

ORGANIZING CRIME: TOWARDS A THEORY OF THE CRIMINAL FIRM

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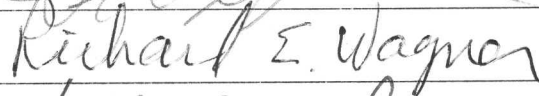


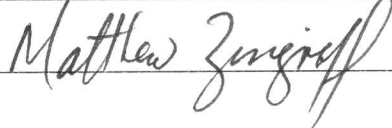
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ABSTRACT

ORGANIZING CRIME: THREE ESSAYS TOWARDS A THEORY OF THE CRIMINAL FIRM

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This dissertation investigates the industrial organization of criminal enterprise. We argue that differences in contestability across criminal industries crucially shape how producers in these industries organize. In more contestable criminal industries, producers use organizational hierarchy to enforce collusion and preserve their returns. However, hierarchy creates scope for boss self-dealing and so is costly. In less contestable criminal industries, where producers' benefit from colluding is smaller, this cost exceeds organizational hierarchy's benefit. Here producers organize "flatly" instead. To examine this hypothesis we explore history's most infamous criminal organizations: the Sicilian Mafia and Caribbean pirates.

It also investigates the problem of external costs within a violent criminal industry. These costs arise when the activities of one criminal enterprise result in increased pressure by the state on other criminal enterprises. Since the costs of violent crime are borne in part by other criminal enterprises, each criminal enterprise engages in a sub-optimally high degree of criminal activity from the perspective of the industry as a whole, driving profitability towards zero. In order to internalize the costs of violence, and thus sustain criminal activity, criminals establish collusive inter-firm institutions designed to regulate the overall amount of criminal activity. These institutions, however, once established, increase profitability in the industry and thus elicit competition amongst the cartel members, increasing the amount of criminal activity. Thus, criminal industries facing problems of external costs exhibit a cycle of regulated and unregulated violent activity. To test this hypothesis, I examine inter-firm institutions, known as commissions, in La Cosa Nostra¹.

Finally, a laboratory experiment was conducted to examine the performance of a market for protection in the absence of external enforcement. The focus of the experiment is whether subjects given the power to protect or predate, designated as “elites,” form a cartel and charge a monopoly price to a set of subjects we label “peasants”, or whether these elites compete as separate entities and charge peasants a competitive price. The price of protective services is measured by the amount of tribute transferred by peasants to a particular elite. Since we endow elites with superior ability in the use of force, they may also utilize involuntary transfers,

¹ La Cosa Nostra is commonly referred to as the Sicilian Mafia.

which incur deadweight losses, to transfer resources. Thus, the subjects are motivated to devise a voluntary means of transfer through tribute within our environment. A baseline treatment was run where there was only a single provider of protection to establish a benchmark comparison. In building the design design, several different literatures were drawn upon, which discuss the viability of a private market for protection. This debate is particularly salient to discussions of protection services in developing countries.

1 Organizing Crime

Criminal organizations display significant variation in their organizational forms. Some, such as the Sicilian Mafia, are organized on the basis of a pronounced hierarchy (Arlacchi 1992: 21, 33,34; Gambetta 1993: 68; Reuter 1983: 156). Hierarchical criminal organizations involve at least two levels of power and decision-making authority: (1) a higher level consisting of individuals who make autonomous decisions and use violence to regulate the behavior of individuals who occupy a lower level, and (2) a lower level consisting of individuals whose behaviors are directed by, accountable to, and thus punishable or capable of being rewarded by higher-level decision makers. Others criminal organizations, such as that of Caribbean pirates, involve only one level of decision-making authority for most decisions (Leeson 2007: 1069-1073; 2009a: 29- 37). They're organized "flatly." What explains these differences in criminals' organizational forms?

This paper explores this question by investigating the industrial organization of criminal enterprise. Following Schelling (1984), who pioneered the economics of organized crime, existing research tends to treat criminal organization as *hierarchically* organized criminal activity, or, what's nearly the same, suggests that all criminal organizations are hierarchical. For instance, according to Abadinsky (1997: 5), a criminal organization is an "enterprise that involves a number of persons in close social interaction, organized on a hierarchical basis for the purpose of securing

profit and power by engaging in illegal . . . activities.” As Skaperdas (2001: 184) puts it, “the great majority of . . . [criminal] groups are hierarchically organized . . . Only some small youth gangs are a possible exception.”

This approach to criminal organization rules criminal organizations that isn’t organized hierarchically out of court and thus inscrutable by economic analysis. Further, it sidesteps a key question about criminal organizations that needs answering: Why are many criminal organizations hierarchical? And what about those, which aren’t? An approach to organized crime that defines organized crime as hierarchical assumes the very feature of many (though not all) criminal enterprises we want to explain.

A growing literature examines the economics of criminal organizations. This research considers organized crime’s economic impact, criminal organizations’ activities and profit-maximizing practices, optimal strategies for preventing organized crime, and reasons for its emergence (besides those cited above see, e.g., Anderson 1979; Reuter 1983, 1987; Jennings 1984; Arlacchi 1986; Jankowski 1991; Fiorentini and Peltzman 1995; Konrad and Skaperdas 1998; Gambetta 1993, 1994; Garoupa 2000; Levitt and Venkatesh 2000; Venkatesh and Levitt 2000; Smith and Varese 2001; Varese 2001; Bandiera 2003; Chang, Lu, and Chen 2005; Varese 2006a, 2006b; Leeson 2009c, 2009d; Skarbek 2009b).²

Dick (1995: 39) explores the industrial organization of criminal enterprise but “considers why particular illegal activities are carried out within the firm while others

² This literature takes its inspiration from Becker (1968) who was the first to apply economic logic to criminal decision making.

are supplied through the market by an organized criminal firm.” Leeson (2007, 2009e, 2009b), Skarbek (2009a), and Leeson and Skarbek (2009) examine criminal organization’s internal structures but focus on governance institutions for preventing intra-organizational predation rather than on the reason for variation in these structures. As Levitt and Venkatesh (2000: 757) point out, in contrast to these aspects of criminal organizations, “there has been little attention paid to . . . the market structure, [and] organizational forms” of varying criminal enterprises. This article begins to fill this gap. We argue that differences in contestability across criminal industries crucially shape how producers in these industries organize. In more contestable criminal industries, producers use organizational hierarchy to enforce collusion and preserve their returns. However, hierarchy creates scope for boss self-dealing and so is costly. In less contestable criminal industries, where producers’ benefit from colluding is smaller, this cost exceeds organizational hierarchy’s benefit. Here producers organize “flatly” instead. Although potential competitive pressure isn’t the only factor that influences criminal organizations’ forms, we argue that it’s an important determinant of the industrial organization of criminal enterprise.

To examine our hypothesis we explore history’s most infamous criminal organizations: the Sicilian Mafia and Caribbean pirates. We consider the Mafia and pirates because they’re among history’s most successful criminal organizations and, most important, because they’re involved in illicit industries that exhibit substantial variation in the key independent variable our theory suggests should influence criminal organizations’ structure: the potential for competition. As our theory predicts, we find

that high producer startup costs in the Sicilian Mafia's primary business—private protection—and comparatively low startup costs in Caribbean pirates' primary business—maritime marauding—led producers in Sicily's private protection industry to organize hierarchically and producers in the Caribbean maritime plunder industry to organize flatly.

Our theory of the criminal firm departs in important ways from the theory of the classic firm. According to Alchian and Demsetz (1972: 777), "It is common to see the firm characterized by the power to settle issues by fiat, by authority, or by disciplinary action superior to that available in the conventional market. This is delusion. The firm . . . has no power of fiat, no authority, no disciplinary action any different in the slightest degree from ordinary market contracting between any two people." Thus boss authority isn't part of the theory of the legitimate firm. Instead Alchian and Demsetz identify the legitimate firm as a means of facilitating team production.

In contrast, the *criminal* firm's distinguishing feature is precisely the potential for "power to settle issues by fiat, by authority, or by disciplinary action superior to that available in the conventional market." Sicilian Mafiosi's saying about their organization—"blood in, blood out"—highlights this important difference between boss-employee relations in a legitimate firm and those in a hierarchical criminal firm.³ Although the criminal firm may also emerge to facilitate team production, the

³ As Sicilian Mafioso Antonio Calderone was informed during his Mafia initiation ceremony, one "goes in and comes out of the Cosa Nostra with blood. One cannot leave, one cannot resign from the Cosa Nostra. You'll see for

hierarchical criminal firm is a means of collusion that emerges even without team production when competitive pressures are naturally strong.

1.1 A Theory of Criminal Organization

The potential for competition varies across criminal industries.⁴ Natural barriers to entry are significantly higher in some criminal industries than others. Differences in startup costs are an important determinant of these barriers. Startup costs include physical capital, labor, and human capital requirements would-be criminals must satisfy to engage in their desired enterprise.

Differences in physical capital requirements across criminal enterprises are straightforward. For example, the technology of safe cracking is considerably more capital-intensive than that of pick pocketing. Because potential criminals typically can't use traditional credit markets to finance such technology, differences in physical capital requirements can produce significant differences in barriers to entry and thus potential competitive pressures across criminal businesses.

A second startup cost that differs significantly across criminal enterprises is labor requirements. For example, to successfully heist a large and well-protected bank,

yourselves, in a little while, how one enters with blood. And if you leave, you'll leave with blood because you'll be killed" (Arlacchi 1993: 68).

⁴ "Demand-side" factors, such as the intensity of consumer demand if the criminal enterprise involves the production of a valued good or service, or, if the criminal enterprise doesn't, the number of potential victims available, will influence the extent of competition across criminal enterprises. In criminal markets where for these or other reasons demand is stronger, *ceteris paribus*, competitive pressures will be higher and vice versa. However, in what follows we focus on the "supply-side" factors driving the variation in contestability across criminal markets—namely those relating to producer startup costs. In this sense we assume away demand-side factors to focus on supply-side ones, or what's the same, assume demand-side factors are the same across criminal markets so we can focus on the influence of the supply-side factors we're concerned with.

several criminals must work together as a team. In contrast, a single criminal can successfully prostitute. When production in a particular criminal industry requires team production and thus a minimum of several laborers, barriers to entering that industry are higher, reducing potential competitive pressure.

A third startup cost that differs across criminal enterprises is human capital requirements. The most important of these requirements is information about criminals' customer and/or victim base. In criminal industries that supply valued goods or services, such as loan sharking or prostitution, would-be customers seek out criminals. Criminals require little information to identify and locate individuals who supply their revenue. In contrast, in criminal industries that generate revenue exclusively by plunder, such as art thievery, would-be victims seek to prevent criminals from locating or identifying them. Here criminals require more information to identify and locate their revenue base.

Criminals also require more specialized knowledge about ancillary markets to participate in certain criminal industries. For example, a bookmaker (where bookmaking is illegal) doesn't require much knowledge beyond how to balance bets to secure revenue in his criminal enterprise. His proceeds are cash. So once his bookmaking is complete, his work is done. In contrast, an art thief requires more knowledge about ancillary markets to operate in his illicit trade. Unlike the fruits of a bookmaker's efforts, the art thief's aren't immediately forthcoming.

Acquiring knowledge about potential buyers' identity and stolen art's value requires human capital investments and may also involve social capital investments if

the stolen art dealer must forge new relationships or tap into art networks to make this possible.

In criminal industries that are highly contestable because of low startup costs, producers have a strong incentive to collude to preserve their returns. Collusion prevents competitive pressures from eroding returns by allocating production rights among cartel members. It also helps prevent new producers from entering the market by enabling existing producers to overcome the free-rider problem that undermines their incentive to invest in blocking new entrants when they act independently.

However, enforcing collusive agreements is difficult. To enforce collusive agreements, colluders must be able to punish cheaters.⁵ The menu of punishments for this purpose available to cartels composed of criminal producers differs from the one available to cartels composed of legitimate producers. Unlike their legitimate counterparts, criminal colluders can use violence to enforce collusion. Although a legitimate colluder's marginal cost of violently punishing a cheating cartel member is large, a criminal colluder's marginal cost of doing so is much smaller because he's a criminal. For example, members of a hitman cartel find it cheaper to murder chiselers than members of a vitamin C cartel do. Unless "white-collar colluders" are willing to become professional criminals and face the stiffer legal penalties, such as lifetime imprisonment and capital punishment, that these criminals face, they can't violently

⁵ For a discussion of ways legitimate producers recruit the unwitting assistance of government enforcement to punish cheating on collusive agreements, see Ayres (1987). For other useful discussions of legitimate producer collusion, see Genesove and Mullin (2001) and Conner (2001).

punish cheating cartel members as criminal colluders can.

Violent punishments can secure more cooperation than non-violent punishments and thus improve collusive agreements' enforcement. Violent punishments supply colluders with additional enforcement options, which enhances their ability to find the combination of penalties and rewards that best enforces collusion. Most important, violent punishments can inflict much harsher penalties on cheaters than non-violent punishments can. A colluder may be willing to hazard chiseling if the strongest punishment his fellow cartel members can impose on him is financial. But he's much less likely to cheat if he knows his comrades will kill him if they catch him.

Criminal colluders prefer violent to non-violent punishments. However, they confront a problem when they use violence to enforce collusion. When each cartel member has the power to violently enforce collusion, mistakes are very costly. Individuals who use violence to punish cheating can't undo their punishments if they later believe they've made a mistake, as they can if they use transfers to punish cheating instead: fines can be refunded; but dead men can't be brought back to life. When each cartel member has the power to violently punish cheating, the prospect of such mistakes is multiplied.

Further, if criminal colluders' enforcement regime requires the punishment of wrongful punishers and there's ambiguity about who cheated and who wrongfully punished, a mistake by one cartel member can lead to a war that engulfs every cartel member and not only dissolves the cartel but ends with the death of most or even all

producers. When every cartel member has the power to violently enforce collusion, the social losses of the “trembling hand” are large.

Cartel members can significantly reduce these losses if instead each member, save one, surrenders his power to violently punish cheaters, leaving a single member with the ability to deal violently with the others. When only one cartel member has the power to use violence to enforce collusion, mistakes are less costly for colluders. The odds that a cartel member will be punished errantly fall substantially and enforcement errors don’t degenerate into cartel-wide massacres. Violent enforcement and organizational hierarchy are complements. This complementarity explains why criminal cartels organize hierarchically.⁶ To realize the benefits of violent enforcement, criminal producers for whom collusion is important organize under the auspices of a single hierarchically structured firm. This firm consists of a boss who wields violent authority over the firm’s employees and becomes the residual claimant on investments that improve the profitability of producing in that market, and employees who are former (or would-be) independent producers in that market.⁷ The boss uses his violent authority to regulate his employees’ production activities. Depending on the number of employees, one or more layers of managers may exist between the boss and the bulk of his employees to help the boss monitor his employees and punish those who

⁶ It also explains why cartels composed of legitimate producers don’t always organize hierarchically. These producers, recall, can’t use violent enforcement. Thus the complementarity between violence and hierarchy is irrelevant for their decision about how to organize. For them, other factors guide this decision. For discussions of these factors, see Genesove and Mullin (2001) and Baker and Faulkner (1993).

⁷ The firm’s creation generates the asymmetry in producers’ ability to use violence with each other that gives the boss coercive authority. Pre-firm, each producer wields coercive power and no producer wields substantially more coercive power than any other. The firm’s creation elevates one producer (the boss) over the others in terms of coercive power. Post-firm, he alone can marshal the entirety of the firm’s resources to support him.

don't comply with his orders.

Under this organizational arrangement the criminal boss acts as a third-party enforcer of collusion between otherwise independent criminal producers.⁸ Criminal producers for whom collusion is important are able to enjoy the superior level of cooperation that violent enforcement enables and, by organizing hierarchically, to do so while avoiding the potential losses that violent enforcement threatens. Organizational hierarchy is a technology for enforcing collusion and the hierarchical criminal firm is a cartel. Since investments to prevent outsiders from entering are now the responsibility of a single actor who's also the residual claimant on such investments, under this hierarchical organizational arrangement there's an incentive to invest in blocking market access to outsiders and the free-rider problem is greatly ameliorated. Firm hierarchy also permits inter-firm collusion. If in each relevant market territory criminal producers organize under the auspices of a single hierarchical firm, producer coordination across market territories becomes easier. Instead of, say, 200 individuals negotiating collusive agreements in two territories, which is required if there are 100 producers in each market territory and each producer operated independently, only two individuals must do so—the firm boss in each market territory. Firm-level hierarchy thus facilitates collusion between many more criminal producers than is

⁸ The logic behind would-be independent producers' decision to surrender decision-making autonomy and authority—including to use coercion—to a boss by subordinating themselves to him in a hierarchical relationship is similar to the logic behind local governments' decision to surrender autonomy and authority to the federal government by subordinating themselves to the national government in a hierarchical relationship, or the logic behind individuals' decision in the state of nature to surrender autonomy and authority to a government by subordinating themselves in a relationship that gives government hierarchical control. In each of these cases agents' private interests frustrate cooperation. Also in each of them, agents overcome this problem and credibly commit themselves to cooperative behavior by surrendering part of their autonomy, decision-making rights, and ability to use coercion to a third party through a hierarchical relationship.

possible without it.⁹

Firm-level hierarchy also contributes to industry level hierarchy. To create a third-party enforcer of inter-firm collusive agreements, criminal firms require a “super boss” who wields power over multiple firms, analogous to the ordinary boss who wields power over his employees inside the firm. In this way, naturally high competitive pressures create hierarchically organized criminal firms that in turn form part of an industry wide hierarchical organization.

Organizational hierarchy is an effective technology of criminal collusion. However, it also creates the specter of boss self-dealing and so is costly. The problems of corporate governance within legitimate firms are well known (see, for instance, Jensen and Meckling 1976; Grossman and Hart 1988; Zingales 1994; Hart 1995; Shleifer and Vishny 1997). Potential for related problems in hierarchical criminal organizations is equally severe. Firm bosses with the coercive authority required to enforce collusion, such as the power to control employees’ output, monitor employees’ activities, and violently punish non-compliant employees, may be tempted to use this authority against their employees for private gain. The law restricts the scope of boss self-dealing in legitimate firms (see, for instance, Djankov et al. 2008). But it’s useless in controlling criminal bosses who wield violent power over their employees.

⁹ Firm-level hierarchy also assists criminals in their relations with government officials. Since the firm boss is a residual claimant of the firm’s investments, he has a strong incentive to negotiate security from government pressure by bribing corrupt officials. Further, firm-level hierarchy protects criminals from government prosecution by concentrating knowledge about the organization in the hands of the boss. For lower-level firm members, orders are taken and not given. Thus the majority of firm members lack intimate knowledge about the firm’s activities they haven’t directly participated in. If they’re arrested, the information they can divulge to authorities is therefore limited, protecting the firm’s other criminals. For discussions of how such informational concerns influence criminal organizations, see Baccara and Bar-Isaac (2008) and Garoupa (2007).

Hierarchical organization's benefit exceeds its cost when producers face naturally strong competitive pressures. Our theory therefore predicts that producers will organize hierarchically in criminal industries where competitive pressures are strong in the absence of such organization. However, things are different in criminal industries where competitive pressures are much weaker. Here hierarchical organization's benefit is low because collusion's benefit is low—lower than the cost associated with the potential for boss self-dealing, which hierarchical organization creates. Our theory therefore predicts that producers will organize flatly in criminal industries where competitive pressures are naturally weak.

1.2 Organizational Hierarchy: The Sicilian Mafia

1.2.1 The Sicilian Mafia and the Business of Private Protection

Competitive pressures in Sicily's private protection business are notoriously absent. To enter this industry a potential producer requires permission from at least one Mafia "boss" and possibly others (Arlacchi 1992: 35; Shawcross and Young 1987: 78). But it would be mistaken to conclude from the absence of competition in most of Sicily's private protection industry that competitive pressures in this industry are naturally weak. This interpretation has things backward. The low degree of contestability observed in this criminal industry is the *result* of producers' successful intervention to countermand strong competitive pressures that would prevail naturally in Sicily's private protection business in the absence of their intervention.

Strong competitive pressures prevail in Sicily's private protection industry

because of naturally low barriers to entry that low startup costs create. Physical capital requirements for entering Sicily's private protection industry are low because protecting local residents and businesses from burglars, street hoods, and other petty thugs isn't capital intensive. The technology of private protection in this market is simple and inexpensive. To enter the private protection industry the only physical capital one requires is a gun. If a would-be protector is strong enough (and the individuals who pose violent threats to his customers are weak enough), in some cases he may not even need this. His fists will do (see, for instance, Stille 1995: 118).

Labor requirements also tend to be naturally low in Sicily's private protection industry. Unlike some criminal enterprises, supplying protection doesn't require team production. Single individuals can, and historically have, supplied private protection successfully (see, for instance, Gambetta 1993: 17, 116). Naturally low labor requirements indirectly increase potential competitive pressures in Sicily's private protection business by lowering the startup cost of entering this criminal industry. They also directly increase such pressures by increasing the number of potential competitors that can operate. If Sicily has 1,000 residents who would like to enter the private protection industry, because each of these residents can operate as a private producer on his own behalf, in principle as many as 1,000 producers may compete in this criminal business, reducing the returns available to each producer.

Finally, human capital requirements tend to be naturally low in Sicily's private

protection business.¹⁰ It requires little information to identify and locate one's customer base (or victim base if protection is really extortion—something we discuss below) in this market (see, for instance, Gambetta 1993: 20-21; Arlacchi 1992: 187, 205). Since Sicily's private protection suppliers often provide a valued service—protection—would-be customers seek them out, identifying and locating themselves (Arlacchi 1992: 187, 205). Even when protection becomes extortion, it remains relatively easy to identify and locate victims. Potential victims are the weaker individuals and businesses in one's immediate geographic neighborhood. As a protection supplier travels outside this neighborhood it becomes less obvious whom he can profitably extort. But because extortion is most effective when the criminal can monitor his victim, victims tend to be local where it's easy to observe their and others' relative strength.¹¹

Further, unlike for the art thief discussed in Section 2, the fruit Sicily's private protection suppliers (or extorters) enjoy is immediately forthcoming. Protection providers (or extorters) can select their form of pay, which will typically be cash. They

¹⁰ Gambetta (1993: 251) notes that the Mafia "is heavily dependent on the local environment. Its initial costs can be met solely under a special combination of conditions since basic resources are expensive to produce in a void: information gathering and advertising, for instance, exploit independent networks of kinship, friendship, and ethnicity." However, as we show, these higher costs of entering Sicily's private protection industry are the *result* of the Mafia's emergence and existence. The Mafia creates a situation for would-be entrants into the private protection industry that requires them to be able to "exploit independent networks of kinship, friendship, and ethnicity" to get their foot in the door in the industry. It does this by making particular kinship, friendship, and ethnic network connections, which only its members have access to, requirements for access to the industry. This is true even within the industry for one *famiglia* vis-à-vis others. For instance, according to Sicilian Mafioso Tommaso Buscetta, the Mafia's hierarchical organization "guarantee[s] a very effective system for safeguarding the secrecy of mafia families, as contacts are limited to the essential, and one knows very little about other families" (quoted in Gambetta 1993: 123).

¹¹ There is one potentially significant human capital investment that would-be entrants into Sicily's private protection business may have to make in some cases. This is investment in "threat capital" to build up their customers' trust or victim's fear. This investment won't be important where a private protector's (or extorter's) superior strength is obvious, but may be important where it's not. Still, compared to the human capital required to entry Caribbean piracy, which we discuss below, this human capital investment, even when it's required to enter the private protection industry, is small.

have no need to resort to secondary markets to sell goods they receive from customers (or victims) and so require no specialized knowledge of such markets. Because of the foregoing factors, in the Mafia's absence it takes relatively little to "set up shop" in Sicily's private protection business. This makes the threat of potential competition in this business strong, which gives Sicily's private protection producers a strong incentive to collude. In turn, the need to violently enforce collusive arrangements to maximize collusion's benefit gives them the incentive to organize hierarchically. Our theory of criminal organization therefore predicts a hierarchically organized Sicilian private protection industry and in particular hierarchically organized Sicilian private protection firms.

The Sicilian private protection industry's organizational structure is consistent with this prediction and highlights how criminal producers in Sicily use organizational hierarchy to collude. "The Mafia" is a collection of some 100+ criminal protection-providing firms throughout Sicily.¹² Each firm acts as a cartel composed of would-be independent producers in a given territory and has "a marked interest in controlling the number of members who can . . . provide...protection" (Gambetta 1993: 124). The organization of these potential competitors under the umbrella of a single hierarchically structured protection firm, or *famiglia*, enforces the cartel. Gambetta's (1993: 111-114) important work describes this organization most clearly

¹² Calderone (see Arlacchi 1992: 5) suggests the number may be as large as 500. Other estimates suggest this number is overstated; the number of Sicilian families is closer to 105-186. Gambetta (1993: 255) suggests that even the 186 figure is likely overstated in that it probably "includes ad hoc protection organizations"—private protection suppliers temporarily competing with one another in a space the Mafia chose to vacate. According to our theory, many of these ad hoc producers should either cartelize under a hierarchical organization or be driven from the market if they're weaker.

(see also, Stille 1995: 101; Arlacchi 1992: 33-34).

Atop the organization is the “boss,” or *capo famiglia*, who appoints his immediate underlings—the vice capo and one to three “counselors,” or *consiglieri*.¹³ Below the vice capo is one or more “captains,” or *capidecina*, who report directly to the *capo famiglia*. Each captain oversees a small number of soldiers, or “men of honor.” The *capo famiglia* directs the production of the soldiers who are immediately supervised by *capidecina* to ensure they limit their protection activities to those the boss specifies (Arlacchi 1992: 33-34; Gambetta 1993: 111, 123; Stille 1995: 101, 115). The *capo famiglia* uses the threat of violence to regulate his “employees” behavior and violently punishes those who don’t comply with his directions. For example, when Sicilian Mafioso Damiano Caruso “decided he did not want to obey anyone any longer” and began acting without his boss’ permission, his boss ordered the death of Caruso, Caruso’s mistress, and Caruso’s 14-year old daughter (Gambetta 1993: 174).¹⁴

The *capo famiglia* regulates the entry of would-be criminal protection providers in his area (Arlacchi 1992: 34; Gambetta 1993: 123; Shawcross and Young 1987: 78, 115; Stille 1995: 115). He requires prospective protection suppliers to get a “license”

¹³ According to Calderone, a family’s men of honor elect the *consiglieri* rather than the family boss appointing them (see, Arlacchi 1992: 25). However, in light of Gambetta’s (1993: 111) description of Mafia boss “elections,” which depicts them as more of rubber-stamping procedures for the strongest than as genuine democratic elections, his description and Arlacchi’s may not substantively disagree. Buscetta suggests that while *consiglieri* are normally boss-appointed, in very large families the men of honor elect them (see, Shawcross and Young 1987: 52).

¹⁴ The *capo famiglia*’s employees are unable to wield similar coercive power over him for two reasons. First, what makes the *capo* the *capo* and distinguishes him from other firm members is the fact that he has the support and allegiance of the majority of the firm’s members. Second, he’s buffered from contact with his men of honor through his *capidencia*, who his men of honor must go through to even communicate with him. As Calderone put it, “It is not possible to have a direct relationship between the man of honor and the rappresentante unmediated by the intervention of the *capidecina*” (quoted in Gambetta 1993: 111). For instance, “If a man of honor had to ask for authorization from the head of the family, he would turn to his *decina* boss, who would forward the request to the representative, who would approve it or turn it down” (Arlacchi 1992: 34). Thus, while bosses can “reach out and touch” their men of honor, their men of honor can’t do the same going up the chain of command, giving bosses coercive authority their employees don’t wield.

from him to produce in his territory (Arlacchi 1992: 35; Gambetta 1993: 113-114; Shawcross and Young 1987: 115). Under this system “a large protection family hands out portions of its territory or particular markets to its smaller colleagues” (Gambetta 1993: 108). As Sicilian Mafioso Antonio Calderone put it, “A family is autonomous in its own territory. The power of the representative [a.k.a., *capo famiglia*] and consiglieri is autonomous too, but not in every case—the decision to kill someone, for instance,” may be under the control of the inter-*famiglia* “supercartel,” which we discuss below (quoted in Arlacchi 1992: 35). According to another Sicilian mobster, Tomasso Buscetta, “No murder . . . could have been committed in that [i.e., the *famiglia*’s] area without the consent of the family” (quoted in Shawcross and Young 1987: 115). “[W]henever an entrepreneur had business in another family’s territory, he had to seek permission through his own family if he was a member of one, or from the boss acting as his protector if he was not” (Gambetta 1993: 113).¹⁵

Capi famiglia ruthlessly punish those who produce in their territories without permission. For example, according to Calderone, “Toward the end of the 1970s and in the early 1980s, the Costanzos opened a building site in Messina. After a while there was a demand for money from one or more of the Messinesi... I asked him whether he had spoken to Nitto” Santapaola—the acting boss—“and he said he had. Subsequently one of the extortionists was killed in Messina” (quoted in Gambetta 1993: 175). In this way the *famiglia*’s hierarchy enables “Sicilian protection firms . . . to deter younger men from being too impatient to become independently established in the trade. When the

¹⁵ Although it relates to the American Mafia rather than the Sicilian one, it’s interesting to note that at various times “the American families” similarly “decided not to admit any new members” and “punished those who sold Mafia membership to others” (Gambetta 1993: 124).

exception . . . dares to mount a challenge, he pays a fearsome price. ‘Self- made men,’ as [Sicilian Mafioso] Stefano Calzetta explained, ‘don’t live long’” (Gambetta 1993: 107).

Contrary to popular perception, the *famiglia*, or private protection-producing firm in Sicily, is small. At its height the largest Sicilian firm, the Calderone family in Catania, had 214 members, only 44 of whom were ~~actual~~ “men of honor.”¹⁶ Other Sicilian protection firms are much smaller, most having some 10-30 members. A few are smaller still (Arlacchi 1992: 5, 21; Gambetta 1993: 111-112; 294). Such smallness makes monitoring easier, which is important for enforcing collusion. It also rejects the hypothesis that a more severe monitoring or related agency problem is responsible for the Sicilian Mafia’s hierarchy.¹⁷ Mafia firms are no larger, and their members no more dispersed, than the “small youth gangs” that Skaperdas (2001) notes organize flatly. It follows that Mafia firms’ monitoring difficulties are no more severe than those of small youth gangs. Yet only the former organize hierarchically.

By reducing the number of decision makers (the *capi famiglia*) who must be monitored, negotiate, and agree on inter-firm cartel agreements, Sicilian protection firms’ internal hierarchy also facilitates inter-firm collusion. When Sicilian protection firms are at peace they have historically, albeit intermittently, used intra-firm hierarchy to form inter-firm cartels at the local, provincial, and industry wide levels.¹⁸ Groups of

¹⁶ The other members, called *avvicinati*, were non-initiated criminals who participated some of the firm’s illicit activities (Paoli 2003: 27-28).

¹⁷ Also contrary to popular perception, the Mafia “family” rarely corresponds to the biological family (Lupo 2009: 20). Thus to the extent that biological families are thought to be naturally hierarchically organized, this can’t be the reason for Mafia *famiglia*’s hierarchical organization since the *famiglia* isn’t a biological family unit.

¹⁸ Various parts of the Sicilian private protection industry’s “super-hierarchy” described below existed from the 1950s

typically three firms occupying contiguous territories that make up a district within a province were led by a boss called the *capo mandamento*—the boss of the strongest of the three firms. *Capi mandamento* in turn formed a *commissione* (Arlacchi 1992: 35; Gambetta 1993: 112-114; Shawcross and Young 1987: 52; Stille 1995: 101). As Buscetta described the *commissione*, “Above the families and serving the purpose of coordinating the different groups is a collegial structure known as the Commission, made up of members each one of whom represents three families that are geographically close together. This member is one of the bosses of the three families, named by the bosses of those families” (quoted in Shawcross and Young 1987: 52). According to Calderone, “If a man in the family’s territory has to be killed as punishment . . . the representative [i.e., *capo famiglia*] makes the decision, the *decina* boss [i.e., *capodecina*] has it carried out, and the man is no more. The representative’s only responsibility is to report to the district boss [i.e., *capo mandamento*]—the boss of a territory that encompasses three families” (quoted in Arlacchi 1992: 35).¹⁹ “Permission had to be granted by the boss of the territory in which the murder was to take place, and the *commissione* was supposed to enforce this rule” (Gambetta 1993: 114; see also, Paoli 2003: 53, 60-61).

through the mid-1980s (Gambetta 1993: 112-113). The first manifestation of the commission was in 1957 when provincial-level commissions were established in every province but Siracusa and Messina. A Mafia war in 1963 dissolved this system; however, it was revived after the war ended in 1969. In 1975 a national commission emerged, consisting of “elected” representatives from every province but Messina, Syracuse, and Regusa. A second Mafia war in 1978 dissolved this system, but it was revived again in 1981 when the war ended until the Maxi trial in 1984, since which time members of the Corleonesi faction have run the commission until Bernardo Provenzano’s arrest in 2006 (Longrigg 2006: 261).

¹⁹ Even when Sicilian Mafiosi traveled to the U.S. they retained this practice. For example, “Buscetta points out that visiting members of the Sicilian Mafia could not engage in criminal activities without first seeking and receiving the approval of the American family in whose territory they wished to operate” (Shawcross and Young: 1987: 78).

At the head of each *commissione* was a leader called the *rappresentante regionale* who was charged with organizing province-level meetings. In the late 1970s a *commissione interprovinciale* formed briefly, consisting of *rappresentanti di provincial*—provincial representatives—who oversaw the private protection business at the inter-province, or industry wide, level. As Buscetta described it, “if the entrepreneur of a province wanted to do some work in another province, permission depended on the decision of the *interprovinciale* (quoted in Gambetta 1993: 113).

The result of this organizational pyramiding was a “super-hierarchy” that attempted to enforce what Gambetta (1993: 113) calls “supercartels”—inter-firm collusive agreements at the local, province, and industry wide levels. These supercartels worked only intermittently and thus met with sporadic success in cartelizing the industry. Conflicts between important families led the *commissione* and *commissione interprovinciale* to break down periodically. However, at other times, the Palermitan *commissione*, for instance, had the “power . . . to impose the will of its members on other families,” facilitating effective inter-firm collusion (Gambetta 1993: 116). We’ve neglected the question of whether the Sicilian Mafia is engaged in providing protection—an economic well—or is engaged in extortion. Gambetta suggests that much of what the Sicilian Mafia does constitutes genuine protection. As he puts it, “contrary to widespread belief, protection money may be willingly paid.” The Mafia’s “services are often useful to and,” thus, “actively sought by customers” (1993: 20, 187; see also, 1993: 21, 248). For instance, according to Calderone, “The Cosa Nostra’s protection was not just sought by the Costanzo’s and the other Catanian

builders. Almost every Sicilian business of a certain size would [voluntarily] resort to the Mafiosi in order to work in peace and keep firms from the North out of their markets” (quoted in Arlacchi 1992: 187; see also, 1992: 205). Demsetz (1972a, 1972b) argues that, economically, the distinction between supplying a valued service, such as protection, and extortion is overdrawn.

Whether private protection providers supply genuine protection or are extortionists (assuming this distinction is meaningful) turns out to be unimportant for our theory. Since genuine protection and extortion involve nearly identical activities and thus similar physical capital, labor, and human capital requirements, the startup cost in both industries, the relative lowness of natural barriers to entry in both industries, and consequently the need for collusion to preserve rents in the face of strong competitive pressures in both industries are nearly the same.²⁰

Competing private protection suppliers erode returns by driving the price of protection to its competitive level. Competing extortionists erode returns by “overfishing”—over-exploiting their victims (Neher 1978). Competition for the resources of a given number of victims in their territory creates a criminal commons problem reminiscent of Olson’s (1993) “roving bandits.” Whereas a single extortionist would exploit prey up to the point at which the marginal benefit of extortion equaled his share of the marginal deadweight loss of his extraction, competing extortionists exploit prey up to the point at which the average benefit of extortion

²⁰ We say “nearly identical” because there’s one important startup cost difference between genuine private protection and extortion related to the human capital requirements in each industry. Because the former criminal business involves supplying a valued service while the other doesn’t, as discussed above, search costs for customers/victims tend to be lower in the private protection industry vs. in the extortion industry.

equals their share of the marginal deadweight loss of their extraction. Supra-optimally extorted victims yield extortionists less revenue than they could earn if they colluded to restrict their exploitation. Our theory therefore predicts similar incentives to organize hierarchically in the private protection and extortion industries.²¹

1.2.2 The Evolution of Organization in a Criminal Market: The Heroin Business and the Sicilian Mafia

To examine our theory of organizational hierarchy in the Sicilian Mafia more closely we'd like to examine the evolution of organization in Sicily's private protection market over time. Unfortunately, information about the Sicilian Mafia's emergence in the private protection industry detailed enough to do this is scant.²² However, because the criminal business the Sicilian Mafia engages in has changed recently to include the production and sale of heroin, we're able to glimpse how venturing into a market with a different degree of contestability has affected the Mafia's organizational theory.

The Sicilian Mafia first became involved in the international heroin business in the late 1950s with the arrival of Lucky Luciano from the United States (Shawcross and Young 1987: 46-47). However, it wasn't until the early 1970s that Mafiosi began engaging in this trade on a large scale. Following a flurry of arrests in the 1960s the Mafia's financial situation suffered. It wasn't until Mafiosi began smuggling tobacco

²¹ The difference in incentives to do so result from the difference in human capital requirements discussed in the foregoing footnote.

²² However, what information is available is consistent with our theory. Individuals rather than hierarchically organized firms initially produced protection in Sicily.

and later trading in heroin that this situation improved. According to Calderone, “When I say there wasn’t any money in those years, that the mafia had no money, I’m not just saying it to exaggerate. After the arrests of 1962-1963 and the Catanzaro trial of 1968, everybody’s money had run out. It had gone to lawyers, prison fees, and the like” (Arlacchi 1992: 93). The enormous profit opportunities the heroin business offered prompted the Mafia to become seriously involved in this market shortly thereafter.

Compared to Sicily’s private protection industry, its heroin industry involved significantly higher physical and human capital requirements and thus startup costs. Heroin production requires equipment and laboratories in which producers can process and prepare the drug. It also requires individuals competent in chemistry and skilled in manufacturing the drug. Besides being very dangerous, this process is difficult and complex. Consequently, few individuals had the skills to process heroin. For instance, in the 1980s Sicilian heroin processor Francesco Marino Mannoia “was . . . very much sought after because of his chemical competencies” (Paoli 2003: 146). Shawcross and Young (1987: 47-48) describe the high human capital requirements of participating in Sicily’s heroin market: Although it is relatively easy to convert raw opium into morphine base, the chemical process of turning morphine base into heroin is considerably more complex. The technical name for heroin is diacetylmorphine: the morphine is acetylated by reacting it with acetic anhydride or acetyl chloride. The morphine base has to be heated to a precise temperature with acetic anhydride, and then filtered through alcohol, charcoal and acetone. The final stage is the drying and crushing, using hydrochloric acid to make the hydrochloric salt of heroin. This makes

it soluble in water—an important property, as heroin cannot be used for injection until its salt has formed. A bad chemist with poor equipment could turn out heroin of such poor quality that there would be difficulty in selling it, and if he was a real amateur, then getting the temperature wrong by just a few degrees during the heating stage would result in a lethal explosion.

Heroin's high human capital requirements generated high social capital requirements since one needed international connections with morphine base exporters or connections with skilled chemists to produce morphine base. "Good chemists were at a premium. Although the Sicilians were skilled smugglers, for the most part they lacked the necessary expertise to run sophisticated refining laboratories. For those skills they had to turn to the chemists of the French connection based in Marseilles" (Shawcross and Young 1987: 48). High social capital requirements weren't restricted to chemists. As one historian of the Sicilian Mafia described it, Sicilian "[d]rug trafficking is all about contacts, about bringing together a gallery of specialists: from investors, to the suppliers of morphine base, to technicians able to refine the drug, to transporters, to small-time dealers who put it on the streets, to financiers with the expertise required to launder the profits and keep them out of the grasp of the Guardia di Finanza (the Italian tax police)" (Dickie 2004: 280; see also, Lupo 2009: 220).

The heroin business' higher physical and human capital requirements reduced potential competitive pressure in this industry.²³ Reduced competitive pressure

²³ Similar high capital requirements prevented entry in the tobacco smuggling industry, which the Mafia engaged in before, and then alongside, heroin. According to Lupo (2009: 221-222), tobacco trafficking required the "availability of immense capital and considerable resources to purchase or lease ships . . . ; purchase or deploy in

reduced the need for collusion and with it organizational hierarchy. Thus, as our theory predicts, when Sicilian Mafiosi increasingly turned their attention to heroin production in the 1970s, they became less eager to employ hierarchical organization as a collusive technology. This explains why since the 1970s “there has been... a clear trend toward the expansion of individual entrepreneurial autonomy” within the Sicilian Mafia’s organization (Paoli 2003: 145).

According to Buscetta, after the Mafia’s entrance into the heroin business “the cleavages among different families were no longer respected, in the sense that everybody could associate with whoever they wanted” (quoted in Paoli 2003: 95). Many Mafiosi operated fully independently in the heroin business. “The freedom wielded by [its] participants was such that... whoever wanted to do so could pick up his share of the processed product in Sicily and arrange distribution independently” (Paoli 2003: 147).

Unlike when they operated in the private protection industry, Mafiosi weren’t obliged to rely on fellow family members, or even other Mafiosi, to conduct business in the heroin industry. Mafiosi and non-Mafiosi alike operated freely in the heroin business. As Buscetta and fellow- Sicilian Mafioso Salvatore Contorno pointed out, in stark contrast to the private protection business, in the drug business “family boundaries were irrelevant: everybody was entitled to associate financially or otherwise with anyone else, whether Mafiosi or not.” Involvement in the heroin business didn’t

France and Italy clandestine radio transmitting equipment; arrange to pay for the tobacco embarked in Tangiers and Gibraltar (the cargo of a single ship generally cost the organizers of the traffic an average of forty thousand dollars); hire, pay and deploy in Italy and in other countries the officers and crews of the ships, and the radio operators; accept and absorb the eventual losses of men and vehicles; transfer sizable financial resources to Switzerland, Italy, France, and Malta.”

typically require a boss' permission. And, "If a license was needed from the family at all, it concerned dealing in general and not how or with whom" (Gambetta 1993: 239).

Inter-firm level organizational hierarchy in the Sicilian Mafia also waned after Mafiosi began devoting greater attention to heroin.²⁴ "As a matter of fact, the single mafia families—and. . . increasingly, even the single 'men of honor'—enjoy full entrepreneurial autonomy, and at the interfamily level, there is no obligation to share illicit proceeds either" (Paoli 2003: 148; see also, 145). Further, since 1994 "the Palermitan provincial commission (undoubtedly Cosa Nostra's most consolidated collegial body) has not held full meetings...According to some investigators, Cosa Nostra's strategic decisions are currently [as of 2006] made by a sort of directory, composed of [Bernardo] Provenzano and three other high-ranking 'men of honor,' who, however, meet rarely. As a result, the range and discretion of each family chief's power has grown considerably" (Paoli 2003: 64). Heroin isn't the only contributor to waning inter-firm organizational hierarchy in recent years. For instance, the Palermitan commission's operational absence may also partly reflect a submersion strategy following the Italian police's improved anti-mafia efforts (Longrigg 2006: 130). But heroin also played an important role and helps explain the pronounced post-1970s flattening of the Sicilian Mafia's organizational structure.²⁵

1.3 Organizational Flatness: Caribbean Pirates and the Business of Maritime Marauding

²⁴ Although a national commission was formed in 1975, this commission regulated Mafiosi activities related to private protection, not other illicit activities, such as drug trafficking.

²⁵ Further, to the extent that producers in the heroin industry rely on team production, the greater scope given to participants in this industry may also reflect the benefits of incentivizing individual producers in an environment in which measuring their contributions to heroin production is difficult.

On the surface, entry into the sea banditry business in the 18th-century Caribbean was completely open.²⁶ There was no “pirate mafia” one had to be part of to participate in the trade; there were no “pirate dons” one had to get permission from to take to the sea; and there was no pirate arrangement that divided the ocean into exclusive territories.

It’s true that pirates didn’t take steps to regulate entry into their criminal industry. But this doesn’t mean pirates’ industry had no barriers to entry. Naturally high barriers to entry in their industry limited competitive pressures without their intervention. Pirates didn’t regulate entry into their industry because they didn’t need to.

In contrast to Sicily’s private protection industry, the Caribbean maritime plunder industry had high startup costs. Whereas the physical capital requirements of the former entailed only a gun, the technology of piracy required a ship and, what’s more, a ship with more guns than potential victims’ ships. Most merchantmen in the early 18th-century carried several cannons (Leeson 2009a: 86). To reliably overtake these targets a pirate ship required at least as many.

Only one Caribbean pirate, Major Stede Bonnet, purchased his ship and cannon (Leeson 2007: 1064).²⁷ Other pirates stole them. A would-be private protector in Sicily could obtain his guns (if he needed them) in the same way if this were cheaper than purchasing them. However, stealing an 80+ ton ship and its associated ordnance

²⁶ Use of the word “criminal” here is necessary because there was also a thriving, *legitimate* (i.e., state-sanctioned) sea banditry business in the Caribbean and elsewhere in the early 18th century: privateering. On the organizational differences between pirate and privateer firms and the reasons for these differences, see Leeson (2007).

²⁷ Bonnet, the so-called “gentleman pirate,” was unusual in that he was a man of distinguished education and career—a wealthy man who decided to take up pirating. This explains why he, unlike most other pirates, who were dirt-poor sailors, was in a position to personally finance his own startup costs.

was considerably costlier than stealing a handgun, machine gun, or even a small arsenal for that matter. Besides the fact that it's harder to conceal absconding with, and thus easier to detect the theft of, a stolen merchantman, while one person can steal a firearm, one person can't steal a merchant vessel. To steal a vessel, a would-be pirate required at least enough sailors to sail away with the ship. If the vessel was small, so might be the number of sailors needed to steal it. But no vessel suitable for pirating could be stolen alone. And, as the vessel's size increased, so did the number of comrades a would-be sea dog needed to help him abscond with it.

Closely related to this was piracy's substantially greater labor. Unlike producing private protection, the technology of piracy required team production. A one-man pirate "crew" wasn't possible (Leeson 2009a: 4). Sailing the ship and operating its guns required multiple pirates. The average pirate ship had 80 crewmembers (Rediker 1987: 256). Smaller crews existed. But to pirate at all required at least five sailors; and in most cases it required many more. The most successful Caribbean pirate crew, the one Bartholomew Roberts captained, had more than 500 sailors at its peak; and crew sizes of 150-200 weren't uncommon, suggesting a significantly larger optimal vessel size (see, e.g., Snelgrave 1734: 199; Examination of John Brown, May 6, 1717, Suffolk Court Files, no. 11945, paper 5; Deposition of Theophilus Turner, June 8, 1699, Public Record Office, Colonial Office Papers 5: 714, no. 70 VI; Examination of John Dann, August 3, 1696, London, Public Record Office, Colonial Office Papers 323: 2, no. 25; Deposition of Adam Baldrige, May 5, 1699, Public Record Office, Colonial Office

Papers 5: 1042, no. 30 II; Johnson 1726–28, 442; Cordingly 2006: 165, 111).²⁸

Piracy's team production requirement not only limited competition indirectly by raising the startup cost of pirating. It limited competition directly by reducing the number of potential competitors by a factor equal to the number of criminals needed to operate the pirate ship and its ordnance. For example, if there were 1,000 would-be criminal competitors in the pirate industry—1,000 individuals hoping to earn their income by maritime marauding—and sailing even the smallest vessel capable of piracy required five pirates, the number of potential competitors in the industry fell “automatically” from 1,000 to a maximum of 200. At its height the Caribbean pirate population reached about 2,400 swashbucklers (see, e.g., Johnson 1726–28: 132; Pringle 1953: 185; Rediker 1987: 256; Marx 1996: 102, 111; Konstam 2002: 6). However, since, to be successful, pirates organized into crews averaging 80 crewmembers, instead of 2,400 competitors, only 30 pirate firms competed.

Piracy's human capital requirement was also substantially greater than that of Sicily's private protection business. Unlike Sicily's private protection suppliers, pirates were in the business of “pure plunder.” Far from seeking them out, pirates' revenue base—merchantmen—sought to avoid them. This increased the information pirates required to identify and locate their prey (see, for instance, Leeson 2009a: 82–106). Further, the field in which pirates might find victims was enormous. It included significant parts of the Caribbean, Gulf of Mexico, North America's Atlantic coastal waters, Africa's western coastal waters, and portions of the Indian Ocean (Leeson

²⁸ Unless otherwise noted, all depositions and examinations cited are reprinted in Jameson (1923).

2009c: 5). Merchantmen tended to follow specific routes. And pirates could count on natural choke points of trade to winnow the possibilities. Still, merchantmen traveled the vast expanse of the sea and pirates had to learn their traveling habits.

While plenty of rich prizes were sailing around, there was no way to establish when or where the next one might be sailing except to buy this information or invest in acquiring it, for example by overtaking some other prey and extracting it from prisoners (Johnson 1726-1728: 88; Leeson 2009a: 109-110; Grey 1971: 317-318). Even then pirates couldn't always rely on this information to yield them booty. Hunting prey was difficult and time consuming, especially since prey weren't just mobile but was, by necessity, constantly on the move (Leeson 2009a: 83-88).

Pirates couldn't easily observe whether a ship they were bearing down on was a potential target—a weaker merchantman—or a much stronger government warship, perhaps hunting for pirates, which they should avoid (see, for instance, Johnson 1726-1728: 215, 299).²⁹ Individuals with significant sailing experience, who knew how to identify other vessels, could avoid sailing into the Royal Navy's clutches. However, sea dogs without such human capital were more vulnerable to doing so. This is one reason piratical production was typically restricted to individuals with maritime backgrounds (Leeson 2009c: 12). Finally, unlike private protectors (or extorters), pirates couldn't choose their form of revenue. Pirates didn't control what the merchantmen they might encounter carried. In many cases this was a goods instead of specie (see, for instance, Cordingley 2006: 107). Pirates could consume these goods.

²⁹ On the difficulty that pirates and their prey faced in identifying others at sea and the strategies they devised to take advantage of this informational asymmetry, see Leeson (2009a, 2009c)

But to convert them to specie, they had to sell their stolen wares on the black market. Finding buyers and identifying the most profitable market for pillaged goods required special knowledge.

Because of Caribbean piracy's greater physical capital, labor, and human capital requirements, the startup costs of entering this criminal industry were higher than those of entering Sicily's private protection business. This led to higher natural barriers to entry and a lower degree of contestability in the Caribbean piracy industry, which significantly reduced Caribbean pirates' benefit of collusion. Thus, according to our theory of criminal organization, in contrast to criminals engaged in Sicily's private production industry, Caribbean criminals engaged in maritime marauding had little incentive to organize hierarchically and could avoid the cost of hierarchical organization—the potential for boss predation—by organizing flatly instead.³⁰ Our theory therefore predicts organizational flatness in the criminal industry of Caribbean maritime marauding.

Piracy's organizational structure supports this prediction. Caribbean pirates organized flatly: (1) internally within the pirate firm and (2) industry wide. These manifestations of organizational flatness in Caribbean piracy correspond to those of organizational hierarchy in Sicily's private protection industry described in Section 3.

Each piratical firm—the pirate crew—had a “leader,” the captain. However, unlike Mafia bosses, pirate captains wielded no more power than ordinary crewmembers in the criminal firm's everyday affairs. As Leeson (2007: 1065-1069) points out, the

³⁰ For a discussion of the specifics of how pirates' flat organization prevented boss predation, see Leeson (2007).

captain assumed authority over his crew's behavior only in times of battle when immediate and unilateral decision making was indispensable. At all other times the captain had the same authority as every other member of his crew (see, for instance, Johnson 1726-1728: 213-214; Snelgrave 1734: 217; Rogozinski 2000: 175).

Caribbean pirate firms made decisions democratically.³¹ This included selecting the firm leader, "the Rank of Captain being obtained by the Suffrage of the Majority," and other crew officers, most notably the quartermaster, who was also "of the Men's own choosing" (Johnson 1726-1728: 214, 213). In this way pirates "only permit[ed] him to be Captain, on Condition, that they may be Captain over him" (Johnson 1726-1728: 213).

Pirate crews endowed their quartermasters with the authority to perform essential firm tasks, such as resolving crewmember conflicts, dividing booty in accordance with the pay scheme crewmembers agreed on, and mustering pirate arms (Johnson 1726-1728: 213). However, quartermasters' authority wasn't absolute, autocratic, or irrevocable, as a Sicilian Mafia boss' authority tends to be. Quartermasters' authority didn't derive from, nor was it part of, an organizational hierarchy. Crewmembers democratically elected their quartermasters. They could and did popularly remove them from power just as they did their captains, "as suited Interest or Humour" (Johnson 1726-1728: 194; *Trials of Eight Persons* 1718: 23; Johnson 1726-1728: 139; Information of Richard Moore, High Court of Admiralty Papers 1724: 1/55, fol. 96; Rogozinski

³¹ Leeson (2009a) has identified only one exception to the "one pirate, one vote" rule. In this crew the captain had two votes instead of one.

2000: 177; *An Account of the Conduct and Proceedings of the Late John Gow* 1723: 23).

Further, pirates' firm organization permitted them to vote on important matters, which, normally, when of more minor consequence, fell under the quartermaster's view. It also permitted pirates to override the quartermaster's authority if popular opinion supported this (*Boston News-Letter* August 1-8, 1723; *A Full and Exact Account, of the Tryal of All the Pyrates, Lately Taken by Captain Ogle* 1723: 27; *British Journal* August 22, 1724).³² Thus, while the quartermaster had authority that other firm members didn't, "ordinary" firm members checked, controlled, and ultimately directed this authority, continuously conditioning it on their will.

The average Caribbean pirate firm was large—some 80 crewmembers. Many other pirate firms were larger still. Pirate firms' larger size suggests that monitoring, which is crucial to successful collusion, wasn't an especially important concern for them. This makes sense, as, unlike Sicilian private protection firms, Caribbean pirate firms weren't cartels. It also rejects the hypothesis that a less severe monitoring or related agency problem was responsible for Caribbean pirates' flat organization.

The fact that pirates worked within the limited confines of their ships made monitoring somewhat easier. However, the additional monitoring difficulties that pirate firms' faced because of their much large size at least partly offset this, and probably more than offset it in crews that were too large to fit in one ship.

Most important, compared to the nature of the production activity that Sicilian private protection involves, the nature of the production activity that

³² Newspaper articles cited are contained in Baer (2007).

Caribbean piracy involved made pirate firms' monitoring problem significantly harder. The important labor tasks of private protection are relatively easy to meter. It's straightforward to determine whether a Mafioso is protecting the customers he's directed to protect, collecting the fees he's directed to collect, and so on. The fact that these protection production activities are individually instead of jointly produced makes determining if a Mafioso is performing his duties easier still.

In contrast, the important labor tasks of piracy, those that involved overtaking potential prey, weren't easily metered. Even when standing right next to a pirate, it wasn't easy to determine whether he was "giving it his all" in battle, doing his best to appear menacing to potential targets, exerting his full effort in trying to extract loot from recalcitrant prisoners, and so on (Leeson 2009: 56). The fact that important pirate production activities, such as sailing the ship and battling targets, were jointly produced compounded the difficulty of determining if a pirate was performing his duties.

Together with the much larger size of Caribbean pirate firms, the problematic nature of piratical production suggests that Caribbean pirate firms faced a harder monitoring problem than Sicilian Mafia firms do. Yet Caribbean pirate firms organized flatly and Sicilian Mafia firms organize hierarchically—the opposite of what the monitoring problem hypothesis predicts.

Maritime marauding was also organized flatly at the industry wide level. Unlike Sicily's private protection firms, Caribbean pirate firms didn't engage in industry wide coordination. Independently operating pirate firms occasionally joined

forces for multi-crew expeditions (Leeson 2009a: 10). Most such coordinated undertakings were spontaneous rather than pre-planned, firms temporarily joining forces after happening upon one another (Rediker 2004: 94; Snelgrave 1734; Johnson 1726-1728: 319). Most important, when two firms coordinated their activities they did so as a temporary “confederacy of equals” instead of through a coercive third-party enforcer with hierarchical control. Crews that sailed together did so as partners with a complete and unquestioned right to exit the partnership when they pleased (see, for instance, Johnson 1726-1728: 175).

Our theory suggests that Caribbean pirate firms didn’t collude across industry as Sicilian private protection firms do because pirates’ benefit of such collusion was low given that naturally high barriers to entry preserved their returns without it. A competing hypothesis is that Caribbean pirate firms didn’t collude because they couldn’t. On the surface this hypothesis is plausible. Sicilian Mafia firms are stationary and geographically close. Pirate firms were mobile and often geographically distant. Thus, while private protection firms possess the communication ability, physical and social closeness, and frequency of interaction required to collude, pirate firms didn’t.

The evidence rejects this hypothesis. Although pirate firms were mobile and sometimes distant, they enjoyed the communication ability, physical and social closeness, and frequency of interaction needed to collude. In fact, in at least a few important ways, Caribbean pirates were in a better position to collude across industry than Sicilian private protectors are.

When they weren’t marauding, Caribbean pirates lived together in an isolated,

close-knit community that included almost every producer in their industry. This pirates' den, or "nest of rogues," as Virginia governor Alexander Spotswood (July 3, 1716 [1882 II: 168]) styled it, was on the island of New Providence in the Bahamas.³³ Pirates inhabited, fraternized in, and plotted their expeditions from this outlaw island, which, before British official Woodes Rogers' arrival, pirates nearly exclusively populated.³⁴ Pirates' landed community not only ensured that producers in the Caribbean piracy industry interacted frequently, spent time in close physical proximity to one another, and developed close social bonds despite their mobility and distance when marauding. It ensured low-cost producer communication and, better still from pirates' perspective, the totally unencumbered kind. Since pirates' land base was isolated and populated entirely by criminal producers, pirates could communicate without secrecy, opaqueness, or concern about authorities. Pirates could take as much time to plot, discuss, and hammer out the details of inter-firm collusion agreements as they wanted and could do so totally transparently. Further, they could use the same unencumbered communication abilities to help them maintain these agreements.

For example, pirates could undertake island-wide advertising campaigns to ensure that no profitable inter-firm collusive arrangement went unarranged because the parties were unaware of each other or of their desire to collude. They could nail posters publicizing the names of cheaters to every palm tree and publicly execute chiselers before the entire industry once they were caught. Pirates could create a criminal

³³ In the first half of the 17th century the buccaneers had a similar landed home at Tortuga, off modern-day Haiti, and then Port Royal, Jamaica. In the second half of the 17th century the Red Sea Men set up a land base on the island of St. Mary's off Madagascar.

³⁴ The exceptions to this were suppliers of pirates' landed economy, who also called New Providence home, mainly alcohol purveyors and whores. Even after Rogers arrived, nearly all of the islands' residents were pirates.

Lloyd's of London to coordinate and handle inter-firm collusion if they wanted.

Pirates' island was isolated, independent, and populated solely by sea dogs. So, they were essentially unconstrained in how they used communication to help create and maintain inter-firm collusion agreements. In this sense Caribbean pirates' ability to communicate for the purposes of establishing and sustaining inter-firm collusion was superior to that of Sicilian private protectors who live among the members of legitimate society, under the watchful eye of government officials, and thus who are severely restricted in the extent to which and ways they can communicate to enable inter-firm collusion.

Further facilitating pirates' ability to collude across industry was the piracy industry's small number of firms. In contrast to the 100+ firms in Sicily's private protection industry, at its peak the Caribbean maritime marauding industry had only 30 firms. The small number of pirate firms made it easy for each firm to know the others and for firms to coordinate if they desired.

Other factors also contributed to pirates' ability to collude. Since pirates lived together between expeditions and operated from the same base, over the course of their careers they came to work with many other members of the pirate community, teaming up with one assortment of pirates to form a crew for one expedition, another assortment of pirates to form a different crew for the next, and so on. In contrast to Sicilian private protection firms, where each producer is attached to one firm permanently, Caribbean pirate producers moved between firms much more frequently.

The fluidity of pirate firms' membership contributed to the frequency and

breadth of pirate producer interactions. It also contributed to the ease of communication throughout the Caribbean marauding industry. Firm-member “mixing” tightened sea bandit bonds and strengthened connections between the industry’s members as well. Because of it, more than 70 percent of Anglo-American pirates can be connected back to one of only three pirate captains, Benjamin Hornigold, George Lowther, and Edward Low (Rediker 1989: 267).

Producers’ social connectedness, physical closeness, frequency of interaction, and ease of communication in the Caribbean pirate industry rules out the suggestion that pirate firms didn’t collude because they couldn’t. They clearly could.

1.4 Concluding Remarks

Our analysis of the industrial organization of criminal enterprise leads to several conclusions. First, producers in more contestable criminal industries, where natural barriers to entry are low, have an incentive to organize hierarchically. Strong competitive pressures that prevail in the absence of producer intervention threaten to erode producers’ returns. But if producers can collude to regulate output and prevent new competitors from entering their market, they can preserve their returns.

However, collusion is difficult to maintain. Unlike members of cartels composed of legitimate producers, members of cartels composed of criminal producers can use violence to help them enforce collusive agreements, which helps them with this task. But when every criminal cartel member has the power to violently punish cheating, mistakes impose large losses on cartel members. Cartel members can reduce these

losses if instead each member, save one, surrenders his coercive power, leaving a single cartel member with the power to deal violently with the others: violent enforcement and hierarchy are complementary. Criminal producers for whom collusion is important create this arrangement by organizing under the auspices of a hierarchically structured firm controlled by a boss who uses coercive power to allocate and enforce production rights. The Sicilian Mafia, which producers in Sicily's private protection business use to cartelize this industry, is the classic case of this.

Alchian and Demsetz's (1972) theory of the legitimate firm is inadequate as a theory of the criminal firm. The potential for coercive authority characterizes the criminal firm. Further, as the case of the Mafia illustrates, the criminal firm may emerge even when team production needs are absent. Our theory explains the importance of boss power to the hierarchical criminal firm and why this firm can emerge when team production is unimportant. It also helps explain the marked movement toward organizational flatness in the Sicilian Mafia in recent years. As Mafiosi have become more active in the heroin industry and less active in the private protection industry since the 1970s, their benefit from collusion has become smaller. In response they've moved away from organizational hierarchy.

Second, our theory explains why less contestable criminal industries, which have high natural barriers to entry, tend to organize flatly. Because the benefit of collusion is low in such industries, the benefit of organizational hierarchy is low as well and isn't large enough to offset the cost associated with boss self-dealing, which

hierarchy creates. In criminal industries where higher natural barriers to entry do the work of limiting competition for them, producers do better by organizing flatly instead. The classic case of this is Caribbean pirates who famously organized their firms as “workers’ democracies.”

Finally, our analysis highlights that the observed presence or absence of barriers to entry across criminal industries reflects the intervention, or lack of intervention, by producers in those industries to maximize their returns. The observed high barriers to entry in Sicily’s private protection business result from its producers’ intervention to countermand naturally low barriers to entry that would prevail and erode their returns without their intervention. Likewise, the observed freeness of entry into the Caribbean maritime plunder business reflects its producers’ decision not to intervene in their criminal industry where naturally high barriers to entry prevailed and preserved their returns without their costly intervention.

2. Internalizing Violence: Conflict and Cooperation in Violent Crime

If...an important man has to be hit – a politician or policeman or judge – the decision has to come from above, from the highest level, namely the regional commission...this is logical. A murder of this kind can cause harm to everyone. True, the killing is done in a given territory, but its consequences will be paid later by everyone.

-Don Antonio Calderone

2.1 Introduction

Violent criminals face many unique obstacles to cooperation in relation to their legitimate counterparts. Shorter time horizons, proclivities for violence and an inability to rely on formal legal systems to resolve disputes all make cooperation especially difficult to sustain. Despite these obstacles, organized criminal activity is ubiquitous in most societies. This is because criminals find creative ways to enforce agreements that sustain cooperation and maximize criminal profits. It is surprising that criminal organization and cooperation occurs under ideal conditions, however, it is even more surprising when criminals manage to overcome obstacles that their law-abiding counterparts struggle with.

Since Becker's seminal work applying rational choice theory to criminal behavior (1968), the literature on the economics of crime has grown substantially³⁵. Authors such as Abadinsky (1997), Gambetta (1993), Jennings (1984) and Shelling (1971) have focused on the prevalence of and reasons for monopoly in organized crime. This paper is focused on a subset of this research, namely the internal organization of criminal enterprises.

This paper adds to this literature by examining the conditions under which criminals employ collusion as an organizational technology to cope with problems of external costs. Specifically, in violent criminal industries where the actions of one criminal or criminal firm imposes non-pecuniary externalities on other criminals, collusion can be used to internalize these costs and prevent market unraveling due to over-extraction problems³⁶. Thus, in violent criminal industries, although the initial effects of collusion are to restrict entry and output, the end result of this collusion can be to sustain criminal activity over time.

The existence of external criminal costs³⁷ decreases the overall profitability of the criminal industry. In this way, criminals, by engaging in violent criminals acts, impose

³⁵ Much of this research considers the economic impact of organized crime (Anderson 1979; Bandiera 2003), the activities and specialization of criminal organizations (Arlacchi 1986; Dick 1995; Fiorentini and Peltzman 1995; Jankowski 1991; Levitt and Venkatesh 2000; Reuter 1983, 1987; Varese 2006a, 2006b), optimal strategies for preventing organized crime (Fiorentini and Peltzman 1995; Jacobs, Panarella and Worthington 1996), and reasons for its emergence (Bandiera 2003; Gambetta 1993, 1994; Garoupa 2000; Konrad and Skaperdas 1998; Smith and Varese 2001; Varese 2001, Varese 2006a, 2006b). Dixit (2004) applies mathematical analysis and surveys the literature in what he refers to as "Lawlessness and Economics."

³⁶ It is important to note that this paper, unlike Buchanan (1973) and Backhaus (1979) does not consider the broader social costs of violent crime. Non-pecuniary externalities are considered only *within* the community of violent criminals. Section four considers the possibility for the overall quantity of violent crime to either increase or decrease as the result of collusion. See Bandiera (2003) for analysis of the external social costs of violent crime.

³⁷ It is worth mentioning again that this paper is neither considering the broader social costs of violent crime nor is it making any normative evaluations. The "problem" in this case is from the perspective of the criminals themselves.

non-pecuniary externalities on other criminals in their industry. If this extraction continues unabated, criminals can expect to find themselves out of work in future periods.

This paper considers one potential source of these external costs³⁸. These costs arise from the potential for the state to respond to violent criminal acts by increasing pressure on criminals who did not participate in the acts in question. The state responds to violent criminal acts by increasing law enforcement. This is done directly by investigating and prosecuting the criminal act itself but also by increasing the resources devoted to law enforcement, i.e. by hiring more police or increasing criminal prosecutions. Even if it is clear which criminals committed a particular violent act, the costs of this increase in enforcement are borne in part by other criminal enterprises. If it is unclear who committed the act in question, other criminals are likely to face a greater percentage of the costs of increased law enforcement.

Given that the traditional solutions to commons problems, property rights and government regulation, are either too costly or unavailable, criminals are forced to rely on alternative means to prevent over-extraction. The means examined in this paper is inter-firm collusion. Collusion can be used to restrict the overall amount of violent criminal activity, thus mitigating over-extraction problems.

Unless solved, this problem will threaten the future profitability and perhaps existence of criminal activity in this industry.

³⁸ This analysis is not meant to be exhaustive. The specific nature of the non-pecuniary externalities in criminal industries is likely to vary depending on the criminal industry examined. This paper focuses on the external costs most likely to apply across criminal industries.

If collusion is so effective in regulating violent criminal activity, however, then why do some criminal industries continue to exhibit periodic bouts of unsustainable levels of violence? The force behind the empirical phenomena of cyclical fluctuations in violent criminal activity is the balance between the benefits of collusion as a solution to the problem of external costs and the benefits of defecting on the cartel.

As collusion becomes effective in solving the external costs problem, the benefits of defecting on the cartel rise. Once the cartel has been dissolved, however, the problem reappears. Competing criminal enterprises return to a sub-optimally large degree of violent activity. As an increase in violent criminal activity occurs, the benefits of collusion as means to prevent over-extraction also increase. The theory put forth in this paper thus predicts a natural cycle between relatively low levels of violent criminal activity under collusion and periodic outbursts of violence when the cartel is dissolved.

The hypothesis put forth in this paper can be divided into three separate theoretical predictions. The first prediction is that the overall amount of violent criminal activity decreases during the period where collusion, enforced via the inter-firm commissions, takes place. In periods where collusion is dissolved, the overall amount of violent criminal activity increases. The second prediction is that the overall profitability of criminal activity increases while collusion is enforced and decreases, due to over-extraction, in periods where collusion is not enforced. The third prediction is that the longevity of criminal enterprises increases during times of inter-firm collusion and decreases during times of competition.

This paper draws heavily on testimony of the various *pentiti*³⁹ who, from the mid-1980 to the early 1990's, provided the first looks inside of La Cosa Nostra. Before this period, little was known about the Sicilian mafia, at either the firm or the inter-firm level. Prosecutors were unable to confirm the very existence of La Cosa Nostra or individual mafia families until this time. The testimony of Tommaso Buscetta alone resulted in the arrests of over 400 Mafiosi in Sicily as a result of the Maxi-trial of 1984 and hundreds more in New York during the Pizza Connection case of 1985 (Shawcross and Young 1987: 298). Buscetta was in part responsible for the creation of an inter-family commission in Sicily during the late 1950's and was the highest-ranking Sicilian Mafioso to turn state's witness. Sicilian Don Antonio Calderone's confession is captured in Pino Arlacchi's excellent book "Men of Dishonor" (1993). His brother, Giuseppe Calderone is responsible for forming a commission amongst all families in La Cosa Nostra in the late 1970s (Arlacchi 1992: 127).

2.2 Theory

Before further analysis is possible, it is first necessary to outline the problem of external costs in crime. This problem occurs whenever the activities of one criminal enterprise impose costs on other criminal enterprises that are not reflected in the price mechanism; i.e., *non-pecuniary* external costs. The example given in this paper is when the activities of one criminal enterprise results in increased police pressure on other criminal enterprises not involved in the initial criminal act.

³⁹ This term translates literally as the "penitent" and is used to describe former Mafiosi who have become witnesses for the Italian state.

The state responds to violent criminal acts by increasing law enforcement. This is done directly by investigating and prosecuting the criminal act itself but also by increasing the resources devoted to law enforcement, i.e. by hiring more police or increasing criminal prosecutions. Even if it is clear which criminals committed a particular violent act, the costs of this increase in enforcement are borne in part by other criminal enterprises. If it is unclear who committed the act in question, other criminals are likely to face a greater percentage of the costs of increased law enforcement. Since the costs of criminal activity are borne in part by other criminal enterprises, the overall amount of criminal activity will be higher than if all costs were internalized.

The existence of external costs thus threatens to unravel the criminal industry as a whole. Given the inefficiently high amounts of criminal activity, the response from law enforcement decreases the profitability of crime towards zero.

This situation describes one possible outcome, i.e. the uncoordinated use of violence by competing criminal enterprises. The second possible outcome is the coordinated regulation of criminal activity by different criminal enterprises, i.e. collusion.

In order to demonstrate the usefulness of collusion to solve the criminal over-extraction problem, it is first necessary to illustrate the conditions where the traditional solutions of private property rights and government regulation are not effective. With well-defined property rights and the absence of transaction costs, externalities are internalized (Coase 1960; Stigler 1966). The establishment of well-defined property

rights, however, is especially difficult in certain criminal activity (Leeson 2009c: 54-55)⁴⁰.

It is often unclear how to define, much less enforce, property rights over criminal activity. Even when property rights can be clearly defined, the establishment of such rights, e.g. territorial rights over which criminals can operate in a certain area, creates scope for costly opportunistic behavior, i.e. boss self-dealing. As Leeson and Rogers (2010) note, profit-maximizing criminals must weigh the costs of boss self-dealing against the benefits of establishing property rights over criminal activity.

These costs are especially acute at the industry wide level. In criminal industries where each criminal act imposes non-pecuniary externalities on all other criminal participants, the property rights solution would require a single criminal firm capable of internalizing all relevant costs and benefits. Given that the costs of boss self-dealing are in direct relation to the size of a criminal enterprise, establishing a single criminal firm that directs all activity over an entire criminal industry is especially costly.

Also worth noting is the ambiguity of some property rights in violent crime. For example, a protection firm may collect dues from a construction company and claim an exclusive property right to do so⁴¹. This construction company, however, may operate in several areas claimed by different criminal entities. Thus, in order for the protection firm to enforce its contract, it may be necessary to commit violent acts across different

⁴⁰ In *The Invisible Hook*, Leeson argues that internal regulation was more “cost effective” than establishing private property rights over certain behaviors exhibiting negative non-pecuniary externalities on pirate ships.

⁴¹ It is worth mentioning that the distinction between “legitimate” protection and pure extortion is irrelevant to this analysis. See Demsetz (1972a, 1972b) who argues that there is no significant economic difference between the provision of a valued service, such as protection, and extortion. Section three considers the extent to which the activities of La Cosa Nostra were either legitimate protective services or pure theft.

territories. Absent communication and cooperation across criminal enterprises, these acts could be interpreted as aggression and thus insight conflict. The costs of establishing a single firm over the entire criminal industry are thus too high.

The possibility of non-traditional solutions to problems of external cost was first explored by the work of Nobel Laureate Elinor Ostrom. As Ostrom and Gardner note “[unless] institutions change the incentives facing appropriators, one can expect substantial over appropriation” (1993: 93-94). An important aspect to this research is that over-extraction problems need not be solved by either the establishment of well-defined private property rights or the external enforcement of government; these problems are often successfully regulated by the appropriators themselves (Ostrom 1990: 1).

The alternative to a competitive criminal industry is thus a collusive one, where potential competing criminal enterprises collude to restrict and regulate the overall amount of criminal activity. Collusion becomes desirable as the profitability of crime approaches zero. As criminals impose external costs on one another via competition, the relative benefits of collusion increase.

As collusion is effective in internalizing the costs of criminal activity, however, a dilemma emerges. Prior to successful collusion, the benefits of defecting on the cartel are essentially zero. As profitability approaches zero, criminal enterprises are more willing to abide by the cartel agreement. Doing so, however, changes the payoffs of defection. Once the cartel is able to successfully internalize costs, and thus reestablish profitability, the benefits of defection rise.

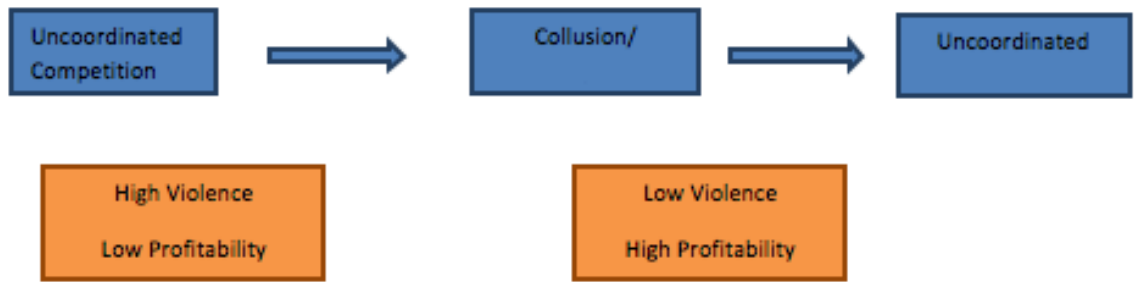


Image 1: Organizational Flowchart

2.3 An Applied Example: Inter-firm Commissions in La Cosa Nostra

2.3.1 *La Cosa Nostra and the Criminal Commons*

Criminal enterprises, or “families,” within La Cosa Nostra (LCN) are in the business of providing protection to their customers (Gambetta 1993: 1). Significant evidence exists to support the claim that these services are willingly paid for, i.e. the activities of La Cosa Nostra constitute genuine protection (Arlacchi 1992: 187, 205; Gambetta 1993: 20, 21, 187, 248; Lupo 2009: 217, 238). Given the widespread existence of petty criminal extortionists and a weak police presence, certain Sicilian property owners petitioned outside mafia families for protection if a family was not present in their area (Gambetta 1993: 3, 23). Large Sicilian firms, such as the Costanzo construction firm of Catania, carried on long-term business relationships with mafia families in exchange for protection (Arlacchi 1992: 188, 189).

Demsetz (1972a, 1972b) argues that there is no significant economic difference between the provision of a valued service, such as protection, and extortion. For the purposes of this paper, this distinction, were it to exist, is not meaningful. Mafia families

determined the profit-maximizing level of violent criminal acts by balancing their private marginal costs and benefits. This paper is concerned only with the impact of violence on criminal profit, whether that profit stems from extortion or a valuable service does not enter into this analysis.

As with any criminal enterprise, violence or the threat thereof is an integral part of the activities of a mafia family. In order to provide protection to their customers and ward off potential competitors, mafia families had to be capable of using, or credibly threatening to use, violence. The targets of this violence depended on the circumstances. In order to maximize criminal profit, a mafia family would need to be capable using violence against other criminals threatening their customers, certain politicians or journalists who threaten to shutdown their organization and possibly other competing mafia families (Arlacchi 1992: 214).

Mafiosi had to be careful about who they informed about planned violence. They could not post fliers indicating their intent to kill someone that had threatened their profits. Aside from the attention that this would draw from the police, the killers cannot let the intended victims know their plans. Secrecy is critical to the successful criminal activities of families in La Cosa Nostra. *Omerta*⁴² was established as an informal rule that each Mafiosi must maintain total secrecy about their criminal activities to avoid such problems. The rules of La Cosa Nostra cannot be written down. Mafioso Michele Cavatio was killed, by order of the regional commission of Palermo, for so much as writing down a map of certain mafia families of the area (Arlacchi 1992: 85). The

⁴² *Omerta* is the code of silence adopted by Mafiosi which prohibits members from informing anyone about their illegal activities or in any way using the formal legal system (Paoli 2003: 109-110).

potential damage that such written documents could cause if they were to fall into the hands of the authorities was enough for other Mafiosi to take such actions seriously. Mafioso Giovanni Bontade was killed, by order of the Palermo commission for claiming that “the mafia” did not murder a recently deceased child, and in so doing revealing the very existence of the wider organization (Gambetta 1993: 103).

A countervailing force, compelling Mafiosi to tell certain people about planned acts of violence, was the danger of rival families interpreting acts of violence as signs of aggression as well as the increased police pressure acts of violence brought upon all mafia families. Don Antonio Calderone summarizes this dangerous potential:

If, on the other hand, an important man has to be hit...the decision has to come from above, from the highest level, namely the regional commission... This is logical. A murder of this kind can cause harm to everyone. True, the killing is done in a given territory, but its consequences will be paid later by everyone (Arlacchi 1993: 36).

Calderone goes on to describe the fall-out from a killing committed by a rouge Mafioso without the knowledge of other Mafiosi in July of 1963. “[the] bombs had sown chaos inside the mafia because no one admitted to having placed them and because they focused police and press attention on the victims... the damage to the Cosa Nostra it caused would last through the seventies (Arlacchi 1993: 80).”

The “consequences... paid later by everyone” that Calderone describes are the negative externalities of criminal violence. Violence has both private and social costs

within La Cosa Nostra⁴³. The total costs of violence include: 1) the potential for direct physical retaliation by the victim and 2) retaliation by the victim's family, if they have one and 3) the increased pressure applied by the state after a highly publicized act of violence. The first two of these costs are fully internalized by the agents committing the act of violence whereas the last cost is borne only in part by those committing the act of violence. The negative externalities of violence are thus the potential for increased police pressure brought on all families because of one family's actions. Without an inter-firm institution to govern certain violent activities, individual mafia families would find it in their interests to engage in more violence than would be optimal for the entire population of Mafiosi.

The commission served to internalize these externalities by concentrating decisions to commit certain acts of violence into one institution. Given that the commission represented the interests of every member family, all of the costs (borne by Mafiosi)⁴⁴ were taken into consideration when a decision to use violence was made. The commission existed to increase total criminal profit within La Cosa Nostra by balancing the full criminal costs of violent activity with its benefits.

The power of the commission to enforce its decisions comes from the ability of commission members to order that certain acts of violence be carried out against those threatening the criminal profitability of La Cosa Nostra as an industry. Commission

⁴³ Private costs, in this context refer to costs that are borne by the mafia family engaging in an act of violence. "Social costs" refer to the costs imposed on other mafia families. The costs imposed on society as a whole are not considered here.

⁴⁴ The social externalities of violence to non-Mafiosi are well beyond the scope of this paper. Bandiera (2003) discusses the impact of mafia activity on the rest of society.

members deliberate on who is imposing external costs on other Mafiosi and whether violence should be used against them. Members of the commission found it within their interests to abide by its decisions because the potential gains from internalizing the externalities of violence exceeded the cost of following these orders.

Prior to the formation of a commission, each mafia family has little incentive to take into consideration the full costs of their violent criminal activity. Each individual mafia family also has little incentive to use violence to prevent other families from imposing external costs onto La Cosa Nostra as a whole. If a mafia family were to attempt to prevent other families from engaging in violent activities with external costs, they would not be able to fully internalize the benefits, i.e. they would only reap a percentage of the total gains from their actions. Thus, prior to the existence of an institution capable of internalizing these costs and benefits, each mafia family has an incentive to impose external costs on other families as well as engage in sub-optimal enforcement against similar behavior on the part of other families.

After the formation of a commission capable of using violence to enforce its decisions, each family is likely to bear the full costs of violent activity. If a family persists in imposing externalities on other families, the commission is capable of punishing that family with violence. The commission also serves to internalize the benefits of enforcement. Each individual family is unlikely to use force to govern another family's violent activities. The commission represents the interests of all member families, however, and thus is capable of internalizing the gains from governing certain violent activities.

This also helps to explain why Mafiosi were unable to engage in bilateral contractual relationships to perform the same function as the commissions. Absent a mechanism to enforce such contracts, any agreement to forgo certain criminal activities lacks credibility. The functionality of such arrangements is further hindered by the presence of high transaction costs typical of criminal activity. It would be exceedingly costly for each individual mafia family to contract with all other families not to engage in certain criminal activities. In order to economize on these transaction costs, Mafiosi established commissions to centralize such contractual arrangements.

In practice, the decisions of the commissions were relegated to criminal behavior that imposed negative externalities on other mafia families. This paper provides an explanation for this practical limit placed on the authority of these institutions. Absent mutual gains from the internalization of externalities, it is difficult to imagine why mafia firms would cede authority over certain criminal activities. In order for mafia families to agree to cede certain authority to an institution capable of using violence to enforce its decisions, it had to be within their interests to do so. Thus, even though the commission was capable of acting as an outside enforcer *ex post*, *the agreement to establish* the commission and what it was empowered to do *ex ante* had to be self-enforcing. Section three discusses failed attempts on the part of commissions to regulate criminal activities that do not exhibit external costs.

2.3.2 The History of the Commissions in La Cosa Nostra

How did these violent criminal enterprises stay in business for several generations, much less keep the existence of their organizations secret? Secrecy was vital to the survival of mafia families and it was not until the mid-1980's that *omerta*, the code of silence among Mafiosi about the existence of La Cosa Nostra, was broken (Stille 1995: 407). It is indeed a testament to the high degree of secrecy and successful coordination between Mafiosi that prosecutors were unable to confirm the very existence of their organizations until this time. The reason this secrecy persisted, as well as the reason for the longevity of their criminal enterprises, is due in great part to the success of inter-firm institutions created to govern violent activities.

The inter-firm commissions in La Cosa Nostra had to balance the benefits of secrecy with the benefits of inter-firm coordination. Given their inability to rely on the formal legal system, Mafiosi had to use violence against those that threatened their criminal profitability. However, the uncoordinated use of violence by different mafia families created potential sources of inter-family conflict that reduced criminal profitability across all families. Section two describes why commissions are an efficient organizational entity but how did these commissions historically arise?

Little is known about La Cosa Nostra prior to the experiences provided by the testimony of the various *pentiti* in the 1980s. The origins of La Cosa Nostra date back to the mid-nineteenth century (Gambetta 1993: 1, 19, 49) yet evidence regarding the organization of mafia families from this time is limited. *Pentiti* testimony indicates the formation of commissions dating back to the late 1950s. The Sicilian mafia scholar Salvatore Lupo, however, reveals evidence indicating the existence of inter-firm

commissions dating back to the end of the nineteenth century: “In Palermo there existed a supervisory body at the end of the nineteenth century, and probably there was such a body in other periods as well. As early as 1951, the Palermo Centro families expressed a common decision-making structure, and there were a series of meetings with other city groups” (Lupo 2009: 225; Paoli 2003: 52). The historical record of these commissions implies that Mafiosi have found these institutions desirable for a long time. However, given the limited information available on these early commissions, this paper focuses on the twentieth-century commissions described in the testimony of the *pentiti*.

Before going into a full organizational analysis of these commissions, it is worth examining the internal organization of a typical mafia family. Atop the organization is the “boss,” or *capo famiglia*, who appoints his immediate underlings—the vice capo, or underboss, and one to three “counselors,” or *consiglieri*⁴⁵. Below the vice capo are one or more “captains,” *capidecina*, or *caporegime*, who report directly to the *capo famiglia*. Each captain oversees a small number of soldiers, or “men of honor.” The *capo famiglia* directs the production of the soldiers who are immediately supervised by *capidecina* to ensure they limit their protection activities to those the boss specifies (Arlacchi 1992: 33-34; Gambetta 1993: 111, 123; Jacobs, Panarella and Worthington 1996: 153; Stille 1995: 101, 115).

⁴⁵ According to Calderone, a family’s men of honor elect the consiglieri rather than the family boss appointing them (see, Arlacchi 1992: 25). However, in light of Gambetta’s (1993: 111) description of Mafia boss “elections,” which depicts them as more of rubber-stamping procedures for the strongest than as genuine democratic elections, his description and Arlacchi’s may not substantively disagree. Buscetta suggests that while consiglieri are normally boss-appointed, in very large families the men of honor elect them (see, Shawcross and Young 1987: 52).

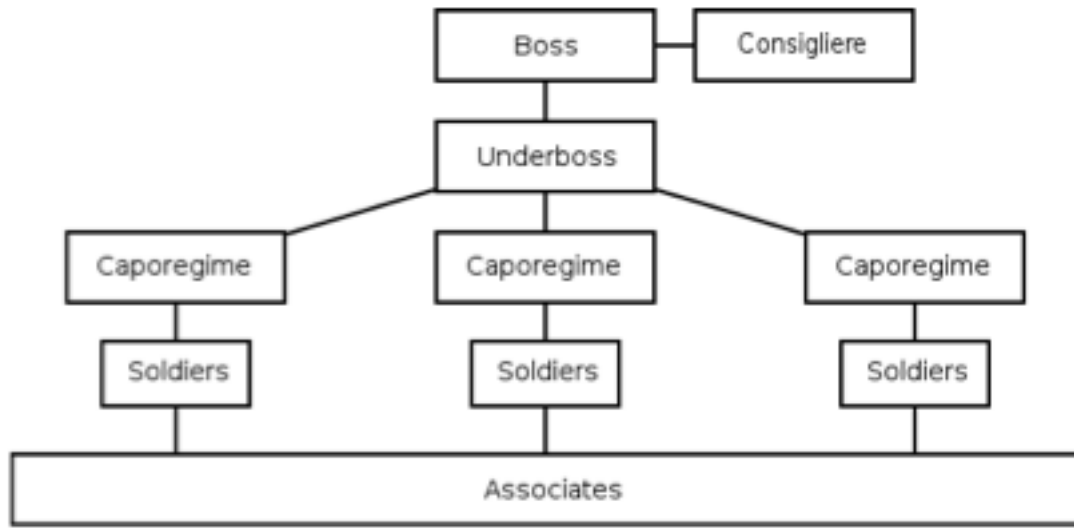


Image 2: Hierarchy of Mafia

Organization at the inter-firm level of the commissions does not display the pronounced hierarchical structure of the individual mafia family. Commissions were comprised of representatives from individual mafia families, usually bosses of individual families, who deliberated as to the purposes and activities of the inter-firm institutions in a democratic fashion. Throughout the twentieth-century, a number of commissions were formed and subsequently dissolved. This section focuses on two of the most prominent manifestations of inter-firm commissions described by the *pentiti*: the provincial system of commissions established in the late 1950s with the help of Tommaso Buscetta and the inter-provincial system of commissions established with the help of Giuseppe Calderone in the mid 1970s.

2.3.3 The Regional System of Commissions (1957-1962)

In 1957, Lucky Luciano and Joseph Bonnano, prominent American Mafiosi, traveled to Sicily in order to encourage the Sicilian families to form larger commissions to resolve certain disputes. In a meeting with Sicilian Mafiosi Tommaso Buscetta and Salvatore Greco, Bonnano said, “[it] would be to everyone’s advantage if you had a Commission, like the one we have in America... Since we started in 1937, the Commission has approved all the hits against Men of Honor, and the system has worked very well (Shawcross and Young 1987: 44).”

Following the advice of Bonnano and Luciano, Tommaso Buscetta and Salvatore Greco established a system of regional commissions in 1957. The Sicilian commission differed from the American version however in that instead of a national commission, Greco and Buscetta established a system of interacting provincial commissions with representatives that were soldiers instead of bosses (Shawcross and Young 1987: 51). This rule that commission representative be soldiers and not family bosses, was meant to create a system of checks and balances that would dilute the power of any one family boss. This rule was quickly abandoned, however, and the bosses of member families were allowed to become participating members of the commissions (Gambetta 1993: 112).

Buscetta describes the organization of this system:

Above the families and serving the purpose of coordinating the different groups is a collegial structure known as the Commission, made up of members each one of whom represents three families that are geographically close together. This member is one of the bosses of the three families, named by the bosses of those

families. The members of the Commission, in my day, held office for three years, but I don't know if these rules still apply (Shawcross and Young 1987: 52).

Buscetta goes on to explain where the authority of the commission comes from and how it is able to punish those threatening the criminal profits of its members:

“The Commission will then form the team that is to carry out the decision. They have the power to choose the executioners from any family without informing its boss; organizing the crime is, therefore, the exclusive province of the Commission and it is supposed to remain a secret from all the others; with exception, of course, of the executioners themselves...” (Shawcross and Young 1987: 123).

If a representative of the regional commission, i.e. a family boss who was also a commission member, did not approve of the request for murder that another representative was making, they were free to veto the request⁴⁶.

This system effectively governed certain violent activities of member families (Gambetta 1993: 114; Paoli 2003: 53) until the First Mafia War of 1962 (Shawcross and Young 1987: 52-53). It is beyond the scope of this paper to explain why commissions were dissolved in times of internecine conflict or why the commissions were unable to prevent such conflicts from occurring. It is worth mentioning, however, that the reformation of these commissions after these periods of conflict indicates their usefulness.

2.3.4 The Interprovinciale System of Commissions (1974-1981)

⁴⁶ In reality the veto was almost never used and commission decisions were based on simple majority rules. However, one family, if they protested strongly enough were often able to dissuade other representative from voting against their interests (Arlacchi 1992: 36; Gambetta 1993: 114)

From the First Mafia War until the mid 1970s, several attempts were made to reestablish the system of regional commissions of the late 1950s (Paoli 2003: 54). It was not until 1974, however, that a system of commissions was established on the same scale as the provincial system. Giuseppe Calderone, capo of the Catania family and brother of Don Antonio Calderone, described why a new system of commissions was needed: “[we] have to know who has committed a murder or a theft, who has ordered a kidnapping, who is protecting whom. If we don’t everything collapses” (Arlacchi 1992: 126).

In an attempt to coordinate mafia families across all of Sicily, as opposed to only in certain regions, Calderone suggested an inter-provincial system of commissions for the entire island. Calderone goes on to explain: “[so] why don’t we establish a commission for the whole of Sicily, a place where any question can be discussed as soon as it arises, or even before it arises? Where every important matter is resolved, like murders and whom to support in elections, where those who make mistakes are punished, where the whole Cosa Nostra can be spoken for instead of the usual Greco, Liggio, and others from Palermo?” (Arlacchi 1992: 126).

The rationale behind the formation of the *Interprovinciale* is consistent with section two of this paper. Calderone explicitly refers to the negative externalities of certain violent criminal activities in his justification for the commission: “...an absolute ban was proclaimed, under pain of death for those responsible, against carrying out kidnappings in Sicily. Pippo strongly insisted that such actions made their perpetrators unpopular among the locals, and that the hubbub caused by kidnappings increased police pressure on the mafia and greatly harmed the families in whose territories they were

carried out” (Arlacchi 1992: 131). Mafia scholar, Letizia Paoli confirms Calderone description of the *Interprovinciale*. “From its inception, the commission was given exclusive authority to order the murder of police officials, prosecutors and judges, politicians, journalists, and lawyers, because these killing could provoke retaliation by law enforcement and thus damage the whole mafia community” (Paoli 2003: 54).

The various manifestations of the commissions were relegated to internalizing externalities. Attempts were made by commission members to extend their authorities over other activities, but given that it was not in the interests of mafia families to cede authority without a corresponding benefit, these attempts were generally unsuccessful. For example, Paoli describes the failed attempt of the *Interprovinciale* to regulate the tobacco smuggling and drug trafficking enterprises of some Mafiosi in the mid 1970s (2003: 145). These activities did not exhibit the same external costs of violent activity discussed in section two and as a result, commissions were not given authority to govern these activities.

2.3.5 An Empirical Test of the Theory

The predictions outlined in section two are now compared with the history provided in section three. Table 1 illustrates the years when commissions, i.e. collusion, occur and the years where uncoordinated competition occurs. This table also examines the three testable predictions made in section two, namely that violence and turnover are high and profitability is low in years of uncoordinated competition and vice versa in years of collusion.

Table 1: The Case of La Cosa Nostra

Years	Commission(s)	Violence	Profitability	Turnover
1957-1962	Yes	Low	High	Low
1963-1973	No	High	Low	High
1974-1980	Yes	Low	High	Low
1981-1991	No	High	Low	High

2.4 Conclusion

The commissions of La Cosa Nostra arose to internalize the externalities of violent criminal activity and in so doing, increase the criminal profits of participating mafia families. Commissions were granted the power to use violence to enforce their decisions by member families because member families had more to gain than this partial abdication of authority cost them.

So far, little has been said about why these commissions failed to ensure long-lasting peace and prosperity in La Cosa Nostra. In order to sufficiently address this issue, a thorough analysis of all of the destabilizing forces acting upon the commissions would be necessary. This is left to further research. It is worth mentioning, however, that half of the external costs facing mafia families, and thus half of the justification for the establishment of inter-family commissions is a result of state intervention into criminal

activities. Absent these interventions, it appears as though the commissions of La Cosa Nostra would exist exclusively to prevent inter-family conflict.

This paper outlines a theory of inter-firm criminal organization in the presence of external costs to violent criminal activity. In the absence of these external costs, it is unlikely to be within the incentives of individual criminal enterprises to create institutions for inter-firm cooperation. *Ceteris paribus*, the greater these external costs are, the greater the profitability is of establishing institutions to internalize these costs.

3 Competition or Collusion?

An Experimental Investigation of the Market for Private Protection

3.1 Development and the Provision of Protection

In much of the developed world, the market for private protection is limited in both size and scope. Privately ordered protection plays a significant role; yet it does so, for the most part, with the consent of the state. For most of the developing world, however, this is not the case. States are either too weak or otherwise incapable of providing protection to much of their populations. In their “Failed States Index (2009),” Foreign Policy and the Fund for Peace labels 11% of world governments in critical condition as failed states with 42% in danger of becoming a failed state and a further 25% labeled borderline. Rajan (2004: 2) argues that given this institutional environment for most developing countries, “[our] analysis would be better informed by assuming anarchy.”

Although these weak and failed states are to a certain extent incapable of protecting the property rights of their citizens, they are still capable of expropriation. The level of expropriation carried on by many governments in weak and failed states may be greater than if the state were not to exist. Assuming anarchy may indeed be optimistic in such environments. Leeson and Williamson (2009) suggest that the first best option of a functional government, typical of most developed countries, is not within the opportunity

set for developing countries. Rather, faced with the choice between a weak, predatory state and anarchy, anarchy may be a second best option for developing countries. Given that secure property rights are essential to development, it is worth examining how these rights might be protected under anarchy.

Building upon these considerations, we investigate the market for private protection in the absence of external enforcement. Would the private provision of protective services result in more, less or the same amount of expropriation as would occur under a weak and predatory state? Would a competitive equilibrium exist, and if so, would it be stable, or would it devolve into monopolistic provision? Answering these questions would go a long way towards understanding the plight of underdevelopment in weak and failed states.⁴⁷

The private provision of protection services encounters at least two potential problems. The first problem is the potential devolution of competition into a war amongst competing providers. Although this Hobbesian state of nature remains a possibility, strong incentives exist for competitors to avoid this outcome (see, for instance: Caplan and Stringham 2003; Friedman 1984; Leeson 2007a, 2007b, 2008, 2009; Powell and Wilson 2008). The second problem concerns the stability of competition and the potential for suppliers to collude, forming a *de facto* monopoly. This paper is concerned exclusively with the latter (for an experimental study of the

⁴⁷ We have neglected the question of whether or not the market for protection actually provides a valuable service or is simply extortive in nature. As Demsetz has argued (1972a, 1972b), economically, the distinction between supplying a valued service, such as protection, and extortion is insignificant. Both activities involve identical revenues and costs. Therefore, any labeling of private protection as beyond the purview of economic analysis arbitrarily imputes a non-substantive normative distinction. Normatively, regarding suppliers of protection as extortive may have effects in the laboratory. Nevertheless, our positive hypotheses on the stability of competition in the market for protection are equally valid regardless of whether subjects consider protection a desired good or pure extortion.

first problem, see Smith et. al. 2008).

An extensive literature has developed around these issues with both theoretical and applied contributions. One of the earliest examinations of a market for protection under anarchy is David Friedman's *The Machinery of Freedom* (1973) in which Friedman argues that protection, along with all other goods, can be provided competitively through market processes.

Following Friedman's approach, Stigler and Becker (1974) examine the efficacy of private enforcement of rules. They conclude that private enforcement unleashes competitive forces, which may reduce conflict as or more effectively than public enforcement.

This was soon contested, however, by subsequent efforts, which found that a private market for protection would be subject to inefficient provision (Landes and Posner 1979) or as Nozick (1974) argues, the inevitable establishment of a monopoly due to increasing returns to scale. A related debate begins with the assertion by Cowen (1992) that given the effects of network externalities, the market for private protection results in the formation of a cartel that engages in monopolistic pricing (for responses and counter responses, see, Friedman 1994; Cowen 1994; Cowen and Sutter 1999; Caplan and Stringham 2003; and Cowen and Sutter 2005). Cowen argues that if protection agencies are to avoid open conflict when customers of different agencies attempt to resolve disputes, they will have to standardize procedures. This standardization allows participating agencies to collude to fix prices and restrict entry into the protection market. Caplan and Stringham respond by arguing that

standardization, a coordination game, does not imply the ability for members of the network to fix prices, which is characterized as a prisoners' dilemma. Protection agencies are likely to overcome coordination problems but given the inherent instability of collusion (see, for instance, Stigler (1968)), they are unlikely to successfully fix prices or restrict entry.

Turning to the applied literature, Acemoglu and Johnson (2005) demonstrate that the degree to which property rights are secure, both from legal and illegal expropriation, is highly correlated with development while state enforcement of contracts, or legal formalism, is not. Indeed, as Grossman suggests, "the existence of a state and a legal system is neither necessary nor sufficient for the existence of effective property rights" (2001: 347). Examples of privately enforced, effective property rights abound (for examples amongst homogenous agents, see, for instance: Berstein 1992; Bowles and Herbet 2002; Clay 1997; Grief 1989, 2002; Grief Milgrom and Weingast 1994 and Landa 1981, 1983; for examples amongst heterogeneous agents, see: Friedman (1977) and Leeson 2007a, 2007b, 2008, 2009). This paper is concerned with whether these privately enforced, effective property rights can exist in the market for protection.

Most recently, North, Wallis and Weingast (NWW 2009) confront this issue at both the theoretical and applied levels. They develop a theoretical framework attempting to explain how societies develop economically by managing the problem of violence. NWW refer to natural states that arose during the last ten millennia, constituting the vast majority of governments past and present. A key element of natural states is that they "limit the ability of individuals to form organizations" (NWW 2009: 2). In such

societies, a dominant coalition reduces the problem of endemic violence by restricting access to certain activities and services, most notably that of protection (NWW 2009: 18). These natural states are stable, but given that they rely on coalitions of parties capable of using force, exogenous shocks to the system potentially disturb these coalitions, resulting in violence until a new coalition is established. The susceptibility of the ruling coalition in natural states to exogenous shocks limits the ability of these societies to develop.

NWW go on to argue that it is only once a legitimate monopoly on force is established, that individuals have open access to form organizations. These “open access orders,” of which the authors estimate that only 25 countries currently qualify (NWW 2009: xii), are less susceptible to exogenous shocks as a legitimate monopoly on force is capable of acting as a third party enforcer. NWW argue that this stability, along with the ability for individuals to openly compete for economic and political power, provides the key to the development witnessed in these countries in the last hundred and fifty years.

NWW shed light on a number of institutional settings at various stages of development; however, the focus of this paper concerns development within what they label the natural state. Specifically, do coalitions inevitably form out of anarchy to restrict competition in the market for protection? The answer to this question is likely to have vast ramifications for development in weak and failed states. If the market for protection is competitive in nature and functions more efficiently than under the existence of a weak and predatory state, then a significant percent of the world’s population would be better off if their government were not to exist.

We return to the basic question: does competition in the market for protection necessarily devolve into monopolistic collusion? We design an experiment in order to shed light on this and related questions. Our primary focus is on two competing hypotheses:

- H1: Firms who specialize in the provision of protection services will collude and provide services at the monopolistic price level.
- H2: Firms who specialize in the provision of protection services will be subject to the inherent instability of collusion and forced to provide their services at competitive price rates.

Through laboratory experimentation, we can begin to understand the ecological response of individuals under these circumstances. The laboratory environment abstracts from the first problem of private protection, the Hobbesian jungle, while allowing us to focus on the stability of competition, or collusion, in the market for protection.

3.2 Experimental Design

Our purpose is to create an experimental environment that examines the competitive structure of protective services. To accomplish this, we establish an environment where a minority of subjects has superior abilities in force while the majority does not. We further narrow this superiority to the dual functions of protection and appropriation. In our primary treatment, twelve subjects interact using an online interface. We designate four of these subjects as “elites” and the remaining eight as

“peasants”.⁴⁸ Each experimental session lasts forty minutes and consists of a single continuous term of decision-making. We do not notify subjects of the length of the session *ex ante* to avoid end-game effects.

Once the session starts, peasants begin generating earnings at a rate of \$0.075 every five seconds. When peasants are left to their own devices, these earnings will accrue into the peasant’s total earnings and cannot be subsequently transferred or removed. Peasants may transfer a portion of future generated earnings to an elite (or elites). They perform this by right-clicking on the intended target of their transfer and then selection the portion of their future generated earnings they wish to send. We display this transfer mechanism in the figure below.

Elites may accumulate earnings using one of two methods, with both methods involving transfer from peasants. Hence, elites cannot generate earnings when left to their own devices. The first method is through voluntary transfer of earnings from peasants using the transfer mechanism described above. The second method is through involuntary transfer from peasants. Elites enact this involuntary transfer by capturing peasants unclaimed by other elites. This is performed by simply right-clicking on an unclaimed peasant in the middle of the screen and selecting the “capture” icon. Once a peasant is captured, the elite may then decide how much of their earnings to transfer to him- or herself. The elite chooses the level of transfer using a slide rule, representing a continuum between zero and full transfer of earnings.

⁴⁸ We use these labels for the purposes of presenting our design. We did not label subjects within the experimental sessions as “elites” or “peasants” but instead as Group A and Group B, respectively. See our instructions below for further details.

With each additional positive amount of involuntary transfer, however, a certain amount of generated earnings is wasted and accrues to no one. Appropriation through means of this involuntary transfer is thus subject to a deadweight loss. We impose this deadweight loss to involuntary transfers between elites and peasants to reflect the fact that transfers made through involuntary plunder are more likely to result in destruction of the transferred resource than those made through voluntary exchange.⁴⁹ Specifically, this relationship between involuntary transfer rate and waste operates as follows. For every 1% of involuntary transfer, 1% of the generated earnings are wasted. For example, if an elite chose a rate of 50%, then 50% of the peasant's earnings would be wasted. The remaining 50% would then be split between the elite and the peasant. Thus, the elite and the peasant would both accrue \$0.01875 per five seconds. The chosen proportion of involuntary transfer holds for all captured peasants within the domain of the elite.

Once an elite captures a peasant, the elite has the additional option to “free” the captured peasant while still keeping this peasant in their respective domain (see the figure below). Once freed, the peasant is able to move to the unclaimed domain or even to another elite's domain, or simply remain in the domain of the current elite. This device is particularly important in devising Pareto-improving (i.e. non-wasteful) voluntary transfers from previously captured peasants to their respective elites. A freed (or unclaimed) peasant may voluntarily transfer a portion of their generated earnings to any elite they wish. A captured peasant can only involuntarily transfer a portion of their generated earnings to the capturing elite.

⁴⁹ See Grossman and Kim (1995) for a theoretical treatment of this parameter. They label this parameter a “destructiveness parameter”. It is widely used in the Economics of Conflict literature. See for example Anderton 2003; Garfinkel and Skaperdas 2000, 2007.

An elite may also attack another elite in order to free peasants currently held by that other elite. This attack is performed by the elite buying a weapon at a cost of \$1 in future generated earnings. Once the weapon is purchased, the elite may attack any other elite of his or her choosing. Once attacked, an elite loses all of their currently held peasants (captured or freed) unless they are shielded. An elite may shield themselves by purchasing this ability at a cost of \$1 in generated earnings per minute. Thus, the cost of using one weapon per minute is equivalent to the cost of shielding one's domain per minute. Once shielded, the elite reduces the chances of losing each subject by one-half. Specifically, when a shielded elite is attacked, each subject in their domain will be freed at an independent probability of one-half. If the attacked elite holds more than one peasant, the attacking elite cannot control which peasant is actually freed, unless the elite is unshielded, in which case all peasants in their domain are freed. We assume conflict between elites to be costly with no net pecuniary advantage.

As we specify in our motivation above, the focus of our paper is the market performance among competing protective associations. We are therefore assuming the issue of inter-group conflict is already resolved through the relatively high strengths of the elites. Consequently, an attacking elite has no guarantee of success in procuring newly unclaimed peasants nor does the attacked elite automatically lose captured peasants, at least when shielded. By imposing this constraint, we narrow the rationale for inter-group conflict solely to enforcing agreements among elites through punishment of "outlaw" protective associations. What constitutes an outlaw protective association is, of course, to be defined by the subjects themselves. However, note that this punishment of

wayward elites is a public good, as all other elites besides the attacked elite gain at the very least through newly freed peasants. Furthermore, this mechanism can be used in a more sophisticated manner to, for example, enforce certain minimum thresholds of tribute or even specific distributions of captured peasants between the four elites. Thus, the social gain of punishing “outlaw” protective associations is greater than the private gain. This feature draws upon Cowen’s argument that elites who are able to overcome the public goods dilemma of punishing other elites should be able to use the same mechanism in enforcing cartel prices.

Finally, we incorporate two methods of communication into the online interface. The first method is a public chat room, in which all subjects may enter and read text messages. A second method allows each subject to privately chat with any other subject of their choosing. They may privately chat with any and all the other subjects throughout the experiment. We incorporate this means of using private chat rooms to allow elites to engage in greater collusive opportunities. Without private communication channels, elites would be less able to discover and agree upon optimal pricing strategies in how tributes are determined. Yet because ultimately communication is non-binding, this should not interfere (in theory) with the rationale for competitive outcomes.

At the end of the session, subjects are paid according to their accrued earnings.

3.3 Treatment Condition

We utilize a baseline treatment to determine the benchmark comparison for the monopolistic provision of protection. In this treatment, we denote only one subject as an “elite”. This subject may no longer produce shields or weapons, as they become obsolete

once no other elites are present. The single elite is able to capture and free peasants in any manner he or she sees fit, and may choose the means of transfer (voluntary or involuntary) to their liking. Thus, all other institutional and environmental features are the same as our primary treatment.

3.4 Discussion

As presented above, we wish to examine the relative explanatory power of two competing constructive hypotheses regarding the market performance of protection services. Through our design, we are able to derive benchmark levels of provision at both the competitive and monopolistic level, which we use to differentiate between the two competing hypotheses. We derive these benchmark comparisons as follows.

First, assume that elites will engage in the maximum amount of transfer. Under involuntary transfer, elites will maximize the following earnings function:

$$EV = 0.075(1 - r)r, \quad r \in (0,1)$$

Earnings Function: Earnings of elites as a function of peasant wealth transfer

First order conditions show that to maximize earnings, the elite will choose a rate of 0.5. By transferring half of the peasant's generated earnings, the elite gains \$0.01875 every five seconds from each captured peasant.

Suppose now that the peasant wishes to negotiate with the elite by offering a greater amount of future generated earnings through voluntary transfer. He or she can

do so by offering anywhere between the maximum involuntary transfer rate of \$0.01875 and their total potential rate of \$0.075. If peasants are maximizing their own earnings, subject to the constraint of potential plunder, then they will transfer no more than \$0.05625 (or 75% of their future generated earnings). The rationale for this upper bound is that a higher rate would net them less earnings than plunder under involuntary transfer. Given that this negotiation involves bilateral bargaining, the actual rate chosen is indeterminate, at least *ex ante*. However, we can say that the elite will procure a rate of at least \$0.01875 (or 25% of the peasant's future generated earnings).

What if elites attempt to collude? Then, the negotiations move from bilateral bargaining to an imposed pricing threshold of the full rate of \$0.05625. As long as all four elites are successful in maintaining identical pricing strategies, then the peasants will have no choice but to transfer the full rate. This is also the outcome in our monopoly treatment, again assuming the lone subject wishes to maximize his or her earnings.

In our primary treatment, this collusive agreement is, of course, susceptible to reneging. Indeed, it is possible that this agreement could break down altogether, resulting in competitive pricing. If in fact elites do price their protective services competitively, then they will be willing to extract as little as just over \$0.01875 from peasants. In other words, they will be willing to extract anything above their opportunity cost of plunder under involuntary transfer. If elites compete with one another for these voluntary transfers, then peasants will be able to negotiate with elites until this minimum threshold is just met.

This reasoning provides us with two *ex ante* theoretical benchmarks for the pricing of protection services in this environment. As displayed in the figure below, pricing behavior should move between the two benchmarks depending on the market performance of the environment in question.

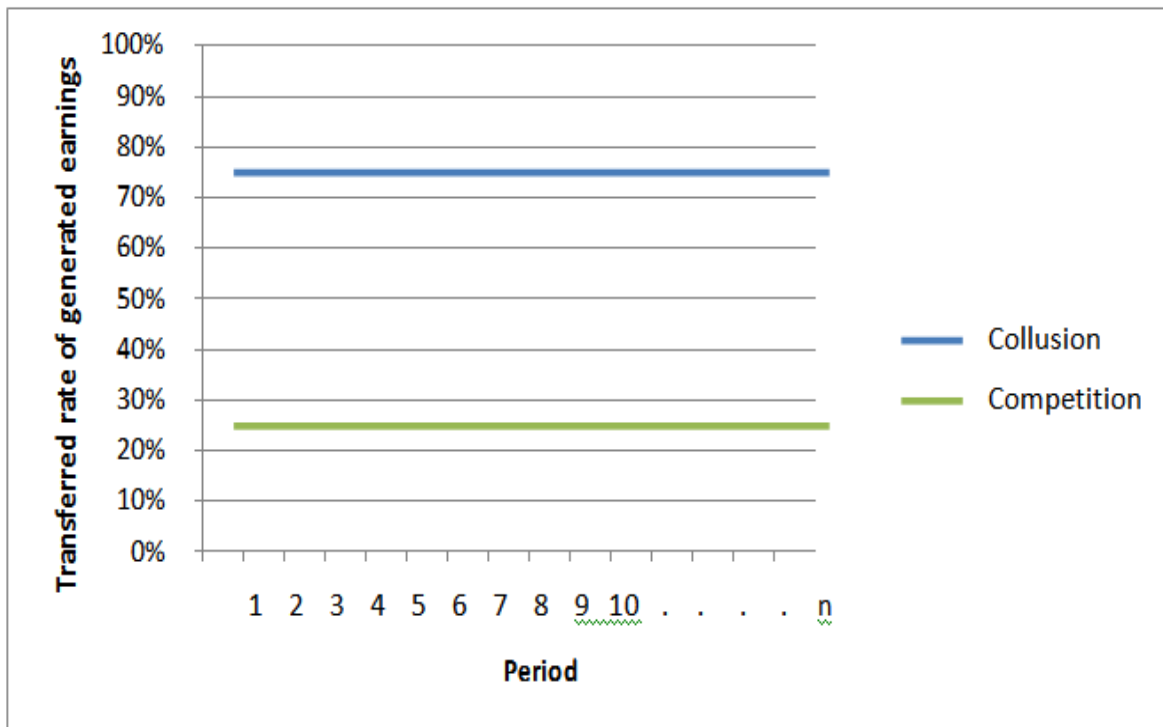
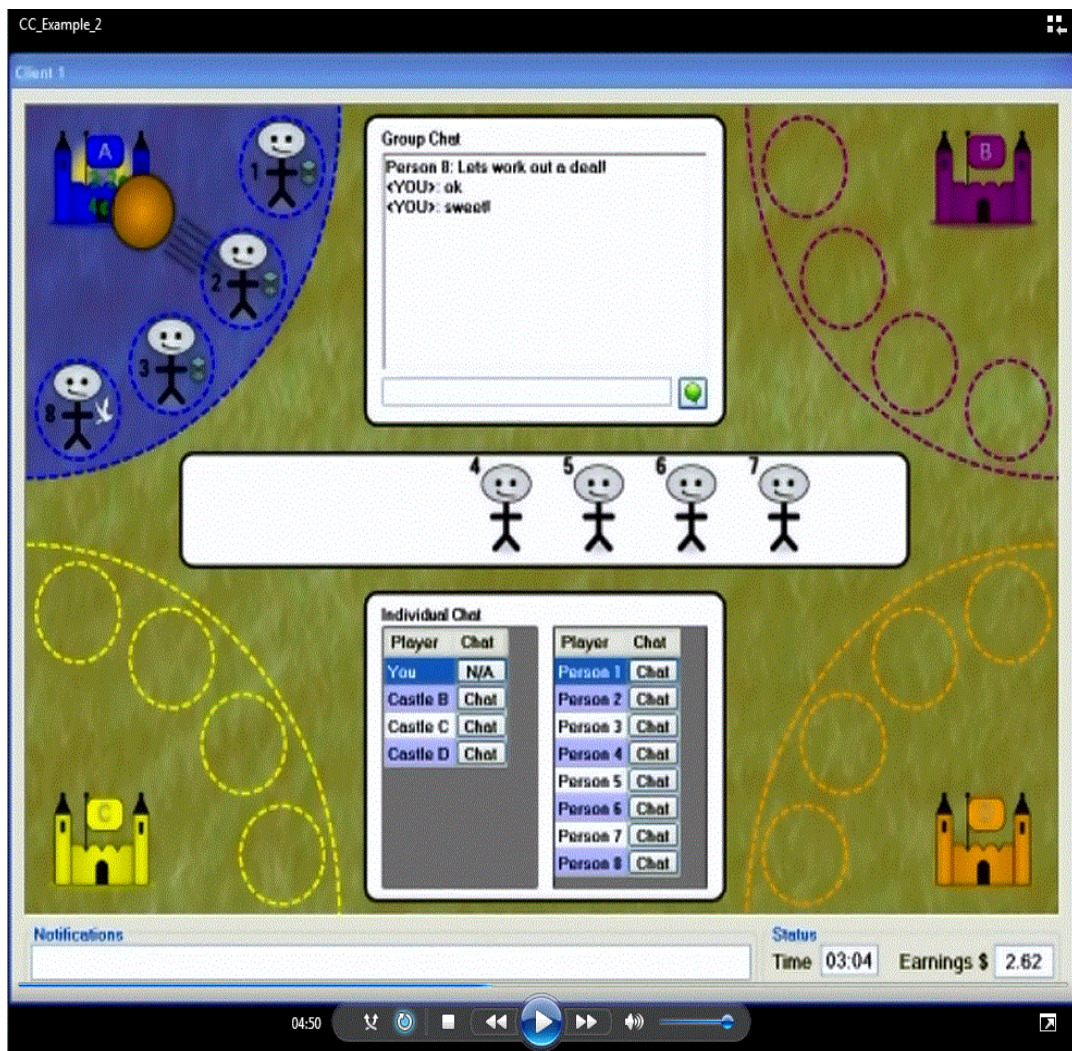


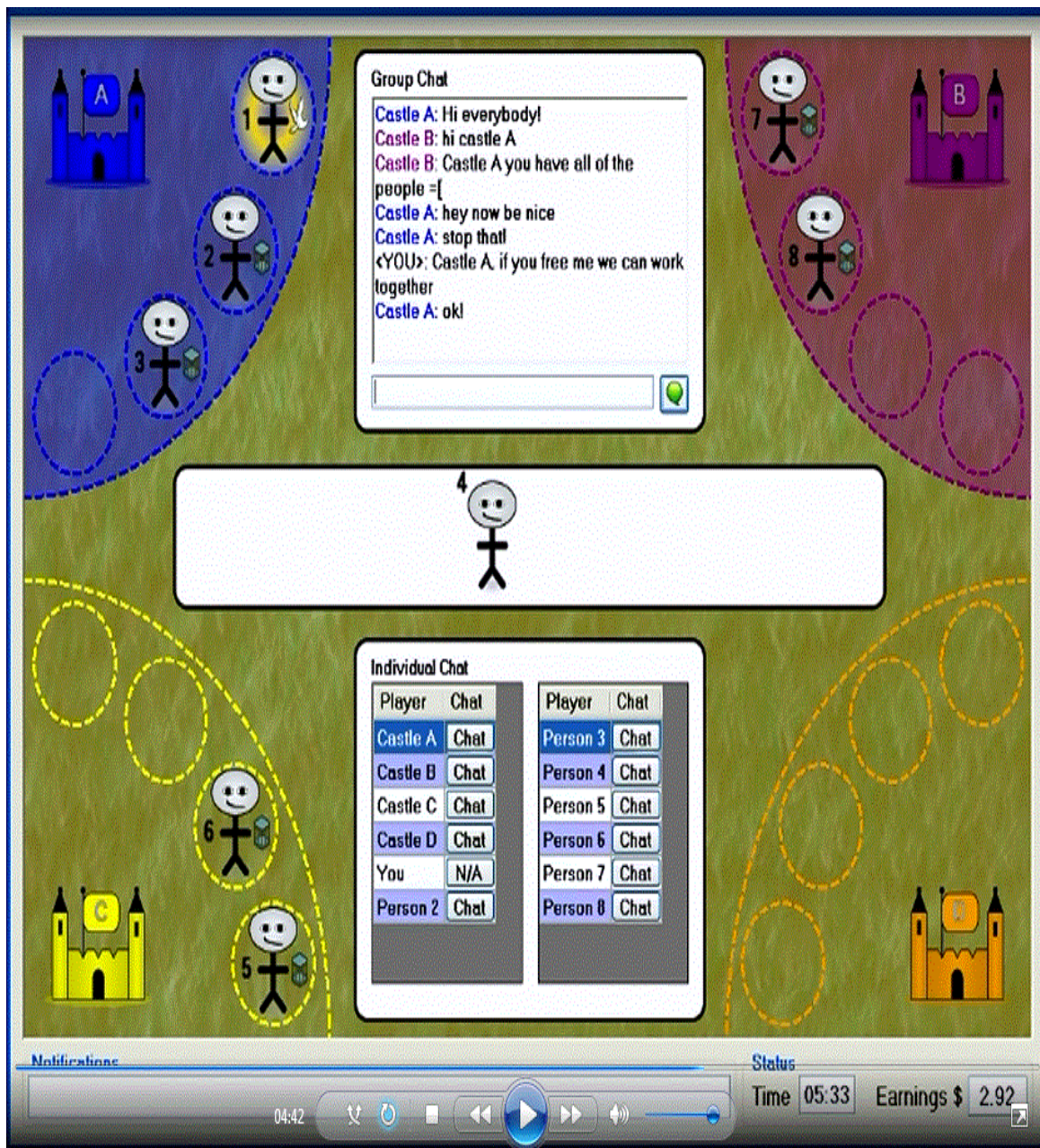
Image 3: Transfer rate of generated earnings

The Competitive array shows the opportunity cost of allowing peasants to voluntarily transfer rather than engage in involuntary plunder. The Collusive array shows how far elites may push up prices before peasants will no longer exceed their opportunity cost of what they would gain from involuntary transfer. Each array represents a bound

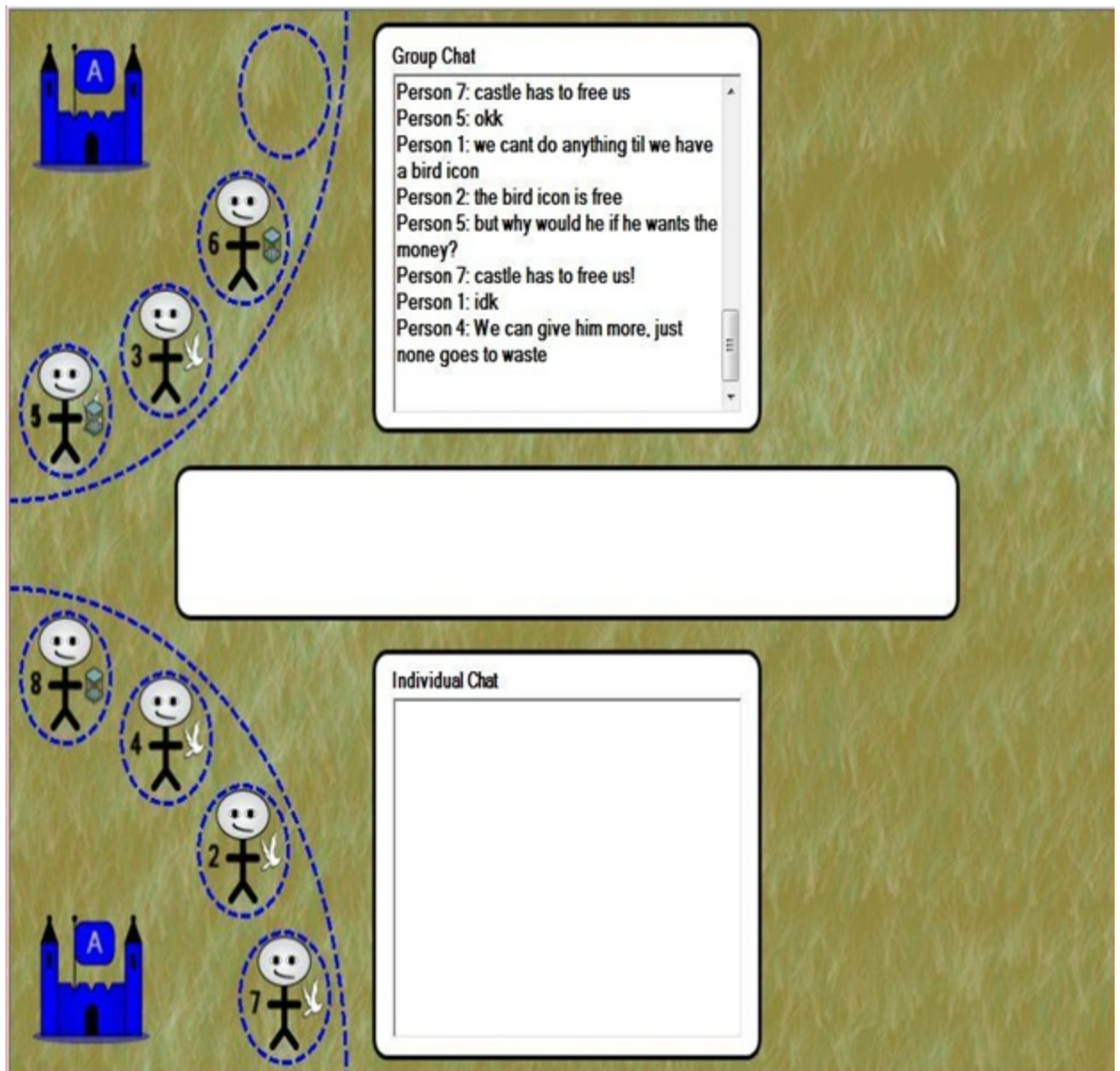
rather than the predicted level. Thus, elites must get just over 25% of transferred earnings under competition and peasants must send just under 75% of transferred earnings under collusion, for each party to gain from the exchange.



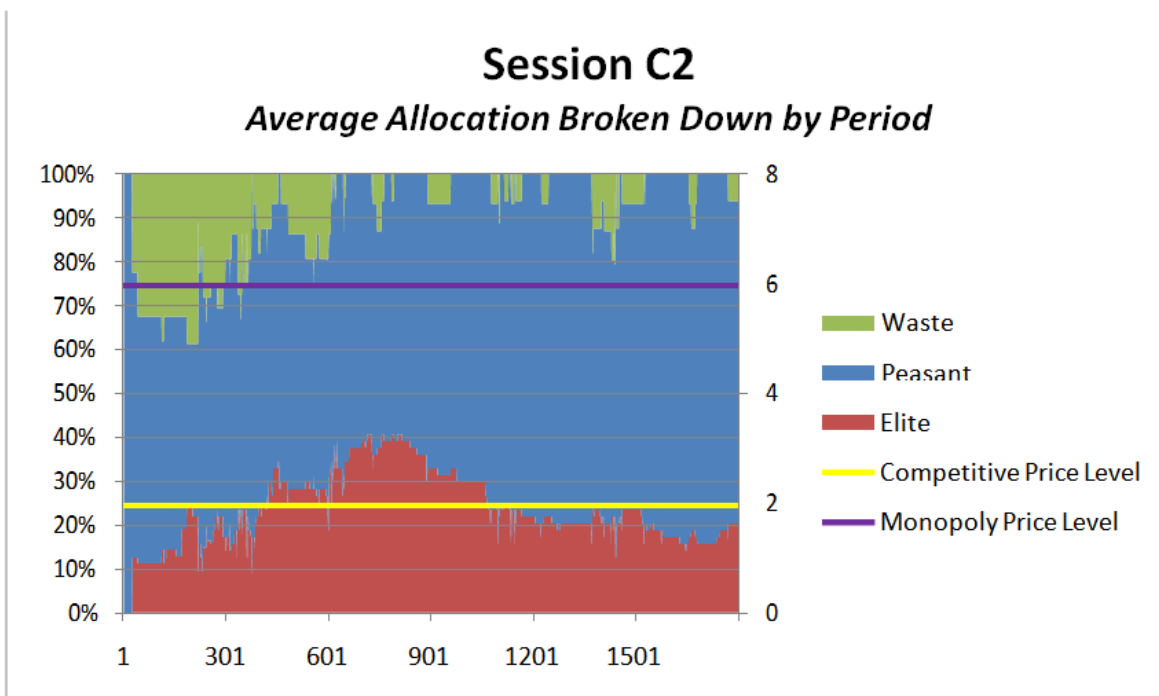
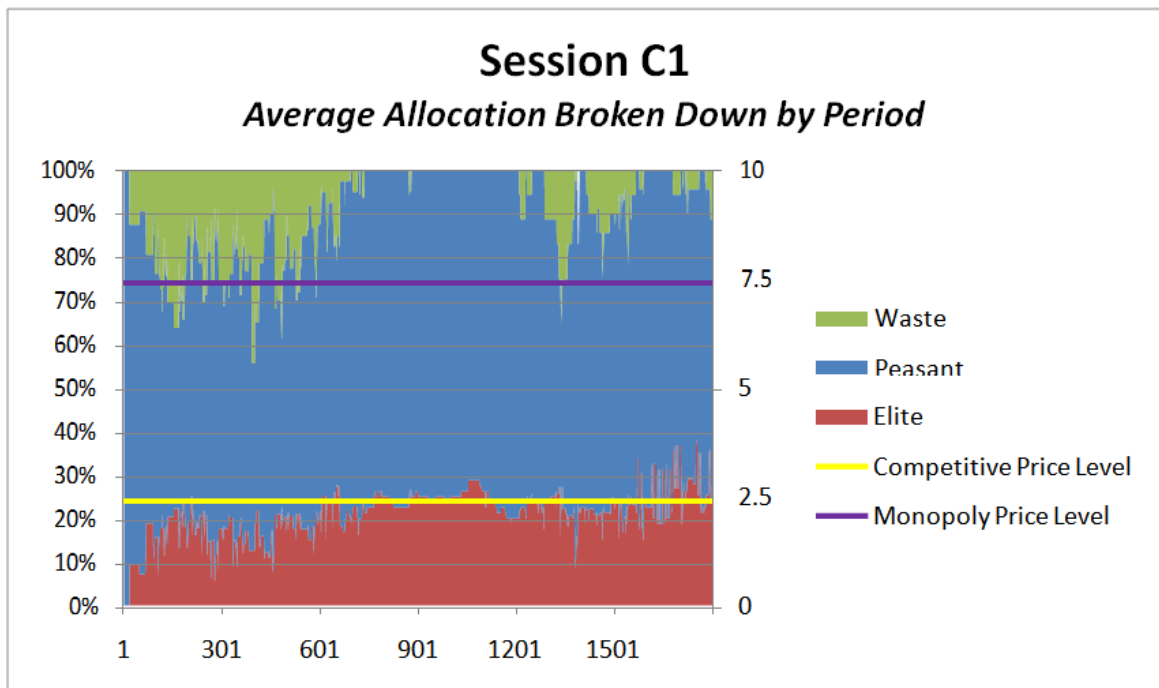
Sample Screen: Multiple Elite Treatment 1



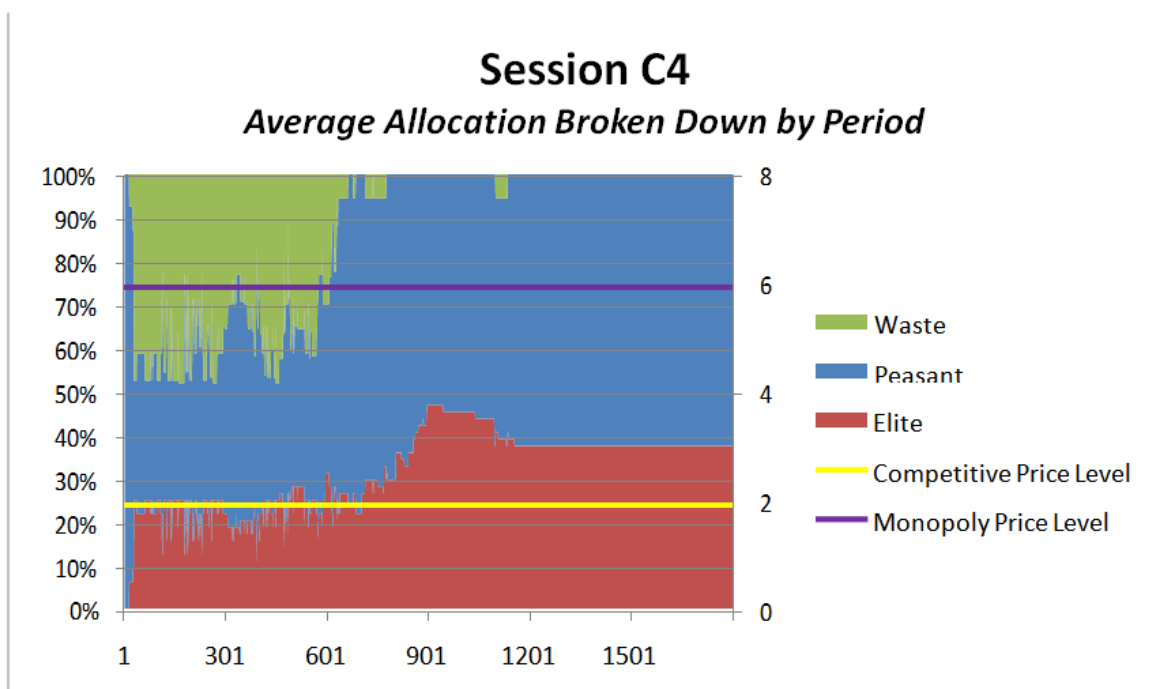
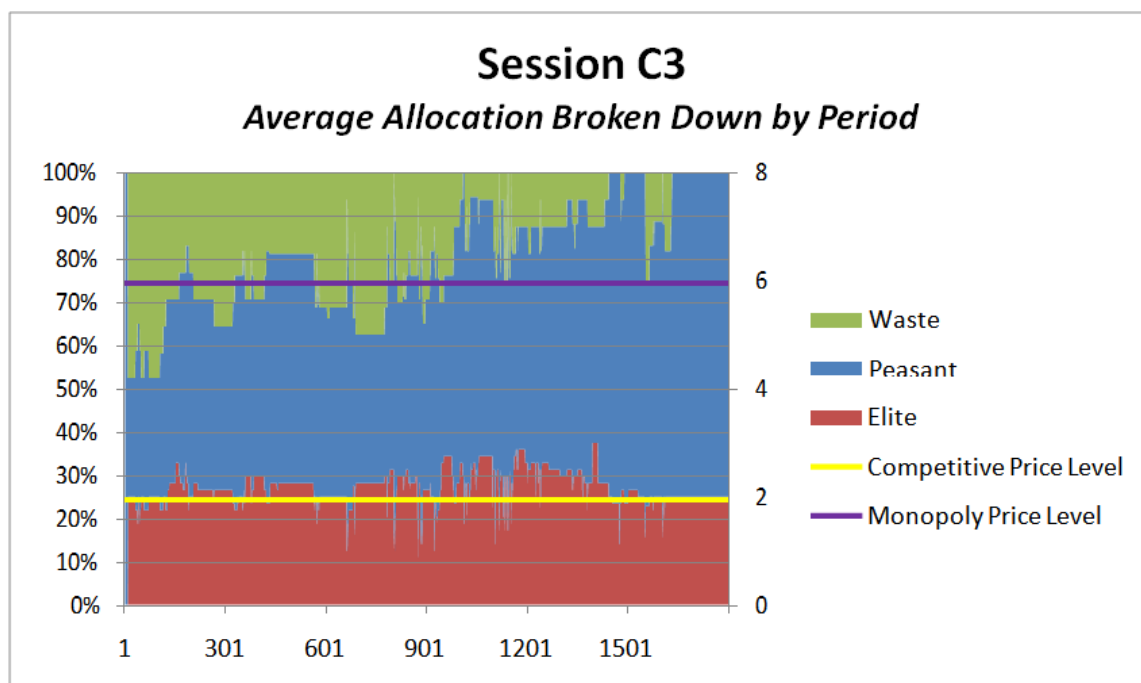
Sample Screen: Multiple Elite Treatment 2



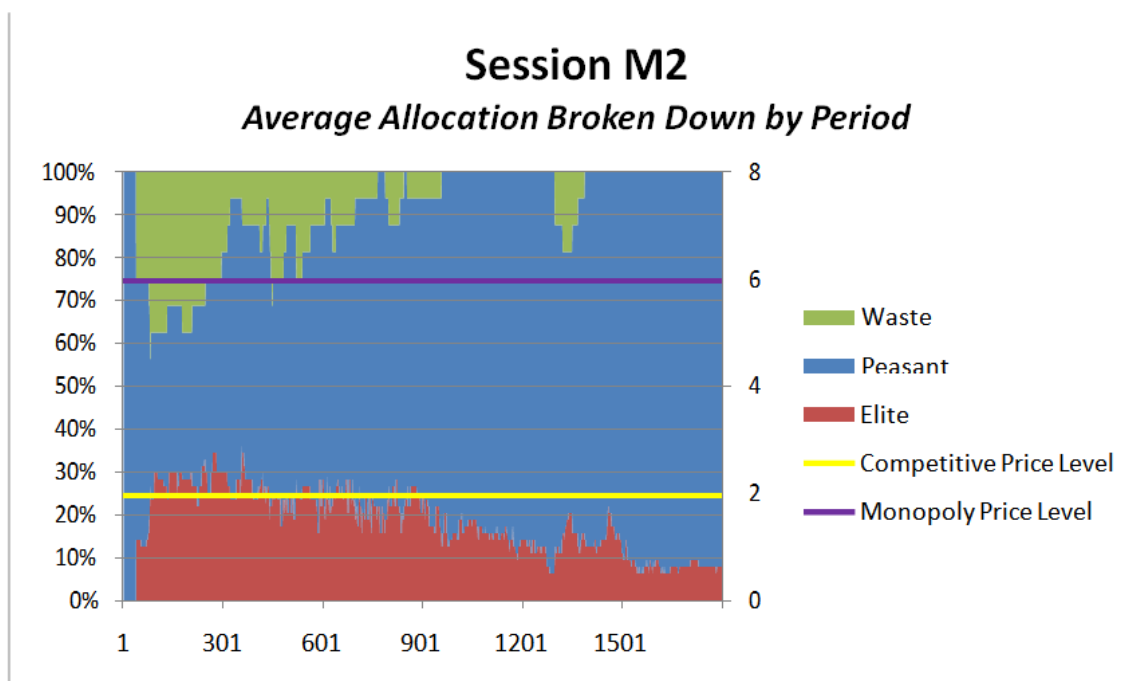
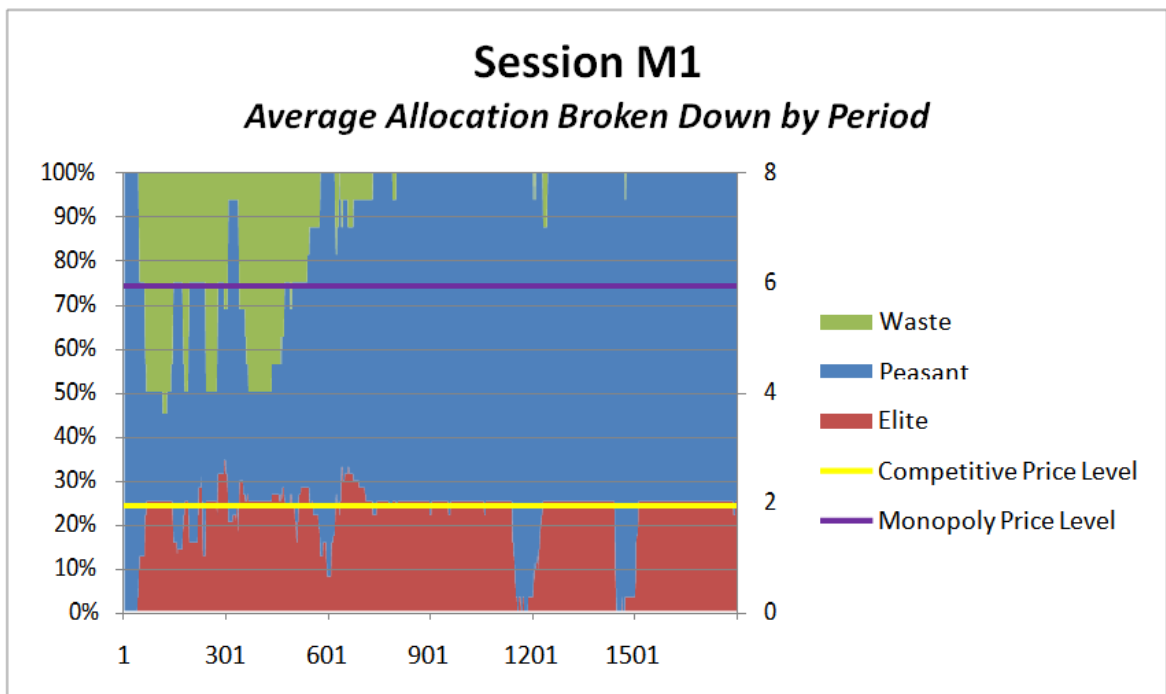
Sample Screen: Monopoly Treatment



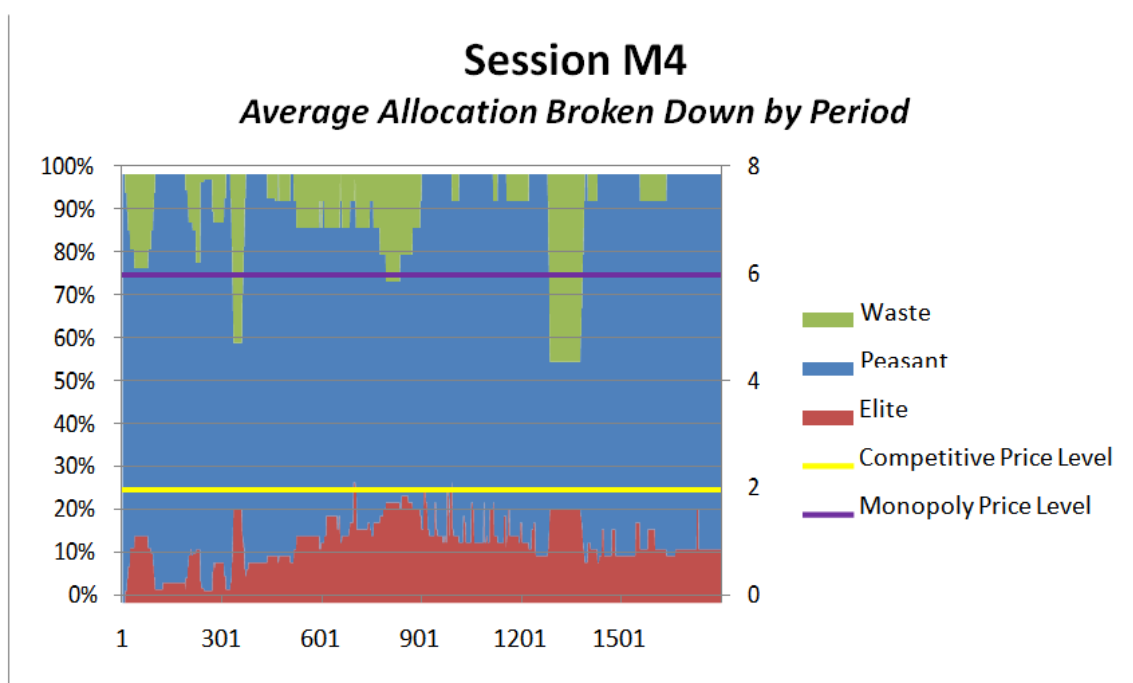
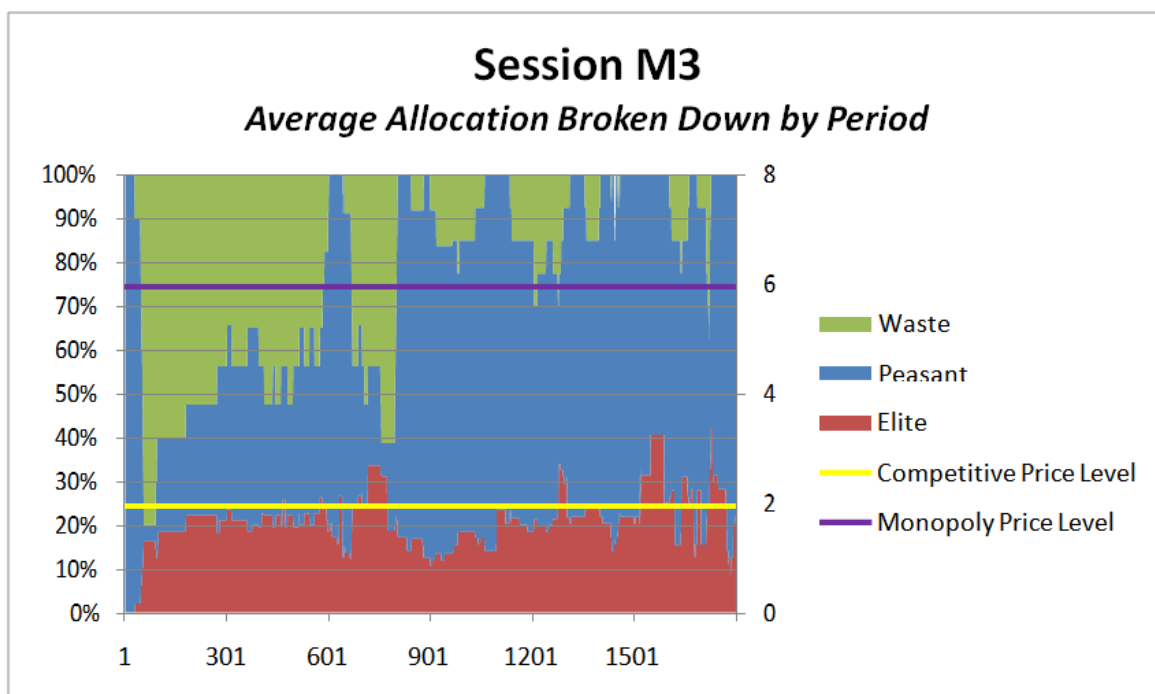
Session C1 vs. C2



Session C3 vs. C4



Session M1 vs. M2



Session M3 vs. M4

Table 2: Session Records

Session	Average Tribute	Efficiency Level
C1	2.13	90.5%
C2	1.90	92.7
C3	2.17	84.7%
C4	2.56	89.6%
Average	2.19	89%
M1	1.77	91.4%
M2	1.45	92.6%
M3	1.66	81.6%
M4	1.15	93.2%
Average	1.51	90%

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