

Returns to the Public from Investing in an Excellent Education for All America's Children

A Focus on Black Males

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Overview of Our Study

It's a major controversy in the debate over how to rectify the problem of educational inequity in the U.S.: Do the benefits to society of investing in improved outcomes for the most disadvantaged students outweigh the costs? Often this question is framed along moral, altruistic lines. However, we have undertaken a cost-benefit analysis of five leading interventions that have been shown to significantly boost the high school graduation rates for young black males, who are educationally and economically the nation's most at-risk population. We find that if the black and white high school graduation rates were equalized through interventions such as these—an increase of 24,000 new high school graduates each year—society could save from \$3.3 to \$4.7 billion for each annual cohort of 20-year-old black males in costs from crime, health care, personal income and state and federal tax revenue.

More specifically, the net public benefit at age 20 for each additional black male high school graduate is between \$136,000 and \$198,000, meaning that for every dollar invested in raising high school completion among this group, there are two to four dollars in public benefits.

Ultimately we find that this is a case in which greater equity produces greater efficiency in the use of public resources. If there is any bias to our calculations, it has been to keep estimates of the benefits conservative so as not to overstate them. Even, so they show that the costs to the nation of failing to ensure high school graduation for black males are substantial.

The Size of the Challenge

The Importance of Education

Is excellent education for all America's children a good investment? We know that it is expensive, but poor and inadequate education for substantial numbers of our young may have public and social consequences that are even more costly. This study examines that question by looking not only at the cost of investing in services to provide an excellent education but also at the costs of not doing so.

An individual's educational attainment is considered to be one of the most important determinants of their life chances in terms of employment, income, health status, housing, and many other amenities. Thus, there is a common expectation

that all citizens will have access to high quality education that will reduce considerably the likelihood of later lifetime inequalities. Yet, large differences in educational quality and attainments persist across income, race, and region. And even with similar schooling resources, these educational inequalities persist because children from educationally and economically disadvantaged populations are less prepared to start school. They are unlikely to catch up without major educational interventions on their behalf.

In the U.S. we typically view educational inequality as a challenging public policy issue because of its implications for social justice. If life chances depend so heavily on education, it is important that educational inequalities be redressed so as to equalize opportunities in a democratic society. But, beyond the broader issue of fairness, such inequalities may create costly burdens for the larger society in excess of what it might take to alleviate the inequalities. An excellent education for all of America's children has benefits not only for the children themselves but also for the taxpayer and society. Poor education leads to large public and social costs in the form of lower income and economic growth, reduced tax revenues, and higher costs of such public services as health care, criminal justice, and public assistance. In this respect, we view efforts to improve educational outcomes for at-risk populations as a public investment that yields benefits in excess of investment costs.

What is an Excellent Education?

Precisely what constitutes an excellent education differs among observers. Some would argue for student performance on achievement tests. Others would say that all students should meet meaningful levels of proficiency in key subjects. Others yet would emphasize the ability to solve problems and to analyze complex situations.

We adopt high school graduation as a minimal criterion for an excellent education. High school graduation captures both the cognitive and non-cognitive attributes that are important for success in adulthood. It is usually a minimum requirement for engaging in further training and higher education. It opens up a range of future possibilities that would otherwise be closed to individuals and without which the possibilities for further advancement are extremely limited. Most importantly, for the population as a whole, we focus on high school graduation because we are far from fulfilling even this basic educational goal.

High School Graduation

Much attention has recently been devoted to measuring rates of high school graduation. Some students may complete high school but not graduate; others may graduate by obtaining the General Educational Development (GED) credential outside the school system. And graduation standards vary considerably across states.

Even without full consensus on a high school graduation standard, there is general agreement on two facts. First, graduation rates are low in absolute terms. On-time public high school graduation rates are approximately 66%–70%, meaning that at least three out of ten students do not graduate through the regular school system within the conventional time allotted. Second, graduation rates are much lower for black

and Hispanics, particularly for males. On-time public high school graduation rates for black males are as low as 43%; this compares to 48% for Hispanics and 71% for whites. Thus, although a large proportion of each cohort meets conventional educational expectations, a significant number have not received an ‘adequate education’.

Among all of the sub-populations, black males face the biggest challenge. Not only do they trail others in educational opportunities and outcomes in youth, but economic prospects in adulthood are not promising. Despite the nation’s strong economic growth in the 1990s, black male adults did see lower rates of unemployment, but they also experienced lower employment and labor force participation rates and significantly higher incarceration rates (Holzer and Offner, 2005). Other than education, there is a dearth of solutions to this situation; those that are offered tend to be reactive, such as making sure ex-offenders get job training programs, rather than proactive changes that would avoid involvement in the criminal justice system in the first place (Pouncy, 2005).

Thus, it makes sense to consider educational investments in black male dropouts as a high priority. To examine the current economic consequences, we focus on those black males who are not high school graduates at age 20 in 2005 (thereby allowing for those who graduate late).

TABLE 1 HIGHEST LEVEL OF EDUCATIONAL ATTAINMENT FOR THOSE AGED 20

	<i>Black males</i>		<i>White males</i>	
Less than 9th grade	6,000	2%	18,000	1%
High school dropout	67,000	22%	193,000	14%
High school graduate	99,000	33%	402,000	29%
Some college or above	133,000	44%	757,000	56%
Total Cohort Size	305,000		1,369,000	

SOURCE: Current Population Survey, March 2005.

NOTES: Race-specific adjustments are made for institutionalization and GED receipt.

Table 1 shows the distribution of black male educational attainment by age 20 alongside that for white males. There are 67,000 black males who are high school dropouts, which is 22% of this population. The corresponding figure for white males is 14%. College progression rates are lower for black males also. Simply equalizing the black and white high school graduation rates would generate an additional 24,000 black male graduates each year. Below we calculate the economic consequences of failing to ensure graduation per black male student and for the aggregate situation where black male graduation rates are lower than white male rates.

Educational Interventions to Raise High School Graduation Rates

Possible Interventions

To raise the rate of high school graduation for black males we need to identify educational interventions that work. From an extensive search, we found very few interventions that demonstrably increased high school graduation rates on the basis of rigorous and systematic evaluation. (Some interventions—such as small schools, charter schools, accountability programs, or vouchers – may be promising; but they have not been evaluated in terms of high school graduation).

TABLE 2 INTERVENTIONS THAT DEMONSTRABLY RAISE THE HIGH SCHOOL GRADUATION RATE

<i>Intervention</i>	<i>Details of the intervention</i>	<i>Extra high school graduates if intervention is given to 100 students</i>
PPP Perry pre-school program	1.8 years of a center-based program for 2.5 hours per weekday, child:teacher ratio of 5:1; home visits; and group meetings of parents.	19
CSR Class size reduction	4 years of schooling (grades K–3) with class size reduced from 25 to 15.	18
FTF First Things First	Comprehensive school reform of: small learning communities with dedicated teachers; family advocates; and instructional improvement efforts.	16
CPC Chicago child-parent center program	Center-based pre-school program: parental involvement, outreach and health/nutrition services. Based in public schools.	11
TSI Teacher salary increase	10% increase in teacher salaries for all years K–12.	3

SOURCES: PPP: Belfield et al. (2006); CSR: Finn et al. (2005); FTF : Quint (2005) ; CPC: Reynolds et al. (2002); TSI : Loeb and Page (2000);.

There are five interventions that demonstrated improvements in high school graduation rates based on a credible evaluation design. These are summarized in Table 2. Two of the interventions take place in pre-school (PPP and CPC), one is implemented in elementary school (CSR), one in high school (FTF), and one through the K–12 years. The pre-school programs involved intensive educational programs with small group sizes and they encouraged parental involvement. The class size reduction intervention is based on Project STAR, a four-year randomized field trial in Tennessee with significantly reduced class sizes for the treatment group. The high school intervention was First Things First, a model comprehensive school reform.

Finally, the teacher salary increase proposal is for a 10% increase in wages across all K–12 years. We express the impacts of these interventions assuming they are delivered to 100 students and based on high-quality peer-reviewed research on their expected outcomes. Although most students would graduate anyway, the effectiveness of each intervention is in the additional graduates that it yields. The Perry pre-school program is the most effective with 19 new high school graduates; at the opposite end of the spectrum, increasing teacher salaries by 10% would yield 3 new graduates with effects of other interventions between these two extremes.

Cost Per Intervention

Each of the interventions costs money. Table 3 reports the costs per person receiving the intervention, based on the inputs needed in each case. These costs also account for three important factors.

First, we must compare these costs with the later educational benefits in a consistent manner. We take the perspective of the current cohort aged 20. We express all costs and benefits in present value terms for a person aged 20. As intervention costs are incurred before age 20 (in the case of pre-school 16 years earlier), then they are weighted up; and the benefits are obtained after age 20, so they are weighted down. We weight figures using a discount rate of 3.5% and we report all figures in 2004 dollars.

Second, since our overall analysis is designed to compare the public benefits of additional high school graduates with the public costs, we calculate the public cost per additional graduate. Because we cannot target interventions perfectly, some students who receive the intervention would have graduated anyway. Table 3 shows the unit cost of delivering the intervention ranges from \$2,900 to \$13,100 per student. But the cost per new graduate will reflect the fact that delivering the interventions to 100 students will only generate between 3 and 19 new high school graduates. So the cost per new graduate is much higher.

Third, increasing the number of high school graduates will mean more costs for extending attendance in school as well as in college for those who are newly motivated to continue their educational participation. We include extra high school costs assuming two extra years are needed to graduate. Conservatively, we include extra college costs assuming the minimal college attendance rates and completion rates of black males in the lowest quartile for reading.

TABLE 3 PRESENT VALUE COSTS PER EDUCATIONAL INTERVENTION

	<i>Interventions to raise high school graduation</i>	<i>Cost per student ^a</i>	<i>Cost per expected high school graduate ^b</i>
FTF	First Things First	\$5,493	\$59,066
CPC	Chicago child-parent center program	\$4,728	\$67,714
PPP	Perry pre-school program	\$12,532	\$90,694
CSR	Class size reduction	\$13,075	\$97,373
TSI	Teacher salary increase	\$2,865	\$120,238

SOURCES: For intervention costs, see Levin et al. (2006, Technical Appendix). For school attainment costs, NCES (2002); for college attainment rates and costs, National Educational Longitudinal Survey (1988); Beginning Postsecondary Students Longitudinal Study (1996–2001).
NOTES: ^a Cost per student counts the costs of delivering the intervention. ^b Cost per expected high school graduate counts the costs of delivering the intervention and the induced extra attainment in high school and college. Present values are expressed using a discount rate of 3.5%.

Therefore, we express our results in terms of an ‘expected high school graduate’, i.e. someone who graduates from high school but may also progress on to college. This hypothetical individual is synthesized from the probabilities: of terminating education after high school or briefly attending a two-year college (0.75); of completing a two-year degree or attending a four-year college (0.17); and of completing a four-year degree (0.08). Each new ‘expected high school graduate’ therefore has more education beyond high school.

Table 3 shows the total costs per new expected high school graduate. These costs account for: delivering the intervention to students who would graduate regardless; extra high school costs for the new graduates; and extra college costs for those who go on to further study. These costs are considerably higher than the unit costs of delivering the intervention. The cost per new expected high school graduate ranges from \$59,100 for First Things First to \$120,000 for teacher salary increases. These total cost figures show that a significant investment is required to generate and support each new high school graduate. At issue is whether this investment is worth making.

The Effects on Labor Market Income and Tax Revenue

Education and the Labor Market

One of the best documented relationships in economics is the link between education and income: higher educated people have higher incomes. Failure to graduate from high school has both both private and public consequences: income is lower, which means lower tax contribution to support the finance of public services .

Many studies using various methods have tested whether the education to earnings correlations indicate causation. This body of evidence is generally consistent: the eco-

conomic return generated by schooling does not appear to be dominated by an omitted correlation between schooling and other personal characteristics. And despite what is sometimes claimed, one does not see clear evidence that the effect of schooling on earnings is associated solely with receipt of the credential; higher earnings reflect the skills learnt in school. Also, there is no strong evidence that this conclusion varies according to race, gender, or ability level. Thus, wage comparisons across education and age levels are likely to yield reliable estimates of the benefits of schooling.

We use national survey data from the Current Population Survey to estimate the differences in earnings by education level, based on a sample of approximately 11,000 black males. These data report on many sources of income, on hourly wages and on salaries, and on time spent working. We can therefore account for both higher pay and the increased likelihood of being employed for those with a high school diploma. With data on incomes, we then apply a tax simulation model (TAXSIM) to calculate federal and state income taxes.

TABLE 4 LABOR MARKET OUTCOMES BY EDUCATIONAL ATTAINMENT FOR BLACK MALES

	<i>High school dropout</i>	<i>High school diploma</i>	<i>High school diploma or more</i>
<i>Aged 21–64:</i>			
Employed	49%	67%	72%
Unemployed	10%	9%	8%
Not in the labor force—other	41%	24%	20%
Weeks worked last year	25	36	38
Annual earnings (all persons)	\$12,262	\$22,199	\$31,230
<i>Aged 21–35:</i>			
Employed	51%	67%	71%
Unemployed	16%	12%	10%
Not in the labor force—other	33%	21%	19%
Weeks worked last year	26	35	37
Annual earnings (all persons)	\$10,674	\$18,808	\$24,387

SOURCE: March Supplement of the Current Population Survey, 2003 and 2004.

NOTES: Annual earnings figures include all persons, i.e., persons with positive or zero income. The CPS does not distinguish GED-holders from graduates. These figures are not adjusted for differences in incarceration rates by education level.

Table 4 shows the differences in labor market outcomes by education level for black males. The top panel shows information for black males aged 21–64. Black male dropouts are less likely to be employed and more likely to be unemployed or out of the labor force. They work approximately 2.5 fewer months per year than high school graduates. Importantly, dropouts’ earnings are lower, at \$12,300 per year or nearly one-half that earned by high school graduates and one-third of that earned by those with at least a high school diploma. These lower earnings reflect lower wages and fewer hours and weeks worked per year.

The bottom panel of Table 4 shows the same information, but restricted to black males aged 21–35. The comparison with the top panel captures age differences: younger workers have inferior jobs and less stable attachment to the labor market. But it may also capture circumstantial differences: today’s younger workers may face relatively inferior jobs compared to younger workers in previous generations. As shown, the younger persons in today’s labor market have higher unemployment rates and lower earnings.

Lifetime Income and Tax Benefits from Graduation

We calculate the age-earnings profile for African American men across an individual’s working life expressed in present values. Table 5 shows lifetime earnings after age 20 and lifetime income tax payments across different education levels.

TABLE 5 PRESENT VALUE OF LIFETIME EARNINGS AND INCOME TAX PAYMENTS FOR BLACK MALES

	<i>High school dropout</i>	<i>High school graduate</i>	<i>Some college</i>	<i>BA degree or more</i>
<i>Absolute:</i>				
Earnings	\$292,174	\$601,845	\$858,755	\$1,478,989
Income tax payments	\$117,957	\$222,418	\$328,591	\$606,940
<i>Extra over high school dropouts:</i>				
Earnings		+\$309,672	+\$566,581	+\$1,186,815
Income tax payments		+\$104,462	+\$210,634	+\$488,983

SOURCES: March Supplement of the Current Population Survey, 2003 and 2004; TAXSIM (Version 6).

NOTES: Annual earnings figures include all persons, i.e., persons with positive or zero income. The CPS does not distinguish GED-holders from graduates. Figures are adjusted for differences in incarceration rates by education level. Productivity growth is assumed at 1.5% per year. Tax payments are calculated in two ways: assuming all males are single and all males are household heads. Reported tax payments are the average of these two approaches.

The present value lifetime earnings of black male dropouts are \$292,000. Graduates earn twice as much, those with ‘some college’ three times as much, and those who obtain a BA degree earn five times that of a dropout. There are correspondingly large differences in tax payments. A black male high school dropout contributes \$118,000 in income taxes over his lifetime. For graduates, income tax contributions are \$222,000 and those with college education contribute significantly more. The bottom panel of Table 5 summarizes these earnings and tax differentials between dropouts and others. The income tax differentials are substantial at \$104,000 for graduation, rising to \$489,000 for those completing college. Property taxes and sales taxes add another 5% to these differences.

The Effects on Health Status and Expenditures

Education and Health

High school graduates not only have a higher income, but they also have improved health status, lower rates of mortality, and fewer social problems. Moreover, there are significant racial disparities in men's health: while on average white males live to 75 years of age, African American males live to only 69 (Arias et al., 2003). This amounts to 2.2 million years of life lost among African American males relative to whites every year. If education and income were equalized, these excess deaths fall by half, and differences in morbidity disappear (Franks et al., 2005).

However, the effects of education on public health costs are not straightforward. Those with higher educational attainment are less likely to use public insurance plans than those with less education. They typically have higher quality jobs that provide health insurance. And, because Medicaid eligibility is based on wages rather than health status, those with more education are less likely to qualify. But lower morbidity and mortality rates do not necessarily translate into lower medical costs. Those with more education use more preventive care and tend to visit doctors when they have less severe ailments. This offsets the cost savings from improved overall health. Moreover, sicker people are more likely to die young, thus reducing the rolls of public programs such as Medicaid. Therefore, improving educational attainment may produce little net change in per enrollee expenditures for those already enrolled in insurance programs such as Medicaid.

All citizens are eligible for Medicare at age 65, and high school graduates cost almost 30% less per enrollee than high school dropouts. However, because these effects are 45 years in the future for our cohort, they are not economically significant for 20 year olds. But, persons under 65 who are on social security disability income also qualify for Medicare, and their per enrollee costs are three times those of non-disabled enrollees. So, to the extent that education reduces the probability of disability, it should also proportionately reduce Medicare enrollment, and therefore reduce public sector costs.

In sum, increasing educational attainment will likely produce the following effects. First, given the causal link between educational attainment and income, the public sector will save money by reducing enrollment in Medicaid and other means-tested programs. Second, if there is a causal link between educational attainment and disability, the public sector will save money by reducing enrollment in Medicare among persons under the age of 65. It may also reduce expenditures among Medicaid beneficiaries by reducing the number of severely ill enrollees.

We use data from a nationally representative sample of over 40,000 non-institutionalized civilian subjects (MEPS, 2002). Information is available on health-related quality of life scores (QALYs) and public insurance enrollments. Public sector costs data are from the National Health Accounts. Table 6 shows tabulations of health status, public insurance rates and public expenditures for black males.

TABLE 6 HEALTH STATUS, PUBLIC INSURANCE RATES, AND PUBLIC EXPENDITURES

	<i>High school dropout</i>	<i>High school graduate</i>	<i>Some college</i>	<i>College graduate</i>
<i>Health status (QALYs/Year):</i>				
Age 18–24	0.86	0.89	0.93	0.96
Age 65	0.68	0.71	0.74	0.77
<i>Public insurance enrollment:</i>				
Age 18–24	70%	56%	41%	28%
Age 65	16%	10%	5%	3%
<i>Annual public expenditures:</i>				
Age 18–24	\$7,361	\$5,904	\$4,340	\$2,929
Age 65	\$1,691	\$1,002	\$575	\$324

SOURCES: Medical Expenditure Panel Survey (2002); National Health Accounts.

NOTES: QALY is defined as the proportion of one year of life spent in perfect health.

There are dramatic differences in health status. High school dropouts have very low health levels compared to high school graduates and college graduates: the annual differences are 0.03–0.1 quality-adjusted years of good health. Public insurance enrollment rates are 14 percentage points lower for high school graduates and 42 percentage points lower for college graduates relative to high school dropouts. Correspondingly, annual public expenditures are much higher for dropouts. These differences hold for all age groups from 18 to 65.

Lifetime Health Benefits from Graduation

We correlate the likelihood of a young black male’s being on public insurance with his educational attainment, controlling for age and income. We then multiply the proportion insured by the mean per enrollee cost to estimate the public expenditure costs. To get lifetime expenditures we adjust for age-specific and education-specific mortality rates. Annual differences across education levels are therefore transformed into a lifetime difference in public health expenditures.

TABLE 7 LIFETIME PRESENT VALUE PUBLIC MEDICAL COSTS

	<i>High school dropout</i>	<i>High school graduate</i>	<i>Some college</i>	<i>College graduate</i>
Absolute public costs	\$108,585	\$83,179	\$57,421	\$37,346
Saving over high school dropout		+\$25,406	+\$51,164	+\$71,239

Lifetime expenditures are shown in Table 7. Public health expenditure on a high school dropout is \$109,000; for a graduate, the figure is \$83,000 and it is even lower for those who attended college. Therefore, net public spending on health is \$25,000 lower for each additional high school graduate, rising to \$71,000 if the high school graduate goes on to complete college.

The Effects on Crime Behavior and Expenditures

Education and Crime

Broadly, crime research finds that higher educational attainment reduces crime. The causal mechanism may be either behavioral or financial: higher educational attainment may directly influence criminal predispositions; or by raising earnings and earnings potential, higher educational attainment reduces the pressure to commit crime and raises the opportunity cost (of job loss). The relationship holds for many juvenile and adult crimes; and there is a strong correlation between being a dropout and being incarcerated: although they constitute less than 20% of the overall population, dropouts make up 54% of the state prison inmate population (Bonczar, 2003).

The relationship is magnified for black males. They are six to eight times more likely to be imprisoned than white males. Among young black males, approximately one-in-four dropouts are incarcerated, compared to one-in-ten high school graduates (Harrison and Karberg, 2003).

The economic cost of crime is high. From the public perspective, there are four main costs to the government: criminal justice system costs for policing and for trials and sentencing; incarceration costs (including parole and probation); state-funded victim costs (medical care and from lost tax revenues); and expenditures of government crime prevention agencies. Although victims bear most of the costs of crime, these are not (directly) counted in the public's balance sheet.

TABLE 8 ANNUAL CRIMINAL ACTIVITY BY BLACK MALE DROPOUTS AT AGE 20

	<i>Murder</i>	<i>Rape</i>	<i>Violent crime</i>	<i>Property crime</i>	<i>Drug offenses</i>
Arrests per dropout	0.002	0.002	0.040	0.059	0.119
Crimes per dropout	0.003	0.007	0.092	0.383	1.188
Impact per expected high school graduate	-19.6%	-19.6%	-19.6%	-10.4%	-11.5%

SOURCES: Uniform Crime Reports (UCR, 2004, Tables 39, 42, 43a); Belfield et al. (2006); Lochner and Moretti (2004).

NOTES: Data adjusted for UCR undersurvey and for college progression rates. Figures are rounded to 3 decimal places.

We focus specifically on the high cost crimes: murder, rape/sexual assault, violent crime, property crime, and drugs offenses. Table 8 shows the annual criminal activity for the cohort of 20-year old black males who are dropouts. It shows high numbers of arrests and crimes for these five crime types. The final row shows the impact of high school graduation (adjusted for college progression) on the commission of these crimes: rates of crime are reduced by 10–20%. This reduction in crime is assumed to have a corresponding effect on incarceration rates.

Lifetime Criminal Activity and Graduation

Using Bureau of Justice Statistics data and survey information we calculate the public cost per crime and per arrest for each of these five crime types. Each crime imposes costs in terms of policing, government programs to combat crime, and state-funded victim costs. But each arrest also imposes costs in terms of trials, sentencing, and incarceration. The costs per crime and arrest vary according to the type of crime (mainly because of differences in prison sentences).

TABLE 9 CHANGE IN COSTS PER EXPECTED HIGH SCHOOL GRADUATE AT AGE 20

<i>Cost saving across five crime types</i>	
Cost saving per expected high school graduate:	
Crime costs (policing)	\$801
Arrests costs (trial/sentencing)	\$48
Incarceration costs	\$4,127
Parole costs	\$157
Total	\$5,132

SOURCES: Cohen (2005); Belfield et al. (2006); Stephan (1999).

NOTES: Figures are only for those age 20.

To estimate the annual cost-saving from increased rates of high school graduation, we multiply the unit cost by the reduction in crime. The resulting cost-savings for black males who are aged 20 is reported in Table 9. This amount of \$5,100 is the single year effect from higher educational attainment. It shows that most of the cost-savings are from lower incarceration costs although there are also substantial savings from lower criminal activity. The lifetime of education on crime costs can be extrapolated by accounting for the rate at which criminal activity declines with age. Data from the Bureau of Justice Statistics is used to map how crime falls as a person ages.

The Aggregate Consequences of Inadequate Education for Black Males

The Benefits of High School Graduation

High school graduation is associated with higher incomes, better health, and lower criminal activity. This has private benefits, but it also produces significant public benefits. When we calculate these benefits in a consistent form, their magnitudes are substantial.

TABLE 10 PUBLIC BENEFITS FROM INCREASED HIGH SCHOOL GRADUATION RATES FOR BLACK MALES

<i>Present value lifetime public benefits</i>	
<i>Per extra "expected high school graduate":</i>	
Increased tax revenues	\$167,623
Reduced costs: health	\$33,518
Reduced costs: crime	\$55,524
Total	\$256,665
 <i>Aggregate effect per annual cohort of 20-year-olds if black and white high school graduation rates were equal:</i>	
Increased tax revenues	\$4.023 billion
Reduced costs: health	\$846 million
Reduced costs: crime	\$1.333 billion
Total	\$6.202 billion

NOTES: Expected high school graduates are graduates adjusted for the probability of progressing onto two-year and four-year colleges. Tax payments include federal and state income taxes, sales tax, and property tax. Equating black and white male graduation rates entails 24,000 additional high school graduates.

Table 10 shows the lifetime public benefits produced per new 'expected high school graduate'. The extra tax revenues are \$168,000; the health cost-savings are \$34,000; and the crime cost-savings are \$56,000. In total, from age 20 to age 65 each extra high school graduate will yield lifetime savings to the government of \$257,000.

Across each age cohort the public benefits are large. If the black and white male high school graduation rates were equalized, there would be 24,000 new high school graduates each year. The total savings would amount to \$6.2 billion for each annual cohort of black males reaching the age of 20.

Public Investment Returns

The public costs of investment in better education must be weighed against the public benefits in order to ascertain the returns to the investment. We therefore compare the costs for each of the five interventions which have been found to raise high school graduation rates.

Table 11 shows the net present values at age 20 of the lifetime public benefits of high school graduation for black males for each of the five potential interventions. The first row shows the cost of producing a new ‘expected graduate’, depending on which of the five interventions is implemented. The second row shows the anticipated benefits per new graduate. The third row shows the Net Present Value, i.e. the difference between the discounted costs and benefits. For each additional black male high school graduate the net public benefit at age 20 is between \$136,000 and \$198,000. The benefit-cost ratio ranges from 2.13 to 4.35 among the alternatives. This means that for every dollar invested in raising high school completion among this group, there are two to four dollars in public benefits.

The most cost-effective intervention is First Things First, the comprehensive high school reform. The two early childhood investments and class size reduction also produce solid investment returns. The least cost-effective intervention is increasing teacher salaries, although this still easily passes a cost-benefit test in returning more than two dollars of public benefits for every dollar of public investment.

TABLE 11 LIFETIME PUBLIC COST-SAVINGS OF HIGH SCHOOL GRADUATION FOR BLACK MALES FROM AGE 20

	<i>Interventions to raise high school graduation ^a</i>				
	<i>First Things First</i>	<i>Chicago Parent-Child Centers</i>	<i>Class size reduction</i>	<i>Perry Pre-school</i>	<i>Teacher salary increase</i>
Per new graduate:					
Costs	\$59,066	\$67,714	\$85,267	\$90,694	\$120,238
Benefits	\$256,665	\$256,665	\$256,665	\$256,665	\$256,665
Net Present Value	\$197,599	\$188,951	\$171,398	\$165,971	\$136,427
Benefit/Cost ratio	4.35	3.79	3.01	2.83	2.13
Aggregate effect if black and white male graduation rates are equal	\$4.74 bn	\$4.54 bn	\$4.11 bn	\$3.98 bn	\$3.27 bn
NOTES: ^a For details on each intervention, see Table 2. To equate black and white male graduation rates for those aged 20 would require 24,000 additional black male high school graduates. Present values are based on a 3.5% discount rate.					

In the aggregate, these effects are substantial. Simply equalizing the black male and white male high school graduation rates for a single cohort of 20 year olds would yield a net public benefit of from \$3.3 to \$4.7 billion. This is an annual benefit as it applies to each age cohort.

What is remarkable and must be emphasized is that an investment to produce greater equity also produces greater efficiency in the use of public resources. Although more than half of the public benefits accrue to the federal government from

these educational investments, the federal government pays only about 10% of the cost of elementary and secondary education. Thus, the incentive structure for reaping the benefits is not well-aligned with the tax structure that is designed to cover the costs of education. Education finance reform and political agreement is therefore needed to ensure the appropriate educational investments are made.

It is important to emphasize that although we believe that the magnitudes of investment costs and benefits estimated in this article are responsible and defensible, they should not be viewed as precise. They are estimates that are based upon the available data and what we deem as acceptable methods of analysis. If there is any bias in the calculations, it has been to keep estimates of the benefits conservative so as not to overstate them. Indeed, we believe that they are understated both in how the benefits are counted and in the omission of some benefits (such as to the welfare system). Even so, they show that the costs to the nation of failing to ensure high school graduation for black males are substantial.

Citations

Full information on the calculations is available in a Technical Appendix from levin@tc.edu.

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