



Comparing Earnings of White Males by Education for Selected Age Cohorts

“High School vs. College Graduates”

A Statistical Brief

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October 2016



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Summary

The “working class” in America has been frequently defined as white males with a high school education working at wage and salary jobs. Some have said that this is one of the groups that has been “left behind” and newly energized during this year’s election process. This statistical brief compares changes in earnings for white males, contrasting the experiences of high school graduates and college graduates between 1996 and 2014. It utilizes a cohort approach to examining changes in their earnings. The results suggest vastly different experiences for high school and college graduates during the period. For example, during this 18-year period wage and salary income per cohort member for high school graduate cohorts declined by 9 percent overall while the income for college graduate cohorts increased by 23 percent. In 2014, income per cohort member stood at \$94,601 for college graduates but only \$36,787 for high school graduates. Using cohort analysis instead of cross-sectional methods shows that while wage and salary incomes of white male college graduates soared as they aged through this 18-year period, the earnings of most high school graduate cohorts managed only meager gains and, for some cohorts, declines. It may be that the “working class” understands better than most just how far their earnings have fallen behind.

The term “working class” in this report refers to white males with a high school education.

Data Sources and Methods

The estimates shown in this statistical brief were derived from U.S. Census Bureau’s annual ASEC supplement to the March Current Population Survey (CPS), the most often referenced source of income and poverty data at the National level. These three survey data sets from the CPS were used in developing the estimates:

- the 1997 ASEC, estimates for 1996
- the 2015 ASEC, estimates for 2014
- the 1979 ASEC, estimates for 1978

This analysis focuses on the period from 1996 to 2014. Estimates have also been made for the previous 18-year period, 1978 to 1996. These earlier estimates are included in an Appendix. Based on those data it appears that working class was somewhat better off during this earlier period than in span between 1996 and 2014.

This analysis was restricted to white males. The definition of white males **excluded** 1) those reporting to be of Hispanic origin, 2) non-citizens, and 3) members of the armed forces at the time of the survey. White males were further separated into two educational groups, high school graduates and college graduates. High school graduates were defined as those completing high school or equivalent but with no additional educational experiences. College graduates were defined as persons with a bachelor's degree or higher. Wage and salary income was based on the total amount of wage and salary income received during the reference year from all jobs.

Ten two-year age cohorts were defined for 1996 beginning with white males 25 to 26 years old and ending with those 43 to 44 years. The incomes of these cohorts in 1996 were then compared to their incomes 18 years later in 2014.

Tabulations were made for high school graduates and college graduates within the two-year age cohorts shown below:

- 25-26 years aging to 43-44 years
- 27-28 years aging to 45-46 years
- 29-30 years aging to 47-48 years
- 31-32 years aging to 49-50 years
- 33-34 years aging to 51-52 years
- 35-36 years aging to 53-54 years
- 37-38 years aging to 55-56 years
- 39-40 years aging to 57-58 years
- 41-42 years aging to 59-60 years
- 43-44 years aging to 61-62 years

For example, the wage and salary incomes of white male, high school graduates, age 25 to 26 years old in 1996 are compared to the incomes of those “same” white males age 43 to 44 years old in 2014. Similarly, the wage and salary income of white male, college graduates, age 25 to 26 years old in 1996 are compared to the income of those age 43 to 44 years old 18 years later in 2014, etc.

All income values shown have been adjusted to reflect 2014 consumer prices. All estimates were generated by Sentier Research using publicly available survey data files containing anonymized survey observations and released by the U.S. Census Bureau. The data files used here were down-loaded from IPUMS-USA at the University of Minnesota (www.ipums.org).

The metric used to make income comparisons was wage and salary income per cohort member. These estimates were computed by dividing the total amount of wage and salary income received by members of the cohort by the overall number of individuals in the cohort. As such, it is not the most common measure of mean wage and salary income based just on those receiving wage and salary income and working year-round full-time. This alternative measure was chosen

because it indirectly reflects changes in the labor force participation rate, the unemployment rate, and in the number of hours and weeks worked during the reference year.

While, ideally, estimates based on cohorts would be derived from data collected in a longitudinal survey, we believe that the March CPS/ASEC provides an instructive alternative. The survey questions covering educational attainment are nearly the same for survey years 1997 and 2015 but differ for 1979. All allow the same distinction between high school and college graduates. The questions covering annual amounts of wage and salary income are consistent and include amounts received from all jobs during the reference year. Survey weights are provided that reflect national population totals although periodic revisions to the survey weights based on Decennial Census population results may have had minor effects on counts within cohorts over time. Citizenship information is available to help exclude persons who may have entered the population during the period between surveys (note that citizenship status was not collected in the March 1979 survey). Population counts within cohorts do appear to reflect increases in the number of college graduates between 1996 and 2014. This, of course, would be expected as members of a cohort may complete degree programs as they age. Finally, those cohort members who die following the base year cannot be removed from the estimates for that year.

Traditional Cross-Sectional Measures of Earnings by Age: 1996 to 2014

Most income and earnings statistics provided by the U.S. Census Bureau, both in reports and in their historical time series, are based on cross-sectional comparisons by age. The estimates in Table A-1 are representative of those provided by standard Census reports. For purposes of exploring income change, especially over long periods of time and for demographic groups such as the working class (who are more likely to experience interruptions in their attachment to the labor force), estimates based on cross-sectional measures can only serve to obfuscate the analysis.

First, any earnings comparisons restricted to year-round full-time workers ignore changes in weeks and hours worked. As illustrated in Table A-1 the number of year-round full-time high school graduates declined by nearly 17 percent while the number of college graduates increased by almost 22 percent. The magnitude of the loss in aggregate wages and salary for high school graduates over those 18 years is unknown, but must be significant. The gain in year-round full-time college graduates, also unknown, must add to the income gap relative to high school graduates.

Second, while the table shows a rise of 5.1 percent in mean wage and salary income for college graduates age 25 to 64 between 1996 and 2014 and a decline of 4.0 percent for the working class, both statistics suffer the proverbial problem of “comparing apples and oranges.” These cross-sectional measures compare the incomes of two different groups of individuals, those age 25 to 64 in 1996 and those in 2014 made up of persons age 25 to 46 in 1996 (who have aged to 43 to 64 in 2014) and those persons age 7 to 24 in 1996 (who have aged to 25 to 42 in 2014).

Table A-1. White Males with Wage and Salary Income and Mean Amount for Year-round Full-time Workers: 1996 and 2014 (cross-sectional measures)						
Age and Education	Number			Mean Wage and Salary		
	1996	2014	Percent Change	1996	2014	Percent Change
High School, 25 to 64	10,768,122	8,976,692	-16.6	\$54,182	\$52,034	-4.0
25 to 29	1,326,973	1,006,412	-24.2	\$41,009	\$39,195	-4.4
30 to 34	1,691,444	1,052,101	-37.8	\$45,774	\$46,319	1.2
35 to 39	2,013,996	1,009,260	-49.9	\$52,483	\$53,800	2.5
40 to 44	1,866,102	1,043,927	-44.1	\$60,126	\$52,512	-12.7
45 to 49	1,315,072	1,239,350	-5.8	\$62,767	\$54,303	-13.5
50 to 54	1,153,830	1,505,736	30.5	\$58,717	\$56,195	-4.3
55 to 59	939,634	1,315,490	40.0	\$60,149	\$56,321	-6.4
60 to 64	461,071	804,416	74.5	\$58,313	\$54,436	-6.6
College, 25 to 64	10,881,497	13,256,229	21.8	\$97,414	\$102,347	5.1
25 to 29	1,369,470	1,679,470	22.6	\$56,827	\$63,839	12.3
30 to 34	1,551,912	1,851,230	19.3	\$76,210	\$77,640	1.9
35 to 39	1,717,123	1,566,780	-8.8	\$103,428	\$103,087	-0.3
40 to 44	1,827,135	1,707,468	-6.5	\$114,128	\$110,427	-3.2
45 to 49	1,896,986	1,829,367	-3.6	\$103,995	\$124,526	19.7
50 to 54	1,390,979	1,840,456	32.3	\$111,173	\$122,543	10.2
55 to 59	724,226	1,594,433	120.2	\$107,700	\$108,539	0.8
60 to 64	403,666	1,187,025	194.1	\$118,599	\$108,952	-8.1
Source: U.S. Census Bureau ASEC/March CPS PUMs - IPUMS-USA, University of Minnesota, www.ipums.org.						
Tabulations by Sentier Research						
Universe: White males with high school diploma (only) or college degree (or higher)						

The mean income values in Table A-1 do provide a source for measuring change in the relative incomes for high school and college graduates within age group. Table A-2 presents mean wage and salary income for the working class as a percent of the mean for college graduates. It indicates deterioration in the mean wage and salary incomes of high school graduates relative to college graduates within the year-round full-time universe for most age groups. For example, between 1996 and 2014 one could say that the incomes of the working class age 45 to 49 declined relative to college graduates of the same age from 60.4 to 43.6 percent. But, again, we have the problem of how to interpret the changes when the age group compositions have changed.

Table A-2. High School Mean Wage and Salary Income as a Percent of College for Year-round Full-time Workers: 1996 and 2014 (cross-sectional measures)		
Age	High School Mean as Percent of College	
	1996	2014
Total, 25 to 64	55.6	50.8
25 to 29	72.2	61.4
30 to 34	60.1	59.7
35 to 39	50.7	52.2
40 to 44	52.7	47.6
45 to 49	60.4	43.6
50 to 54	52.8	45.9
55 to 59	55.8	51.9
60 to 64	49.2	50.0
Tabulations by Sentier Research		
Universe: White males with high school diploma (only) or college degree (or higher)		

Examining Income Changes Between 1996 and 2014 By Cohort

The purpose of this study was to seek a measure of income change that could replace the more conventional cross-sectional measures for examining changes in the income of the “working class.” What is missing in the cross-sectional estimates is a more robust picture showing what is happening to the earnings of an age group over time and not just those working year-round full-time. We chose a measure that is based on age cohorts as analysis units so that incomes received in the base year (in this case 1996) could be compared to incomes for the “same” men **n years** later (in this case 2014). We also chose an income measure that indirectly reflects increases and decreases in earning power as the labor force participation of cohort members changes -- essentially wage and salary income per cohort member. For example, a working class member who is laid off and fails to find a job for an entire year would be accounted for in the income measure as a member of the cohort but contributing no wages to the sum of wages received by all members of the cohort.

We decided to use two-year age cohorts beginning with those 25 to 26 years old in 1996. Single year age cohorts were deemed too small from the sampling variability standpoint. Income change is measured from that base year to 2014. The 1996 to 2014 period was selected mainly because 2014 was the most recent year for which wage and salary data were available when this study was undertaken. The data in Table B and Charts 1 and 2 summarize the results.

Ages of Cohorts (1996 and 2014)	High School Graduates (Working Class)					College Graduates				
	Number		Wage and Salary Income Per Cohort Member			Number		Wage and Salary Income Per Cohort Member		
	1996	2014	1996	2014	Percent Change	1996	2014	1996	2014	Percent Change
Total	9,676,920	8,815,618	\$40,362	\$36,787	-8.9	7,991,885	9,587,439	\$77,209	\$94,601	22.5
25-26 (43-44)	744,800	675,226	\$32,677	\$38,803	18.7	632,655	939,073	\$40,487	\$94,252	132.8
27-28 (45-46)	731,179	759,809	\$33,958	\$40,480	19.2	801,083	977,530	\$48,832	\$109,733	124.7
29-30 (47-48)	785,590	785,456	\$36,526	\$34,304	-6.1	760,158	949,598	\$55,481	\$112,426	102.6
31-32 (49-50)	941,661	994,690	\$39,872	\$38,671	-3.0	796,761	908,128	\$67,262	\$101,687	51.2
33-34 (51-52)	987,543	928,166	\$34,942	\$39,134	12.0	754,328	1,019,806	\$70,233	\$104,232	48.4
35-36 (53-54)	1,170,391	994,093	\$37,725	\$43,438	15.1	811,727	981,722	\$93,656	\$100,658	7.5
37-38 (55-56)	1,165,959	1,024,862	\$44,209	\$32,298	-26.9	823,290	866,116	\$82,784	\$87,750	6.0
39-40 (57-58)	1,100,150	949,503	\$42,338	\$38,646	-8.7	905,769	1,070,593	\$106,517	\$84,036	-21.1
41-42 (59-60)	1,113,416	903,921	\$45,066	\$34,130	-24.3	837,746	884,633	\$95,233	\$82,837	-13.0
43-44 (61-62)	936,231	799,892	\$51,491	\$27,230	-47.1	868,368	990,240	\$95,734	\$68,406	-28.5
Source: U.S. Census Bureau ASEC/March CPS PUMs - IPUMS-USA, University of Minnesota, www.ipums.org .										
Tabulations by Sentier Research										
Universe: White males with high school diploma (only) or college degree (or higher)										

The total line in Table B shows the number and mean wage and salary income per cohort member for high school graduates and college graduates for the combined cohorts overall -- those age 25 to 44 in 1996 and age 43 to 62 in 2014. During the 18-year period between 1996 and 2014, wage and salary income per cohort member for the working class cohorts declined by 8.9 percent while the mean for college graduate cohorts increased by 22.5 percent (the cross-sectional measures shown in Table A-1 for those 25 to 64 years old indicates a 4.0 percent decline for high school graduates and a 5.1 percent increase for college graduates).

In terms of level, wage and salary income per cohort member for the working class was \$40,362 in 1996, declining to \$36,787 in 2014. The college graduate cohorts taken together had an income per cohort member of \$77,209 in 1996 that increased to \$94,601 in 2014.

Examining the experiences of the two-year cohorts reveals a picture of working class white males being left far behind in terms of wage and salary income per cohort member. For the 25-26 age cohort the high school graduates began 1996 with a mean income of \$32,677. Eighteen years later their income had risen 19 percent to \$38,803. During this same period, however, the income per cohort member for white male college graduates 25 to 26 years old in 1996 rose by 133 percent, from \$40,487 in 1996 to \$94,252 in 2014. Large gains were registered for the college cohorts for the next four age cohorts as well; 27 to 28, 29 to 30, 31 to 32, and 33 to 34 years. Following those, beginning with the 35 to 36 year cohort, growth in mean wages slowed as members of this group reached ages 53 to 54 in 2014. Income for college graduates began to decline significantly with the 39 to 40 age cohort but remained more than double those of the high school cohorts. Remembering that the income measure is based on wage and salary income per cohort member, these declines largely reflect separations from the labor force: voluntary, involuntary, partial, and permanent, e.g., retirement and disability.

Chart 1. Wage and Salary Income Per Cohort Member for White Male High School Graduates: 1996 and 2014 (in 2014 Dollars)

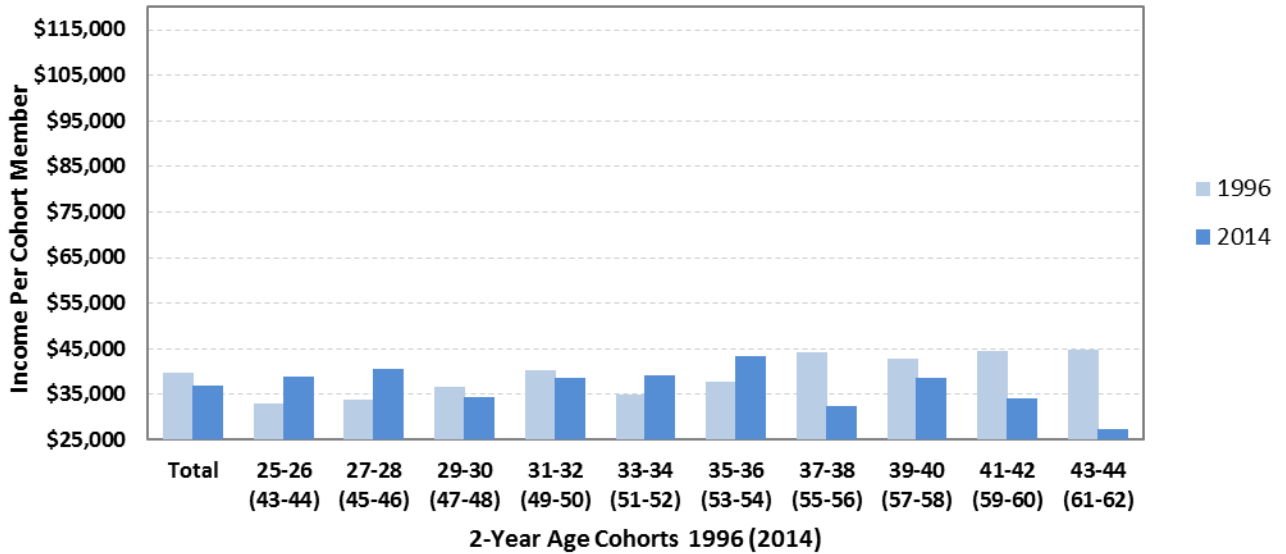
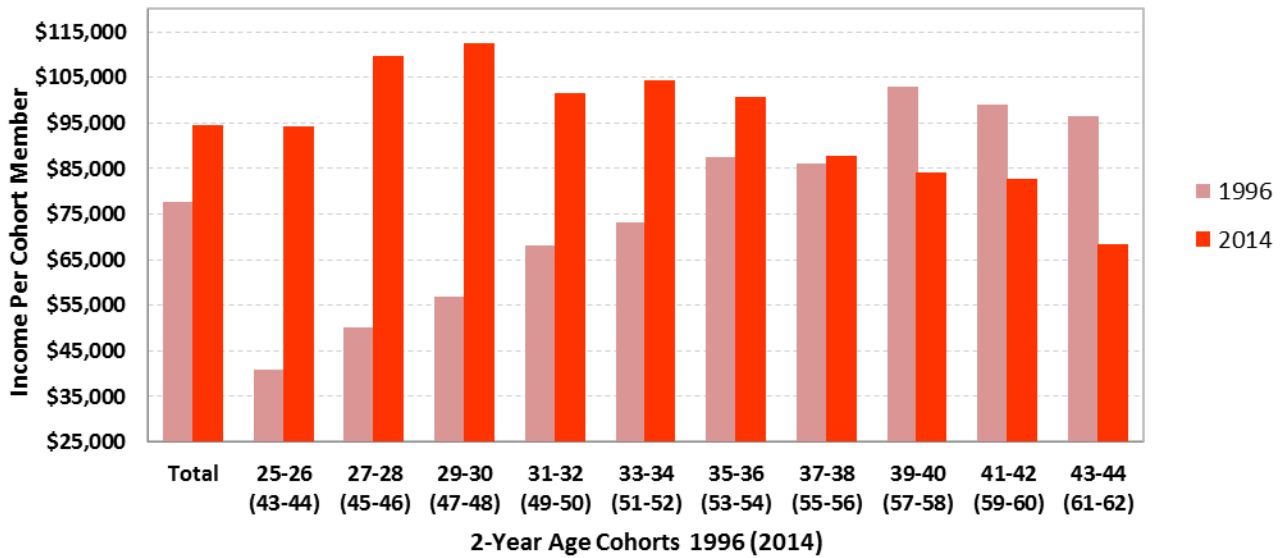


Chart 2. Wage and Salary Income Per Cohort Member for White Male College Graduates: 1996 and 2014 (in 2014 Dollars)



APPENDIX. Data for the 1978 to 1996 Period

Ages of Cohorts (1978 and 1996)	High School Graduates (Working Class)					College Graduates				
	Number		Wage and Salary Income Per Cohort Member			Number		Wage and Salary Income Per Cohort Member		
	1978	1996	1978	1996	Percent Change	1978	1996	1978	1996	Percent Change
Total	8,156,210	6,832,325	\$49,414	\$44,108	-10.7	6,560,508	6,747,054	\$66,161	\$86,297	30.4
25-26 (43-44)	1,106,401	936,231	\$40,560	\$51,491	27.0	745,087	868,368	\$40,218	\$95,734	138.0
27-28 (45-46)	925,903	825,622	\$43,380	\$47,590	9.7	811,332	892,030	\$49,048	\$88,312	80.1
29-30 (47-48)	840,842	710,364	\$46,154	\$49,795	7.9	881,430	939,327	\$54,396	\$82,441	51.6
31-32 (49-50)	893,340	743,347	\$49,692	\$42,998	-13.5	933,517	964,988	\$62,376	\$97,481	56.3
33-34 (51-52)	733,954	593,336	\$52,787	\$45,093	-14.6	668,494	609,222	\$68,344	\$97,128	42.1
35-36 (53-54)	874,020	690,259	\$52,217	\$47,655	-8.7	694,799	720,443	\$80,486	\$89,955	11.8
37-38 (55-56)	787,516	684,529	\$54,266	\$46,292	-14.7	526,534	505,910	\$87,051	\$74,126	-14.8
39-40 (57-58)	717,696	563,584	\$54,379	\$38,243	-29.7	496,381	444,318	\$79,727	\$82,023	2.9
41-42 (59-60)	644,558	568,339	\$52,370	\$30,840	-41.1	382,571	406,417	\$81,892	\$72,116	-11.9
43-44 (61-62)	631,980	516,714	\$55,212	\$31,166	-43.6	420,363	396,031	\$94,593	\$54,545	-42.3
Source: U.S. Census Bureau ASEC/March CPS PUMs - IPUMS-USA, University of Minnesota, www.ipums.org .										
Tabulations by Sentier Research										
Universe: White males with high school diploma (only) or college degree (or higher)										

Chart 1C. Mean Wage and Salary Income Per Cohort Member for White Male High School Graduates: 1978 and 1996 (in 2014 Dollars)

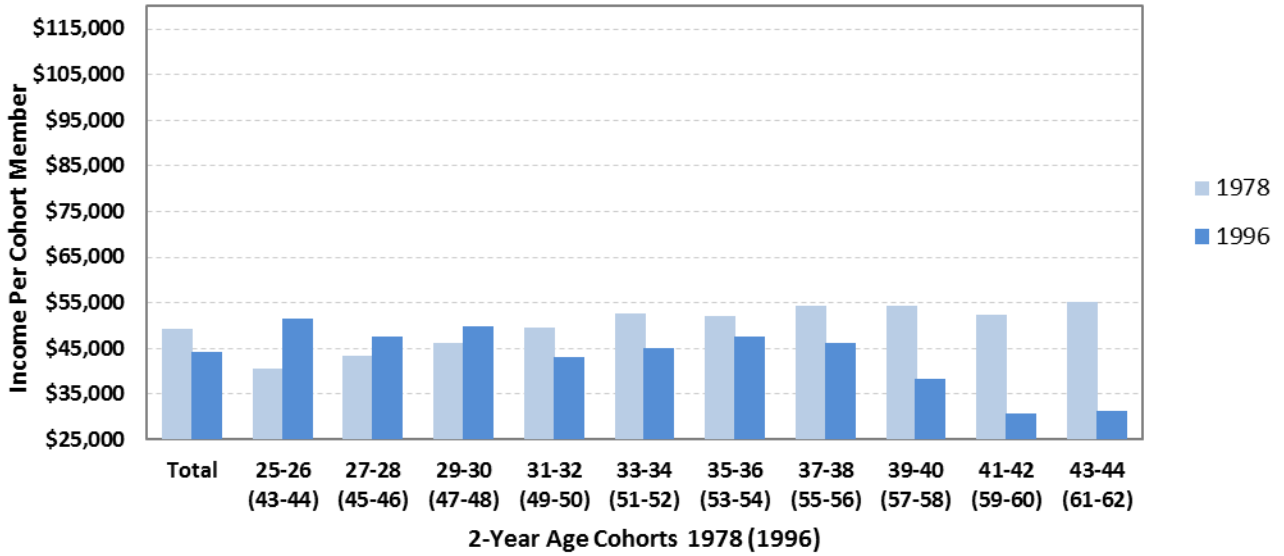


Chart 2C. Mean Wage and Salary Income Per Cohort Member for White Male College Graduates: 1978 and 1996 (in 2014 Dollars)

