The Economic Payoff to Educational Justice

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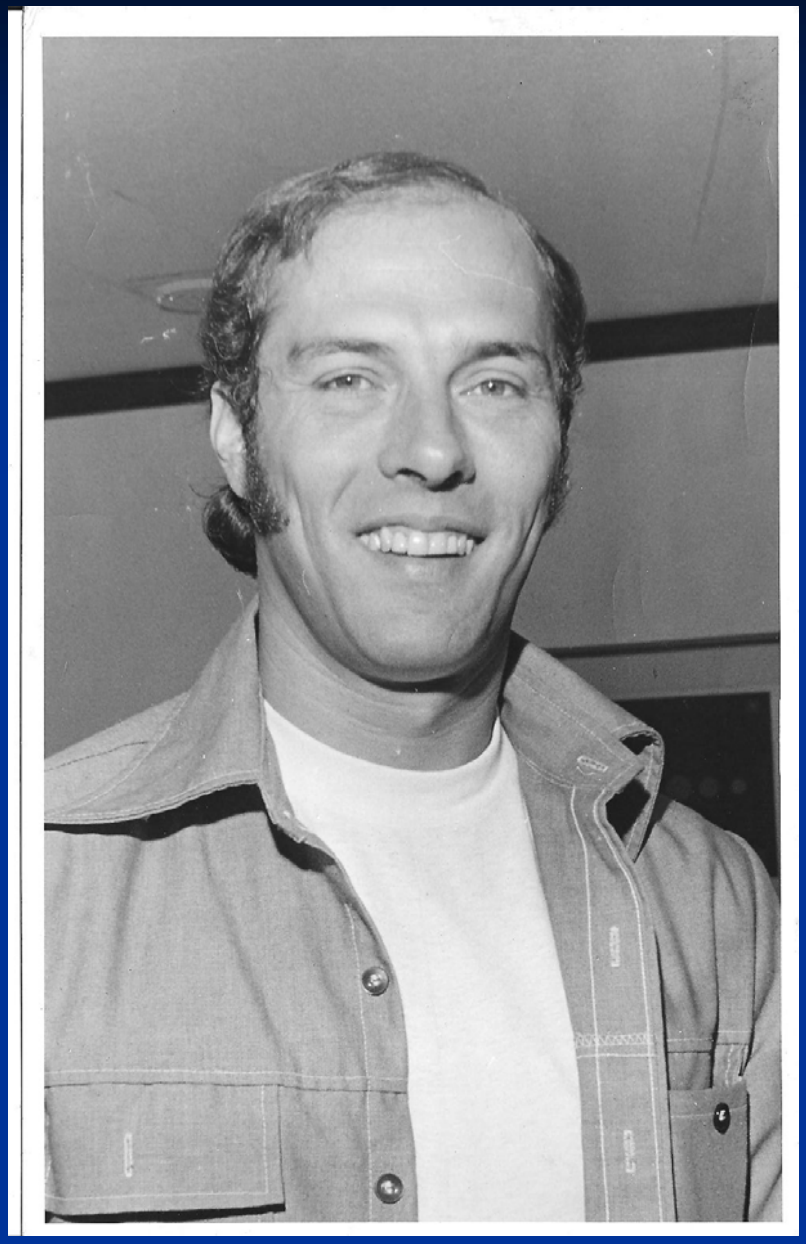
Educational Justice

- Equity in Education is a Moral Imperative
- Largely a matter of fairness or justice
- But inadequate education also exacts toll on society in terms of lost productivity and tax revenues and higher costs of public service
- Goal is to look at educational equity and adequacy as a social investment in terms of costs and benefits.



92d Congress
2d Session

COMMITTEE PRINT

THE COSTS TO THE NATION OF INADEQUATE EDUCATION

SELECT COMMITTEE ON EQUAL EDUCATIONAL OPPORTUNITY UNITED STATES SENATE

FEBRUARY 1972

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1972 U.S. Senate Report-Cost of Inadequate Education

Analysis for 25-34 Year Old Males, 1970

- $237 billion lost in lifetime earnings for failure to graduate from high school ($1.2 trillion in 2004 dollars).
- $71 billion in tax revenues lost ($350 billion in 2004 dollars).
- $40 billion in costs to achieve 100 percent graduation ($200 billion in 2004 dollars)
- Benefit-to-Cost Ratio of Almost 2:1.

Problems of 1972 Study

- No Reliable Evaluations of Dropout Interventions.
- No reliable cost data.
- Assumed 50 percent increase in spending K-12 would do job.
- Assumed upward ability bias of 25 percent.
- Lack of good data sets on education and public health costs, criminal justice costs, public assistance costs.
- What data did exist did not include covariates to adjust for non-educational factors.

Redux

- Revisited Beginning 2004.
- Research Team Colleagues:

  Clive Belfield, Economics, Queens College, CUNY.

  Cecilia Rouse, Economics, Princeton.

  Peter Muennig, Public Health, Columbia.
- Series of Studies.

High school dropouts

- Many ways to count dropouts but end result is the same
- Approx. 3 of 10 students are dropouts
- Rate higher for males than females
- For minorities, 4 of 10 are dropouts
- US lags most industrialized countries in graduation rates
- Dropouts rising, not falling (Heckman 2008)
- Single cohort 20 year olds, 700,000 dropouts

How to reduce the dropout rate

- Many factors influence dropouts
- Inadequate educational investment is one
- Search for interventions that have been demonstrated, using a strong research method, to reduce the dropout rate
- Over 200 references, but few with strong evaluations and results

Effective Interventions

- Longitudinal to link interventions with high school graduation
- Use of experimental or strong, quasi-experimental design
- Evaluation implementation of a high quality.
- Only 5 of more than 200 intervention studies met these criteria.

TABLE 2 INTERVENTIONS THAT DEMONSTRABLY RAISE THE HIGH SCHOOL GRADUATION RATE

Intervention		*Details of the intervention*	*Extra high school graduates if intervention is given to 100 students*
PPP	Perry preschool 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
FTF	First Things First	Comprehensive school reform of: small learning communities with dedicated teachers; family advocates; and instructional improvement efforts.	16
CSR	Class size reduction	4 years of schooling (grades K–3) with class size reduced from 25 to 15.	11
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.	5

SOURCES: Belfield et al. (2006); Quint et al. (2005); Finn et al. (2005); Reynolds et al. (2001); Loeb and Page (2000).

Cost Determination and Cost-Effectiveness

- Few evaluations include costs.
- Those evaluations that mention costs provide no information on cost methods used.
- Evaluators typically have little understanding of how to measure costs

Cost-Methdology

- Established consistent method based upon accepted economic criteria (1975)
- Expansion and applications in Cost-Effectiveness Analysis (1983) and (second edition, 2001).
- Used for Perry Preschool (Barnett 1985).
- Used to compare cost-effectiveness of four interventions: computer-assisted instruction, smaller class size, longer school days, and peer tutoring (Levin, Glass, and Meister 1987).

Steps Required for Costing

- Specify resource ingredients necessary for intervention.
- Determine from reports, observations, interviews—

Rarely is detail found in evaluations of interventions.

- Establish market price or shadow price of each ingredient.
- Determine total cost of intervention.
- Determine cost per participant or set number of participants.

Application to Dropouts

- Estimate cost per 100 participants.
- Divide this cost by the number of "additional graduates" attributed to intervention.
- Add costs of additional years of schooling for additional graduates.
- Add costs of post-secondary education for estimated transition to higher education of portion of additional graduates.
- Assumes transition to higher education will be lower than average—used bottom quartile in reading.

Present Value

- Convert to present value at Age 20 of overall investment at 3.5 percent interest rate for comparison with benefits.
- Present values of costs and benefits can be compared directly.
- Lottery example--$1 million received as $50,000 over 20 years or as lump sum.

TABLE 3 PRESENT VALUE COSTS PER EDUCATIONAL INTERVENTION AT AGE 20

Interventions to raise high school graduation		*Cost per student* [a]	*Cost per expected high school graduate* [b]
FTF	First Things First	$5,500	$59,100
CPC	Chicago child-parent center program	$4,700	$67,700
TSI	Teacher salary increase	$2,900	$82,000
PPP	Perry preschool program	$12,500	$90,700
CSR	Class size reduction	$13,100	$143,600

SOURCES: See Table 2 and NCES (2002).

NOTES: [a] The unit cost of delivering the intervention. [b] The cost of delivering the intervention to 100 students and the induced extra attainment in high school and college for the new high school graduates. Discount rate is 3.5%.

The benefits of graduation

1. Private benefits to the individual who graduates

2. Fiscal benefits to the taxpayer
   - Higher tax revenues because of increased earnings
   - Lower government expenditures on health, crime, welfare, remedial education, public services

Fiscal benefits per additional high school graduate

1) Identify the “causal impact” of education on earnings, health, crime, and welfare
2) Calculate the economic benefit to the taxpayer of each “causal impact” spread over the lifetime
3) Expressed as present value at age 20

Present Value Age 20

- Like a Certificate of Deposit
- Benefits and costs occur over time
- Present value takes account of when they are incurred or received and tells us what they are worth at point in time.
- Similar to lump sum payment for winning lottery instead of 20 years of annual payments

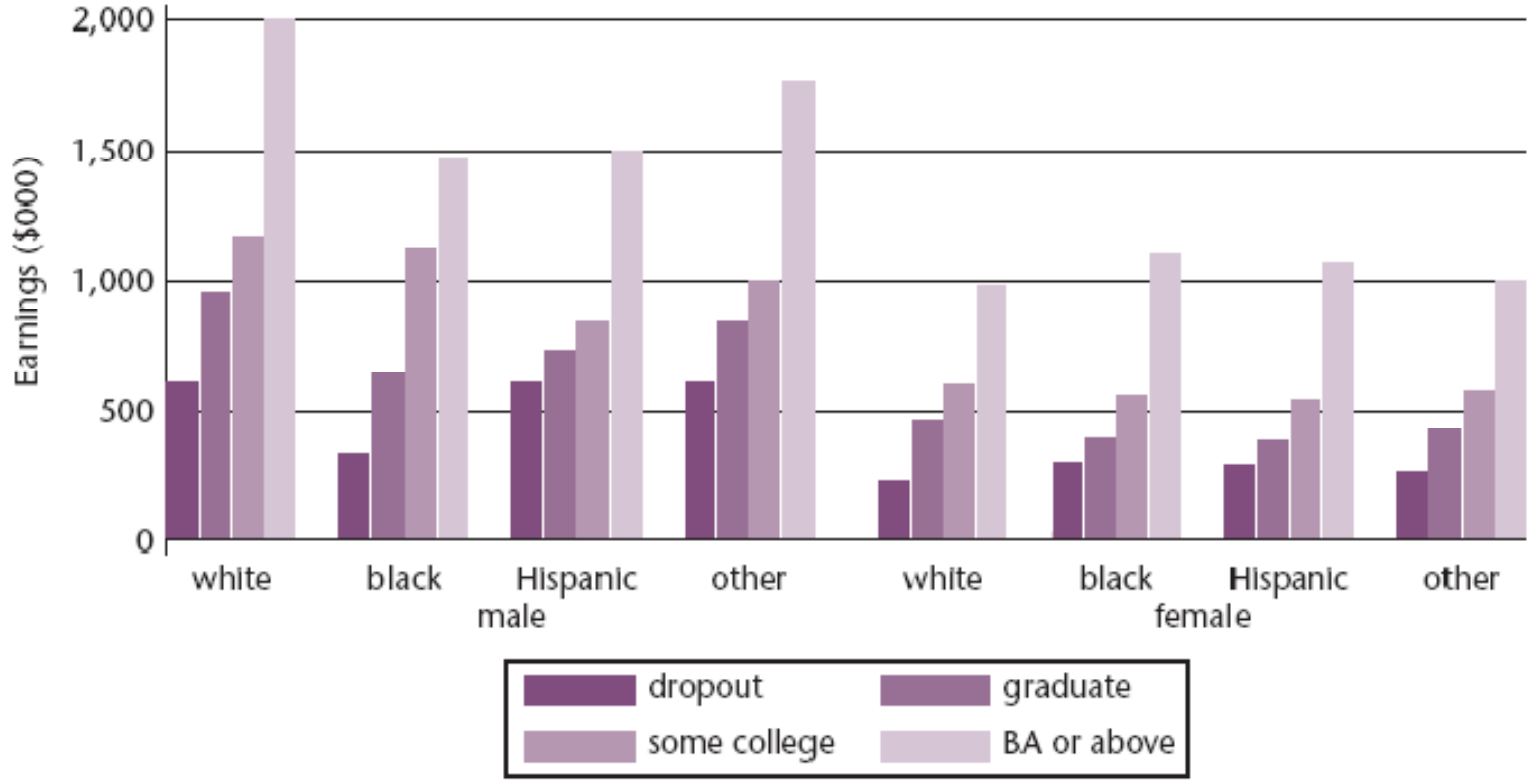
TABLE 4 LABOR MARKET OUTCOMES BY EDUCATIONAL ATTAINMENT (AGED 21–64)

	High school dropout	*High school graduate*	*Some college*	*BA degree or more*
Employment (%):				
Male: white	71	79	81	89
Male: black	49	66	70	83
Male: Hispanic	70	78	69	85
Male: other	71	79	77	88
Female: white	46	65	72	78
Female: black	46	63	70	84
Female: Hispanic	51	57	64	65
Female: other	48	62	69	73
Average annual earnings:				
Male: white	$22,800	$33,900	$40,300	$79,100
Male: black	$13,500	$21,800	$29,600	$53,800
Male: Hispanic	$21,400	$24,000	$26,000	$54,200
Male: other	$22,300	$30,100	$34,900	$69,700
Female: white	$7,800	$16,500	$20,400	$35,600
Female: black	$10,000	$14,200	$19,500	$40,600
Female: Hispanic	$9,900	$14,500	$17,300	$39,000
Female: other	$8,600	$15,700	$19,200	$36,900

SOURCE: Current Population Survey (March 2003 and 2004).

NOTES: Employment rates are based on populations, not labor force size. Annual earnings include those with zero earnings. No adjustment is made for incarceration rates.

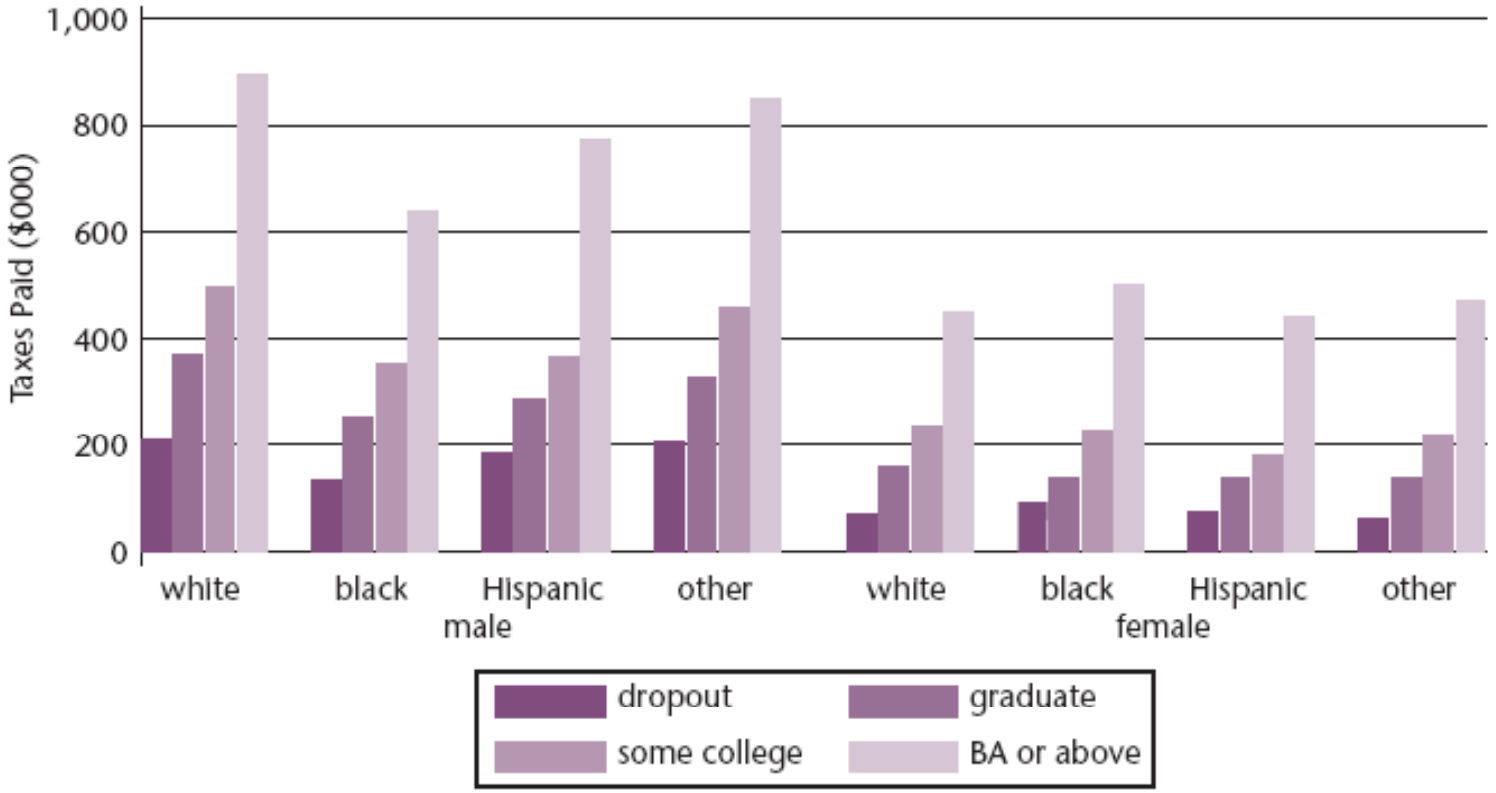
CHART 1 LIFETIME EARNINGS BY EDUCATION LEVEL



SOURCES: Current Population Survey (March 2003 and 2004).

NOTES: Earnings figures include all persons, i.e., persons with positive or zero income. Figures are adjusted for differences in incarceration rates by education level (but not GED status). Productivity growth is assumed at 1.5% per year. Discount rate is 3.5%.

CHART 2 LIFETIME TAX PAYMENTS BY EDUCATION LEVEL



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

NOTES: Figures are adjusted for differences in incarceration rates by education level (but not GED status). Income tax payments are calculated as the average of assuming all males are single and all males are household heads. Sales and property taxes are 5% of income tax payments. Discount rate is 3.5%.

TABLE 5 LIFETIME TOTAL TAX PAYMENTS PER EXPECTED HIGH SCHOOL GRADUATE

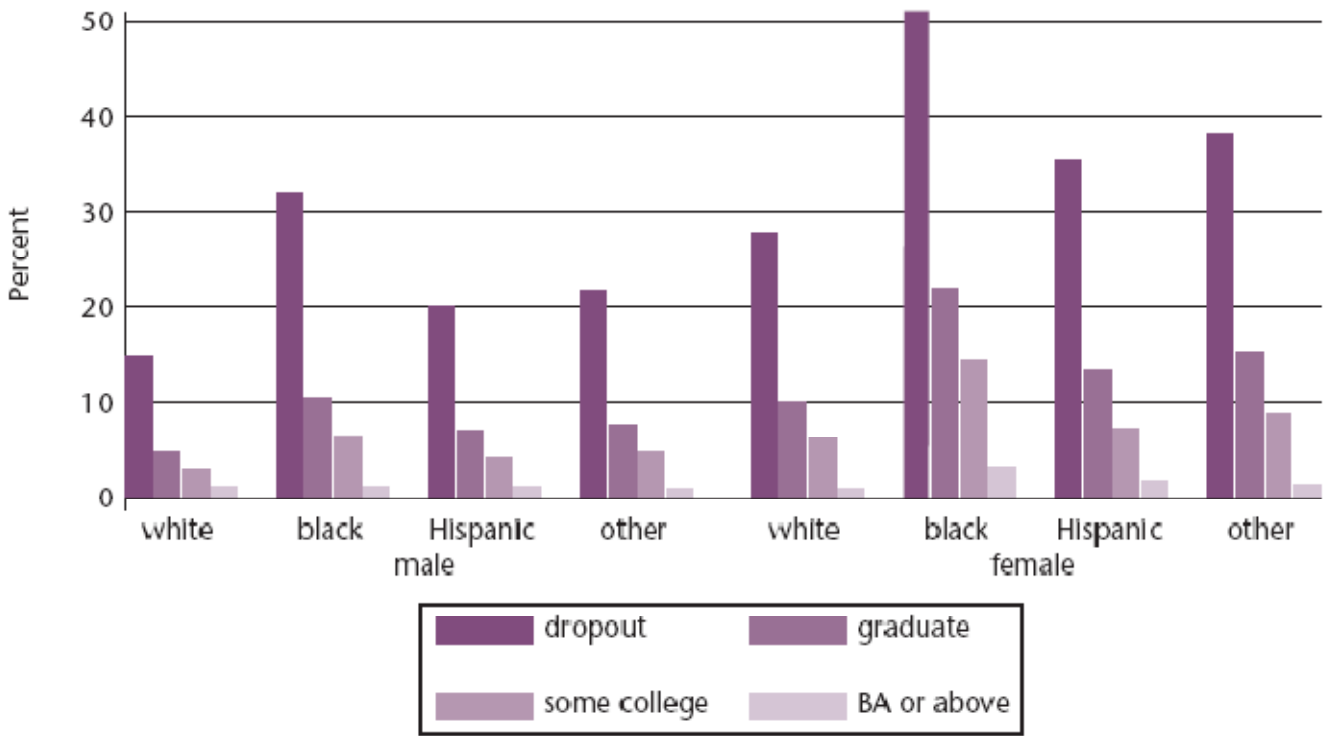
	Tax payment *Extra lifetime contribution per expected high school graduate*	
	Male	*Female*
White	$202,700	$109,100
Black	$157,600	$94,300
Hispanic	$119,000	$85,000
Other	$168,600	$96,700
Average	*$139,100*	

NOTES: An expected high school graduate is one who probabilistically either: terminates education after graduation; completes some college; or completes a BA Degree. Discount rate is 3.5%.

Impacts: health

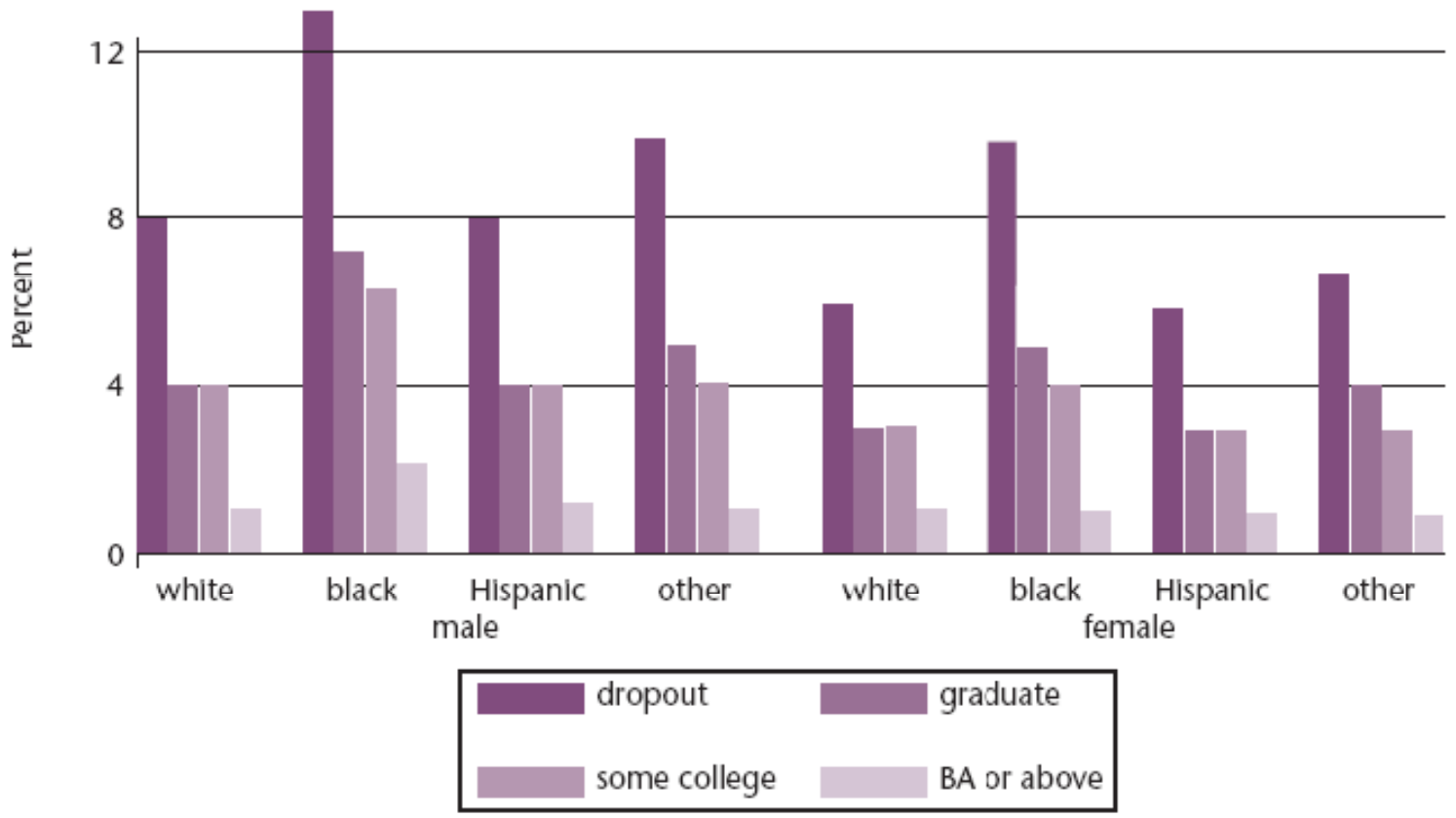
- Education is strongly correlated with good health, either directly or because of income
- High School graduates live 7 years longer than dropouts
- Lifestyle differences-nutrition, health care, less substance abuse
- Better knowledge and health decisions
- Higher income and better jobs mean greater health insurance and private coverage

CHART 3 MEDICAID COVERAGE



SOURCES: Medical Expenditure Panel Survey (2004); National Health Accounts.

Chart 4 Medicare coverage



SOURCES: Medical Expenditure Panel Survey (2004); National Health Accounts.

TABLE 6 TOTAL PRESENT VALUE LIFETIME PUBLIC HEALTH COSTS PER CAPITA

	High school dropout	*High school graduate*	*Some college*	*BA degree or above*
Male:				
White	$43,500	$17,000	$12,900	$3,100
Black	$82,400	$34,200	$25,100	$6,000
Hispanic	$59,000	$23,300	$16,700	$4,000
Other	$61,600	$24,800	$18,200	$4,400
Female:				
White	$60,800	$23,200	$15,900	$3,600
Black	$107,200	$48,500	$33,500	$7,800
Hispanic	$73,700	$29,200	$19,600	$4,400
Other	$80,500	$33,600	$23,000	$5,300

NOTES: Costs include Medicaid and Medicare. Discount rate is 3.5%.

TABLE 7 LIFETIME TOTAL PUBLIC HEALTH SAVINGS PER EXPECTED HIGH SCHOOL GRADUATE

	Public health expenditures *Extra lifetime saving per expected high school graduate*	
	Male	*Female*
White	$27,900	$39,600
Black	$52,100	$62,700
Hispanic	$37,800	$46,500
Other	$39,000	$49,200
Average	*$40,500*	

NOTES: An expected high school graduate is one who probabilistically either: terminates education after graduation; completes some college; or completes a BA Degree. Discount rate is 3.5%.

Crime:Impact

- Since 1987 public spending on incarceration has risen by 127 percent and on higher education by 21 percent
- Already several states spend more on incarceration than higher education
- Consistent evidence of education on crimes and incarceration
- About half of all incarcerated are high school dropouts
- Focus only on five major crimes (most crimes are misdemeanors; exclude fraud and juvenile crime)

TABLE 8 ANNUAL CRIMINAL ACTIVITY BY DROPOUTS AGED 20

	Per 1,000 high school dropouts		*Impact from expected high school graduation*
	Arrests	*Crimes*	
Murder	0.48	0.82	–19.6%
Rape	0.69	2.43	–19.6%
Violent crime	14.02	32.24	–19.6%
Property crime	42.95	279.17	–10.4%
Drugs offenses	60.04	600.43	–11.5%

SOURCES: UCR (2004) adjusted for undersurvey; Wolf and Harlow (2003); Lochner and Moretti (2004).
NOTES: Violent crime includes robbery and aggravated assault. Property crime includes burglary, larceny-theft, arson, and motor vehicle theft. The share of total arrests by high school dropouts is based on incarceration rates.

TABLE 9 TOTAL PRESENT VALUE LIFETIME COST-SAVINGS FROM REDUCED CRIMINAL ACTIVITY

	Criminal justice system expenditures *Extra lifetime saving per expected high school graduate*	
	Male	*Female*
White	$30,200	$8,300
Black	$55,500	$8,600
Hispanic	$38,300	$8,300
Other	$30,200	$8,300
Average	*$26,600*	

NOTES: An expected high school graduate is one who probabilistically either: terminates education after graduation; completes some college; or completes a BA degree. Annual criminal activity is assumed to decay to zero by age 65. The decay rate is based on the actual incidence of crime for each age group (UCR, 2004, Table 1). Discount rate is 3.5%.

Impacts: welfare receipt

- Effects of education are strongest for those whose dependence on public assistance is most intensive such as single mothers
- Focus only on three programs: TANF, housing assistance and food stamps

TABLE 11 WELFARE COST-SAVING PER EXPECTED HIGH SCHOOL GRADUATE

	Welfare expenditures *Extra lifetime saving per expected high school graduate*	
	Male	*Female*
White	$1,200	$5,000
Black	$3,300	$9,000
Hispanic	$1,200	$3,100
Other	$1,200	$3,100
Average	*$3,000*	

NOTES: Expected high school graduate status adjusts for progression on to college. Lifetime welfare cost-savings adjust for the decline in these forms of welfare receipt with age. Welfare programs are TANF, housing assistance, food stamps, and state-level programs on a proportionate basis. Discount rate is 3.5%.

Lifetime benefits per additional high school graduate

TABLE 12 PRESENT VALUE LIFETIME PUBLIC ECONOMIC BENEFITS

	Total lifetime economic benefit per expected high school graduate	
	Male	*Female*
White	$262,100	$162,000
Black	$268,500	$174,600
Hispanic	$196,300	$143,000
Other	$239,000	$157,300
Average	*$209,100*	

NOTES: Benefits are gross, i.e. they do not account for the costs of additional educational attainment. An expected high school graduate is one who probabilistically either: terminates education after graduation; completes some college; or completes a BA degree. Discount rate is 3.5%.

Cost-benefit ratios

TABLE 13 NET PUBLIC INVESTMENT RETURNS

	Interventions to raise high school graduation rates				
Per additional expected high school graduate	*First Things First*	*Chicago Parent-Child Center*	*Teacher salary increase*	*Perry Preschool*	*Class size reduction*
Costs (C)	$59,100	$67,700	$82,000	$90,700	$143,600
Benefits (B)	$209,100	$209,100	$209,100	$209,100	$209,100
Benefit/cost ratio (B/C)	3.54	3.09	2.55	2.31	1.46
Net present value (B-C)	$150,100	$141,400	$127,100	$118,400	$65,500

NOTES: Numbers are rounded to nearest $100. Costs include delivering the intervention and any subsequent public subsidies for high school and college. Discount rate is 3.5%.

Conclusion

- Increasing high school graduation increases equity and justice, a moral commitment
- Also a great investment for society where the benefits far exceed costs
- Each additional graduate confers the equivalent of a CD worth $127,000 to the taxpayer beyond personal benefits
- Schools must choose programs that are effective to get these results

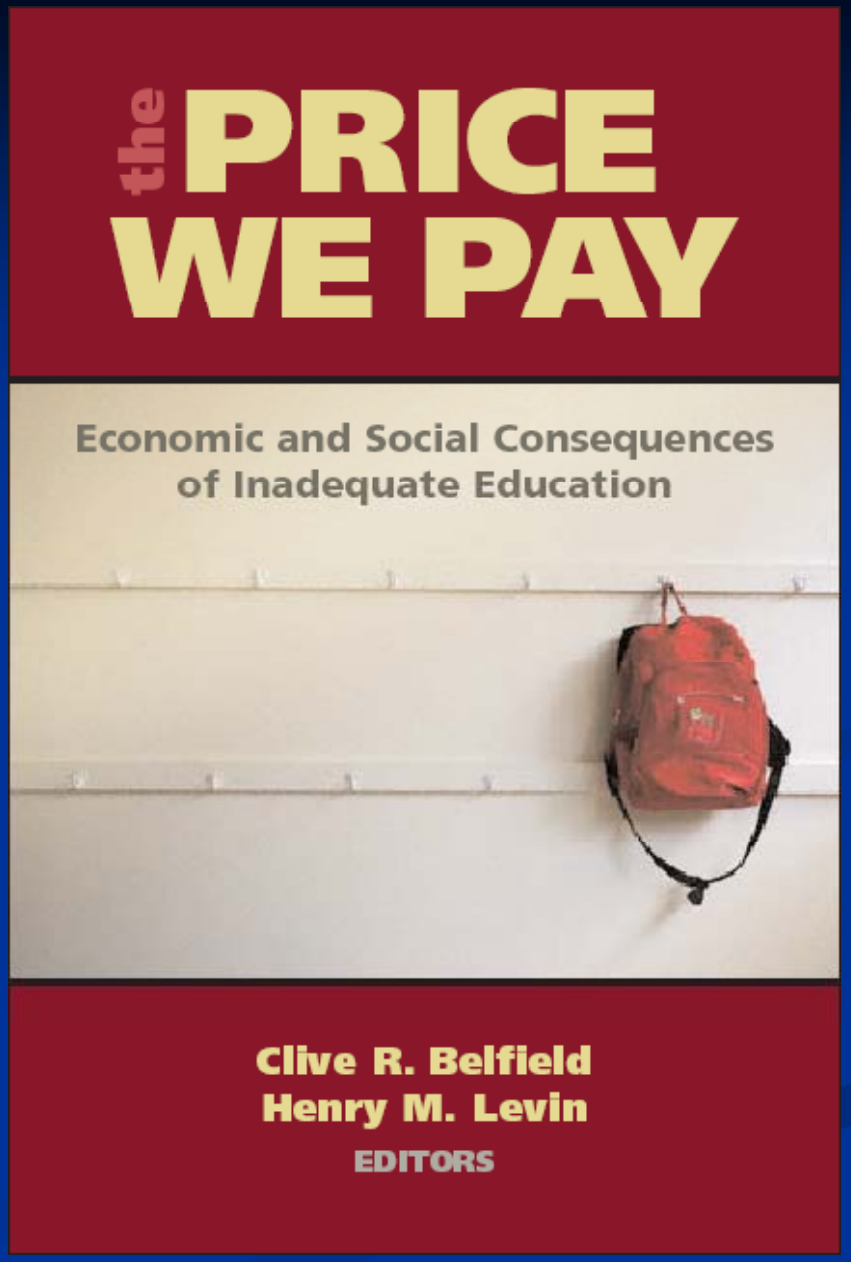
Net Benefits Accumulate

- Each cohort of 20 year olds has about 700,000 high school dropouts
- If we could reduce that number by half, we would provide a present value of $45 billion to society
- Each additional year would also add that amount so that benefits for ten cohorts would be almost a half-trillion dollars

Present Work

- Increase number of interventions in analysis.
- Few that measure HS graduation directly.
- Many more that increase test scores and that increase 9th grade course taking and passing.
- Estimate impact of improvements in test scores and/or course taking on increase in probability of graduation.
- One sigma improvement in combined reading/math scores at eighth grade increases probability of graduation by almost 50 percent. Varies among groups.

THE
PRICE
WE PAY
Economic and Social Consequences of Inadequate Education
Clive R. Belfield
Henry M. Levin
EDITORS (Washington, DC: Brookings, 2007).



Resources

- Center for Cost-Benefit Studies in Education 20 percent discount on book
- (www.cbcse.org)

- Henry M. Levin, Teachers College, Columbia University
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