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Stirring up a hornets' nest: Geographic distribution of crime☆

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ABSTRACT

How to make police deployment strategies more efficient is becoming the crucial research agenda for the economics of crime and law enforcement. We contribute to this agenda developing the first general equilibrium model designed to study how the geographic distribution of police protection affects the decision to pursue illegal activities, the intensity and location of crime, residential choices, housing prices, and the welfare of different socioeconomic groups. The target is to explore the positive and normative long-run effects of different ways of spatially allocating police forces in an urban area. We find that, when the police protect some neighborhoods (concentrated protection), the city becomes segregated, while when the police are evenly deployed across the city (dispersed protection), an integrated city emerges. Unequal societies face a difficult dilemma in that concentrated protection maximizes aggregate welfare but exacerbates social disparities. Taxes and subsidies can be employed to offset the disadvantages of police concentration. Private security makes an integrated city less likely to occur in equilibrium. Even under dispersed public protection, rich agents may use private security to endogenously isolate themselves in closed neighborhoods.

1. Introduction

Following the seminal theoretical work of Becker (1968), a large body of empirical literature has revealed that preventive and punitive measures do in fact have a significant impact on criminal activities (Benson and Zimmerman, 2010; Cook, 2009; Cook et al., 2013; Draca and Machin, 2015). In particular, regarding law enforcement, it is well established that an increase in the size of the police force reduces crime (Di Tella and Schargrodsky, 2004; Draca et al., 2011; Evans and Owens, 2007; Klick and Tabarrok, 2005; Levitt, 1997). The key question now at the frontier of the economics of crime and law enforcement is how to make police deployment strategies more efficient (see Benson, 2010 for a recent survey on this topic). This paper contributes to answer this question by developing the first general equilibrium model to study how the geographic distribution of police protection affects the decision to become a criminal, the intensity and location of crime, residential choices, housing prices, and the welfare of different socioeconomic groups. The goal is to study the positive and normative effects of different ways of spatially allocating police forces in a city.

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The central object of our analysis is public protection regimes. We consider two extreme strategies to allocate the police across the city, which we assume are both feasible and have the same cost. Under concentrated public protection, the police only protect some neighborhoods and leave the rest of the city completely unprotected. Under dispersed public protection, the police are evenly deployed across the entire city, inducing an equal level of public protection in all neighborhoods. With these two protection regimes we try to capture, albeit in stylized fashion, the basic trade-off faced by the police with regard to the geographic allocation of protection. With the same resources, the police can either extensively protect a smaller area (concentrated protection) or partially protect a larger area (dispersed protection).

Section 2 develops our baseline model. The building block is a model of a city populated by agents of different socioeconomic groups and made up of several residential areas, which are denoted as neighborhoods. Socioeconomic groups are distinguished by their factor endowments. In particular, there is one homogenous group of skilled agents, and several homogenous groups of unskilled agents, each of them with a different per capita endowment of unskilled labor. The city is treated as a small open economy, that is, the prices of tradable goods and inputs are exogenously given. Agents select (1) their occupation (i.e., work in firms that produce goods or become a criminal); (2) their residence (i.e., in which neighborhood to reside); and (3) consumption and housing. Firms demand unskilled and skilled labor and supply tradable goods using a constant returns to scale technology. Criminals use their labor endowments to extract income from other citizens. The supply of housing in each neighborhood is chosen by profit-maximizer developers, who use capital and land to build houses. Capital is a tradable input, that is, it is elastically supplied at a given price, while land is a nontradable input in fixed supply in each neighborhood. The government provides public protection by deploying police forces in the city, which reduces the amount that criminals can otherwise extract from their victims. Given the prices of tradable goods and inputs and the allocation of public protection, the model determines the three endogenous variables mentioned above by employing a combination of a standard small and open-economy competitive equilibrium and a spatial notion of equilibrium. In equilibrium, no agent can obtain a rent changing his or her occupation and/or location. Thus, we adopt a long-run perspective that allows agents enough time to change their occupation and residence.

Section 3 characterizes the equilibrium in each protection regime. It shows that, under proper conditions, concentrated public protection leads to a spatially segregated city. Only rich agents are willing to pay the high housing prices in protected neighborhoods, while poor workers and criminals reside in unprotected neighborhoods. Neighborhoods protected by the police are safe, concentrate wealthy citizens, and have high land and housing prices. In the rest of the city, crime is pervasive, neighborhoods are populated by poor agents, and land and housing prices are relatively low. The opposite happens under dispersed public protection. When the police force is evenly dispersed across all neighborhoods, the city becomes fully integrated. All neighborhoods are inhabited by citizens of all income levels. Indeed, income per capita and crime levels are equalized across the city.

There are two mechanisms operating in the model presented here that produce these results. Regarding occupational choices, the payoff from crime does not vary with a citizen's labor endowment, while the payoff from working is obviously increasing in a citizen's labor endowment. This makes relatively poor citizens more prone to become criminals. Indeed, both under concentrated and dispersed public protection, we focus on a region of the parameter space for which, in equilibrium, only agents in the poorest socioeconomic group decide to become criminals. Regarding residential choices, the wealthier the agents, the more harmful criminal activities are for them and, as a consequence, the more they are willing to sacrifice in order to avoid high-crime areas. Under concentrated public protection, these differences in the willingness to pay for a safe neighborhood produce a concentration of rich agents in protected neighborhoods and poor agents in unprotected neighborhoods. Under dispersed public protection, there is no essential difference among neighborhoods, crime distributes evenly in the city, and agents only take into account housing prices in their residential choices. As a consequence, there is housing price equalization across the city and all neighborhoods have the same income per capita.

After formally characterizing the equilibrium under concentrated and dispersed protection, Section 4 makes several comparisons. In particular, it compares crime, measured as the total income of criminals, aggregate income, and housing prices. With respect to crime, there is likely to be more of it under dispersed protection than under concentrated protection when the wage-income share of skilled agents is high, dispersing the police significantly reduces its effectiveness, the proportion of income that criminals can extract from rich agents is high, and the proportion of income that criminals can extract from the poor is low. Aggregate income is more likely to be higher under concentrated protection, the higher the wage-income share of skilled agents, the more intense the reduction in police effectiveness when the force is dispersed, the more criminals can extract from skilled workers, and the less criminals can extract from unskilled workers. Finally, we find conditions under which housing prices under dispersed protection are higher than housing prices in unprotected neighborhoods but lower than housing prices in protected neighborhoods under concentrated protection . We also show that these conditions are more likely to be satisfied the higher the wage-income share of skilled agents.

Section 4 also examines the welfare and distributive effects associated with a change in the public protection regime. First, employing a simple utilitarian welfare function, we show that concentrated protection may induce higher aggregate welfare than dispersed protection. Moreover, income inequality matters. We prove that aggregate welfare is higher under concentrated protection for a society with a high wage-income share of skilled agents, while aggregate welfare is higher under dispersed protection for a society with a low wage-income share of skilled agents. Thus, in terms of welfare, the optimal police deployment's strategy depends on the level of inequality of society.

Second, regarding distributive effects, we prove that, with regard to a utilitarian welfare function, unskilled agents as a whole are better off under dispersed protection. Thus, societies with high levels of income inequality may face a complicated