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The Socioeconomic Determinants of Crime. A Review of the Literature

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Abstract

Starting from Becker's seminal paper we review the first contributions to the economics of crime, stressing how with the first model of criminal choice, due to Becker, the way of conceiving criminal behaviours has drastically changed. In fact, criminal choice ceases to be viewed as determined by mental illness or bad attitudes, but it is considered on the basis of a maximization problem in which agents have to compare costs and benefits of legal and illegal activities taking in account the probability of being arrested and punished and the expected returns from crime. Criminal decision is an economic choice by rational agents. In the second part of the survey, in which we focus our attention on empirical works, we present the main recent contributions to the economics of crime; in particular we outline the determinants of criminal behaviours and explore the relationships existing between crime and socioeconomic variables emerging from the literature. In fact, the economics of crime interacts with different and heterogeneous fields (i.e. sociology, criminology, psychiatry and geography). It is closely related to poverty, social exclusion, wage and income inequality, cultural and family background, level of education and other economic and social factors that may affect individual's propensity to commit crimes such as cultural characteristics, age and sex.

Key words: Crime; Education; Inequality; Social Interactions; Unemployment; Youth
JEL Classification: I2; J24; K42

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1 Introduction

During the last three decades the economics of crime has become a new field for economics investigation, in particular due to the fact that over the same period of time there has been an outstanding increase in criminal activities, as confirmed by several empirical studies.[1]

In 1968 Becker presents a paper that radically changes the way of thinking about criminal behaviour. Becker was anticipated by Fleisher, who in 1963 published a paper titled "The Effect of Unemployment on Juvenile Delinquency" in which he tried to explore the relationships existing between unemployment and youth crime. But it's Becker's paper to represent a milestone for economic disciplines.

In fact, Fleisher's work was merely an empirical study aiming at detecting economic determinant of individual's criminal behaviour. Becker instead builds the first model of criminal choice, stressing that "some individuals become criminals because of the financial and other rewards from crime compared to legal work, taking account of the likelihood of apprehension and conviction, and the severity of punishment" (p. 176).

Since the beginning of 80s, Becker's paper opens the door to a new field of empirical research whose main purpose is to verify and study the economic variables that determine criminal choices and behaviours of agents.

This has been possible because during the last two decades more rigorous and systematic studies have been undertaken and especially a more systematic and specific methodology in collecting data very useful in analyzing this social problem has been developed.

Given the high level of crime, it is not surprising that crime prevention is a major economic activity. In fact, crime is a negative externality with enormous social costs, hence it appears to be relevant that feasible and effective social and economic policies in tackling crime will be pursued and undertaken; in doing so it is important to consider the social returns and the net benefits of those policies.

In particular, one of the aims of the economist is to design and to explore effective policies, not only to identify the economic and social determinants of crime. The economic analysis has to support policy makers in pursuing and implementing the correct and adequate policies in reducing crime. In order to do this it is required to outline the determinants of criminal behaviours and explore the relationships existing between social and economic variables.

[1] Fajnzylber et al., (2002, 2002); Freeman, (1991, 1996 and 1999); Glaeser, (1999).

In fact, the economics of crime interacts with different and heterogeneous fields (i.e. sociology, criminology, psychiatry and geography). It is closely related to poverty, social exclusion, wage and income inequality, cultural and family background, level of education and other economic and social factors that may affect individual's propensity to commit crimes such as cultural characteristics (i.e. religion and colonial heritage),[2] age and sex (i.e. young males are said to be more prone to violence than the rest of the population),[3] the availability of fire arms in the countries and the existence of illegal drug-related activities.[4]

Since Becker's (1968) seminal paper, economists have increasingly studied the determinants and consequences of crime.

The aim of this survey is to discuss the outstanding contribution produced, in doing this we present both theoretical and empirical papers.

In the first paragraph of this paper we discuss the theoretical papers and the theoretical models from which the economics of crime has started.

In analyzing and presenting the empirical works on crime we focus our attention on the determinants of crime and in particular on the relationships existing between wage inequality, income redistribution, education, age, unemployment and crime.

The paper is organized as follows. In Section 2 we present an historical overview discussing the first contributions to the economics of crime.[5] Section 3 examines the literature about crime and labour market, focusing on the role of unemployment and labour opportunities.

In Section 4 we present recent contributions relative to crime and inequality, while in Section 5 we discuss theoretical and empirical works about crime and youth. Section 6 examines the role of education in criminal behaviour, while Section 7 examines literature on social exclusion (racial discrimination, peer effects, gender), social interactions and crime. Section 8 concludes.

2 An Overview of the Early Literature on Crime

The first economist that treated crime from an economic perspective was Fleisher.

In 1963, Fleisher stressed the importance of "understand(ing) the relationship between delinquency and labour market condition... from the point

[2] Fajnzylber, Lederman, and Loayza (2002).

[3] Among the others Freeman (1991) and Grogger (1998).

[4] Levitt and Venkatesh (1998).

[5] Fleisher, (1963, 1966); Becker, (1968); Sjoquist, (1973); Ehrlich (1975); Block and Heineke, (1975).

of view of public policy" and furthermore focused his attention on "other aspects of the functioning of the labour market, such as the determination of levels and distributions of wages and the determination of population distribution" that "may well have important effects upon the allocation of time among legitimate and illegitimate forms of activity" (p. 543).

Fleisher comes to the conclusion that "an examination of delinquency rate and other variables by age and through time suggests that the effect of unemployment on juvenile delinquency is positive and significant. However, this statement is easier to support when it refers to individual who are over sixteen years of age" (pp. 553-554).[6]

Furthermore, Fleisher (1966) was a pioneer in studying the role of income on the decision to commit criminal acts by individuals, and stated that "the principal theoretical reason for believing that low income increases the tendency to commit crime is that it raises the relative cost of engaging in legitimate activity" and that "the probable cost of getting caught is relatively low, since they (low-income individuals) view their legitimate lifetime earning prospects dismally they may expect to lose relatively little earning potential by acquiring criminal records; furthermore, if legitimate earnings are low, the opportunity cost of time actually spent in delinquent activity, or in jail, is also low" (Fleisher 1966, p. 120). However, the level of legal income expected by an individual is not the only relevant 'income' factor; the income level of potential victims also matters. The higher the level of income of potential victims, the higher the incentive to commit crimes, especially crimes against property. Thus, according to Fleisher (1966, p. 121), "(average) income has two conceptual influences on delinquency which operate in opposite directions, although they are not necessarily equal in strength."

Fleisher's (1966, pp. 128-129) econometric results showed that higher average family incomes across 101 U.S. cities in 1960 were actually associated with lower court appearances by young males, and with lower numbers of arrests of young males for the crimes of robbery, burglary, larceny, and auto theft.

The author also found that the difference between the average income of the second lowest quartile and the highest quartile of households tended to increase city arrest and court-appearance rates, but the coefficient was small in magnitude, and became statistically insignificant when the regressions were run for high-income communities alone.

[6] Following and recent studies (i.e. Grogger 1995 and 1998) have confirmed that in particular young men between 16 and 30 years of age are more prone to violence and to commit crime.

The two papers of Fleisher represent a first attempt to analyze from an economic point of view the relationship between crime and economic and social variables, but it was Becker (1968) in his seminal work on the economic analysis of criminal behaviour to represent the starting point for analyzing society's choice of crime control policies in the context of an economic model.

In fact Becker stressed that "crime is an economically important activity or 'industry'... almost total neglected by economists" (p. 170).

In his Nobel lecture, Becker (1993, p. 390) emphasizes that while "in the 1950s and 1960s, intellectual discussions of crime were dominated by the opinion that criminal behaviour was caused by mental illness and social oppressions, and that criminals were helpless victims" the economics approach "implie(s) that some individuals become criminals because of the financial and other rewards from crime compared to legal work, taking account of the likelihood of apprehension and conviction, and the severity of punishment."

Becker proposes a framework where an individual rationally decides whether to engage in criminal activities by comparing the expected returns to crime with the returns to legitimate market opportunities.

We here quickly review the basic Becker's model where individuals decide whether or not to commit crimes, in other words individuals decide how to allocate time between legitimate and illegitimate activities, basing their decision on a cost-benefit analysis.

"The approach taken" in his analysis "follows the economist' usual analysis of choice and assumes that a person commits an offence if the expected utility to him exceeds the utility he could get by using his time and other resources at other activities. Some persons become 'criminals', therefore, not because their basic motivation differs from that of other persons, but because their benefits and costs differ" (p. 176).

Hence, Becker defines a supply of offences (O) which related "the number of offences by any person to his probability of conviction (p), to his punishment if convicted (f) and a portmanteau variable (u), such as the income available to him in legal and other illegal activities" (p. 177):

$$O_j = O_j(p_j, f_j, u_j)$$

The agent's choice is made under uncertainty, then the utility expected from committing a crime is defined, by Becker, as:

$$EU_j = p_j U_j(Y_j - f_j) + (1 - p_j)U_j(Y_j)$$

where Y_j "is his income, monetary plus psychic" (p. 177), from committing a crime, furthermore expected utility is also determined by the proba-

bility of success $(1 - p_j)$and by "the monetary equivalent of the punishment" f_j. The supply of crime is decreasing in p and f.

"The main contribution of this essay is to demonstrate that optimal policies to combat illegal behaviour are part of an optimal allocation of resources" (p. 209), hence "optimal decisions are interpreted to mean decisions that minimize the social loss in income from offenses" (p. 207).

Becker defines the social loss function from offences as:

$$L = D(O) + C(p, O) + bfpO$$

where D is damage from crime, C cost of apprehension and conviction and $bfpO$ is the total social loss from punishments.

Social policy variables are represented by p (probability of arrest) and f (punishment). Minimizing with respect to p and f and solving the model Becker obtains important implications on agents propensity toward risk.[7]

Crime reduction can occur through reducing the benefits of crime or raising the probability of being caught or the costs of punishment conditional upon being caught. Also "a rise in the income available in legal activities or an increase in law-abidingness due, say, to 'education' would reduce the incentive to enter illegal activities and thus reduce the number of offenses" (p. 177).

This is confirmed by U.S. data (see Grogger, 1991): increases in the probability of arrest tend to be more effective than increases in the time spent in prison. In principle, this might occur because criminals are not risk neutral or because criminals are very impatient. Finally, in this model the role of arrest and punishment comes exclusively through deterrence. If these factors are operating through incapacitation (i.e. locking up particularly dangerous people), then the probability of arrest and the size of punishment might not have equivalent effects.[8]

[7] "The loss from offenses is minimized if p and f are selected from those regions where offenders are, on balance, risk preferrers. Although only the attitudes offenders have toward risk can directly determine whether "crime pays", rational public policy indirectly insures that "crime does not pay" through its choice of p and f" (p. 183).

"An increase in p "compensated by an equal percentage reduction in f would not change the expected income from an offense but could change the expected utility, because the amount of risk would change. It is easily shown that an increase in p would reduce the expected utility, and thus the number of offenses, more than an equal percentage increase in f, if agent has preference for risk; the increase in f would have the greater effect if he has aversion to risk; and they would have the same effect if he is risk neutral." (p. 178)

[8] "Shift in the form of the punishment, from a fine to imprisonment, would tend to reduce the number of offenses, at least temporarily, because they cannot be committed while in prison" (p. 178).

Ehrlich (1973) extends the analysis made by Becker, considering how income levels and distribution may affect criminal propensity and crime rate. He argues that payoffs to crime, especially property crime, depend primarily on the "opportunities provided by potential victims of crime".

The author assumes that, "the mean legitimate opportunities available to potential offenders" may be approximated by "the mean income level of those below the state's median (income)" (p. 539). For a given median income, income inequality can be an indicator of the differential between the payoffs of legal and illegal activities. In his econometric analysis of the determinants of state crime rates in the U.S. in 1960, Ehrlich (1973) finds that higher median family incomes were associated with higher rates of murder, rape, and assault, and with higher rates of property crimes, such as burglary. In addition, a measure of income inequality - the percentage of families below one-half of the median income - was also associated with higher crime rates. The former finding contradicts Fleisher (1966), but the latter finding on the role of income inequality supports Fleisher's findings that inequality is associated with higher crime rates.

Both Fleisher (1966) and Ehrlich (1973) considered the effect of unemployment on crime rates, viewing the unemployment rate in a community as a complementary indicator of income opportunities available in the legal labour market.

In their empirical studies, however, both authors find that unemployment rates were less important determinants of crime rates than income levels and distribution, as confirmed in following and recent papers (i.e. Grogger, Freeman, 1994; Imrohoroglu et. al, 2000).

Another important factor related to the effect of economic conditions on crime is the level of education in the population, which can determine the expected rewards from both legal and criminal activities.

In fact, Usher (1997) has argued that education may also have a 'civilization' effect, tending to reduce the incidence of criminal activity.

However, after controlling for income inequality and median income, Ehrlich (1975, p. 333) found a positive and significant relationship between the average number of school years completed by the adult population (over 25 years) and particularly property crimes committed across the U.S. in 1960. The author provided four possible explanations of this puzzling empirical finding. First, it is possible that education may raise the marginal product of labour in the crime industry to a greater extent than for legitimate economic pursuits (Ehrlich, 1975, p. 319). Second, higher average levels of education may be associated with less under-reporting of crimes (Ehrlich, 1975, p. 333). Third, it is possible that education indicators act

as a "surrogate for the average permanent income in the population, thus reflecting potential gains to be had from crime, especially property crimes" (Ehrlich 1975, p. 333). Finally, combined with the observation that income inequality raises crime rates, it is possible to infer that certain crime rates are "directly related to inequalities in schooling and on-the-job training" (Ehrlich, 1975, p. 335).

Together with the relationship between economic conditions and crime, one of the main issues in the pioneering studies by Becker (1968) and Ehrlich (1973, 1975, 1996) is the assessment of the effects of police presence, convictions, and the severity of punishment on the level of criminal activity. Individuals who are considering whether to commit crimes are assumed to evaluate both the risk of being caught and the associated punishment. The empirical evidence from the United States confirmed that both factors have a negative effect on crime rates.[9]

However a distinction is often made between the 'deterrence' effects of policing and convictions and the 'incapacitation' effect of locking-up criminals who may have a tendency to rejoin the crime industry once they are released.

As stated by Ehrlich (1981, p. 311), "deterrence essentially aims at modifying the 'price of crime' for all offenders," while incapacitation – and for that matter, rehabilitation – acts through the removal of "a subset of convicted offenders from the market for offences either by relocating them in legitimate labour markets, or by excluding them from the social scene for prescribed periods of time." The author shows that the effectiveness of rehabilitation and incapacitation depends on the rate of recidivism of offenders, and on their responsiveness to economic incentives.

Since most forms of punishment that incapacitate offenders also involve deterrent effects it is often difficult to evaluate empirically the importance of each type of action. Using estimates based on regression results for the U.S. in 1960, Ehrlich (1981) concluded that "in practice the overwhelming portion of the total preventive effect of imprisonment is attributable to its pure deterrent effect."

Another important consideration for assessing the effectiveness of deterrence is the individual's attitude towards risk, because in maximizing his expected utility from illegal income an agent will be affected by his risk aversion. Becker (1968, p. 178) and Ehrlich (1973, p. 528), for example, establish, in their theoretical analysis, that a risk-neutral offender would tend to spend more time in criminal activity than a risk-averse individual.

[9] See Ehrlich (1973, p. 545, and 1996, p. 55).

Another implication of assuming risk-aversion is that raising the probability of conviction may have a greater deterrent effect than raising the severity of punishment (Becker 1968, p. 178).

David Sjoquist (1973) follows the approach used by Fleisher and Becker. The basic idea, as in Becker's papers, of this interesting work, is that "under some conditions, criminals can be treated as rational economic beings, assumed to behave in the same economic manners as any other individual making an economic decision under risk". In Sjoquist's model, agents, given a fixed amount of time, must choose how to allocate their time between legal and illegal activities. Psychic and financial costs and gains depend on participation in the two activities. Psychic and financial costs associated with illegal activities result from arrest, conviction and punishment. Using a Von Neumann-Morgenstern utility function agents have to maximize their expected utility function subject to the time constraint.

Very interesting is the econometric part of Sjoquist's work. He tested his theoretical model using a cross-sectional sample of 53 municipalities of the United States with 1960 population of 25,000 to 200,000. From the econometric estimates it results that an increase in the ratio of arrests to the number of crime reduces the amount of crime because it increases the expected costs and therefore reduces the expected utility from crime (as previously analyzed in the Becker's model). Furthermore Sjoquist's analysis consent to show that it exists a positive effect of unemployment on property crime, even if this result is not confirmed in following and recent studies (Freeman, 1994 and Imrohoroglu et al., 2001).

Finally, an interesting and original work is represented by the paper of Block and Heineke (1975), the authors present an alternative formulation of the criminal choice problem. They follow the theoretical framework used by Becker, Ehrlich and Sjoquist even if in the introduction of their work they state that "in particular, Becker, Isaac Ehrlich, and David Sjoquist summarize the consequences of time-consuming illegal activities in terms of a distribution of wealth alone without fully considering the underlying multiattribute choice problem". Furthermore they "show that by not fully specifying their choice problems, and therefore the transformation between what is inherently a multiattribute decision problem and the wealth-only problem" the three authors mentioned above "are led to conclusions which are valid only in very special cases" (p. 314).

The main critique by Block and Heineke to previous papers is related to the definition of crime behaviour as a 'wealth-only' problem. The authors introduce time spent in legal and illegal activities in the utility function of their model, differentiating from Becker, Ehrlich and Sjoquist that consid-

ered time allocation only implicitly through its effects on wealth.[10]

The approach followed by Block and Heineke tends to be more general and more complete with respect to the previous analysis conducted by Becker and Ehrlich. The two authors try to generalize the previous economic models of crime (ECMs) in order to be able to obtain results valid not only in very special cases. "Most significantly, changes in (i) wealth, (ii) the payoff to illegal activity, (iii) enforcement, (iv) punishment, and (v) the degree of certainty surrounding punishment were seen to have no qualitative supply implications under traditional preference restrictions" (p. 323).

The papers discussed and presented in this section represent the theoretical basis of the economic of crime and demonstrated the tentative to study crime from an economic point of view.

In particular they permit to deduce that any criminal behaviour is influenced by some specific factors:

- differential wages between legal and illegal activities,
- income level,
- probability of arrest and probability of punishment,
- level of education.

Criminal choice is not determined by mental illness or bad attitudes, but it is made on the basis of a maximization problem in which agents have to compare costs and benefits of legal and illegal activities taking in account the probability of being arrested and punished and the expected returns from crime. Criminal decision is determined by an economic analysis of agents.

In this first paragraph of the survey we have presented the most important contribution to the economics of crime. In particular, starting from the first paper of Fleisher and from the seminal paper of Becker, we present and discuss the main theoretical and empirical papers produced until the late '70s. We review the literature with the aim of stressing the theoretical

[10] As stressed by Witte (1980), "The major attack on Ehrlich's model and results come in a paper by Block and Heineke. They show that if the time allocated to legal and illegal activity is introduced explicitly into the utility function, no comparative static results are forthcoming under traditional preference restrictions, This is true because increasing (decreasing) the relative return to an activity will cause a wealth as well as a substitution effect. Restrictions that allow the wealth effects to be signed are necessary for unambiguous results to be forthcoming. Specifically, they show that Ehrlich's comparative static results are forthcoming only if psychic and ethical costs emanating from time allocation decision are independent of wealth" (p. 59).

framework of economics of crime. In particular, we propose the milestone represented by Becker's seminal paper and the following contribution and extension of Becker's original idea (Ehrlich, Block and Heineke). Our review of the origins of economics of crime is completed by presenting the first econometric contributions due to Fleisher, Sjoquist and Ehrlich, in which the authors test empirically the theoretical models. There are some differences between econometric and theoretical results (i.e. the role of unemployment), but we can state that the theoretical framework is robust to the empirical tests.

3 Crime and Unemployment

The existence of a relationship between crime and unemployment is ambiguous, both in its nature and in its robustness. Since the first contributions to the economics of crime it has been try to identify if exist a relationship between crime and unemployment.[11] In particular many works have focused their attention only on unemployment, neglecting other relevant components of the labour market as wages and employment opportunities. Furthermore, it is believed that most of criminals are unemployed, while, as showed by several studies,[12] the majority of people who decide to engage in criminal activities are employed. Thus, we focus on these aspects trying to give a wider perspective of the relationship existing between crime and unemployment.

Using Freeman's (1994) words we can state that "the question that traditionally motivated analyses of crime and the job market has been the effect of unemployment on crime. Many people believe that joblessness is the key determinant of crime, and have sought to establish a significant crime-unemployment trade-off. Studies through the mid 1980s found that higher unemployment was associated with greater occurrence of crime, though the unemployment-crime link was statistically looser than the link between measure of deterrence and crime... Most important, although the rate of unemployment drifted upwards from the 1950s to the 1990s, even the largest estimated effects of unemployment on crime suggest that it contributed little to the rising trend in crime" (p. 1).

This sceptical opinion by Freeman is confirmed by the fact that "since the late '70s, many social scientists have concluded that the unemployment-crime relationship, measured at aggregate level, is both inconsistent and insignificant" (Chiricos, 1987) (p. 188).

[11] Fleisher (1963, 1966), Ehrlich (1973).

[12] Freeman, (1994); Imrohoroglu et al.(2001).

Recently, a clarifying and complete review of the many theoretical and empirical models addressing the issue of the relationships between unemployment and crime has been produced by Masciandaro (1999).

Our aim is not to reproduce Masciandaro's survey, but to focus our attention on the very recent contributions to the debate on the relationship between unemployment and crime. In particular, we are interested in stressing how most people engage in crime are employed and that unemployment alone is not a relevant determinant to crime. In this sense we need to account for wage rate and employment opportunities in order to analyze the role of the labour market on crime.

From our point of view very interesting and relevant are the results obtained by Imrohoroglu, Merlo and Rupert (2001). Their "model predicts that about 79% of the people engaging in criminal activities are employed and only the remaining 21% are unemployed", this is consistent with the U.S. 1980 data. Furthermore, "the decrease in the unemployment rate does not seem to have any impact on the crime rate. This finding is mostly due to" the fact that "even though the overall unemployment rate is lower in 1996 as opposed to 1980, youth unemployment rates were actually higher in 1996" and "the overwhelming majority of criminals are employed".

Then, it is important to decomposed the effect of labour market on criminal activities. In fact, it is important to distinguish between overall unemployment rate and youth unemployment rate. Furthermore, it is important to distinguish between labour market opportunities and employment.

As stressed by Gould, Weinberg and Mustard (2002), "previous works on the relationship between labor markets and crime focused mainly on the relationship between unemployment rate and crime, and found inconclusive results. In contrast" it is important to "examine the impact of both wages and unemployment on crime, and use instrumental variables to establish causality".

The same approach has been used by Witt et. al (1998) in their empirical investigation for England and Wales. Their empirical results suggest "that continued falls in the relative wages of unskilled men and increases in male unemployment in England and Wales act as incentives to engage in criminal activity."

We briefly mention, as did by Freeman (1994) and Masciandaro (1999), that "social science analyses of the effect of the labor market on crime take several forms: time series studies that compare the crime rate to labor market variable over time; cross-section area studies that compare crime and economic characteristics across people" (Freeman, 1994, p. 8).

Depending on the type of study conducted is likely to obtain different

results and specifically the time series are not a robust way to determine the job market/crime link. Cross-section area studies are free from collinearity or serial correlation, but they suffer from their own set of inference problem. Even this kind of studies find positive link between crime and unemployment, but "there is enough statistical frailty in extant estimate to leave a door open to doubt" (Freeman, 1994, p. 15).

The relationship existing between crime and unemployment is not clear and unambiguous, and appears to be very sensitive to econometric specification.

4 Crime and Inequality

Income inequality is likely to be one of the major causes of crime. As discussed above,[13] criminal activities are determined by economic motivations and a very important and relevant aspect is represented by the distribution of income across workers and more in general across society. An outstanding number of papers deal with this topic and in recent years interesting and valid works have been written about the relationships between inequality and crime.[14]

Over the past 30 years[15] wage inequality has considerably increased and over the same period there has been a striking increase in crime rate.

Our aim is to examine whether this two factors – crime and inequality – are linked, but in doing this we have to distinguish carefully the effects of inequality from those of poverty.

We can distinguish among many effects of inequality on crime. Following Kelly (2000) we can state that "in the economics theory of crime, areas of high inequality place poor individuals who have low returns from market activity next to high-income individuals who have goods worth taking, thereby increasing the returns to time allocated to criminal activity" furthermore "strain theory argues that, when faced with the relative success of others around them, unsuccessful individuals feel frustration at their situation. The greater the inequality, the higher this strain and the greater the inducement for low-status individuals to commit crime".

Basically we can differentiate between two causes: one purely economic and one psychological, more specifically it is possible to argue that the ef-

[13] Fleisher (1966), Ehrlich (1973).

[14] Chiu and Madden (1998); Burdett et. al (1999); Imrohoroglu et al. (2000, 2001); Kelly (2000); Fajnzylber et al. (2002); Burdett and Mortensen, (1998).

[15] Juhn, Murphy and Pierce (1993).

fect of income or wage inequality in society will depend on the individual's relative income position. It is likely that in the case of the rich, an increase in inequality will not induce them to commit more crimes. However, in the case of the poor, an increase in inequality may be crime inducing, because such an increase implies a larger gap between the poor's wages and those of the rich, thus reflecting a larger difference between the income from criminal and legal activities. A rise in inequality may also have a crime-inducing effect by reducing the individual's moral threshold through what we could call an "envy effect".

Therefore, a rise inequality will have a positive impact on (at least some) individuals' propensity to commit a crime. The following logical step is to identify which are the causes that determine inequality.

Juhn, Murphy and Pierce (1993), analyze the relationship between wage inequality and the rise in returns to skill in the U.S.. Then, they show that between 1963 and 1989 the average weekly wage of working men increased by about 20 %, but these real gains were not spread equally across workers. Wages for the least skilled, measured by the tenth percentile of the wage distribution, fell by about 5 %, while wages for the most skilled, measured by the ninetieth percentile of the wage distribution, increased by about 40 percent.

According to Katz and Murphy (1992) over the same period of time (1963-1987) the U.S. experienced an increase in wage differentials, due in particularly to a sharp increase in the relative earnings of college graduates. They are able to verify that average wages of older workers increased relative to the wages of younger workers.

Katz and Murphy (1992) suggest that the change in relative wages is partly due to the growth in the demand for more educated workers.

A very similar results is obtained by Juhn, Murphy and Pierce (1993), in fact looking within education and experience categories a more striking change in wage inequality is revealed.

These two papers suggest that over the past 30 years there has been an enormous increase in wage inequality and in particular the change has regarded young and unskilled workers.

This outstanding increase in wage inequality is one of the major causes of increased criminal behaviour according to several authors.[16]

In the remaining part of this section we will try to give an exhaustive overview of economic contribution with respect to this topic.

Burdett, Lagos and Wright (1999) build a dynamic model for the labour

[16] Freeman (1994); Grogger (1998); Imrohoroglu et al. (2000, 2001).

market in which agents decide whether or not to commit property crime. The basic framework of this model is a generalization of Burdett and Mortensen (1998), where firms set wages and workers randomly search for firms. On-the-job search is allowed, so the equilibrium is characterized by a non-degenerate distribution of wages. Periodically, each worker faces an opportunity to enter crime activities and make a choice about it by weighting the expected cost and benefit. Agent's decision depends on the state of the labour market, the probability of being apprehended and convicted, and the severity of the punishment (i.e. fines and jail).

Several empirical studies have showed a positive relationship between inequality, unemployment and crime. This could mean that labour-market policies that are able to reduce unemployment and inequality may also be used to discourage crime. Burdett, Lagos and Wright discuss this hypothesis using their model and in particular, they study the interactions between unemployment, the degree of income inequality and crime rate, all of which are endogenously determined in the model.[17] Furthermore, they analyze the effects of several policies designed to combat crime. The model presents four different types of equilibria. In the first case both employed workers and unemployed agents engage in crime. In the second case employed agents do not commit crime, while unemployed agents do. In the third case both employed workers and unemployed agents engage in criminal activity. Finally, in the fourth case there are two types of employed workers and with respect to their wage level they decide whether to engage crime. In particular, this last equilibrium permits to state that "while some workers are employed in high-paying jobs and remain honest, others work for firms that pay less than the crime wage and hence choose to become criminals" (p. 13).

An important study has been conducted by Imrohoroglu, Merlo and Rupert (2000). They present a general equilibrium model in which heterogeneous agents specialize either in legal activities or in illegal (or criminal) activities, and majority rule determines the share of income redistributed and the expenditures devoted to the apprehension of criminals. They calibrate their model to the U.S. economy in 1990, and conduct simulation exercises to assess the effectiveness of expenditures on police protection and income redistribution at reducing crime.

Their results can be summarized as follows. Expenditures devoted to police protection reduce crime, while the crime rate may increase with income redistribution. These results appear counter-intuitive and it depends

[17] "There will be a critical wage w* such that agents commit crimes if and only if w < w*", (p. 4).

specifically on the characteristics of the wage distribution the authors adopt and on the efficiency of the apprehension technology. In fact, economies which adopt relatively more generous redistribution policies may have either higher or lower crime rate than economies with relatively less generous redistribution policies.

In particular, they show that in an environment where it is not possible to detect criminals and non-criminals as recipient of transfer payment, increasing government subsidies may increase the crime rate because of the distortionary effects of the higher taxes necessary to finance the subsidy.

In their following paper, Imrohoroglu, Merlo and Rupert (2001) propose a dynamic equilibrium model and they analyze recent trends in aggregate property crime rates in the United States.

In fact, during the last decade crime rate has sharply and steadily declined. The authors' aim is to identify which economic and social factors are responsible of this decline.

As already suggested by Grogger (1998) and Freeman (1994), most of the crimes in the U.S. as in European countries are committed by youths,[18] then the demographic factor appears to be strongly related to criminal activity and thus to crime patterns. In fact, over the last decade the fraction of youths in the U.S. population has decreased from 20.5% in 1980 to 15.1% in 1996.

Another important factor that may alter incentives to commit crime and then reduce (or increase) crime rate is law enforcement. Police expenditures "have increased from 0.6% of GDP in 1980 to 0.7% of GDP in 1996" (p. 1).

Other relevant phenomena have been taking place in the 1990s. In particular, changes in the structure of earnings, employment opportunities, and the skill composition of the work force are likely to be closely related to changes in the level of criminal activity.

All these observations seem to go in a direction of a reduction in crime. Real earnings have been increasing, at the same time, aggregate unemployment has been decreasing and so has the fraction of unskilled individuals in the labour force.

The change in other variables, however, seems to point in the opposite direction. Income inequality has been increasing. In addition, youth unemployment has been increasing.

Calibrating their model using U.S. data for 1980, Imrohoroglu, Merlo and Rupert (2001) are able to reproduce the drop in crime. Second, they

[18] It does not exist a precise definition for young people, but generally youth include people aged from 14 to 25.

identify factors that account for the observed decline in property crime: higher apprehension probability, stronger economy, and aging of population. Third, they conclude that the effect of unemployment on crime is negligible. Fourth, inequality represent an important factor in determining the level of crime. In fact, holding everything else constant, the increase in income inequality between 1980 and 1996 would have caused a substantial increase in property crime.

In both their models, the authors allow also employed workers to engage in crime. In fact, data showed how more than 75% of criminals are employed workers and this basically exclude unemployment as one of the major causes of criminal behaviour.

Chiu and Madden (1998) investigate the relationship between the level of crime and the distribution of income. They show that the number of burglaries increases as the income distribution becomes more unequal. This paper provides a theoretical explanation for a relationship between income inequality and property crime, which has been empirically established.[19] In particular, increases in relative differential inequality increase the level of crime. Moreover, "increases in income tax progressivity reduce the crime rate". It is worth to notice that according Chiu and Madden model "richer neighbourhoods may have lower crime rates than poorer neighbourhoods because they may have a lower relative differential income inequality or because the richest households in the richer neighbourhoods adopt an effective defence technology against burglary" (p. 135).

Kelly (2000) analyses whether high inequality and high rates of crime, particularly of violent crime, are linked. As the author states (p. 537) "In assessing the social costs of inequality, the economics literature has tended to consider its long-run costs: lower economic growth (Persson and Tabellini, 1994) and reduced human capital formation (Benabou, 1996; Durlauf, 1996; Kremer, 1997)" while "this paper investigated a much more immediate cost of inequality: its impact on crime".

In his empirical analysis, using data taken from the 1991 FBI Uniform Crime Reports, Kelly shows that for violent crimes the impact of inequality is large, even after controlling for the effects of poverty, race, and family composition. Although most crimes are committed by the most disadvantaged members of society, these individuals face greater pressure and incentives to commit crime in areas of high inequality.

[19] Imrohologlu et al. (2000, 2001); Grogger (1998); Freeman (1994).

5 Crime and Education

Crime appears to be strictly related to the level of education attained and to individuals' economic and social background.

Several studies have shown that criminals tend to be less educated and from poorer economic backgrounds than non criminals.[20] Thus, identifying low education as a determinant of criminal behaviour would allow us to design effective and proper policies aiming at increasing the level of education and schooling in order to reduce crime rate. This topics is closely linked to other aspects that determine and influence crime rate such as age and inequality. In fact, agents decide their educational demand in their youth and in doing this they are influenced by their social and economic background and by the level of education of their parents (i.e. a sort of "peer effect").

As previously asserted, some studies address this topic. Freeman (1991, 1996), Grogger (1995, 1998) and more recently Lochner and Moretti (2001) attempt to clearly identify the relationships between crime and education. Even if it appears quite reasonable to look for a relationship between crime and level of education, very few economic works have tried to analyze this relationship.[21]

Most of the contributions on the effects of education on crime stress how education raises individuals' skills and abilities, thus increases the returns to legitimate work, raising the opportunity costs of illegal behaviour. But there exist benefits from education that are not taken in account by individuals, this implies that the social return of education is higher than its private return. Education has an indirect (non-market) effect that affects the preferences of individuals. This effect ("civilization effect") makes criminal decision more costly in psychological terms. Thus, we focus on these aspects trying to give a wider perspective of the relationships existing between education and crime.

In his first paper, Lochner (1999) asserts that "crime is primarily a problem among young uneducated men. Individuals with low skill level are more likely to participate in criminal activities because the returns they can earn from work or school are low. Both high school graduation and ability directly lower criminal propensities" (p. 34).

In his analysis, he aims at showing how high school graduation substantially lowers criminal participation rate even after controlling for heterogeneity in ability. Thus, if that statement is confirmed this could have important

[20] Wilson and Herrnstein (1985).

[21] Lochner, (1999); Lochner and Moretti, (2001).

policies implications. In fact, "policies which raise the skills and abilities of children and adolescent as well as encourage them to finish high school can have sizeable impacts on crime" (p.34).

Similar results in tackling crime can be obtained using wage subsidies instead of "education subsidies", but in this case it is important to consider the dynamic effects of a policy which targets wage subsidies to younger workers. In fact, as already underlined by Imrohoroglu et al. (2001), such a policy can have distortionary effect and discourage skill formation and raise crime rates among older workers.

Most of previous researches on crime reduction has focused on the deterrent and incapacitation effects of stricter law enforcement, instead this study suggests that an optimal mix of policies aiming at increasing skill investment, legitimate earnings and work should be pursued . Enforcement, skill investment, and wage subsidy policies are important components of an effective crime fighting strategy.

This paper develops a dynamic two-period model of individual behaviour in which adolescent and adults decide how to allocate their time between school, work and crime. As suggested by Lochner (1999) "this paper provides a more rigorous analysis, developing a simple model that incorporates individual decision about work, crime and education. A number of new insights are derived and empirical implications are then tested using data from various sources" (National Longitudinal Survey of Youth, Current Population Survey and Uniform Crime Reports) (p. 1).

First, the model explains why older and more educated workers tend to commit less of some property crimes than others. Second, the model is useful to analyze the impact of education, training and work subsidies on criminal behaviour. Third, unobserved age differences in on-the-job skill investment explain why wages and crime are negatively correlated at older ages. Fourth, the model predicts a rise in youth crime should accompany the recent rise in returns to skill. Finally, the model suggests that law enforcement policies increase education, training, and labour supply, while reducing criminal activity.

In a successive paper joint with Moretti (2001), Lochner estimates "the effect of education on participation in criminal activity accounting for endogeneity of schooling" (p. 1).

The key assertion of their work is that "crime is a negative externality with enormous social costs, so if education reduces crime, then schooling may have large social benefits that are not taken into account by individuals. In this case, the social return to education may exceed the private return" (p. 1). The aim of this paper is to analyze whether there is a correlation

between crime and education and to identify effective policies in pursuing a reduction in crime. In particular, given the large social costs of crime, small reductions in crime associated with education may be economically relevant.

Lochner and Moretti (2001) argues that several reasons lead economists to think of the role of education in combating and reducing crime rate.

We can summarize their explanations as follows: "first, schooling increases the returns to legitimate work, raising the opportunity costs of illegal behaviour. Additionally, punishment for criminal behaviour often entails incarceration. By raising wage rates, schooling makes any time spent out of the labour market more costly. Second, schooling may directly affect the financial or psychic rewards from crime itself. Finally, schooling may alter preferences in indirect ways, which may affect decisions to engage in crime. For example, education may increase one's patience (as in Becker and Mulligan, 1997) or risk aversion" (p. 1).

They use a simple economic model of work, school, and crime, in which maximizer individuals are assumed to choose the amount of education they wish to acquire and the amount of time spent on work and crime once they have finished school.

The empirical analysis of crime and education presents some difficulties due to the presence of unobserved characteristics affecting schooling decisions that are likely to be strictly correlated with unobservable influencing the decision to engage in crime.

In this paper the authors use three data sources: "individual-level data from the Census on incarceration, state-level data on arrests from the Uniform Crime Reports, and self-report data on crime and incarceration from the National Longitudinal Survey of Youth" (p. 2).

The results obtained using these three sets of data allow Lochner and Moretti (2001) to conclude that "schooling significantly reduces criminal activity" (p. 30). It is important to stress that these findings are robust to different identification strategies and measures of criminal activity.

Given the consistency and the robustness of their findings, Lochner and Moretti (2001) conclude "that the estimated effects of education on crime cannot be easily explained away by unobserved characteristics of criminals, unobserved state policies that affect both crime and schooling, or educational differences in the conditional probability of arrest and imprisonment given crime. Evidence from other studies regarding the elasticity of crime with respect to wage rates suggests that a significant part of the measured effect of education on crime can be attributed to the increase in wages associated with schooling. . . .We further argue that the impact of education on crime implies that there are benefits to education not taken into account by individuals

themselves, so the social return to schooling is larger than the private return. The estimated social externalities from reduced crime are sizeable" (p. 31).

In particular, the economic returns from an appropriate and effective policy are massive and outstanding. In fact, "a 1% increase in the high school completion rate of all men ages 20-60 would save the United States as much as $1.4 billion per year in reduced costs from crime incurred by victims and society at large. Such externalities from education amount to $1,170-2,100 per additional high school graduate or 14-26% of the private return to schooling" (p. 31). It appears to be socially convenient to promote and pursue policies aimed at preventing high school drop out and increasing schooling participation.

A very interesting paper is by David Usher (1997). He analyses the relationship between education and criminal activity from a different point of view. In fact, he argues that education may also have a "civilization" effect, tending to reduce the incidence of criminal activity. Education conveys a civic externality, a benefit to society over and above the benefit to the student in enhancing his future earning power. Students are taught not only to be productive, but to be law abiding and loyal to their country. The civic externality is incorporated into an "anarchy" model where people choose to be farmers or bandits, and schooling inculcates a distaste for a life of crime. Estimates of the return to education are biased down when the civic externality is overlooked. In particular, as the author says in the introduction to his paper, "education promotes good citizenship. Education does more than teach skills to enhance one's capacity to earn income. It perpetuates the values of society, enculturates people to serve their communities, and promotes the virtues of hard work and honesty" (p. 368).

Thus, education has a multiple role in deterring crime. In fact, as suggested by Freeman (1994) and Lochner (1999) education may raise skills and abilities and then increasing wage level and work opportunities, but at the same time it can have a "civilization" effect, as stated by Usher (1997). Then an effective and appropriate education or schooling policy can be very useful in combating and reducing the level of crime overall and in particular among young people.

6 Crime and Youth

As seen in the previous section the level of education is closely related to crime, in particular as suggested by several studies (Wilson and Herrnstein, 1985, Freeman, 1991 and 1996, Grogger, 1991, 1995 and 1998) criminals

tend to be less educated and from poorer economic backgrounds than others. Moreover, young men are said to be more prone to engage in criminal activities than the rest of the population.

Freeman, in his 1991 paper aimed at examining the magnitude of criminal activity in the 1980s, documents the increasing participation of disadvantaged young men, in particular, less educated young blacks, in criminal activities; he also shows that crime has long-term negative consequences for their future possibilities of employment; and that the decision to commit crime is economically rational only in the short run.

This category of people has massively joined criminal market because of the huge drop in the real earnings and employment opportunities for less educated young men over the last two decades. As stressed by Freeman (1991) "the fall in real earnings reduced the opportunity cost of crime, and may, have convinced many youths that they have no future in the legitimate job market. The long term decline in the probability of employment of the less educated is likely to have had a similar impact inducing youths into crime" (p. 21).

As already suggested in our previous section on crime and inequality, another potential cause for the rising participation in crime is the increased income of the upper deciles of the income distribution and the increased inequality in wages. According to Freeman (1991) the higher income level of the "already rich" has had two important effects on crime; first, "the more money in the hands of the wealthy, the more lucrative is robbery or burglary, and the greater is the potential demand by wealthy for illegal consumption items such as drugs" and second, "the exogenous growth of criminal opportunities due to innovation and expansion of the drug business is also likely to have contributed to rise in youth crime" (p. 22).

Freeman suggest that to improve less educated skills and to increase their legitimate opportunities should be part of any crime reduction programs.

In a following paper, Freeman (1994) suggests that "the continued crime high rate in the U.S., despite massive imprisonment of criminals, may be one of the costs of the rising inequality in the country, and in particularly of the falling real earning of the less educated" (p. 1) and "perhaps the widely increase in earnings inequality and the fall in the real earnings of the less skilled men who commit most crimes gave young men a job market push into crime"(p. 1).[22]

[22] It is worth to notice that a reduction in real wages earned by less skilled men implies a increase in wage inequality, but an increase in wage inequality not necessarily implies a reduction in wages earned by less skilled men. The increase in inequality may be due to an increase in wages earned by more skilled men (Katz and Murphy (1992); Juhn et

Youth participation to crime and the reasons that induce youth to enter the illegal activities market are also the topic of Grogger's paper (1998). In fact, in order to study the effect of market wages on youth crime, Grogger proposes a time-allocation model in which agents face a parametric wage and diminishing marginal returns to crime. Agents decide how much crime to commit and how much to work on the legitimate market on the basis of their returns from crime and their legal wages. As done in several other papers, the author considers agents to be amoral in the sense that committing crime causes no more disutility than working.

By estimating the model for the U.S., using data from National Longitudinal Survey Youth Cohort for 1980, Grogger identifies the determinants of criminal returns and of the wage responsiveness of criminal participation. In particular, youths' behaviour appears to be very responsive to price incentives. Thus, falling real wages have been an important determinant of rising youth crime over the past twenty years. Furthermore, as underlined by the author "wages explain an important component of the racial differential in criminal participation, and they largely explain the age distribution of crime" (p. 1).

It appears crucial to properly understand the relationships existing between wages, youth and crime in order to promote and pursuing feasible policies in tackling crime. The main goal of Grogger's "paper is to estimate the effect of the market wages on youth crime and determine whether wages can explain the recent trend in crime and its distribution by race and age", focusing "exclusively on property crimes, ..., crimes from which the perpetrator may acquire income".

In particular the author determines some relevant determinants of youth crime and possible explanations for the increasing crime rate across young people.

We have already discussed, in particular in the previous section, but also in the present one the reasons of the decline in the real wages over the past two decades, especially for young, unskilled and uneducated men (Katz and Murphy, 1992; Juhn, Murphy and Pierce, 1993; Freeman, 1991 and 1994). Over the same period, youth arrest rates have risen substantially, as also presented by Imrohoroglu, Merlo and Rupert (2001).

Moreover, Grogger (1998) shows that the reason why blacks participate in crime at a much greater rate than whites can be found in the wage

al. (1993)). Implications are radically different. In fact, in the first case it is less worth staying in the legal sector, while in the second case crime returns increase. This second effect may be lower than the first one, because it not directly affect the individual who may decide to enter the crime market.

differential between blacks and whites. (If crime is responsive to wages, then black-white gap may explain part of the black-white difference in crime rates.)

Finally, criminal activities typically increase with age until the late teens and then declines. This relationship appears to be quite robust, and justified by the fact that wage represent the opportunity cost of committing crime, and rise steeply with age during the early part of one's career.

7 Crime and Social Interactions

In this section we review the literature documenting the importance of social factors in explaining the level of crime. In fact, social factors, social interactions and social networks[23] appear to be strongly correlated with propensity to crime.

Criminal activity may be contagious in high-crime areas because the social penalties for committing crime or the probability of arrest may be lower than in other neighbourhoods, as may be the costs of acquiring important "inputs" for crime.

Neighbourhood poverty may also affect the actual or perceived returns to schooling and work by affecting access to quality schools, which may depress the opportunity cost of crime.

Some studies[24] suggest that children who grow up in "bad neighbourhoods" tend to have worse outcomes on a range of social indicators. They accumulate less human capital, drop out of school earlier and have a higher risk of involvement in criminal activity. Young women are more likely to get pregnant in their teenage years, and tend to form single parent household after the birth of their child. Furthermore, the fact that neighbourhood characteristics appear to be related to individual behaviour may result from the tendency of families with similar characteristics to live close to each other.

In others words, individuals are affected in taking their decisions by peer group components (i.e. relatives, parents, schoolmates, neighbourhood) and by their socioeconomic background .

Starting from the fact that the rate of unemployment has sharply increased for disadvantaged and less-educated youths and that poverty rate among families headed by young persons has increased since the early 70s, Case and Katz (1991) examine the effects of family background and neigh-

[23] Calvó-Armengol and Zenou, (2003).

[24] Glaeser et al., (1996); Case and Katz, (1991); Ludwig et. al, (2000).

bourhood peers on the behaviours of youth living in low-income Boston neighbourhoods.

Using data from the NBER survey of youths aged 17 to 24 from high-poverty neighbourhoods in inner-city Boston in early 1989, they conduct an interesting econometric analysis that allows them to conclude that "family adult behaviours are strongly related to analogous youth behaviours. The links between the behaviour of older family members and youth are important for criminal activity, drug and alcohol use,..., schooling...". (p.1) They "also find that the behaviours of neighbourhood peers appear to substantially affect youth behaviour... Residence in a neighbourhood in which a large proportion of other youths are involved in crime is associated with a substantial increase in an individual's probability of the being involved in crime. Significant neighbourhood peer effect are also apparent from drug and alcohol use,..., and the propensity of youths to be out of school and out of work". (p. 1)

Family background and neighbourhood peers are strongly related with the decisions of youth. Disadvantaged youths, living in suburb or high-poverty or high-crime areas, are more likely to imitate bad attitudes of their parents and neighbours. Then it appears to be crucial an effective policy (i.e. schooling, education,...) aimed at giving different perspectives to disadvantaged youths. In fact, education may provide an alternative source of information about the returns from criminal actions and parents or positive example may send messages that interrupt the messages from one's neighbours (Glaeser et al., 1996).

In a recent paper, Ludwig et. al (2000), using data generated by a randomized housing-mobility experiment conducted on 638 families from high-poverty Baltimore neighbourhoods, study the effects of relocating families from high- to low poverty neighbourhoods on juvenile crime. The authors try to find an empirical support to the possibility "that the volume of crime... may be related in part to the spatial concentration of low-income families in high-poverty, high-crime urban neighbourhoods" (p. 1). In other words "criminal activity may be contagious in high-crime areas because the social penalties for committing crime or the probability of arrest may be lower than in other neighbourhoods, as may be the costs of acquiring an important input for crime" (p.1) and furthermore neighbourhood poverty may also affect the actual or perceived returns to schooling and work by affecting access to quality schools, which may depress the opportunity cost of crime.

Ludwig et al. (2000) determine that the offer to relocate families from high- to low poverty neighbourhoods reduces juvenile arrest and violent

criminal behaviours by teens on the order of 30 to 50 percent.

A different approach is followed by Glaeser et al. (1996). Given the high degree of variance of crime across space, they try to determine which can be the reasons of this puzzle, supported by their empirical work that strongly suggests that the variance is not the result of geographical attributes. The aim of the paper is to measure the presence of social interactions and their influence on crime.

They present two models populated by two different classes of agents: a) agents who influence and are influenced by their neighbours and b) agents who influence their neighbours, but who are not themselves influenceable ("fixed agents").

The so called "fixed agents" can be interpreted, following the authors, in different ways: "1) the expected distance between two fixed agents is the expected size of a group with positive social interactions... 2) agents who do not observe their neighbours action... 3) metaphor for the forces that slow social interaction (i.e. strong parents, formal schooling)".

The model provides a natural index of social interactions derived from the presence of "fixed" agents which can compare the degree of social interactions across crimes, across geographic units and across time.

The results obtained are "similar for different data samples and suggests that the amount of social interactions are highest in petty crimes (such as larceny and auto theft), moderate in more serious crime (assault, burglary and robbery) and almost negligible in murder and rape. The index of social interactions is also applied to non-criminal choices and we find that there is substantial interaction in schooling choice" (p. 1).

In a more recent paper by Glaeser and Sacerdote (1999), the authors attempt to explain why crime rate is much higher in big cities than in either small cities or rural areas. They decomposed the relationship between cities and crime in four category: 1) higher pecuniary returns to crime in urban areas, 2) lower probability of arrest, 3) characteristics exogenous with respect to location, 4) characteristic endogenous with respect to location. Using data from the National Crime Victimization Survey they empirically test their hypothesis they find that: 45% of this connection can be explained by the fact that families are much less intact in cities; 26% by higher benefit levels in cities and 12% by lower probability of arrest. Thus, this study confirm how family background and neighbourhood peers play a main role in criminal behaviour.

8 Conclusions

Starting from the most important and first contribution to the economics of crime we have presented and discussed both empirical and theoretical contributions.

Our review of the literature presents an "historical" part in which we stress the theoretical framework of the economics of crime and propose the milestone represented by Becker's seminal paper and the following contribution and extension of Becker's original idea. In particular, the Becker's paper radically changes the way of thinking about criminal behaviour contributing to look at the criminal choice as a maximization problem in which agents have to compare costs and benefits of legal and illegal activities taking in account the probability of being arrested and punished and the expected returns from crime. Thus, criminal decision is determined by an economic analysis of agents.

Since the beginning of 80s, Becker's paper open the door to a new field of empirical research whose main purpose is to verify and study the economic variables that determine criminal choices and behaviours of agents.

The papers presented and discussed permit to deduce that criminal behaviour is influenced by some specific factors: probability of punishment and apprehension, deterrence, differential wages between legal and illegal activities, wage inequality, level of education, unemployment, cultural and family background and other economic and social factors that may affect individual's propensity to commit crimes such as cultural characteristics, age and sex.

The economics of crime is closely related and interacts with different and heterogeneous fields (i.e. sociology, criminology, psychiatry and geography).

In particular, we focus our attention on social and socioeconomic determinants such as unemployment, education, inequality, social networks, socioeconomic background and age, presenting both empirical and theoretical recent contributions. This allows us to conclude that the criminal phenomenon is a complex phenomenon that is strongly related and affected by several socioeconomic determinants whose relationships with crime have to be known in order to design and to implement effective and adequate policies in reducing crime.

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