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Welfare effects of forming a criminal organization

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Abstract

This paper develops a simple model to examine the economic consequences of two different criminal market structures in the private protection and extortion industry: (1) horizontal (decentralized) governance and market structure and (2) hierarchical (centralized) governance and market structure with a criminal organization. Forming a criminal organization produces positive or negative effects on its members and social efficiency. These results depend on the potential competitiveness among criminals and the ability of a criminal organization's boss to target more valuable extortion victims.

Keywords Conflict · Organized crime · Rent-seeking · Crime · Extortion

JEL Classification K42

1 Introduction

An economic analysis of illegal activities by individuals, proposed by Becker (1968), has been extended to criminal organizations' activities. The presence of a criminal organization in illegal markets makes a great difference in the market structures of illegal activities. Regarding the governance structures of criminal organizations and markets, there are 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), 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

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coordinated organizational benefits. Famous Japanese criminal organizations, such as the 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).[1] Within criminal organizations, a transition from a horizontal to a hierarchical structure is repeated, and vice versa.

As these examples show, there seem to be very different welfare effects on illegal markets and society depending on these different market and governance structures. Thus, we need to investigate the effects of these different market structures of illegal markets. Doing so helps us to understand the consequences of anti-Mafia policies to collapse a criminal organization, such as the incapacitation of its powerful leaders by imprisonment. Doing so also helps us understand how participants in illegal activities change their incentives depending on governance and market forms and whether or not the government's severe attitude is efficient.

This paper 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.[2]

This paper 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 criminal (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 market.

Additionally, we also consider that the Mafia can find more valuable extortion targets in a monopolized market by providing a protection service such as enforcing implicit cartels. Moreover, the Mafia can control vote shares in political elections in exchange for achieving benefits for its organization. This reflects a strong link between notable figures in the Mafia and large legal firms and politicians (Gambetta

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[1] 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.

[2] 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.

1993; Hill 2003; Lavezzi 2008; Buonanno et al. 2016). 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 play an important role in monopolization.

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 form-ing a criminal organization.[3] 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.[4] Based on these motivations, this paper 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 paper 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 paper shows that a transition from a competitive and anarchic market to a hierarchical 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 is connected to valuable extortion victims and provides them with protective ben-efits, 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 neg-ative effects on society. This finding is consistent with the recent empirical find-ing in Pinotti (2015). In contrast, as long as the Mafia does not provide any extra

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[3] Most previous papers do not use a formal setting by focusing on specific examples: prison and youth gangs, eighteenth-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 above-mentioned papers do not explicitly discuss the relationship between coordinated organizational benefits among criminals and its monopolized governance form.

[4] 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.

protection benefits, 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, criminals are likely to delegate to the established Mafia, and its negative effects on society are inevitable, as empirically stressed in Pinotti (2015).

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 Sect. 3, we compare and discuss the outcomes obtained in Sect. 2. Section 4 concludes the results of this paper.

2 Basic setting

Following Konrad and Skaperdas (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 Italy, Japan, and other countries. Private protection and extortion take certain forms: protection against theft, police harassment, competitors, and so on (Gambetta 1993). 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 criminal (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 find more valuable victims for extortion. 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.[5] This assumption departs from Leeson and Rogers (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).

2.1 The 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.

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

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.[6] 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 criminal i and B be the investment by the government. Damage v^C is interpreted as the expected earnings or valuable resources if the victim engages in business in the relevant location when there is no Mafia. We also assume that v^C is exogenously given.[7] Thus, criminals can destroy the relevant 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 $1 - p_k$.[8] However, in this competitive scenario, cooperation among criminals is impossible; hence, conflicts among them are inevitable. Therefore, the probability of criminal 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. Criminal 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 criminal can obtain the extortion gain if the victim agrees to pay.

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[6] We implicitly assume that one representative criminal demands the tribute. Thus, in this case, we do not consider the strategic situation among criminals.

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

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

We solve the game by backward induction. The expected payoff of the victim is $\pi = v^C - y$ if he agrees to pay a tribute to criminal i and $\pi = p_k v^C$ if he refuses to pay. Thus, the victim agrees to pay a tribute if and only if $v^C - y \geq p_k v^C$, 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.[9] Therefore, it must hold that $y = (1 - p_k)v^C$. Because each criminal is in conflict with rival criminals, the expected payoff of criminal 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[10]

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

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

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

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

Because every criminal i has the same objective function, we assume the symmetric equilibrium $a_i = a$ for all i.[11]

Thus, the equilibrium outcomes in a competitive market are summarized in Lemma 1.

Lemma 1 In a competitive market, the equilibrium results are as follows:

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

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

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[9] 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.

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

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

Lemma 1 indicates that a larger number of criminals or an intensified competition induces 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 A 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 Yakuza in Japan.

The role of a boss (or an upper-tier criminal) 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; 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 Yakuza 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; 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 σA, where $\sigma \in [0, 1]$, 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, $R = (1 - \sigma)A$, 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.[12]

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[12] 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

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; 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.[13]

Thus, the probability that extortion is successful is as follows[14]:

$$p = \frac{\sigma A}{\sigma A + B}. \tag{7}$$

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

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

The game proceeds as follows. At stage 1, a boss demands a share of royalty as leadership rent, or $(1 - \sigma)$. In stage 2, the government and the Mafia choose investments σA 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

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

Footnote 12 (continued)

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; 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.

[13] 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 paper's results provide the same implications.

[14] 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 paper tries to apply it to an illegal market.

Additionally, the government chooses B to maximize

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

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

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

Thus, given $\sigma \in [0, 1]$, the equilibrium outcomes in the monopolized market are summarized in Lemma 2.[15]

Lemma 2 In a monopolized market, the equilibrium results are as follows:

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

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

Lemma 2 illustrates the intuitive result that a more extractive behavior is good for the victim and bad for criminals. Each royalty decreases with σ 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

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

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

Lemma 3 In a monopolized market, the equilibrium results are as follows:

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

$$B^M = \frac{3v^M}{16}, \quad \pi_k^M = \frac{9v^M}{16} \quad and \quad R^M = \frac{v^M}{8}.$$

According to Dixit (1987), a player whose winning probability is less than 1/2 is called the underdog. Hence, the group becomes the underdog. Because the role of

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

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 criminal's benefit depends on this number.

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.

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.[16] 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 4:

Lemma 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 $D^M = v^M/4$.

According to Lemma 4, we obtain Proposition 1.

Proposition 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 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 $max[k/(4-k), 1]$. $\qquad\square$

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

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 exist some competitiveness and the Mafia is less profit motivated and cannot find more valuable victims (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.

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).

3.2 The criminals' welfare

Let us compare the welfare of criminal i in two different situations. According to Lemmas 1 and 3, the welfare comparison for criminal i is summarized in Proposition 3.

Proposition 2 If the number of potential criminals is large, that is, $n > max[8/k - 1 + 4\sqrt{(4-k)/k^2}, 1]$, it holds that $\pi_i^M > \pi_i^C$.

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 condition holds if $n > max[8/k - 1 + 4\sqrt{(4-k)/k^2}, 1]$. □

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.[17] Additionally, another role of the Mafia such as the ability to target more valuable victims (large v^M) is also important for improvement because $\pi_i^M = v^M/16n$ 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

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[17] If a boss acts benevolently and demands no private gain with $\sigma = 1$, each criminal's benefit is $v^M/4n$ according to Lemma 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 paper expands this discussion to the setting of a criminal market using a formal and theoretical model.

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 $\pi_i^C > \pi_i^M > w$.[18]

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 criminals.

With Proposition 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

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[18] As we explained for the game setting in Sect. 2, a boss chooses his share before a conflict. However, if a boss chooses the share after a conflict, the value σ that represents his share acts as a parameter. In this modified scenario, as long as σ is small because of the extractive behavior of a boss, our implications will be unchanged. This is because, as in Lemma 2, if σ is sufficiently small, π_i^M and $D^M = \sigma A + B$ 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.

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.[19]

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.[20] 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.

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

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

Therefore, we obtain the following.[21]

Proposition 3 In the long-run equilibrium, we have $n^M > n^C$ if $k > 16(\sqrt{v'} - 1)/v'$.

Proof According to a simple calculation, we investigate the condition $n^M = kv'/16 > n^C = \sqrt{v'} - 1$. This condition holds if $k > 16(\sqrt{v'} - 1)/v'$. ☐

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[19] 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).

[20] When $v^M = v^C$, we always have $D^M < D^C$ according to Proposition 1.

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

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). The implications of other welfare consequences will be unchanged. 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.[22]

4 Concluding remarks

This paper 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 paper provides a framework for analyzing the social welfare effects of criminal constitutions that provide order among criminals. Moreover, this paper 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 counterintuitive, if we focus on the effects of organizing criminal activities, as observed for Mafias, our conclusion is reasonable.

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[22] Although the existing literature primarily focuses on the consumption of illegal goods, this paper considers the extent of illegal activities such as the use of violence. Thus, this paper has a different setting and motivation in that we stress the effect of organizing violence and criminal activities in an illegal market.

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