Essays on Economic Analysis of Criminal Organizations

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1 Introduction

1.1 Purpose of This Thesis

In this thesis, we try to analyze criminal organizations with economics frameworks. Even if it seems that the presence of criminal organizations cause negative (or positive) effects on illegal activities and society, there are still a lot of things to study. In this thesis, we consider illegal activities as the provision of goods or services that generates negative effects on society.[1] Based on these motivations, we would like to investigate the effects of the presence of criminal organizations on society and efficiency by using the economics analysis frameworks. Then, we also try to provide a theoretical framework to discuss how the government and the la

l organizations.

In reality, there are lots of famous criminal organizations around the world that engage in organized crime, e.g., the Sicilian and American Mafia, the Japanese Mafia (Yakuza), Colombian and Mexican drug cartels, the Russian Mafia, the Triads in Hong Kong and other large scale of criminal groups.[2] They engage in a lot of activities (Paoli 2014), e.g., extortion, provision of protection, provision of illegal drugs, human smuggling and trafficking in the sex industry, illegal gambling, money laundering, arms trafficking, organized fraud, cyber crime, illegal exploitation of natural resources, and so on. In a more broader sense, these characteristics are shared among other groups, e.g., pirates, terrorist groups, organized violent groups, hate groups, gangs and so on.

In the economics literature, scholars and prosecutors try to define and summarize the characteristics of organized crime and criminal organization.[3] Garoupa (2000) summarizes the characteristic

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[1]Since this definition is too general, then we consider more specific definition of illegal activities in each chapter based on each chapter's motivation.

[2]According to Paoli and Vander Beken (2014), organized crime remains a fuzzy and contested umbrella concept. They mentioned that 'the understanding of organized crime has since the 1920s shifted back and forth between two rivaling notions: (1) a set of stable organizations illegal per se or whose members systematically engage in crime; and (2) a set of serious crime activities, particularly the provision of illegal goods and services, mostly carried out for monetary gain.'

[3]Since Becker (1968) has proposed an influential paper about economic analysis of crime and punishment, a number of papers studying crime by using the economic approach has been published. According to the motivation of Becker (1968), this economic analysis of "crime" can cover many kinds of violations, not just felonies-like murder, robbery, and assault, which receive so much newspaper coverage-but also tax evasion, the so-called white-collar crimes, and traffic and other violations.

features of organized crime that are provided by the influential article Fiorentini and Peltzman (1995): (1)economics of scale and exploitation of monopolistic prices on supply of illegal goods and services (2) practice of violence against other legal and illegal business (3) criminal hierarchy with internalization of negative externalities and management of portfolio of risky activities (4) avoidance of resources dissipation through competitive lobbying and corruption and (5) easier access to markets.

Based on these characteristic features, this thesis focuses on hierarchical and monopolistic features of criminal organizations and investigate the economic effects of the presence on criminal organizations on society. That is, this thesis assumes that criminal organizations such as Mafia-type organizations have hierarchical governance structures with a vertical structure where the principal (upper-ranked Boss) extracts some rents from the agents (lower-ranked offenders). Additionally, by using violence, they monopolizes illegal markets such as illegal drug, prostitution, extortion and so on. These approaches are called the monopolistic view.[4] [5]

The basic assumption among these articles is that potential offenders are rational utility maximisers choosing in their illegal behavior. If a potential offender commits an illegal act to obtain a gain, he or she will be caught with some probability and then possibly have to pay a fine or go to jail, or both. In general, a potential offender will commit a crime if and only if his or her expected utility from doing so, taking into account his gain and the chance of his being caught and sanctioned, exceeds his utility if he does not commit the act.

In Becker's paper "Crime and Punishment: An Economic Approach" published in 1968, he mentioned that "the main purpose of this essay is to answer normative versions of these questions, namely, how many resources and how much punishment should be used to enforce different kinds of legislation?". To answer the question, the literature of economic analysis of crime introduces some notions about costs of crime and punishment: (1) social harms caused by some illegal acts, i.e., the cost of negative externality on society members and (2) expenditures of la .e., the cost of deterrence, apprehensions, convictions, imprisonment and so on. Additionally, while it is widely debated in the optimal la .See Polinsky and Shavell (2000) and Garoupa (1997) for an overview about the optimal law enforcement theory and Dau-Schmidt (1990) and Lewin and Trumbull (1990) for discussion about how and why offender's welf lysis of crime.

[4]This monopolistic view analysis focuses on the welf .g., monopoly and competitive supply, of bads (Buchnan 1973). This classical monopolistic view states that a monopolistic market is more efficient than a competitive market because the bads are less produced. This indicates the positive effect of criminal organization. In the similar sense of the above monopolistic viewpoint, Garoupa (2000, 2007) considers the criminal organization as an illegal business organization. He modeled criminal organization as a vertical structure where the principal extracts some rents from the agents through extortion. As long as extortion is a costless transfer from individuals to the criminal organization, we show not only that the existence of extortion is social welf l offense less attractive, but that it also allows the government to reduce expenditure on law enforcement.

[5]Of course, some other approaches exist. Based on these characteristic features of organized crime and criminal organizations, lots of articles have been published. Skaperdas (2001) considers the defining economic activity of organized crime is the provision of protection or its more respectable variation, security. Therefore, organized crime emerges out of the power vaccuum that is created by the absence of state enforcement. In related with this perspective, Konrad and Skaperdas (1998) investigate effects of extortion that legal business must pay protection fee to Mafias. While other papers studies organized crime and criminal organizations with many kinds of perspectives,

1.2 Three Approaches

In order to develop this literature, this thesis tries to extend the economic analysis of criminal organizations with different three approaches focusing on (1) an organizer of crime, (2) an endogenous collaboration among criminal organizations and (3) a provision of membership benefits within organization. We will explain each topic in details.

1.2.1 An Organizer of Crime

At first, we would like to provide a framework to discuss the effect of the presence of a criminal organization (Boss) as a organizer of (lower-ranked) criminals. The role of Boss (or an upper-tier criminal) is to resolve disputes among lower-ranked offenders and pursue the benefits of coordination and collusion (Leeson and Rogers 2012). To increase the cooperative organizational benefits, Boss develops rigid written or unwritten rules, such as "criminal constitutions" (Leeson and Skarbek 2010) within the organization. A violent punishment is an effective approach to securing lower-ranked criminals' cooperation and enforcing collusion agreements in a Mafia-type organization. Thus, lower-ranked criminals are less likely to engage in activities that are undesirable to the organization if they know such uncoordinated actions are deadly.

Thus, we try to study the welfare effects of Boss on society. Therefore, the research question with this approach is "what is the welfare effects of forming a criminal organization? " This perspective is also similar to studies on recent topics, such as the emergence and centralization of criminal organizations, for example, Bandiera (2003), Dimico et al. (2017), Leeson (2007), Leeson and Rogers (2012), Leeson and Skarbek (2010), Skarbek (2008; 2012), and Sobel and Osoba (2009). Since these papers are mainly empirical and hitorical analysis, we need a theoretical framework to discuss these issues. [6]

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e.g., corruption with police officers (Kugler et al. 2005) and with policy makers (Yahagi 2018), pirates (Leeson 2007), network approach (Mastrobuoni (2015), criminal constitutions (Leeson and Rogers 2012, Leeson and Skarbek 2010), the use of violence (Flores 2016) and so on.

[6]This analysis also can be helphul to understand governance structures of criminal organizations. It is said that governance structures of criminal organizations have two notably different types: (1) a decentralized and competitive market structure and (2) a hierarchical and centralized structure. Certain Italian criminal organizations show these different organizational structures. According to Paoli (2014), while it is said that the Camorra has no strong hierarchical structure, other famous Mafia-type criminal organizations, such as the Cosa Nostra and the ' Ndrangheta, have hierarchical organizational structures to pursue coordinated organizational benefits.

1.2.2 Collaboration among Criminal Organizations

In the second, we would like to provide one viewpoint of an endogenous collaboration among criminal organizations. Therefore, the research question with this approach is "what is the effects of more involvements of criminal organizations? " This viewpoint also challenges the classical monopolistic viewpoint in that even if criminal organization seems to be a monopolistic illegal firm, there are some vertical transaction within the organization. In particular, it is said that higher ranked sub-group gives an illegal task such as extortion to lower ranked sub-groups in exchange for royalties. In other scenarios, one criminal organization might need a collaboration with another criminal organization in extending their illegal business. There are some examples about these collaborations, e.g., Sicilian Mafia members and Nigerian gangs (Gaffy 2017), Mexican drug cartels and American street gangs (Schmidt 2012) and Japanese Mafia (Yakuza) and emerging loosely organized groups (Schreiber 2012).

1.2.3 Club Goods Provider

Finally, we would like to provide one viewpoint of a criminal organization as an provider of club goods that only members of the organization can enjoy. Therefore, the research question with this approach is "what is the effects of harsh sanctions against criminal organizations when they provide such network externalities ? " Let us give some examples of hate groups. One of roles that hate group play is to provide group members with psychological needs. Woolf and Hulsizer (2004) analyzed the functioning and structure of hate groups in detail. They argue that hate groups can provide for the psychological needs of group members; a sense of belonging, identity, self-worth and so on. Hence, potential offenders commit crimes out of pressure or the desire to follow their groups and gain acceptance from peers. Additionally, hate crimes are considered as one part of social movement activities. From the viewpoint of social movement organizations, hate groups can implicitly/explicitly foster ideological motivations among members and induce them to seek to satisfy their ideological needs based on prejudice and biases (Freilich et al., 1999).

1.3 Overview of This Thesis

Based on the above motivations, we try to extend the previous literature of organized crime and criminal organization in the above directions. This thesis consists of five chapters. Chapter 1 provides an overview about economic analysis of criminal organizations. Chapter 2 considers a criminal organization as an organizer of illegal activities. Chapter 3 considers a criminal organization as a collaborator with other criminal organization. Chapter 4 considers a criminal organization as a provider of membership benefits within their group. Finally, in Chapter 5, we provide my concluding remarks.

Chapter 2 is based on Yahagi (2018b) "Welfare Effects of Forming a Criminal Organization", European Journal of Law and Economics, 46(3), 359–375. Chapter 3 is based on Yahagi (2019a) "Law Enforcement with Criminal Organizations and Endogenous Collaboration, European Journal of Law and Economics, 48(3), 351-363. Chapter 4 is based on Yahagi(2019b) "The Effects of Hate Groups on Hate Crimes", Review of Law and Economics, 15(3).

Chapter 2 focuses on an important role of criminal organizations as an organizer of illegal activities. As we mentioned previously, we compare (1) a decentralized structure that sub criminal groups compete for illegal gains and (2) a centralized structure that Boss organizes them to achieve more illegal gains. In order to see such interactions among actors who engage in illegal activities, we follow the extortion model provided by Konrad and Skaperdas (1998). In this chapter, we consider illegal activities as costly transfer of property rights from citizens to offenders. The role of a criminal organization is to organize their coordinated extortion activities with more effective ways.

This chapter indicates that forming a centralized criminal organization produces positive or negative effects on potential criminals and social efficiency. These results depend on the potential competitiveness among criminals and the ability of Boss to target more valuable extortion victims. These results can be helpful to understand the effects of anti-Mafia policies to collapse a criminal organization, or welfare implication of an emergence of centralization of criminal organizations.

Chapter 3 focuses on an important role of criminal organizations as a collaborator with other criminal organization. It is said that criminal organizations have a choice to collaborate with local

gangs or established organized crime groups in extending their illegal activities. Based on this motivation, we first compare two different situations: (1) one monopolistic criminal organization controlling an illegal market and (2) one criminal organization collaborating with a local criminal organization by providing the right to control the market in exchange for royalties from the collaborator. In order to see such interactions among criminal organizations, we follow the illegal business firm model provided by Garoupa (2000). In this chapter, we consider illegal activities as socially undesirable activities because of negative externalities, e.g., illegal consumption of drugs, extortion, human smuggling and so on. The role of a criminal organization is to regulate the illegal market by providing lower-ranked offenders the information or knowledge to engage in these activities.

We show that whether collaboration between criminal organizations can be beneficial to social efficiency depends on the quality of the illegal markets they control. If there is less (more) severe social harm, a collaborative (monopolistic) operation is preferred. However, such social welfare efficiency can or cannot be consistent with the economic incentives of criminal organizations.

Chapter 4 focuses on an important role of criminal organizations as a provider of membership benefits with its group. One of the main roles of criminal organization is to provide group members with psychological needs. We assume that this membership benefits increase as the number of total criminals increases. In this situation, potential criminals choose whether or not to commit crimes based on (1) illegal benefits and (2) the membership benefits provided by the group. In order to investigate such new ideas, we follow the basic crime model provided by Becker (1968), Garoupa (1997) and Polinsky and Shavell (2000).

This chapter shows that multiple equilibria of crime rates are possible. This multiplicity of equilibria explains why the incidents of hate crimes vary across communities and over and a social shock induces a rapid increase of crimes such as 9/11 and terrorism.

F   1 by considering two types of membership benefits for criminals (active members) and other members (non-active members). This extension is more realistic and provides the mechanism by which these membership benefits interact and reinforce with each other. This helps us to understand how harmonization or polarization between

these active and non-active members happens with one organization.

Finally, Chapter 5 provides concluding remarks and future research proposals.

2 A Criminal Organization as An Organizer of Crime

2.1 Introduction

This chapter incorporates the existence of a Mafia Boss into the notable paper by Konrad and Skaperdas (1998) that studies extortion markets. Extortion is one of the primary activities of criminal organizations (Gambetta 1993). Based on some important roles of a criminal organization, a Mafia Boss can construct a rent-extracting relation with lower-ranked organizational members in exchange for pursuing coordinated and collusive organizational benefits.[7]

This chapter consider only extortion market because this activity can be related to an emergence of centralized criminal organizations (Leeson and Rogers 2012 and Leeson and Skarbek 2010). In this thesis, extortion activity can be interpreted as the costly transfer of property rights from victims of extortion to offenders who engage in extortion. The role of Boss is to organize offenders who engage in extortion by helping their coordinated activities. Since offenders cannot rely on legal process, it is hard for them to cooperate with each other. Therefore, Boss can provide a political order among them in order to promote cooperation. That is, Boss is an enforcer of criminal constitutions (Leeson and Rogers 2012 and Leeson and Skarbek 2010).

This chapter compares two different criminal market structures: (1) a competitive market and (2) a monopolized market. In a competitive market, potential criminals (or clans of one Mafia) compete for extortion gains derived from a given number of victims through costly investments such as violence. The government defends the victims by costly enforcement activities. Thus, each offender (or clan) has to fight against not only the government but also other criminals (clans) because cooperation with each other is usually difficult. In contrast, in a monopolized market, if the Mafia controls the market, conflicts among criminals (clans) are resolved, and criminals (clans) can engage in coordinated activities against victims and the government. In this scenario, lower-ranked criminals (clans) must pay a royalty to the (upper-ranked) boss for permission to enter the

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[7]Usually, the boss of a criminal organization behaves as a rent-seeker. This setting is similar to studies of the Mafia and the state using the conflict approach, as in Grossman (1995) and Skaperdas and Syropoulos (1995). Additionally, one notable example is that of a monetary transfer or a royalty payment from lower to upper ranks within the Japanese Mafia known as "jonokin" (Hill 2003). Such a monetary payment becomes a burden on lower-ranked organizational members.

market.

Additionally, we also consider that the Mafia can cause severe damage against victims. This aspect as an operative benefits provider is based on the brand name and reputations of the organization (Gambetta 1993). That is, the ability of the Mafia with profit-seeking motivation as an extra protection provider and producing operative benefits is likely to pla

lization.

Our motivation is also similar to studies on recent topics, such as the emergence and centralization of criminal organizations, for example, Bandiera (2003), Dimico et al. (2017), Leeson (2007), Leeson and Rogers (2012), Leeson and Skarbek (2010), Skarbek (2008, 2012), and Sobel and Osoba (2009). In particular, Leeson and Rogers (2012) and Leeson and Skarbek (2010) are similar to our motivation in that they focus on coordination benefits provided by the Mafia as the merit of forming a criminal organization.[8] Although these papers mainly consider how a criminal organization emerges but do not discuss the economic consequences on society, we must extend their discussion to consider whether the presence of the Mafia can be bad or may be good for society and what the government should do depending on its governance form.[9] Based on these motivations, this chapter contributes to incorporate these features into a formal setting to analyze the welfare implications derived from centralization and the emergence of a criminal organization. Finally, compared with these previous studies, because we consider the Mafia not only as the coordination device but also as the operative benefits provider motivated by profit-seeking, this chapter provides a more general and inclusive framework for how a rent-extractive criminal organization with an influential and strong reputation is likely to succeed in its monopolistic control by attracting more members and generating negative effects on society.

This chapter shows that a transition from a competitive and anarchic market to a hierarchical

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[8]Most previous papers do not use a formal setting by focusing on specific examples: prison and youth gangs, 18th-century pirates, and the Sicilian Mafia. These papers focus on the exogenous shock of the demand in the lemon market (Dimico et al. 2017), the alternative provider of protection (Sobel and Osoba 2009), and the internal institution mechanisms to prevent extreme predation (Leeson 2007, Skarbek 2008) and norms (Skarbek 2012) within the organization as characteristic features of criminal organizations. Thus, except for Leeson and Rogers (2012) and Leeson and Skarbek (2010), the abovementioned papers do not explicitly discuss the relationship between coordinated organizational benefits among criminals and its monopolized governance form.

[9]Although Bandiera (2003) explicitly discusses the economic implications of the emergence of the Sicilian Mafia with a formal setting, the main role of the Mafia is different from ours. In Bandiera (2003), the Mafia is modeled as a pure provider of private protection to multiple landowners. Thus, the Mafia as a coordination benefit provider is not incorporated.

and predatory market structure may or may not contribute to the enhancement of social welfare as measured by the total of unproductive investments used for fighting and the conflicts among criminals and the government. If the Mafia can cause severe damage, while lower-ranked members of an organization gain greater extortion benefits, centralization leads to larger investments in conflict and detrimental consequences for social efficiency. That is, internalizing externalities among criminals has negative effects on society. This finding is consistent with the recent empirical finding in Pinotti (2015). In contrast, as long as the Mafia does not provide any extra damage against victims, an organization's members do not always demand a hierarchical organization because, in certain cases, the benefit of coordination is not sufficient to compensate for the negative effects of members' oppressive relations with a high-ranking boss. In contrast to these negative effects on an organization's members, organizing criminals leads to a reduced social welfare loss because the conflict is less intensified.

Thus, in contrast to previous articles of the standard tragedy of common problems, such as Kamien et al. (1992), introducing distinct features of a criminal organization in an illegal market such as private protection and extortion industries produces different results and implications. By considering such characteristic features of the extortion industry, our results extend the classical view of, for example, Schelling (1971), Buchanan (1973), and Garoupa (2000), which stress the desirable effects of the existence of a monopolistic criminal organization.

Because of these results, this inclusive framework helps us to extend discussions on the relationships between the centralization of criminal activities and its economic consequences. When the Mafia works only as the government's substitution as a provider of protection, social efficiency may be improved but criminals are worse off compared with competitive situations. However, centralized illegal activities are operated by a profit-seeking motivated criminal organization, offenders are likely to delegate to the established Mafia, and its negative effects on society are inevitable, as empirically stressed in Pinotti (2015).

This can be helpful to understand welfare effects of two different governance structures of criminal organizations and markets : (1) a decentralized and competitive market structure and (2) a hierarchical and centralized structure. Certain Italian criminal organizations show these

different organizational structures. According to Paoli (2014), it is said that the Camorra has no strong hierarchical structure. The Camorra consists of independent criminal groups and clans located in Naples, the capital of the Campania region. However, in contrast to the Camorra, other famous mafia-type criminal organizations, such as the Cosa Nostra and the 'Ndrangheta, have hierarchical organizational structures to pursue coordinated organizational benefits. The Japanese Mafia (Yakuza) also tend to have a centralized organizational structure (Hill 2003). Such organizations are a confederation of several groups and clans. The lower-level groups are well-organized by a high-ranking boss with rigid rules and a criminal constitution within the organization (Leeson and Skarbek 2010).[10] Within criminal organizations, a transition from a horizontal to a hierarchical structure is repeated, and vice versa.

Of course, our results can be interpreted as other major illegal activities. Moreover, our formalization is also applied to the theory of the state, as in Bates et al. (2002) and Grossman (2002). In a lawless society, if households must protect their property against organized violence groups, victimized households need to be organized by a strong and charismatic leader to combat the opponent. However, it is well-known that such a leader tends to be self-interested and rent-extracting. If our original scenario is so interpreted, the results in the original setting have implications for the welfare effects of forming a state. Such a similarity between a criminal organization and the state is also discussed in Skaperdas (2001).

The paper is organized as follows. In the next section, we formalize a basic setting of the extortion industry following Konrad and Skaperdas (1998). We consider two different market structures: (1) a competitive market structure without a hierarchical organization and (2) a monopolized market with hierarchical structures. In Section 3, we compare and discuss the outcomes obtained in Section 2. Section 4 concludes the results of this chapter .

2.2 Basic Model

F   (1998), we consider the private protection and extortion industries that are some of the main activities conducted by a criminal organization, such as the Mafia in

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[10]According to Leeson and Skarbek (2010), criminal constitutions promote the cooperative behavior of members in the organization and regulate behavior that is costly to the organization, such as unnecessary use of violence.

Italy, Japan, and other countries. Private protection and extortion take certain forms: protection against theft, police harassment, competitors, and so on (Gambetta 1993). That is, the illegal activities in this chapter can be interpreted as the costly transfer of property rights from victims to offenders. Another reason about extortion market is that the extortion market is the source of emergence of criminal organization (Gambetta 1993, Leeson and Skarbek 2010). To investigate the impact on the welfare and economic consequences of the market structure of such an industry, we consider two different market structures: (1) a competitive market without the Mafia and (2) a monopolized market controlled by the Mafia. Of course, this classification applies to the organizational structure of the Mafia: (1) a horizontal and less-centralized Mafia organizational structure and (2) a vertical and centralized Mafia organizational structure.

In the former market structure, potential criminals (or clans of one Mafia) compete for extortion gains derived from a given number of victims through the use of violence. Thus, each offender (or clan) has to fight against not only the government that protects the victims but also other criminals (clans) because cooperation with each other is difficult.

In contrast, in a monopolized market controlled by the Mafia, conflicts among criminals (clans) are resolved, and such entities can engage in coordinated activities. In this case, lower-ranked criminals (clans) must pay royalties to a higher-ranked boss to engage in activities, thus restricting the use of violence.

Moreover, we also consider the possibility that the Mafia is profit motivated and can effectively thread the victim by causing more severe damage. This can be interpreted that they can find more profitable targets. These observations are appropriate when Mafias provide protection to large legal firms or have a relationship with a high-ranking politician, which are less likely to be targets if individual criminals solely engage in extortion. Large firms and politicians are more valuable extortion targets because they possess greater economic benefits in their present positions. That is, victims' business profits earned by relying on Mafias may be larger in a monopolized market than in a competitive market without Mafias. [11] This assumption departs from Leeson and Rogers

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[11]According to Gambetta (1993), Varese (2011), and Lavezzi (2008), the monopolistic Mafia can produce privileged protective profits for firms by eliminating competition and enforcing an implicit cartel among such firms in numerous industries, which is a difficult task for independent individual criminals. Additionally, see Buonanno et al. (2016) for political connections with Mafias in political elections. Mafias create benefits by providing voting

(2012) and other papers on the emergence of criminal organizations in that such a profit-seeking Mafia is well observed in a mature and developed society rather than a primitive society as their main concerns.

Focusing on these different market structures regardless of the existence of the Mafia, we investigate economic consequences, that is, the amount of investment in conflicts and the welfare of potential criminals. Hereafter, we derive and compare these results for each market structure as in Garoupa (2000).

2.2.1 Competitive Market

We reconsider the primary setting in Konrad and Skaperdas (1998) by incorporating competition among criminals, which is the main reason for a strong and centralized organizational structure that can enforce coordination among criminals (Leeson and Rogers 2012). Moreover, as an example of today's criminal organizations, the Camorra is an Italian criminal organization that engages in extortion (Paoli 2014). In contrast to other famous Mafia-type criminal organizations, such as the Cosa Nostra and the 'Ndrangheta in Italy, it is said that the Camorra has no strong hierarchical structure.

At first, we do not consider the Mafia; hence, there are three main actors: potential criminals, the victim, and the government. There are $n > 1$ criminals who try to obtain a tribute from the victim. Let y be criminals' tribute.[12] We assume that the victim is similar to a unitary actor that consists of a given number of victims; thus, competition among criminals is inevitable. The victim, who is asked by criminals to pay a tribute decides to agree or to refuse to pay. If he refuses to pay a tribute, he will suffer damage v^C with probability $(1 - p_k)$. This probability depends on the amount of costly investments by n criminals and the government. Let a_i be the investment by offender i and B be the investment by the government. Therefore, the government protects the victim. We also assume that v^C is exogenously given.[13] Thus, offenders can destroy the relevant

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shares for some politicians. As an example of a Japanese Mafia, Hill (2003) noted interactions among the Mafia, the construction industry, and famous politicians.

[12]We implicitly assume that one representative offender demands the tribute. Thus, criminals compete for this tribute.

[13]Konrad and Skaperdas (1998) consider the possibility that v^C can be a random variable. In this case, an incentive for investments can be different from that in the case of fixed v^C. However, this scenario does not reduce

opportunities and properties. We assume that the probability p_k that the victim who refuses to pay a tribute is protected to be

$$p_k = \frac{B}{\sum_{i=1}^n a_i + B}. \tag{1}$$

Therefore, criminals succeed in extortion with probability $1 - p_k$.[14] However, in this competitive scenario, cooperation among criminals is impossible; hence, conflicts among them are inevitable. Therefore, the probability of offender i obtaining a tribute, if the victim refuses, is

$$p_i = \frac{a_i}{\sum_{i=1}^n a_i + B}. \tag{2}$$

Such investments can be interpreted as those in weapons and guns to destroy the property of victims and to fight against the government and other criminals. Therefore, investments used in this conflict are socially undesirable. Additionally, they are interpreted as resources that can be used productively elsewhere, as in Nitzan (1991). In each case, this investment in conflict is the same as the loss of social welfare. Offender i's payoff is $y - a_i$ if extortion is successful, and $-a_i$ otherwise, while he wins the competition with probability p_i.

The game proceeds as follows. At stage 1, the government and n criminals choose the amounts of investments. At stage 2, criminals demand a tribute. In stage 3, the victim decides to agree or refuse. In stage 4, if the victim refuses, he suffers damage v^C with probability $1 - p_k$. If he agrees, there is no damage with probability 1. The winning offender can obtain the extortion gain if the victim agrees to pay.

We solve the game by backward induction. The expected payoff of the victim is $\pi_k = -y$ if he agrees to pay a tribute to the offender and $\pi_k = -(1 - p_k)v^C$ if he refuses to pay. Thus, the victim agrees to pay a tribute if and only if $-y \geq -(1 - p_k)v^C$, that is, $(1 - p_k)v^C \geq y$. Thus, at stage 3, criminals demand the maximum tribute as long as the victim agrees to pay. Additionally, we assume that all criminals demand the same amount of tribute.[15] Therefore, it must hold that

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the competitive pressures among criminals; hence, this chapter does not consider this random variable scenario because our main motivation is to examine how organizational structures impact the criminal market.

[14]This setting follows basic conflict theory. See Garfinkel and Skaperdas (2007) and Konrad (2009).

[15]In this case, the expected payoff of the victim is identical for these two choices; thus, we assume that the victim always pays a tribute.

$y = (1 - p_k)v^C$. Because each offender is in conflict with rival criminals, the expected payoff of offender i is

$$\pi_i = p_i v^C - a_i = \frac{a_i}{\sum_{i=1}^{n} a_i + B} v^C - a_i. \tag{3}$$

Additionally, the government chooses the amount of investment to maximize the expected payoff of the victim; hence, we obtain [16]

$$\pi_k = -(1 - p_k)v^C - B = -\frac{\sum_{i=1}^{n} a_i}{\sum_{i=1}^{n} a_i + B} v^C - B. \tag{4}$$

Because every actor determines a_i and B to maximize his or her expected payoff, the first-order conditions for each i and the government are

$$\frac{d\pi_i}{da_i} = \frac{\sum_{i=1}^{n} a_i + B - a_i}{(\sum_{i=1}^{n} a_i + B)^2} v^C - 1 = 0 \text{ and} \tag{5}$$

$$\frac{d\pi_k}{dB} = \frac{\sum_{i=1}^{n} a_i}{(\sum_{i=1}^{n} a_i + B)^2} v^C - 1 = 0. \tag{6}$$

Because every offender i has the same objective function, we assume the symmetric equilibrium $a_i = a$ for all i.[17]

Thus, the equilibrium outcomes in a competitive market are summarized in Lemma 2.1.

Lemma 2.1. In a competitive market, the equilibrium results are as follows:

$$a_i^C = \frac{nv^C}{(n+1)^2}, \quad p_i^C = \frac{1}{n+1}, \quad \pi_i^C = \frac{v^C}{(n+1)^2},$$

$$B^C = \frac{nv^C}{(n+1)^2}, \quad p_k^C = \frac{1}{n+1} \text{ and } \pi_k^C = -\frac{(n^2 + 2n)v^C}{(n+1)^2}.$$

Lemma 2.1 indicates that a larger number of criminals or an intensified competition induces

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[16]Hereafter, we assume that the victim has the same objective function as the government. That is, the victim must bear the investment costs.

[17]These outcomes also satisfy the second-order conditions.

lower welfare for not only criminals but also the government. This is because more costly investments are inevitable to maintain economic benefits if there are more rivals.

2.2.2 Monopolized Market

Compared with a competitive market, the primary difference is the existence of a Mafia boss who can control extortion activities in its territory. Such a hierarchical organizational structure is well-known to be observed in Mafia-type organizations, such as the Cosa Nostra and 'Ndrangheta in Italy and the Japanese Mafia (Yakuza).

The role of a boss (or an upper-tier offender) is to resolve disputes among lower-ranked criminals and pursue the benefits of coordination and collusion (Leeson and Rogers 2012). To increase the cooperative organizational benefits, a boss develops rigid written or unwritten rules, such as "criminal constitutions" (Leeson and Skarbek 2010) within the organization. A violent punishment is an effective approach to securing lower-ranked criminals' cooperation and enforcing collusion agreements in a Mafia-type organization. Thus, lower-ranked criminals are less likely to engage in activities that are undesirable to the organization if they know such uncoordinated actions are deadly.

In this process, a boss demands a royalty from lower-ranked criminals in exchange for pursuing the benefit of a coordinated organization. Such a royalty can be interpreted as a fee for permission to enter the market or to join the organization. These are based on the monopolistic feature of a criminal organization (Garoupa 2000 and Leeson and Rogers 2012). One example of such a monetary transfer from the bottom to the upper tier is "jonokin," which is observed in a Japanese Mafia organization (Yakuza). Lower-ranked members in the organization are forced to make monthly duty payments to high-ranking members and a central reserve fund used for an organization's activities (Hill 2003). Additionally, a boss maximizes the rent derived from the royalty. Such an extractive role of a boss is often assumed (Grossman 1995 and Garoupa 2000). In this respect, we assume less extreme predation behavior of a boss.

The primary setting is the same as in the previously considered competitive market. A Mafia boss demands a royalty from all criminals before a conflict with the government begins. The total

royalty collected from n members is $A = \sum_{i=1}^{n} a_i$. Out of this monetary resource A, a boss has to spend funds on investments in extortion activities. Formally, a boss uses δA, where $\delta \in [0, 1]$, as the cost of investments for conflicts with the government. This also implies that a boss controls the use of violence in his territory. The remainder of the royalty, $R = (1 - \delta)A$, is the leadership rent for the boss. In the conflict stage, criminals act as a unitary actor in coordinated extortion activities. Hence, we assume that extortion gains are equally allocated among n lower-ranked criminals. [18]

This assumption arises even if a Mafia boss seems to be predatory, from the Mafia itself pursuing its cooperative organizational benefit. The "Family" system in Italian Mafias and the "Ikka" system in the Japanese Mafia are famous examples of such features (Gambetta 1993 and Hill 2003). Additionally, such a setting is based on the characteristic feature of criminal constitutions. According to Leeson and Skarbek (2010), rules such as criminal constitutions within criminal organizations require an ex-ante agreement to the rules by potential members. Thus, such arrangements may be interpreted as a form of criminal constitution.[19]

Thus, the probability that extortion is successful is as follows [20]:

$$p = \frac{\delta A}{\delta A + B}.$$ (7)

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[18]Following previous studies of a monopolistic criminal organization by Schelling (1971), Buchanan (1973) and Garoupa (2000), once the mafia establishes a monopoly in its territory, lower-ranked criminals are organized by a boss and cannot engage solely in extortion. Additionally, for a while, we assume that potential criminals cannot choose whether or not to join the organization. Then, we implicitly assume that potential criminals join the Mafia as long as other options, such as working for a legal firm, are less attractive to them. In other words, criminals are passive to the Mafia's entrance into the criminal market and a change in governance structure. Because many factors interact with each other (Skaperdas 2001 and Varese 2011), lower criminals' demand for a strong Mafia is not the only reason for the emergence of the Mafia. Of course, because improving the welfare of an organization's members is a convincing reason for the centralization, we subsequently discuss the condition for the emergence of a centralized organization. Lastly, we consider the long-run equilibrium to investigate how the incentive of criminals regarding whether or not to enter the criminal market changes depending on market structures and governance forms.

[19]To reflect such transactions within Mafia organizations, we consider the described manner of compensating a boss. However, if the manner that a boss is compensated is modified such that a boss receives a share of extortion gains after the conflict, this chapter 's results provide the same implications.

[20]This formulation is similar to that of Epstein and Mealem (2012) in that organized groups act as a unitary actor. Hence, by introducing an extractive relation within the organization, this chapter tries to apply it to an illegal market.

In the same way, the government can defend the victim with probability

$$p_k = \frac{B}{\delta A + B}. \tag{8}$$

The game proceeds as follows. At stage 1, a boss demands a share of royalty as leadership rent, or $(1 - \delta)$. In stage 2, the government and the Mafia choose investments δA and B. At stage 3, the Mafia demands a tribute y. Subsequently, the victim decides to agree or refuse. At stage 5, if the victim refuses, he suffers damage v^M with probability $1 - p_k$, where $v^M \geq v^C$. If he agrees, there is no damage with probability 1.

Thus, we solve the game by backward induction. The Mafia chooses a tribute $y = (1 - p_k)v^M$. Thus, the Mafia chooses A to maximize

$$\pi = pv^M - A = \frac{\delta A}{\delta A + B}v^M - A. \tag{9}$$

Additionally, the government chooses B to maximize

$$\pi_k = -pv^M - B = -\frac{\delta A}{\delta A + B}v^M - B. \tag{10}$$

Thus, the first-order conditions for the Mafia and the government are

$$\frac{d\pi}{dA} = \frac{\delta B}{(\delta A + B)^2}v^M - 1 = 0 \ and \ \frac{d\pi_k}{dB} = \frac{\delta A}{(\delta A + B)^2}v^M - 1 = 0. \tag{11}$$

Thus, given $\delta \in [0, 1]$, the equilibrium outcomes in the monopolized market are summarized in Lemma 2.2. [21]

Lemma 2.2. In a monopolized market, the equilibrium results are as follows:

$$a_i^M = \frac{\delta v^M}{n(\delta + 1)^2}, \quad p^M = \frac{\delta}{\delta + 1}, \quad \pi_i^M = \left(\frac{\delta}{\delta + 1}\right)^2 \frac{v^M}{n},$$

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[21]The second-order conditions are also satisfied.

$$B^M = \frac{\delta v^M}{(\delta + 1)^2}, \quad \pi_k^M = \frac{v^M}{(\delta + 1)^2} \quad and \quad R^M = \frac{(1 - \delta)\delta v^M}{(1 + \delta)^2}.$$

Lemma 2.2 illustrates the intuitive result that a more extractive behavior is good for the victim and bad for criminals. Each royalty decreases with δ because this is determined to pursue an organization's benefits. Thus, a boss must consider this trade-off in deciding his leadership rent. At stage 1, a boss of the Mafia decides the amount of his private gain. Thus, the first-order condition is

$$\frac{dR}{d\delta} = \frac{(1 - 3\delta)v^M}{(\delta + 1)^3} = 0. \tag{12}$$

Therefore, we obtain $\delta^* = 1/3$. The equilibrium results are summarized in Lemma 2.3.

Lemma 2.3. In a monopolized market, the equilibrium results are as follows:

$$a_i^M = \frac{3v^M}{16n} \quad p^M = \frac{1}{4}, \quad \pi_i^M = \frac{v^M}{16n},$$

$$B^M = \frac{3v^M}{16}, \quad \pi_k^M = -\frac{7v^M}{16} \quad and \quad R^M = \frac{v^M}{8}.$$

According to Dixit (1987), a pla   lity is less than 1/2 is called the underdog. Hence, the group becomes the underdog. Because the role of the Mafia is to coordinate the collusive benefits among criminals, these results do not depend on the number of criminals, except for their payoff. This is because illegal gains are derived from a given number of potential victims; hence, each offender's benefit depends on this number.

2.3   Comparing the Two Markets

In this section, we will compare several results of the preceding section. In particular, our primary concern is to examine and compare two important aspects: (1) the social welfare measured by

costly investments for conflict and (2) the welfare of criminals. For a simple investigation of these results, let $v^M/v^C = k$, where $k \geq 1$. In this respect, a large k indicates the presence of a profit-seeking Mafia that can target more profitable extortion targets. In contrast, a small k indicates that the Mafia is less likely to be profit-motivated and acts like a pure protection provider by organizing criminals.

2.3.1 Social Welfare

First, we investigate the effects on social welfare and efficiency. As we mentioned previously, following the literature on conflict theory, the criterion for determining social efficiency concerns the amount of resources wasted in conflicts.[22] In the organized crime literature, such resources, for example, weapons and guns, have negative externalities on society. We will examine how the organization's structure impacts such investments. According to previous lemmas, the equilibrium outcomes are summarized in Lemma 2.4:

Lemma 2.4. In a competitive market, the amount of investments is $D^C = \sum_{i=1}^{n} a_i^C + B^C = nv^C/(n+1)$. In a monopolized market, the amount of investments used in extortion activities is $D^M = \delta^* A^M + B^M = v^M/4$.

According to Lemma 2.4, we obtain Proposition 2.1.

Proposition 2.1. The amount of investments' relation between the competitive market and the monopolized market is as follows. (1) If $k \geq 4$, we have $D^M > D^C$. (2) If $4 > k \geq 1$ and $max[k/(4-k), 1] > n$, we have $D^M > D^C$ and $4 > k \geq 1$, and if $n > max[k/(4-k), 1]$, we have $D^C > D^M$.

Proof. According to Lemma 2.4 and a simple calculation, $D^M > D^C$ if $(k-4)n + k > 0$. This condition holds if $k \geq 4$ or $4 > k$ and n is smaller than $max[k/(4-k), 1]$. Q.E.D.

This result indicates that the existence of the Mafia and a hierarchical organizational structure can contribute to a reduction in unproductive investments for violence and conflicts when there

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[22]Nitzan (1991) terms the resources wasted in conflicts as rent dissipation. The researcher also assumes that wasted resources in conflicts are non-productive.

exist some competitiveness and the Mafia has less violence motivations (small v^M). This is because criminals have to invest more if there are more rivals. Thus, in a monopolized market, because competition is eliminated, criminals do not need to engage in wasteful activities.[23]

In contrast, once the Mafia with a profit motivation organizes criminals and can target more valuable victims for its extortion activities (large v^M), an increase in inefficient investments is inevitable, which leads to detrimental effects on society. This result helps us understand how the presence of Mafias imposes the negative effects on society described in the empirical literature, as in Pinotti (2015).

2.3.2 Offenders' Welfare

Let us compare the welfare of offender i in two different situations. According to Lemmas 2.1 and 2.3, the welfare comparison for offender i is summarized in Proposition 2.2.

Proposition 2.2. The number of potential criminals is large, that is, $n > max[8/k - 1 + 4\sqrt{(4-k)/k^2}, 1]$, if and only if we have $\pi_i^M > \pi_i^C$ The same calculation holds for only if part.

Proof. According to a simple calculation, we investigate the condition $\pi_i^M = v^M/16n > \pi_i^C = v^C/(n+1)^2$. This conditions holds if $n > max[8/k - 1 + 4\sqrt{(4-k)/k^2}, 1]$. The same calculation holds to investigate only if part. Q.E.D.

We can provide an intuitive explanation for whether forming a group is beneficial to its members. If there is a large number of rival criminals, avoiding competition benefits the organization's members. However, such a conflict resolution may be insufficient for covering the costs of the rent-extractive behavior of a boss. [24] Additionally, another role of the Mafia such as the ability to target more valuable victims (large v^M) is also important for improvement because $\pi_i^M = v^M/16n$

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[23]Even though it is not acceptable for containing offenders' welfare into social welfare, comparing the welfare loss of victims lead to the same massage. That is, causing severe damage (large k) or severe competition among offenders cause severe welfare loss for the victim according to Lemma 2.1 and 2.3.

[24]If a boss acts benevolently and demands no private gain with $\delta = 1$, each offender's benefit is $v^M/4n$ according to Lemma 2.2. Thus, it always holds that $v^M/4n > v^C/(n+1)^2 = \pi_i^C$. That is, lower-ranked organizational members face a trade-off between coordinated benefit and an oppressive relation with a hierarchical boss, in which competitive pressures are insufficient to cover the cost of the rent-extractive relations within organizations. Such an oppressive relation between rulers and lower-ranked members of certain governance structures has already been discussed in the political science literature (Olson 1993). Olson discusses this effect on political institutions without a formal setting. Thus, this chapter expands this discussion to the setting of a criminal market using a formal and theoretical model.

tends to be large.

The welfare reduction of criminals can occur with exogenous centralization because the intrusion of the Mafia does not always come from lower criminals' demand for hierarchical authority. For example, as is similar to the discussion about gang formations in Skaperdas (2001) and Sobel and Osoba (2009), when the government cannot provide the appropriate protection of victims' property rights, the Mafia can be another provider of the protection by organizing criminals. In this situation, based on the demand from victims of violence, the Mafia can emerge to organize criminals without any extra profit motivations (small v^M). Once the Mafia establishes its monopoly, lower criminals are forced to decide on whether to stay in the illegal market organized by the Mafia with payoff π_i^M or to work for legal firms (with payoff w) because sole activities can be difficult given the brutal features of the monopolistic Mafia. Thus, as long as other options such as legal work are less attractive ($\pi_i^M > w$), welfare reduction for lower criminals from a competitive market structure can occur in the exogenous centralization situation; we may have $\pi_i^C > \pi_i^M > w$. [25]

In contrast, our results also help us understand the condition for the emergence of a centralized criminal organization that some papers study recently, such as Bandiera (2003), Dimico et al. (2017), Leeson (2007), Leeson and Rogers (2012), Leeson and Skarbek (2010), Skarbek (2008, 2012), and Sobel and Osoba (2009). When potential criminals find centralization with a profit-seeking motivated Mafia (large v^M) attractive, endogenous centralization can occur with the delegation to a rent-extractive boss. In this respect, the condition $\pi_i^M > \pi_i^C$ is important. In contrast to these papers, by an explicit introduction of more general roles of the Mafia as a provider of more valuable extortion benefits, we provide an inclusive framework to extend their discussion on the mechanism for its emergence and its welfare implications. That is, sufficient coordination benefits are not the only source of its centralization. This helps us understand why the reputation and the brand name of the established Mafia, which are useful in extortion activities, are likely to play important roles for its monopolization even if there seems to be less competition among potential

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[25] As we explained for the game setting in Section 2, a boss chooses his share before a conflict. However, if a boss chooses the share after a conflict, the value δ that represents his share acts as a parameter. In this modified scenario, as long as δ is small because of the extractive behavior of a boss, our implications will be unchanged. This is because, as in Lemma 2, if δ is sufficiently small, π_i^M and $D^M = \delta A + B$ tend to be small and π_k^M is large. Thus, the presence of the Mafia contributes to a reduction in the loss of social welfare and the welfare of organization members.

criminals.

With Proposition 2.1, welfare implications about the social efficiency and welfare of an organization's members vary depending on the motivation and mechanism of centralization. That is, internalizing externalities within a criminal organization can be beneficial to an organization's members but detrimental to social efficiency and vice verse. Therefore, the centralized organization in our framework cannot solve the tragedy of common problems in criminal markets, such as private and extortion industries. Finally, depending on the features of a formed criminal organization, policies targeting a charismatic boss that lead to the disbanding or collapse of the organization can or cannot be justified to make society better off.

Because of these results, this inclusive framework helps us extend discussions on the relationships between the centralization of criminal activities and its economic consequences. Depending on the Mafia's situations and motivations, we have different implications. When the Mafia is less profit motivated (small v^M), social efficiency can be improved, but criminals are worse off relative to competitive situations. This can happen when the Mafia works only as a substitute of the government as a provider of protection, as in Skaperdas (2001) and Sobel and Osoba (2009), which can be observed in primitive and less developed societies.[26]

However, centralization is operated by profit-seeking motivated Mafia (large v^M), organized crime tends to form, and negative effects from the presence of the Mafia are inevitable, as empirically stressed in Pinotti (2015). This can occur when an established and mature Mafia works as the protection provider and engages in more profitable extortion by using its established and influential brand name to extend its territories, as can be observed in developed and mature societies. If the Mafia plays only the role of the coordination device (with small v^M), bad effects on society are not realized because of fully internalizing externalities. [27] This indicates that modeling only coordinated benefits is insufficient to account for the actual monopolization delegated to famous bosses of established Mafias of various group sizes and the negative effects of the Mafia as observed in many countries.

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[26]When these exist, some competitiveness among criminals both in social efficiency and improvement of an organization's members can be achieved. This situation corresponds to the early emergence of the Sicily Mafia, as in Leeson and Rogers (2012).

[27]When $v^M = v^C$, we always have $D^M < D^C$ according to Proposition 2.1.

2.3.3 Long-run Effects

Finally, let us investigate the long-run effects in this criminal market. We assume that criminals obtain w if they work for legal firms. Thus, in the long-run equilibrium, the payoff of participants in a competitive market is

$$\pi_i^C = \frac{v^C}{(n+1)^2} = w \ \ or \ \ n^C = \sqrt{v'} - 1, \ where \ v' = v^C/w. \tag{13}$$

In the same way, in equilibrium, the payoff of participants in a monopolized market is

$$\pi_i^M = \frac{v^M}{16n} = w \ \ or \ \ n^M = kv'/16. \tag{14}$$

Therefore, we obtain the following.[28]

Proposition 2.3. In the long-run equilibrium, we have $n^M > n^C$ if and only if $k > 16(\sqrt{v'}-1)/v'$. Also, we have $D^C > D^M$ if and only if $4(1 - 1/\sqrt{v'}) > k$.

Proof. According to a simple calculation, we investigate the condition $n^M = kv'/16 > n^C = \sqrt{v'} - 1$. This condition holds if $k > 16(\sqrt{v'} - 1)/v'$. The same calculation holds to investigate only if part. By substituting $n^M and n^C$ into the results in Lemma 2.4, we have $D^C > D^M$ if $4(1 - 1/\sqrt{v'}) > k$. The same calculation holds for only if part. Q.E.D.

This result indicates that in the long-run equilibrium, more criminals join the criminal market organized by the Mafia if greater extortion gains are expected (a large k). Additionally, wasteful activities also increase as greater extortion gains are expected (a large k). That is, this result has similar implications with the excess entry theorem as in the standard industrial organizations. As we previously observed, in the long-run equilibrium, there can be more criminals in a monopolized than in a competitive market because of the coordination benefits for an organization's members. By considering these important roles of the Mafia, these differences lead to detrimental effects on society, in contrast to Garoupa (2000) and other articles on a monopolistic criminal organization that stressed the desirable effects of a monopolistic Mafia.[29]

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[28]We assume that $\sqrt{v'} > 4$, which implies that extortion gains are large enough to retain some participants.

[29]Although the existing literature primarily focuses on the consumption of illegal goods, this chapter considers

3   A Criminal Organization as A Collaborator with Another Criminal Organization

3.1   Introduction

This chapter considers more involvements of criminal organizations in contrast to the monopolistic view as in Schelling (1967), Buchanan (1973) and Gambetta (1993). We can observe this situation. For example, criminal organizations collaborate with local gangs and established organized crime groups, e.g., Sicilian Mafia members and Nigerian gangs (Gaffy 2017), Mexican drug cartels and American street gangs (Schmidt 2012) and Japanese Mafia (Yakuza) and emerging loosely organized groups (Schreiber 2012).[30] These phenomena are primarily due to economic profit motives.

Collaboration across multiple criminal organizations has been noted in the previous literature, e.g., Paoli (1994) and Catino (2015).[31] This is because criminal organizations require elaborate processes due to the complexities involved and special knowledge requirements to obtain illegal gains from end consumers. For instance, for illegal drugs to reach end consumers, several steps are required, including production, smuggling, high-level and mid-level dealing, retailing and trafficking (Reuter 2014).

While such collaborations have been repeated within and across criminal organizations throughout their long history, their economic incentives and welfare implication are still ambiguous. Aiming to understand this process, we construct a simple framework of a law enforcement model in which

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the extent of illegal activities such as the use of violence. Thus, this chapter has a different setting and motivation in that we stress the effect of organizing violence and criminal activities in an illegal market.

[30]According to Gaffy (2017), Nigerian gangs and the Sicilian Mafia collaborated with each other. This report states that Nigerian criminals were used as drug dealers by higher-ranking Italian mobsters. Additionally, gangs have profited from managing the many thousands of Nigerian women trafficked into Italy as sex workers in recent years. Other collaborations between drug cartels and local American gangs have been summarized by Schmidt (2012). American gang alliances with Mexican drug trafficking organizations (MDTOs) is a logical step for gangs in their effort to establish and maintain control over street sales of illegal drugs in many U.S. cities (Schmidt 2012). As a domestic case, the Japanese Mafia (Yakuza) has cooperated with a new breed of criminal elements referred to as han-gure (Schreiber 2012). The emergence of han-gure may relate to recent police crackdowns on designated crime syndicates with tough new anti-gang strategies. Since the organization are now under much closer scrutiny by the police, it can be profitable for them to farm out illegal jobs to such members. In other words, tough approaches by the police toward them may have created a power vacuum in which the han-gure are likely to be active.

[31]According to Catino (2015), for example, in the Sicilian and American Mafias, several illegal activities are carried out by the following: (1) the Mafia organization; (2) subcontracted groups and criminal cells that are not organic parts of the Mafia organization but that receive a percentage of the earnings; and (3) co-partnerships with other criminal groups and/or other Mafia organizations.

criminal organizations (Mafias) control an illegal market that generates harmful externalities by demanding royalties from lower-level criminals. While this model is based on Garoupa (2000), we extend this notable paper by incorporating cooperation between criminal organizations whereby one organization can propose collaboration with another organization. We first investigate and compare two different situations: (1) one monopolistic Mafia controlling an illegal market and (2) one Mafia collaborating with a local criminal organization by providing the right to control the market in exchange for royalties from the collaborator. Subsequently, we explore the conditions under which criminal organizations cooperate and relationships between market structure, the quality of the illegal market controlled by criminal organizations and effects on social welfare efficiency.[32]

Based on these motivations, we consider framework to discuss the welfare effects of more involvements of criminal organizations. In contrast to Chapter 2, we provide more general framework about illegal activities, illegal consumption of drugs, prostitution, extortion and so on. We assume that this activity can be socially undesirable. Following Garoupa (2000), we introduce criminal organizations (Mafias) as a regulator of offenders who engage in these activities. This is based on hierarchical organization structures between upper-ranked Boss and lower ranked offenders.

This chapter shows that whether collaboration between criminal organizations can be beneficial to society depends on the quality of the illegal markets they control. If there is less (more) severe social harm, a collaborative (monopolistic) operation is preferred. This mechanism could be similar to the tragedy of the commons problem in which profit-seeking Mafias show extractive behavior for limited illegal gains. Thus, because the intervention of more Mafias leads to excessive extortion and reduced illegal demands, social welfare improvement and harm reduction can be achieved. However, such cooperation cannot happen as long as a new collaborator is good at controlling the

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[32]These settings can be applied to analysis of the governance structure of criminal organizations. It has been said that there are two notably different types of governance structures for criminal organizations and markets: (1) a hierarchical and monopolized structure and (2) a decentralized operation. Certain Italian criminal organizations exhibit these different organizational structures. According to Paoli (2014), while the Camorra is said to lack a strong hierarchical structure, other famous Mafia-type criminal organizations, such as the Cosa Nostra and the 'Ndrangheta, have hierarchical organizational structures that allow them to pursue coordinated organizational benefits. Such organizations are either independent or consist of a confederation of several groups and clans. Other criminal organizations also exhibit these different organizational forms; the Japanese Mafia (Yakuza), drug cartels in Mexico, pirates and terrorist groups also tend to have an organizational structure that is either centralized or decentralized (Hill 2003, Leeson and Rogers 2012 and Shirk and Wallman 2015).

market.

Our result may indicate that while the emergence of more hierarchical Mafia structures can be detrimental to social welfare efficiency, it cannot happen due to criminal organizations' economic incentive. This work extends recent articles that have investigated the welfare effects on society associated with the emergence of criminal organizations and criminal constitutions, including Bandiera (2003), Dimico et al. (2017), Leeson (2007), Leeson and Rogers (2012), Leeson and Skarbek (2010), Skarbek (2008; 2012), Sobel and Osoba (2009) and Yahagi (2018). These articles do not explicitly discuss economic consequences, nor do they address how the government should respond depending on the governance structure. Moreover, this chapter also extends the classical view of a monopolistic criminal organization, stressing that the desired effect of a monopolistic organized criminal market, as in Schelling (1967), Buchanan (1973) and Garoupa (2000), does not always hold.

While Mansour et al. (2006) and Poret and Tejedo (2006) discuss how criminal organizations as illegal good producers endogenize their market structures, the government's optimal strategy and its welfare implications remain uncertain. Thus, this chapter provides a new formal framework to discuss how cooperation among criminal organizations or monopolistic operations can be chosen, as well as its welfare impacts.

The remainder of this chapter is organized as follows. In Section 2, by extending the basic model of criminal organizations presented in Garoupa (2000), we analyze two market structures: (1) a monopolistic criminal organization and (2) a collaborative criminal organization. We then compare the two structures. Next, we investigate organizations' incentives to cooperate. Finally, we conclude with our results.

3.2   Basic Model

In this section, we introduce a basic law enforcement model with criminal organizations. First, by extending the basic model of criminal organizations presented in Garoupa (2000), we consider criminal organizations as a regulator of illegal markets, e.g., the market for illegal drugs, prostitution, kidnapping, or extortion markets by demanding protection fees against legal firms or politicians.

The primary actors in this model are potential criminals (lower-ranked subordinates), Mafia 1 and Mafia 2 (higher-ranked criminals or a boss), and the government as the law enforcement authority. Potential criminals with lower rankings must pay a fee for permission to enter a criminal market controlled by a high-ranking boss of an organization. This transaction is a notable characteristic of criminal organizations and is often observed in many of their activities, including in the provision of protection and in transactions of illegal goods (Gambetta 1993 and Leeson and Rogers 2012). As in Garoupa (2007), we could imagine lower-ranked offenders to be drug dealers in the street with Mafia being the local distributor. Another example would be lower-ranked offenders as extortionists or blackmailers distributed across the city with Boss being the coordinator of their activities providing them information or criminal know-how.

In this chapter, we consider the possibility of tentative cooperation among criminal organizations. While criminal organizations such as Mafias seem to act monopolistically, some examples indicate that tentative cooperation between Mafias and local gangs tends to emerge as we mentioned previously, e.g., Sicilian Mafia members and Nigerian gangs, Mexican drug cartels and American street gangs, and Japanese Mafia (Yakuza) and emerging loosely organized groups called "hangure". New collaborators help large criminal organizations to operate smuggling and trafficking of illegal sex workers and drugs, as well as to engage in racketeering activities in new territories. In this process, each criminal organization obtains mutually beneficial illegal profits.

Based on these motivations, we consider two situations. First, an illegal market is controlled by a single Mafia 1. Another situation is that Mafia 1 delegates control rights to Mafia 2 in exchange for royalties from the cooperative. Following the analysis, we consider these scenarios with formal settings.

3.2.1 Monopolistic Criminal Organization

The analysis in this section is basically the same approach as in Garoupa (2000). There are potential offenders (lower-ranked criminals), one criminal organization (Mafia 1) and the government. Let b be the illegal gain or demand for illegal goods by potential criminals or end consumers. We assume that b is uniformly distributed over $[0, 1]$, while the government and Mafia 1 cannot

observe its value. Because illegal gains are derived from the ultimate consumers and victims, we assume that the harm to society increases with the amount of illegal gains. Let $H > 1$ be one unit of social harm. Since $H > 1$, more offenders indicate socially undesirable. Potential offenders must pay e_1 for Mafia 1 to engage in illegal activities under the threat of being sanctioned by the government. We refer to this monetary payment as extortion. That is, limited illegal gains from a given number of end consumers exhibit a common pooling feature for the Mafia. The Mafia chooses e_1 to maximize its extortion profit with marginal cost c_M.

Let s be the sanction on potential offenders.[33] Additionally, we assume that the expenditure associated with sanctions s is $C(s) = \sigma s$.

Therefore, the condition for whether offenders enter a criminal market is given by $b \geq s + e_1$. Thus, the Mafia chooses e_1 to maximize

$$\pi^M = \int_{s+e_1}^1 e_1 db - c_M e_1. \tag{15}$$

3.2.2 Collaboration between Criminal Organizations

While the main settings are the same in the monopolistic criminal organization, we introduce two criminal organizations, Mafia 1 and Mafia 2. We assume that Mafia 1 delegates control rights to Mafia 2; thus, potential offenders must pay their royalties to Mafia 2. However, we also assume that Mafia 2 must also pay royalties to Mafia 1 out of the payment collected from the lower-ranked offenders. This happens when Mafia 1 tries to start illegal business in new markets; it gives extortion tasks to local criminal organizations that are familiar with the new market. Mafia 2 takes marginal cost c_T in extortion against potential offenders who enter the illegal market.[34] This can be smaller than c_M when Mafia 2 is good at controlling the market. The total extortion from potential offenders to Mafia 1 and Mafia 2 becomes $e_1 + e_2$, where e_i is the transfer to Mafia i. We also assume that Mafia i bears the extortion cost in accordance with the ratio of each amount of

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[33]We assume that sanctions are imposed on lower-ranked criminals who engage in a criminal market. This is because the main profits of Mafias are obtained from illegal market control; thus, such sanctions are an important tool for controlling a Mafia's economic profits.

[34]We use T to denote such "teaming up" situations among collaborative criminal organizations.

extortion, $e_i/(e_1 + e_2)$. Thus, Mafia i's extortion cost is $c_T(e_1 + e_2) \times e_i/(e_1 + e_2) = c_T e_i$. [35]

We assume that since collusion between these criminal organizations tends to be tentative, each Mafia pursues its own economic profits independently. Usually, criminal organizations cannot rely on legal institutions to enforce their rules, and it becomes difficult to enforce coordinated activities among different criminal organizations. Therefore, Mafia 1 maximizes its profits by choosing the royalty from Mafia 2 "e_1", and Mafia 2 maximizes its profit with the royalty from lower-ranking criminals "e_2".

The condition for potential offenders to engage in illegal activities is $b \geq s + e_1 + e_2 = b_T$. Thus, the profit functions for Mafia 1 and 2 are given by

$$\pi_1^T = \int_{s+e_1+e_2}^{1} e_1 db - c_T e_1 \quad and \quad \pi_2^T = \int_{s+e_1+e_2}^{1} e_2 db - c_T e_2. \tag{16}$$

3.2.3 Timing of the Game

Following Garoupa (2000), the government chooses s to maximize social welfare, which consists of the potential criminals' benefit, the social harm and the cost of sanctions.[36]

Since our motivation is to see how cooperation between Mafias emerges, we also consider their economic incentive. Therefore, the game proceeds as follows. In stage 1, Mafia 1 decides whether to collaborate with Mafia 2. Then, the government chooses s. At stage 3, Mafia(s) can engage in extortion activities. F

[37]

Subsequently, potential offenders decide whether to engage in illegal activities.

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[35] Even if we introduce a different way to allocate the total extortion cost between Mafia 1 and Mafia 2, we believe that our main implications do not change dramatically.

[36] In contrast to Chapter 2, we assume that the government considers offenders' welfare. However, as in Chapter 2, our massage will not be changed dramatically even if the government (and social welfare) only considers welfare loss of society. That is, the government chooses s to minimize the social harm and the cost of sanctions. According to Garoupa (1997) and Polinsky and Shavell (2000) for discussions about including criminal gains in social welfare, the notion that criminals benefits are social gains did not originate with Becker, but goes back to Beccaria and Bentham . Beccaria's basis for a penal structure was the greatest happiness principle which was used by Bentham in his utilitarian approach. A possible interpretation in this assumption is that the "firm" offers a productive good or service that is in demand such as prohibited alcohol or drugs. Also, when offenders engage in extortion, even if this causes negative effect on victims, offenders enjoy this gains. However, since this entails some negative cost, their activities are socially undesirable. Thus, compared to the extortion model in Chapter 2, the victim can be passive actors.

[37] However, even if Mafia 1 decides first and then Mafia 2 chooses its strategy, our main intuitions do not change.

Our assumption is that the government moves after the collaboration choice of the Mafia. Since such collaboration tends to take place with new collaborators with different characteristics, it is less likely to be transparent. Thus, the law enforcement authority might need new information and cooperation among authorities in different jurisdictions. Therefore, it is sensible to assume that the government is a passive actor for the emergence of collaboration.

3.3 Analysis

3.3.1 Monopolistic Criminal Organization

In this section, we derive the equilibrium in the situation of a monopolistic criminal organization. Since Mafia 1 chooses e_1 to maximize $\pi^M = \int_{s+e_1}^1 e_1 db - c_M e_1$, the first-order condition is given by

$$\frac{d\pi^M}{de_1} = 1 - s - 2e_1 - c_M = 0. \tag{17}$$

Therefore, we obtain $e_1 = (1 - s - c_M)/2$. The expected profit of the Mafia is $\pi^M = (1 - s - c_M)^2/4$.

According to the above results, the condition for potential criminals to enter the criminal market is given by $b \geq s + e_1 = (1 + s - c_M)/2 = b_M$. In stage 1, the government chooses sanctions s to maximize social welfare:

$$W^M = \int_{(1+s-c_M)/2}^1 (b - H) db - \sigma s. \tag{18}$$

Thus, the first-order condition for the government is given by

$$\frac{dW^M}{ds} = -\frac{(1 + s - c_M)}{4} + \frac{H}{2} - \sigma = 0. \tag{19}$$

Hence, we obtain $s^M = 2H + c_M - 1 - 4\sigma$ and $b_M = H - 2\sigma$. Thus, we have the social welfare with monopolistic criminal organization as in $W^M(s^M) = 1/2 - H + (H - 2\sigma)^2/2 + \sigma(1 - c_M)$.

3.3.2 Collaboration between Criminal Organizations

We follow the same analysis as in the previous section. The first-order conditions for Mafias 1 and 2 are

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$$\frac{d\pi_1^T}{de_1} = 1 - s - 2e_1 - e_2 - c_T = 0 \ \ and \ \ \frac{d\pi_2^T}{de_2} = 1 - s - 2e_2 - e_1 - c_T = 0. \tag{20}$$

Therefore, we obtain $e_1 = e_2 = (1 - s - c_T)/3$.

Thus, there exist certain externality and conflicts in pursuing economic profits. Increased extortion by one Mafia will lead to reduced extortion by the other because the Mafias share the same pool of extortion gains, thus resulting in a tragedy of the commons problem. The expected profits of Mafias 1 and 2 are $\pi_1^T = \pi_2^T = (1 - s - c_T)^2/9$.

According to the above results, the condition for potential criminals to enter the criminal market is $b \geq s + e_1 + e_2 = (2 + s - 2c_T)/3 = b_T$. In stage 1, the government chooses sanctions s to maximize social welfare:

$$W^T = \int_{(2+s-2c_T)/3}^{1} (b - H)db - \sigma s. \tag{21}$$

The first-order condition for the government is

$$\frac{dW^T}{ds} = -\frac{2 + s - 2c_T}{9} + \frac{H}{3} - \sigma = 0. \tag{22}$$

Thus, we obtain $s^T = 3H + 2c_T - 2 - 9\sigma$, and $b_T = H - 3\sigma$. Therefore, social welfare in this equilibrium is given by $W^T(s^T) = 1/2 - H + (H - 3\sigma)^2/2 + 2(1 - c_T)\sigma$.

As a given sanction s, if $s < 1 + 3c_M - 4c_T$, the crime rate in the monopolistic situation becomes larger than in the collaborative situation, or $1 - b_M > 1 - b_T$. That is, as long as c_T is not large enough, collaboration regimes leads to less illegal transactions.

However, the marginal effect of an increase of sanctions becomes large in the monopolistic situation than in the collaborative situation, $db_M/ds = 1/2 > 1/3 = db_T/ds$. That is, the involvements of more Mafias make the intervention of the government less effective. This mechanism is related to the incentive of Mafias' extortion: severe sanctions lead them to have less incentive to extort against lower-ranked criminals. Since the main mechanism of our results depends on whether Mafias can work as regulators. That is, more severe detection indicate that criminal organizations are not likely to work as regulators. Finally, the total effects of the presence of regulators

become weaker when the number of them increases and severe detection are implemented. In conclusion, the marginal effect of more severe sanction (large s) on reducing crime rates becomes smaller when more and more Mafias involve and interact with each other. While these results are basically related to the over-exploitation of Mafias, the previous literature has not pointed out these mechanisms.

3.3.3 Social Welfare Implication

First, let us investigate the chosen sanction. The sanction against a monopolistic criminal organization is more severe than the sanction against collaborating criminal organizations ($s^M > s^T$) when $H < 5\sigma + 1 + c_M - 2c_T$. That is, only when illegal activities generate severe social harm is it necessary to enact severe intervention against the illegal market, according to normative and social welfare efficiency criteria.

The social welfare with collaborating criminal organizations, W^T, is larger than that of a monopolistic criminal organization, W^M, if and only if the following condition holds: $W^T = 1/2 - H + (H - 3\sigma)^2/2 + 2(1 - c_T)\sigma > W^M = 1/2 - H + (H - 2\sigma)^2/2 + \sigma(1 - c_M)$. Therefore, following a simple calculation, we have Proposition 3.1.[38]

Proposition 3.1. The social welfare with collaborating criminal organizations is larger than in the monopolized governance and market structure ($W^T > W^M$) if and only if $H < 5\sigma/2 + 1 + c_M - 2c_T = H^*$. The opposite result ($W^M > W^T$) occurs if $H^* < H$.

This result depends on the quality of the illegal market that the Mafias control and their abilities to extort their subordinates and criminals. If criminal organizations control an illegal market that generates less severe social harm, i.e., H is sufficiently small ($H < H^*$), collaborating criminal organizations are preferred. This outcome is because in this case, the Mafias tend to demand more royalties. As a result, fewer criminals engage in illegal activities, and the government can reduce the cost of law enforcement.

On the other hand, if the level of social harm H is sufficiently large ($H > H^*$), it is important

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[38]To have interior solutions, we assume that the social harm H is not an extreme value. That is, we assume $1 < H < min[2\sigma + 1 - c_M, 3\sigma + 1 - c_T]$.

for the government to commit to reducing the number of criminals by increasing sanctions. This outcome is because Mafias do not take into account the harmfulness of their illegal activities in pursuing their extortion profits; thus, severe sanctions are preferred for monopolized governance. In other words, although Mafias can pla   le of regulators in illegal markets, severe social harm requires strong intervention by the government according to each actor's objective function.

These results shed light on relations among the social harms of illegal activities, the enforcement cost and governance structures of criminal organizations. As criminal organizations collaborate with each other, illegal transactions among lower-ranked criminals decrease. Then, the government has a chance to reduce the enforcement cost. However, because motivations of criminal organization are not harmful reductions but a profit seeking, in the case that the controlled market generates more severe social harms, a strong intervention of the government is necessary. Therefore, as the number of involved criminal organizations increases, the reduction of enforcement costs becomes more and more efficient compared to the reduction of social negative externalities with the direct intervention of the government. In other words, from the social welfare efficiency perspective, as the number of criminal organizations increases, the government has more incentive to save the cost rather than to intervene directly.

This mechanism is similar to the tragedy of the commons problem in which Mafias act to extract limited resources of illegal gains and suffer from externalities if they act independently. Thus, because collaboration between Mafias leads to excessive extortion and reduced illegal demand, improvements in social welfare and harm reduction can be achieved. This implication extends the traditional argument about problems involving the tragedy of the commons to illegal markets (Leeson and Skarbek 2012).

3.3.4   Endogenous Collaboration

In this section, we introduce the possibility of endogenous cooperation between Mafias. By investing economic incentives of Mafia 1 to collaborate with Mafia 2 or act alone without collaboration, we explore whether the above social welfare efficiency can be consistent with Mafias' economic incentives.

According to the previous analysis, the profit of Mafia 1 in a monopolistic situation is $\pi_1^M = (1 + 2\sigma - c_M - H)^2$. The profit from collaborating with Mafia 2 is $\pi_1^T = (1 + 3\sigma - c_T - H)^2$. [39] Therefore, according to a simple calculation, we have Proposition 3.2 regarding the economic incentive of criminal organizations collaborating.

Proposition 3.2. The condition that Mafia 1 chooses to collaborate with Mafia 2 is $\pi_1^T > \pi_1^M$ if and only if $\sigma + c_M > c_T$.

Mafia 1 has an incentive to propose cooperation with Mafia 2 when this new collaborator can effectively control the illegal market (small c_T) compared to Mafia 1 (large c_M). This is a "direct effect" for collaboration benefits. Moreover, when the detection cost of the government σ is large, this cooperation is more likely to happen. This is because when Mafia 1 delegates the extortion activities to Mafia 2, they demand more royalties from the lower criminals than the situation of a monopolistic operation, as we explained the common pool feature previously. As a result, as there are fewer criminals, the government also sets less severe detection under the collaborative regime. More importantly, as this detection cost σ is larger, the government tends to choose smaller sanctions to save the total enforcement cost. As a result, this reduced detection produces more collusive profits for Mafia 1 and Mafia 2. This is an "indirect effect" for collaboration benefits.

For example, the "direct effect" with small c_T is likely to occur when one criminal organization collaborates with a local gang to move to the new market. This is because local gangs are good at operating illegal activities rather new and unfamiliar criminal organization. The criminal organization chooses collaboration rather than monopolistic operation. This collaboration is likely to happen in international illegal operations such as smuggling or drug trafficking as we introduced the collaborations, e.g., Sicilian Mafia members and Nigerian gangs and Mexican drug cartels and American street gangs. Moreover, in this case, because governments need international cooperation among jurisdictions and the enforcement cost must increase, the "indirect effect" with large σ will be important.

On the other hand, as domestic issues, one strong Japanese Mafia (Yakuza) collaborates with

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[39]We assume that there is no side-payment from Mafia 2 to Mafia 1 to propose a collaboration. However, when considering such monetary transfers, our main results and implications do not change.

new emerging loosely organized groups called "han-gure". This collaborator seems to have a less influential reputation; thus, it is not as good at illegal activities compared to Yakuza. That is, there seems to be no "direct effect" with small c_T. However, it is likely that Yakuza's outsourcing to such groups creates significantly more royalties from lower criminals. As a result, this can work to reduce the total number of criminals and the government's inefficient intervention in illegal markets. As long as the "indirect effect" is attractive, a proposal from a strong criminal organization to a weak one is made even if a new collaborator is not very attractive, $c_M < c_T$.

For the consistency of economic incentives of criminal organizations to social welfare, when c_T is small or σ is large, collusive criminal organizations emerge and social welfare efficiency can be realized as long as social harm is less severe $H < H^*$. Moreover, such "direct effect" with small c_T or "indirect effect" with large σ makes the threshold parameter H^* large, so it is more likely to be consistent between the Mafias' motivation and welfare enhancement. However, when a new collaborator is not good at its activities (large c_T) or the government has fewer incentives to save on enforcement costs (small σ), collusion is less likely to happen and the threshold H^* tends to be small. As a result, there could be (in)compatibility between criminal organizations' economic motivations and social welfare efficiency.

One of the most similar papers are by Mansour et al. (2006) and Poret and Tejedo (2006), which discusses the relation between an endogenous organization structure and government sanctions. They consider the endogenous horizontal structure of illegal drug markets by focusing on how sanctions increase or decrease consumption that depend on the number of involved criminal organizations. In contrast to these related papers, the main difference from this chapter is that we consider a different role of criminal organizations, i.e., not an illegal goods producer but rather a regulator of illegal markets. Then, effects of collaborations on illegal markets can be different from these related papers. More importantly, we discuss criminal policy from the perspective of social welfare efficiency.

These above results contribute to several strands of the literature. Our analysis indicates that a monopolistic Mafia can be detrimental to social welfare efficiency. However, this desirable situation does not always happen because of criminal organizations' economic incentives. By considering the

condition about how (de)centralization happens when criminal organizations engage in extortion activities, our results extend recent analyses of the emergence of more hierarchical organization of Mafias, e.g., Bandiera (2003), Dimico et al. (2017), Leeson (2007), Leeson and Rogers (2012), Leeson and Skarbek (2010), Skarbek (2008; 2012), and Sobel and Osoba (2009), by including implications for welfare and outcomes of normative analysis. These articles do not explicitly discuss the economic consequences, nor do they address how the government should act depending on the governance structure.

This chapter also extends the original model proposed by Garoupa (2000) by introducing additional Mafias. As long as extortion activities operate appropriately, a larger number of Mafias with extortion profit-seeking motives can improve social efficiency. In this respect, the classical view of a monopolistic criminal organization that stresses the desired effect of a monopolistic organized criminal market, as in Schelling (1967), Buchanan (1973) and Garoupa (2000), does not always hold.

These results depend on how delegated criminal organization effectively engages in extortion activities c_D compared to c_M. The difference in extortion costs, c_M and c_T, represents how criminal organizations effectively engage in extortion activities (Gambetta 1993). The merit of collaboration c_T tends to be small when local gangs as delegated collaborators have strong influences in their territory, as well as discipline and loyalty within their organizations (Schmidt 2012). Since this depends on the reputation of criminal organizations, targeting strong bosses of these organizations is influential in whether collaboration is attractive.[40] Since large c_T or c_M is related to the influence of leaders in criminal organizations, one potential strategy that could be enacted against such higher-ranking criminals to make extortion difficult could be imprisonment with incapacitation effects (Garoupa et al. 2006). This is because efficient incapacitation eliminates the opportunities available to an influential person, such as a charismatic crime boss.

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[40]Mafia bosses are the most important factors in enforcing their organizations. This is based on the fact that bosses play an important role in ensuring the efficient use of violence (Gambetta 1993), enforcing criminal rules (Leeson and Rogers 2012, Leeson and Skarbek 2010 and Catino 2015), and constructing criminal networks (Baccara and Bar-Isaac 2008 and Mastrobuoni 2015).

4 A Criminal Organization as A Provider of Membership Benefits

4.1 Introduction

For decades, there have been economic analyses focused on hate crimes (Gale et al. 2002, Dharmapala and Garoupa 2004 and Gan et al. 2011). Gerstenfeld (2004, p.9) introduces the simplest definition of hate crimes; a criminal act which is motivated, at least in part, by the group affiliation of the victim. In a broader sense, hate crimes are violent activities with a biased motivation directed at individuals based on their ethnicity or social identity.

However, economic analyses to explain whether hate groups are associated with hate crimes are scarce. According to the Southern Poverty Law Center (SPLC), characteristics shared by all hate groups are that they have beliefs or practices that attack or malign an entire class of people, typically for their immutable characteristics; major hate groups in the United States are the Ku Klux Klan, the neo-Nazi movement, racist skinheads, neo-Confederates, black separatists, antigovernment militias and Christian Identity adherents. The rise of hate groups in the United States since the turn of the century has been documented by SPLC (2016).[41]

What are hate groups activities? Gerstenfeld (2004, p.131) picked up five activities: Meetings, Rallies, Propaganda, Internet, Organized Political Activity and Socializing. These activities mainly aim to express their ideology in order to attract more supporters and group members and to demonstrate their presence in the society.

Moreover, what are the important roles of hate groups in a society? One of them is to provide group members with psychological needs. Woolf and Hulsizer (2004) analyzed the functioning and structure of hate groups in detail. They argue that hate groups can provide for the psychological needs of group members; a sense of belonging, identity, self-worth and so on. Hence, potential offenders commit crimes out of pressure or the desire to follow their groups and gain acceptance from peers. Additionally, hate crimes are considered as one part of social movement activities. From the viewpoint of social movement organizations, hate groups can implicitly/explicitly foster

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[41]According to the SPLC (2016), between 1999 and 2010, the number of hate groups increased from 457 to 1002.

ideological motivations among members and induce them to seek to satisfy their ideological needs based on prejudice and biases (Freilich et al. 1999).

Motivated by these observations, we present a model of criminal activities based on Becker (1968) by incorporating two important roles of hate groups: (1) as providers of membership benefits for group members and (2) as a coordination device with leadership. For (1), offenders obtain additional benefit when they engage in hate group activities such as hate crimes. We will call these membership benefits. This can be interpreted as one form of network externalities that are known as "peer effects" or "neighborhood effects" (Durlauf 2004). In our model, the membership benefit increases as the number of offenders increases. Since extreme ideology grows as the number of those who support the same thoughts increase, the benefits and psychological needs met by committing hate crimes also increase. For (2), hate groups work as a coordination device with strong leadership. Group leaders will have an effect on group activities through the mass media and other measures (Gerstenfeld 2004, p 132). In our model, one of the effects of leadership is defined as the power to coordinate potential offenders, which is often used in the rational choice theory literature (Calvert 1992 and Myerson 2004).

This chapter shows that multiple equilibria of crime rates are possible. By considering the membership benefit that depends on crime rates, potential offenders must consider other offenders' decisions. First, the multiplicity of equilibria explains why the incidents of hate crimes vary across communities and over time.[42] Furthermore, the multiplicity of equilibria gives us the reason why a social shock induces a rapid increase of hate crimes. F   /11 will induce potential offenders to expect that other offenders will also engage in hate activities, this shock can result in a jump from a low crime rate equilibrium to a high crime rate equilibrium.[43]

Furthermore, this chapter extends the basic model by considering the possibility that all of the group members do not always commit hate crimes. Thus, there exist two types of membership benefits for criminals (active members) and other members (non-active members). This extension

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[42]There are some papers that discuss the multiplicity of crime rates (Ehrlich 1973, Bar-Gill and Harel 2001, Funk 2005 and Kim 2013). Since our model has an approach in common with these papers, our contributions are to reinterpret their models in terms of hate crimes and consider the important role of hate groups as a coordination device.

[43]Crimes against Americans who are Muslim, Arab, or Middle Eastern in California, Colorado and Illinois increased from 2000 to 2001. The effects of 9/11 are summarized in Gerstenfeld (2004, p144).

is more realistic and provides the mechanism by which these membership benefits interact and reinforce with each other. Additionally, we also consider that potential criminals can choose the quality of their activities, e.g., more severe violence or non-violent activities. Thus, since hate group motivation differs across groups, so we can provide the trade-off between quality and quantity of their illegal activities.

Finally, our model indicates that the imposition of harsh penalties against hate crimes can be effective because an increase in expected sanctions will work not only for direct deterrence effects against offenders but also for inducing them to expect that other criminals will also refrain from committing hate crimes. Hence, the imposition of harsh penalties and enhanced penalties against hate crimes and other crimes providing membership-motivated benefits is justified compared to other usual crimes.

While there are two theoretical analyses of hate crimes, the previous literature does not consider the characteristics of hate group activities. Dharmapala and Garoupa (2004) develop a model which allows potential victims to have opportunities to avoid being victimized by making costly effort. In this situation, they conclude that the enhanced penalty is justified in order to reduce wasteful activities of potential victims.[44] Additionally, Dnes and Garoupa (2010) study the gang formation mechanism that gang members will commit reckless and extreme behavior to reveal gang-relevant skills and enjoy their reputational benefits. Dur and Van der Weele (2013) also argue that some offenders commit crimes to gain social status among their peers for being "tough". This status-seeking motivation generates an incentive for them to commit more severe crimes. While these papers examine similar motivation to ours, in that committing crimes is motivated by not only pure illegal benefits but also by other concerns, they do not consider the relationship between the inter-dependent payoff derived from positive network externalities such as peer effects and the role of the group leader as a coordination device.

Finally, our model contributes to understanding a theoretical relationship between hate groups and hate crimes. If hate groups exercise leadership, they will attempt to enlarge their influence

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[44]Gan et al. (2011) develop a model similar to Dharmapala and Garoupa (2004). However, by focusing on the difference between hate crimes and other crimes, they show that the government's optimal policy against hate crimes can be smaller or larger than other crimes depending on the complementarity or substitutability between victim's effort and government effort.

on the society. Thus, the total harm of hate crimes to society will get worse. This result supports the empirical literature arguing that hate crimes are associated with the existence of hate groups (Mulholland 2013 and Adamczyk et al. 2014).

The rest of the paper is organized as follows. The next section provides a basic framework to analyze how membership benefit works within hate groups. In section 3, we consider an extension in which some group members do not commit hate crimes. Section 4 also extends the basic framework in section 2 by considering the different quality of hate crimes. Some group members choose high quality crimes and other members choose low quality. Then, we conclude our results.

4.2   Basic Model

In this section, we introduce a basic model of hate crimes. In this chapter, we consider the two important roles of hate groups: (1) as a provider of membership benefits for potential offenders or group members, and (2) as a coordination device with leadership. Hence, in the following analysis, we first incorporate the basic membership benefit into a framework of crimes and law enforcement. Then, we consider the role of hate groups in terms of leadership effects.

Following Becker (1968), we consider risk-neutral individuals who rationally decide whether to engage in illegal activities by comparing the expected benefit from hate crimes with the benefit from legal work. An individual who commits illegal activities obtains the illegal gain b which differs across individuals. Let $f(b)$ be the probability density function of b and $F(b)$ be the probability distribution function of b. $F(b)$ is a continuous and nondecreasing function of b. Moreover, he or she has a risk of being sanctioned with some probability. Thus, there is an expected loss $S \geq 0$. This is defined as the probability of apprehension multiplied by the fine. Individuals who engage in legal work obtain 0 in normalization.

First, we consider the role of hate groups as a membership benefit provider. We assume that a membership benefit from committing hate crimes is provided by hate groups. Let $m(\theta)$, where $\theta \in [0, 1]$ is the crime rate, be the membership benefit provided by hate groups through propaganda such as hate speech, websites and so on. F   ) is a continuous and increasing function with respect to θ. This assumption indicates that only individuals who engage in hate crimes obtain

this benefit other than the illegal gain, b, and the existence of more criminals will be beneficial for them. This assumption is also related to the idea of "peer effects" as in the network externalities literature (Durlauf 2004). Also, this additional benefit can be interpreted as the benefit of efficient information gathering with one organization.[45] These settings are almost the same as Funk (2005) and Kim (2013).[46]

Before individuals decide whether to engage in hate crimes, they do not know the crime rate. Hence, they must decide based on their expectation of θ. We assume that all individuals have the same expectation. Individuals commit hate crimes if and only if $b + m(\theta) \geq S$. Therefore, the crime rate is

$$\theta = \int_{S-m(\theta)}^{\infty} f(b)db = 1 - F(S - m(\theta)). \tag{23}$$

Let θ^* be the equilibrium crime rate satisfying $\theta^* = 1 - F(S - m(\theta^*))$. Because of our assumption, the right hand side of equation (23) is an increasing function of θ. Hence, we have at least one equilibrium.[47] The multiple equilibria case is illustrated in Fig.1. The graph of $\theta^* = 1 - F(S - m(\theta^*))$ depends on the characteristics of the probability function of b and $m(\theta)$.
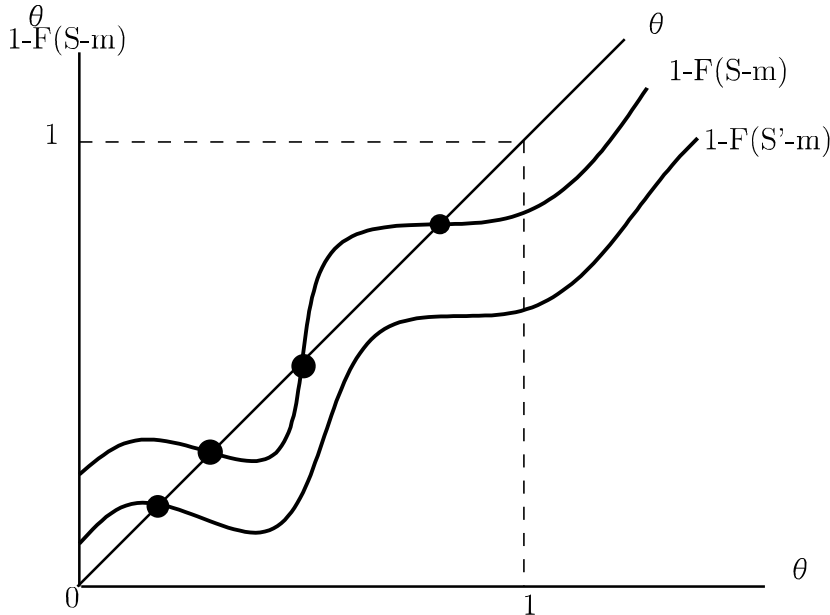
[45] This transaction is more deeply analyzed in Garoupa (2007).

[46] Funk (2005) considers the social norm effects that high crime rates result in less social norm costs. Kim (2013) considers that apprehension probability depends not only on government effort, but also on crime rates.

[47] We assume that $0 \leq 1 - F(S - m(0)) < 1 - F(S - m(1)) \leq 1$.

Fig.1 An increase of the expected sanction from S to S'

In reality, not only hate groups but also other social actors can be providers of membership benefits. We consider two examples. First, some churches pla   le of a membership benefit provider. According to SPLC (2015), some churches are counted as active anti-LGBT groups in the United States. For example, the Westboro Baptist Church based in Kansas expressed the primary antipathy toward gays and lesbians. Second, some political bodies also pla   le. According to Petrosino (1999), many historical acts committed by legitimate governments can be qualified as hate crimes. This fact indicates that the legitimate authority itself can be a main advocate of hate-motivated activities. Examples include the genocide of Native Americans, Japanese internment camps and so on.

As long as some social actors can pla

    lity of multiple equilibria. The existence of multiple equilibria provides an explanation for the regional difference in hate crimes. Although some communities have the same characteristics of population, incidents of reported hate crimes can differ among these communities. Additionally, the number of hate crimes varies over the time within each community.

The crime rate depends on individual's expectations regarding the decisions of other individuals. This mechanism is also known as peer effects or neighborhood effects as in the network externalities literature (Durlauf 2004). Such inter-dependent decision-making and payoff plays an important role in deriving our results; the presence of peers increases the incentive to commit crimes. This inter-dependence is affected by particular characteristics in each community, for example, historical contexts, shock conditions, social actors and so on. It is argued that after 9/11 the number of reported hate crimes increased. According to our model, after the 9/11 shocks, because potential criminals tend to expect that other potential criminals will engage in hate crimes, this expectation produced more peer effect benefits and resulted in a jump from a low crime rate equilibrium to a high crime rate equilibrium.

Let us consider another role of hate groups as a coordination device with strong leadership.[48]

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[48]This role of leadership is often used in the rational choice theory literature (Calvert 1992 and Myerson 2004).

As an example of hate groups working as a coordination device, the Ku Klux Klan was a dominant force in killings and tortures against African Americans. Group leaders will have an effect on group activities through the mass media and other measures (Gerstenfeld 2004, p 132). Thus, according to our results, the existence of hate groups can produce a high crime rate equilibrium.

The previous literature on hate crimes was mainly concerned with the effects of and justification for the imposition of harsh punishments and penalty enhancements against hate crime offenses. We investigate this argument by considering an increase of S and its effect. An increase of expected punishment from S (to S') will make criminal activities less attractive in terms of not only the criminal gain but also the membership benefit associated with the number of criminals. Compared to other crimes, the imposition of harsh penalties will contribute to a reduction of hate crimes and other crimes that are motivated by not only criminal gains but also other additional benefits. After all, since penalty enhancements will work more efficiently in these cases as compared to other crimes without membership benefit, so the government's severe stances against hate crimes are justified.

4.3 Model with Non-active Group Members

While the basic model in the previous section has some important implications, in reality, all of the group members do not always engage in the illegal activities. Thus we should modify our model in an appropriate way. In this section, we try to extend the previous basic model to incorporate non-active members who do not engage in hate crimes but join the group. Thus, the source of membership benefits comes from (1) active members who commit hate crimes and (2) non-active members who do not engage in the illegal activities. As for (1), we assume the same setting as in the previous section. Thus, membership benefits with active members become $m(\theta)$, where θ is the crime rate. As for (2), we assume another membership benefit that depends on the total number of group members. Let $n(\omega)$ be the membership benefit with active and non-active members, where ω is the population size of the group and n represents the continuous and increasing functions of ω. The benefit of joining the group is i which differs across individuals, and comes from the sense of belonging and so on. Let $g(i)$ be the probability density function of i and $G(i)$ be the probability

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distribution function of i. $G(i)$ is a continuous and non-decreasing function of i. We assume that the illegal benefit and this membership benefit are independent from each other.

Thus, the modified game becomes a two-stage game. At the first stage, potential criminals decide whether or not to join the group in exchange for paying some cost such as a membership fee, a donation, participation in time-consuming activities and so on. Then, group members choose to engage in illegal activities or stay as non-active members.

Thus, we solve the game by backward induction. The expected payoff for non-active members is

$$v^{NA} = (m(\theta) + n(\omega)) + i - c. \tag{24}$$

The expected payoff for active members is

$$v^A = b - S + \alpha(m(\theta) + n(\omega)) + i - c. \tag{25}$$

Let c be the cost to join the group. The parameter $\alpha > 1$ indicates that active members would gain additional benefits not only from committing crime but also from the status-motivated benefits of the group. Although this assumption is similar to the motivation in Dur and Van der Weele (2013), we introduce the status-motivation with a different approach that depends on peer effects. This depends on the desire for acceptance from active and non-active members gained by committing crimes. The large α means that group members tend to have more incentive to become active members.

Therefore, the condition that group members become active members is

$$v^A \geq v^{NA} \Leftrightarrow b \geq S - (\alpha - 1)(m(\theta) + n(\omega)) \tag{26}$$

Thus, with the same calculation as in the previous model, given the group size ω, the equilibrium crime rate can be a multiple such as

$$\theta = \int_{S-(\alpha-1)(m(\theta)+n(\omega))}^{\infty} f(b)db = 1 - F(S - (\alpha - 1)(m(\theta) + n(\omega))). \tag{27}$$

This result indicates that only group members with large criminal benefits will commit crimes, thus whether or not to join the group depends on how large are the membership benefits $m(\theta)+n(\omega)$ and the joining benefits i. For simplicity, the benefit for non-members is $v^{NM} = 0$. Thus, at the first stage, the condition for the total group size is as follows;

$$v^{NA} \geq v^{NM} \Leftrightarrow (m(\theta) + n(\omega)) + i - c \geq 0. \tag{28}$$

Therefore, only potential members with $i \geq c - (m(\theta) + n(\omega))$ will participate in the group without committing crimes. Thus, in the same way as with the previous analysis, the group size becomes

$$\omega = \int_{c-(m(\theta)+n(\omega))}^{\infty} g(i)di = 1 - G[c - (m(\theta) + n(\omega))]. \tag{29}$$

This result indicates that if the group leader can act as a coordination device to make the criminal rate high, this also generates an increase of group size. At the same time, an increase of group size makes committing crimes more attractive, thus this also pushes up the equilibrium crime rate. Therefore, this modified setting provides a clearer mechanism and richer implications for the dynamic interaction and reinforcement of these two different network externalities. For example, this mechanism provides an explanation for the recent growth of hate groups and the empirical results about the hate groups and hate crimes. Finally, this modified model also reinforces the justification for imposition of harsh punishments and penalty enhancements against hate crime offenses.

4.4 Model with Quality Choice by Offenders

In this section, we try to modify the basic model in section 2 in that potential criminals can choose the quality of illegal activities (high quality or low quality). For example, severe violent activity that needs some knowledge and technique can be thought of as high quality crimes with more pleasure for offenders, and less or non-violent activity that does not require complicated skills can be thought of as low quality.

Let λb be the benefits from high quality illegal activities, where $\lambda > 1$, and b be the benefits for

criminals with low quality illegal activities. Let S be the sanction on criminals with high quality and s be the sanction on criminals with low quality, where $S > s > 0$. Additionally, membership benefits consist of two parts: criminals with low quality $m(\theta^L)$ and high quality $M(\theta^H)$, where θ^H and θ^L are the crime rate with high (H) and low (L) quality, and M and m are continuous and increasing functions. Moreover, potential criminals obtain more membership benefits from the same quality group rather than the different quality group.

Thus, the expected payoff for criminals with a high quality choice is

$$v^H = \lambda b - S + \beta m(\theta^L) + M(\theta^H). \tag{30}$$

and the expected payoff for criminals with a low quality choice is

$$v^L = b - s + m(\theta^L) + \beta M(\theta^H), \tag{31}$$

where the parameter $0 \leq \beta \leq 1$ indicates how the membership benefits are shared between sub-groups with high and low quality. One interpretation of β is the degree of polarization and harmonization between high and low quality sub-groups. This polarization is well observed in hate groups (Woolf and Hulsizer 2004). When β approaches to 1, both of the sub-groups are interactive and harmonized. Conversely, when β approaches to 0, both sub-groups are polarized and pay less attention to each other. Coordinating aims of the group by cultivating sub-cultures and prompting interaction between sub-groups is also one of the main important roles of hate group leaders.

Therefore, the condition that potential criminals choose high quality rather than low quality is as follows:

$$v^H \geq v^L \Leftrightarrow b \geq \frac{S - s + (1 - \beta)(m(\theta^L) - M(\theta^H))}{\lambda - 1} = b^H. \tag{32}$$

Then, the likelihood that the potential criminals choose how quality rather than nothing is as follows:

$$v^L \geq 0 \Leftrightarrow b \geq s - m(\theta^L) - \beta M(\theta^H) = b^L. \tag{33}$$

We assume that $b^H > b^L \Leftrightarrow S - \lambda s + (\lambda - \beta)m(\theta^L) + (\beta\lambda - 1)M(\theta^H) > 0$. This assumption holds

if the sanction on high quality S is large enough and the different quality of illegal activities λ is large to some extent.

Thus, the condition for the equilibrium for both high and low quality crime is as follows:

$$\theta^H = \int_{b^H}^{\infty} f(b)db = 1 - F[\frac{S - s + (1 - \beta)(m(\theta^L) - M(\theta^H))}{\lambda - 1}] \tag{34}$$

and

$$\theta^L = \int_{b^L}^{b^H} f(b)db = F[\frac{S - s + (1 - \beta)(m(\theta^L) - M(\theta^H))}{\lambda - 1}] - F[s - m(\theta^L) - \beta M(\theta^H)]. \tag{35}$$

According to (35), when potential offenders with low quality choice expect the high crime rate of high quality choice, the right-hand side of (35) may or may not increase. A change to more large high θ^H (and $M(\theta^H)$) induces the first part of the right-hand side of (35), or $F[\frac{S-s+(1-\beta)(m(\theta^L)-M(\theta^H))}{\lambda-1}]$, tends to be small and the second part, or $-F[s - m(\theta^L) - \beta M(\theta^H)]$, tends to be large. This depends on the parameter β that represents the degree of polarization and harmonization between high and low quality sub-groups. Large (small) β indues the right-hand-side of (35) moves up (down). This result indicates that when the hate group leader is likely to coordinate a high crime rate equilibrium of high quality crimes, then the number of criminals with low quality choice may or may not increase. Large β indicates that offenders want to participate in illegal markets because they obtain membership benefits from high quality members. On the other hand, when β is small, the low quality choice is not attractive because an increase of high quality crime contributes nothing for them. As a result, they are likely to choose high quality crime or give up committing crimes rather than choosing low quality crimes.

Moreover, when the government set harsh sanction against offenders who choose High quality crimes (large S), some offenders choose Low quality rather than High quality. Finally, even if such severe stances can contribute to a reduction in High quality crime rates, it may lead to an unintended expansion of Low quality offenders (and the group size) because of membership benefits shared among offenders.

One of the main motivations for the difference in quality is based on the objective function of

hate groups. We propose two different possibilities for the objective function: (1) the quantity-based objective function type and (2) the quality-based objective function type. If hate groups care about the group size and have a quantity-based objective function, they attempt to increase the number of criminals to stress the presence of the groups. Conversely, if hate groups have a quality-based objective function, they attempt to screen out group members to keep the high quality of group activities and criminals.[49] Thus, depending on the motivation of hate groups, the chosen equilibrium crime rate also varies.

When the hate group leader with quality motivation is likely to coordinate a high equilibrium crime rate with high quality, harmonization with large β is likely to induce an increase of offenders with low quality choice. Thus, quality and quantity cannot contradict each other. On the other hand, when there exists polarization within the group and less interaction between high and low quality choice offenders, then coordination with the high quality offenders with small β will lead to a reduction in the number of offenders with low quality. Thus, there seems to exist a trade-off between quality and quantity. Therefore, this framework with network externalities provides a mechanism for how polarization or harmonization develops within one organized crime group depending on the culture and aims within the group.[50]

Finally, the enhancement of penalties on high quality crime is as follows. When the sanction on high quality crime S is raised, then according to (35), offenders with high quality choice are likely to choose low quality. Then, because this makes potential offenders expect a low crime rate of high quality crimes, this may produce an increase of offenders with low quality choice, not only because of the substitution effects from high to low quality but also the membership benefits. As a result, penalty enhancements against severe illegal activities may generate negative effects on other types of illegal activities.

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[49]According to SPLC (2008), white supremacist leaders attempted to recruit active-duty soldiers and recent combat veterans of the wars in Iraq and Afghanistan because group leaders evaluated their military experience and knowledge. Bueno de Mesquita (2005) offers a more detailed discussion about the case that extreme terrorist groups consider the quality of their activities.

[50]Of course, as we studied in section 3, choosing a high crime rate of high quality crimes may or may not collect more non-active members. This is because it is still unclear whether total membership benefits $m(\theta^L) + M(\theta^H)$ increase or not. Thus, there seems to be a trade-off between group size and quality.

5 Concluding Remarks

5.1 Summary

At first, we would like to summarize the results of this thesis.

5.1.1 Chapter 2

Chapter 2 develops a simple model to examine the economic consequences of two different criminal market structures in the private protection and extortion industry. One is a horizontal and competitive market structure with no strong enforcement body to coordinate cooperative activities among criminals or clans. The other is a hierarchical and monopolized market structure with a centralized criminal organization, such as the Mafia in Italy and Japan. The role of the Mafia is to organize criminals and clans to pursue benefits for the organization with a rent-extractive relationship between the low-ranked and high-ranked criminals.

Our result shows that a transition from a competitive and anarchic to a hierarchical and predatory market structure with a Mafia boss may contribute to the enhancement of social welfare measured by the total of the unproductive investments used for fighting and the conflict among criminals and the government that protects the victim. In contrast, lower-ranked organizational members do not always demand a hierarchical organization structure because, in certain cases, the benefit of coordination is insufficient for compensating the negative effects of such members' oppressive relations with a high-ranking boss. These results depend on the ability of the Mafia to target more valuable extortion victims and potential competitiveness among criminals. As a result, organizing criminals produce positive or negative effects of an organization's members and social efficiency.

This chapter provides a framework for analyzing the social welfare effects of criminal constitutions that provide order among criminals. Moreover, this chapter provides justification for the presence of a criminal organization in an anarchic situation and indicates that an enforcement policy that leads to disbanding hierarchical organizations may not be desirable. Although this implication may be counter-intuitive, if we focus on the effects of organizing criminal activities, as

observed for Mafias, our conclusion is reasonable.

5.1.2 Chapter 3

In Chapter 3, while it seems that criminal organizations tend to engage in monopolistic operations, increasing collaborations among them are being reported within and across countries. While these governance forms have important impacts on the illegal market, appropriate la

licies remain uncertain. Motivated by these considerations, this chapter provides a simple la

l in which two criminal organizations that pursue extortion profits by controlling an illegal market can choose whether or not to cooperate with each other.

First, this chapter investigates whether an illegal market should be controlled by one monopolistic criminal organization or two collusive criminal organizations. When the social harms generated by illegal activities are less severe, the organization of the illegal market into decentralized criminal organizations is preferable compared to control by a monopolistic criminal organization. On the other hand, when the expected social harm is large, the illegal market should be organized into one monopolistic criminal organization.

We then consider the relationship between law enforcement policies and the economic incentive toward collusive activities of criminal organizations. Thus, we discuss the possibility that the above better situations can be consistent with organizations' economic incentives. As long as new collaborators can effectively engage in controlling a market or as long as the government finds it difficult to detect potential offenders, collaboration between criminal organizations can be realized. As a result, social welfare efficiency cannot be consistent with the economic incentives of criminal organizations. These results provide new implications regarding conditions for collaborating between criminal organizations and its welfare implications.

5.1.3 Chapter 4

Chapter 4 presents a simple model to analyze the relationship between hate groups and hate crimes. This chapter focuses on two important roles of hate groups. First, they can provide membership benefits that are beneficial for participants in hate crime activities, which can be interpreted as

one form of network externalities. Second, they can work as a coordination device for hate crime activities. We assume membership benefits should become more attractive as the number of hate crime offenders increases, then individuals must take into account the expectation of other potential criminals. This strategic aspect results in the possibility of multiple equilibria of the crime rate. This result explains why hate crimes and extreme criminal activities vary across communities and over time. Additionally, the multiplicity of equilibria gives us one explanation why a social shock such as 9/11 resulted in a jump from a low crime rate to a high crime rate. Moreover, since the imposition of harsh penalties and penalty enhancement against hate crimes works more effectively in almost all of our cases, the government's severe stance against hate crimes is justified. If hate groups also work as a coordination device, they must try to enlarge their social harm influences. As a result, the existence of hate groups will increase hate crimes. In the empirical literature, there are some papers which examine the relationship between hate groups and hate crimes. Mulholland (2013) and Adamczyk et al. (2014) find that the existence of hate groups is associated with more hate crimes. Therefore, our results support these findings with the theoretical analysis.

While this chapter focuses only on hate groups and hate crimes, the implication of our model also applies to other organized crime activities such as international terrorists and mafias. Although there is a difference between the international and the domestic aspects of terrorism, they have similar characteristics (Sandler and Enders 2004). Previous studies on organized crime and criminal organizations have not considered the effects of a membership benefit. Our consideration of membership benefits is important because hate groups and mafias work as a safety network for vulnerable people in society. Since mafias also will work as a membership benefit provider and a coordination device, our results can contribute to an understanding of organized crime activities (Gambetta 1993).

5.2   Future Work

In this thesis, we only consider a theoretical model about criminal organizations. However, in accordance to growing interests of organized crime, more and more empirical works have been published, e.g., money laundering (Schneider 2010), political connection in voting process (Daniele

and Geys 2015), drug selling (Levitt and Venkatesh 2000), en emergence of Mafia (Bandiera 2003, Dimico et al. 2017), network formation (Mastrobuoni 2015), and so on. Since these papers use data sets from European countries or the United States, there are still less papers using Japanese criminal organizations except for Ramseyer (2016). Therefore, we believe that there are lots of empirical analysis that we must tackle with using Japanese data sets.

As for the theoretical analysis, although more and more articles have been published, there are still less works. Since criminal organizations engage in many kinds of illegal activities, we have chances to study these activities. In particular, some policymakers consider a legalization of some goods as one way to eradicate illegal gains of criminal organizations. For example, the legalization of illegal goods, such as the medical or recreational use of marijuana, is controversial throughout the world. The well known example are debates in the United Stats. While more than half of the states, mainly in West and East regions, have approved the legalization of the medical use of marijuana, the rest of the states, mainly in the South and Midwest regions, still prohibit such use. This has some similarities with the discussion about whether or not we should prohibit the prostitution. Even if these issues are important, there are still little research by using a theoretical framework, e.g., Becker et al. (2006), Immordino and Russo (2015) and Yahagi (2019c). We believe that there are lots of theoretical research about criminal organizations.

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