

Education and Crime

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Abstract

Economic theory implies a negative correlation between educational attainment and most types of crime. First, schooling increases the returns from legitimate work (relative to most types of crime) and may also socialize youth. Second, youth who plan to engage frequently in crime benefit little from a good education. Empirically, an increase in educational attainment significantly reduces subsequent violent and property crime yielding sizeable social benefits. Schooling has small positive effects on white collar crime. School attendance reduces contemporaneous property crime but increases contemporaneous violent crime among juveniles. Incarceration during late adolescence appears to reduce educational attainment.

1 Introduction

This article analyzes the relationship between education and crime. Section 2 describes a number of important factors that may drive this correlation, and Section 3 reviews the current empirical literature on the inter-relationship between education and crime. Section 4 concludes with a discussion of the social savings from crime reduction associated with increasing high school graduation rates.

2 The Economics of Education and Crime

This section discusses a number of factors that may contribute to a correlation between education and crime. Many of these points are more formally analyzed in Lochner (2004), who takes

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a human capital approach to analyzing the relationship between education and crime.¹ This framework assumes that education (as well as job training) develops formal labor market skills, which raises the opportunity costs of crime commission. Education may also develop criminal skills; although, this is only likely to be important for certain white collar crimes. Alternatively, education may ‘socialize’ individuals such that they prefer not to engage in crime.

The Effects of Education on Subsequent Crime among Adults

There is a relatively large literature linking wages and unemployment rates to criminal behavior. Recent studies conclude that crime is increasing in local unemployment rates and decreasing in wage rates (e.g. Raphael and Winter-Ebmer 2001, Gould, et al., 2002, and Machin and Meghir 2004). To the extent that education increases wage rates (and reduces the likelihood of unemployment), it increases the opportunity costs of crime and will tend to reduce post-school criminal activity. Higher wages raise the opportunity costs of crime in two distinct ways. First, since crime may require time to commit, that time cannot be used for other productive purposes like work. Here, it is useful to think of all of the time involved in planning a crime, locating a target and, potentially, evading detection and arrest. Second, each crime committed entails an expected period of incarceration, which is more costly for individuals with better labor market opportunities and wages.

On one hand, property crimes like burglary, auto theft, and drug dealing can involve significant planning or time spent on the actual activity itself. On the other hand, violent crimes like assault would appear to require less time for planning and execution but are associated with higher expected probabilities of arrest, conviction, and incarceration as well as longer sentence lengths conditional on incarceration. For example, Lochner (2004) calculates that for each assault, the perpetrator can expect to spend 63 days incarcerated; however, the expected incarceration period for a burglary is only 13 days. These time costs would appear to exceed the direct time costs associated with committing most crimes. Thus, changes in wages or unemployment rates could have greater effects on violent crimes than on property crimes.²

¹Lochner (2004) also argues that the age-crime profile may be partially explained by the accumulation of human capital over the lifecycle.

²The estimated effects of low skill wages on violent crime are larger than on property crime for some specifications in Gould, et al., (2002).

Education may also affect the rewards from crime. This is most likely to be true for white collar crimes like fraud, forgery, and embezzlement. Education may actually increase these types of crime if it increases the rewards from crime more than it increases legitimate wages. Lochner (2004) finds some evidence that white collar crime rates are increasing in average education levels as discussed below. To the extent that schools ‘socialize’ students to become better citizens and to treat others better, education may also reduce the psychic returns to crime causing individuals to forego lucrative criminal opportunities.

Education may also teach individuals to be more patient. This will discourage crime, since forward-looking individuals place greater weight on any expected punishment associated with their criminal activities. Education may also affect preferences toward risk. To the extent that schooling makes individuals more risk averse, it will tend to discourage crime.

Contemporaneous Crime and Education Decisions among Youth

Youth crime will tend to be decreasing in both contemporaneous and future wage rates. Higher contemporaneous wages increase the direct opportunity cost of committing crime, while higher future wages increase the costs associated with potential incarceration. Because education increases future wage rates, youth who are enrolled in school will be less likely to engage in crime than otherwise similar youth who are not in school.³

Schooling is not exogenously determined. Youth will choose to enroll in school if they receive a net benefit from doing so; otherwise, they will not. Not only does an increase in wages for high school graduates or college attendees reduce crime for all youth who would have attained these schooling levels in the first place, but it also causes more youth to finish high school and attend college, lowering their lifetime criminal activity as well.

Since the benefits from schooling through higher lifetime earnings are delayed, youth who are more patient are more likely to attend school. More patient youth are also less likely to engage in crime, since the punishments tend to be delayed. Thus, differences in patience across the population will tend to lead to a negative relationship between education and crime. Population

³Prison is costly for those who stand to earn a lot in the future — either legitimately or illegitimately. The extent to which education increases post-school criminal returns also tends to discourage youth crime. The potential to earn high rewards from white collar crime after school may discourage youth criminal activity to avoid imprisonment.

heterogeneity in preferences toward risk may also lead to a correlation between education and crime. If the rewards to school are risky as some economists suggest, more risk averse youth will tend to quit school at earlier ages. Risk averse youth are also more likely to engage in crime regardless of their schooling, generating a negative correlation between crime and education.

Youth who plan to commit more crime as adults will tend to benefit less from each year of school for two reasons. First, those who allocate more time to crime and less to work will benefit less from the increased wages associated with schooling (assuming schooling raises legitimate wages more than the returns from crime). Second, those who commit more crime can expect to spend more time in prison, a place which offers little reward to additional schooling. As a result, education decisions may depend on factors that affect the returns to or costs of crime. For example, a higher return to crime or more favorable treatment to prisoners will encourage criminal activity and, therefore, lower the returns from schooling. The effects of a reduction in arrest or incarceration rates on schooling are less clear. On the one hand, a reduction in the probability of incarceration directly increases the value of schooling holding criminal activity constant. On the other hand, a lower incarceration probability encourages crime, which reduces the value of education. In general, criminal abilities/opportunities and law enforcement policies should affect the schooling decisions of marginal youth.

The role of peers or social networks may also be important determinants of crime and educational attainment. Youth who drop out of school may be influenced by a more negative set of peers, which may exacerbate any tendencies to engage in crime. Similarly, youth who join gangs or who otherwise engage in crime may be encouraged to leave school by their peers. Crime, or arrest and incarceration, may also come with a stigma which makes school more difficult, an issue we discuss briefly in Section 3.

All of these factors suggest that youth will tend to make an early choice between little education and a life of street crime or a good education and a largely crime-free life. Education does not pay if one intends to participate in gang life, selling drugs and engaging in other criminal activity. The fact that such a lifestyle is also likely to come with substantial periods of incarceration further reduces any potential benefits from schooling. At the same time, youth in neighborhoods with poor schools or that offer few jobs even to those who do finish high school are likely to find the street life relatively attractive. Social networks and peers are likely to

strengthen these forces.

3 Empirical Evidence on Crime and Education

The empirical literature on education and crime has focused almost exclusively on the effects of educational attainment on post-school criminal activity; however, a few studies have attempted to estimate the ‘effects’ of school enrollment on contemporaneous crime. Given the simultaneity of enrollment and crime choices (do youth drop out of school because they want to sell drugs all day or do they sell drugs because they dropped out of school?), this is a particularly daunting task and one that is often ill-defined. Recently, a few studies have attempted to estimate the effects of youth arrest and incarceration on educational outcomes. Studies which attempt to estimate the effects of law enforcement policies or criminal opportunities on educational decisions are virtually non-existent. We briefly summarize the current state of empirical evidence on these issues.

The Effects of Education on Crime

We have discussed four primary reasons schooling might affect crime: (i) education raises wage rates, which raises the opportunity costs of crime; (ii) education may directly affect the financial or ‘psychic’ rewards from crime; (iii) education may alter preferences for risk-taking or patience; and (iv) schooling may affect the social networks or peers of individuals. For most crimes (except, possibly, white collar crimes), one would expect these forces to induce a negative effect of schooling on crime.

Empirically, there is a strong negative correlation between educational attainment and various measures of crime. Freeman (1996) points out that more than two-thirds of all incarcerated men in 1993 had not graduated from high school. In the 1980 wave of the National Longitudinal Survey of Youth (NLSY), 34% of all men ages 20-23 with 11 or 12 years of completed schooling self-reported earning some income from crime, compared with 24% of those with a high school degree, and only 17% of those with more than twelve years of school (Lochner 2004). Similar differences are evident for other self-reported measures of both violent and property crime.

Early studies of the relationship between education and crime focused on their correlation conditional on measured individual and family characteristics using multivariate regression

methods. For example, Witte and Tauchen (1994) find no significant relationship between educational attainment and crime after controlling for a number of individual characteristics. Grogger (1998) estimates a significant negative effect of wages on crime, but he finds no relationship between years of completed schooling and crime after controlling for individual wage rates. Of course, increased wages and earnings are important consequences of schooling. Thus, this study suggests that education may indirectly reduce crime through increased wage rates.⁴

These earlier studies must be interpreted with caution. A negative correlation between education and crime, even after controlling for measured family background and neighborhood characteristics, does not necessarily imply that education reduces crime. Standard regression studies are unlikely to estimate the causal effect of education on crime (i.e. the effect increasing someone's schooling on his criminal activity) for a number of reasons. First, unobserved individual characteristics like patience or risk aversion are likely to directly affect both schooling and criminal decisions. Individuals who choose more schooling (even after conditioning on observable characteristics) might also choose less crime regardless of their education level, in which case regression-based estimates do not identify the causal effect of schooling on crime. Second, using variation in crime and education across states or local communities may also produce biased estimates. Governments may face a choice between funding law enforcement and good public schools, which would tend to produce a spurious positive correlation between education and crime. Alternatively, unobserved characteristics about communities or their residents may directly affect the costs or benefits of both education and crime. For example, communities with few job opportunities that reward schooling may also be faced with severe gang problems. While it is often possible to account for permanent unobserved differences across communities by examining the relationship between changes in schooling and crime over time, such an approach cannot account for the effects of changing unobserved community characteristics. Third, reverse causality is another important concern, in which case traditional regression estimates may be confounded by the effect of criminal activity on schooling. Individuals who plan to heavily engage in crime (e.g. because they are particularly good at it, enjoy it, or live in areas

⁴Gottfredson (1985), Farrington, et al. (1986), and Witte and Tauchen (1994) explore the link between time spent in school and contemporaneous crime, concluding that time spent in school significantly reduces criminal activity. This type of analysis is particularly difficult to interpret given the simultaneous nature of the crime and schooling choices.

with plenty of illicit opportunities) are likely to choose to leave school at a young age. Arrests or incarceration associated with juvenile crime may also cause some youth to drop out of school early. Finally, it is difficult to measure crime itself; instead, researchers are often forced to use measures of arrest or incarceration rather than actual crimes committed. It is possible that education reduces the probability of arrest and incarceration or the sentence lengths administered by judges. Estimates based on measures of arrest or incarceration will incorporate these effects in addition to any effects of education on actual crime.

Recently, economists have attempted to address these difficult issues through the use of instrumental variable (IV) estimation methods. In the context of estimating the effect of educational attainment on crime, an instrument is valid if it induces variation in schooling but is uncorrelated with other factors that directly affect criminal behavior (e.g. individual preferences or abilities). Intuitively, this approach exploits differences in educational attainment across individuals that arise in response to factors that have no direct effect on criminal decisions. An ideal instrument would randomly assign some youth to drop out of high school and others to finish high school. Then, comparing the differences in crime rates across these groups would identify the causal effect of high school completion on crime. In practice, we typically do not observe such perfect experiments, but researchers can sometimes come close.

Lochner and Moretti (2004) use changes in state-specific compulsory schooling laws over time as an instrumental variable for completed schooling to estimate the effects of education on arrest rates and the probability of incarceration among adult men. Intuitively, they measure the extent to which an increase in a state's compulsory schooling age leads to an immediate increase in educational attainment and reduction in subsequent crime rates for affected cohorts. This identifies the causal effect of schooling on crime as long as the changes in compulsory schooling laws are not related to changes in the underlying propensity to commit crime. Lochner and Moretti's (2004) analysis suggests that changes in compulsory schooling laws are exogenous and not related to prior trends in schooling or state expenditures on law enforcement, so it appears to be a valid instrument.

Lochner and Moretti (2004) first use individual-level data on incarceration and schooling from the 1960, 1970, and 1980 U.S. Censuses to estimate the effects of educational attainment on the probability of imprisonment separately for black and white men. Their estimates control

for age of the respondent (three-year age categories), state of birth, state of residence, cohort of birth, and state-specific year effects. Most importantly, controlling for state-specific year effects allows for the possibility that different states may have different time trends for law enforcement policies or may simply exhibit different trends in aggregate criminal activity. Identification comes from the fact that in any given state and year, different age cohorts will have faced different compulsory schooling laws during their high school years, causing them to acquire different levels of schooling and to commit crime at different rates. Interestingly, both ordinary least squares (OLS) and IV estimates are very similar and suggest that, on average, an extra year of school reduces the probability of imprisonment by slightly more than .1 percentage point for whites and by about .4 percentage points for blacks. Given the probability of incarceration for male whites without a high school degree averaged .83% across all three Census and the incarceration rate for male black dropouts was 3.6%, these effects are sizeable. OLS results suggest that completion of the twelfth grade causes the greatest drop in incarceration, while there is little effect of schooling beyond high school.

In their analysis of male arrest rates, Lochner and Moretti (2004) use state-level arrest rates by criminal offense and age (five-year age categories beginning at ages 20-24 through 55-59) from the FBI's Uniform Crime Reports (UCR) for 1960, 1970, 1980, and 1990. This data is linked to 1960-90 U.S. Census data on educational attainment and race to estimate regressions of the form:

$$\ln(A_{cast}) = \beta E_{ast} + \gamma B_{ast} + d_{st} + d_{sc} + d_{sa} + d_{ct} + d_{at} + d_{ac} + \varepsilon_{cast} \quad (1)$$

where $\ln(A_{cast})$ is the logarithm of the male arrest rate for crime c , age group a , in state s in year t (from UCR); E_{ast} is either average education or the high school graduation rate for males in age group a in state s at time t (from Census); B_{ast} is the percent of males that are black in age group a in state s at time t (from Census). They analyze arrest rates for the following crimes: murder, rape, assault, robbery, burglary, larceny, auto theft, and arson. In using log arrest rates, the effect of education on arrest rates is assumed to be the same in percentage terms for all types of crime.

The d 's in equation (1) represent indicator variables that account for unobserved differences across states, years, cohorts, and criminal offense types. The term d_{st} allows for state-specific

time effects, which is more general than including time varying observable state-level variables reflecting differences in public spending, economic conditions, or law enforcement. The inclusion of d_{sc} allows the distribution of crimes or arrests across states to differ. Some states may focus arrests more heavily on one type of crime, while others focus on other types. Furthermore, the age distribution of arrestees need not be the same across states – some age groups may be more prone to commit crimes in some states or the arrest policy with respect to age may differ across states. The term d_{sa} absorbs long-run differences in age-arrest patterns across states. Crime-specific and age-specific trends in arrest common to all states are accounted for by d_{ct} and d_{at} , respectively. Finally, d_{ac} accounts for long-term differences in age-crime profiles across different types of criminal offenses.

Using OLS, Lochner and Moretti (2004) estimate that a one-year increase in average education levels in a state reduces state-level arrest rates by 11 percent. IV estimates suggest slightly larger effects, although they are not statistically different. These estimated effects are very similar to the predicted effects derived from multiplying the estimated increase in wages associated with an additional year of school by the estimated effects of higher wage rates on crime (from Gould, et al. 2002). This suggests that much of the effect of schooling on crime may come through increased wage rates and opportunity costs. Using OLS, Lochner and Moretti (2004) also estimate separate effects of education for different types of crime. These results suggest similar effects across the broad categories of violent (murder, rape, robbery, and assault) and property (burglary, larceny, motor vehicle theft, and arson) crime — a one year increase in average years of schooling reduces both property and violent crime by about 11-12%. However, the effects vary considerably within these categories. A one-year increase in average years of schooling reduces murder and assault by almost 30 percent, motor vehicle theft by 20 percent, arson by 13 percent, and burglary and larceny by about 6 percent. Estimated effects on robbery are negligible, while those for rape are significantly positive. This final result is surprising and not easily explained by standard economic models of crime.⁵

Lochner (2004) follows a similar approach to estimate the effects of average schooling levels on arrest rates for white collar crime (forgery and counterfeiting, fraud, and embezzlement)

⁵However, it is consistent with evidence in Gould, et al. (2002), which suggests that local wage rates are positively correlated with local crime rates.

using UCR and Census data from 1960, 1970, and 1980. In contrast to the results for violent and property crimes, he estimates a *positive*, though statistically insignificant, effect of schooling on white collar arrest rates.

One obvious concern with these studies is their use of arrest and incarceration as measures of crime. It is possible that education improves the chances that someone evades arrest or conviction or that judges tend to give more educated defendants lighter prison sentences. While there is little direct evidence on these issues, Mustard (2001) finds negligible effects of defendant education levels on the sentence lengths they receive. Furthermore, results using self-reported measures of criminal activity in the National Longitudinal Survey of Youth (NLSY) support the case that education reduces actual violent and property crime and not just the probability of arrest or incarceration conditional on crime (Lochner 2004, Lochner and Moretti 2004).

A growing body of evidence suggests that early childhood interventions can also substantially reduce adult crime rates. Most famously, the High/Scope Perry Preschool Program for disadvantaged minority children measured lifetime arrests for randomly assigned participants and non-participants. While 55% of all non-participants were arrested five or more times through age 40, only 36% of the preschool participants had been arrested that often (Schweinhart, et al., 2005). The Syracuse Family Development Program also produced large reductions in delinquency (Lally, et al., 1998). These findings lead Donohue and Siegelman (1998) to conclude that small, rigorous early intervention programs may pay for themselves through reduced crime rates alone, if they can be targeted to high-crime groups.

A provocative recent study by Jacob and Lefgren (2003) explores the contemporaneous effects of school attendance on juvenile crime rates. To identify these effects, the study uses exogenous variation in teacher in-service days across jurisdictions over time, essentially comparing local juvenile crime rates on days when school is not in session to those when it is in session. Their findings suggest that school attendance reduces contemporaneous juvenile property crime while *increasing* juvenile violent crime. These results are consistent with an ‘incapacitation effect’ of school that limits participation in property crime. However, the increased level of interaction among adolescents facilitated through schools may raise the likelihood of violent conflicts after school. It is important to distinguish between the contemporaneous effects of school attendance and crime estimated in this study from the effects of educational attainment

on subsequent crime estimated by Lochner and Moretti (2004) or Lochner (2004). There is no logical inconsistency between the findings of these studies.

The Effects of Arrest and Incarceration on Education

Hjalmarsson (2006) empirically examines the effects of juvenile arrests and incarceration (through age 16) on high school completion by age 19. Her main specifications control for youth cognitive achievement, juvenile criminal activity, and family background. She also considers additional models that account for state or family fixed effects to account for differences in state-level juvenile law enforcement and education policies as well as differences in family (and, therefore, neighborhood) environments. Her regression-based estimates suggest substantial effects of both arrest and incarceration on subsequent schooling attainment; however, she finds that her estimated effects for arrest may be largely due to unobserved heterogeneity across youth. Her findings for juvenile incarceration are more robust and suggest that youth who become incarcerated, holding their juvenile criminal activity and arrest rates constant, are roughly 25 percentage points less likely to complete high school by age 19 than similar youth who are not arrested.

Hjalmarsson (2006) next explores a number of mechanisms that may generate an effect of incarceration on schooling. First, she finds that the effects are substantially larger for parochial school students than public school students. Second, she finds that incarceration has its greatest effects on high school graduation when the sentence overlaps with the school year; however, the length of the sentence does not affect the probability of graduation. Finally, she finds that incarceration has substantially larger effects on high school completion in states that require the justice system to notify schools of an arrest when compared with other states that do not require notification. All of this evidence suggests that teachers and/or administrators may treat students differently if they are known to have been incarcerated. Thus, juvenile incarceration may carry a negative stigma in schools, just as it appears to in the labor market.

Education and Training in Prison

The vast majority of U.S. correctional facilities offer some form of education and training for prisoners, with GED (General Educational Development) preparation courses the most

common. To the extent that prison education programs help build valuable market skills (in the same way traditional schools do), we would expect them to increase post-release earnings and reduce recidivism. Unfortunately, convincing empirical studies on this topic are scarce, primarily because prisoners who choose to enroll in prison education programs likely differ from those choosing not to enroll. Tyler and Kling (2006) attempt to account for these differences through a rich set of prisoner characteristics (e.g. sentence length, marital status and number of dependents, employment status prior to arrest, offense type, and a measure of cognitive ability), comparing the post-release earnings of prisoners who received a GED in prison with similar high school dropout prisoners who did not. They further account for prisoner differences by controlling for pre-prison earnings. Their findings suggest that a GED earned in prison offers no post-release earnings benefit for white offenders, but it does increase the earnings of minority offenders for the first two years after release (by about \$800 per year). The earnings benefits for minorities fade quickly after the second year and are no longer statistically significant.

4 Conclusions

To the extent that education reduces crime, schooling may have important externalities and social benefits that are not taken into account by individuals. When making their schooling decisions, youth may not consider the important negative costs they impose on society if they choose to drop out of high school in favor of a life of crime. Thus, policies to promote schooling may benefit society through reduced crime, in addition to the more obvious gains from increased productivity. Lochner and Moretti (2004) estimate that a one percent increase in high school graduation rates would save the U.S. economy nearly \$2 billion from reduced costs associated with criminal activity.⁶ The social savings per additional male graduate from crime reduction alone amounts to \$1,600-2,900, or 14-26% of the private return to individuals from increased earnings.

⁶All social savings figures are reported in year 2006 dollars.

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Crime rates peak at age 18, and keeping teenagers in school during this key period can help ensure that they never proceed down the wrong track. a. A. Related. Neighbourhood spillovers in youth crime: Social interactions matter. Stephen Billings , David Deming, Stephen Ross.Â What is less well understood is how this education policy-induced crime reduction comes about. One channel might be that the extra education makes the individual more productive in the labour market and so boosts employment and wages.