

Organizing Crime^{*}

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Abstract

This paper 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 our hypothesis we explore history's most infamous criminal organizations: the Sicilian Mafia and Caribbean pirates.

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1 Introduction

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 aren'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 (some recent examples include Chang, Lu, and Chen 2005; Varese 2006a, 2006b; Leeson 2009c, 2009d; Skarbek 2009b; Sobel and Osoba 2009).¹

Dick (1995: 39) explores the industrial organization of criminal enterprise but "considers why particular illegal activities are carried out within the firm while others are supplied through the market by an organized criminal firm." Leeson (2007, 2009a, 2009b) and Skarbek (2009a) examine criminal organizations' 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

¹ This literature is large and takes its inspiration from Becker (1968) who was the first to apply economic logic to criminal decision making. 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).

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.² Although the criminal firm may also emerge to facilitate team production, the *hierarchical* criminal firm is a means of collusion that emerges even without team production when competitive pressures are naturally strong.

2 A Theory of Criminal Organization

The potential for competition varies across criminal industries.³ 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.

² 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 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).

³ “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.

A second startup cost that differs significantly across criminal enterprises is labor requirements. For example, to successfully heist a large and well-protected bank, 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 theft, 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.⁴ 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 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

⁴ 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).

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.⁵ 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.⁶ 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 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.⁷ 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.

⁵ 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).

⁶ 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.

⁷ 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.

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 operates 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 possible without it.⁸

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

⁸ 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).

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.

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.

3 Organizational Hierarchy: The Sicilian Mafia

3.1 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.⁹ It requires little information to identify and locate one's customer base (or victim base

⁹ 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

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 who 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.¹⁰

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 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

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 Tomasso 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).

¹⁰ There’s 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.

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.¹¹ 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 (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*.¹² 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

¹¹ 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.

¹² 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).

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).¹³

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” 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

¹³ 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.

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).¹⁴

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 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."¹⁵ 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

¹⁴ 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).

¹⁵ The other members, called *avvicinati*, were non-initiated criminals who participated some of the firm's illicit activities (Paoli 2003: 27-28).

problem is responsible for the Sicilian Mafia's hierarchy.¹⁶ 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.¹⁷ Groups of 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).

¹⁶ 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.

¹⁷ Various parts of the Sicilian private protection industry's "super-hierarchy" described below existed from the 1950s 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).

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).¹⁸ “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).

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).

¹⁸ 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).

We've neglected the question of whether the Sicilian Mafia is engaged in providing protection—an economic good—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.¹⁹

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.”

¹⁹ 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.

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 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.²⁰

3.2 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.²¹ 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 structure. This organizational structure's evolution is consistent with our 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

²⁰ The difference in incentives to do so result from the difference in human capital requirements discussed in the foregoing footnote.

²¹ However, what information is available is consistent with our theory. Individuals rather than hierarchically organized firms initially produced protection in Sicily.

large scale. Following a flurry of arrests in the 1960s the Mafia's financial situation suffered. It wasn't until Mafiosi began smuggling tobacco 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, 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.²² Reduced competitive pressure 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).

²² 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 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."

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 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.²³ "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

²³ 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.

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.²⁴

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

On the surface, entry into the sea banditry business in the 18th-century Caribbean was completely open.²⁵ 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.

²⁴ 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.

²⁵ 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).

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).²⁶ 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 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 requirement. 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

²⁶ 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.

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).²⁷

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).

²⁷ Unless otherwise noted, all depositions and examinations cited are reprinted in Jameson (1923).

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 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 were, 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).²⁸ 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

²⁸ 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).

cases this was goods instead of specie (see, for instance, Cordingly 2006: 107). Pirates could consume these goods. 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.²⁹ 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 captain assumed authority over his crew's behavior only in times of battle when immediate and unilateral decision making was

²⁹ For a discussion of the specifics of how pirates' flat organization prevented boss predation, see Leeson (2007).

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.³⁰ 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 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,*

³⁰ 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.

Lately Taken by Captain Ogle 1723: 27: British Journal August 22, 1724).³¹ 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 since, 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 larger 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 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,

³¹ Newspaper articles cited are contained in Baer (2007).

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.³² Pirates inhabited, fraternized in, and plotted their expeditions from this outlaw island, which, before British official Woodes Rogers' arrival, pirates nearly exclusively populated.³³

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

³² 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.

³³ 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.

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 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.

5 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.

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