ties and shared beliefs. They can therefore capture more efficiency gains in lootable resource markets than organizations that lack shared norms of cooperation.

My hypotheses examine the relationship between the production of lootable products and violent crime, while controlling for other factors commonly linked to crime. All else remaining equal, the difficulty enforcing property rights in lootable resource markets should increase violent crime rates. I would like to further investigate these mechanisms by examining regions of mineral resource production in greater detail. I use the case of resource production in Colombia in order to test key findings in my cross national analyses and more closely examine the theoretical mechanisms explored in this chapter.

## **CHAPTER 4: EXPLAINING VARIATIONS IN THE COLOMBIAN CRIME RATE**

This chapter uses local level data from Colombia in order to more closely examine variations in violent crime rates than is possible in cross national studies. Specifically, I explore the connection between violent crime, socio-economic variables widely believed to affect crime rates, natural resource production, and property rights enforcement. The preliminary findings suggest that the effects of lootable mineral resources on crime are distinct from those of other resources, and increase violent crime rates due to the specific nature of resource markets. I use part of Snyder's (2006) definition of lootable products as those that are high in value and have low barriers to market entry. To this, I add the condition that the products are easily transportable, what Thoumi (2002) calls a high value to volume ratio. As described in previous chapters, the illicit markets often associated with lootable resources tend to generate high levels of homicide. Illicit markets are also facilitated by civil conflict (Ross, 2004b). Additionally, property rights enforcement, even if informal, can help reduce transaction costs in the production and transportation of lootable resources and can reduce violence.

I begin with an overview of why Colombia is a good case for the study of violent crime and natural resource production. I then proceed to describe several aspects of the mineral resource industry in Colombia that might influence crime rates. I highlight several aspects of lootable resource markets in Colombia central to my argument regarding transaction costs and property rights, and their relationship with violent crime rates. I obtained data for murder rates and key independent variables from every municipality in Colombia between 1998 and 2006, as well as murder and lootable resource production data from before and after this period for cross tabulation and analyzing trends over time. To test my hypotheses I use a mix of multivariate

regression analyses over time and case studies. Homicide is the key dependent variable because it is widely recognized as the best method of measuring crime (Fajnzylber 2002ab), as previously discussed. My study also relies on case study analysis and original fieldwork to explore the direction of causation and to assess several competing mechanisms that large-N statistical analyses cannot evaluate. I then interpret the results by focusing on the impact of factors, such as mineral resource production, not commonly considered in the study of crime. Finally, I outline how property rights enforcement can help decrease levels of violent crime. This also involves examining the role of social capital in enforcing property rights.

### **Case Selection**

Colombia is an optimal case for the study of crime for several reasons. Colombia is a middle-income country with a stable democratic government and a solid macroeconomic record. However, the Colombian government lacks a strong presence in much of the country, which is one of the factors that allowed crime syndicates and insurgents to establish bases of operation and expand illegal markets. As a weak state under attack from insurgents and global crime syndicates, it could be a representative case for state building efforts in the near future.

Interestingly, Colombia has no major ethnic or regional based conflicts. Although 18% of the population is Afro-Colombian and 2% is Indigenous (EIU, 2003, 15; 2012), ethnicity is not the source of any insurgent movements (Rabasa and Chalk, 2001, 23-39), allowing the current study to focus on other important variables in the study of crime. Colombia also has a history of stable, if imperfect democracy (Bejarano and Pizarro, 2003, 236). Unlike other countries in the region, Colombia has held frequent, fair elections for the last fifty years. However, there have been several episodes of extreme political violence this century. Additionally, weak rule of law



and a lack of checks and balances have not always been able to protect civil liberties. Despite this, Colombia has a general tradition of free speech and protection of democratic rights (Bejarano and Pizarro, 2003, 236-240; Peeler, 1986).

The economic performance of Colombia has been very good relative to other countries in the region. Colombia has exhibited steady economic growth over the last sixty years, and only two recessions since 1928 (Rabasa and Chalk, 2001, 5). Despite poor performance in 2000 and a steep downturn in 2009, the economy rebounded well in both cases, exhibiting solid growth in every year since through 2011, while keeping inflation down. Colombia's GDP and economic growth rank near the top of the region. However, the country has a highly unequal distribution of wealth, and income (GDP per capita) is one of the lowest in the region. Poverty is pervasive, with half the population surviving on less than two dollars per day (EIU, 2003; 2012; ECLAC, 2003; 2012; Rabasa and Chalk, 2001, 4-6; WBI, 2008).<sup>111</sup> Colombia's national economic performance allows this study to largely hold economic growth constant (although growth does vary by region), while allowing poverty levels in different regions to vary.

Colombia produces and exports a variety of natural resources, both legal and illegal. These include oil, gold, gemstones, a number of agricultural products (such as bananas and palm oil), and narcotics. The lootability of some of these products might contribute to high levels of violence through the creation of illicit markets and conflicts over territorial control. Coffee has historically been Colombia's key legal export, although oil and coal are now larger sources of revenue, while gold has quickly become a significant source of export revenue as well. Narcotics is a major illegal export, earning about \$2.5 billion in 2003, representing about 2.5% of Colombia's GDP, or one fifth of legitimate annual export earnings during the last several

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<sup>111</sup> Colombia's GDP in 2002 was \$81.1 billion, behind Mexico, Brazil, Argentina, and Venezuela, but ahead of all others in Latin America, including Chile. GDP per capita in the same year was \$1,859, ahead of only Paraguay and Bolivia (EIU, 2003).

decades (EIU, 2003, 26; 2011, 10-12). Unlike many oil producer countries, petroleum does not seem to play a major role in the Colombian conflict after the early 1980s. Although some rebel groups extort oil companies through kidnapping and pipeline bombing, their operations are dwarfed by those who do not. The conflux of these factors – civil war, high crime, democracy, a strong economy, and natural resources – in one country, coupled with the existence of local-level data, provides the unique opportunity to control for multiple variables that might affect crime rates and test key hypotheses.

Colombia's history is characterized by frequent spikes of high level violence punctuated by periods of medium-level violence. According to Fearon and Laitin's (2003) definition of civil war, Colombia qualifies as a civil war for every year since 1984. However, not only has Colombia suffered from a long running civil war, it also consistently has one of the highest murder rates in the world (Gaviria, 1998; UNODC 2004). The violence in Colombia has both domestic and international linkages, at times leading to dangerous levels of political instability and extremely high levels of violent crime.

Perhaps more importantly, this instability helped foster the largest cocaine market in the world in the 1980s, when anti-government forces began funding themselves through the sale of narcotics. Violence escalated through the late 1980s and 1990s, corresponding to increased guerilla threats and inadequate government response. Part of this is due to a decrease in U.S. funding for counter drug efforts in the mid 1990s (Rabasa and Chalk, 2001, 3), but also due to a lack of political leadership and accountability (Bejarano and Pizarro, 2003, 243). The non-government paramilitaries grew to represent a significant sector of Colombian society. Most of these groups have their origins as private militias for businessmen and ranchers for protection

against guerillas in the 1970s. Their sources of funding shifted, but since the late 1980s a significant percentage has come from drug revenue (Rabasa and Chalk, 2001, 56).

In early 2000, Colombian generals and American advisers drew up a new aid plan with U.S. support. “Plan Colombia,” as it was called, greatly increased U.S. funding in a very short time period.<sup>112</sup> In August of 2002, Alvaro Uribe won the presidency of Colombia on a platform of strong national security. The immediate goals of this policy were to expand military and police presence, and incorporate all of society into a nation wide effort to defeat insurgency.<sup>113</sup> The overriding objective was to improve the rule of law in all regions of the country through increased security and infrastructure provision. Some of the provisions include placing national police in all major townships, peasant militias, and networks of civilian informants (Rabasa and Chalk, 2001, 61-69; Restrepo and Spagat, 2005, 131-132). However, even during its most intense periods, only fifteen percent of the extremely high levels of violent crime in Colombia can be attributed to the civil war (Gaviria, 1998), leading researchers to contemplate what other factors contribute to such a high crime rate.

### **The Structure of Lootable Resource Markets: Examining the Colombian Emerald Market**

The following section discusses theories of transaction costs as they apply to the Colombian Emerald industry.<sup>114</sup> In order to establish a link between loutable resources and

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<sup>112</sup> From 2000 to 2003 the U.S. gave Colombia approximately \$2.5 billion in foreign aid (Restrepo and Spagat, 2005, 1).

<sup>113</sup> For more information on Plan Colombia see [www.ciponline.org/colombia/plancolombia.htm](http://www.ciponline.org/colombia/plancolombia.htm) and the Congressional Research Service Report “Plan Colombia: A Progress Report” Feb. 17, 2005. <http://www.globalsecurity.org/military/library/report/crs/43875.pdf>

<sup>114</sup> Although this section describes the Colombian emerald market, case study evidence reveals that other precious gem production regions in Central and Southeast Asia, West Africa, and Brazil exhibit similar characteristics. See for example “Millions from Diamonds go to Mugabe, Observers say,” New York Times, 2011: <http://www.nytimes.com/2011/12/17/world/africa/experts-say-diamonds-help-fill-mugabe-coffers.html?pagewanted=all>, “Afghanistan’s fabulous ruby mines plundered by thieves” BBC News, <http://www.bbc.co.uk/news/world-asia-18070571>, “Diamonds and Clubs: The Militarized Control of Diamonds and

violent crime, it is necessary to examine exactly how the specific market environment can lead to violence. As discussed in the previous chapter, the institutional framework generally depends on the strength of actors involved and the market structure, including the specific product's lootability and legality. These factors in turn affect the transaction costs in lootable resource markets.<sup>115</sup> Transaction costs can lead to violence when they make business disagreements costly or difficult to settle by other means. Property rights can reduce transaction costs and violence and are thus an important part of a market's structure. A strong state is the primary enforcer of property rights in most countries, and is responsible for supplying the rule of law and other public goods that decrease transaction costs. If the state is weak or unable to do this, other actors compete with each other to fill the power vacuum, and violence tends to be high. Thus, the connection between violent crime and resource production seems to be due to the high transaction costs and the difficulty in forming and enforcing property rights associated with these markets. In order to discuss the specific implications of mineral resource production on violent crime in Colombia, it is helpful to briefly examine the emerald industry. Although each natural resource industry is unique, there are many similarities, especially in regards to lootable mineral production in poor and middle-income countries.

## AN OVERVIEW OF THE COLOMBIAN EMERALD INDUSTRY

While specific aspects of Colombia's emerald industry lead to exceptionally high transaction costs, examining the emerald industry in Colombia will help attach the theoretical

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Power in Zimbabwe", Partnership Africa Canada, [http://www.pacweb.org/Documents/diamonds\\_KP/Zimbabwe-Diamonds\\_and\\_clubs-eng-June2010.pdf](http://www.pacweb.org/Documents/diamonds_KP/Zimbabwe-Diamonds_and_clubs-eng-June2010.pdf), and "The Heart of the Matter: Sierra Leone, Diamonds, and Human Security," Partnership Africa Canada, <http://idl-bnc.idrc.ca/dspace/bitstream/10625/33311/1/114727.pdf>

<sup>115</sup> Here I use the same definition for transaction costs as in Chapter 2, from Williamson (1985, 20-21), who defines transaction costs as the "ex ante costs of negotiating and safeguarding an agreement... [and the] ex post cost of haggling... set up, and running costs of government structures ... and "bonding" costs of effecting secure commitments."

aspects of transaction costs with a concrete example.<sup>116</sup> Emerald mining is deeply ingrained in Colombia's history; it dates back more than four hundred years, and at times reads more like a "telenovela" than a historical narrative. Colombia produces about 60 percent of the world's emeralds, and they are considered to be the highest quality emeralds in the world. These characteristics probably afford producers both monopoly and differential rents.<sup>117</sup> There are several mines in Colombia, but all are located in a small area (9 municipalities) of Colombia, and controlled by a small number of families. The price and production level of emeralds do vary considerably (Leiteritz et al., 2009, 5), although it is hard to tell how much of this is driven by consumer demand and how much by the inability to produce emeralds. The general boom and bust patterns are evident over most of the recorded history of emerald production. The vast majority of emeralds are for export, and the majority of these go to the United States market. While the Emerald sector in general only accounts for about .07 percent of GDP and .38 percent of export earnings (Leiteritz et al., 2009, 3), the geographical concentration of the industry means the effects are very intense on a local level.

*A Brief History:* The emerald producing region has a violent history, even by Colombian standards. The origin of modern conflict is usually traced back to the 1940s, when the

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<sup>116</sup> Information in this section is based on personal conversations with many researchers, politicians, and individuals involved in the emerald industry, conducted between June and July, 2009 and June and September 2010 in Colombia. These include Ralf Leiteritz, professor at La Rosario University (formerly at Los Andes University), Jacinto Pineda, professor at the University of Technology and Pedagogy in Tunja, Colombia, Antonio Ordonez Triana, former congressional representative and land owner in Boyacá, and many other individuals who are not named. I also rely on the paper "Romancing the Stone: Conflict and Peace in the Western Boyacá Region of Colombia" by Ralf Leiteritz and Manuel Riano. Presented at a Conference "Different Resources, Different Conflicts? An Exploration of the Regional Political Economy of the Colombian Armed Conflict" in the Political Science Department at the University of Los Andes, Bogota, April 24<sup>th</sup>, 2009. I draw on two master's theses as well. One is "Conflicto y Pacificación en Occidente de Boyacá, 1970-1995" by Antonio Ordonez Triana (available at Universidad de Los Andes Library). The other is Jacinto Pineda's Master's thesis from UPTC, giving to me by the author, version untitled.

<sup>117</sup> The definition of rents, according to Ross (2001a, 10) is "Supranormal profits in excess of the normal cost of extracting or producing a good, which includes normal profit." There are three types of rents. Scarcity rents come from control of a resource that is in demand and has inelastic supply curves. Differential rents come from the control of resources that are of unusually high quality or low extraction costs. Monopoly rents come from a monopoly or oligopoly supplier.

government took over production at all mines, creating a prohibition that severely limited private markets. It is estimated that 15-20 thousand people migrated to western Boyacá to find work during peak production times, such as the late 1980s. Since then, there have been three distinct spikes in violence, the first Green War ran from 1961-1973, the second Green War from 1975-1978, and the third Green War from 1988-1992 (Leiteritz et. al, 2009, 14-16). Interestingly, the wars are all preceded by the assassination of a family leader or the withdrawal of the government as a mediator, leading to violent struggles over property rights. The dynamics of the three conflicts are similar, pitting families and residents of the towns surrounding the mines they control against each other. The last conflict was the most violent, usually attributed to increased involvement from drug syndicates.<sup>118</sup> Estimates of casualties between 1988-1992 are as high as 5 thousand dead in a population of 50 thousand, or 10 percent of the population.<sup>119</sup>

*Socio-Economic Factors:* Almost all of the emeralds are produced in one relatively small region in Colombia, the Western municipalities of the department of Boyacá. This makes the industry extremely important on a regional level. Unfortunately, profits from the mining industry have not translated into a better quality of life for the general population, and Boyacá is the second poorest state in Colombia, according to government statistics. The average income in the region is about half of the national average, and the Unmet Basic Needs Index (or NBI in the more common Spanish acronym) is 43 percent, compared to 28 percent at the national level (Leiteritz et al., 2009, 22). It also has one of the highest rates of child prostitution, sexual assault, and alcoholism in Colombia,<sup>120</sup> and the mining industry probably drains labor and resources

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<sup>118</sup> There is a history of drug gang involvement in the emerald region, largely to launder profits in the emerald industry. However, the emerald families have always held more power in the region and have discretion over who has access to the region.

<sup>119</sup> Official government statistics are 2,098 dead, but these are largely disregarded. Guerrero (2008, 134) gives an alternative estimate of 4,000 lives and 4 percent of the population.

<sup>120</sup> This comes from a personal interview with Dr. Arguello, director of the regional hospital in Chinquiquera, Boyacá.

away from more productive sectors. Unfortunately, the characteristics of poverty and violence are common in many areas of mineral resource extraction around the world (Cornell, 2007; Fuller, 2007; Lujala, 2009; Ross, 1999; 2001a, 2006; Sachs and Warner, 1995; Snyder, 2006; Weinstein, 2007; UNCSD, 2004).<sup>121</sup>

*The Organization of Production:* The most powerful members of the emerald industry are the leaders of elite local families, referred to as the Emerald Dons, or “Esmeralderos.” The power of these families stretches back generations, and most were wealthy landowners involved in agriculture and ranching before mining. They now own a majority of the concessions from the state over the mining territory, and are the real power brokers in the area, including having their own private militias. The chain of production involves several layers. Traditionally, most formal workers have a labor contract, but are not paid salary. Instead they are provided food, housing, and equipment, and share in profits from any emeralds found in their tunnel.<sup>122</sup> The bottom of the pyramid consists of informal mine workers. They work outside in the riverbeds, where overburden is dumped from the working mines, or in older, abandoned mines that dot the hillsides. Theft inside the mines is high, with as much as 40 percent of the product stolen.<sup>123</sup> It is also estimated that about 30 percent of all emeralds produced in country actually pass through the official export office in Bogota. Domestic contraband emeralds typically enter the legal chain in Bogota through jewelry stores and exporters. The exact number of employees in a mine is difficult to measure at any one time due to high variation. A typical mine might have 250 formal

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<sup>121</sup> The United Nations Commission for Sustainable Development – Economic Commission for Africa study can be found at: [http://www.uncsd2012.org/rio20/content/documents/Mainstreaming\\_mineral\\_wealth\\_policy\\_paper\\_FINAL\\_CT.pdf](http://www.uncsd2012.org/rio20/content/documents/Mainstreaming_mineral_wealth_policy_paper_FINAL_CT.pdf), other related papers and statistics can be found at: <http://www.uncsd2012.org/rio20/index.html>.

<sup>122</sup> This practice is changing with increased foreign investment and consolidation in the industry.

<sup>123</sup> Theft rates are also decreasing in mines that have foreign investment, probably due to both better labor relations and higher salaries, as well as improved anti-theft technologies.

employees, with about 1,000 informal employees outside of the mine at any one time (Leteiritiz et al., 2009, 10).<sup>124</sup>

*The Colombian State in the Emerald Region:* As previously discussed, the Colombian government is historically weak and lacks control over several areas of the country, and this holds true for the emerald region, where the Colombian state has little influence. In fact, the emerald families act as the provider of public goods, such as property rights enforcement and security, and have more power than the government in the region. Until the latter years of the Uribe administration, they were able to effectively resist government influence and act with near impunity in the region. Although political changes to the industry opened the door to more investors in the early 1990s, as the industry becomes more capital intensive there has been a consolidation among the “Esmeralderos.” This has introduced a different dynamic, but has generally increased the power of a few families over the region. If a strong actor had been willing to enforce property rights and a system of dispute resolution, crime could have remained low. However, in times of violence in the emerald producing regions, neither the state nor the families were willing, or capable, of doing this.

#### FACTORS THAT INCREASE TRANSACTION COSTS

The specific characteristics of the Colombian emerald market increase transaction costs and make property rights harder to enforce. As highlighted in chapter 3, the factors that affect transaction costs are information asymmetries and monitoring costs between buyer and seller (1973), uncertainty (Williamson, 1973; 1985, 59-60; 1981, 1549), asset specificity, or the

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<sup>124</sup> The mining operations have traditionally been very labor intensive, especially in the informal sector, but techniques are changing and migrating towards new, more capital-intensive technologies. Due to the need for outside capital investment and international linkages, the amount of middlemen involved in the industry is decreasing, while the percent of gems coming from the formal sector is increasing.



difficulty in reallocating people and machinery (Williamson, 1973; 1979, 239; 1981, 1548; 1985, 54), and the frequency of transactions (Williamson, 1973; 1979, 256-249). The frequency of transactions is synonymous with the homogeneity of market interactions (Weber, 1997, 330), and frequent and consistent interactions between buyer and seller decrease transaction costs. Although many mineral resource markets exhibit these characteristics, transaction costs increase further when products are lootable, and/or the market is illegal.<sup>125</sup>

It is useful to use the Colombian Emerald Market to highlight how these theoretical aspects of transaction costs might affect the market structure. First, monitoring costs in informal markets without contract enforcement for miners and middlemen are very high. Formal mine workers are paid a set percentage of any emerald discoveries and share this with other workers in the immediate area of discovery. Although the power asymmetries in the mine make price negotiation very difficult, the incentive for theft is high. Informal miners have little ability to enforce agreements with each other, if working in teams or close proximity (as is usually the case), or with middlemen from Bogota. This makes the threat of violence high, as there are no formal methods of contract enforcement. Not only are the threat of violence and robbery very high, which makes enforcement important and more costly, it is unlikely that a mine worker (formal or informal) understands the process once the emerald leaves the mine. They most likely have little idea of how much a finished "rock" is sold for in a jewelry store in Bogota or to an exporter.

Second, uncertainty levels are very high surrounding both the legal and illegal emerald markets. One reason is the "boom and bust" cycle common to much mineral production, leading to long periods of no financial gain followed by (possible) windfall profits. A second reason is

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<sup>125</sup> Additionally, as discussed in chapter 3, for violence to take place there must also be correspondingly high organization costs that prohibit organizations from forming to overcome high transaction costs.

that pricing and related costs, including the risk that the refinement process might not produce a quality product, is very subjective,<sup>126</sup> complicating the business environment. Finally, the people involved in the production chain, from the level of the mine up to the level of exporters and storeowners, can change rapidly due to uncertainties about production, price, and the actors involved. Many times grievances over perceived wrongs in past dealings complicate current business relationships.

Third, assets, both physical and human, are difficult to transfer. This is partly because a mine's location is fixed, but also because of the large investment required in opening a mine, both in terms of leasing the land from the state and in terms of machinery. Additionally, laborers have relatively high sunk costs in their investment when moving to the region. After years of mining, their job prospects in other industries and other regions are low.<sup>127</sup> The fact that the product is lootable and easy to steal makes it more difficult to recoup costs. Thus, both controlling families and workers are not readily mobile.

Fourth, transactions between buyer and seller are infrequent and usually heterogeneous. A typical broker visits the emerald region 5 to 10 times per year. However, they might do business with different people, face different pricing structures, and confront alternative negotiating constraints in subsequent interactions. Business relationships are based on a high degree of trust and long term family relationships that reduce transaction costs. However, these relationships can break down for a variety of reasons, some as simple as the death or relocation of a contact. On one such trip, one of my emerald dealer sources reports that between the time he was contacted about a possible sale and the twelve hours it took him to reach the specific outdoor

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<sup>126</sup> There are aspects of the an emerald, such as color, purity, and brilliance, that are not uniform and hold different value to different buyers (Leiteritz et al, 2009).

<sup>127</sup> This is partly due to the negative reputation of those who work in the emerald industry, which has a reputation for violence throughout Colombia. A laborer who stated that he previously worked in the emerald mines would most likely be treated with distrust by any future employer.

market in the emerald region, the owner of the emerald had been lured to a different region by a better offer. Not only did this particular emerald dealer lose a potential profit from the emerald, he also lost the cost of the trip and the cost of lost business he could not conduct that day.

Again, property rights play a key role in decreasing transaction costs. They generally help designate who may use resources and how those resources may be used, and can also be important determinants of levels of violence (Anderson and Hill, 2003, 4-7, 14). Where property rights are difficult to enforce or disputed, crime tends to be higher. Thus, a strong system of property rights could be crucial in limiting access to illicit markets and decreasing levels of crime.<sup>128</sup>

In summary, important aspects of lootable resource markets are highlighted by examining the Colombia emerald industry. The industry exhibits many factors similar to other lootable resource products, especially in non-industrialized countries. Property rights decrease transaction costs, but are difficult to enforce for lootable products and without the help of a strong actor or accepted norms of cooperation. A political explanation for violent crime involves the dynamics between the strength of the actors involved and the specific nature of the resource markets, including monitoring costs, uncertainty, asset specificity, homogeneity of interactions, legality, and lootability of the product. The conflux of these factors leads to an overall market structure, the most important aspect of which is property rights enforcement. According to Snyder (2006,

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<sup>128</sup> In theory, organizations should form to overcome high transaction costs (Weber, 1997). The fact that the Emerald Dons were unable to form organizations in violent times, or that miners themselves were unable to do so, must indicate that organizational costs were very high in the region. Such things as low social capital, levels of trust, community ties, and high levels of immigration from various communities increase organization costs. A lack of a rule of law and general levels of violence can further increase these phenomena, further straining social cohesion. Anything that upsets the delicate web of market interactions can further increase transaction and organizational costs, and possibly require a new market structure. These vast numbers of immigrant, informal workers that migrated to the region in times of high production (and high violence) might have contributed to increased violence by decreasing social capital and eroding business relationships, thus increasing the probability of conflict.

952), the specific properties of markets, including the resources they are based on, “can shape markets and the resulting institutions of extraction.”

The properties of markets can make property rights harder to enforce, and can interact with the state’s ability to provide the rule of law, especially in the case of prohibition.

Prohibitions by the state and criminalization of legal products shape the type of market formed (Andreas, 2006, 643). Illicit markets, but the interactions of buyers and sellers, the properties of specific products, and prohibitions create unique contraband markets (Kleiman, 1993, 104-107, 115). The markets formed exhibit high transaction costs that lead to a greater propensity for violence, especially in the absence of a legal method of dispute resolution. The key finding is that the framework in which resource markets are embedded is the key determinant of levels of violence. In this sense, property rights are part of this framework and are important because they decrease transaction costs. Colombia is a relatively weak state, and most resources are produced where the state has minimal influence. This leaves room for competition among other actors to compete over resources.

## **Methodology**

In this chapter, I examine how resource production affects crime rates at the municipal level. To do this, I use a mix of structured interviews, case studies based on archival research, and statistical data analysis to test my hypotheses.<sup>129</sup> I use multivariate OLS and Poisson regressions to statistically analyze both data collected on key variables. Statistical data was largely collected from the National Bureau of Statistics (DANE) in Bogota, Colombia, and from

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<sup>129</sup> I obtained local level data during fieldwork in Colombia funded by the UCLA International Institute Fieldwork Fellowship in 2010, and the UCLA Tinker Fellowship in 2009.

several Colombian research Institutions.<sup>130</sup> I was able to obtain valuable qualitative data from local universities, international institutions, government agencies, non-governmental organizations, and original fieldwork.

In statistically analyzing the relationship between homicide rates over time and lootable resource production, I use homicide as the key dependent variable. Murder rate is widely recognized as the best method of measuring crime across nations because its definition and classification are similar across most countries (Fajnzylber 2002), and murder rates are usually good proxy measures for other kinds of crime (Lynch, 2004). I have municipal level data for production of several agricultural and mineral products, including coca, and control variables measuring infrastructure and poverty.<sup>131</sup> Missing data was imputed using standard Amelia techniques, and adhered to all normal checks for compatibility with the procedure (Honnaker et al., 2001; 2006).<sup>132</sup>

As with the cross-national study of crime, endogeneity is a serious concern, and the direction of causality is often difficult to ascertain with large statistical studies. I attempt to overcome that problem by relying on qualitative case studies to more closely examine directionality than is possible in many purely quantitative studies.<sup>133</sup> This is done on a local level in specific areas of interest based on prior research and the results of statistical analysis. In an

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<sup>130</sup> I would like to especially thank Ralf Leiteritz, Frederico Seguro, and Juan Vargas for their help in obtaining data. I would also like to thank the Political Science Department at the University of Los Andes in Bogota, Colombia and the International Development Resource Center, which funded the initial data collection by researchers in Colombia.

<sup>131</sup> The total list of variables is extensive, but includes homicides as well as production of oil, flowers, coca, gold, emeralds, palm oil, and coffee. I have population, aqueduct, and sewer coverage data as well. I also have the “Unmet Basic Needs Index,” which is a measure of poverty in all of Latin America. All data is at the municipal level.

<sup>132</sup> I would like to thank Matt Spense for help with data imputation.

<sup>133</sup> There are other methodological problems in trying to relate the production of natural resources, especially contraband, to homicide. This is partly because production and violence do not exactly correlate to price and there is a confluence between drugs and legal resources. Also, contraband can be stockpiled, further complicating any straightforward economic analysis. In addition, many factors determine the export price of gems and drugs in Colombia. Drug gangs are often related to the dependent variable (homicide rate), even in regions they do not necessarily produce coca in. Again, focusing on the municipal level in Colombia will control for some, and hold constant other, aspects of important explanatory variables. The study can then focus on affects of natural resource production with the available data.

attempt to explain the mechanism of interest, the case studies will focus only on the outcomes relevant to this study, such as the relationship between mineral resources, property rights, and violent crime. In order to avoid selection bias, I first statistically analyze the factors of influence in a national level multivariate regression to ascertain areas of interest. I then focus on explaining the relevant methods of property rights enforcement at the community level. It is possible to select explanatory variables and not introduce bias (King, Keohane, Verba, 1994, 129).<sup>134</sup> For the case studies, this means selecting regions with similar levels of mineral production because this is my key variable of interest, but with variation of the dependent variable, homicide.

My interviews were designed to obtain expert opinion on exactly how mineral production and resulting contraband markets are administered, and evaluate competing mechanisms between crime, illicit markets, and property rights. They include individuals in industry and government, as well as police and politicians in areas of interest. Focusing local-level analysis on a single country facilitates research from a methodological standpoint and helps to control for variables that might vary from country to country. If we can use evidence collected in Colombia to uncover the mechanisms involved in how quality of governance relates to crime and contraband markets, these findings can be applied to other countries and regions.

### *Testable Hypotheses*

There are several hypotheses of interest, described in more detail in the previous chapter, which can be tested by the available data.

*Hypothesis 1:* When there is no strong state or non-state actor to enforce property rights, incentives for competition make violence more likely.

*Hypothesis 2:* Violence should be higher in areas of lootable resources.

*Hypothesis 3:* Property rights enforcement decreases violent crime rates.

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<sup>134</sup> For a detailed explanation of the dangers of selecting on the dependent variable, see Geddes (2005) chapter 4.

## Results and Discussion

The regression techniques described in the previous section produce many interesting results and lead to some counterintuitive findings. These results are robust in several different model specifications and regression techniques.<sup>135</sup> As shown in Table 4.1, the major findings are that agricultural resources are insignificant predictors of crime rates, though with varying signs. Oil production is also insignificant, although with a constantly negative sign. Emerald production is an insignificant predictor of homicide, with a constantly positive sign. Coca production is significant at the .01 level and positive. Surprisingly, gold production is significant at the .01 level, and negative. The measure for infrastructure (aqueduct coverage) is significant and positively associated with crime, the opposite of expected findings. However, it is insignificant when only looking at towns with less than 50 thousand inhabitants. Likewise, the Unmet Basic Needs Index (a measure of poverty), commonly known by its Spanish acronym, NBI, is consistently negative, the opposite of what is expected. As a check on results, population is always positive and significantly correlated to murder rates at the .01 level. The most surprising findings in this analysis are the negative results for gold production, and the positive findings for infrastructure and for NBI. As surprising as these results seem, the fact that population and coca production are always positive and significant lends credibility to the analysis. Case study evidence, both at the national and local level, sheds further light on the results. While the results are counterintuitive, they can be explained by the institutional arrangements of the market.

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<sup>135</sup> This includes different regression techniques, like Poisson, OLS and GLS, and the inclusion of fixed effects for state and year. Additionally, models were used with and without variables that could be problematic. This includes variables such as the Gini coefficient, which is notorious for poor data quality, and the production of flowers, which are predominately produced in one state, Antioquia, which is also one of the most violent departments. In addition, dummy variables were used instead of production levels to partially control for endogeneity, and results remained the same.

**Table 4.1**  
**Regression Results for Colombia Municipal Homicide Rates**

<b>Dependent Variable = Homicides</b>					
<b>Statistical Models</b>	<b>Poisson with State Fixed Effects</b>	<b>Poisson with State and Year Fixed Effects</b>	<b>OLS with State Fixed Effects</b>	<b>OLS with State and Year Fixed Effects</b>	<b>OLS</b>
<b>Independent Variables</b>					
<b>Emerald</b>	0.0308 (0.0225)	0.0313 (0.0218)	0.8183 (0.6210)	0.8059 (0.6211)	1.0266 (0.6375)*
<b>Gold</b>	0.0114 (0.0048)*	-0.0127 (0.0053)*	-0.3866 (0.2021)*	-0.3869 (0.2027)*	-0.4797 (0.2089)***
<b>Coca Production</b>	0.0814 (0.0210)**	0.0735 (0.0230)**	1.6936 (1.0624)*	1.6646 (1.0748)*	2.2983 (1.0766)**
<b>Palm oil Production</b>	-0.0022 (0.0021)	-0.0022 (0.0022)	-0.0403 (0.0467)	-0.0402 (0.0469)	-0.0314 (0.0431)
<b>Oil Production</b>	-0.0008 (0.0015)	-0.0008 (0.0015)	0.0083 (0.0466)	-0.0083 (0.0466)	0.0332 (0.0538)
<b>Coffee Production</b>	0.0021 (0.0023)	0.0019 (0.0021)	0.2174 (0.2059)	0.2171 (0.2062)	0.2526 (0.1884)
<b>NBI</b>	-0.0049 (0.0012)**	-0.0050 (0.0012)***	-0.0886 (0.0257)***	-0.0888 (0.0256)***	-0.1361 (0.0241)***
<b>Gini</b>	-0.1164 (0.0783)	-0.1012 (0.0732)	-0.8151 (3.3704)	-0.7210 (3.3485)	-4.4593 (3.7266)
<b>Log population</b>	0.6958 (0.0044)***	0.7019 (0.0050)***	18.3728 (0.6647)***	18.3922 (0.6730)***	19.4029 (0.6919)***
<b>Aqueduct Coverage</b>	0.0019 (0.0006)**	0.0018 (0.0006)**	0.0510 (0.0261)*	0.0508 (0.0261)*	0.0508 (0.0261)*

Coefficients in the table report the estimated effect on homicide rate in Colombian municipalities. Data was imputed using Standard Amelia techniques, as described in the Methodology section. Standard errors are in parenthesis.

Estimations performed using STATA 10. \*p<.1; \*\* p<.05; \*\*\* p<.01

*Hypotheses 1:* When there is no strong state or non-state actor, incentives for competition make violence more likely.

The capacity for violence of the actors involved, including the state, is a vital component to the study of violent crime. Much of the variation in violent crime cross-nationally is explained by the effectiveness of government in deterring criminal behavior, as discussed in the first two chapters of this dissertation. The absence of a monopoly of force leads to violent competition due



to a general increase in transaction costs, the prevalence of black markets, and increased organizational costs. In regions where a single entity, such as the government or guerilla organizations, is able to enforce property rights and control or reduce illicit markets, violence levels should be lower. While it is difficult to test statistically, I attempt to do this by using two statistical proxies for state strength, a measure of infrastructure (aqueduct coverage), and a measure of poverty (the NBI index), as well as extensive case studies.

As described above, the Colombian state is considered relatively weak and ineffective. In fact, there are many parts of the country outside of state control, especially where mineral resources are produced (Bejarano and Pizarro, 2003; Thoumi, 2003). The state often fails to provide a strong police or judicial system that protects property rights. For example, in the late 1990s Colombia had 1,670 police officers per million, one of the lowest police per capita ratios in the world, even lower than that of countries such as Peru and Malaysia (Rubio, 1999, 182; Thoumi, 2003, 274-275). The lack of state presence allows other powerful actors to attempt to establish control. The contestation over lootable resources production in an area of little state presence generally leads to increased violence (Weinstein, 2007, 251-257). Colombia's recent history provides further evidence of this.

There are two available statistical measures that might proxy for the strength of the state. These are NBI and aqueduct coverage. In the statistical analysis, NBI is consistent and negative, while aqueduct coverage is significant and positively associated with crime, the opposite of expected findings.<sup>136</sup> However, NBI and infrastructure measures might not accurately measure

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<sup>136</sup> As a check on data quality, the poverty and infrastructure measures do show the expected relationship to each other; as infrastructure increases, poverty decreases. The relationship between murder and kidnapping, and murder and displacement, also show the expected relationship as a further check on data quality.

the ability to deter crime in Colombia for several reasons.<sup>137</sup> Critically, under Uribe's Plan Colombia strategy, the state specifically targeted high crime and unstable areas for increased state presence, pushing out rebels and other actors in many areas (Restrepo and Spagat, 2005). This partially explains the negative correlation of crime and infrastructure provision on a national level. Additionally, when looking at towns smaller than 50 thousand people, infrastructure measures are insignificant in predicting crime. Most of the recent crime in Colombia has become an urban phenomenon (McDermot, 2010). As outlined in Plan Colombia and Thoumi (2003, especially 270-276), variables such as police per capita, military presence, and effective judiciary are probably more important in assessing Colombia's state strength.

Most importantly, the fact that infrastructure provision and poverty measures are not predictors of crime is consistent with previous research in Colombia (Bejarano et al., 1997; Daza, 1996; Rubio, 1999; Thoumi, 2003). In fact, these variables are also not accurate predictors of where or when illegal narcotic markets form (Thoumi, 2003) - other lootable resource markets, such as those for gems and gold, are at least somewhat constrained by geology. However, poverty and infrastructure seem to be legitimate, if imperfect, measures of state strength (FL, 2003; Sckocpol 1979, 1985; Snyder 1987). The fact that they are not significant is evidence that the effect of drug markets is very strong in Colombia. In fact, Mejia (2012) and Mejia and Restrepo (2011) find that illegal drug markets increase Colombia's murder rate by 35 percent. Without this "bump" from drug markets, Colombia's murder rate would approach the

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<sup>137</sup> NBI is problematic because the way it is measured might not accurately measure income, especially in the short to medium term. NBI measures poverty by access to drinking water, safe shelter, and other circumstantial measures, and not income directly. These factors change much more slowly than income. An overview of the NBI measurement can be found in "An Analysis of the Index of The Unsatisfied Basic Needs (NBI) of Argentina with suggestions for improvements" (ECLAC, 2011) <http://www.eclac.cl/deype/mecovi/docs/TALLER5/9.pdf>, "Refining the Basic Needs Approach: A multidimensional Analysis of Poverty in Latin America" (Santos et al., 2007) [http://www.cepal.org/deype/noticias/noticias/0/38360/Santos\\_Lugo\\_Lopez\\_Calva\\_Cruces\\_and\\_Battiston.pdf](http://www.cepal.org/deype/noticias/noticias/0/38360/Santos_Lugo_Lopez_Calva_Cruces_and_Battiston.pdf), and "Expert group on poverty statistics – Compendium of Best Practices in Poverty Measurement" (Rio Group, 2006) [http://www.insee.fr/en/insee-statistique-publique/colloques/pauvrete/pdf/Rio\\_Group\\_Fall\\_EN.pdf](http://www.insee.fr/en/insee-statistique-publique/colloques/pauvrete/pdf/Rio_Group_Fall_EN.pdf)

regional average. The results indicate that the presence of lootable resource production can be even more important in predicting crime rates than measures of poverty or infrastructure, and possibly other measures of state strength.

While statistical proxies for poverty and infrastructure might not predict levels of violence across Colombia because of the strong effect of the drug market, different levels of hierarchy and property rights enforcement within lootable resource markets do seem to have an effect on violent crime rates. Where organizations gain control of production areas, they actually can replace the state to a degree and establish some form of governance, although typically not as effective as a state. Case study evidence supports these findings in gold, gem and drug producing regions in Colombia and Peru. When the FARC control areas of coca production, violence appears to be lower than when less organized drug syndicates are in control, and they do provide some of the services that a government provides (Thoumi, 2003, 201; Weinstein, 2007, 291-294). Additionally, guerilla groups in Colombia decrease crime rates in marijuana growing areas by regulating the market and extracting taxes in exchange (Thoumi, 2003, 82). The same appears to be true in coca producing regions in the Upper Huallaga Valley in Peru. When the Sendero Luminoso was in power, crime rates were lower than when drug gangs were in power (Gonzales, 1992, 125-130; Weinstein, 2007, 251). This effect is not limited to just cocaine and coca production. In emerald production areas of Colombia the level of stability between the families and their incentive to enforce the peace greatly affects crime rates. When emerald families supply public goods, rates of violence are much lower.<sup>138</sup> There is also a large variation in levels of violence in gold production areas, even though the state is very weak in most regions that produce gold. When large corporate mines enter production, they usually have

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<sup>138</sup> Information on levels of stability and public goods provision comes from original fieldwork in the production region and Leteiritz et al. (2009; 2011), as well as national police statistics.

strong state backing in the form of military presence (Lopez-Gamundi, 2011; Mejia, 2012; Wyss, 2011). Most of this variation is driven by a lack of property rights enforcement. As will be elaborated on below, when either a community or other organization is able to enforce property rights, levels of violence are lower. When no one group is able to control a production site, groups compete for control and levels of violence are much higher.<sup>139</sup>

Another area where effective property rights enforcement affects violent crime rates is oil production in Colombia. Oil does sometimes have properties of lootable resources, especially when it can be stolen from pipelines, wells, trucks, or ports, can be extorted by threat of sabotage, or oil workers can be held for ransom (Ross, 2012, 169-179).<sup>140</sup> Oil is statistically significant at a low level in predicting violent crime cross-nationally, as discussed in chapter two. However, oil is not a significant predictor of violent crime in Colombia due to the fact that the Colombian oil industry is highly connected to the state (Rettberg et al., 2011) and funds security forces that directly defend oil production.<sup>141</sup> In addition to direct foreign government support (such as the U.S. funded “Plan Colombia”), the state security apparatus usually receives funding from large multinationals. For example, in Colombia, beginning in 1992, a “war tax” of \$1 per barrel on foreign corporations helped increase troops in oil producing regions.<sup>142</sup> In 1996 the Colombian military estimated that half of Colombia’s troops were used to protect the oil

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<sup>139</sup> Information on public goods provision in Colombia comes from original fieldwork, analysis from the think tanks, such as Insight (Mining and Crime Intersect in Colombia Gold Rush Town, January 2012, 2012(<http://insightcrime.org/insight-latest-news/item/2049-mining-and-crime-intersect-in-colombia-gold-rush-town>), and COHA “Colombia’s Gold Rush: The Silver Lining for Paramilitaries and Guerillas” (<http://www.coha.org/colombias-gold-rush-the-silver-lining-for-paramilitaries-and-guerrillas/>), and newspaper articles from the Economist “Guerilla Miners” January 27<sup>th</sup>, 2011; New York Times, “In Colombia New Gold Rush Fuels Old Conflict”, March 3, 2011 ([http://www.nytimes.com/2011/03/04/world/americas/04colombia.html?\\_r=1&pagewanted=all](http://www.nytimes.com/2011/03/04/world/americas/04colombia.html?_r=1&pagewanted=all))

<sup>140</sup> For an excellent description of the myriad problems associated with oil production see Ross (2012), and for the connection between oil production and violence specifically, see pages 145-178. For a summary of oil production and violence in Colombia, see pages 173-174.

<sup>141</sup> However, oil production does seem to predict violent attacks from paramilitaries (non-state armed groups), which is different than overall crime rates (Dube and Vargas, 2009).

<sup>142</sup> Additionally, in 1996 the Colombian military estimated that half of Colombia’s troops were used to protect the oil pipelines, and this increased to two-thirds by 2001 (Dunning and Wirpsa, 2004, 91).

pipelines, and this increased to two-thirds by 2001. Occidental Petroleum estimated that 10 percent of its in-country operating budget (as much as \$750,000 annually) went to security, mostly the Colombian military, and Ecopetrol paid \$12 million to the Colombian armed forces annually (Dunning and Wirpsa, 2004, 91). The U.S. Congress also authorized \$98 million in funding to create a special battalion of the Colombian Army specifically to protect the Cano-Limon pipeline (Chernick, 2005, 194).

In general, when production is capital intensive and it is possible to capture sufficient profits, an investor, private or public, is willing to pay more to protect property rights, which should reduce violence. This contrasts to production in which it is difficult capture profits, thus decreasing the incentive for investment, as is the case with lootable resources. Oil is not as lootable as other products in this study, and profits can therefore be more easily captured and used by the state to finance a strong security apparatus. Contraband revenue, however, is completely outside state capture due to its illegality (Cornell, 2005; Ross, 2004a).<sup>143</sup>

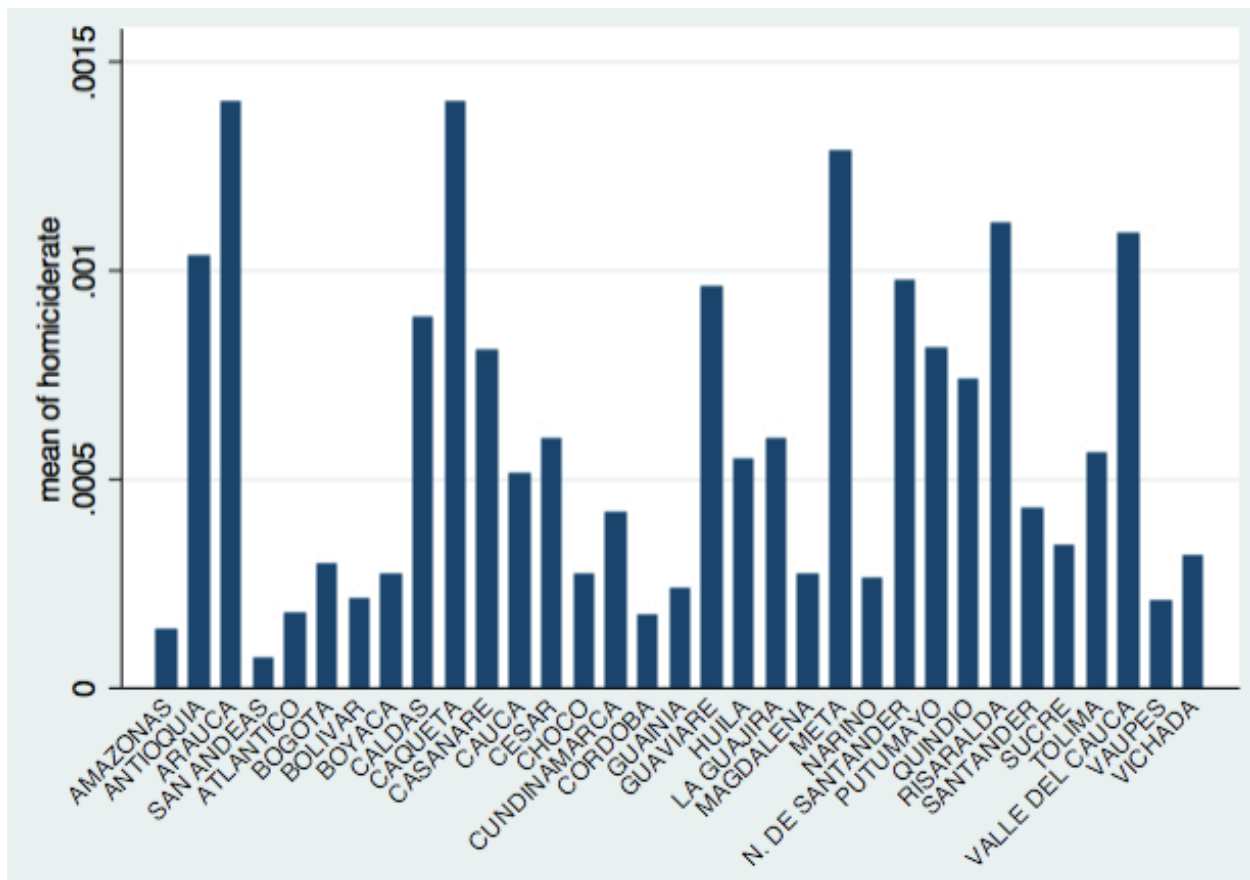
In Colombia, there is a high amount of variation between departments, as shown in Figure 4.1 below. Some of the variation is initially due to the fact that the government is weak or nonexistent in some areas. State strength explains some of the variation we see cross-nationally in violent crime rates, but it is difficult to determine exactly what aspects of effective governance are most important in deterring crime. In addition, there are other factors that, in more recent decades, appear to be more important. Second, there is a relatively high amount of variation in crime rates between cities and regions where the state is strong, such as between the cities of Medellin and Bogota, and cities and regions where the state is weak, such as the countryside of Choco and Boyacá. The variation in violent crime rates between areas of different lootable

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<sup>143</sup> The government does tax emeralds and gold, but at very low levels, especially in the case of emeralds (Leteiriz, 2009). Additionally, according to interviews conducted during fieldwork, much of the emerald and gold production is exported illegally without paying export taxes.

resource production, especially when state strength is held more or less constant, might reveal a relationship between different types of natural resource production and violent crime. This relationship is more closely examined in the following section.

**Figure 4.1**  
**Variation of Colombian Homicide Rate by Department (State)**

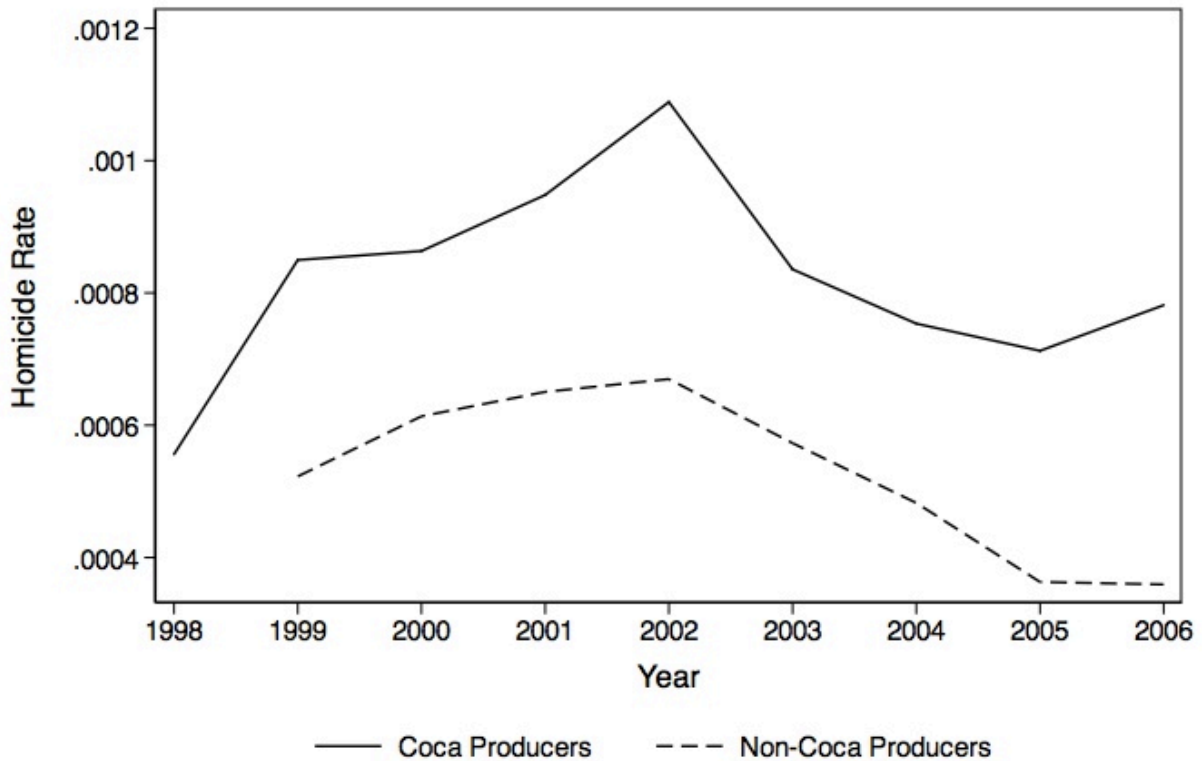


Source: DANE (2009)

*Hypothesis 2:* Violence should be higher in areas of lootable resource production.

The markets surrounding different types of resources might contribute to the variation in crime rates between regions of Colombia. Agricultural production does not correlate to levels of violence because of lower lootability, specifically a smaller value to volume ratio of agricultural products. The results for coca production are expected due to the high transaction costs in cocaine markets and the lootability of the product. The effect of cocaine on violence is shown in Figure 4.2, where municipalities that produce coca are shown against those that do not. It is apparent from the graph that cocoa production corresponds to increased murder rates. In fact, the cities that function as the center of the cocaine market (though not coca production), Medellin and Cali at varying times, are typically the most violent in cities Colombia, as will be discussed later.

**Figure 4.2**  
**Homicide Rate in Coca and Non-Coca Producing Municipalities in Colombia**



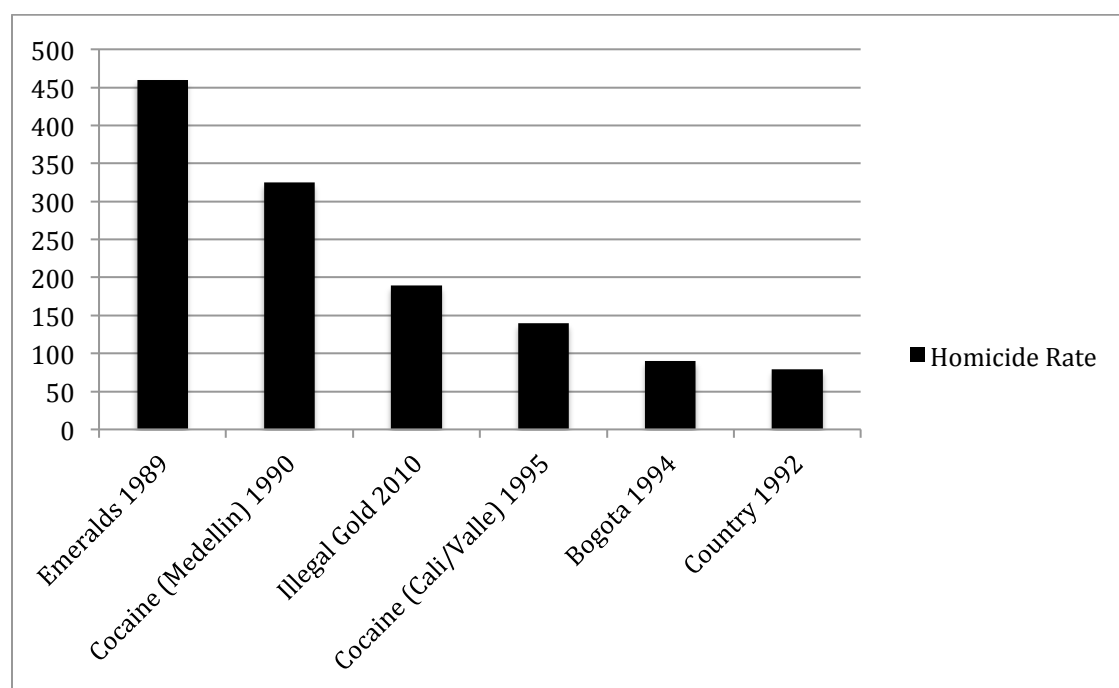
Source: DANE (2009)

The results for the gold and emerald regions are counterintuitive, but a closer analysis of the data yields interesting findings. There are two reasons that emerald production is found to be statistically insignificant as a predictor of murder rates in this study. First, this finding of statistical insignificance might be due to the small number (9 out of 1100) of municipalities that produce emeralds. Second, although at times the emerald production region was extremely violent, the timeframe of the statistical analysis captures the emerald region in a period of relatively low violence. However, as shown in Figure 4.3, where the murder rate of lootable resource production centers, the capital, and the national average are shown at their highest



levels in the last thirty years (outside of the time frame of statistical analysis), the emerald producing region has the highest per capital murder rate in modern Colombian history, and one of the highest in the world. As will be elaborated on below, during this time the powerful families in the region were unable, or unwilling, to produce a stable market environment and enforce property rights, as reflected in the breakdown of institutions and increases in murder rates.

**Figure 4.3**  
**Maximum Murder Rate in last 30 Years by Resource Type in Colombia**



Source: DANE (2009), National Police (2009), New York Times (2010), UNODC (2006)

The low level of violence in the legal gold production region is another unexpected finding. There is actually a negative correlation with gold and homicide rates over the time frame covered in statistical analysis. However, as shown in Figure 4.3, there is a distinction between

legal gold and illegal gold. This seems to indicate that other factors in lootable resource production can mitigate the effects of lootability, and the relationship between legal and illegal gold production will be explored further in the following section.

In conclusion, although there is a connection between lootable resource production and crime rates, there must be other factors besides quantity or price of resource explaining the variation in crime rates between regions. Property rights enforcement might explain some of this variation. Lootable resources increase transaction costs, make property rights more difficult to enforce, and increase the propensity of illicit markets. The narcotics markets and secondary (informal) gemstone and gold production are largely outside of government control,<sup>144</sup> and business disputes will tend to be solved with violence unless other actors fill the power vacuum and enforce property rights. The black market increases both the cost and profitability of drug and gemstone production, generating more violence because of more powerful criminals and the spillover effects into other sectors of society. The control of revenue streams is a key factor in limiting violence (Weinstein, 2007, 294), and should be harder for an actor, either government or non-government, when products are lootable. Thus, the difficulty in enforcing property rights in lootable resource markets could explain much of this variation in violent crime rates between lootable resource production municipalities. The connection between property rights, natural resource production, and violent crime will be further analyzed in the following section.

*Hypothesis 3: Property rights enforcement decreases violent crime rates.*

In this section, I more closely examine the role of property rights in decreasing violent crime in lootable resource production areas. There are several types of property rights, including legal property rights imposed by the state, informal property rights imposed by a community, and

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<sup>144</sup> In many countries, such as Bolivia and Peru, the production and use of coca is legal, but processing and distributing coca paste – the base form of cocaine – is not. In Colombia, the production of coca is illegal.

property rights imposed by illegal actors.<sup>145</sup> It is difficult, but possible, to measure the affect of property rights on violent crime by comparing various distribution and production areas with different levels of property rights enforcement. I attempt to do this by two distinct methods. First, I examine levels of crime after the breakdown of the system of property rights enforcement in individual markets.<sup>146</sup> Specifically, I focus on waves of violence from the destruction of equilibrium, through the assassination or capture of key leaders. Second, I compare violent crime rates in regions of various types of legal gold production with property rights enforcement in areas of illegal gold production (where there is little property rights enforcement). In the first comparison of gold production regions, I examine how community property rights can decrease violent crime rates by comparing crime rates in the department of Choco with those of Antioquia. In the second gold production region comparison, I examine the effect of legality by comparing municipalities with a high number of legal land titles to mines with municipalities with a very high presence of illegal gold markets.

#### *WAVES OF VIOLENCE DUE TO INSTITUTIONAL BREAKDOWN*

One method of testing the importance of property rights enforcement in decreasing levels of violence is to examine levels of violence when property rights enforcement breaks down after a disruption in the equilibrium, or status quo, in lootable resource markets. There appears to be fluctuations in violence surrounding the assassination or capture (and often extradition to the U.S.) of heads of criminal and family organizations. These changes in equilibrium usually create a spike followed by a subsequent return to a steady state of violent criminal activity that is lower than the spike, but higher than previous levels before the breakdown. The “Dons” control operations in production or distribution areas, and are critical to enforcing property rights.

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<sup>145</sup> For a theoretical discussion of the formation of property rights see Eggertsson (1990), especially pages 59-153.

<sup>146</sup> Again, this is similar to what Synder (2006, 952) calls “institutions of extraction,” however, he focuses on government-private relationships more than on property rights specifically.

I will outline five cases of the breakdown in property rights enforcement that occurred after a disruption in equilibrium. These case studies are, by necessity, brief, and leave out many important details due to space constraints. The first example is that of Medellin and Pablo Escobar in the early 1990s. The second, also in Medellin, is the more recent capture and extradition of the drug boss “Don Berna” in late 2008. The third is the capture or killing of several crime bosses in Cali that occurred in two periods, 1992-1997 and 2004-2007, both of which were accompanied by spikes in crime and subsequent returns to lower, steady states. The fourth is the increase in violent crime associated with the assassination of two heads of powerful emerald families in Boyacá at two periods in time, and the subsequent peace deal that resulted in the current low levels of violence in the region. The fifth is the example of coca production in the Upper Huallaga Valley in Peru. These case studies were chosen because they represent variation on several important independent variables, including the resource type, rural and urban settings, as well as different time periods and geographical diversity.

#### *Medellin – Pablo Escobar*

Murders spiked dramatically in Medellin between 1989 and 1993. Medellin is Colombia’s second largest city and is located in Colombia’s wealthiest state. Since virtually the inception of the modern cocaine trade, it has been the center of the global cocaine market. Pablo Escobar was the undisputed ruler of the Colombian, and by default, global cocaine trade from the 1980s until his death in 1993. Although the cocaine trade is spread throughout the country and drug gang violence is not isolated to the city in which a drug gang is based, some basis for comparison is helpful. In the late 1980s and early 1990s, the country average for Colombia was between 70-80 murders per 100,000. During this same time the average U.S. murder rate was about 10 per 100,000, while the most dangerous cities in the U.S., such as Detroit, had a murder

rate of about 40-45 murders per 100,000 (Pinker, 2011, 52). In 2010, the murder rate in New Orleans, the most violent city in the U.S., was 52 per 100,000. The increases in violence in Medellin occurred in two phases during this period. The first spike was in late 1989 to mid 1991, when Pablo Escobar declared “war” on the government of Colombia. At this time, the rate was as high as 380 murders per 100,000 (Millaer-llana, 2010; UNDOC, 2006).<sup>147</sup> The increase in violence was due to the ability to bring two highly organized forces against one another: the armed drug syndicate versus the government (Bowden, 2001, 63-98; Cockburn et al., 1992; Guillermprieto, 1993; UNDOC, 2006, 18). As discussed in the previous chapter, the more hierarchical an organization is, the greater the ability to control violence, but also the greater ability to produce violence because of the economies of scale in the production of violence. The level of violence decreased when Escobar negotiated a peace deal with the government that allowed him to maintain control of his operation.<sup>148</sup>

The second phase of the spike in violence in Medellin resulted when Pablo Escobar escaped from his “jail” and went on the run in mid-1992. From his escape in July of 1992 until his death in December of 1993, government, rival drug gangs, and vigilante forces pursued him. It became increasingly difficult for Escobar to maintain control of his organization and former lieutenants and rivals became increasingly powerful as his power waned. During the time Escobar was on the run, most of the increase in violence comes from the instability and absence of market institutions (most importantly property rights) that his absence led to. This involved rival factions realigning themselves, settling scores, and competing over new business

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<sup>147</sup> There are discrepancies in murder rates from various sources. The UNODC records about 330 murders per 100,000 at this time. Regarding crime rates in Colombia in general, also see [www.distriseguridad.gov.co](http://www.distriseguridad.gov.co), and for crime rates in Medellin specifically, also see [www.medellin.gov.co](http://www.medellin.gov.co)

<sup>148</sup> Escobar negotiated a settlement with the government in late 1991 and was allowed to set the terms of his surrender. Although he was technically incarcerated in late 1991, he was allowed, or at least not deterred, from maintaining an armed group of bodyguards, cell phone and land line phone communications, wide screen televisions, frequent parties attended by prostitutes, and furloughs outside of the prison (Bowden, 2001, 98-115).

possibilities (Bowden, 2001, 118-249 –especially 168-200; Cockburn et al., 1992; Guillermprieto, 1993; UNODC, 2006,18-19). According to the UNODC (2006), violence reached over 300 homicides per 100,000. Because Escobar had been effectively removed from control of the Medellin cocaine syndicate almost a year before his death, most of the violence due to realignment of the market structure had already occurred by the time he was killed.

### *Medellin – Don Berna*

After Escobar's death and the realignment of the drug market structure, murder rates decreased to about 185 murders per 100,000, the same level as the mid-1980s (but still much higher than the early 1980s). As a point of comparison, the national average at this time was about 65 murders per 100,000. Starting in 2002 through 2008, crime decreased dramatically in Medellin, to as low as 34 murders per 100,000, a level below the level of the early 1980s (Miller-Llana, 2010; UNODC, 2006). While part of this is surely do to good police work and a stronger state as a result of Plan Colombia (crime fell throughout the country), it was also because one person, "Don Berna", had managed to take control of most of the criminal underworld of Medellin. His dominant control is one reason why crime was kept so low, because his rule enforced property rights in criminal markets and minimized conflicts (Pachico, 2012; Drost, 2010).<sup>149</sup> In fact, according to Garzon (2008, 46), "There was no crime" in Medellin without Don Berna's approval. He even managed to charge a 30 percent tax on virtually all criminal enterprise. Don Berna was captured and extradited in 2009, leading to another spike in murder rates. In fact, murder rates more than doubled from 2008 to 2009, increasing to 94.5 out of 100,000 (Miller-Llana, 2010). This spike in violence was due to the infighting and realignment

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<sup>149</sup> <http://www.insighcrime.org/criminal-groups/colombia/ofinica-de-envigado/item/80-oficina-de-envigado> and <http://www.time.com/time/world/article/0,8599,1967232,00.html>

of the remaining syndicate faction and a lack of a powerful actor to enforce property rights. The crime rate continues to rise in Medellin, and as of early 2011, the realignment of the market had not finished. So, while murder rates are much lower than in the 1990s, they are higher than in most of the past decade.

### *Cali and the Diffusion of Power*

The Cali cartels started to gain prominence in the late 1980s and early 1990s, filling the void after the demise of Pablo Escobar and the Medellin Cartel. After the growth and consolidation of smaller units, the Henao and Urdinola families consolidated power and kept violent crime at a relatively constant level. However, increased pressure from the authorities starting in 1992 led to numerous arrests and several assassinations of powerful drug lords, starting with Ivan Urdanola Grajales. His assassination initiated a spike in violence that lasted until about 1996, with murder rates reaching as high as 145 per 100,000, from a starting point of about 90 murders per 100,000. At this time, Diego Montoya (“Don Diego”) was able to consolidate power and reduce violence to a new steady state, initially comparable to the rate prior to the breakdown of the market in 1992, at around 90 murders per 100,000. Over time, the murder rate eventually dropped back down to levels as low as the mid 1980s of about 55 murders per 100,000 (UNODC, 2006). This period of relative stability lasted until the capture of Don Deigo in 2007, leading to a subsequent second spike in violence that lasted until 2008. After more than a year of intense fighting, the various factions settled into a new equilibrium, with lower crime rates, based on more of a network of small groups organized into “collection agencies” (Garzon, 2008, 40-46). These collection agencies are smaller and draw from more diverse revenue sources than previous syndicates, but their profitability and resilience is difficult to evaluate. The smaller syndicates do seem to be harder for government forces to target directly,

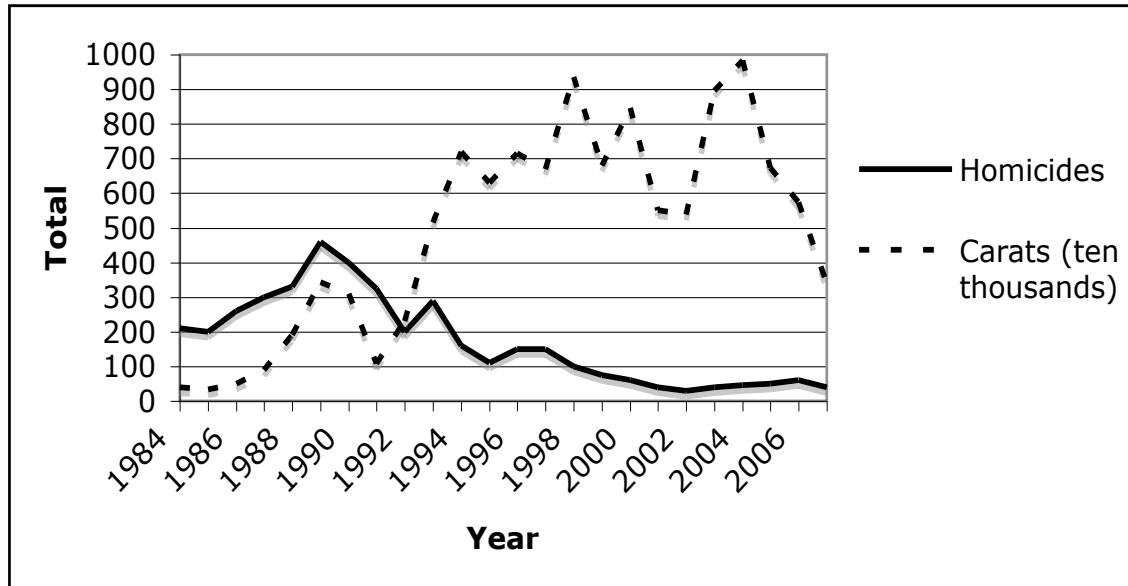
but also less powerful than traditional drug syndicates. They have lost ground to Mexican cartels and are still frequently punished by the Colombian government. While their overall profitability and effectiveness is difficult to analyze, both in a comparative and absolute sense, they do seem to be able to hold violent crime rates at a lower level than when the equilibrium was disrupted through capture and assassination.

#### *Emerald Production in Boyacá*

A stable market structure and the enforcement of property rights is also important in predicting levels of violence in the emerald producing region of Colombia. Emerald production is found to be statistically insignificant as a predictor of murder rates. However, as shown in Figures 4.3 and 4.4, when data from the 1980s and early 1990s are examined separately (outside of the time frame of my regression analysis), the emerald production region has the highest per capital murder rate in modern Colombian history. The Colombian emerald industry is unique in that it operates without a standard business framework or institutions, relying instead on personal connections and trust. Thus, the market structure provided by the ruling families is even more important to enforcing property rights and keeping levels of violence low. When assassinations do occur, they are key in disrupting the stability of the emerald market (Leiteritz, 2009, 13-21; Rettberg et al., 2011, 186-187).



**Figure 4.4**  
**Homicide Rate and Production in Emerald Region of Colombia**



Source: DANE (2009), Colombian National Police; Ralf Leiteritz (2011); National Police, (2009)

It is beneficial to re-examine the case of Colombian emerald production through the lens of property rights enforcement. The Central Bank of Colombia controlled emerald production in name, while the illegal trade in emeralds boomed. The contraband trade meant that real power was held by whoever could supply the biggest armed militia to protect illegal production and shipment. However, even the existence of a large illegal market was not enough to instigate a full-blown conflict due to the balance of power between leading families in the region. The start of the first war over emerald mines, or the “Green War,” coincided with the assassination of Efraim Gonzalez in 1965, introducing a period of increased violence and instability lasting until 1973. The peace came about through a realignment of power arrangements and the intervention of the military to restore stability. The second “Green War,” lasting from 1975-1978, closely followed the first and was preceded by the withdrawal of the military and a settling of unresolved

scores form the first Green War. As part of a peace deal, the government fully privatized the land and gave property rights to the controlling families. The ability of the powerful families to protect property rights ushered in an era of temporary stability. However, the absence of a strong state and the existence of lootable resources provided incentive for conflict. After a steady increase in violence through the mid 1980s, the assassination of Gilberto Molina, leader of the most powerful family, by a rival clan (the rival clan's leader was subsequently assassinated in revenge later that year) lead to a nearly 50% increase in murders over the previous year and the start of the third Green War, which lasted from 1988-1992 (Leiteritz et al., 2009, 15-16). The third Green War finally came to an end when a balance of power was reached between the families, and with the intervention of the military, church, political, and business leaders. However, even though the agreement brought peace between the families and in the formal mining sector, violence in the informal sector, between individual miners, continued to be high (Leiteritz et al., 2009, 19). Only when families decided to enforce the public goods, including property rights, did the murder rate in the informal sector, outside of the mines, decrease.

The history of the emerald production zone demonstrates the importance of market structure and property rights in ensuring a functioning market environment and keeping levels of violence low. The government recognized its inability to police the region in the long term and structured the peace agreement with a large degree of autonomy for the controlling families. With the peace agreement in place and a stronger government due to Plan Colombia, the state was able to put much greater pressure on the controlling families to keep violence down by enforcing property rights, both in the formal and informal sectors (Leiteritz et al., 2009, 19). The emerald organizations thus have incentives to provide the public goods that keep transaction costs low at this time, which helps to explain why emerald production can increase, poverty

remain high, and violence remain relatively low, as shown in Figure 4. However, even with pressure to decrease violent crime and provide public goods, the murder rate in the emerald region is higher than that of Bogota.

#### *Coca Production in the Upper Huallaga Valley of Peru*

Case study evidence in the Upper Huallaga Valley (UHV) of Peru reveals that a strong entity, whether the insurgent or government forces, can bring stability to this coca production region by enforcing property rights, and thus reduce crime rates. During the early 1980s, when the global cocaine market was relatively new, the UHV became a major coca production center, although it had no indigenous coca tradition. The Community insurgent movement, Sendero Luminoso (SL) was present in the region since at least the early 1980s, and initially were probably the single strongest actor in the region. However, a government campaign to retake the region pushed them out around 1984. Political and strategic decisions to focus on counter-insurgency as opposed to counter-narcotics allowed the drug gangs to largely take control of day-to-day affairs in the region. When these drug gangs did take control, crime increased dramatically. The criminal leaders used terror and violence to control civilians, gang members, and rival gangs (Gonzales, 1992, 126). After a brief period of conflict, the SL were subsequently able to take back control and fill a power vacuum left by a weak state and an ineffective political and judicial system. Coca production quickly became an important source of financing for the Sendero Luminoso, and they set up a rudimentary government, supplying public goods and enforcing property rights in the Coca production region. They formed what appeared to be a well organized hierarchy, setting up police and social service forces, and establishing order.<sup>150</sup> As a result, there was a reduction in violent crime rates (Gonzalez, 1992, 127-130; Tarazona, 1992,

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<sup>150</sup> The Sendero Luminoso did use targeted assassinations both against political opponents and as punishments in areas of control (Tarazona, 1992, 204). It appears that targeted assassinations in political conflicts did increase violence, crime, and general instability, while assassinations used for punishment did not.

199, 203; Weinstein, 2007, 123, 193, 291). So, while coca production did increase violence, corruption, and insecurity on a national level (Gonzalez, 1992, 133), the level of property rights enforcement instilled by SL in coca production regions decreased violent crime rates.

In summary, the evidence presented in these brief case studies demonstrates that the waves of crime depend on equilibrium between individual factions and the government, and when the equilibrium is disrupted, higher murder rates result until a new steady state level of violence is reached. The capture or killing of a mafia don or family boss seems to result in a disruption and violent reorganization of business relationships. This includes the fight over open markets between organization heads as well as score settling between lower level combatants. A new leader or strong state usually comes to power and is able to enforce property rights, thus decreasing murder rates.

## *LEGAL VERSUS ILLEGAL GOLD PRODUCTION*

### *Indigenous Production of Lootable Resources*

One common characteristic that many loutable resource production regions around the world have is an indigenous or traditional (community) based production culture with some property rights enforcement and delineated responsibilities regarding cultivation. This is true for many gem, precious metal, and narcotics production regions. Drug producing countries usually have an indigenous drug cultivation tradition, highlighted by the fact that drugs are only produced in a few specific areas around the world, whereas the ecology for drug production and conflict zones frequently overlap (Cornell, 2007). Initially, there was no coca production in Colombia, and thus no indigenous production tradition or protection of property rights. This changed in the late 1990s with the obstruction of shipment routes from Peru and Bolivia (Dreyfuss, 1999). Indigenous property rights are usually enforced within the community, but the

communities' right to do so is sanctioned by the state. It is uncommon that indigenous groups engage in violence over cultivation areas. Strong indigenous social ties and the subsequent, socially oriented dispersement of profits among these communities may be one reason that violence is much lower in countries with indigenous production traditions, such as Bolivia and Peru, as opposed to Colombia (Thoumi, 2003, 250). It might also be that coca leaf is much less valuable than processed cocaine, as discussed in chapter 2, but this still begs the question of why the cocaine industry developed in Colombia.<sup>151</sup>

### *Community Gold Mining*

Artisanal, or community, gold mining in Colombia has a strong and time-honored tradition.<sup>152</sup> Legal mining in Colombia can be separated into three distinct categories: indigenous or community (Afro-Colombian community owned mines) mining areas with clear legal title, informal, family owned mines that may or may not have official land title, and corporate mines, with government support and legal title.<sup>153</sup> Large scale, corporate mines are relatively few in number and typically have critical government support, including the military. Informal land title and small scale, family owned mines are difficult to obtain data for and not easily separated into legal and illegal operations. There are around 6,000 small-scale mines in Colombia, most of which have no formal title, with new mines emerging on a weekly basis. Each mine can support hundreds of informal workers (meaning hundreds of thousands of informal workers nationwide),

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<sup>151</sup> It is uncommon that indigenous groups engage in violence over cultivation areas. This initial phase of drug production is often legal and is usually a safe, if not a lucrative profession. In almost every country where initial drug production occurs, the state does not seem to punish growers, who are usually poor farmers, and often offers replacement crops. See for example, Alistair Leithead, BBC News "The secret of Thai success in opium war" <http://news.bbc.co.uk/2/hi/asia-pacific/7899748.stm>, and Robert Draper, National Geographic, "Opium Wars," <http://ngm.nationalgeographic.com/2011/02/opium-wars/draper-text>

<sup>152</sup> See, for example, Wyss "Where the gold is green, and so are the profits," <http://www.miamiherald.com/2012/03/03/2674413/where-the-gold-is-green-and-so.html>

<sup>153</sup> For an overview of land title and production data for mineral resources in Colombia, see the Colombian Ministry of Mines web page at: [http://www.minminas.gov.co/minminas/minas.jsp?cargaHome=2&id\\_noticia=436&opcionCalendar=4](http://www.minminas.gov.co/minminas/minas.jsp?cargaHome=2&id_noticia=436&opcionCalendar=4)

most of whom make no clear distinction between illegal and informal mining (Lopez-Gamundi, 2011; Pachico, 2012; Romero, 2011).<sup>154</sup> These factors, plus the way mining permits are issued, make comparison of every mine with legal title with every mine without legal title very difficult. However, it is possible to make several broad, general comparisons. By further separating out legal community and indigenous mining areas, it is possible to compare murder rates in these areas with murder rates in illegal mining areas. Community based mining has a solid legal status, as outlined in the Colombian constitution. Thus, it makes sense to compare levels of violence in regions with a high amount of indigenous/community mining regions with levels of violence in regions with a high presence of illegal mining areas.

I compare gold producing municipalities in the two very different departments of Antioquia and Choco in order to highlight how communities can play an important role in enforcing property rights.<sup>155</sup> About 84 percent of gold mining in Antioquia is illegal.<sup>156</sup> Choco, on the other hand, is home to the largest number of artisanal, family owned mines in the country, which also account for most of the production in the department. The Choco bioregion comprises one of the largest contributors to Colombia's gold production. Artisanal families with a communal mining tradition do most of the production within this region. The community council of Tado is in charge of 54,541 hectares of collectively managed land. This land is home to about 1,224 families, approximately 80% of whom are dedicated to artisanal mining. For example, the

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<sup>154</sup> According to Ingeominas, the government regulating agency, illegal means no mining work plan or environmental impact statement on file (Pachico, 2012).

<sup>155</sup> These departments do show variation of key independent variables. Choco has a below average murder rate, produces an above average amount of gold, a below average amount of coca, and is the poorest state in Colombia. Antioquia has an above average murder rate, produces an above average amount of gold, is the center of the cocaine business (although it produces a below average amount of coca), and is the richest department in Colombia. The data used in this chapter comes from the DANE government.

<sup>156</sup> Council of Hemispheric Affairs, "Colombia's Gold Rush: The Silver Lining for Paramilitares and Guerrillas." September 2, 2011. <http://www.coha.org/colombias-gold-rush-the-silver-lining-for-paramilitaries-and-guerrillas/>

community of Condoto is in charge of 87,801 hectares collectively managed land. This land comprises about 2,169 families, approximately 85% of who are dedicated to artisanal mining.<sup>157</sup>

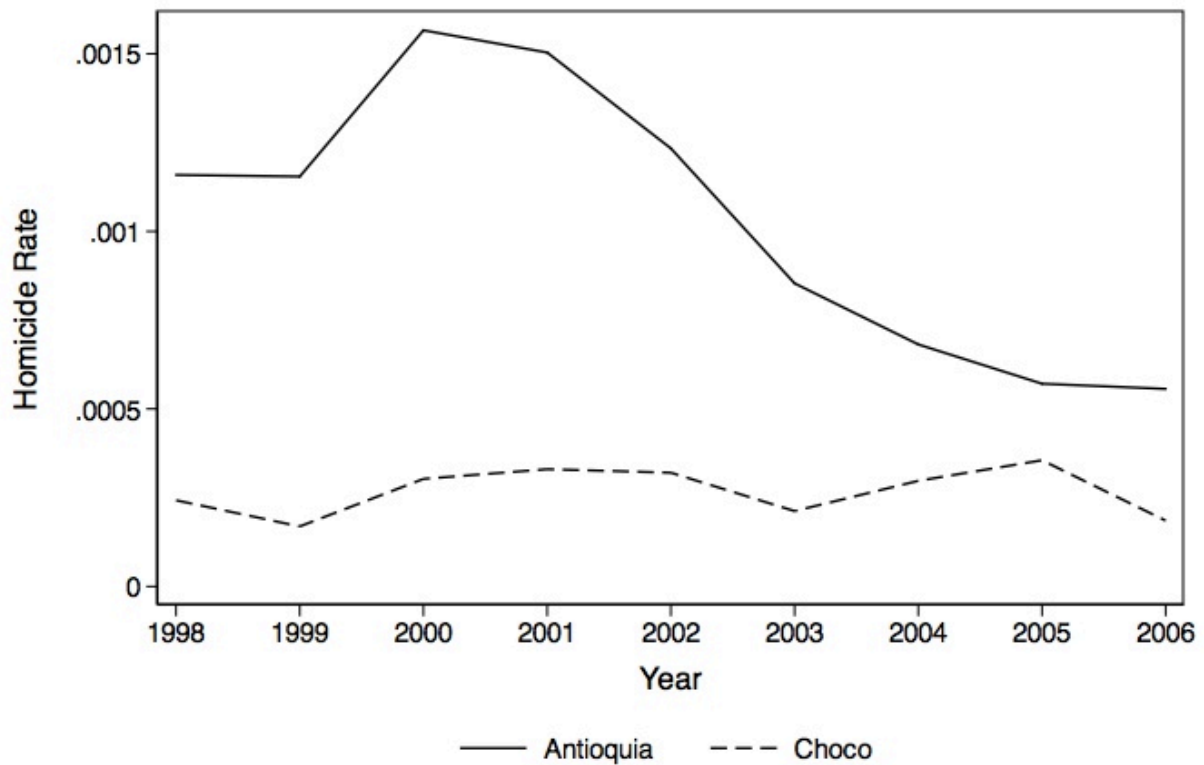
To make sure the selection of Choco as a state for analysis is not biased, it is important to compare it individually to other states that demonstrate variation on key variables. Choco has a below average murder rate, produces an above average amount of gold, a below average amount of coca, and is the poorest state in Colombia (DANE government database). In comparison, Antioquia has an above average murder rate, produces above average amounts of gold, is the center of the world's cocaine trade, and is one of the richest states in Colombia (DANE government database). The comparison of gold producing municipalities in Choco versus Antioquia is shown in Figure 4.5 below. The difference is striking and clearly shows that murder rates are lower in Choco than Antioquia during the time frame of statistical analysis (1998-2006). This analysis supports the idea that property rights enforcement in the communal aspect of gold mining decreases violent crime rates. As will be discussed in the following section, the increased price of gold might change this dynamic and increase murder rates in Choco. As discussed in chapter two, as the potential for rent extraction increases, communal property rights and social norms against violence become harder to enforce.<sup>158</sup>

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<sup>157</sup> This data comes primarily from the NGO Oro Verde, through both personal conversations with their representatives and their web page: [www.greengold-oro Verde.org/loved\\_gold](http://www.greengold-oro Verde.org/loved_gold)

<sup>158</sup> In fact, the murder rate in Choco is increasing and the last time I was in Colombia I was not able to access the region due to threats from armed groups. This comes from personal fieldwork conducted in March of 2012.

**Figure 4.5**  
**Comparison of Homicide Rate in Antioquia and Choco in Colombia**



Source: DANE (2009)

### *Legal Title to Gold Mines*

Another way to test the affect of property rights on levels of crime is to compare legal mining operations with illegal mining operations. Even if the state is weak, legality should provide some level of property rights enforcement. As previously stated, there is actually a negative correlation between gold production and violence on a national level. Most gold mines in Colombia are small, family owned operations, although this appears to be rapidly changing (Pachico, 2011). However, both corporate mines and community owned mines have clear legal title, and are able to enforce property rights at production sites. While most small-scale mines



(the majority of mines in Colombia) lack legal title, a useful comparison can be made between mines that have formal legal title and those that are clearly illegal.<sup>159</sup>

There is typically little state presence in resource production areas, including a lack of banks, social services, police, or military. However, there are increasingly large and profitable illegal mines (The Economist, 2011b; Mejia, 2012; Lopez, 2011; McDermot, 2010; Pachico, 2012; Romero, 2011;), attracting criminals and increasing violence. The high value of gold, especially over the last four years, makes it harder for property rights to be locally enforced because it requires a powerful actor with a monopoly of force. A majority of informal miners are not capable of enforcing property rights in this environment, and many illegal miners are attracted to the opportunity for financial gain. As the world price of gold increases, powerful illegal armed groups are becoming involved in the region and earning increasing amounts of money from gold mining operations (Romero, 2011).

Murder rates can be very high in areas of illegal gold production. For example, the community of Caucaasia is notorious for illegal gold mining and has one of the highest murder rates in the country (Romero, 2011), as shown previously in Figure 12. The nationwide relationship between legal gold production and illegal gold production is further demonstrated over the time frame of my statistical analysis in Figure 4.6 below. Here, murder rates in municipalities with high amounts of illegal mining are compared to murder rates of municipalities that produce other loutable resources, including legal gold mining operations.<sup>160</sup> The findings support the idea that property rights play an important role in influencing levels of violence. This finding is corroborated by recent research by Colombian economist Daniel Mejia

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<sup>159</sup> The designation of legal title comes from personal interviews conducted during fieldwork, newspaper articles, and think tank research in mining areas cited in this chapter.

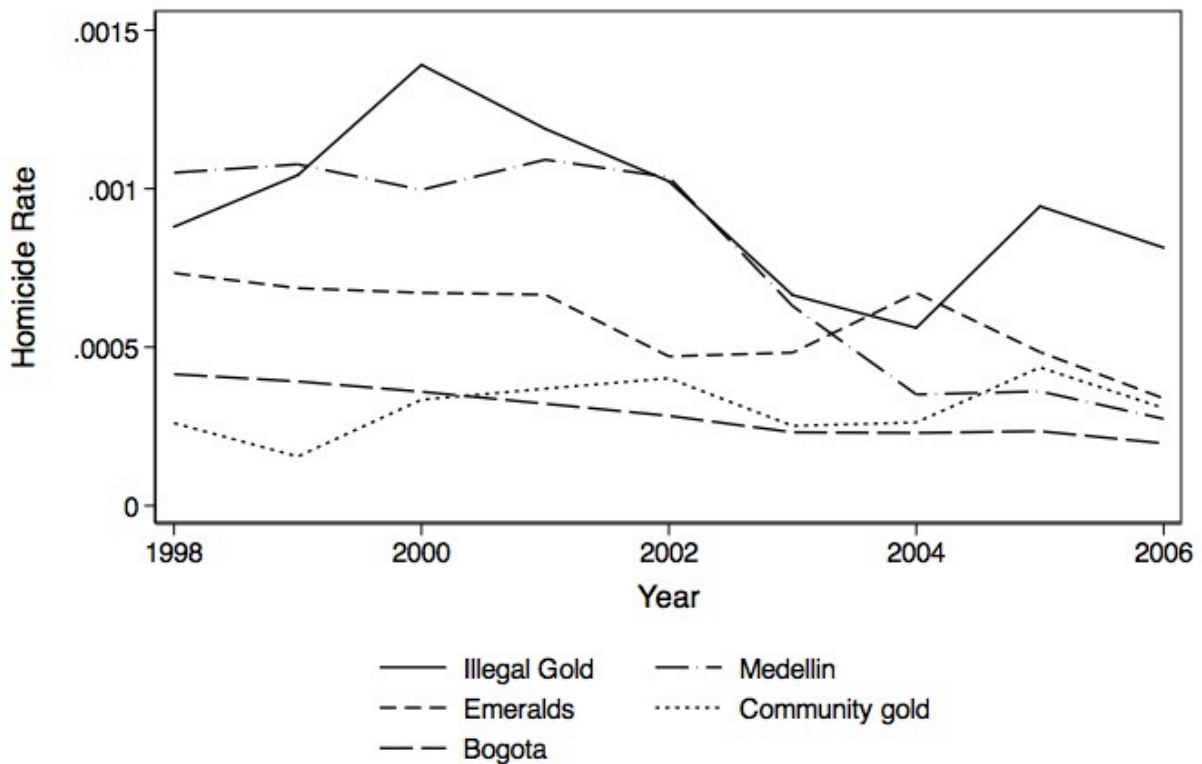
<sup>160</sup> The data for gold production in Figure 6 is outside of the time frame for statistical analysis in this study. However, violence has almost certainly increased in gold producing regions over the last several years due to the increase in global gold prices, as shown by Daniel Mejia (2012).

of the University of the Andes. Using the latest available data sets, (from 2006 to 2010 – the four year period after the statistical analysis of my study ends and when the world price of gold started to increase dramatically), Professor Mejia finds a clear negative correlation between the number of permits for gold mining and murder rates in gold mining regions. While the overall number of murders increase in gold mining regions as the world price of gold increases, murder rates decrease with formal land titles.<sup>161</sup> The increased levels of violence in illegal gold production areas is probably related more to a lack of clear property title and property rights enforcement than the overall level of production or global price of gold. This is further evidence that property rights enforcement is critical in decreasing violence in lootable resource production areas.

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<sup>161</sup> This information comes from a personal conversation with Professor Mejia in Bogota, Colombia, in March 2012, and from the article “El siguiente boom ilegal en Colombia? Minería ilegal y violencia”, <http://focoeconomico.org/2012/05/08/el-siguiente-boom-ilegal-en-colombia-mineria-ilegal-y-violencia/>

**Figure 4.6**  
**Homicide Rate in areas of Lootable Resource Production in Colombia**



Source: DANE (2009)

In summary, the evidence presented in this analysis points to the importance of property rights enforcement decreasing levels of violence. In the absence of a strong state, a powerful non-state actor or community can enforce the rule of law and property rights. The protection of property rights by various non-state actors might explain a large amount of variation in violent crime rates in Colombia. The three types of loutable resources examined above support the idea that property rights decreases levels of violence. First, cocaine markets within cities were less violent when a strong actor enforced property rights. Second, coca production correlates to violence in Colombia, with a lack of indigenous production, but is not nearly as violent in Peru or Bolivia, which have strong histories of indigenous production. Third, emerald production

from the 1980s and early 1990s was very violent, but the violence was reduced dramatically after 2000 when the controlling organizations protected property rights. Fourth, legal gold production in Colombia has relatively low levels of violence, while illegal gold production has very high levels of violence. Fifth, indigenous or community property rights enforcement decreases violence in gold production areas. Collectively, the findings support the idea that property rights play an important role in influencing levels of violence. Cultivation often takes place within indigenous communities that have at least some level of property rights enforcement and clearly delineated responsibilities regarding cultivation. These property rights can be formal or informal, but are usually widely recognized within the communities. Legal mining permits do seem to decrease murder rates in mining areas of Colombia, even if the state is relatively weak.

## **Conclusion**

My hypotheses examined the relationship between the production of lootable products, such as gems and narcotics, and violent crime, while controlling for other factors commonly attributed to crime in Colombia. I first explained why Colombia is a good case study for the connection of violent crime, lootable resources, and property rights. Second, I conducted statistical and case study analysis on three key hypotheses. The results of the statistical analysis I conducted on a local level in Colombia demonstrate three things. First, state strength does explain some variation in rates cross-nationally and in production and non-production areas of Colombia. However, it is not a good predictor of murder rates in Colombia because of the strong effect of drug markets, which essentially dominates the effect of many other variables. However, it is probably the case that a weak state is what allows a drug market to foster and grow initially, so over the long term there are endogeneity issues. Second, in general lootable resource

production is a significant predictor of murder rates unless there is an intervening factor such as strong property rights, while the existence of non-lootable resources is not. Third, the variation in murder rates between lootable resource production areas seems to be the result of property rights enforcement.

Property rights enforcement is achieved through either a strong actor, such as the state or powerful family, or through a cohesive community. Coca production in Colombia is done close to where the illicit cocaine markets take place and is not controlled by communities, leading to high levels of violence in these areas. Emerald production is done under the control of powerful families that currently have incentives and means to enforce property rights, and violence is held low in this production region. Gold production is largely artisanal and done at a community level, and communities are able to enforce communal property rights and keep violence relatively low.

Despite promising research, the identification of causal mechanisms is difficult, similar to the identification of causal mechanisms cross-nationally. In this study, I attempted to explain a small piece of this puzzle by examining the affect of lootable resources in Colombia on crime rates. The connection between lootable resource production and violent crime is related to the capacity of actors involved, the specific product market, and the resultant market structure. In other words, where and how the actual *business* of the contraband industry takes place. Property rights enforcement can shape the institutional framework in which markets operate and affect levels of violence. Property rights are established through the political bargaining process between actors in specific markets. Thus, property rights can be imposed by a strong actor, or established on a local level. Lootable products make property rights harder to enforce and interact with the state's ability to provide the rule of law, especially in the case of prohibitions.

The illicit markets commonly associated with lootable resources typically increase violence because normal business disputes are settled with violence. Property rights help designate who may use resources and how those resources may be used (Anderson et al., 2003, 4-7). Well-defined and enforced property rights, therefore, generally reduce transaction costs. A reduction in transaction costs decreases the likelihood of violent competition for resources.

## CHAPTER 5: CONCLUSION

The effects of violent crime have implications for global economic and political development. For several middle-income countries, such as Brazil, Thailand, and Colombia, reducing levels of violent crime could be the most important factor in determining whether or not they enter the club of wealthy nations and utilize their full economic potential. For many low-income countries, such as Iraq and Honduras, reducing levels of violent crime is more a matter of survival and critical in avoiding becoming a failed state. Not only do high crime rates lead to human suffering, local criminal networks are often connected to international criminal and terrorist organizations, further increasing their power and threatening to overwhelm overmatched governments. In my dissertation, I introduce a new explanation of the variation in violent crime rates between countries. In this conclusion, I condense my main argument of the relationship between violent crime rates and property rights and recap the most important findings of my research. I then consider the theoretical and practical contributions of my findings. Finally, I outline related areas for further research.

My theory connecting property rights enforcement and violent crime is general and should be applicable to states of varying strength and different resource markets. The only assumption I use is a modified rational actor assumption. The generality of the theory allows me to place the findings in a broader perspective. My analysis starts with a cross-national scope, elaborates on the theoretical connection between property rights and violent crime, and then retests these hypotheses on a sub-national level in Colombia. Data collection and analysis in high crime and conflict zones is notoriously difficult, and data quality is a primary concern in this and

other studies of violent crime.<sup>162</sup> However, with decades of data and more than seventy countries in the cross-national analysis, as well as over a thousand municipalities and nine years of data for Colombia, I am able to test my ideas with a level of data quality rarely obtained in previous studies. My finding that the existence of lovable resource markets and property rights enforcement have large, offsetting effects on levels of violent crime, suggests that the further study of property rights and transaction costs holds promise for future research on violent crime. Even if the case of Colombia is idiosyncratic, the consistency of results of cross-national and country level analysis lend considerable support to the importance of property rights enforcement being critical to decreasing levels of violent crime.

### *The Puzzle I Explain*

The issue I examine is the variation in violent crime between countries and over time, with a special focus on why different countries and regions have such diverse levels of violent crime. As discussed throughout my dissertation, these disparities are not fully explained cross-nationally by economic indicators, types of government, or factors such as numbers of police per capita. In order to analyze levels of violent crime, I use murder rates as my level of measurement. Homicides are a very specific part of violence in society and leave out many other important and devastating types of crime. However, other types of violent crime usually correlate to homicide rates. Additionally, the crime of murder has a clear and similar definition between countries and murder rates are the most reliable method of cross national crime comparisons (Lynch, 2004, 14-15; Fajnzylber et al., 2000; 2002). Thus, I test several hypotheses regarding violent crime both at the cross-national and local level. The two main objectives of my analysis

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<sup>162</sup> See, for example, Restrepo, Spagat, and Vargas (2005, 402-406).



are to explain why countries have such disparate crime rates and to elucidate possible causal mechanisms leading to violent crime.

### *Theory Overview*

I demonstrate that the production and transportation of lootable resources generates high transaction costs due to the characteristics of these markets, unless there is some level of property rights enforcement and the organization of criminal groups allows these groups to enforce property rights and maximize profits. When the cost of conducting business is high and no organization is able to enforce property rights or the rule of law, the probability of violence increases. Additionally, lootable resources facilitate illicit markets and contraband, which increase levels of violence. Property rights enforcement, even if informal, reduces transaction costs in the production and transportation of these resources and thus can reduce levels of violence. Therefore, the presence of lootable resource markets tends to increase violent crime rates, whereas a state or organization's ability to enforce property rights can reduce violent crime rates, both across countries and across the production of different types of lootable resources.

### *Chapter Summaries*

In Chapter Two I test my hypotheses regarding the effect of lootable resources on violent crime rates after testing several standard explanations of the variations in cross-national crime rates. Influential studies (e.g. Fajnzylber et al. 2002ab) examine cross-national crime data in order to highlight relationships between common theoretical explanations of crime and violent crime data. Moreover, most recent studies of crime have largely overlooked political and natural resource factors, which seem to explain some of the variation in violent crime across states. This is especially important given that the variation of between-country violent crime is much greater than the within-country variation over time, and regions have widely disparate crime rates.

The chapter begins with an overview of the major theoretical approaches to the study of violent crime. I then explain how natural resource production influences violent crime rates. To test my hypotheses, I use a multi-method approach combining cross-sectional time series regression analyses and qualitative case information. Homicide rates, widely recognized as the best method of measuring crime rates across nations (Fajnzylber 2002ab, Lynch 2004), serve as the dependent variable. The analyses of qualitative data explore the direction of causation and assess competing mechanisms that large-N statistical analyses are ill-suited to evaluate. In the discussion of results, I focus on the impact of factors not previously considered in the study of crime, outline the possible mechanisms involved, and highlight paths for future research. This paper suggests that some of the variation in violent crime rates can be explained by political and institutional variables, such as natural resource management, that many studies of violent crime ignore. Thus, the presence of lootable resource markets tends to increase violent crime rates, whereas a state or organization's ability to enforce property rights can reduce violent crime rates, both across countries and across the production of different types of lootable resources.

In Chapter 3, I outline my theory in further detail. The specific resources that markets are based on can also shape the resulting market structure and institutions (Snyder, 2006). Lootable resources increase the cost of business because of the opportunity for rents and the ease of theft and spillover of product and money. Lootable products also make the laws regarding property rights more difficult to enforce, especially in the case of prohibitions. The resultant illicit markets can engender violence because normal business disputes often are settled through violence due to the lack of enforceable contracts. Property rights help designate who may use resources and how those resources may be used, and they can be important determinants of economic prosperity (Anderson and Hill, 2003, 14). Well-defined and enforced property rights, either by a community

or state, reduce the cost of gathering information and enforcing contracts regarding business transactions, thereby reducing the cost of doing business and making violence a less attractive option.

Developing a theory of criminal organization is important because standard market theories of crime do not explain the development of criminal organizations. Economies of scale in the production of violence create incentives for forming increasingly complex security arrangements in order to aggregate capabilities and provide a higher capacity for violence (Weber, 1997, 326), and maximizing violence is a means to maximize profit. The absence of written contracts and increased uncertainty surrounding property rights enforcement in illicit economies contribute to a higher demand for protection and the propensity for violence (Gambetta, 1988; Schvarts, 2001, 31).<sup>163</sup> Thus, we should expect criminal organizations to form in order to overcome the high cost of business experienced in criminal markets. In the world of crime, forming a hierarchical organization means that criminals balance the cost and benefits of committing crimes individually with those of forming a criminal syndicate.

Chapter 4 uses local level data from Colombia in order to more closely examine variations in violent crime rates than is possible in cross-national studies. I highlight several aspects of lootable resource markets in Colombia central to my argument regarding their relationship with violent crime rates. I go into a high level of detail on the Colombian emerald industry in order to connect the theoretical aspects of transaction costs and property rights to actual lootable resource industries. To test my hypotheses, I use a mix of multivariate regression

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<sup>163</sup> The one possible exception in the literature occurs when everyone has an equal capacity for violence and capacity of resource production (Umbeck, 1981). Umbeck analyzes the California Gold Rush and finds these conditions to hold. Even if this is an accurate analysis of this time period, I see this as an anomaly and a historical example that is rarely encountered. It is unclear to me how violence does not benefit from economies of scale. Umbeck (1981) is also primarily concerned with conflict at mining sites, and not what happened during transportation to cities or retail stores.

analyses over time and case studies. My study also relies on case study analysis and original fieldwork to explore the direction of causation and to assess hypotheses that statistical analysis cannot access at this point. I then interpret the results by focusing on the impact of factors, such as mineral resource production, not commonly considered in the study of crime.

My findings corroborate the cross-national findings to a high degree and suggest that the effects of lovable mineral resources on crime are distinct from those of other resources, and increase violent crime rates due to the specific nature of resource markets. As described in previous chapters, the illicit markets often associated with lovable resources tend to generate high levels of homicide. Additionally, property rights enforcement, even if informal, can help reduce transaction costs in the production and transportation of lovable resources and typically reduces violence. I use original fieldwork to outline how social capital and informal property rights enforcement at the community level plays a critical role in reducing violence in certain resource production regions.

#### *Contribution to the Literature and Future Research*

My research contributes to the literature because the variation in violent crime rates between countries is not fully explained by current theories of violent crime, state strength, or resource dependence. The large effects of lovable resource markets and property rights enforcement that I identify in my empirical analysis are interesting, new, and appear to be generalizable to a very broad set of cases. There are several ways that future research can build on my theoretical and empirical findings.

The next step is more in-depth fieldwork and comparative case studies, especially in gold producing regions, to confirm the initial findings. The data for gold production tends to be better than that of coca production and gold production is more widespread than emerald production.

Comparative case studies should be done in regions that demonstrate sufficient variation on key variables, including coca production, some measure of income (such as NBI), legal land titles, and the dependent variable, murder rate. Additionally, geographically disparate regions should be included, if possible, due to the different dynamics of gold production regions in Colombia. Structured interviews of miners and political power brokers in the region should also be conducted to highlight how property rights are actually enforced.

A second extension is to factor in the possibility of changing targets of criminals and criminal organizations. For example, while murder rates might be higher in drug markets, criminal organizations in these regions might only target other criminal organizations. Thus, the average citizen (or tourist) could, in fact, be much safer there than in other areas with lower overall crime rates. The foundation of my interest in the targeting of victims comes from my fieldwork in Colombia. Almost everyone I spoke with in Colombia, except academics who study the topic, feels that Medellin is much safer than Bogota. Most middle and working class Colombians in either city have been to the other for vacation or work. Undoubtedly in reality the danger posed by criminals in either city changes between neighborhoods and the actions of the possible victim, but whether the specific interests of individual criminals have material effects on crime rates is not clear. The focus of criminal organizations is very difficult to test statistically and measuring such decisions and attitudes is empirically challenging and probably needs to include structured interviews and surveys of criminal actors themselves.

Moving forward, I would like to use different statistical models to estimate the relationships between predictors of violent crime, including lootable resource production, and violent crime. While the data collection and computational requirements are a challenge, the endeavor is not something that is beyond the scope of the model or the analysis I have presented

in this dissertation. There is room for improvement in the estimation model I implement in both the second and fourth chapters. Implementing a dynamic model, perhaps an improved Generalized Method of Moments (GMM) estimator, might increase the precision and accuracy of my statistical estimates. The dependent variable, murder rate, and several independent variables I use in my analysis, such as inequality and ethno linguistic fractionalization, usually change very slowly over time. This is one drawback when using fixed effects models, and one reason that I did not use a first-difference GMM estimator in my analysis. A system generalized GMM estimator developed by Blundell and Bond (1998) might account for slowly changing variables, as described by Aslaksen (2010) and Ross (2012, 100-101).

What do my results suggest about the nature of violent crime and property rights? My interpretation is that property rights play a significant role in levels of violent crime through their effect on transaction costs. Despite the description of mostly economic explanations in previous research, my results also suggest the value of looking at the levels and origins of social capital. Although individuals demonstrate many motivations for committing violent crime, the biggest constraint on behavior seems to be the level of family, peer group, and community enforcement of norms of behavior. The study of violent crime, property rights, and transaction costs remains interesting and challenging because of the high impact on the quality of life, and the lack of causal mechanisms and solid explanations for observed patterns in the data. My theoretical framework lays the groundwork for various pathways forward for future research. My project is just one small piece of the puzzle, yet if it helps us to understand how certain resource production leads to increases in violent crime, we can use the results to encourage appropriate strategies for decreasing the prevalence of both, as well as for promoting government policies to insure a greater quality of life for the average citizen, especially in the developing world.

## References

- Daron Acemoglu and James A. Robinson. 2006. *Economic Origins of Dictatorship and Democracy*. New York: Cambridge University Press.
- Anderson, Terry L. and Peter J. Hill. 2003. *The Not so Wild West*. Quebec City: Queen's University Press.
- Andreas, Peter. 2004. "Illicit International Political Economy: the Clandestine Side of Globalization." *Review of International Political Economy*. 11(3): 641-652.
- Andreas, Peter & Ethan Nadelman. 2006. *Policing the Globe: Criminalization and Crime Control in International Relations*. New York: Oxford University.
- Arana, A. 2001. "The new battle for Central America." *Foreign Affairs*. 80 (6):88-101.
- Aslaksen, Silje. 2010. "Oil as Sand in the Democratic Machine?" *Journal of Peace Research* 47 (4): 421-31.
- Becker, Gary. 1968. "Crime and Punishment: An Economic Approach." *Journal of Political Economy*. 76 (March-April): 169-217.
- Bejarano, Ana Maria, and Eduardo Pizarro. 2003. "A Changing Nature of the Limits to Democracy in Columbia." In *The Third Wave of Democratization in Latin America: Advance and Setbacks*. eds. Hagopian F., Mainwaring, Scott. Cambridge: Cambridge University Press, 235-260.
- Bejareno, Jesus Antonio, Camilo Echandia-Castilla, Rodolfo Escobedo, and Enrique Leon Queruz. 1997. *Colombia: Inseguridad, Violencia, y Desempeno Economico en las Areas Rurales*. Bogota: FONADE and Universidad Externado de Colombia.
- Blattman, Christopher and J. Annan. 2010. "Consequences of Child Soldiering." *Review of Economic and Statistics*. 92(4) 882-898.
- Blumstein, Alfred. 2004. "Prisons: A Policy Challenge." In *Crime: Public Policies for Crime Control*. Eds. Wilson, James Q., and Joan Petersilia. Oakland: Institute for Contemporary Studies. 451-482.
- Blundell, Richard, and Stephen Bond. 1988. "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models." *Journal of Econometrics* 87 (1): 205-43.
- Boix, Carles and Susan Stokes. 2003. "Endogenous Democratization" *World Politics*. 55(1) July pp. 517-549.

- Bourgois, P. 2001. "The Power of Violence in War and Peace: Post- Cold War Lessons from El Salvador." *Ethnography*, 2, (1): 5-34. Reprint accessed at the scholarship Repository, University of California. <http://repositories.cdlib.org/postprints/705>.
- Boweden, Mark. 2001. *Killing Pablo: The Hunt for the World's Greatest Outlaw*. New York: Atlantic Monthly Press.
- Boyum, David A. and Mark Kleiman. 2004. "Substance Abuse Policy from a Crime Control Perspective." In *Crime: Public Policies for Crime Control*. Eds. James Q. Wilson and Joan Petersilia. Oakland: Institute for Contemporary Studies. 351-382.
- Bushway, Shawn, and Peter Reuter. 2004. "Labor Markets and Crime." In *Crime: Public Policies for Crime Control*. Eds. Wilson, James Q., and Joan Petersilia. Oakland: Institute for Contemporary Studies. 191-224.
- Central Intelligence Agency, "Implications for the United States of the Colombian Drug Trade." A Special Intelligence Estimate. Volume 2, June 28, 1983. [http://www.foia.cia.gov/docs/DOC\\_0000623339/DOC\\_0000623339.pdf](http://www.foia.cia.gov/docs/DOC_0000623339/DOC_0000623339.pdf) Accessed April, 2012.
- Chernick, Marc W. 2005. "Economic Resources and Internal Armed Conflicts: Lessons from the Colombian Case." In *Rethinking the Economics of War: The Intersection of Need, Greed and Greed*. eds. Arnson, C. and Zartman, W. Baltimore: JHU Press.
- Cockburn, Andrew, and Leslie Cockburn. 1992. "On the trail of Medellin's Drug Lord." *Vanity Fair*, December.
- Coleman, J. S. 1990. *Foundations of Social Theory*. Cambridge, MA: Harvard University Press.
- Collier, P., V. Elliott, H. Hegre, A. Hoeffler, M. Reynal-Querol, and N. Sambanis. 2003. "Breaking the Conflict Trap: Civil war and Development Policy." World Bank Policy Research Report, Washington, D.C. World Bank.
- Collier, Paul, and Anke Hoeffler. 2004a. "Greed and Grievance in Civil War." *Oxford Economic Papers* 56: 563-595.
- Collier P., Anke Hoeffler. 2004b. "Murder by Numbers: Socio-Economic Determinants of Homicide and Civil War". Oxford Department of Economics Working Paper. [http://www.economics.ox.ac.uk/index.pp/papers/details/murder\\_by\\_numbers\\_socioeconomic\\_determinants\\_of\\_homicide\\_and\\_civil\\_war/](http://www.economics.ox.ac.uk/index.pp/papers/details/murder_by_numbers_socioeconomic_determinants_of_homicide_and_civil_war/)
- Congressional Research Science Report. 2005. "Plan Columbia: A Progress Report." February. <http://globalsecurity.org/military/library/report/ers/43875.pdf>



Accessed 5 April 2012

- Cook, Philip. 1986. *The Demand and Supply of Criminal Opportunities* Chicago: The University of Chicago Press.
- Cook, Philip J., Mark H. Moore, and Anthony A. Braga. 2004. "Gun Control." In *Crime: Public Policies for Crime Control*. Eds. Wilson, James Q., and Joan Petersilia. Oakland: Institute for Contemporary Studies. 291-329.
- Cornell Svante E. 2005. "The Interaction of Narcotics and Conflict." *Journal of Peace Research* (42)6: 751-760.
- Cornell Svante E. 2007. "Narcotics and Armed Conflict: Interaction and Implications." *Studies in Conflict and Terrorism*. 30(3):207-227.
- DANE. El Departamento Administrativo Nacional de Estadística. The government of Colombia's National Statistics Department. Much of the statistical Data obtained in Chapter 4 comes from DANE through personal meetings with researchers, especially Frederico Seguro. <http://www.dane.gov.co>
- De Soto, Hernando. 2000. *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else*. New York: Basic Books.
- Dick, Andrew R (1995). "When Does Organized Crime Pay? A Transaction Cost Analysis." *International Review of Law and Economics*, 15: 25.
- Dilulio Jr., J.J. 1996. "Help Wanted: Economists, Crime, and Public Policy." *Journal of Economic Perspectives*. 10(1):2-24.
- Dreyfus, Pablo. 1999. "When all the Evils Come Together: Cocaine, Corruption and Shining Path in Peru's Upper Huallaga Valley." *Journal of Contemporary Criminal Justice* 15 (4): 370-396.
- Drost, Nadja. 2010. <http://www.time.com/time/world/article/0,8599,1967232,00.html>. Accessed March, 2011.
- Dunning, Thad and Leslie Wirpsa. "Oil and the political economy of Colombia and beyond: a linkages approach." *Geopolitics*, Vol. 9 No.1, (Spring 2004), pp. 81-108.
- Echenique, Federico, and Roland G. Fryer Jr. 2007. "A Measure of Segregation based on Social Integrations." *Quarterly Journal of Economics*. 122 (2):441-485.
- Economic Commission for Latin America and the Caribbean. 2004. "Statistical Yearbook for Latin America and the Caribbean 2003." Santiago: ECLAC

- Eggertsson, Thrainn. 1990. *Economic Behavior and Institutions*. Cambridge: Cambridge University Press.
- Ehrlich, Isaac. 1973. "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation." *Journal of Political Economy*. 81 (3): 521-565.
- Einstadter, Werner, & Stuart Henry (1995). *Criminological Theory: An Analysis of Its Underlying Assumptions*. Fort Worth, Texas: Harcourt Brace College, 1995.
- EIU Country Report. 2003.  
[http://portal.eiu.com/report\\_dl.asp?issue\\_id=1592361544&mode=pdf](http://portal.eiu.com/report_dl.asp?issue_id=1592361544&mode=pdf). Accessed: 10 February 2008
- EIU Country Report 2012.  
<http://www.erepublik.com/en/article/the-economist-intelligence-unit-colombia-report-10-03-2012-1984351/1/20> Accessed April, 2012.
- El Tiempo* "Escobar: 17 Anos de Historia del Criminal." December 3, 1993.  
<http://www.eltiempo.com/archivo/documento/MAM-270722> Accessed April, 2012.
- Englander, Ernie (1988). "Technology and Oliver Williamson's Transaction Cost Economics," *Journal of Economic Behavior and Organization*, 10: pp. 339-353.
- Fajnzylber, Pablo, Daniel Lederman, and Norman Loayza. 2000. "Crime and Victimization: An Economic Perspective." *Economia - Journal of the Latin American and Caribbean Economic Association*. 1(1): 219- 278.  
<http://www.worldbank.org/laccrime> Accessed: August 15, 2007
- Fajnzylber, Pablo, Daniel Lederman, and Norman Loayza. 2002a. "What Causes Violent Crime?" *European Economic Review*. 46(7):1323-1357. Online:  
<http://www.elsevier.com/locate/econbase> Accessed: April 1
- Fajnzylber, Pablo, Daniel Lederman, and Norman Loayza. 2002b. "Does Inequality Cause Violent Crime?" *Journal of Law and Economics*. 45(1): 1-39 Online:  
<http://www.journals.uchicago.edu> Accessed: April 15, 2007
- Fearon, James, and David Laitin. 2003. "Ethnicity, Insurgency, and Civil War. Primary Commodity Exports and Civil War". *American Political Science Review*. 97 (February): 75-90.
- Fearon, James. 2004. "Why do some Civil Wars last so much Longer than Others?" *Journal of Peace Research*. 41(3): 275-301.
- Fearon, James. "Primary Commodity Exports and Civil War." *Journal of Conflict Resolution* 49, 4 (August 2005), 483-507.

- Ferroz, Joana and Claudia Monteiro. 2010 "Does Oil Make Leaders Unaccountable? Evidence from Brazil's Offshore Oil Boom." <http://sites.google.com/site/claufferraz/research> Accessed 8 November 2011
- Freeman, R. 1985. "Who Escapes? The Relation of Churchgoing and other Background Factors to the Socioeconomic Performance of Black Male Youths from Inner City Tracks." In *Drugs Crime and Social Isolation: Barriers to Urban Opportunity* eds. Freeman, R.B., and H. Holzer. Washington D.C.: Urban Institute Press.
- Fuentes, J. 2005. "Violent conflict and Human Development in Latin America: The Cases of Colombia, El Salvador, and Guatemala." Human Development Report Occasional Paper No 10 of 2005, New York: United Nations Development Program.
- Fuller, Alexandra. 2007. "Boomtown Blues: How Natural Gas Changed the Way of Life in Sublette County." *New Yorker*. February: 38-44.
- Gambetta, Diego (1988). "Fragments of an Economic Theory of the Mafia." *European Journal of Sociology*. 29:127-145.
- Gambetta, Diego (1993). *The Sicilian Mafia. The Business of Private Protection*. Harvard University Press.
- Garzon, Juan Carlos. *Mafia & Co.: The Criminal Networks in Mexico, Brazil, and Colombia*. Woodrow Wilson Center for International Scholars. 2008. Washington D.C.
- Gaviria Alejandro. 1998. "Increasing Returns in the Evolution of Violent Crime: The Case of Columbia." *Journal of Development Economics*. 61 (1):1-25.
- Geddes, Barbara. 1999. "What do we know about Democratization after Twenty Years?" *Annual Review of Political Science*. 2: 115-144
- Gonzales, Jose E. 1992. "Guerillas and Coca in the Upper Huallaga Valley." David Palmer (Ed.) *Shining Path of Peru*. New York: St. Martin's Press. pp.209-242.
- Greenwood, Peter. 2004. "Juvenile Crime and Juvenile Justice." In *Crime: Public Policies for Crime Control*. eds. Wilson, James Q., and Joan Petersilia. Oakland: Institute for Contemporary Studies. 90-91.
- Greif, Avner 1989. "Reputation and Coalitions in Medieval Trade: Evidence on the Maghribi Traders." *Journal of Economic History*. 49 (4): 857-882.
- Guerrero Baron, Javier. 2008. "Region, ilegalidad, y Violencia en el Caso de las Guerras de las Esmeraldas." In *Boyaca: Region y Conflicto*. eds. Javier Guerrero Baron

- and Olga Yaney Acuna Rodriguez. Medellin: La Carreta Editores.
- Guillermoprieto, Alma. 1993. "Exit el patron." *The New Yorker*, October 25.  
[http://www.newyorker.com/archive/1993/10/25/1993\\_10\\_25\\_072\\_TNY\\_CARDS\\_000365987](http://www.newyorker.com/archive/1993/10/25/1993_10_25_072_TNY_CARDS_000365987). Accessed November, 2011.
- Gurr, Ted Robert 1970. *Why Men Rebel*. Princeton: Princeton University Press.
- Uk Heo and Alexander C. Tan. 2001. "Democracy and Economic Growth: A Causal Analysis". *Comparative Politics*. 33(4): 463-473
- Hobsbawn, Eric J. 1959. *Primitive Rebels: Studies in Archaic Forms of Social Movement in the 19th and 20th Centuries*. New York: W.W. Norton and Company.
- Honaker, James, Gary King, Anne Joseph, and Kenneth Scheve. 2001. "Analyzing Incomplete Political Science Data: An Alternative Algorithm for Multiple Imputation." *American Political Science Review*. 95(March): 49-69
- Honaker, James, and Gary King. 2006. "What to do about Missing Values in Time Series Cross-Section Data." Los Angeles: UCLA.
- Horowitz, Donald. 1985. *Ethnic Groups in Conflict*. Berkeley: University of California Press.
- Huntington, Samuel 1968. *Political Order in Changing Societies*. New Haven: Yale University Press.
- Humphreys, Marc Cartan. 2005. "Natural Resources, Conflict, and Conflict Resolution: Uncovering The Mechanisms." *Journal of Conflict Resolution* 49(4):508-537.
- Insight, 2012. "Oficina of Envigado."  
<http://www.insightcrime.org/criminalgroups/colombia/ofinica-de-envigado/item/80-oficina-de-envigado>
- King, Gary, Robert Keohane, Sidney Verba. 1994. *Designing Social Inquiry: Scientific Inference in qualitative research*. New Jersey: Princeton University Press.
- King, Gary. 1997. *A Solution to the Ecological Inference Problem*. Princeton: Princeton University Press.
- Kleiman, Mark. 1993. *Against Excess: Drug Policy for Results*. New York: Basic Books.
- Kleiman, Mark. 2009. *When Brute Force Fails: How to have Less Crime and Less Punishment*. Princeton: Princeton University Press.
- Krasner, Stephen 1978. *Defending the National Interest; Raw Materials Investments in*

- US Foreign Policy*. Princeton: Princeton University Press.
- Lederman, Daniel, Norman Loayza, and Ana Maria Menendez. 2002. "Violent Crime: Does Social Capital Matter?" *Economic Development and Cultural Change*. 50(3):509-39. Online: <http://www.journals.uchicago.edu> Accessed: April 15, 2007.
- Leeson, Peter 2007. "Escaping Poverty: Foreign Aid, Private Property, and Economic Development." *Journal of Private Enterprise*. 23(2): 39-6.
- Leiteritz, Ralf and Manuel E. Riano. 2009. "Romancing the Stone: Conflict and Peace in the Western Boyacá Region of Colombia." Presented at the Conference "Different Resources, Different Conflicts? An Exploration of the Regional Political Economy of Colombian Armed Conflict," Universidad De Los Andes, Bogota, April 24, 2009.
- Levitt, Steven. 1997. "Using Electoral Cycles in Police Hiring to Estimate the Effect of Police on Crime." *American Economic Review*, 87(3): 270–90.
- Levitt, Steven. 2002. "Using Electoral Cycles in Police Hiring to Estimate the Effects of Police on Crime: Reply." *The American Economic Review*. 92(4):1244-1250.
- Levitt, Steven. 2004. "Deterrence." In *Crime: Public Policies for Crime Control*. eds. Wilson, James Q., and Joan Petersilia. Oakland: Institute for Contemporary Studies. 435- 450.
- Levitt and Venkatesh, "An Economic Analysis of a Drug-Selling Gang's Finances," *Quarterly Journal of Economics*, August 2000.
- Lopez-Gamundi, Paula. Council On Hemispheric Relations (COHA). September 2, 2011. "Colombia's Gold Rush. The Silver Lining for Paramilitaries and Guerillas." <http://www.coha.org/colombias-gold-rush-the-silver-lining-for-paramilitaries-and-guerrillas/> Accessed September, 2011.
- Lujala, Paivi. 2009. "Deadly Combat over Natural Resources; Gems, Petroleum, Drugs and the Severity of Armed Civil Conflict." *Journal of Conflict Resolution*. 53(1): 50-71.
- Lynch, James. 2004. "Crime in International Perspective." In *Crime: Public Policies for Crime Control*. eds. Wilson, James Q., and Joan Petersilia. Oakland: Institute for Contemporary Studies, 5-41.
- McDermot, Jeremy. BBC News. July 31, 2010. "Colombia sees crime rise in major cities." <http://www.bbc.co.uk/news/world-latin-america-10560568>. Accessed October, 2011.
- Mejia. 2012. "¿El siguiente boom ilegal en Colombia? Minería ilegal y violencia"

- <http://focoeconomico.org/2012/05/08/el-siguiente-boom-ilegal-en-colombia-mineria-ilegal-y-violencia/>
- Mejia and Restrepo. 2011. "Do Illegal Drug Markets Breed Violence? Evidence from Colombia." Mimeo, CEDE-Universidad de los Andes.
- Miller-Llana, Sara. October, 25, 2010. "Medellin, once the epicenter of the Colombia's drug war, fights to keep the Peace." The Christian Science Monitor. <http://www.csmonitor.com/World/Americas/2010/1025/Medellin-once-epicenter-of-Colombia-s-drug-war-fights-to-keep-the-peace> Accessed: October, 2011
- Naim, Moises. 2005. *Illicit: How Smugglers, Traffickers and Copycats are Hijacking the Global Economy*. New York: Doubleday Press.
- Neumayer, Eric. 2005. "Inequality and Violent Crime: Evidence from Data on Robbery and Violent Theft." *Journal of Peace Research*. 42;101.
- North, Douglass C. and Barry Weingast. 1989. "Constitution and Commitment: The Evolution of Institutional Governing Public Choice in Seventeenth-Century England." *The Journal of Economic History*, 49/4: 803-832.
- Olson, Mancur, Jr. 1991. Autocracy, Democracy, and Prosperity. In *Strategy and choice*, ed. Richard J. Zeckhauser. Cambridge: MIT Press, 131-57.
- Olson, Mancur. 1991. "Dictatorship, Democracy, and Development." The American Political Science Review. 87 (3): 567-576.
- Paoli, Letizia. 2001. "Drug Trafficking in Russia: A Form of Organized Crime?" *Journal of Drug Issues* 31(4), 1007-1038  
<http://jod.sagepub.com/content/31/4/1007.full.pdf> Accessed May, 2011.
- Pachico, Elyssa. Insight, January 12, 2012. "Mining and Crime Intersect in Colombian Gold Rush Town." <http://insightcrime.org/insight-latest-news/item/2049-mining-and-crime-intersect-in-colombia-gold-rush-town> Accessed January, 2012.
- Palmer, David Scott. *Shining Path of Peru*. New York: St. Martin's Press.
- Peeler, John A. 1986. *Latin America Democracies: Columbia, Costa Rica, and Venezuela*. Chapel Hill: University of North Carolina Press.
- Pinker, S. (2011). *The Better Angels of our Nature*. New York: Viking
- Policia Nacional. The National Colombian Police. Data from this source was obtained through personal conversations, especially with Frederico Seguro and Ralf Leiteritz. Some of this data is used in UNODC studies cited in this dissertation.

- Williamson, and Oliver E. 1973. "Markets and Hierarchies: Some Elementary Considerations." *American Economic Review*, American Economic Association, vol. 63(2), pp. 316-25, May.
- Rabasa, Angel and Peter Chalk. 2001. *Colombian Labyrinth: The Synergy of Drugs and Insurgency and It's Implications for Regional Stability*. Santa Monica: Rand Corporation.
- Restrepo, Jorge, Michael Spagat, and Juan F. Vargas. "The Dynamics of the Colombian Civil Conflict: A New Dataset." *Homo Oeconomicus* 21(2): 396-428 (2004).
- Restrepo, Jorge A. and Michael Spagat. 2005. "Columbia Tipping Point?" *Survival* 47(2)131-152.
- Rettberg, Angelika, Ralf Leiteritz, and Carlo Nasi. 2011. "Entrepreneurial Activity in the Context of Violent Conflict: Business and Organized Violence in Colombia." *Journal of Small Business and Entrepreneurship* 24.2 pp. 179-196.
- Romero, Simon. The New York Times, March 3, 2011. "In Colombia, New Gold Rush Fuels Old Conflict."  
[http://www.nytimes.com/2011/03/04/world/americas/04colombia.html?\\_r=1&pagewanted=all](http://www.nytimes.com/2011/03/04/world/americas/04colombia.html?_r=1&pagewanted=all) Accessed October, 2011.
- Ross, Michael. 1999. The Political Economy of the Resource Curse." *World Politics*. 51(2):297-322.
- Ross, Michael. 2001a. *Timber Booms and Institutional Breakdown in Southeast Asia*. Cambridge University Press. Cambridge.
- Ross, Michael. 2001b. "Does Oil Hinder Democracy?" *World Politics*. 53 (3):325-61.
- Ross, Michael. 2003. "Oil, Drugs, and Diamonds: The Varying Role of natural Resources in Civil War." In *The Political Economy of Armed Conflict: Beyond Greed and Grievance*. eds. Karen Ballentine and Jake Sherman. 47-70.
- Ross, Michael. 2004a. "How Does Natural Resource Wealth Influence Civil Wars? Evidence from 13 Cases." *International Organization* 58 (Winter): 35-67.
- Ross, Michael. 2004b. "What do We Know about Natural Resources and Civil War?" *Journal of Peace Research*, 41(3):337-356.
- Ross, Michael. 2004c. "Does Taxation Lead to Representation?" *British Journal of Political Science*, 34, 229-249
- Ross, Michael. 2006a. "A Closer Look at Oil, Diamonds, and Civil War." *Annual Review of Political Science* 9 (February): 265-300.

- Ross, Michael. 2006b. "Is Democracy Good for the Poor". *American Journal of Political Science*, Vol. 50, No. 4, October 2006, Pp. 860–874
- Ross, Michael. 2012. *The Oil Curse: How Petroleum Wealth Shapes the Development of Nations*. New Jersey: Princeton University Press.
- Rogers, Mary (1974). "Instrumental and Infra-resources: The Bases of Power." *American Journal of Sociology*. 79(6): 1418-1433.
- Rubio, Mauricio (1999). *Crimen y Impunidad: Precisiones Sobre la Violencia*. Bogota: Terser Mondo Editores and Centro de Estudios sobre DeBartolo Economic, Universidad de Los Andes.
- Sachs, Jeffery D., Warner, Andrew, 1995. "Natural Resource Abundance and Economic Growth." *Harvard Institute for International Development*, Development Discussion Paper No. 517.
- Sambanis, Nicholas. 2004a. "Using Case Studies to Expand Economic Models of Civil War." *Perspective on Politics*. 93(2):259-279.
- Schvarts, Alexander 2001. "The Russian Mafia: Do Rational Choice Models Apply." *Michigan Sociological Review*. 15 (fall): 29-63.
- Siegel, Joseph, Mitchel Weinstein, and Morton Halpern. 2004. "Why Democracies Excel." *Foreign Affairs*. 83(5): 57-71.
- Snider, Lewis W. "Identifying the Elements of State Power: Where do we Begin?" *Comparative Political Studies*. October 1987 20: 314-356.
- Snyder, Richard. 2006. "Does Lootable Wealth Breed Disorder? A Political Economy of Extraction Framework." *Comparative Political Studies*, 39:8 (October 2006): 943-968.
- Snyder, Richard & Angelica Duran-Martinez. 2009. "Does Illegality Breed Violence? Drug Trafficking and State-Sponsored Protection Rackets." *Crime, Law and Social Change* 52:253- 273.
- Standing, Andre. 2003. "Rival Views of Organized Crime". *Institute for Security Studies*. Monograph 77. <http://www.iss.co.za/pubs/Monographs/No77/Content.html> Accessed July, 2009.
- Skocpol, Theda. 1979. *States and Social Revolutions*. Cambridge: Cambridge University Press.
- Skocpol, Theda. 1985. "Bringing the state back in: strategies of analysis in current



- research,” in *Bringing the State Back In*. eds., P. Evans, D. Rueschemeyer and T. Skocpol. New York and Cambridge: Cambridge University Press
- Snyder, Richard. 2006. “Does Lootable Wealth Breed Disorder? A Political Economy of Extraction Framework.” *Comparative Political Studies*, 39 (8): 943- 968.
- Sokoloff, Kenneth L. and Stanley L. Engerman. 2000. “History Lessons: Institutions, Factors Endowments, and Paths of Development in the New World”. *The Journal of Economic Perspectives*. 14 (3):217-232
- Strong, Simon. 1992. *Shining Path: Terror and Revolution in Peru*. New York: Times Books/Random House.
- Tarazona-Sevillano, Gabriela. 1994. “The Organization of Shining Path.” In *Shining Path*. eds Palmer, Scott. New York: St. Martin’s Press. 189-208.
- The Economist, March 10, 2011. “Bogota’s Rise and Fall.”<http://www.economist.com/node/18334997> Accessed October, 2011.
- The Economist, January 27, 2011. “Guerilla miners: The FARC turn to gold.”  
<http://www.economist.com/node/18013780> Accessed February, 2011.
- Thoumi, Francisco E. 2002. "Illegal Drugs in Colombia: from Illegal Economic Boom to Social Crisis (Working Paper No. 2)" (2002). LACC Working Paper Series. Paper 6. <http://digitalcommons.fiu.edu/laccwps/6> Accessed April 2, 2010.
- Thoumi, Francisco E. 2003. *Illegal Drugs, Economy and Society in the Andes*, Baltimore: The Johns Hopkins University Press.
- Tilly, Charles. 1985. “War Making and State Making as Organized Crime.” In *Bringing the State Back*. eds. Peter Evans, Dietrich Rueschemeyer, and Theda Skocpol Cambridge: Cambridge University Press. 169-187.
- Tong, James.1991. *Disorder Under Heaven: Collective Violence in the Ming Dynasty*. Stanford: Stanford University Press.
- Treisman, Daniel. 2000. “The Causes of Corruption: A Cross-National Study.” *Journal of Public Economics*. 76(3):399-457.
- Treisman, Daniel. 2007. “What have we Learned about the Causes of Corruption from 10 years of Cross- National Empirical Research.” Forthcoming in *Annual Review of Political Science*, available at  
<http://www.sscnet.ucla.edu/polisci/faculty/treisman/> Accessed 8 May 2011.
- Umbeck, John. 1981. *A Theory of Property Rights: With Application to the California Gold Rush*. Ames: Iowa State University Press.

- United Nations Office of Drugs and Crime. "Annual Homicide Statistics, 2004." United Nations Publication. <http://www.unodc.org/documents/data-and-analysis/IHS-rates-05012009.pdf> Accessed 15 February 2010.
- United Nations Office of Drugs and Crime. 2006. "Violence, Crime, and Illegal Arms Trafficking in Columbia." *United Nations Publication*. [www.unodc.org/pdf/Colombia\\_Dec06\\_en.pdf](http://www.unodc.org/pdf/Colombia_Dec06_en.pdf) Accessed 9 May 2011.
- United Nations Office of Drugs and Crime. 2007. "Crime and Development in Central America - Caught in the Crossfire." *United Nations Publication*, [www.unodc.org/pdf/research/Central\\_America\\_Study\\_2007.pdf](http://www.unodc.org/pdf/research/Central_America_Study_2007.pdf) Accessed 11 February 2009.
- United Nations Office of Drugs and Crime. 2009. "Annual Homicide Statistics, 2009." United Nations Publication. <http://www.unodc.org/documents/data-and-analysis/IHS-rates-05012009.pdf> Accessed 15 February 2010.
- United Nations Office of Drugs and Crime, 2010a. "The Globalization of Crime: A Transnational Organized Threat Assessment". *United Nations Publication* [www.unodc.org/unodc/en/data-and-analysis/TOCTA\\_Report\\_2010\\_low\\_res.pdf](http://www.unodc.org/unodc/en/data-and-analysis/TOCTA_Report_2010_low_res.pdf) Accessed 5 November, 2011.
- United Nations Office of Drugs and Crime Homicide Statistics 2010b <http://www.unodc.org/unodc/en/data-and-analysis/homicide.html>
- United Nations Office of Drugs and Crime. 2011. "The 2011 Global Study on Homicide." *United Nations Publication*, <http://www.unodc.org/unodc/en/data-and-analysis/homicide.html> Accessed 5 November, 2011.
- United States Department of State International Narcotic Control Strategy Reports, 196-2012. <http://www.state.gov/j/inl/rls/nrcrpt/>. First accessed in February, 2007. Last accessed May, 2012.
- Venkatesh Sudhir. 2000. "In Economic Analysis a Drug Selling Gang Finances." *Quarterly Journal of Economics*. August: 755-789.
- Waltz. 1979. *Theory of International Politics*. McGraw Hill. New York.
- Williamson, Oliver E., 1973. "Markets and Hierarchies: Some Elementary Considerations." *The American Economic Review*. 63(2):316-325.
- Williamson, O. 1979. "Transaction-Costs Economics: The Governance of Contractual Relations." *Journal of Law and Economics*. 22:233-261.

- Williamson O. 1981. "The Economics of Organization. The Transaction Cost Approach." *American Journal of Sociology*. 87:548-77.
- Williamson, O. 1985. *The Economic Institutions of Capitalism: Firms, Markets, and Relational Contracting*. New York: Free Press.
- Weber, Katja. 1997. "Hierarchy Amidst Anarchy: A Transaction Costs Approach to International Security Cooperation." *International Studies Quarterly*. 41:321-340.
- Weber, Max. "Politics as a Vocation." In *Essays in Sociology*, eds. H.H. Garth and C. Wright Mills, 26-45. New York: Macmillian, 1946.
- Weinstein, Jeremy. 2007. *Inside Rebellion: The Politics of Insurgent Violence*. New York: Cambridge University Press.
- Wilson, James Q. 2004. "Crime and Public Policy." In *Crime: Public Policies for Crime Control*. eds. Wilson, James Q., and Joan Petersilia. Oakland: Institute for Contemporary Studies.
- World Bank Indicators. 2008. <http://web.worldbank.org> Accessed: 20 March 2008.
- Wyss, Jim. February 8, 2011. "Colombia's FARC lured by gold mining." *Miami Herald*. <http://www.miamiherald.com/2011/02/07/v-print/2055591/> Accessed November, 2012.