

# *“The Economic Impact of the Dropout: Now and Then”*

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## Roadmap

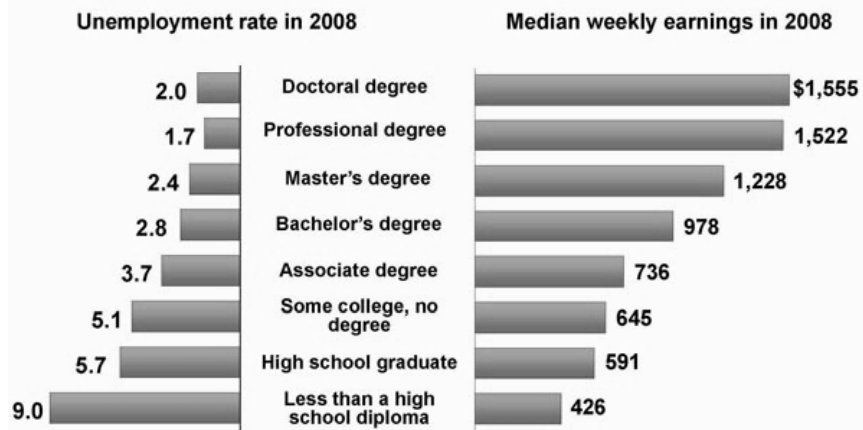
- Average Trends
  - Earnings by Race/Ethnicity and Education
  - Dropouts By State, Income and Race/Ethnicity
- Economic Reasoning (Summary)
  - Selection vs. Causation
  - Policy and other variation
  - Economic Externalities
- Three Illustrative Cases
  - Sibling Comparisons
  - Desegregation (“Then”)
  - Compulsory Schooling a la Oreopolous (“Now”)
- Other Types of Effects
- Policy Recommendations
- Additional Tables
  - Immigrant educational attainment
  - Teenage births and dropout
  - Severity of Compulsory Schooling laws and dropout



# Trends

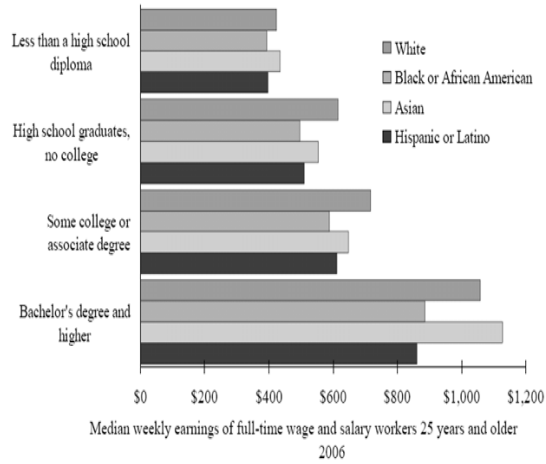


## Education pays



Source: Bureau of Labor Statistics, Current Population Survey

**Chart 2-5. Education pays for everyone, regardless of race or Hispanic ethnicity**



SOURCE: Bureau of Labor Statistics

## Barrow & Rouse (2006)

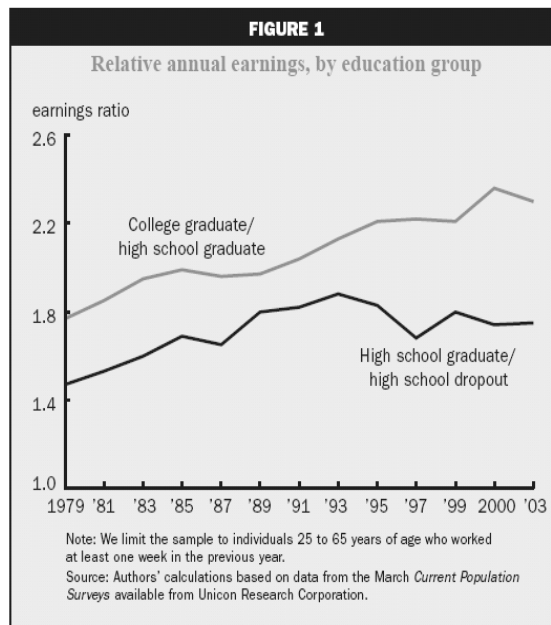


Table 16. Median usual weekly earnings of full-time wage and salary workers in current dollars by race, Hispanic or Latino ethnicity, and sex, 1979-2005 annual averages

Year	Total, both sexes					Women				
	Total	White	Black or African American	Asian	Hispanic or Latino ethnicity	Total	White	Black or African American	Asian	Hispanic or Latino ethnicity
1979....	\$241	\$248	\$199	-	\$194	\$182	\$184	\$168	-	\$157
1980....	262	269	212	-	209	201	203	185	-	172
1981....	284	291	235	-	223	219	221	206	-	190
1982....	302	310	245	-	240	239	242	217	-	203
1983....	313	320	261	-	230	252	254	232	-	215
1984....	326	336	269	-	239	265	268	241	-	223
1985....	344	356	277	-	270	277	291	252	-	230
1986....	359	371	291	-	277	291	294	264	-	241
1987....	374	384	301	-	285	303	307	276	-	251
1988....	385	395	314	-	290	315	318	288	-	260
1989....	399	409	319	-	298	328	334	301	-	269
1990....	412	424	329	-	304	346	353	308	-	278
1991....	426	442	348	-	312	366	373	323	-	292
1992....	440	458	357	-	321	380	387	335	-	302
1993....	459	475	369	-	331	393	401	348	-	313
1994....	467	484	371	-	334	399	408	346	-	305
1995....	479	494	383	-	339	406	415	355	-	305
1996....	490	506	387	-	339	418	428	362	-	316
1997....	503	519	400	-	351	431	444	375	-	318
1998....	523	545	426	-	370	456	468	400	-	337
1999....	549	573	445	-	385	473	483	408	-	348
2000 <sup>1</sup> ..	576	590	474	\$615	399	493	502	429	\$547	366
2001....	596	610	491	639	417	512	522	454	563	369
2002....	608	623	498	659	424	529	547	473	566	367
2003....	620	636	514	683	440	552	567	491	598	410
2004....	630	657	525	700	456	573	594	505	613	419
2005....	651	672	520	753	471	585	596	499	665	429

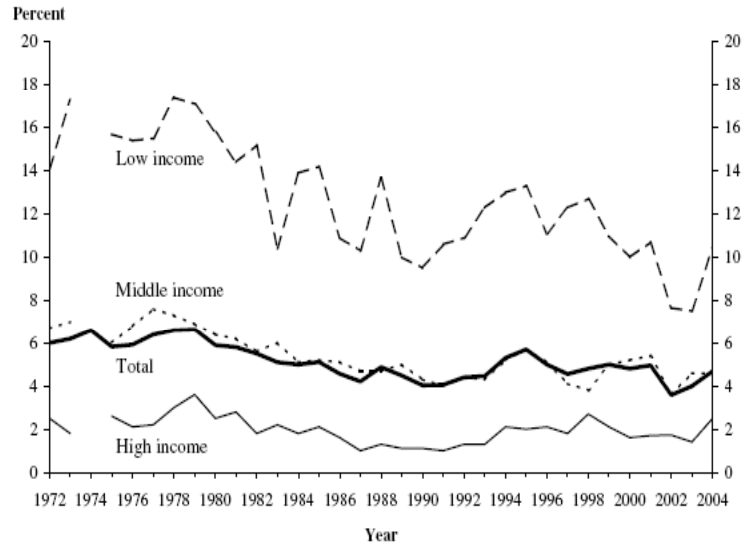
### Dropouts by State: NCES data

Table 5. Event dropout rates for public school students in grades 9–12, by state: School years 1993–94 through 2001–02

State	Event dropout rate (percent)									
	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99	1999–2000	2000–01	2001–02	AVERAGE
Louisiana	4.7	3.5	11.6	11.6	11.4	10.0	9.2	8.3	7.0	8.6
Nevada	9.8	10.3	9.6	10.2	10.1	7.9	6.2	5.2	6.4	8.4
Georgia	8.7	9.0	8.5	8.2	7.3	7.4	7.2	7.2	6.5	7.8
New Mexico	8.1	8.5	8.3	7.5	7.1	6.7	6.0	5.3	5.2	7.0
Illinois	6.8	6.6	6.4	6.6	6.9	6.5	6.2	6.0	6.4	6.5
Wyoming	6.5	6.7	5.7	6.2	6.4	5.1	5.7	6.4	5.8	6.1
Mississippi	6.1	6.4	6.2	6.0	5.8	5.0	4.9	4.6	3.9	5.4
Missouri	7.0	7.0	6.5	5.8	5.2	4.8	4.4	4.2	3.6	5.4
Oklahoma	4.6	5.8	5.7	5.9	5.8	5.2	5.4	5.2	4.4	5.3
Arkansas	5.3	4.9	4.1	5.0	5.4	6.0	5.7	5.3	5.3	5.2
Alabama	5.8	6.2	5.6	5.3	4.8	4.4	4.5	4.1	3.7	4.9
Vermont	4.8	4.7	5.3	5.0	5.2	4.6	4.7	4.7	4.0	4.8
Minnesota	5.1	5.2	5.2	5.5	4.9	4.5	4.3	4.0	3.8	4.7
Rhode Island	4.9	4.6	4.6	4.7	4.9	4.5	4.8	5.0	4.3	4.7
Tennessee	4.8	5.0	4.9	5.1	5.0	4.6	4.2	4.3	3.8	4.6
Delaware	4.6	4.6	4.5	4.5	4.7	4.1	4.1	4.2	6.2	4.6
Maryland	5.2	5.2	4.8	4.9	4.3	4.4	4.1	4.1	3.9	4.5
Virginia	4.8	5.2	4.7	4.6	4.8	4.5	3.9	3.5	2.9	4.3
Nebraska	4.6	4.5	4.5	4.3	4.4	4.2	4.0	4.0	4.2	4.3
South Dakota	5.3	5.3	5.7	4.5	3.1	4.5	3.5	3.9	2.8	4.3
West Virginia	3.8	4.2	3.8	4.1	4.1	4.9	4.2	4.2	3.7	4.1
Utah	3.1	3.5	4.4	4.5	5.2	4.7	4.1	3.7	3.7	4.1
Pennsylvania	3.8	4.1	4.0	3.9	3.9	3.7	4.0	3.6	3.3	3.8
Connecticut	4.8	4.9	4.8	3.9	3.5	3.3	3.1	3.0	2.6	3.8
New Jersey	4.3	4.0	4.1	3.7	3.5	3.1	3.1	2.8	2.5	3.5
Maine	3.1	3.4	3.1	3.2	3.2	3.3	3.3	3.1	2.8	3.2
Iowa	3.2	3.5	3.1	2.9	2.9	2.5	2.5	2.7	2.4	2.9
North Dakota	2.7	2.5	2.5	2.7	2.8	2.4	2.7	2.2	2.0	2.5
Wisconsin	3.1	2.7	2.4	2.7	2.8	1.8	2.6	2.3	1.9	2.5

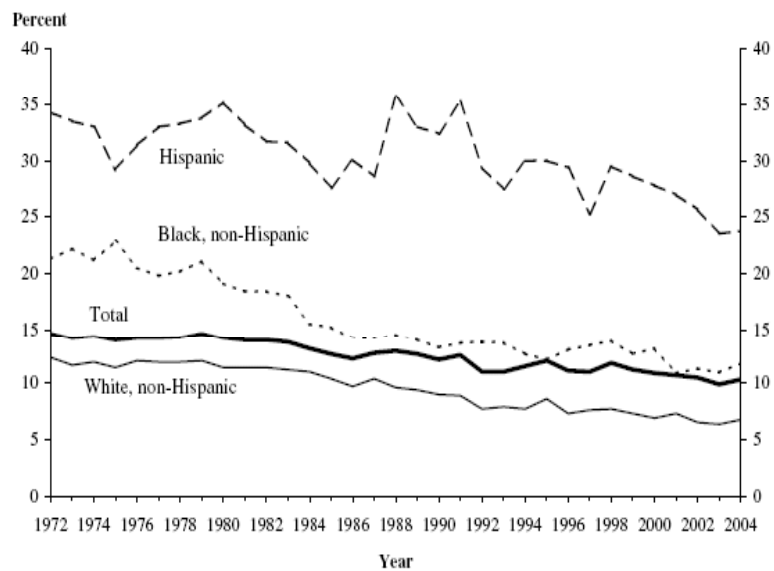
## Income Level and Dropout Rates (NCES, 2006)

Figure 1. Event dropout rates of 15- through 24-year-olds who dropped out of grades 10-12, by family income: October 1972 through October 2004



## Race/Ethnicity and Dropout Rates (NCES, 2006)


Figure 2. Status dropout rates of 16- through 24-year-olds, by race/ethnicity: October 1972 through October 2004



# Economic Reasoning



## Disentangling Cause and Effect

- Two possibilities:
    - Dropout *causes* inferior outcomes
    - Dropout is a *signal* that individuals were already likely to have poor outcomes but it is not the actual cause.
  - To Clarify:
    - Possibility 1: “I drop out, and as a result I can’t find a high paying job.”
    - Possibility 2: “I have poor skills and wouldn’t have found a good job anyway. Dropping out is a signal of my skills rather than the ultimate cause.”
- 

## What Would an Economist Answer?

- Find a mechanism disentangling dropout variation from underlying skills.
  - Classic Example: Mandatory Schooling and Child Labor Laws
  - Desegregation Policies
  - Other policies where groups do not vary in level of affectedness solely by skill
- Econometric (economic statistical) methods to account for this selection by skill into dropping out



## Why Education Matters in a “Societal” Sense

- Clear relationship between human capital and country measures of output per worker → Acemoglu & Angrist (2001)
  - More human capital facilitates innovation and growth. (Romer, 1990; Foster & Rosenzweig, 1996; and others)



# Case Studies

- Siblings
- Desegregation
- Compulsory Schooling

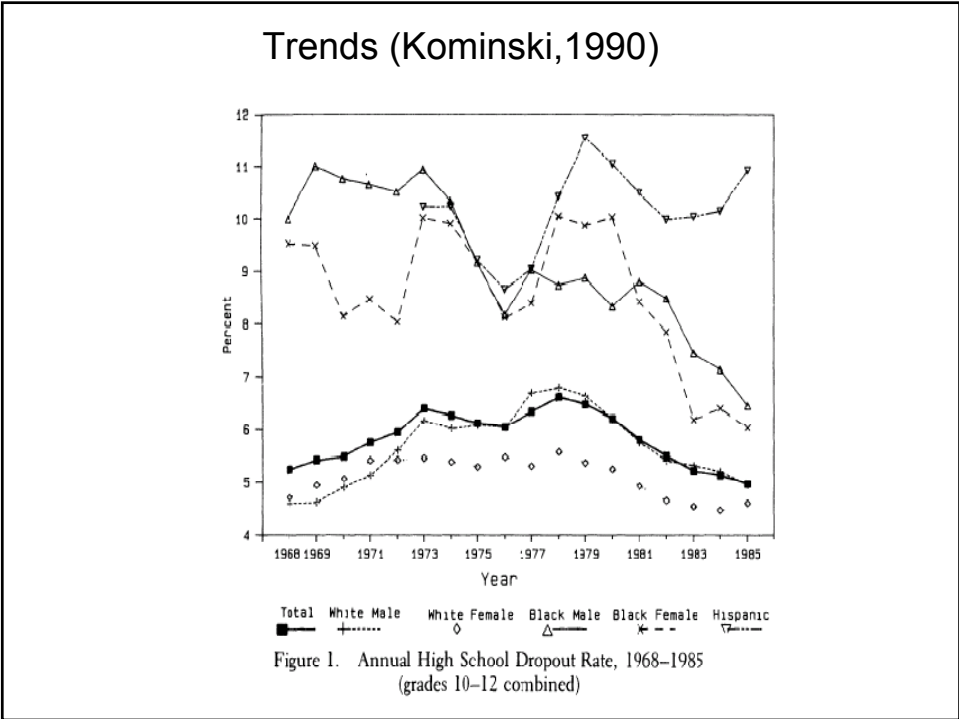
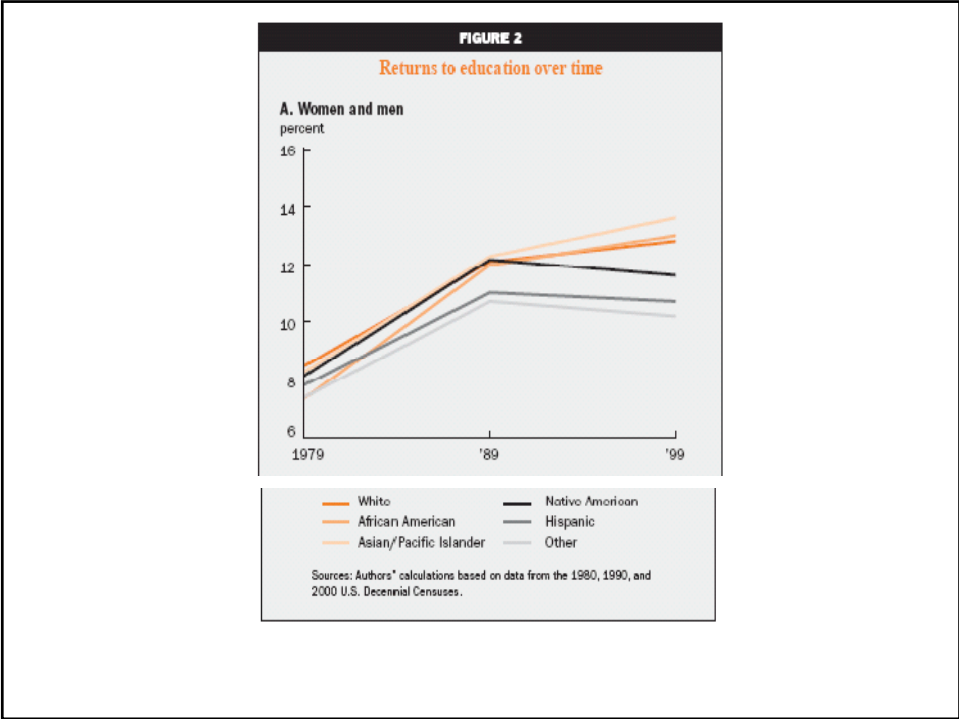


## Sibling comparison via Barrow & Rouse (2006)

- Determine effect of additional schooling returns (not specific to dropout)
- Stratify by race/ethnicity
- Similar returns to schooling for all racial groups (6% per year schooling)
- Some issues with ability bias and measurement error merit consideration







## Desegregation Evidence (Guryan, 2004)

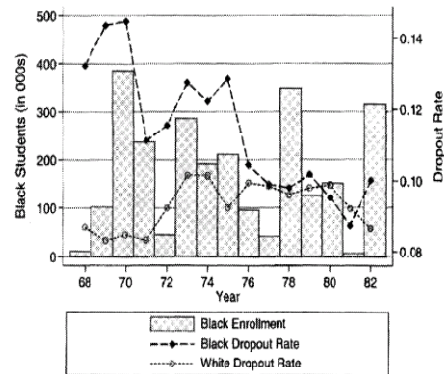


FIGURE 1. AGGREGATE TRENDS IN BLACK AND WHITE DROPOUT RATES AND THE NUMBER OF BLACK STUDENTS NEWLY AFFECTED BY DESEGREGATION

## Recent Evidence

- Negative impact of dropping out on wealth, health, and happiness (Oreopolous, 2007)
  - 15% increase in wealth per year of schooling
  - Students ignore or too heavily discount the future in deciding to drop out
  - Compulsory Schooling Laws as exogenous variation
    - Instrument the actual patterns with the “rules”

## Results: (Oreopolous, 2007)

Percent increase in present value wealth from one year of compulsory schooling

	(1)	(2)	(3)
	Discount rate		
	0.03	0.05	0.08
Percent change in present value wealth, OLS estimate	11.0%	10.8%	8.5%
Percent change in present value wealth, IV estimate	17.6%	16.9%	16.0%
Percent change in present value wealth, assuming 8% return	7.1%	6.4%	5.6%
Hurdle rate	1.20%	1.80%	2.60%

Notes: The regression specification follows Table 3 for the sample of U.S. males and with log annual income as the dependent variable. Estimated income profiles from ages 15 to 65 and estimated annual returns to compulsory schooling (17.4% for the IV estimate and 9.5% for the OLS estimate) are used to calculate present value changes in wealth using the discount rate indicated in the table. The overall change in wealth includes the expected income loss from attending school an additional year. The hurdle rate is the minimum annual return required to make an individual financially better off from taking one year of school instead of one year of work. It is based on the projected earnings profile for a 15-year old high school dropouts and uses the discount rate indicated in the table.

## Results (Cont.)

Table 6

Reasons for leaving school among 16 to 25 year olds

	Fraction mentioning reason		
	Finished school immediately at minimum school-leaving age	Finished school 1–2 years after minimum school-leaving age	Finished school 3+ years after minimum school-leaving age
Had gone as far as I could	0.148	0.332	0.540
I saw no point in going on	0.295	0.172	0.193
I did not like it	0.243	0.114	0.040
I needed money	0.126	0.095	0.053
I wanted to work	0.445	0.437	0.293
Family needed money	0.039	0.034	0.013
Couldn't afford course	0.009	0.019	0.013
Had to bring up children	0.015	0.009	0.067
<i>N</i>	461	325	150

Notes: Sample includes 16 to 25-year olds in Britain from the 1990 Eurobarometer Youth Survey.

## Discussion

- Different discount rates matter little.
- Lack of motivation more pertinent than actual constraints (time, money, children).
  - See Brideland, Dilulio, Morrison, and Burke (2006).



## Wrapping Up:

- Other Effects
- Policy Recommendations



## Schooling and Various Concerns:

- Angrist & Krueger (1991)
  - Compulsory Schooling & Earnings
- Black, Devereux & Salvanes (2004)
  - Compulsory Schooling and Teenage Births
- Moretti (2001, 2004)
  - Schooling and Civic Participation & Crime
- Bray et. al. (2000)
  - Marijuana initiation and dropout



## Black, Devereux & Salvanes (2004)

Table 9: Effect of Compulsory Schooling Laws on the Probability of Birth  
Conditional on Not Already Having a Child

United States					
Dependent Variable	Birth at 16/No prior birth	Birth at 17/No prior birth	Birth at 18/No prior birth	Birth at 19/No prior birth	Birth at 20/No prior birth
Dropout Age=16	-.0001 (.0006)	-.0025* (.0009)	-.0035* (.0013)	-.0021 (.0019)	-.0024 (.0036)
Dropout Age=17	-.0009 (.0008)	-.0045* (.0012)	-.0057* (.0013)	-.0047* (.0018)	-.0056 (.0040)
Dropout Age=18	.0002 (.0010)	-.0015 (.0049)	.0005 (.0078)	-.0007 (.0054)	-.0061 (.0050)
White	-.0271* (.0020)	-.0349* (.0029)	-.0344* (.0034)	-.0292* (.0033)	-.0182* (.0033)
N	1,572,513	1,545,369	1,493,288	1,414,844	1,311,693

## Moretti (2001)

Table 3: Census Incarceration Rates for Men Ages 20-60 by Drop Out Status

	All Years	1960	1970	1980
<b>All Men</b>				
Drop Out	.012	.010	.010	.015
HS Graduate +	.003	.002	.002	.004
Difference	.009	.008	.008	.011
<b>White Men</b>				
Drop Out	.008	.007	.006	.009
HS Graduate +	.002	.001	.001	.002
Difference	.006	.006	.005	.007
<b>Black Men</b>				
Drop Out	.036	.029	.029	.041
HS Graduate +	.019	.013	.012	.020
Difference	.017	.016	.017	.021

## Bray et. al. (2000)

Table 2. Dropout rate by substance use initiation

Variable	Proportion of sample dropping out at age:			
	16 (N = 1, 392)	17 (N = 1, 302)	18 (N = 1, 191)	All ages (N = 1, 392)
All respondents	0.027 (0.003)	0.040 (0.003)	0.038 (0.003)	0.099 (0.003)
<b>Marijuana use</b>				
Did not initiate prior to age of dropout	0.009 (0.003)	0.021 (0.004)	0.016 (0.004)	0.047 (0.006)
Initiated prior to age of dropout	0.052 (0.007)	0.063 (0.007)	0.063 (0.007)	0.153 (0.008)
<b>Cigarette use</b>				
Did not initiate prior to age of dropout	0.008 (0.004)	0.015 (0.004)	0.024 (0.006)	0.046 (0.008)
Initiated prior to age of dropout	0.038 (0.005)	0.054 (0.005)	0.046 (0.005)	0.125 (0.006)
<b>Alcohol use</b>				
Did not initiate prior to age of dropout	0.011 (0.005)	0.023 (0.007)	0.030 (0.011)	0.068 (0.013)
Initiated prior to age of dropout	0.032 (0.004)	0.044 (0.004)	0.040 (0.004)	0.105 (0.004)
<b>Other drug use</b>				
Did not initiate prior to age of dropout	0.018 (0.004)	0.026 (0.004)	0.031 (0.005)	0.073 (0.007)
Initiated prior to age of dropout	0.041 (0.006)	0.059 (0.007)	0.047 (0.007)	0.131 (0.008)

Standard errors in parentheses.

## Policy Recommendations

- Clear causal relationship between dropout and outcomes
  - Economic & social
- Economic human capital externalities for society.
- Variety of prior methods employed
  - Mandatory schooling laws
  - Incentive devices to staying in school



## Chiswick and DebBurman (2004)

Table 3  
Summary statistics of selected variables, by country of origin, first-generation adults, United States, 1995

Country of origin	Sample size	Educational attainment	Age at immigration
English-speaking countries	720 (9.61) <sup>a</sup>	13.73 (2.68) <sup>b</sup>	23.70 (11.66) <sup>b</sup>
Africa	94 (1.25)	14.98 (3.26)	26.66 (8.54)
Mexico	1650 (22.01)	8.66 (3.83)	22.79 (9.94)
Cuba	233 (3.11)	11.96 (3.35)	24.04 (13.10)
S. and C. America	890 (11.87)	11.58 (3.87)	25.54 (9.97)
Caribbean	287 (3.83)	11.06 (3.72)	26.44 (8.94)
Southern Europe	360 (4.80)	11.64 (4.16)	20.26 (11.158)
E. and C. Europe	698 (9.31)	14.10 (2.96)	27.22 (13.82)
N. and W. Europe	70 (0.93)	15.31 (2.31)	22.70 (8.74)
Philippines	438 (5.84)	14.11 (2.82)	26.78 (11.28)
China	259 (3.46)	13.60 (4.37)	30.61 (11.67)
Vietnam	191 (2.55)	11.99 (4.17)	29.18 (13.06)
East Asia	363 (4.84)	14.43 (2.64)	27.73 (10.42)
South Asia	307 (4.10)	15.57 (3.04)	26.74 (7.86)
Middle East	183 (2.44)	14.33 (3.62)	25.58 (10.14)
Other Asia	252 (3.36)	11.71 (4.52)	26.10 (10.42)
Remaining countries	501 (6.68)	13.97 (3.17)	25.87 (10.77)
Total	7496 (100.00)	11.82 (4.23)	24.79 (11.07)

Source: Current Population Survey, United States Bureau of the Census, October 1995. Variables are as defined in Table A1.

<sup>a</sup> Percent foreign-born are in parentheses.

<sup>b</sup> Standard deviations are in parentheses.

# Patterson (2008)

Appendix Table 4  
Dropout Rates and Teen Childbearing Rates by Neighborhood Professional Rates

% Professional	All Dropout			White Dropout			Black Dropout			Hispanic Dropout			Asian Dropout		
	Mean	95% C.I.		Mean	95% C.I.		Mean	95% C.I.		Mean	95% C.I.		Mean	95% C.I.	
0% - 20%	12.0%	11.8%	12.3%	9.4%	8.9%	9.9%	10.7%	10.0%	11.5%	14.3%	13.9%	14.6%	5.2%	4.5%	5.8%
20% - 40%	6.3%	6.1%	6.4%	5.5%	5.3%	5.8%	6.6%	5.9%	7.4%	9.3%	8.9%	9.8%	3.6%	3.3%	4.1%
40% - 100%	3.2%	3.0%	3.4%	3.2%	2.9%	3.4%	<b>D</b>			5.1%	4.3%	6.0%	<b>D</b>		
Overall Rate:	8.0%	7.9%	8.1%	5.6%	5.5%	5.8%	8.7%	8.2%	9.2%	12.4%	12.1%	12.6%	3.8%	3.5%	4.1%

% Professional	All Teen Births			White Teen Births			Black Teen Births			Hispanic Teen Births			Asian Teen Births		
	Mean	95% C.I.		Mean	95% C.I.		Mean	95% C.I.		Mean	95% C.I.		Mean	95% C.I.	
0% - 20%	7.0%	6.7%	7.3%	5.1%	4.6%	5.6%	12.0%	10.9%	13.2%	7.7%	7.3%	8.1%	<b>D</b>		
20% - 40%	3.5%	3.3%	3.7%	2.6%	2.4%	2.8%	8.1%	7.1%	9.3%	5.5%	5.1%	6.0%	<b>D</b>		
40% - 100%	1.1%	1.0%	1.3%	0.9%	0.7%	1.1%	<b>D</b>			<b>D</b>			<b>D</b>		
Overall Rate:	4.4%	4.3%	4.6%	2.6%	2.4%	2.7%	9.9%	9.2%	10.7%	6.8%	6.5%	7.1%	1.4%	1.1%	1.6%

Exact binomial confidence intervals are calculated. D: not disclosed because sample size is less than 75 observations

# Acemoglu and Angrist (2001)

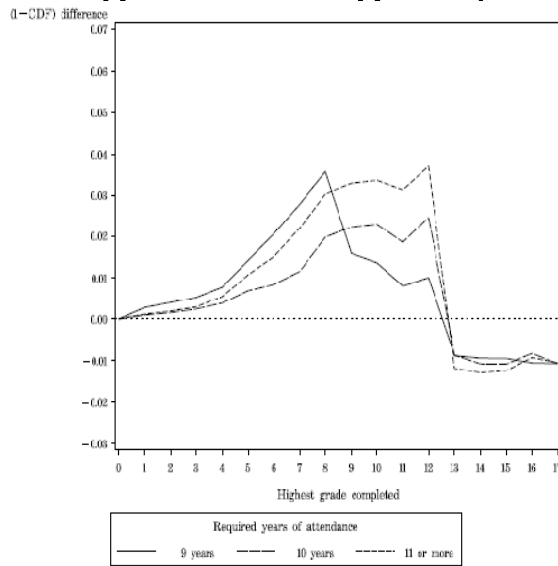


Figure 2. CDF difference by severity of compulsory attendance laws. The figure shows the difference in the probability of schooling at or exceeding the grade level on the X-axis. The reference group is 8 or fewer years required schooling.