Black-White Inequality

Econ 350

Winter 2021

Big Picture

- Black-White Progress Largely Stalled About 1990
- Measured Skill Gaps, Education Gaps, and Labor Market Progress All Beginning Stalling in the 1980s
- Hard to blame bad labor market outcomes or trends (primarily) on market discrimination
- Hard to blame skill gap trends on some broad trend in public education policy
- Great Recession made things worse, what will Pandemic Recession do?
- Criminal Justice outcomes make overall story worse.
- Researchers are not sure how criminal justice policy impacts other trends
- My recent work: differences in recidivism are appear to be a huge driver of differences in criminal justice outcomes by race. 60 percent boost associated with being black. Part appears to be a different response to treatment, but large component is orthogonal to sentencing decisions.

Puzzle

- Much of 20th century B-W convergence in education and earnings was noteworthy. See Smith and Welch (1989)
- Skill convergence stops around 1990
- Wage / Earnings convergence stopped earlier
- Remaining gaps are large

Discrete Progress

Heckman and Donohue (1991)

- Migration Stops in 1965
- B-W gains concentrated in South
- Discrete jumps in occupational composition by race in 1965
- B-W gains during 1965-1975 for ALL entry cohorts
- Almost impossible to tease out school quality trends from discrimination trends

Not Only Discrete Progess in 1965 but also

- Much of 20th century B-W convergence in measured skills, education and earnings was noteworthy. See Smith and Welch (1989)
- Skill convergence stops around 1990
- Wage / Earnings convergence stopped earlier
- Remaining gaps are large

Two Agendas

- How have wage structure changes shaped different measures of B-W inequality?
- What has skill convergence slowed or even stopped?

Important Facts

Figure: Ratio of Median Black and Median White Weekly Wages, Males Only

Mixing Over Only Non-Institutionalized Nonworkers

Years of Potential Experience	Year	10/25	15/15	25/10	Raw	Percent Workers		Percent Inst. Nonworkers		Percent Other Nonworkers	
						Black	White	Black	White	Black	White
6-10	1960	0.553	0.567	0.567	0.606	90.1%	96.7%	3.6%	0.9%	6.3%	2.4%
	1970	0.643	0.650	0.666	0.689	89.6%	96.4%	3.8%	0.7%	6.6%	2.8%
	1980	0.645 [0.659]	0.661 [0.676]	0.686 [0.692]	0.716 [0.717]	82.1%	95.2%	4.2%	0.7%	13.7%	4.1%
	1990	0.644 [0.648]	0.673 [0.650]	0.677 [0.680]	0.738 [0.750]	79.0%	94.1%	6.7%	1.0%	14.3%	5.0%
	2000	0.679 [0.673]	0.704 [0.686]	0.730 [0.703]	0.828 [0.764]	74.2%	92.1%	10.7%	1.7%	15.1%	6.2%
	2007	0.696 [0.667]	0.722 [0.673]	0.733 [0.705]	0.812 [0.781]	77.8%	92.5%	8.1%	1.5%	14.1%	6.0%
	2010	0.567 [0.604]	0.593 [0.623]	0.652 [0.684]	0.801 [0.750]	68.6%	88.3%	8.6%	1.6%	22.8%	10.1%
	2014	0.637 [0.603]	0.667 [0.650]	0.667 [0.656]	0.758 [0.706]	73.2%	88.6%	7.3%	1.5%	19.5%	9.9%
11-15	1960	0.578	0.578	0.581	0.601	91.1%	97.2%	3.3%	0.9%	5.6%	1.9%
	1970	0.666	0.672	0.684	0.669	91.1%	97.0%	2.9%	0.7%	6.0%	2.2%
	1980	0.635 [0.659]	0.657 [0.675]	0.688 [0.692]	0.712 [0.742]	83.8%	95.2%	3.7%	0.7%	12.5%	4.1%
	1990	0.606 [0.601]	0.635 [0.619]	0.650 [0.636]	0.713 [0.701]	79.7%	94.2%	6.2%	0.9%	14.1%	4.9%
	2000	0.667 [0.662]	0.700 [0.667]	0.717 [0.700]	0.785 [0.787]	76.3%	92.4%	10.5%	1.7%	13.2%	5.8%
	2007	0.673 [0.668]	0.684 [0.681]	0.711 [0.697]	0.750 [0.769]	79.6%	93.2%	8.3%	1.5%	12.1%	5.3%
	2010	0.591 [0.573]	0.617 [0.583]	0.667 [0.618]	0.750 [0.695]	71.1%	89.2%	8.9%	1.7%	20.0%	9.1%
	2014	0.610 [0.593]	0.640 [0.615]	0.676 [0.649]	0.750 [0.700]	75.1%	89.4%	7.3%	1.7%	17.6%	8.9%
16-20	1960	0.593	0.593	0.593	0.622	90.9%	96.8%	3.5%	1.0%	5.6%	2.2%
	1970	0.654	0.657	0.669	0.654	91.3%	96.9%	2.5%	0.7%	6.2%	2.4%
	1980	0.645 [0.686]	0.658 [0.687]	0.684 [0.714]	0.718 [0.722]	84.6%	94.9%	2.7%	0.7%	12.7%	4.4%
	1990	0.600 [0.615]	0.622 [0.615]	0.651 [0.631]	0.709 [0.685]	80.0%	93.8%	4.9%	0.8%	15.1%	5.4%
	2000	0.658 [0.647]	0.692 [0.657]	0.694 [0.685]	0.788 [0.757]	76.6%	91.7%	9.1%	1.7%	14.3%	6.6%
	2007	0.698 [0.642]	0.706 [0.648]	0.743 [0.676]	0.791 [0.697]	80.8%	92.6%	7.5%	1.3%	11.7%	6.1%
	2010	0.632 [0.648]	0.667 [0.688]	0.731 [0.705]	0.782 [0.746]	74.2%	89.0%	7.1%	1.5%	18.7%	9.5%
	2014	0.622 [0.607]	0.654 [0.645]	0.713 [0.679]	0.745 [0.719]	75.3%	89.4%	7.1%	1.6%	17.7%	9.0%
21-25	1960	0.571	0.575	0.578	0.619	90.4%	96.3%	3.0%	1.0%	6.6%	2.7%
	1970	0.640	0.647	0.661	0.641	89.8%	96.1%	2.5%	0.8%	7.8%	3.1%
	1980	0.651 [0.682]	0.665 [0.686]	0.667 [0.711]	0.707 [0.722]	84.1%	93.9%	1.8%	0.6%	14.1%	5.5%
	1990	0.641 [0.636]	0.645 [0.642]	0.677 [0.667]	0.750 [0.705]	80.1%	92.6%	3.8%	0.8%	16.2%	6.6%
	2000	0.615 [0.620]	0.630 [0.643]	0.658 [0.660]	0.750 [0.693]	75.4%	90.8%	7.5%	1.4%	17.2%	7.8%
	2007	0.652 [0.655]	0.667 [0.676]	0.693 [0.702]	0.735 [0.728]	79.8%	90.9%	6.4%	1.3%	13.9%	7.8%
	2010	0.622 [0.590]	0.653 [0.626]	0.673 [0.670]	0.760 [0.722]	71.8%	87.5%	7.0%	1.3%	21.2%	11.2%
	2014	0.609 [0.607]	0.625 [0.636]	0.651 [0.667]	0.775 [0.726]	74.8%	88.7%	5.8%	1.4%	19.4%	9.9%

Data come from IPUMS. See note to Table 10 for information about the sample. Columns one through four of this table apply a different mixing rule than Table 10. For each column, we assume that institutionalized nonworkers all have potential wages below the median of their race*experience*year cell, and we only apply the mixing rule specified at the top of the column to other nonworkers.

Figure: Racial Earnings Level and Earning Rank Gaps

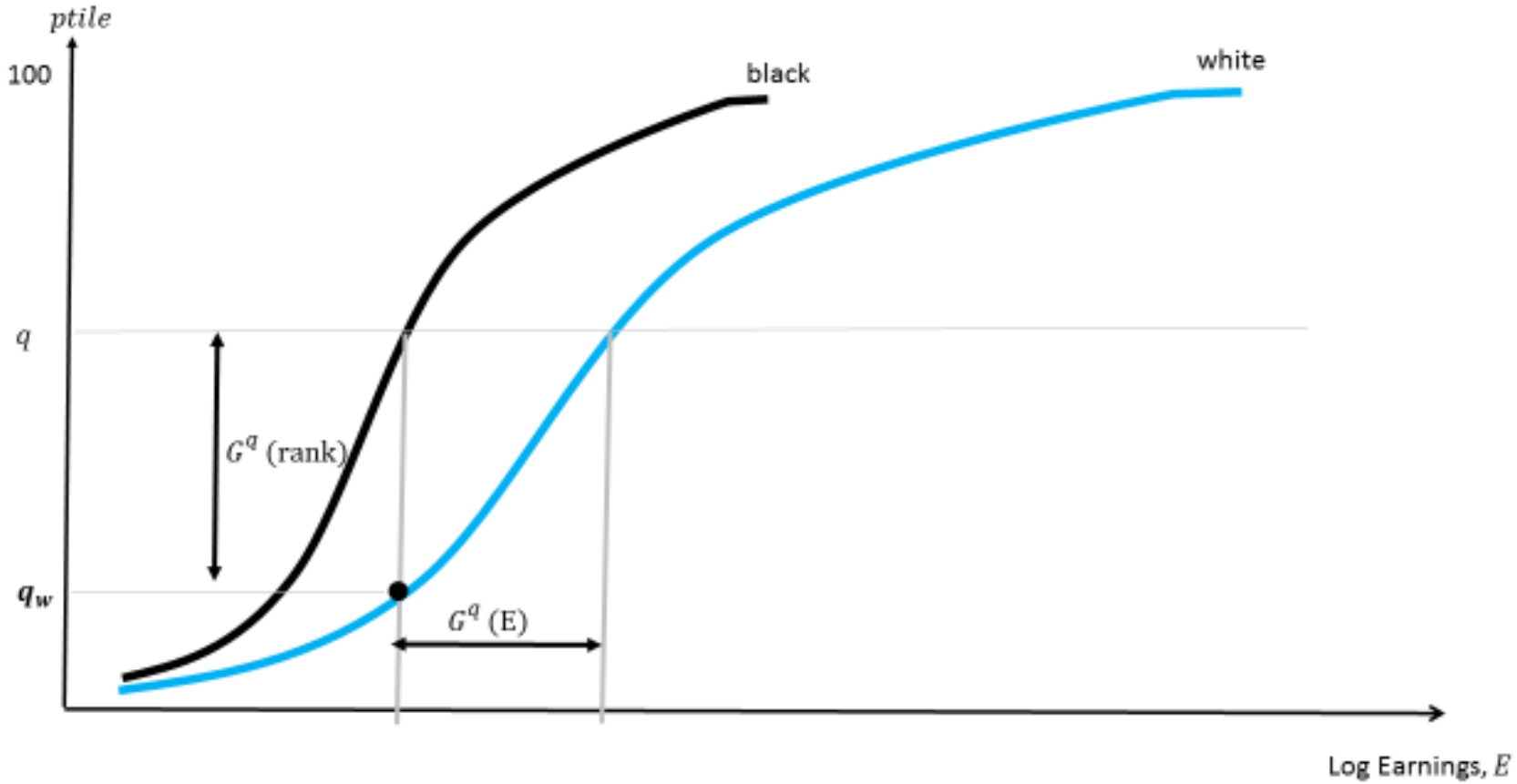
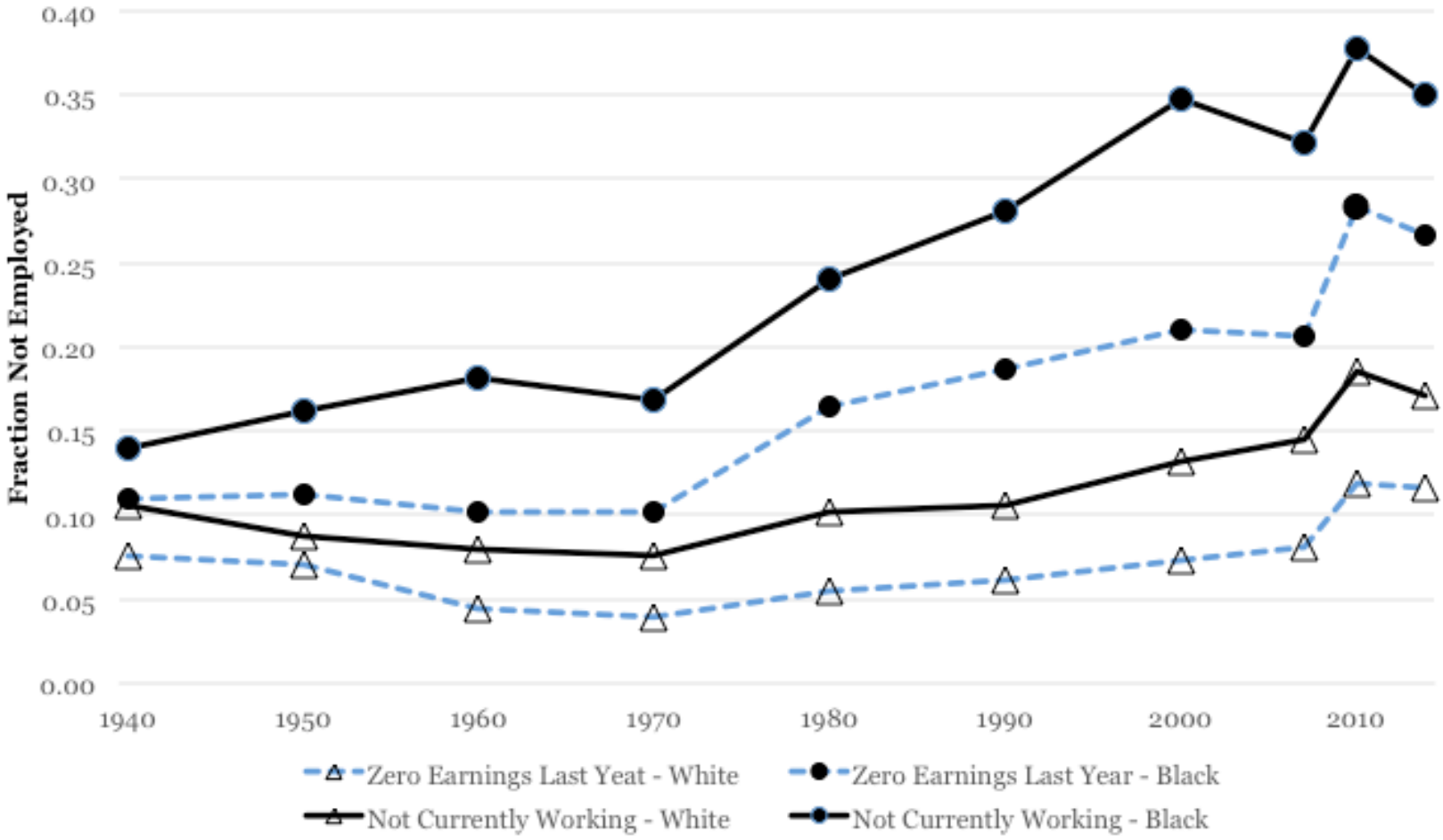
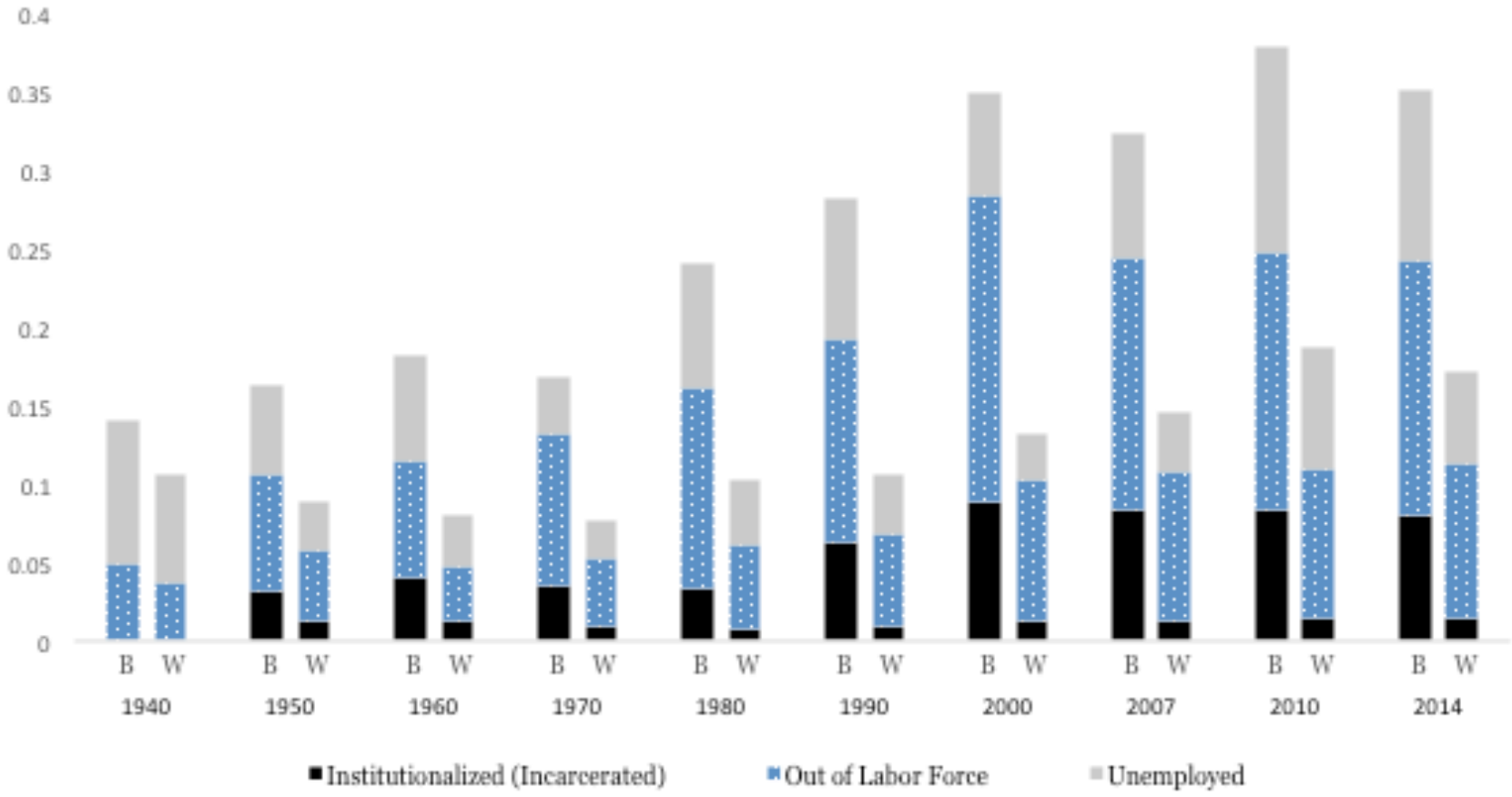


Figure: Fraction of Men Not Employed, by Alternative Measure and Race



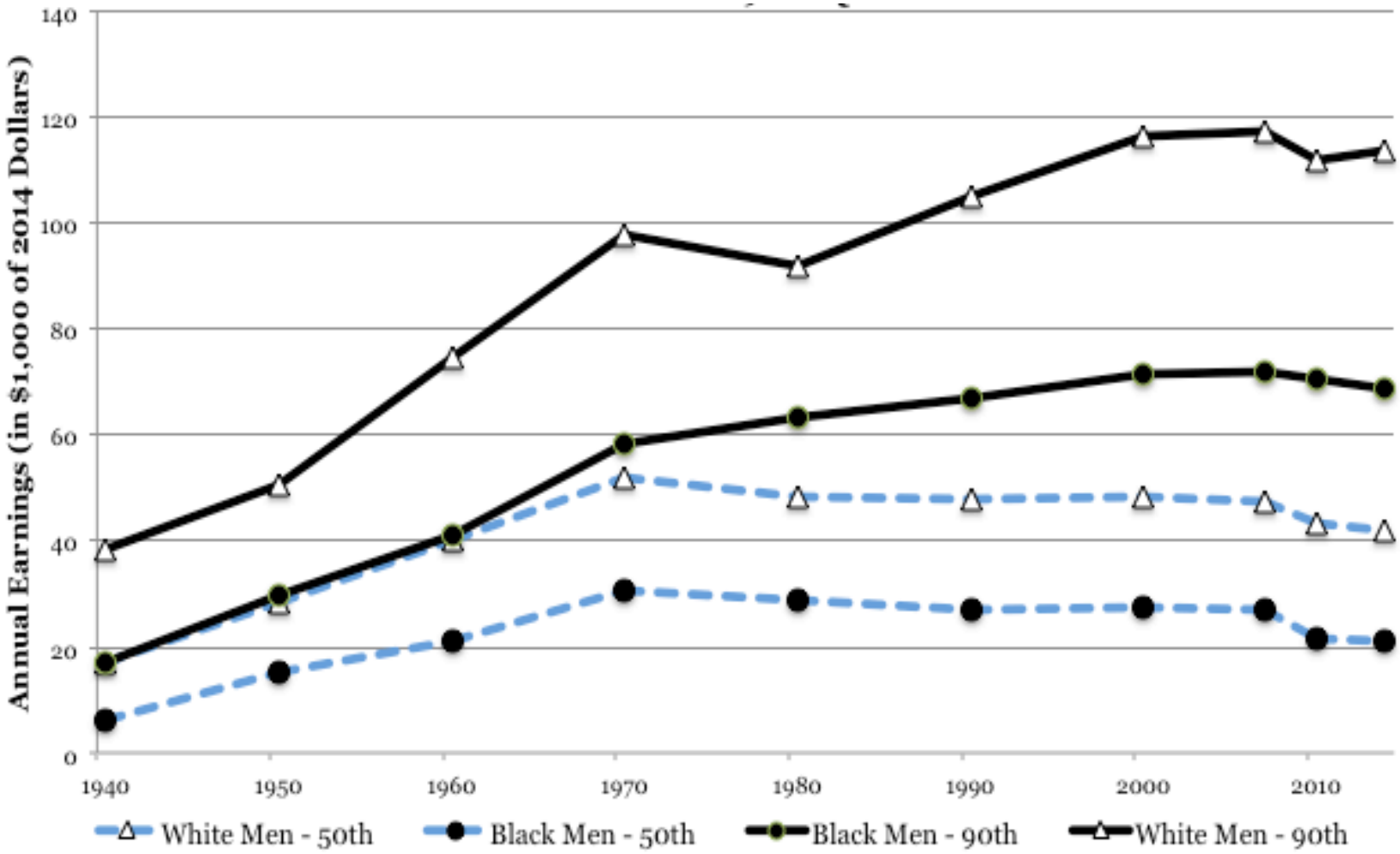
Note: Figure displays fraction of non-Hispanic black and white men aged 25-54 not working according to two measures: not currently working and zero annual earnings in the previous year. The measure of earnings is labor market earnings plus business and farm income. *Sources:* Census, 1940-2000; American Community Survey, 2005-2014. The sample year labeled '2007' combines ACS samples from 2005-07 and '2014' combines those from 2013-14.

Figure: Fraction of Men Not Currently Working, by Explanation and Race



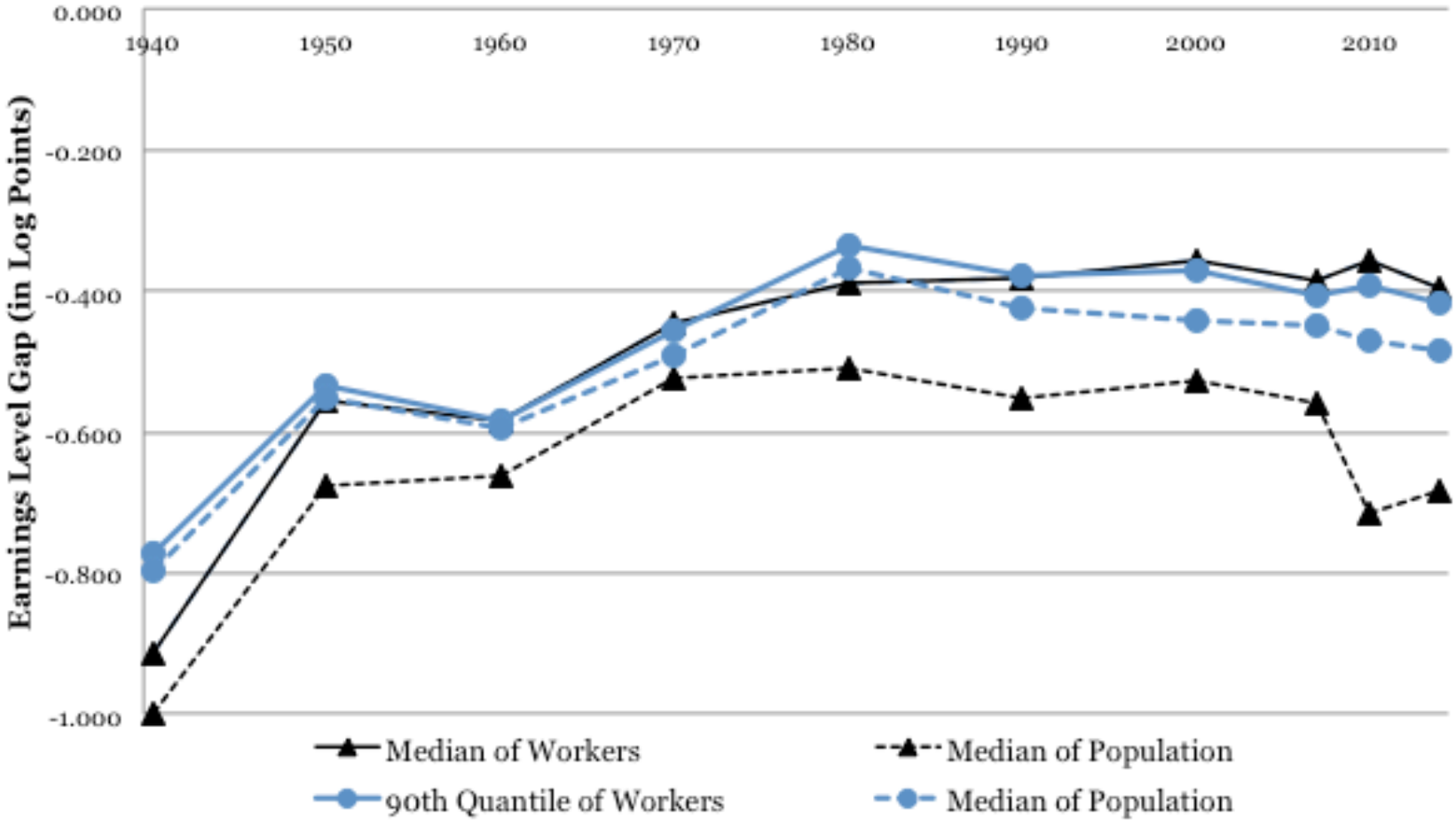
Note: Figure displays fraction of non-Hispanic black and white men aged 25-54 not currently working for three mutually exclusive reasons: institutionalized, not institutionalized but out of the labor force, in the labor force but unemployed. *Sources:* Census, 1940-2000; American Community Survey, 2005-2014. The sample year labeled '2007' combines ACS samples from 2005-07 and '2014' combines those from 2013-14.

Figure: Real Earnings of Black and White Men, Median and 90th Quantile



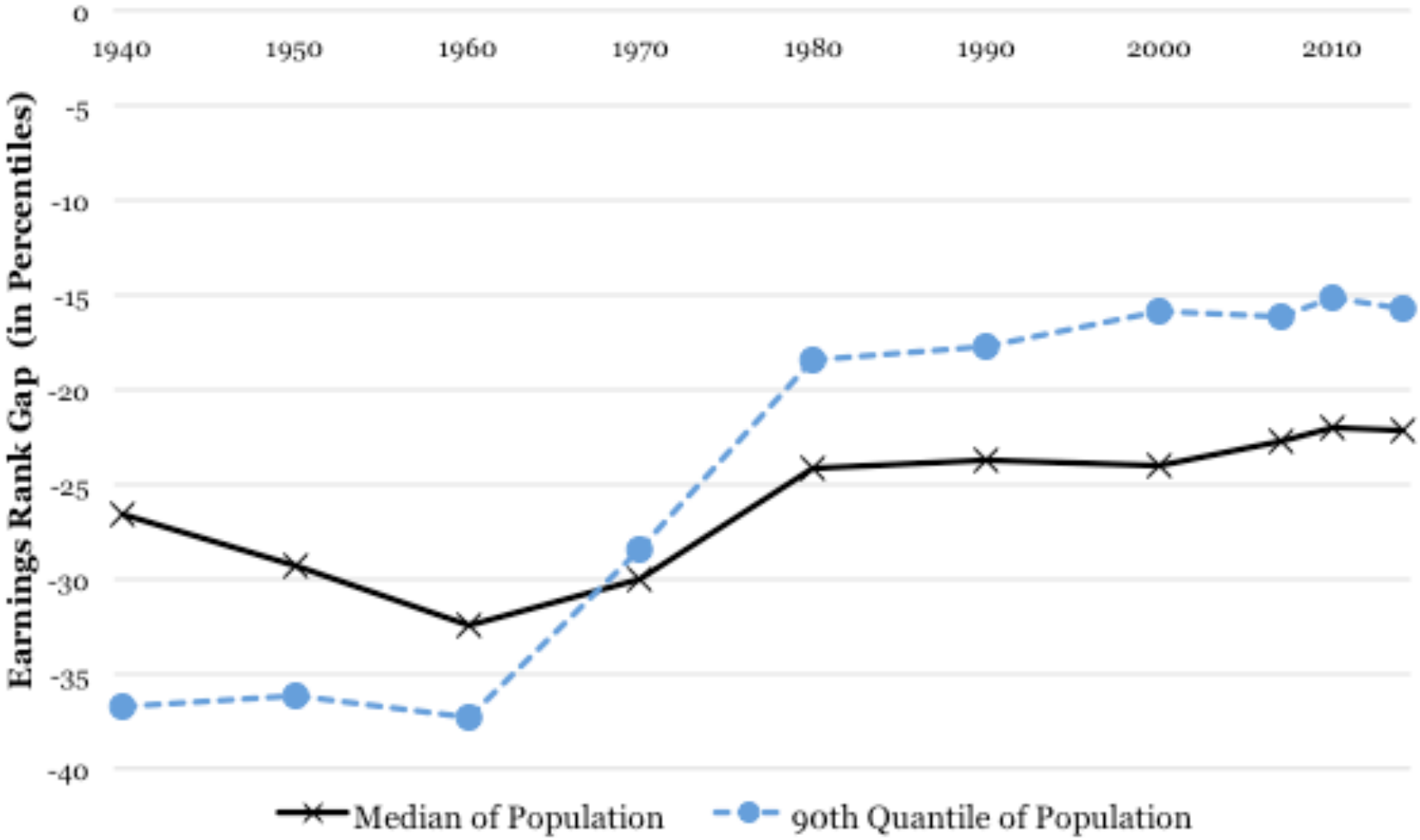
Note: Figure displays earnings of the median and 90th quantile non-Hispanic black and white men measured in the population of all men aged 25-54. Earnings are converted to constant 2014 dollars using the CPI-U price deflator and are measured in thousands of dollars. *Sources:* Census, 1940-2000; American Community Survey, 2005-2014. The sample year labeled '2007' combines ACS samples from 2005-07, '2014' combines those from 2013-14.

Figure: Racial Earnings Level Gap, Workers and Population, Median and 90th Quantile



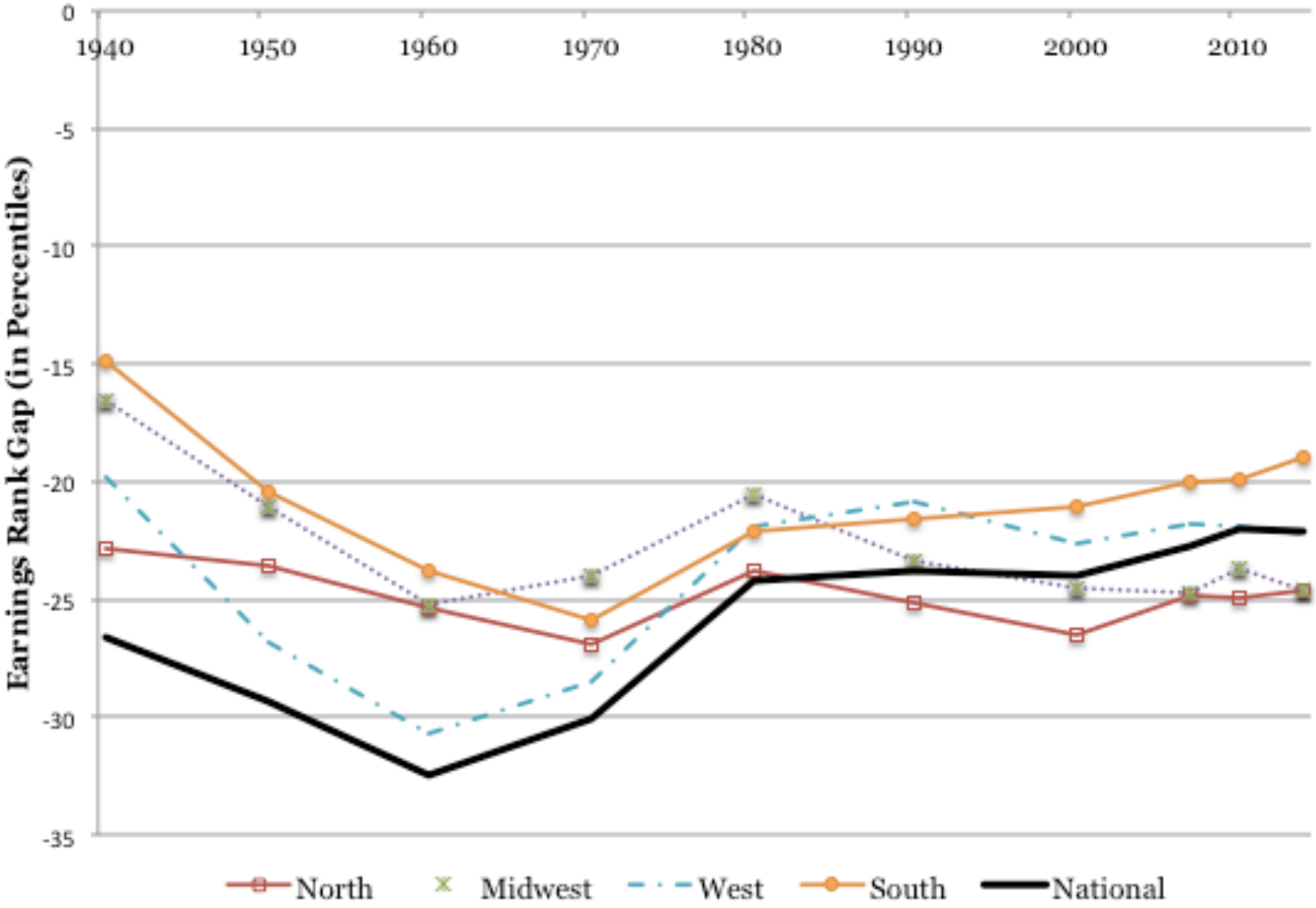
Note: Figure displays earnings level gap, measured in log points, for the median and 90th quantile for non-Hispanic black and white men aged 25-54. Gaps are reported for the sample of workers and the population of all men, including non-workers. *Sources:* Census, 1940-2000; American Community Survey, 2005-2014 .The sample year labeled '2007' combines ACS samples from 2005-07 and '2014' combines those from 2013-14.

Figure: Racial Earnings Rank Gaps, Median and 90th Quantiles



Note: Figure displays earnings rank gap, measured in percentiles, for the median and 90th quantile in the population of all non-Hispanic black and white men aged 25-54, including non-workers. *Sources:* Census, 1940-2000; American Community Survey, 2005-2014 .The sample year labeled '2007' combines ACS samples from 2005-07 and '2014' combines those from 2013-14.

Figure: Median Earnings Rank Gaps, by Region



Note: Figure displays median earnings rank gap, measured in percentiles, for the population of all non-Hispanic black and white men aged 25-54, including non-workers. Gaps are shown for the four major Census regions as well as the U.S. as a whole. *Sources:* Census, 1940-2000; American Community Survey, 2005-2014. The sample year labeled '2007' combines ACS samples from 2005-07 and '2014' those from 2013-14.

Figure: Two Sources of Changes in Racial Earnings Gaps

A. Distributional Convergence

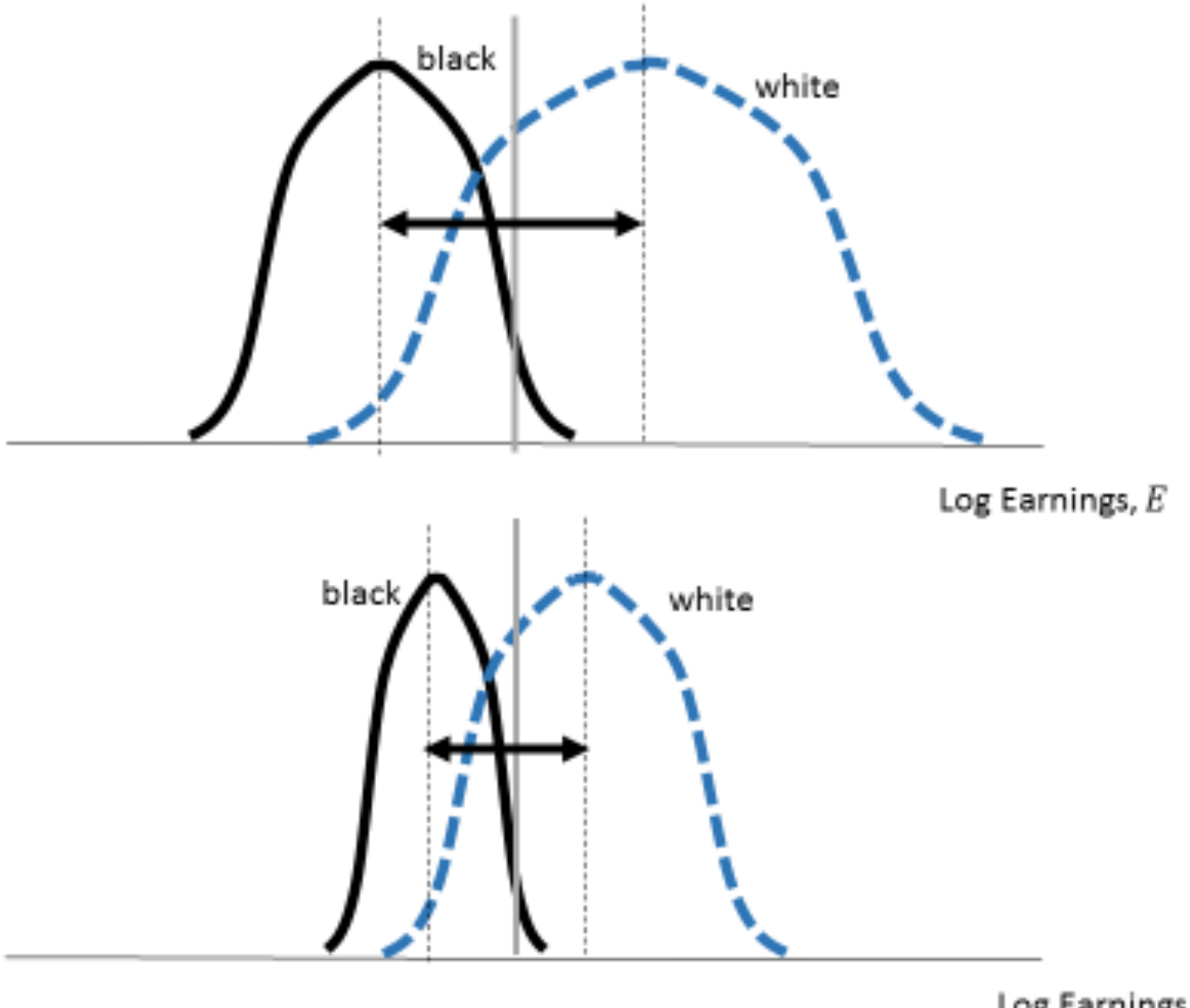


Figure: Two Sources of Changes in Racial Earnings Gaps

B. Positional Convergence

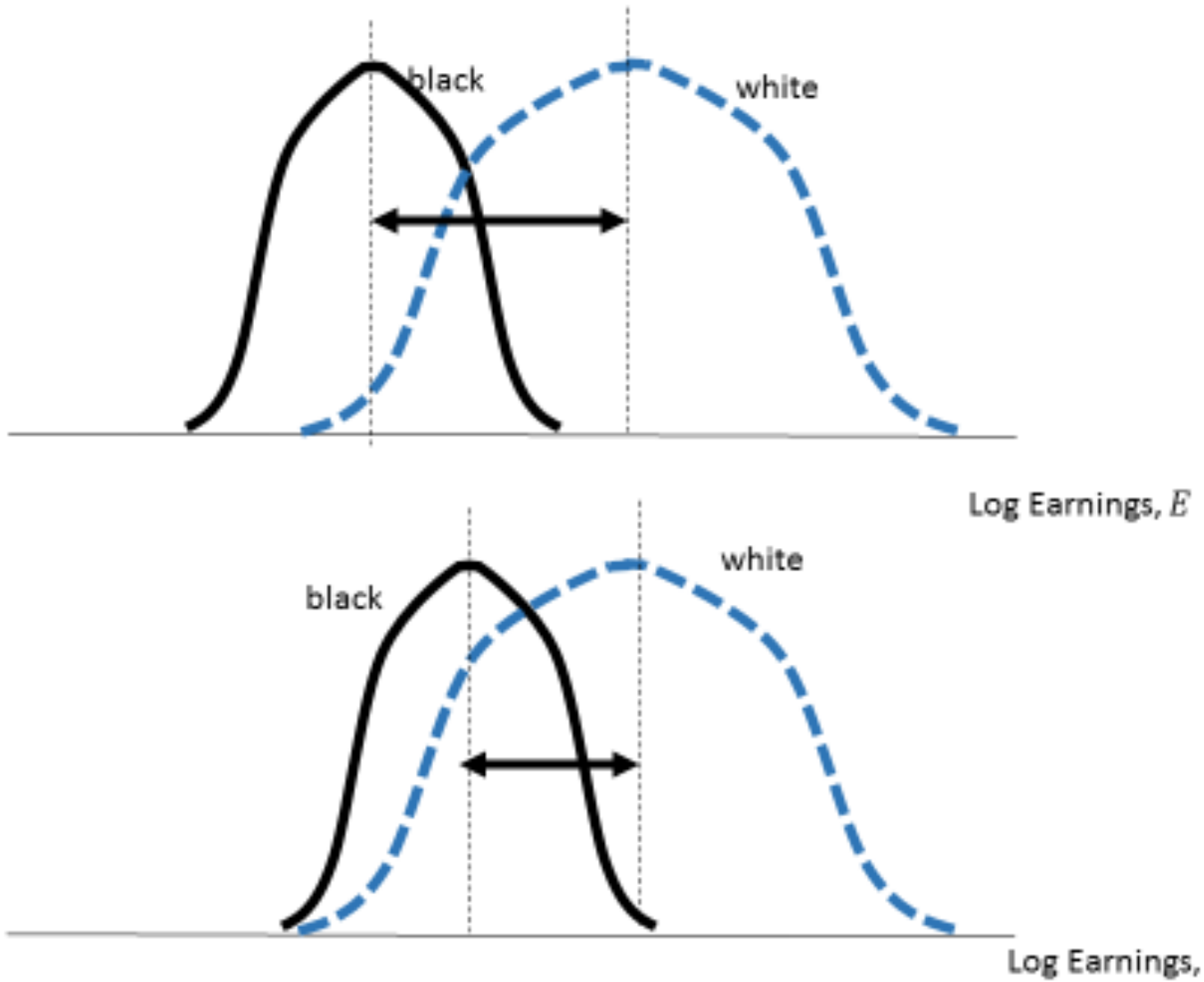


Figure: Illustrating Decomposition Method

A.

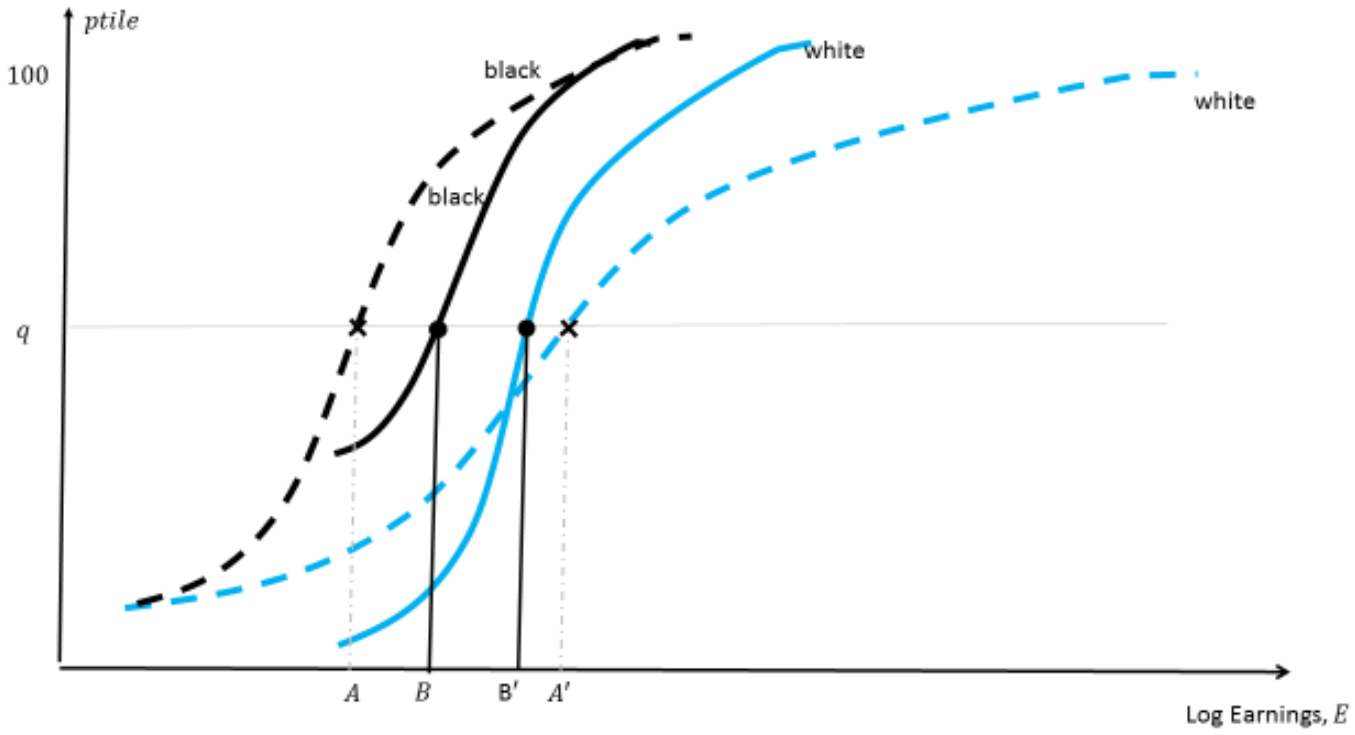


Figure: Illustrating Decomposition Method

B.

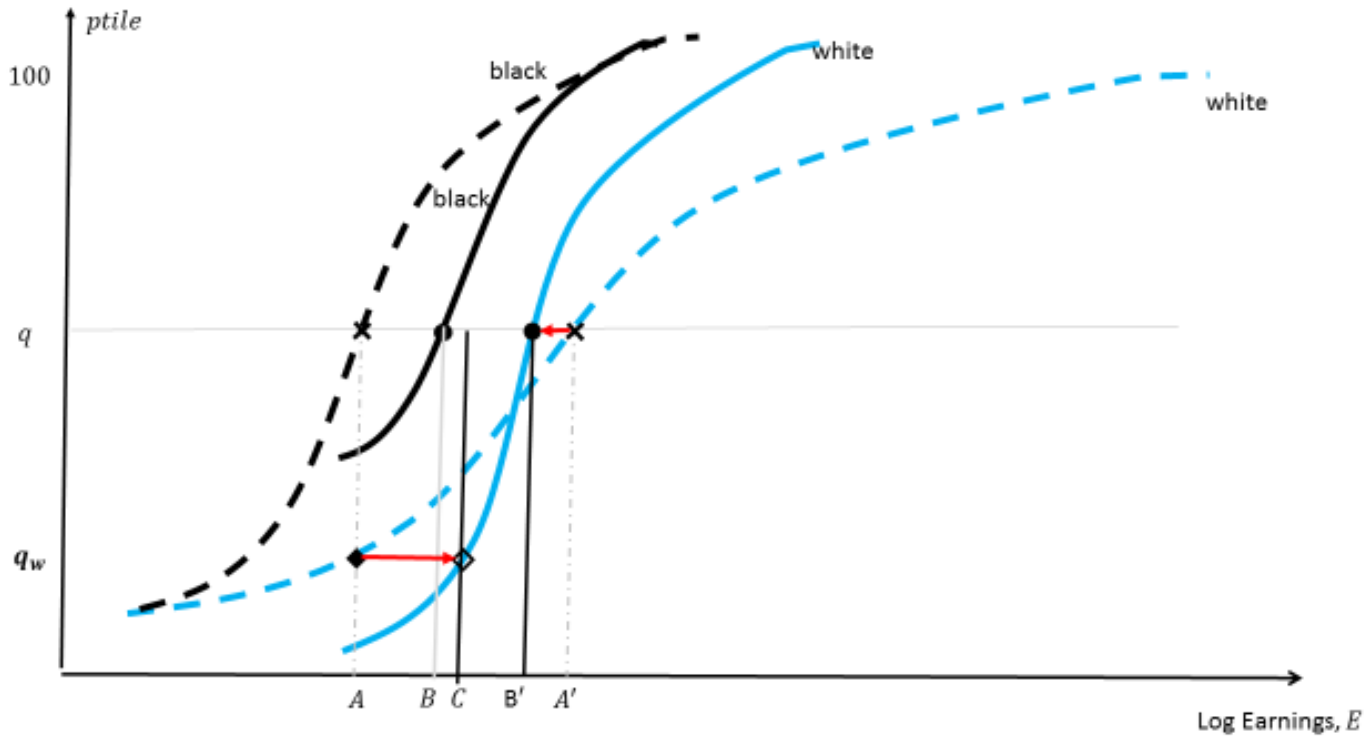


Figure: Illustrating Decomposition Method

C.

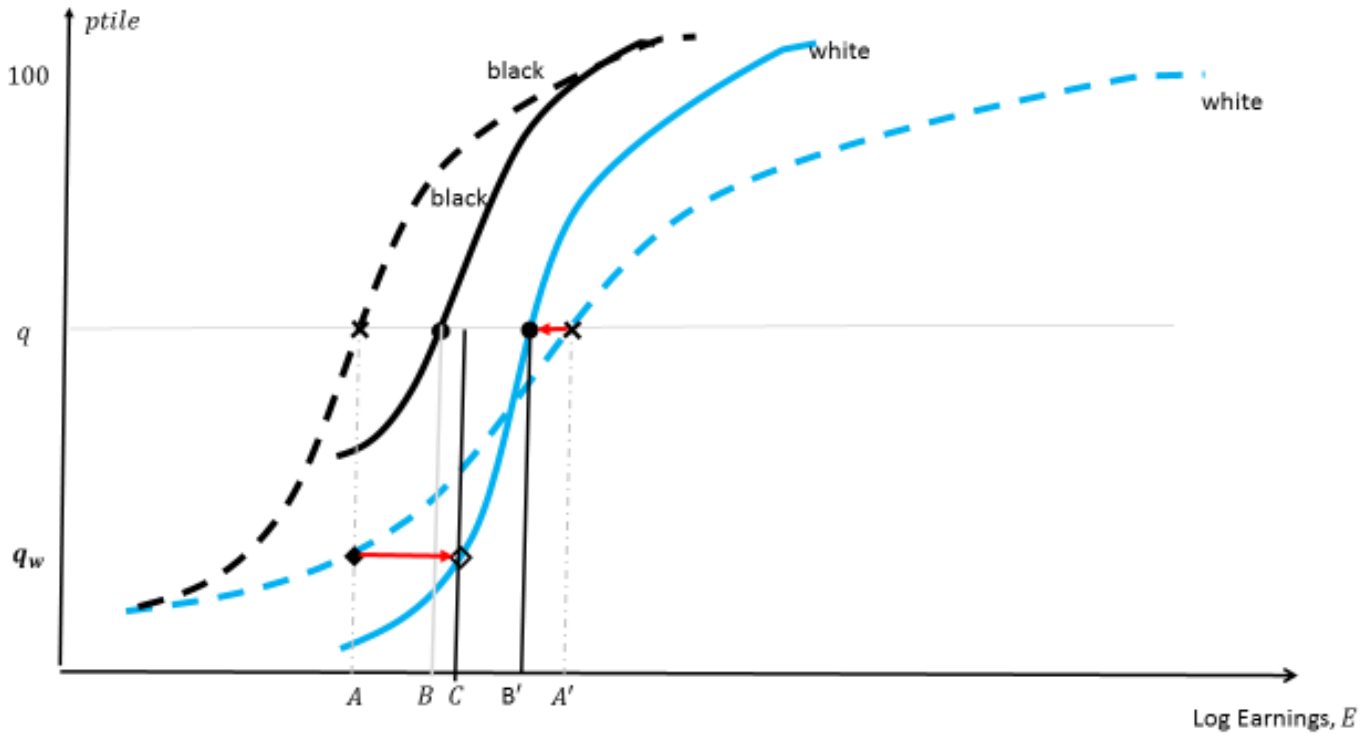


Table: Black-White Differences in Average Education

Men

Year of birth/age	26-30	31-35	36-40	41-45	46-50
1910-1914					-3.13
1915-1920				-3.03	
1920-1924			-2.81		-2.60
1925-1929		-2.48		-2.30	
1930-1934	-2.26		-1.95		-1.81
1935-1939		-1.71		-1.53	
1940-1944	-1.50		-1.38		-1.29
1945-1949		-1.21		-1.29	
1950-1954	-0.99		-0.97		-1.10
1955-1959		-0.76		-0.84	
1960-1964	-0.66		-0.76		
1965-1969		-0.81			
1970-1974	-0.72				

Notes: Data are from the decennial census IPUMS. Mean education for whites 26-30 years old was 11.6 in the 1960 census, 12.5 in the 1970 census, 13.3 in the 1980 census, 13.1 in the 1990 census and 13.6 in the 2000 census. The ipums variables used for constructing years of schooling are "higraded" for 1960, 1970 and 1980 and "educ99" for 1990 and 2000. Individuals with allocated age, sex, race or education have been dropped from the sample. Sample weights "perwt" are used for year 2000.

Table: Black-White Differences in Average Education

Women

Year of birth/age	26-30	31-35	36-40	41-45	46-50
1910-1914					-2.53
1915-1920				-2.25	
1920-1924			-2.04		-2.00
1925-1929		-1.68		-1.54	
1930-1934	-1.46		-1.21		-1.06
1935-1939		-1.07		-0.80	
1940-1944	-1.06		-0.72		-0.73
1945-1949		-0.68		-0.65	
1950-1954	-0.64		-0.64		-0.71
1955-1959		-0.47		-0.63	
1960-1964	-0.45		-0.59		
1965-1969		-0.64			
1970-1974	-0.62				

Notes: Data are from the decennial census IPUMS 1960-2000. Mean education for whites 26-30 years old was 11.3 in the 1960 census, 12.1 in the 1970 census, 13.0 in the 1980 census, 13.3 in the 1990 census and 13.9 in the 2000 census. The ipums variables used for constructing years of schooling are "higraded" for 1960, 1970 and 1980 and "educ99" for 1990 and 2000. Individuals with allocated age, sex, race or education have been dropped from the sample. Sample weights "perwt" are used for year 2000.

Table: High School Graduation Rates By Age, Gender and Race

Top Number Excludes GED, Bottom Number Includes GED

		Men				Women			
	Year of Birth	**19**	**20**	**21**	**30**	**19**	**20**	**21**	**30**
Whites	**1957-1958**	0.75	0.81	0.83	0.84	0.80	0.83	0.84	0.85
		0.77	0.84	0.85	0.89	0.82	0.86	0.87	0.91
	1959-1960	0.69	0.78	0.79	0.79	0.79	0.81	0.81	0.83
		0.71	0.81	0.83	0.86	0.81	0.85	0.86	0.90
	1961-1962	0.69	0.74	0.75	0.75	0.74	0.79	0.79	0.79
		0.73	0.79	0.81	0.84	0.78	0.83	0.84	0.89
	1963-1964	0.66	0.72	0.72	0.74	0.74	0.78	0.78	0.78
		0.71	0.78	0.79	0.85	0.79	0.83	0.84	0.88
	1980-1981	0.67	0.78	0.79		0.76	0.85	0.86	
		0.71	0.84	0.86		0.78	0.87	0.89	
Blacks	**1957-1958**	0.51	0.61	0.65	0.66	0.64	0.74	0.75	0.77
		0.55	0.66	0.71	0.74	0.67	0.78	0.80	0.86
	1959-1960	0.48	0.62	0.67	0.68	0.62	0.70	0.70	0.72
		0.50	0.67	0.72	0.79	0.66	0.74	0.76	0.82
	1961-1962	0.50	0.61	0.61	0.63	0.69	0.76	0.76	0.77
		0.56	0.68	0.71	0.80	0.71	0.79	0.80	0.85
	1963-1964	0.53	0.64	0.67	0.68	0.66	0.72	0.73	0.74
		0.59	0.72	0.76	0.83	0.68	0.77	0.78	0.84
	1980-1981	0.43	0.56	0.58		0.66	0.76	0.78	
		0.47	0.62	0.65		0.68	0.79	0.82	

Notes: Data are from NLSY 1979 and NLSY 1997. Only individuals who were observed after the age of interest are included. Individuals with coding errors for the age variable have been dropped from the sample.

Table: Black-White Math and Reading Score Gaps in NAEP

Entries are black-white gaps in mean scores expressed in standard deviation units.

	Reading		Math	
cohort/age	**9**	**13**	**9**	**13**
1958		-1.08		
1960				-1.18
1962	-1.04	-1.02		
1964			-0.97	
1965				-1.08
1966	-0.92			
1967		-0.91		
1969			-0.88	-1.02
1971	-0.84	-0.74		
1973			-0.84	-0.79

Table: Black-White Math and Reading Score Gaps in NAEP, Cont'd

Entries are black-white gaps in mean scores expressed in standard deviation units.

	Reading		Math	
cohort/age	**9**	**13**	**9**	**13**
1975	-0.79	-0.53		
1977		-0.58	-0.74	-0.87
1979	-0.71	-0.73		-0.93
1981	-0.79	-0.77	-0.81	-0.90
1983	-0.83	-0.82	-0.82	-0.92
1985	-0.80		-0.74	
1986		-0.74		-0.98
1987	-0.74		-0.75	
1990	-0.91		-0.82	

Notes: Data are from 1999 NAEP Long-Term Trend Summary Data Tables. Entries are calculated as the score gap divided by the overall standard deviation for the corresponding test year. The standard deviations for the 1973 age 9 and age 13 math tests are not available, and therefore the standard deviations of the 1978 math tests are used instead.

Table: Fraction of children with zero, one, and two parents

	Black			White		
	Zero	One	Two	Zero	One	Two
1960	0.08	0.24	0.68	0.01	0.06	0.93
1970	0.06	0.36	0.58	0.01	0.09	0.90
1980	0.06	0.49	0.46	0.01	0.13	0.86
1990	0.07	0.59	0.34	0.02	0.18	0.80
2000	0.11	0.56	0.33	0.03	0.19	0.79

Notes: The Table displays fractions of children aged 0-5 who live in a household with zero, one or two parents. Data are from the decennial census IPUMS, 1960-2000. The ipums variables used for defining the number of parents are "momloc" and "poploc". Individuals with allocated sex, age or race have been dropped from the sample. Sample weights "perwt" are used for year 2000.

Table: Average Household Income of children with zero, one, and two parents

	Black				White			
year/parents	Average	Zero	One	Two	Average	Zero	One	Two
1960	18,280	15,730	13,282	20,323	34,769	24,386	21,076	35,725
1970	28,065	23,376	19,264	33,934	45,779	34,477	27,427	47,664
1980	31,017	29,674	22,150	40,670	45,480	41,464	27,671	48,136
1990	30,933	29,299	22,590	45,634	52,828	42,965	31,773	57,740
2000	35,756	35,591	25,197	53,894	64,065	46,149	37,495	71,016

Notes: The Table displays average total household income for children aged 0-5. Data are from the decennial census IPUMS, 1960-2000. The ipums variable used for constructing total household income is "inctot". Total household income is the sum of "inctot" across individuals who live in the same household. Negative values of "inctot" have been recoded to zeros. Values are expressed in 1999 USD. Current monetary values have been adjusted using the CPI-U. The variables used for defining the number of parents are "momloc" and "poploc". Individuals with allocated sex, age or race have been dropped from the sample. Sample weights "perwt" are used for year 2000.

Table: Changes in Black-White Score Gaps – Gap in Followup Year - Gap in Base Year

	Boys				Girls			
	Reading		Math		Reading		Math	
Data Set	Score Gain (se)	Stand Dev. Gain	Score Gain (se)	Stand Dev. Gain	Score Gain (se)	Stand Dev. Gain	Score Gain (se)	Stand Dev. Gain
High School & Beyond Sophomore 1980 Cohort (10th - 12th Grade)	-0.123 0.371	0.005	0.188 0.744	0.078	-0.302 0.323	-0.021	-0.206 0.627	0.047
NELS 1988-1990 (8th - 10th Grade)	-1.151 0.844	-0.013	-1.169 1.066	0.037	-0.517 0.738	0.025	-1.872 0.954	-0.046
NELS 1990-1992 (10th - 12th Grade)	-0.326 0.904	-0.018	-0.757 1.165	-0.012	-0.217 0.723	-0.012	0.515 0.996	0.069
ECLS 1998-1999 (Fall K - Spring 1st Grade)	-4.386 1.171	-0.122	-2.417 0.846	-0.130	-3.429 1.217	-0.096	-1.876 0.837	-0.071

This table displays the changes in the black-white score gaps (referred to as score gains) in score terms and in standard deviation terms for the HSB, NELS and ECLS data. The ECLS base period is fall kindergarten and followup period is spring first grade for 1998-99. The HSB base period is 10th grade and the followup period is 12th grade for the 1980 cohort. The NELS data covers two time periods. In the first the base period is 8th grade and followup is 10th grade for 1988-90. The second has a base period of 10th grade and a followup of 12th grade for 1990-92.

Table: Average Percentile Ranking in White Test Scores Among Black Children

HSB

Year	Reading		Math	
	Male	Female	Male	Female
1980	0.34	0.33	0.27	0.28
1982	0.35	0.32	0.30	0.30

NELS

	Reading		Math	
	Male	Female	Male	Female
1988	0.31	0.32	0.27	0.28
1990	0.32	0.32	0.27	0.29
1992	0.31	0.31	0.27	0.31

ECLS

	Reading		Math	
	Male	Female	Male	Female
1998	0.36	0.36	0.32	0.30
1999	0.34	0.35	0.28	0.29

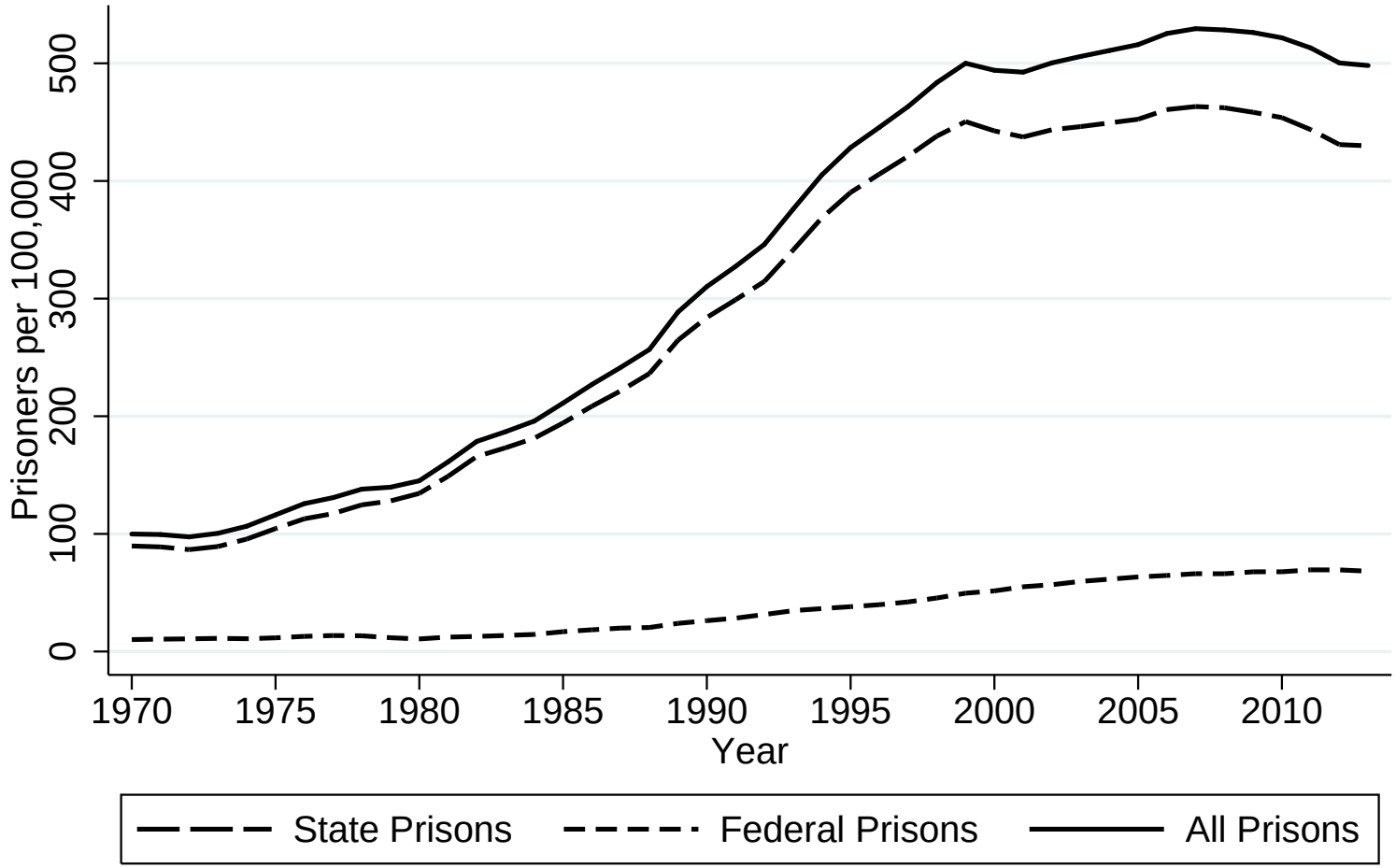
Notes: each entry represents the average white percentile for black scores. The ECLS data corresponds to fall kindergarten in 1998 and to spring first grade in 1999. The HSB data are for 10th grade in 1980 and 12th in 1982. The NELS data are for 8th grade in 1988, 10th grade in 1990 and 12th grade in 1992.

Table: Average Percentile Ranking in White Test Scores Among Black Children

	Reading		Math	
Cohort	**Score Gain (se)**	**Stand Dev. Gain**	**Score Gain (se)**	**Stand Dev. Gain**
1962	7.50 (2.37)	0.03	-	-
1969	-	-	-2.30 (2.36)	-0.14
1971	5.80 (2.38)	0.11	-	-
1973	-	-	4.70 (3.28)	0.04
1975	14.10 (3.12)	0.26	-	-
1977	-	-	-1.90 (3.20)	-0.13
1979	0.40 (3.80)	-0.02	-	-
1981	4.40 (4.13)	0.01	-2.50 (4.31)	-0.09
1983	1.50 (3.69)	0.01	-2.00 (2.67)	-0.10

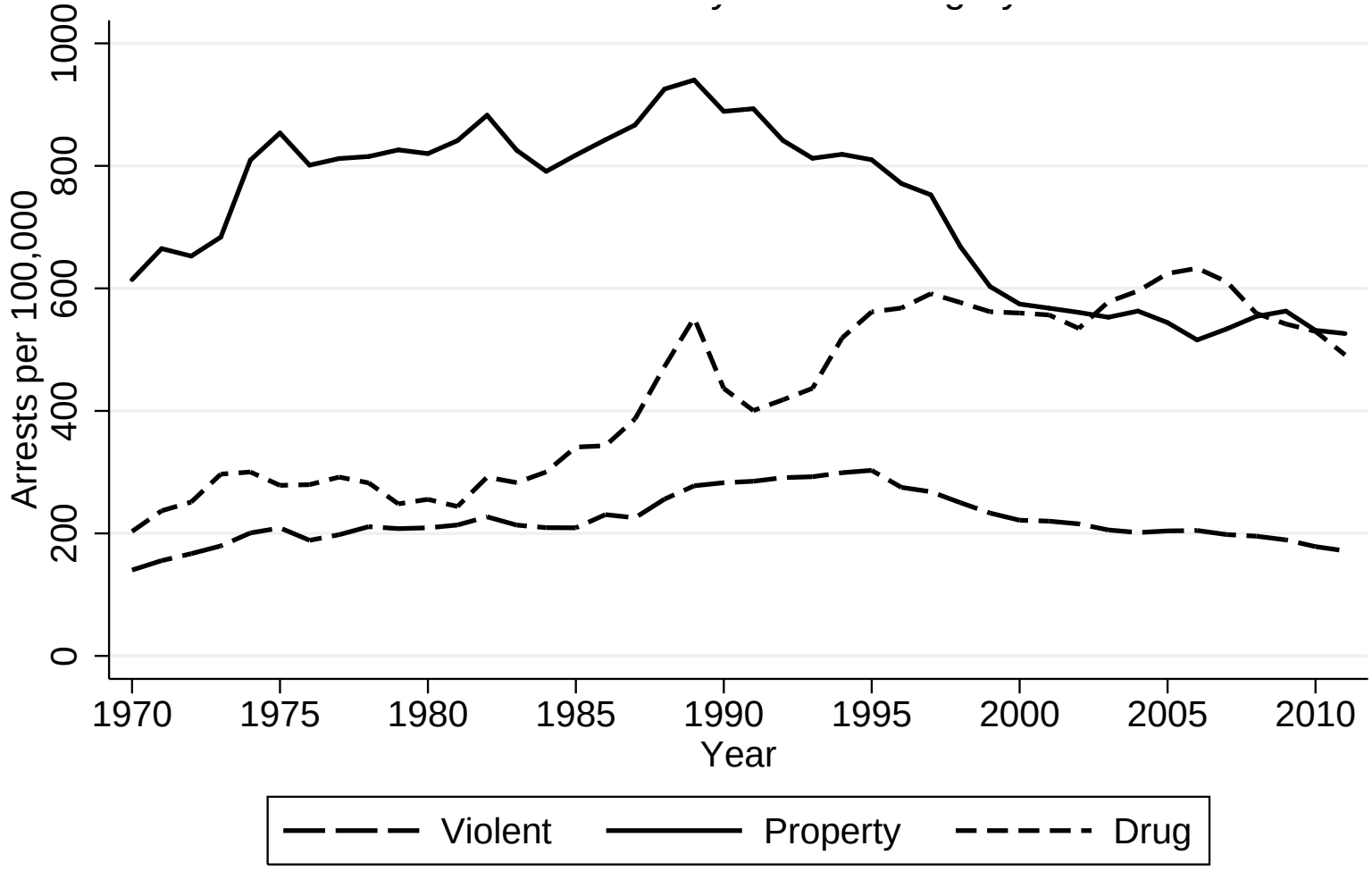
Notes: The Table displays the change in the black-white reading and math score gap between ages 9 and 13 for various birth cohorts. The data are taken from the 1999 NAEP Long-Term Trend Assesment Summary Data Tables.

Figure: U.S. Incarceration Rates 1970-2013



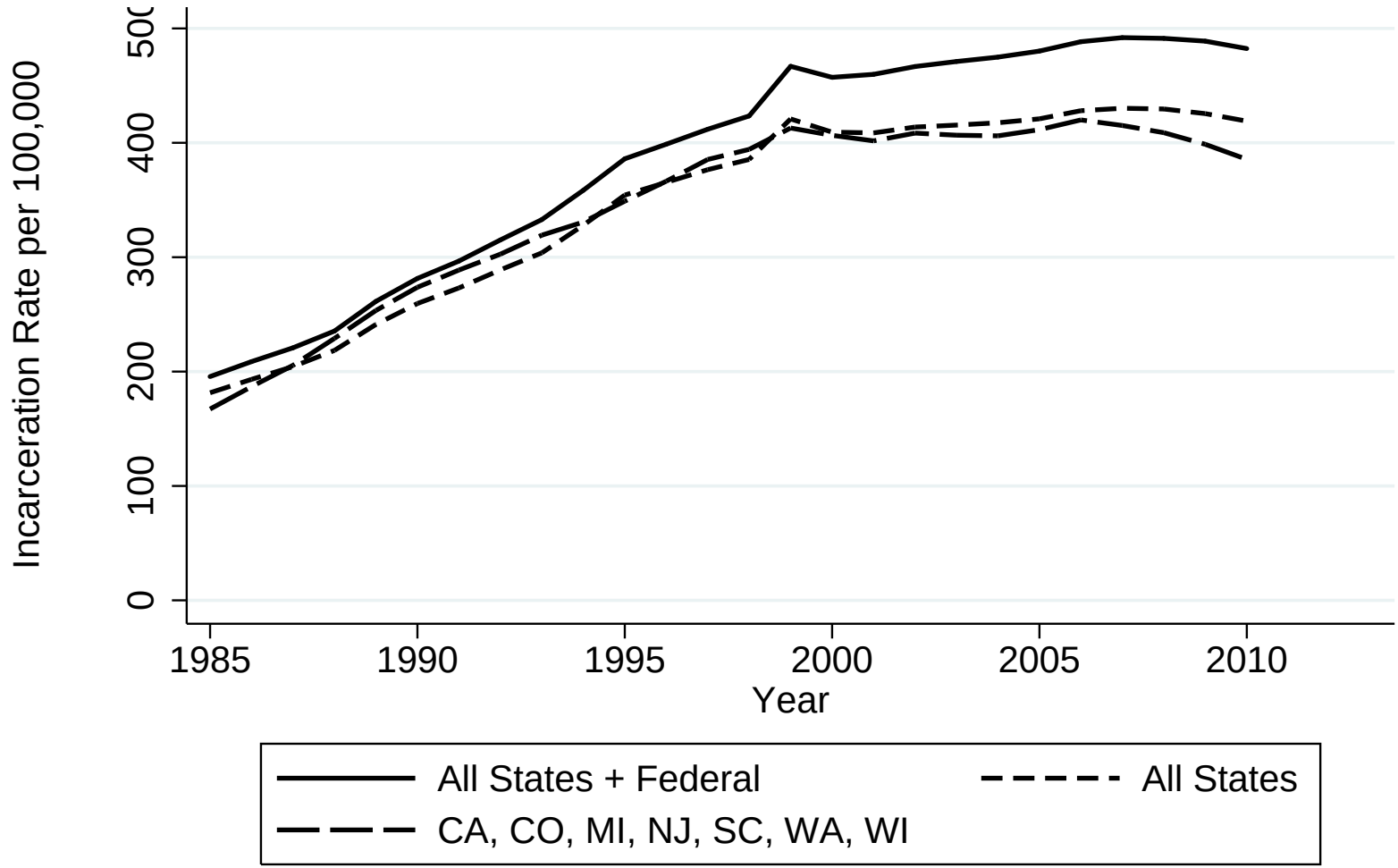
This figure uses data from National Prisoner Statistics, Historical Statistics on Prisoners in State and Federal Institutions, Year-end 1925-86 on prison populations. Population data for generating incarceration rates come from Census historical population estimates.

Figure: Arrest Rates by Crime Category



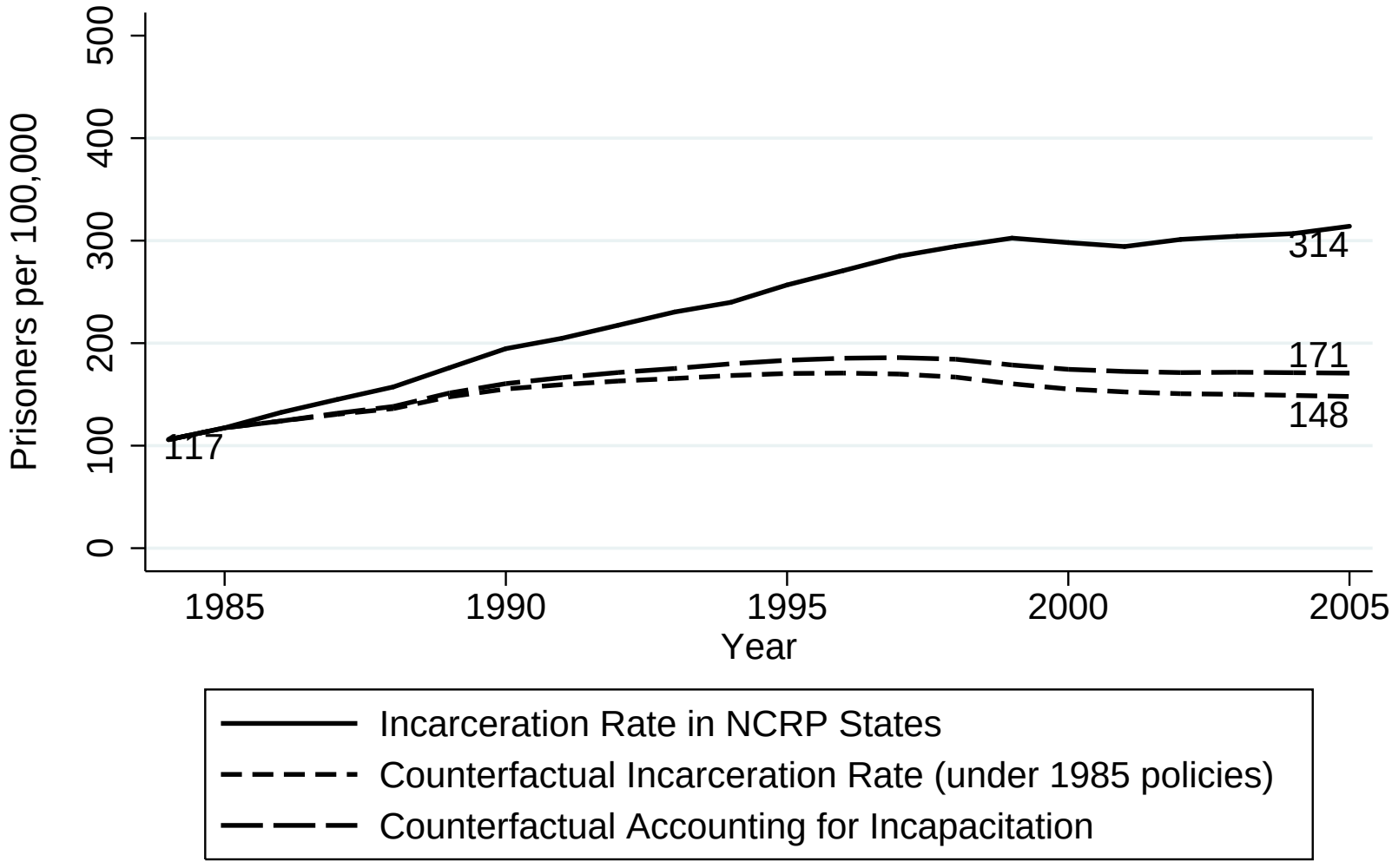
This figure uses data from the FBI's Uniform Crime Reporting program, which contain national estimates from crimes and arrests based on voluntary reporting from law enforcement agencies. Population data for generating incarceration rates come from Census historical population estimates.

Figure: Prison Populations for Three Samples



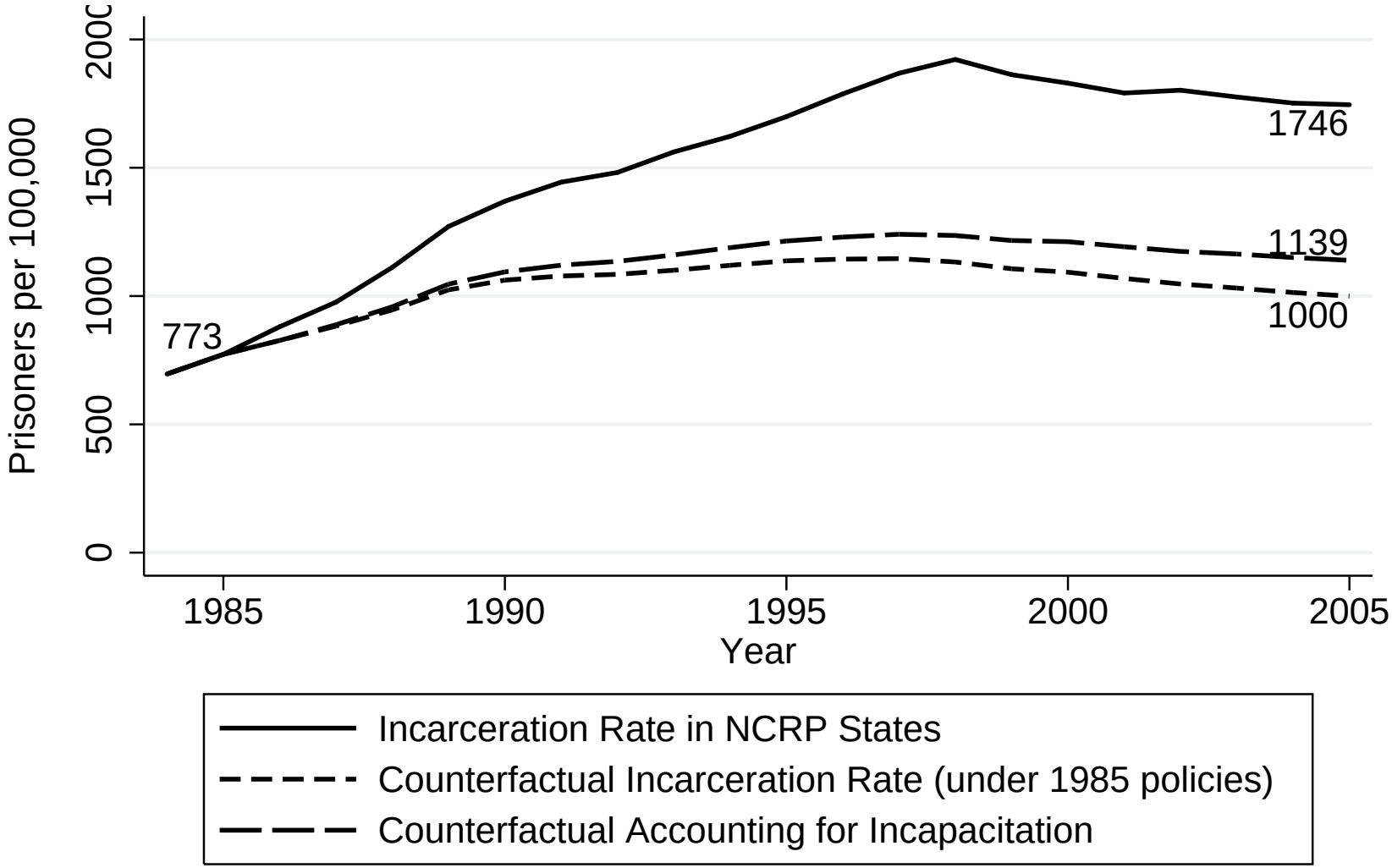
This figure uses annual data from the National Prisoner Statistics. Population data for generating incarceration rates come from Census historical population estimates.

Figure: Actual and Counterfactual Incarceration Rate: White



See notes to Figure 4.

Figure: Actual and Counterfactual Incarceration Rate: Black



See notes to Figure 4.

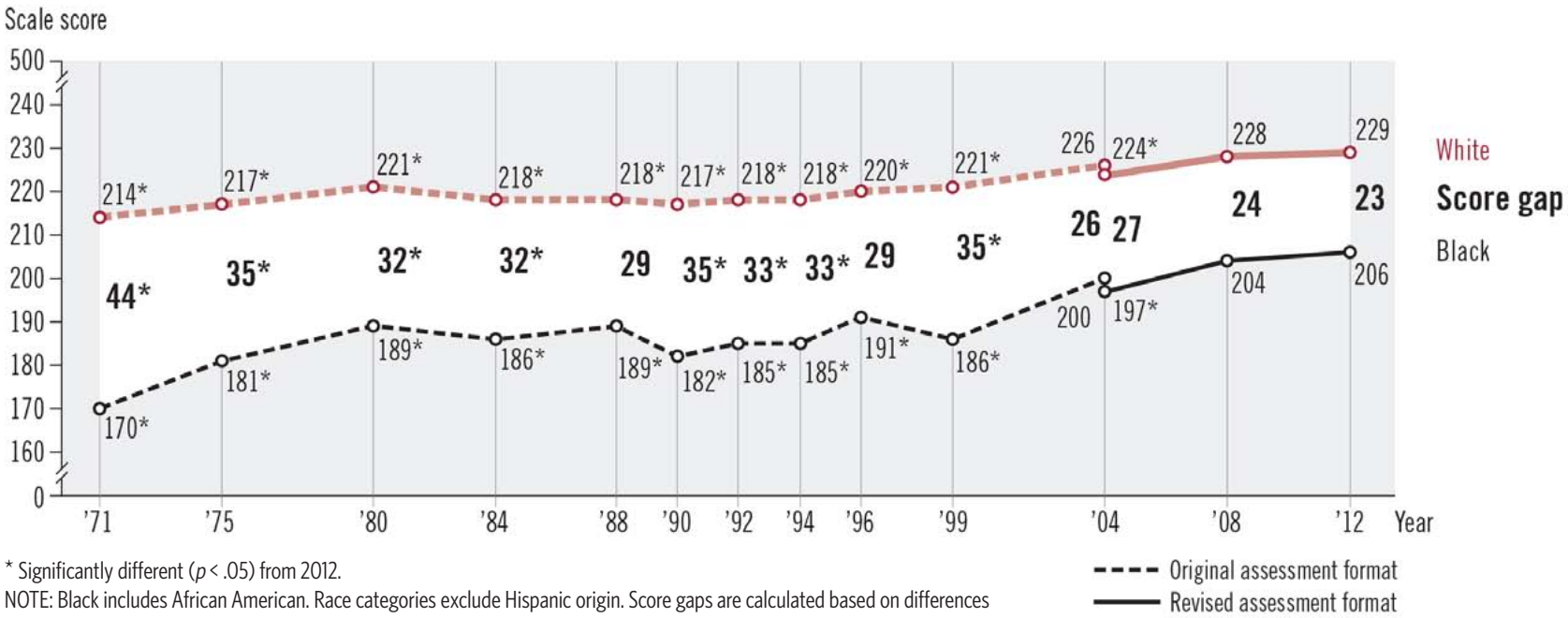
Racial/ethnic score gaps narrow at all three ages

- Even though White students continued to score 21 or more points higher on average than Black and Hispanic students in 2012, the White – Black and White – Hispanic gaps narrowed in comparison to the gaps in the 1970s at all three ages.
- The White – Black score gaps for 9- and 17-year-olds in 2012 were nearly half the size of the gaps in 1971.

Black and Hispanic 9-year-olds make larger gains than White students

- The score gaps between White and Black students and between White and Hispanic students at age 9 narrowed from the 1970s because Black and Hispanic students made larger gains than did White students.
- The average score for Black students was 36 points higher in 2012 than in 1971 (206 –170) and the score for White students was 15 points higher (229 - 214).
- The average score for Hispanic students increased 25 points from 1975, and the score for White students increased 12 points.

Figure: Trend in NAEP reading average scores and score gaps for White and Black 9-year-old students



* Significantly different ($p < .05$) from 2012.
NOTE: Black includes African American. Race categories exclude Hispanic origin. Score gaps are calculated based on differences between unrounded average scores.

Figure: Trend in NAEP reading average scores and score gaps for White and Hispanic 9-year-old students

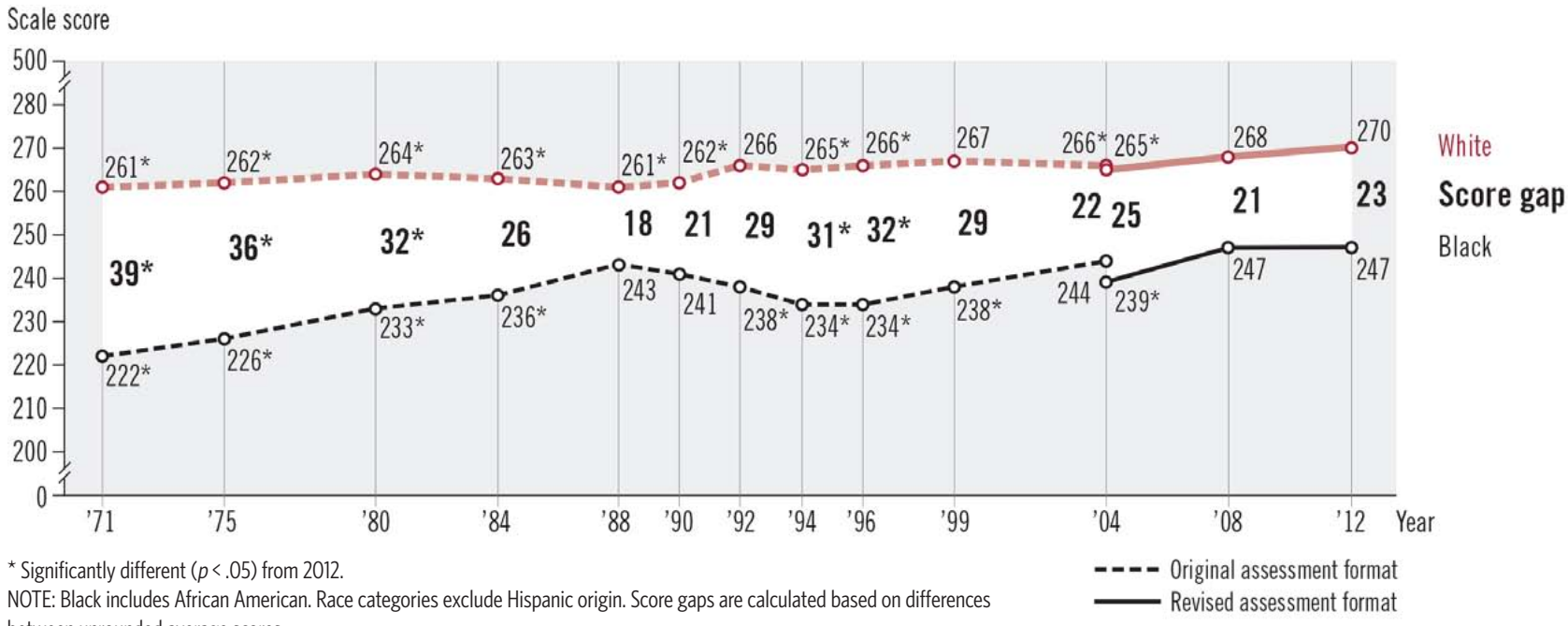
* Significantly different ($p < .05$) from 2012.

NOTE: White excludes students of Hispanic origin. Hispanic includes Latino. Results are not available for Hispanic students in 1971 because Hispanic was not reported as a separate category at that time. Score gaps are calculated based on differences between unrounded average scores.

Thirteen-year-old Hispanic students make long- and short-term gains

- The racial/ethnic score gap trends at age 13 are similar to those at age 9. Black and Hispanic students both made larger gains from the 1970s than White students, leading to a narrowing of the score gaps in 2012.
- Hispanic 13-year-olds are the only racial/ethnic group to make short-term reading score gains.
- The White – Hispanic gap narrowed 5 points since 2008.

Figure: Trend in NAEP reading average scores and score gaps for White and Black 13-year-old students



* Significantly different ($p < .05$) from 2012.
NOTE: Black includes African American. Race categories exclude Hispanic origin. Score gaps are calculated based on differences between unrounded average scores.

Figure: Trend in NAEP reading average scores and score gaps for White and Hispanic 13-year-old students

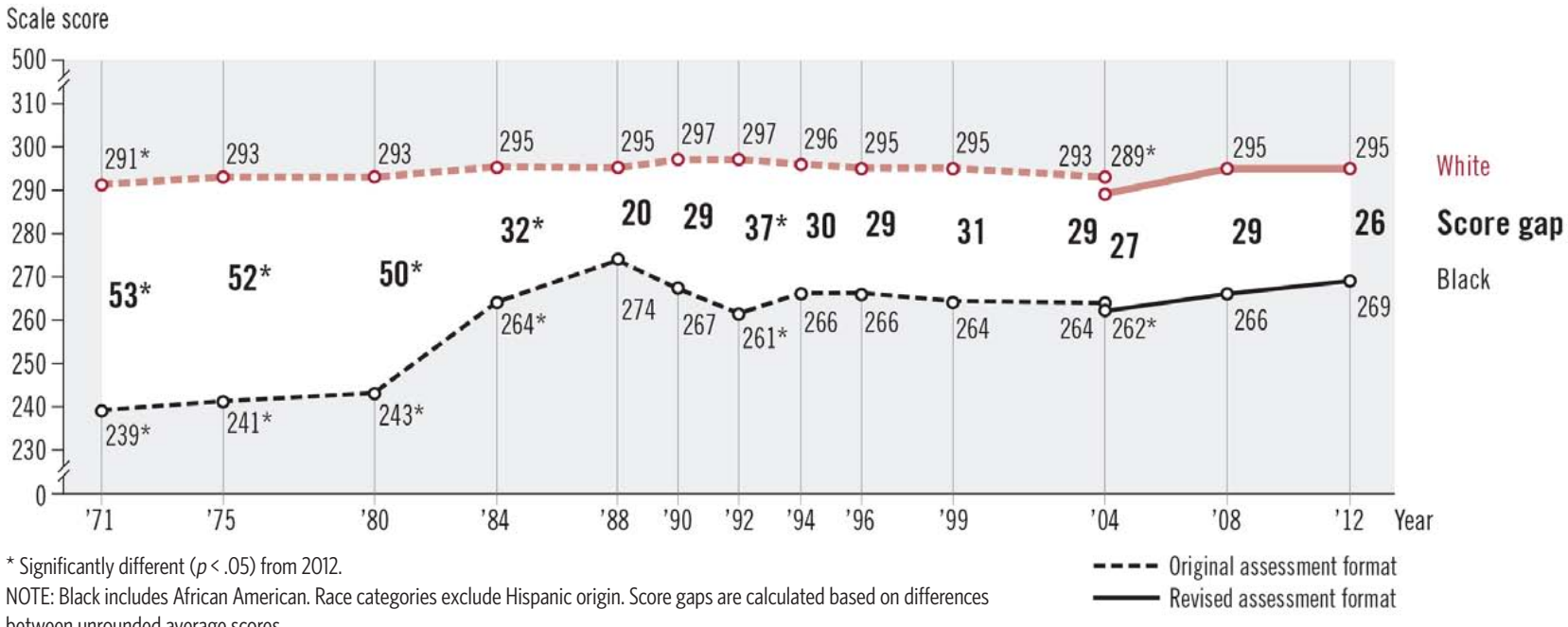
* Significantly different ($p < .05$) from 2012.

NOTE: White excludes students of Hispanic origin. Hispanic includes Latino. Results are not available for Hispanic students in 1971 because Hispanic was not reported as a separate category at that time. Score gaps are calculated based on differences between unrounded average scores.

White, Black, and Hispanic 17-year-olds show improvement since the 1970s

- Average reading scores for 17-year-olds increased 4 points from the first assessment year for White students, 30 points for Black students, and 21 points for Hispanic students. Larger gains for Black and Hispanic students than for White students narrowed the White – Black and White – Hispanic gaps to about half of what they were in the 1970s.
- The changing makeup of the student population is one reason why the overall average score for 17-year-olds has not changed significantly, even though student groups within the overall population are making gains. When an increase in the proportion of typically lower performing students is accompanied by a decrease in the proportion of higher performing students, the overall average score can remain unchanged even though the average scores for both higher and lower performing groups increase. This phenomenon is known as Simpson's paradox.

Figure: Trend in NAEP reading average scores and score gaps for White and Black 17-year-old students



* Significantly different ($p < .05$) from 2012.

NOTE: Black includes African American. Race categories exclude Hispanic origin. Score gaps are calculated based on differences between unrounded average scores.

Figure: Trend in NAEP reading average scores and score gaps for White and Hispanic 17-year-old students

* Significantly different ($p < .05$) from 2012.

NOTE: White excludes students of Hispanic origin. Hispanic includes Latino. Results are not available for Hispanic students in 1971 because Hispanic was not reported as a separate category at that time. Score gaps are calculated based on differences between unrounded average scores.

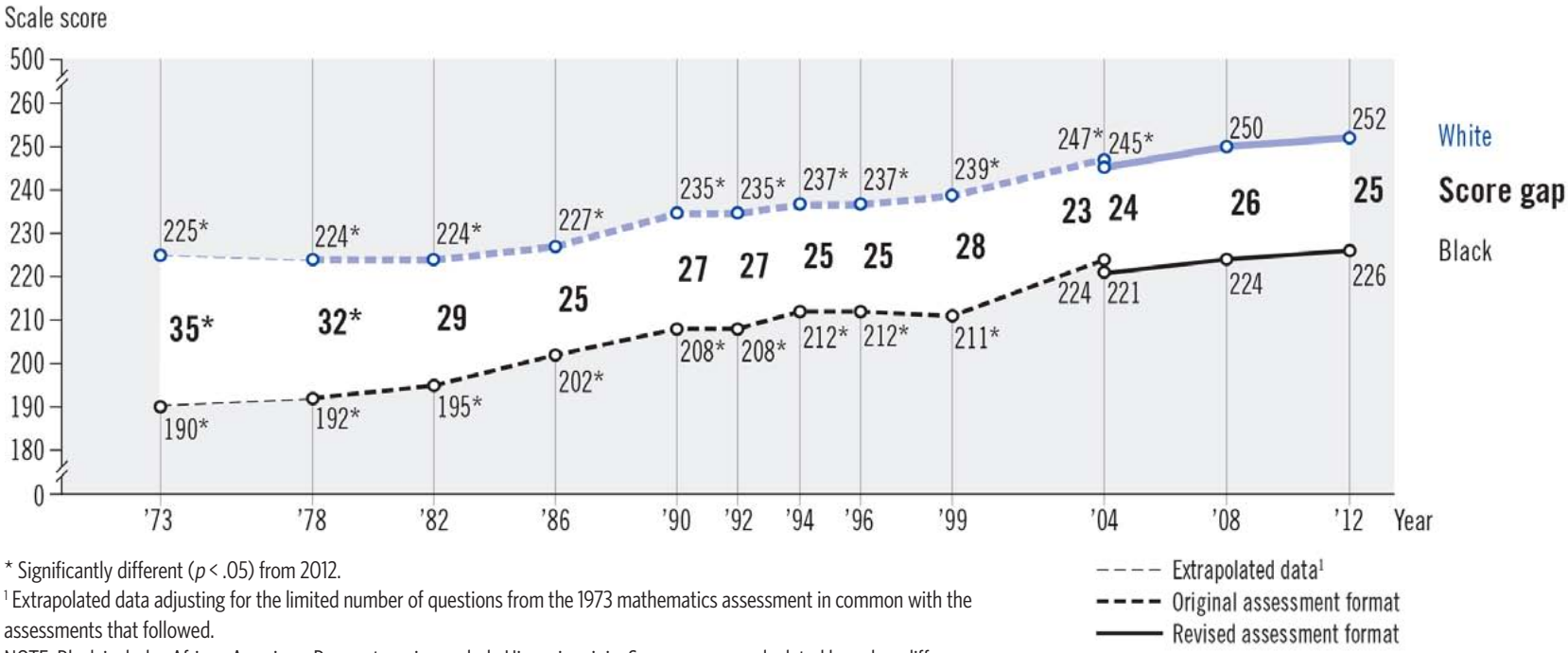
White – Black score gap narrows at all three ages

- Even though White students continued to score 25 or more points higher on average than Black students in 2012, the White – Black gap narrowed in comparison to the 1970s at all three ages.
- The White – Hispanic gap also narrowed from 1973 at ages 13 and 17, but did not change significantly at age 9.

Black 9-year-olds make larger gains than White students

- The 36-point gain made by Black 9-year-olds from 1973 was larger than the gain made by White students, leading to a narrowing of the White – Black score gap in 2012.
- Hispanic students made a 32-point gain, but this was not significantly different from the gain for White students.
- Consequently, the White – Hispanic gap did not narrow significantly even though it was numerically smaller.

Figure: Trend in NAEP mathematics average scores and score gaps for White and Black 9-year-old students

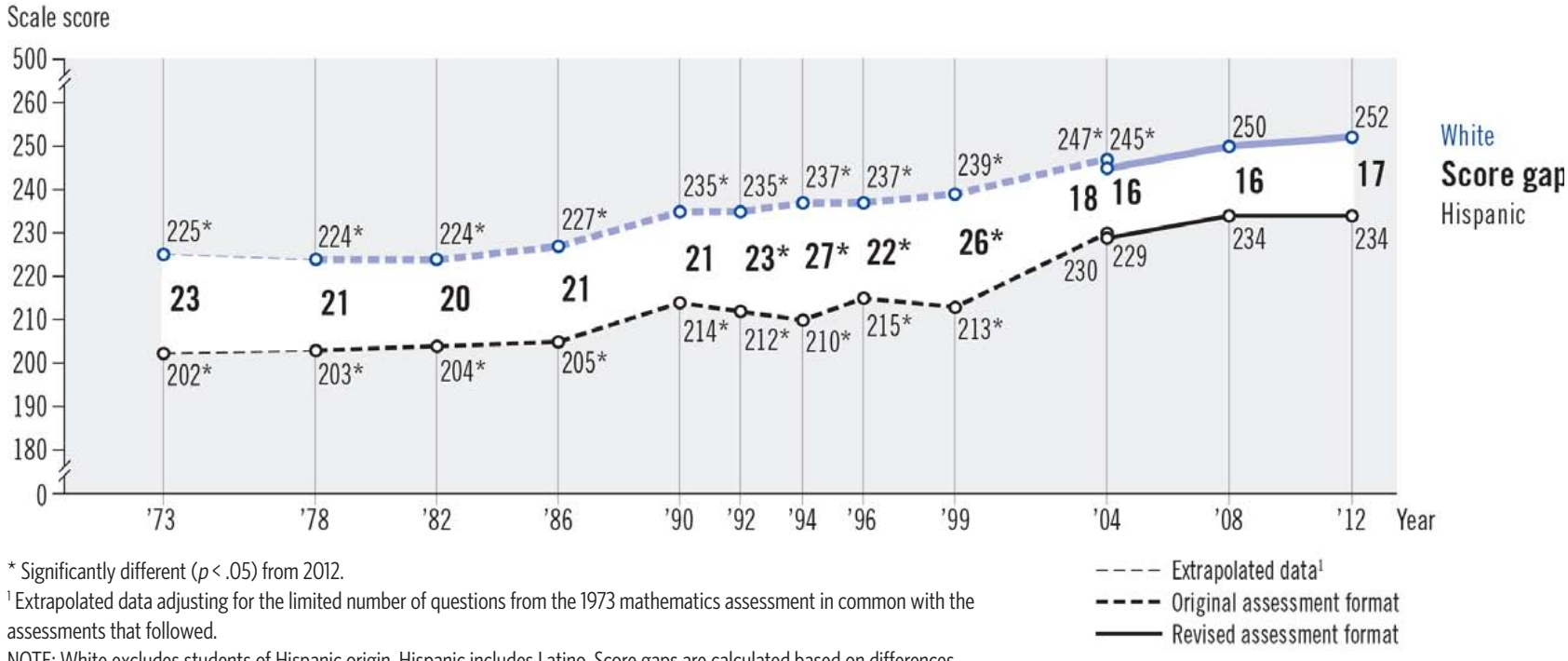


* Significantly different ($p < .05$) from 2012.

[1] Extrapolated data adjusting for the limited number of questions from the 1973 mathematics assessment in common with the assessments that followed.

NOTE: Black includes African American. Race categories exclude Hispanic origin. Score gaps are calculated based on differences between unrounded average scores.

Figure: Trend in NAEP mathematics average scores and score gaps for White and Hispanic 9-year-old students



* Significantly different ($p < .05$) from 2012.

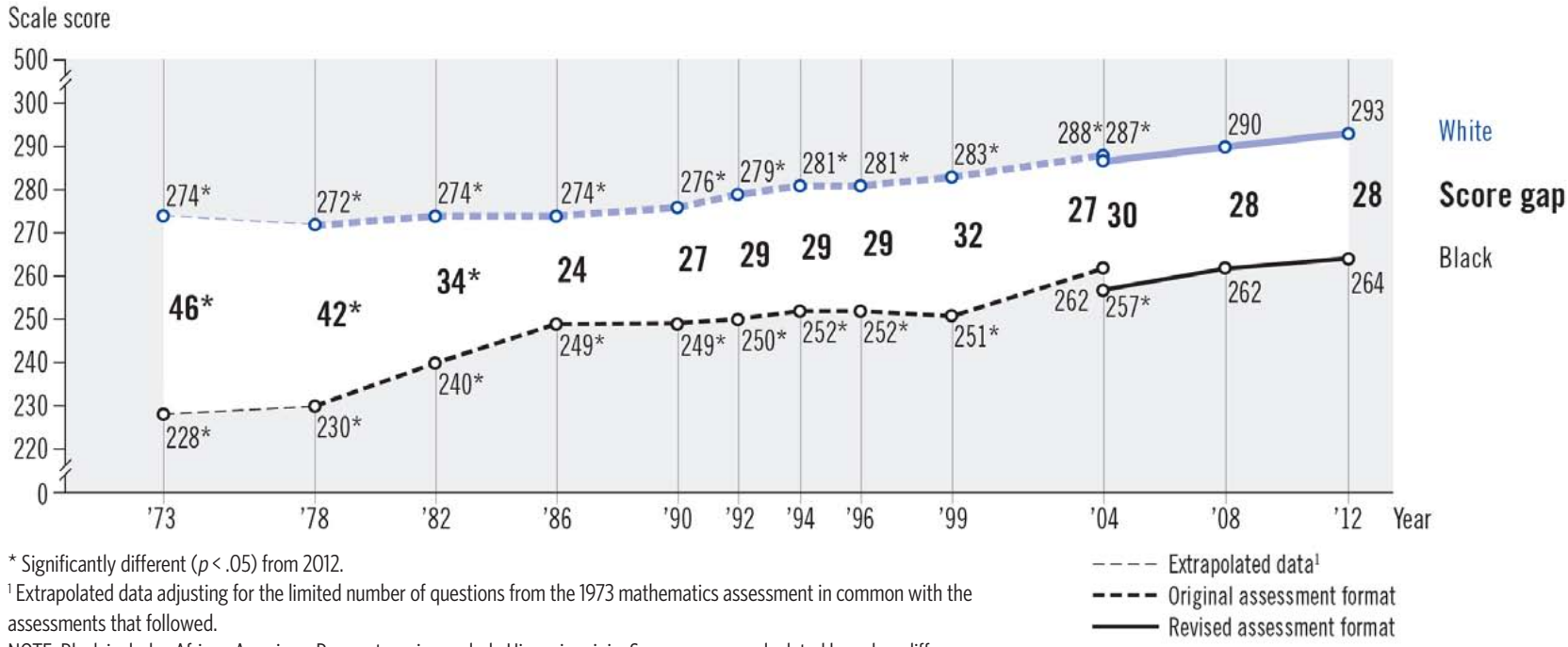
[1] Extrapolated data adjusting for the limited number of questions from the 1973 mathematics assessment in common with the assessments that followed.

NOTE: White excludes students of Hispanic origin. Hispanic includes Latino. Score gaps are calculated based on differences between unrounded average scores.

Racial/ethnic score gaps narrow at age 13

- Both the White – Black and White – Hispanic gaps narrowed from 1973 at age 13.
- Black and Hispanic students both made larger gains from the 1970s than White students, leading to a narrowing of the score gaps in 2012.

Figure: Trend in NAEP mathematics average scores and score gaps for White and Black 13-year-old students



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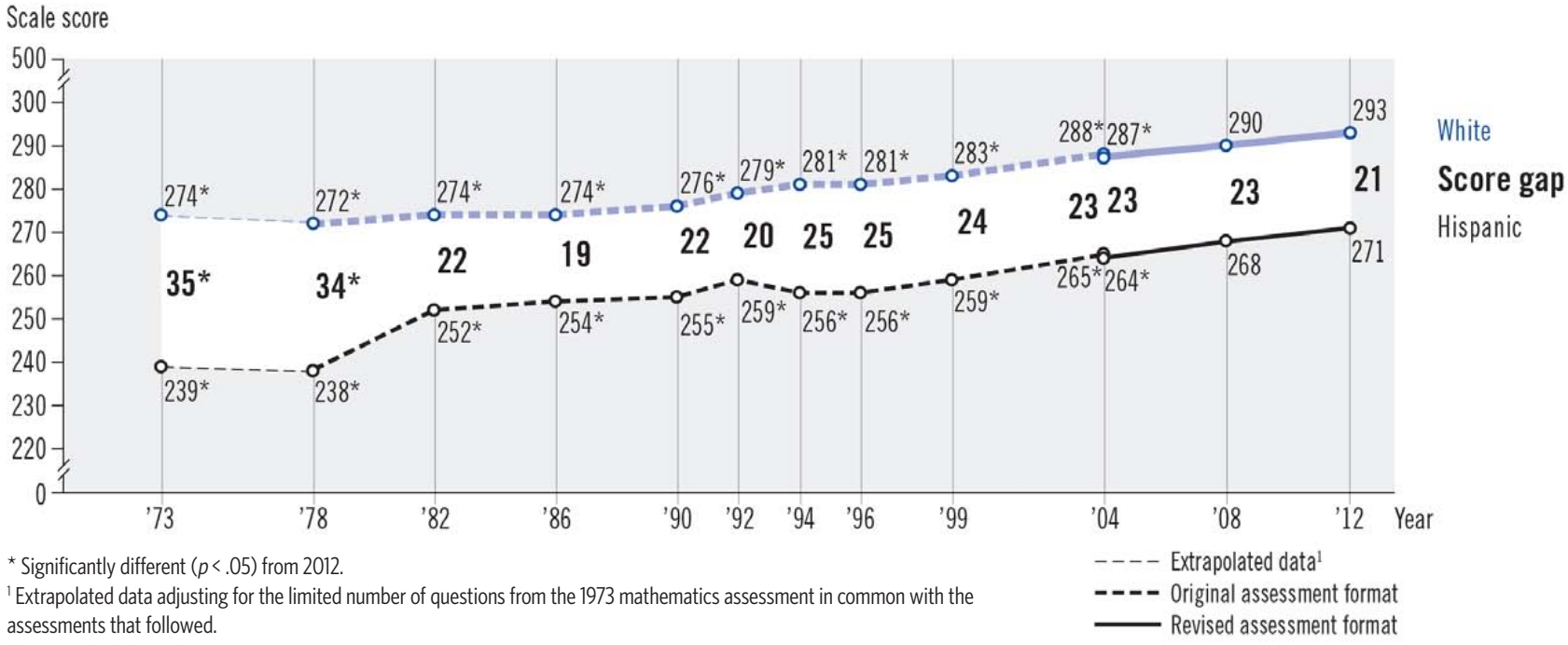
[1] Extrapolated data adjusting for the limited number of questions from the 1973 mathematics assessment in common with the assessments that followed.

NOTE: Black includes African American. Race categories exclude Hispanic origin. Score gaps are calculated based on differences between unrounded average scores.

Figure: Trend in NAEP mathematics average scores and score gaps for White and Hispanic 13-year-old students



* Significantly different ($p < .05$) from 2012.

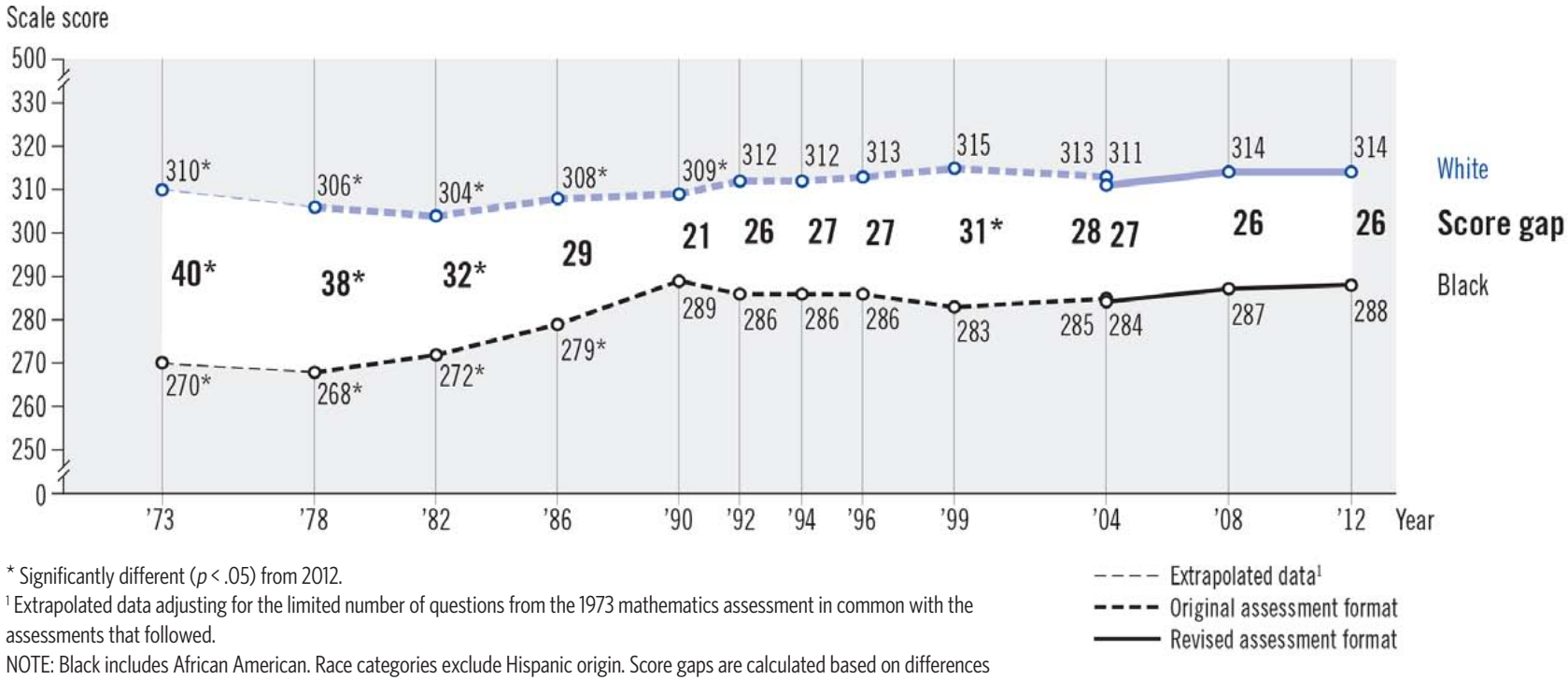
[1] Extrapolated data adjusting for the limited number of questions from the 1973 mathematics assessment in common with the assessments that followed.

NOTE: White excludes students of Hispanic origin. Hispanic includes Latino. Score gaps are calculated based on differences between unrounded average scores.

White, Black, and Hispanic 17-year-olds show improvement since the 1970s

- White – Black and White – Hispanic gaps narrowed at age 17 because Black and Hispanic students made larger gains from 1973 than White students.
- Average mathematics scores for 17-year-olds increased 4 points from the first assessment year for White students, 18 points for Black students, and 17 points for Hispanic students.
- The changing makeup of the student population is one reason why the overall average score for 17-year-olds has not changed significantly even though student groups within the overall population are making gains.
- When an increase in the proportion of typically lower performing students is accompanied by a decrease in the proportion of higher performing students, the overall average score can remain unchanged even though the average scores for both higher and lower performing groups increase.
- This phenomenon is known as Simpson's paradox.

Figure: Trend in NAEP mathematics average scores and score gaps for White and Black 17-year-old students



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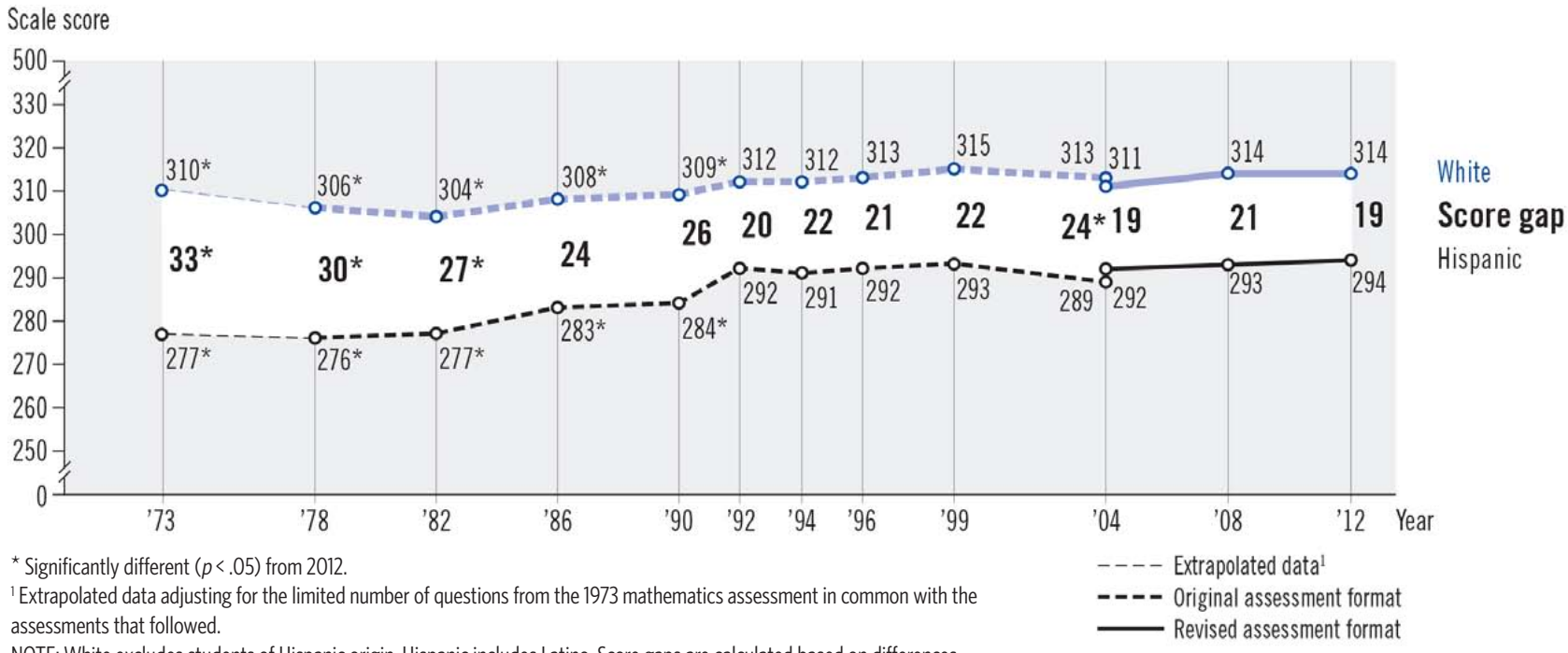
NOTE: Black includes African American. Race categories exclude Hispanic origin. Score gaps are calculated based on differences between unrounded average scores.

Figure: Trend in NAEP mathematics average scores and score gaps for White and Hispanic 17-year-old students



* Significantly different ($p < .05$) from 2012.

[1] Extrapolated data adjusting for the limited number of questions from the 1973 mathematics assessment in common with the assessments that followed.

NOTE: White excludes students of Hispanic origin. Hispanic includes Latino. Score gaps are calculated based on differences between unrounded average scores.