Does Education Reduce Participation in Criminal Activities?

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1 Introduction

Criminologists and educators have long speculated that increasing the educational achievement of young males might lower the probability that they engage in criminal activities. There are several theoretical reasons for expecting a relationship between education and crime. First, and most importantly, schooling increases the economic returns to legitimate work. Second, education may directly increase the psychic cost of committing crime. Finally, schooling could alter preferences in indirect ways. For example, education may help teen-agers better understand all the consequences of their decisions, an ultimately make them more far-sighted and/or more risk adverse.

From the policy point of view, what matters is the exact magnitude of the effect of education on criminal activity. Policy makers are presumably interested not only in whether it is theoretically possible to reduce crime rates by raising the education of potential criminals, but also in whether it is cost effective with respect to other crime prevention measures.

Estimating the effect of education on criminal activity may also shed some light on the magnitude of the *social return* to education. Economists interested in the benefits of schooling have traditionally focused on the private return to education. However, researchers have recently started to investigate whether schooling generates benefits beyond the private returns received by individuals. Crime is a negative externality with enormous social costs. If education reduces crime, then schooling will have social benefits that are not taken into account by individuals. In this case, the *social return* to education may exceed the private return. The exact magnitude of the social return to education is crucial in determining the efficient amount of public investment in education. Given the large social costs of crime, even small reductions in crime associated with education may be economically important.

Although there are good *theoretical* reasons to expect that increases in high school graduation rates may result in lower crime rates, quantifying this relationship is not an easy task. The key difficulty in estimating the effect of education on criminal activity is that unobserved characteristics affecting schooling decisions are likely to be correlated with unobservables influencing the decision to engage in crime. For example, individuals who grow up in poor inner-city neighborhoods may be more likely to drop out from school, and at the same time may be more likely to engage in criminal activities. As a result, we might observe a negative correlation between crime and education even if there is no <u>causal</u> effect of education on crime. In other words, the correlation between education and crime may not be causal, but might simply reflect the influence of disadvantaged family background, bad peer influence and poverty in general.

Determining whether the correlation between schooling and criminal activity is causal is crucial for policy makers. If the negative association is causal, investing in public education will have important benefits not only for the individuals who acquire the extra schooling, but for society at large, in the form of lower crime rates. On the other hand, if the negative association is spurious—for example, if it is only driven by the influence of family background or peer effects— then investing in public education will not have much effect on crime rates. In this case, it would be better for policy makers to try to address the root causes of criminal behavior rather than focus on education.

To address this problem, some researchers have focused on changes in state compulsory attendance laws across states and over time. Changes in state compulsory attendance laws can be used to isolate the causal effect of schooling on crime from all the other determinants of criminal behavior that might pollute a simple correlation. Furthermore, compulsory schooling laws are likely

to be of direct interest for policy, because they represent one the most important tool available to policy makers to increase graduation rates.

Recent research shows that changes in these laws have a significant effect on educational achievement, and these changes do not simply reflect pre-existing trends toward higher schooling levels in states that increase compulsory education. In the years preceding increases in compulsory schooling laws, there is no obvious trend in schooling achievement. Increases in education associated with increased compulsory schooling take place *after* changes in the law. In other words, it seems that the increases in compulsory schooling raise education, not vice versa.

Notably, Lochner and Moretti (2004) find that states that raise high school graduation rates through increases in compulsory schooling experience significant decline in incarceration rates. In particular, one extra year of schooling results in a .10 percentage point reduction in the probability of incarceration for whites, and a .37 percentage point reduction for blacks. To help in interpreting the size of these impacts, consider that differences in average education between blacks and whites can explain as much as 23% of the black-white gap in incarceration rates.

FBI data on arrests indicate that most type of crime are affected. In particular, estimates uncover a robust and significant effect of high school graduation on arrests for both violent and property crimes, effects which are consistent with the magnitude of impacts observed for incarceration data. When arrests are separately analyzed by crime, the greatest impacts of graduation are associated with murder, assault, and motor vehicle theft.

Using these estimates, Lochner and Moretti (2004) calculate the social savings from crime reduction associated with high school completion. Their estimates suggest that a 1% increase in male high school graduation rates would save as much as $1.4 billion, or about $2,100 per additional male high school graduate. These social savings represent an important externality of education. The estimated externality from education ranges from 14-26% of the private return to high school graduation, suggesting that a significant part of the *social return* to education is in the form of externalities from crime reduction.

2 The Correlation Between Education and Crime

2.1 Theory

Theory suggests several ways in which educational attainment may affect subsequent criminal decisions. First, schooling increases individual wage rates, thereby increasing the opportunity costs of crime. Second, punishment is likely to be more costly for the more educated. Incarceration implies time out of the labor market, which is more costly for high earners. Furthermore, previous studies estimate that the stigma of a criminal conviction is larger for white collar workers than blue collar workers (see e.g. Kling (2002)), which implies that the negative effect of a conviction on earnings extend beyond the time spent in prison for more educated workers.

Third, schooling may alter individual rates of time preference or risk aversion. That is, schooling may increase the patience exhibited by individuals (as in Becker and Mulligan, 1997) or their risk aversion. More patient and more risk averse individuals would place more weight on the possibility of future punishments. Fourth, schooling may also affect individual tastes for crime by directly affecting the psychic costs of breaking the law. For example, Arrow (1997) discussing the social benefits of education, argues that

Like everything else interesting about human beings, preferences are a mixture of hereditary and environment. Schools must surely have a major part, if only because they occupy a large part of a child's day. It is a traditional view that not only does education influence values but it ought to do so.

Fifth, it is possible that criminal behavior is characterized by strong state dependence, so that the probability of committing crime today depends on the amount of crime committed in the past. By keeping youth off the street and occupied during the day, school attendance may have long-lasting effects on criminal participation.[1]

These channels suggest that an increase in an individual's schooling attainment should cause a decrease in his subsequent probability of engaging in crime. But, it is also possible that schooling raises the direct marginal returns to crime. For example, certain white collar crimes are likely to require higher levels of education. Education may also lower the probability of detection and punishment or reduce sentence lengths handed out by judges. Mustard (2001) finds little evidence of the latter.

2.2   Some Empirical Evidence

Irrespective of the reason, it is a well known fact that individuals with low levels of education are over-represented in the criminal justice system. For example, Table 1 reports incarceration rates by race and educational attainment. The table is based on data for men from the US Census of Population.

The Table clearly sows that the probability of imprisonment is substantially larger for blacks than for whites, and this is the case for all years and education categories. Incarceration rates for white men with less than twelve years of schooling are around .8% while they average about 3.6% for blacks over the three decades. Incarceration rates are monotonically declining with education for all years and for both blacks and whites.

An important feature to notice in Table 1 is that the reduction in the probability of imprisonment associated with higher schooling is substantially larger for blacks than for whites. For example, in 1980 the difference between high school drop outs and college graduates is .8% for whites and 3.5% for blacks. Because high school drop outs are likely to differ in many respects from individuals with more education, these differences do not necessarily represent the causal effect of education on the probability of incarceration. However, the patterns indicate that the effect may differ for blacks and whites.

This simple empirical regularity is difficult to interpret, because it does not control for the endogeneity of schooling. As I mention in the introduction, the most important difficulty in estimating the effect of education on criminal activity is that unobserved characteristics affecting schooling decisions may be correlated with unobservables influencing the decision to engage in crime.

For example, individuals with more disadvantaged family backgrounds may be more likely to drop out from school, and to engage in criminal activities. As a result, we might observe a

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[1]Estimates by Jacob and Lefgren (2003) suggest that school attendance reduces contemporaneous juvenile property crime while increasing juvenile violent crime. Their results are consistent with an incapacitation effect of school that limits student capacities for engaging in property crime, but they also may suggest that the increased level of interaction among adolescents facilitated through schools may raise the likelihood of violent conflicts.

negative correlation between crime and education. But this negative correlation may simply reflect the influence of family background, and have nothing to do with education er se. If the negative association is spurious—for example, if it is only driven by the influence of family background— then raising the schooling level of males will not have much effect on crime rates.

The literature on this question is large. But despite the many theoretical reasons to expect a causal link between education and crime, quantifying empirically this link has proven difficult, probably because of the endogeneity in schooling. For example, Witte (1997) concludes that "...neither years of schooling completed nor receipt of a high school degree has a significant affect on an individual's level of criminal activity." But this conclusion is based on only a few available studies, including Tauchen, et al. (1994) and Witte and Tauchen (1994), which find no significant link between education and crime after controlling for a number of individual characteristics.

More recently, Lochner (2003) estimates a significant and important link between high school graduation and crime using data from the National Longitudinal Survey of Youth (NLSY). Other research relevant to the link between education and crime has examined the correlation between crime and time spent in school (for example, Gottfredson, 1985). These studies find that time spent in school significantly reduces criminal activity – more so than time spent at work – suggesting a contemporaneous link between school attendance and crime.

Grogger (1998) estimates a significant negative relationship between wage rates and crime. However, he finds no relationship between education and crime after controlling for wages. Of course, increased wages are an important consequence of schooling. Freeman (1996), Gould, et al. (2000) , Machin and Meghir (2000), and Viscusi (1996) also establish a negative correlation between earnings levels (or wage rates) and criminal activity. The relationship between crime and unemployment has been more tenuous (see Chiricos (1987) or Freeman (1983 and 1995) for excellent surveys); however, a number of recent studies that better address problems with endogeneity and unobserved correlates (including Gould, et al. (2000) and Raphael and Winter-Ebmer (2001)) find a sizeable positive effect of unemployment on crime.

3   The Causal Effect of Education on Crime

3.1   The Effect of Compulsory Attendance Laws on Schooling Achievement

The estimates in Table 1 are consistent with the hypothesis that education reduces the probability of imprisonment. If so, the effect appears to be statistically significant for both whites and blacks, and quantitatively larger for blacks. However, these estimates are not easy to interpret. They may simply reflect the effects of unobserved individual characteristics that influence the probability of committing crime and dropping out of school. For example, individuals with a high discount rate or taste for crime, presumably from more disadvantaged backgrounds, are likely to commit more crime and attend less schooling. To the extent that variation in unobserved discount rates and criminal proclivity across cohorts is important, these simple correlations could overestimate the effect of schooling on imprisonment.

It is also possible that juveniles who are arrested or confined to youth authorities while in high school may face limited educational opportunities. Even though the data in the Table include only men ages 20 and older, some are likely to have been incarcerated for a few years, and others may

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be repeat offenders. If their arrests are responsible for their drop out status, this should generate a negative correlation between education and crime. Fortunately, this does not appear to be an important empirical problem.

Is the relationship between schooling and imprisonment uncovered in Table 1 causal? Lochner and Moretti (2004) provide evidence that indicates that the relation is indeed causal, and not spurious. Specifically, Lochner and Moretti use changes over time in the number of years of compulsory education that states mandate as an instrumental variable for education. Compulsory schooling laws have different forms. The laws typically determine the earliest age that a child is required to be in school and/or the latest age he is required to enroll and/or a minimum number of years that he is required to stay in school. They define years of compulsory attendance as the maximum between (i) the minimum number of years that a child is required to stay in school and (ii) the difference between the earliest age that he is required to be in school and the latest age he is required to enroll. They assign compulsory attendance laws to individuals on the basis of state of birth and the year when the individual was 14 years old. They create four indicator variables, depending on whether years of compulsory attendance are 8 or less, 9, 10, and 11 or 12.

Table 2 quantifies the effect of compulsory attendance laws on different levels of educational achievement. These specifications include controls for age, year, state of birth, state of residence, and cohort of birth effects. To account for the impact of Brown v. Board of Education on the schooling achievement of Southern born blacks, they also include an additional state of birth dummy for black cohorts born in the South turning age 14 in 1958 or later. Identification of the estimates comes from *changes* over time in the number of years of compulsory education in any given state.

Consider the estimates for whites presented in the top panel. Three points are worth making. First, the more stringent the compulsory attendance legislation, the lower is the percentage of high school drop outs. In states/years requiring 11 or more years of compulsory attendance, the number of high school drop outs is 5.5% lower than in states/years requiring 8 years or less (the excluded case). Second, the coefficients in columns 1 and 2 are roughly equal, but with opposite sign. For example, in states/years requiring 9 years of schooling, the share of high school drop outs is 3.3 percentage points lower than in states/years requiring 8 years or less of schooling; the share of high school graduates is 3.3 percentage points higher. This suggests that compulsory attendance legislation does reduce the number of high school drop outs by 'forcing' them to stay in school. Third, the effect of compulsory attendance is smaller, and in most cases, not significantly different from zero in columns 3 and 4.

The bottom panel in Table 2 reports the estimated effect of compulsory attendance laws on the educational achievement of blacks. These estimates are also generally consistent with the hypothesis that higher compulsory schooling levels reduce high school drop outs rates, although the coefficients in column 1 are not monotonic as they are for whites.

3.2 Causal Estimates of the Effect of Education on Incarceration

Having shown that compulsory schooling laws provide a plausible exogenous variation in graduation rates, Lochner and Moretti use this variation to estimate the causal effect of high school graduation on crime. Compulsory schooling laws are also directly interesting for policy makers, since they represent a key policy tool to raise educational achievement.

OLS and 2SLS estimates of the impact of high school completion are reported in Table 3.

Estimates for whites are presented in the top panel with estimates for blacks in the bottom. In column 1, covariates include year dummies, age (14 dummies for three-year age groups, including 20-22, 23-25, 26-28, etc.), state of birth, and state of current residence, which are all likely to be important determinants of criminal behavior and incarceration. To account for the many changes that affected Southern born blacks after Brown v. Board of Education, they also include a state of birth specific dummy for black men born in the South who turn age 14 in 1958 or later.

The OLS estimates indicate that white high school graduates have a 0.76 percentage points lower probability of incarceration than do drop outs. 2SLS estimates are quite similar. Incarceration rates among black graduates are 3.4 percentage points lower than among drop outs according to the OLS estimates. 2SLS estimates are larger, ranging from -7 to -8 percentage points.

To gauge the size of these impacts on incarceration, one can use these estimates to calculate how much of the black-white gap in incarceration rates is due to differences in educational attainment. In 1980, the difference in incarceration rates for whites and blacks is about 2.4%. Using the estimates for blacks, we conclude that 23% of the difference in incarceration rates between blacks and whites could be eliminated by raising the average education levels of blacks to the same level as that of whites.

4   Causal estimates of the Effect of Education on Arrest Rates

One limitation of the estimates presented so far is that they do not differentiate among different types of criminal offenses. Lochner and Moretti use arrest data collected by the FBI Uniform Crime Reports (UCR) by state, criminal offense, and age for 1960, 1970, 1980, and 1990. For each year and reporting agency, arrests are reported by age group, gender, and offense type.

The estimated impacts of education on arrest rates, by type of crime, are reported in Table 4. The top half distinguishes between violent and property crimes, while the bottom half examines arrests for more detailed types of crimes. Estimates for years of schooling are in columns 1 and 2. The upper panel shows similar effects across the broad categories of violent and property crime; however, the bottom panel suggests that the effects vary considerably within these categories. A one year increase in average years of schooling reduces murder and assault by almost 30%, motor vehicle theft by 20%, arson by 13%, and burglary and larceny by about 6%. 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.

Lochner and Moretti find very similar patterns when looking at the relationship between high school graduation rates and arrest rates, reported in columns 3 and 4. The estimates for detailed arrests imply that a ten percentage point increase in graduation rates would reduce murder and assault arrest rates by about 20%, motor vehicle theft by about 13%, and arson by 8%.

As a whole, these results suggest that schooling is negatively correlated with many types of crime even after controlling for a rich set of covariates that absorb heterogeneity at the state, year, crime, and age level. Both IV and OLS estimates are similar, again suggesting that endogeneity problems are empirically unimportant.

One might also expect effects of this magnitude based on the estimated impact of increased wage rates on crime and arrest rates. For example, Grogger (1998) estimates an elasticity of criminal participation with respect to wages of around 1-1.2 using self-report data from the NLSY.

Gould, et. al (2000) estimate the elasticity of arrest rates to the local wage rates of unskilled workers to be in the neighborhood of 1-2. When using March CPS data from 1964-90, a standard log wage regression controlling for race, experience, experience-squared, year effects, and college attendance yields an estimated coefficient on high school graduation of 0.49. Combining this estimate of the effect of schooling on wages with the elasticity of arrests with respect to wages estimated by Gould, et. al (2000) produces an impact of 0.5-1.0. That is, a 10% increase in high school graduation rates should reduce arrest rates by 5-10% through increased wages alone. This covers the range of estimates in Lochner and Moretti (2004) and confirms that an important explanation for the effect of high school graduation on crime resides in the higher wage rates associated with finishing high school.

5 Policy Implications: Social Savings from Crime Reduction

Given the estimated impact of education on crime, it is possible to determine the social savings associated with increasing education levels. Because the social costs of crime differ substantially across crimes, Lochner and Moretti use estimates based on the impact of schooling on arrests by offense type to determine the social benefits of increased education. Recognizing the inherent limitations of the exercise, they nonetheless provide a rough estimate of the social savings from crime reduction resulting from a 1% increase in high school graduation rates.

Columns 1 to 4 of Table 5 report the costs per crime associated with murder, rape, robbery, assault, burglary, larceny/theft, motor vehicle theft, and arson. Victim costs and property losses are taken from Miller, et al. (1996). Victim costs reflect an estimate of productivity and wage losses, medical costs, and quality of life reductions based on jury awards in civil suits. Incarceration costs per crime equal the incarceration cost per inmate multiplied by the incarceration rate for that crime (approximately $17,000). Total costs are computed by summing incarceration costs and victim costs less 80% of property losses, which are already included in victim costs and may be considered a partial transfer to the criminal.[2] The table reveals substantial variation in costs across crimes: violent crimes like murder and rape impose enormous costs on victims and their family members, while property crimes like burglary and larceny serve more to transfer resources from the victim to the criminal.

It is important to recognize that many costs of crime are not included in this table. For example, the steps individuals take each day to avoid becoming victimized – from their choice of neighborhood to leaving the lights on when they are away from home – are extremely difficult to estimate. More obvious costs such as private security measures are also not included in Table 5. Even law enforcement (other than costs directly incurred when pursuing/solving a particular crime) and judicial costs are absent here, mostly because they are difficult to attribute to any particular crime. Finally, the costs of other crimes not in the table may be sizeable. Nearly 25% of all prisoners in 1991 were incarcerated for drug offenses, costing more than $5 billion in jail and prison costs alone.

Column 5 reports the predicted change in total arrests in the U.S. based on the arrest estimates reported in panel B, column 4 of Table 4 and the total number of arrests in the Uniform Crime

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[2]For the crime of arson, total costs equal victim costs plus incarceration costs, since it is assumed that none of the property loss is transferred to the criminal.

Reports. The estimates imply that nearly 400 fewer murders and 8,000 fewer assaults would have taken place in 1990 if high school graduation rates had been one percentage point higher. Column 6 adjusts the arrest effect in column 5 by the number of crimes per arrest. In total, nearly 100,000 fewer crimes would take place. The implied social savings from reduced crime are obtained by multiplying column 4 by column 6 and are shown in column 7. Savings from murder alone are as high as $1.1 billion. Savings from reduced assaults amount to nearly $370,000. Because the estimates suggest that graduation increases rape and robbery offenses, they partially offset the benefits from reductions in other crimes. The final row reports the total savings from reductions in all eight types of crime. These estimates suggest that the social benefits of a one percent increase in male U.S. high school graduation rates (from reduced crime alone) would have amounted to $1.4 billion. And, these calculations leave out many of the costs associated with crime and only include a partial list of all crimes. Given these omissions, $1.4 billion should be viewed as an under-estimate of the true social benefit.

One might worry that our large estimated effects for murder combined with the high social costs of murder account for most of the benefits. When Lochner and Moretti, instead, use the estimated effects for violent and property crime in the top panel of Table 4, the resulting total social benefits from crime reduce to $782 million. (An overly conservative estimate that only considered savings from reductions in incarceration costs would yield a savings of around $50 million.)

The social benefit *per additional male graduate* amounts to around $1,170-$2,100, depending on whether estimates in the top or bottom panel of Table 4 are used. To put these amounts into perspective, it is useful to compare the private and social benefits of completing high school. Completing high school would raise average annual earnings by about $8,040. Therefore, the positive externality in crime reduction generated by an extra male high school graduate is between 14% and 26% of the private return to high school graduation. The externalities from increasing high school graduation rates among black males are likely to be even greater given the larger estimated impacts on incarceration and arrest rates among blacks. On the other hand, the fact that women commit much less crime than men, on average, suggests that the education externality stemming from reduced crime is likely to be substantially smaller for them.

For another interesting comparison, consider what a one percent increase in male graduation rates entails. The direct costs of one year of secondary school were about $6,000 per student in 1990. Comparing this initial cost with $1,170-$2,100 in social benefits per year thereafter reveals the tremendous upside of completing high school.[3]

How do these figures compare with the deterrent effects of hiring additional police? Levitt (1997) argues that an additional sworn police officer in large U.S. cities would reduce annual costs associated with crime by about $200,000 at a public cost of roughly $80,000 per year. To generate an equivalent social savings from crime reduction would require graduating 100 additional high school students for a one-time public expense of around $600,000 in schooling expenditures (and a private expense of nearly three times that amount in terms of foregone earnings). Of course, such a policy would also raise human capital and annual productivity levels of the new graduates

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[3]Because the arrest estimates reflect the average difference between all high school graduates and all drop outs (rather than comparing those with 12 versus 11 years of schooling), the estimated benefits are likely to be greater than the benefits that result from simply increasing the schooling of those with eleven years by one additional year. However, as Figure 3 reveals, 70% of the reductions seem to be associated with finishing the final year of high school.

by more than 40% or $800,000 based on our estimates using standard log wage regressions. So, while increasing police forces is a cost effective policy proposal for reducing crime, increasing high school graduation rates offers far greater benefits when both crime reductions and productivity increases are considered.

6   Conclusions

There are many theoretical reasons to expect that education reduces crime. By raising earnings, education raises the opportunity cost of crime and the cost of time spent in prison. Education may also make individuals less impatient or more risk averse, further reducing the propensity to commit crimes. To empirically explore the importance of the relationship between schooling and criminal participation, Lochner and Moretti 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.

All three of these data sources produce similar conclusions: schooling significantly reduces criminal activity. This finding is robust to different identification strategies and measures of criminal activity. The estimated effect of schooling on imprisonment is consistent with its estimated effect on both arrests and self-reported crime. Different estimators produce similar conclusions about the quantitative impact of schooling on incarceration and arrest. Lochner and Moretti find similar estimates when using aggregated state-level UCR data as they do using individual-level data on incarceration and self-reported crime in the Census or NLSY.

Given the consistency of their findings, it is reasonable to 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.

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. 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. It is difficult to imagine a better reason to develop policies that prevent high school drop out.

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Table 1: Census Incarceration Rates for Men by Education (in percentage terms)

	All Years	1960	1970	1980
White Men				
HS Drop Out	0.83	0.76	0.69	0.93
HS Graduate	0.34	0.21	0.22	0.39
Some College	0.24	0.21	0.13	0.27
College +	0.07	0.03	0.02	0.08
Black Men				
Drop Out	3.64	2.94	2.94	4.11
HS Graduate	2.18	1.80	1.52	2.35
Some College	1.97	0.81	0.89	2.15
College +	0.66	0.00	0.26	0.75

Notes: High school drop outs are individuals with less than 12 years of schooling or 12 years but no degree; high school graduates have exactly 12 years of schooling and a high school degree. Individuals with some college have 13-15 years of schooling, and college graduates have at least 16 years of schooling and a college degree.

Table 2: The Effect of Compulsory Attendance Laws on Schooling Achievement (in percentage terms)

	drop out (1)	high school (2)	some college (3)	college+ (4)
WHITES				
Compulsory Attendance = 9	-3.25	3.27	-0.04	0.03
	(0.34)	(0.37)	(0.17)	(0.20)
Compulsory Attendance = 10	-3.31	4.01	-0.30	-0.39
	(0.45)	(0.51)	(0.30)	(0.33)
Compulsory Attendance ≥ 11	-5.51	5.82	-0.68	0.36
	(0.47)	(0.52)	(0.26)	(0.32)
F-test [p-value]	47.91	45.47	3.05	1.67
	[0.000]	[0.000]	[0.027]	[0.171]
R-squared	0.12	0.02	0.04	0.05
BLACKS				
Compulsory Attendance = 9	-2.36	3.09	-0.69	-0.03
	(0.46)	(0.41)	(0.23)	(0.16)
Compulsory Attendance = 10	-1.76	4.06	-1.82	-0.47
	(0.65)	(0.64)	(0.39)	(0.23)
Compulsory Attendance ≥ 11	-2.96	5.02	-1.89	0.16
	(0.69)	(0.62)	(0.34)	(0.25)
F-test [p-value]	10.09	27.13	12.76	1.85
	[0.000]	[0.000]	[0.000]	[0.136]
R-squared	0.19	0.07	0.06	0.02

Notes: Standard errors corrected for State of Birth - Year of Birth clustering are in parentheses. The dependent variable in column 1 is a dummy equal to 1 if the respondent is a high school drop out. Coefficient estimates multiplied by 100. The dependent variables in columns 2-4 are dummies for high school, some college, and college, respectively. All specifications control for age, year, state of birth, state of residence, and cohort of birth. Sample in the top panel includes white males ages 20-60 in 1960, 1970, and 1980 Censuses; N = 3,209,138. Sample in the bottom panel includes black males ages 20-60 in 1960, 1970, and 1980 Censuses; N = 410,529. Age effects are 14 dummies (20-22, 23-25, etc.). State of birth effects are 49 dummies for state of birth (Alaska and Hawaii are excluded). Year effects are 3 dummies for 1960, 1970 and 1980. State of residence effects are 51 dummies for state of residence. Cohort of birth effects are dummies for decade of birth (1914-23, 1924-33, etc.). Models for blacks also include an additional state of birth dummy for cohorts born in the South turning age 14 in 1958 or later to account for the impact of Brown v. Board of Education. F-tests are for whether the coefficients on the excluded instruments are jointly equal to zero, conditional on all the controls (3 degrees of freedom).

Table 3: Estimates of the Effect of High School Graduation on Imprisonment (in percentage terms)

	OLS Estimates		IV Estimates	
	(1)	(2)	(3)	(4)
WHITES				
Second-Stage				
High School	-0.77	-0.77	-0.61	-0.89
	(0.02)	(0.02)	(0.35)	(0.37)
BLACKS				
Second-Stage				
High School	-3.39	-3.39	-7.23	-8.00
	(0.01)	(0.01)	(3.66)	(3.78)
Additional Controls:				
State of Residence × Year Effects		y		y

Notes: Standard errors corrected for state of birth - year of birth clustering are in parentheses. The dependent variable is a dummy equal to 1 if the respondent is in prison. All coefficient estimates multiplied by 100. All specifications control for age, year, state of birth, cohort of birth, and state of residence. Sample in the top panel includes white males ages 20-60 in 1960, 1970, and 1980 Censuses; N = 3,209,138. Sample in the bottom panel includes black males ages 20-60 in 1960, 1970, and 1980 Censuses. N = 410,529. Age effects include 14 dummies (20-22, 23-25, etc.). State of birth effects are 49 dummies for state of birth (Alaska and Hawaii are excluded). Year effects are 3 dummies for 1960, 1970, and 1980. State of residence effects are 51 dummies for state of residence. Cohort of birth effects are dummies for decade of birth (1914-23, 1924-33, etc.). Models for blacks also include an additional state of birth dummy for cohorts born in the South turning age 14 in 1958 or later to account for the impact of Brown v. Board of Education.

Table 4: OLS Estimates for Arrest Rates by Type of Crime

	Average Educ.		HS Grad. Rate	
	(1)	(2)	(3)	(4)
(A) VIOLENT vs. PROPERTY CRIME				
Violent Crime	-.121	-.116	-.751	-.793
	(.025)	(.044)	(.198)	(.291)
Property Crime	-.111	-.105	-0.593	-0.621
	(.026)	(.044)	(.208)	(.304)
(B) BY DETAILED TYPE OF CRIME				
Murder	-.276	-.274	-2.062	-2.133
	(.041)	(.058)	(.403)	(.403)
Rape	.113	.118	1.094	1.049
	(.037)	(.048)	(.307)	(.353)
Robbery	-.007	-.005	0.184	0.113
	(.031)	(.047)	(.253)	(.333)
Assault	-.297	-.292	-2.136	-2.179
	(.028)	(.048)	(.226)	(.326)
Burglary	-.057	-.052	-0.202	-0.250
	(.032)	(.048)	(.268)	(.347)
Larceny	-.058	-.052	-0.235	-0.277
	(.027)	(.045)	(.209)	(.311)
Vehicle Theft	-.201	-.197	-1.227	-1.271
	(.030)	(.048)	(.251)	(.346)
Arson	-.133	-.127	- 0.745	-0.784
	(.044)	(.053)	(.358)	(.408)
Additional Controls:				
state × year		y		y

Notes: Standard errors corrected for state-year-age clustering are in parentheses. Violent crimes include murder, rape, robbery, and assault. Property crimes include burglary, larceny, vehicle theft, and arson. Average schooling and high school graduation rate are by age group, state, and year (see text). All specifications control for percentage black, age × offense effects, offense× year effects, age × year effects, state × age effects and state × offense effects. There are 8 age groups, 8 offenses, 50 states, and 4 years. All models are weighted by cell size.

Table 5: Social Costs per Crime and Social Benefits of Increasing High School Completion Rates by 1%

	Victim Costs per crime (1)	Property Loss per crime (2)	Incarc. Cost per crime (3)	Total Cost per crime (4)	Est. Change in Arrests (5)	Est. Change in Crimes (6)	Social Benefit (4)×(6) (7)
Violent Crimes							
Murder	2,940,000	120	845,455	3,024,359	-373	-373	$1,129,596,562
Rape	87,000	100	2,301	89,221	347	1,559	- $139,109,278
Robbery	8,000	750	1,985	9,385	134	918	-$8,617,191
Assault	9,400	26	538	9,917	-7,798	-37,135	$368,252,227
Property Crimes							
Burglary	1,400	970	363	987	-653	-9,467	$9,342,643
Larceny/Theft	370	270	44	198	-1,983	-35,105	$6,944,932
Motor Vehicle Theft	3,700	3,300	185	1,245	-1,355	- 14,238	$17,728,056
Arson	37,500	15,500	1,542	39,042	-69	-469	$18,323,748
Total					11,750	94,310	$1,402,461,698

Notes: Victim costs and property losses taken from Table 2 of Miller, Cohen, and Wiersema (1996). Incarceration costs per crime equal the incarceration cost per inmate, $17,027 (Dept of Justice, 1996), multiplied by the incarceration rate. Total costs are calculated as the sum of victim costs and incarceration costs less 80% of the property loss (already included in victim costs) for all crimes except arson. Total costs for arson are the sum of victim costs and incarceration costs. See text for details. Estimated change in arrests calculated from panel B, column 4 of Table 4 and the total number of arrests in 1990 Uniform Crime Reports. Estimated changes in crimes adjusts the arrest effect by the number of crimes per arrest. The social benefit is the estimated change in crimes in column 6 times the total cost per crime in column 4. All dollar figures are in 1993 dollars. See text for details.