

Part 2: Role of Skills and Skill Prices in Explaining Inequality

James J. Heckman
University of Chicago

Econ 350, Winter 2023

Inequality in What? Alternative Measures of Inequality and Social Mobility

Table of Contents

Part 1: Income and Wage Measures

Part 2: Role of Taxes and Transfers in Post-Tax Transfer Outcomes

Part 3: **Role of Skills & Skill Prices** ←

Part 4: Income Mobility

Part 5: Inheritance of Inequality

Wage Inequality

- Importance of skills for individual incomes
- Early literature focused on return to education
- What other skills?

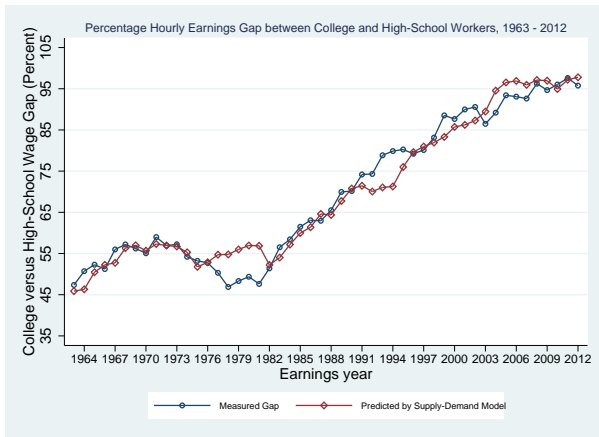
TABLE 1

ESTIMATED AVERAGE ANNUAL PERCENTAGE CHANGE IN THE SIZE-ADJUSTED HOUSEHOLD INCOME GINI COEFFICIENT ATTRIBUTABLE TO FACTOR COMPONENTS BY BUSINESS CYCLE

	1979–89	1989–00	2000–07	1979–07
(1) Actual Gini average annual percentage change	0.97	0.08	0.10	0.40
<i>Average annual percentage change accounted for by:</i>				
(2) Marriage rates	0.13	0.05	0.10	0.09
(3) Male head employment	0.03	-0.02	0.05	0.02
(4) Male head earnings distribution	0.65	0.36	-0.35	0.29
(5) Female head employment	-0.15	-0.16	0.08	-0.10
(6) Female head earnings distribution	0.09	0.01	0.17	0.08
(7) Spouses' earnings correlation	0.14	0.02	-0.05	0.04
(8) Non-head labor earnings distribution	-0.01	-0.10	-0.02	-0.05
(9) Non-head labor earnings correlation	0.03	-0.03	-0.02	0.00
(10) Private non-labor income distribution	-0.09	0.04	0.08	0.00
(11) Private non-labor income correlation	0.08	-0.01	-0.01	0.02
(12) Public transfers distribution	0.01	-0.06	0.02	-0.02
(13) Public transfers correlation	0.06	-0.01	0.03	0.02

Figure 1: Larrimore (2014)

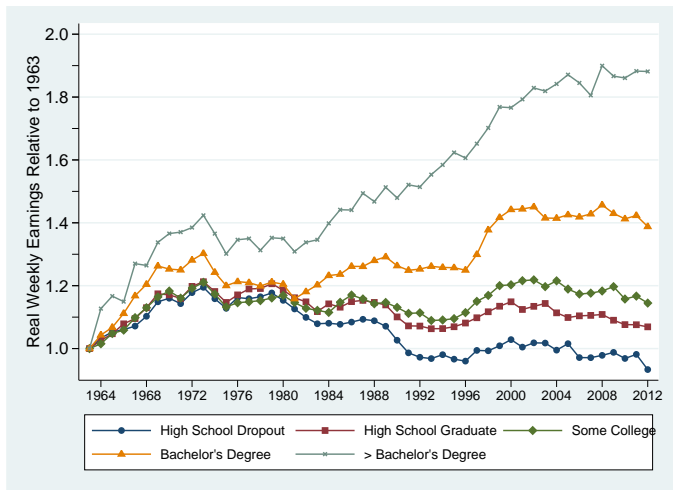
Figure 2: The U.S. College/High School Premium, 1963–2012



Source: Autor 2014, Skills, Education, and the Rise of Earnings Inequality Among the “Other 99 Percent.”

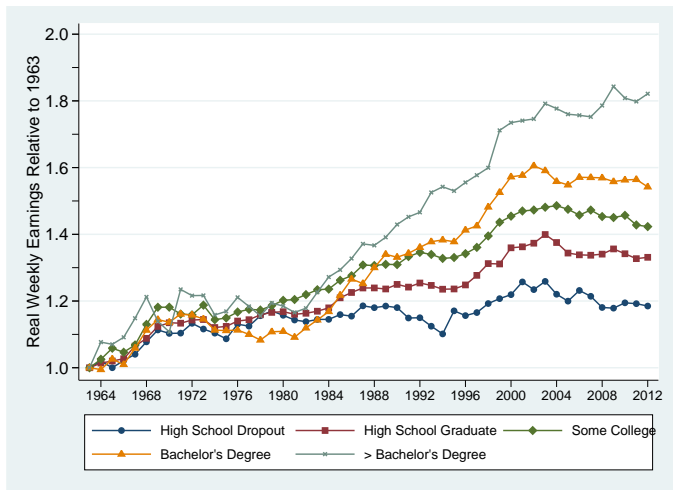
Note: College versus high school wage gap. Figure uses March CPS data for earnings years 1963 to 2012. The series labeled “Measured Gap” is constructed by calculating the mean of the natural logarithm of weekly wages for college graduates and non-college graduates, and plotting the (exponentiated) ratio of these means for each year. This calculation holds constant the labor market experience and gender composition within each education group. The series labeled “Predicted by Supply-Demand Model” plots the (exponentiated) predicted values from a regression of the log college/noncollege wage gap on a quadratic polynomial in calendar years and the natural log of college/noncollege relative supply.

Figure 3: Changes in Real Wage Levels of Full-time U.S. Workers by Sex and Education, 1963–2012, Males



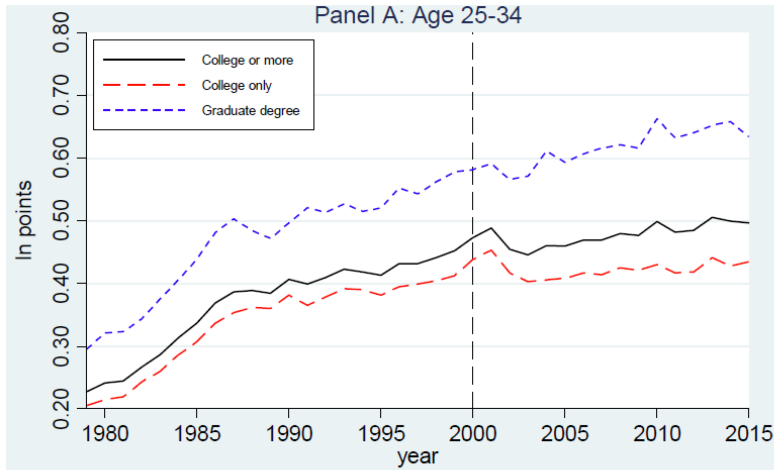
Source: Autor 2014, Skills, Education, and the Rise of Earnings Inequality Among the “Other 99 Percent.”

Figure 4: Changes in Real Wage Levels of Full-time U.S. Workers by Sex and Education, 1963–2012, Females



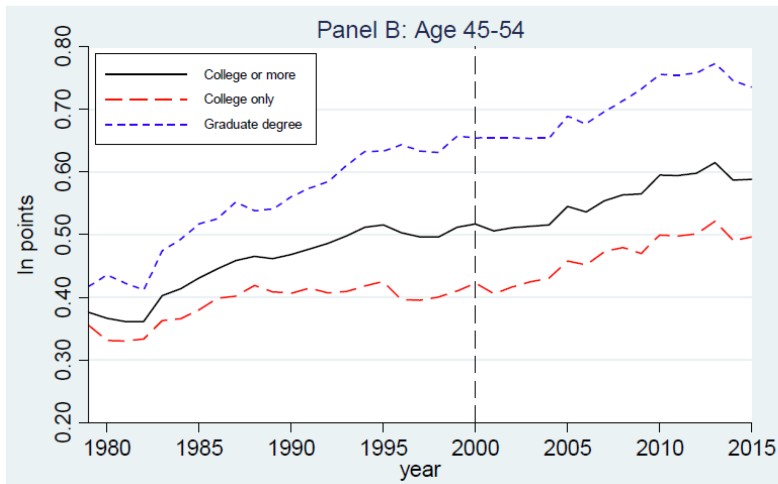
Source: Autor 2014, Skills, Education, and the Rise of Earnings Inequality Among the “Other 99 Percent.”

Figure 3: Estimated Higher Education Wage Premium, 1979-2015, by Age Group



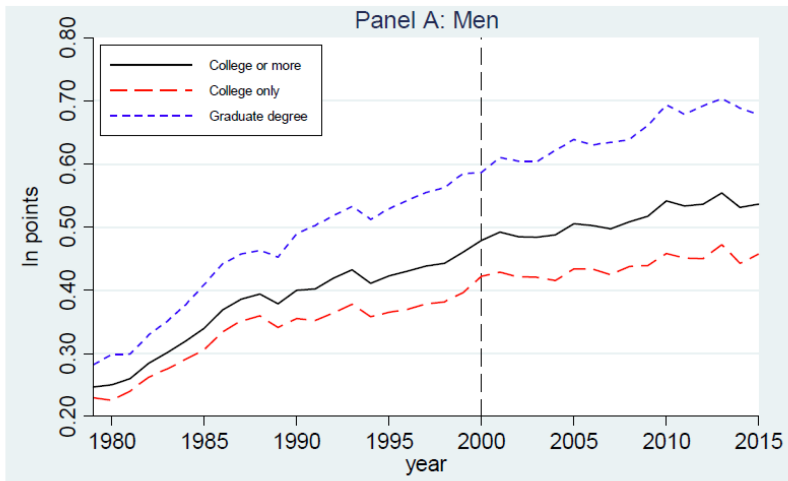
Source: Valletta (2019)

Figure 3: Estimated Higher Education Wage Premium, 1979-2015, by Age Group



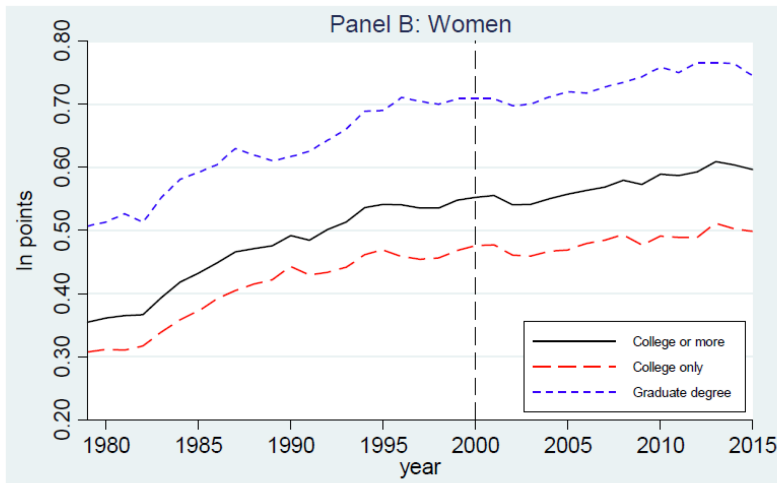
Source: Valletta (2019)

Figure 4: Estimated Higher Education Wage Premium, 1979-2015, by Gender



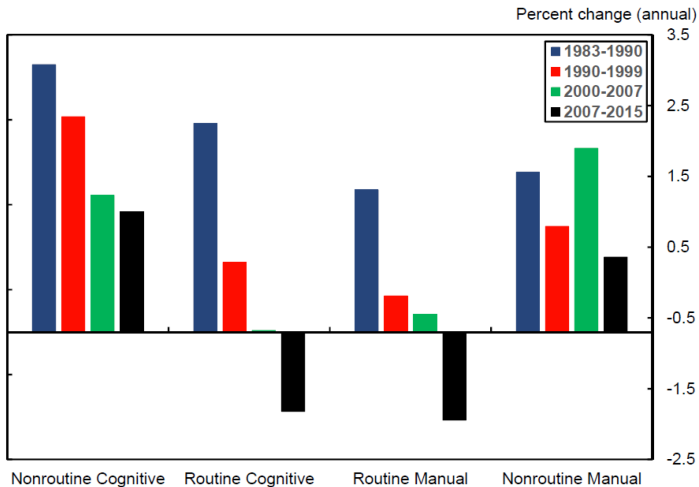
Source: Valletta (2019)

Figure 4: Estimated Higher Education Wage Premium, 1979-2015, by Gender



Source: Valletta (2019)

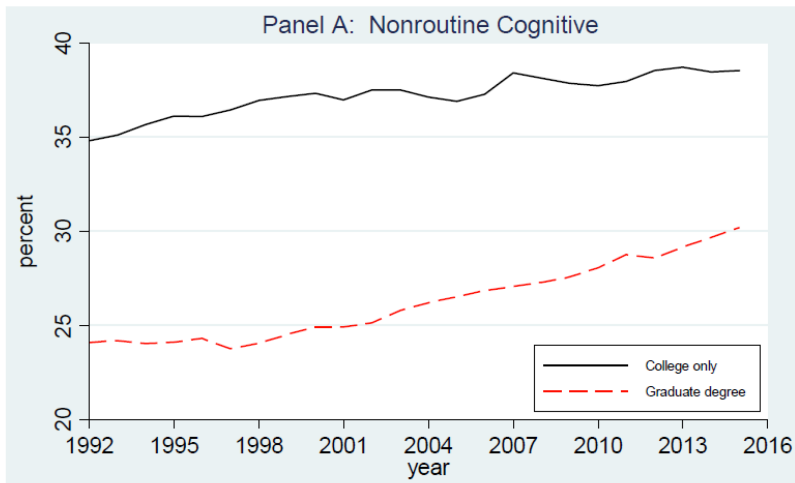
**Figure 5: Employment Growth by Broad Occupation Category,
Sub-Periods from 1983-2015**



Note: Author's calculations from Bureau of Labor Statistics data. See text and Appendix B for occupational category definitions.

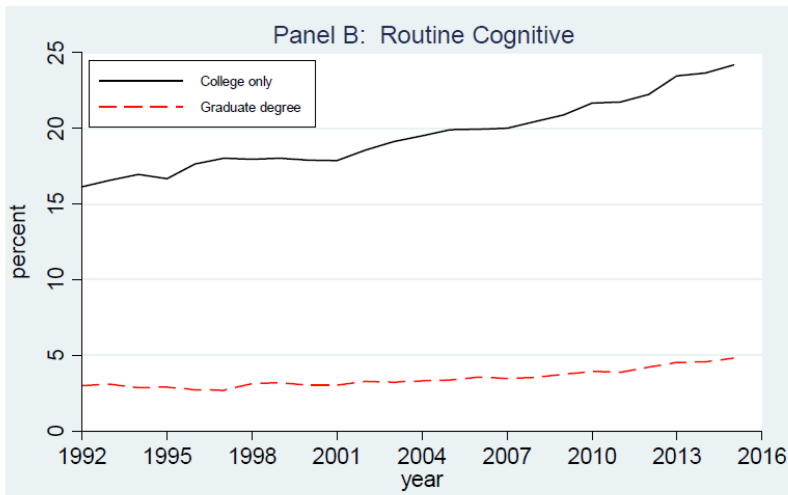
Source: Valletta (2019)

Figure 6: Higher Educational Attainment Shares by Occupational Category (selected), 1992-2015



Source: Valletta (2019)

Figure 6: Higher Educational Attainment Shares by Occupational Category (selected), 1992-2015



Source: Valletta (2019)

[Link to Valletta Materials](#)

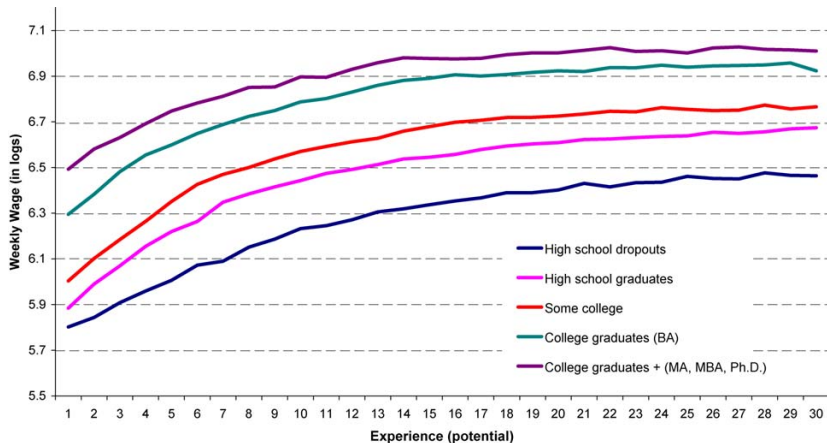
Executive Pay Excessive?

[Link to Additional Graphs](#)

Growth in Inequality in Male Earnings is in Early Adult Years Across Cohorts

- Growth in earnings is also concentrated in early adult years (Topel and Ward, *JPE* (1991))

Figure 5: Mean weekly wages (in logs) by education and (potential) experience, white males, full-time full-year workers (52 weeks), CPS, March supplements, 1964–2002



Source: Rubinstein and Weiss (2006).

Multiple Skills

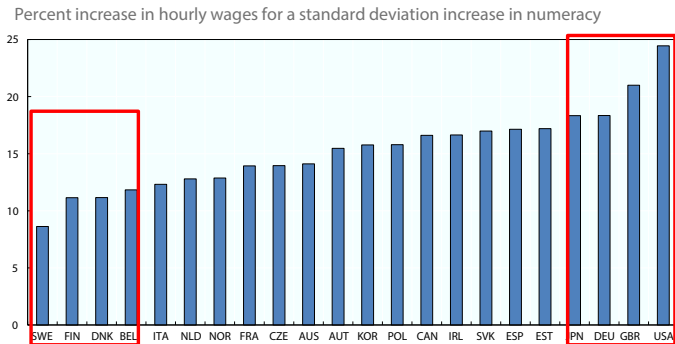
Variance of log of earnings explained by various skills:

\mathcal{R}^2

	NLSY (U.S.)	MIDUS (U.S.)	BCS (U.K.)
Cognitive traits alone	0.031	0.018	0.024
Non-cognitive traits alone	0.021	0.050	0.053
Cognitive & non-cognitive skills together	0.040	0.060	0.061
Schooling alone	0.036	0.048	0.109
All together: Cogn., non-cogn. and schooling	0.080	0.084	0.141

- At most 25% due to measurement error
- 60% is the economic counterpart of astronomy's "dark matter"
- Recent work focuses on a skill called an ability to deal with complexity

Figure 6: Returns to skills across different policy environments

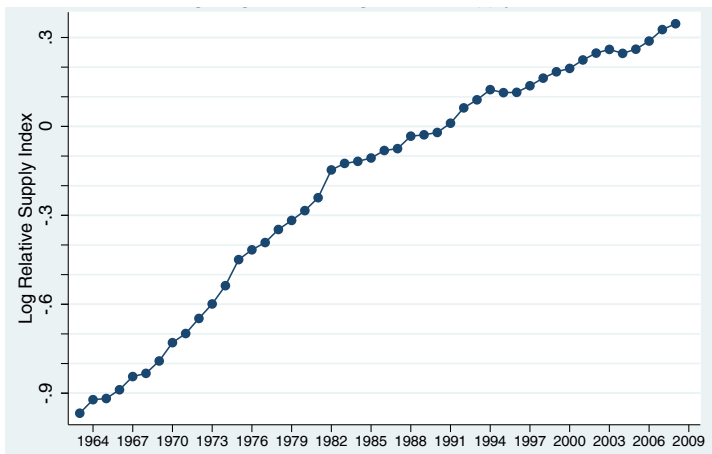


Coefficients on numeracy scores from country-specific OLS regressions of log hourly wages on proficiency scores standardised at the country level

Quintini (2015)

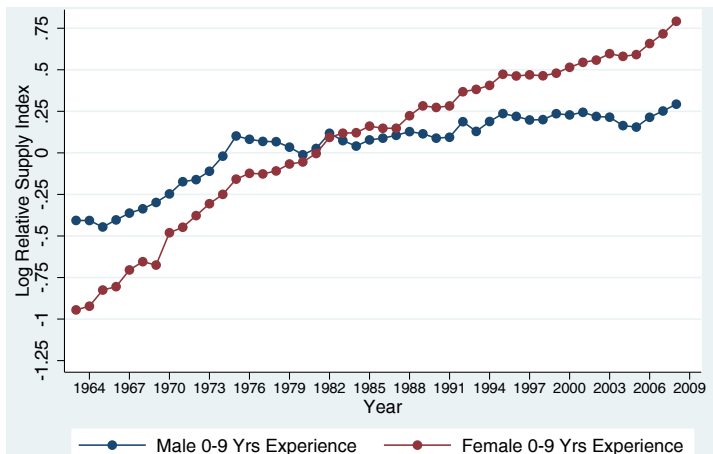
Adequate Response of Schooling to Rising Skill Prices?

Figure 7: College/high-school log relative supply, 1963–2008



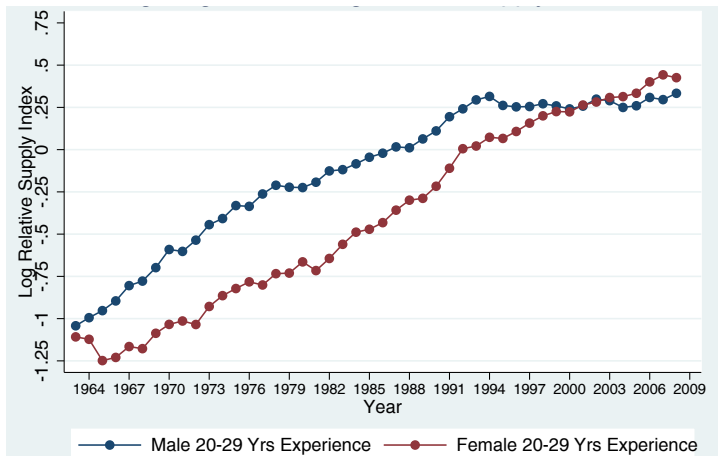
Source: March CPS data for earnings years 1963–2008.

Figure 7: College/high-school log relative supply, 1963–2008



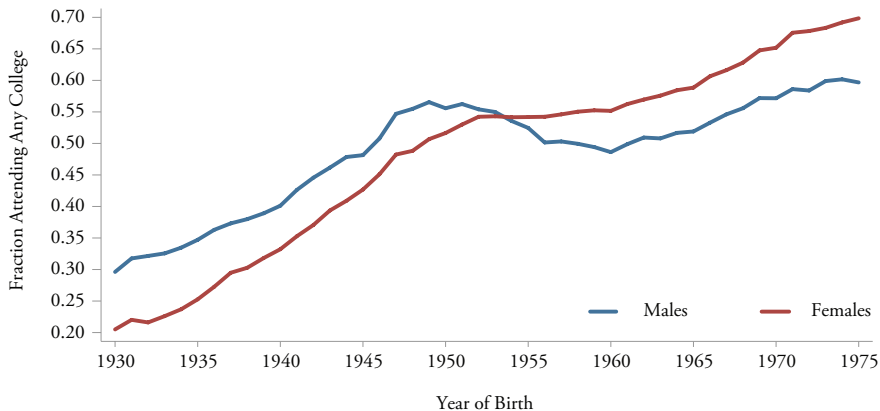
Source: March CPS data for earnings years 1963–2008.

Figure 7: College/high-school log relative supply, 1963–2008



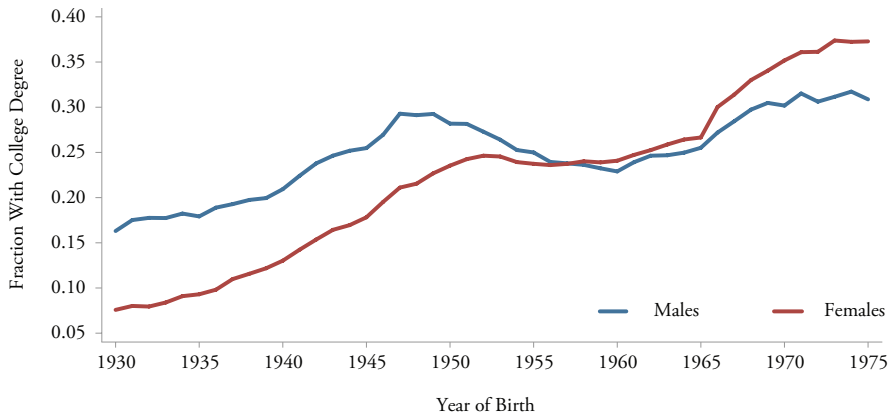
Source: March CPS data for earnings years 1963–2008.

Figure 8: Percent of Adults with Some College Education by Age 35



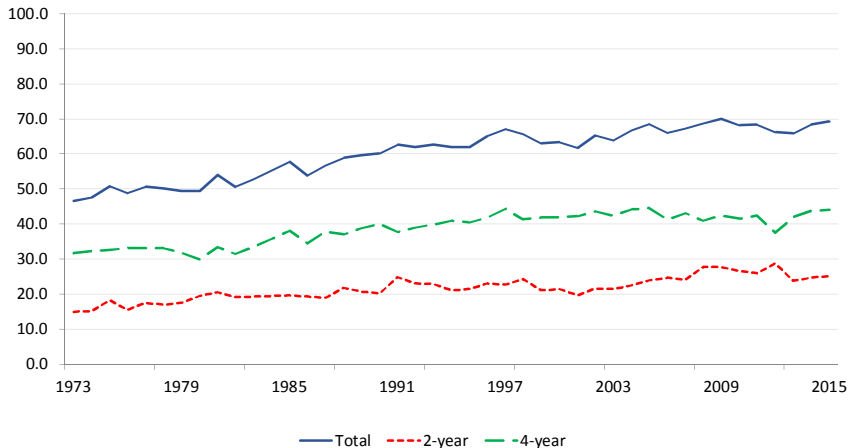
Source: (Autor & Wasserman, 2013) Census IPUMS 1 percent samples for years 1960 and 1970, Census IPUMS 5 percent samples for years 1980, 1990, and 2000 and American Community Survey (ACS) 2010.

Figure 9: Percent of Adults with Four-Year College Degree by Age 35



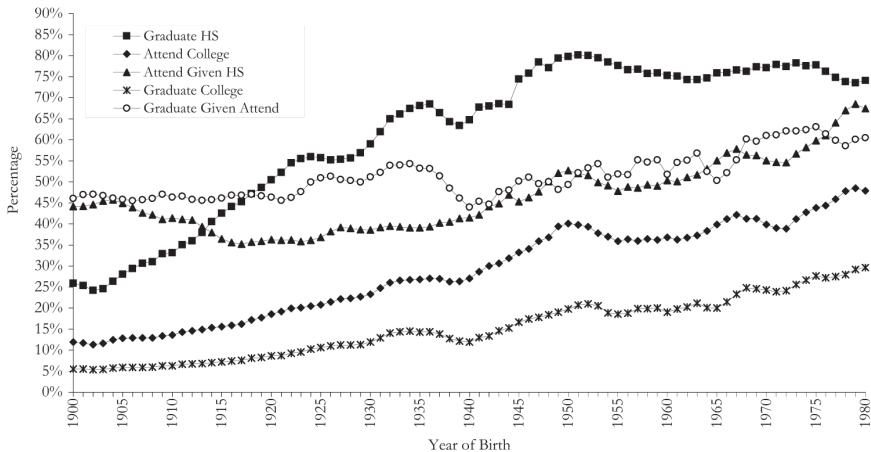
Source: (Autor & Wasserman, 2013) Census IPUMS 1 percent samples for years 1960 and 1970, Census IPUMS 5 percent samples for years 1980, 1990, and 2000 and American Community Survey (ACS) 2010.

Figure 10: Percentage of High School Completers who were Enrolled in 2- or 4-year Colleges by the October Immediately Following High School Completion: 1973-2015



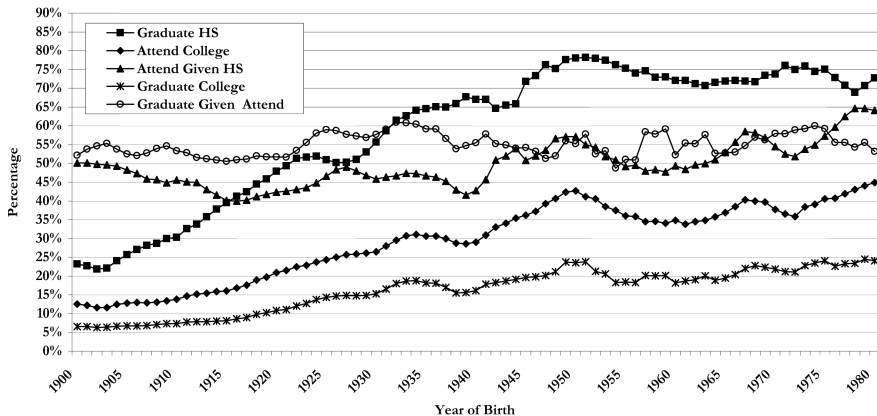
Source: Digest of Education Statistics 2016, Table 302.10.

Figure 11: Educational Attainment Decompositions, Males and Females, 1900-1980 Birth Cohorts



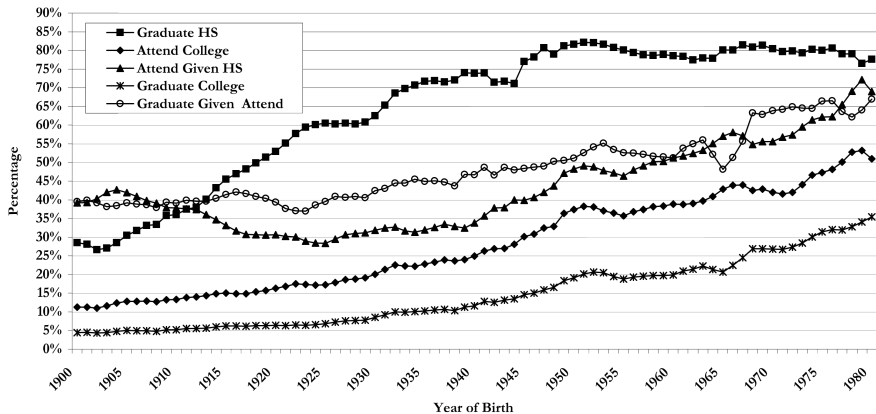
Source: Heckman and LaFontaine (2007).

Figure 12: Educational Attainment Decompositions, Males 1900-1980 Birth Cohorts



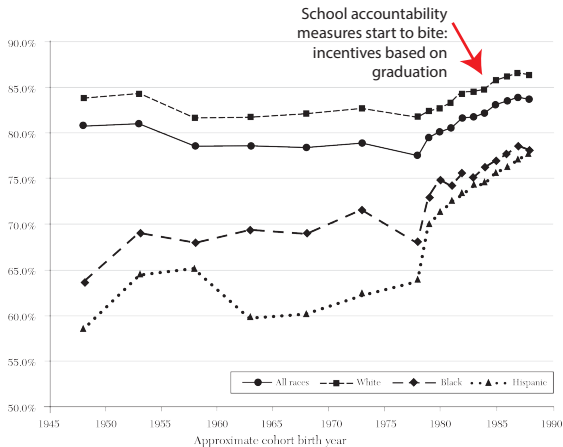
Source: Heckman and LaFontaine (2007).

Figure 13: Educational Attainment Decompositions, Females 1900-1980 Birth Cohorts



Source: Heckman and LaFontaine (2007).

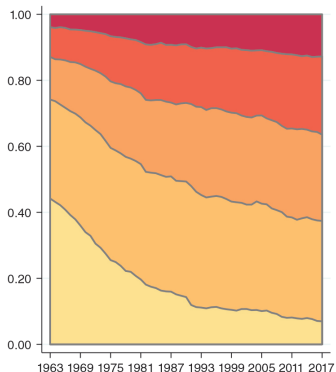
Figure 14: U.S. High School Graduation Rate for 20–24-Year-Olds by Race/Ethnicity and Birth Cohort



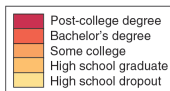
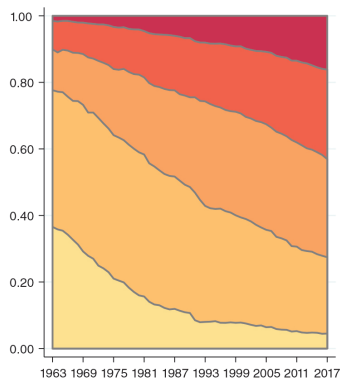
Source: Murnane (2013). For birth cohorts 1947-50 to 1956-60, see Heckman and LaFontaine (2010); for subsequent cohorts, author's estimation from U.S. Census, American Community Survey, and GED Testing Service data.

Figure 15: Share of Hours Worked in the US Economy by Education Group, 1963–2017

Panel A. Men



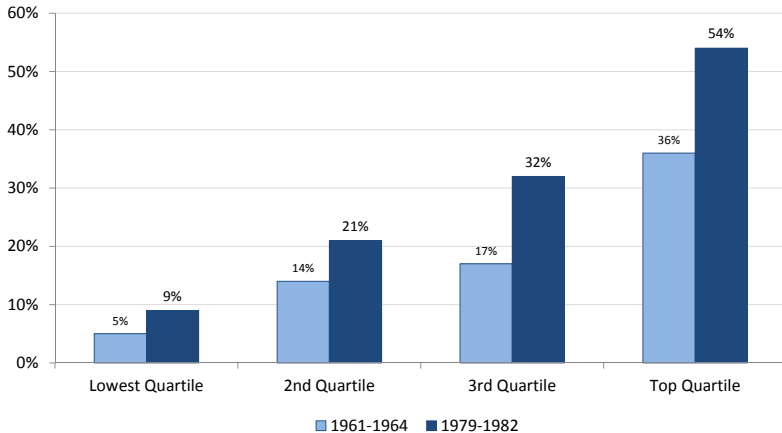
Panel B. Women



Source: Autor, 2019.

Importance of Family Background

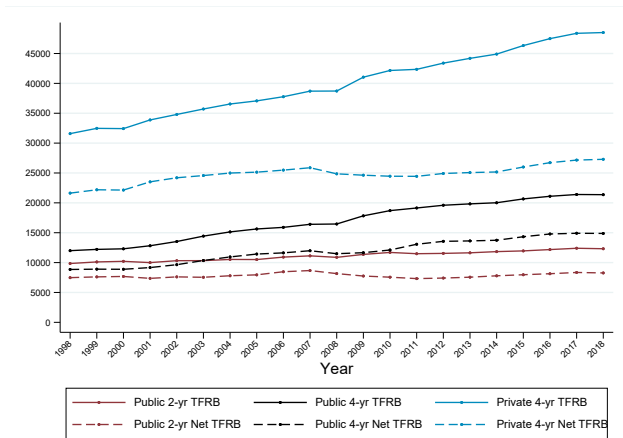
Figure 16: Fraction of Students Completing BA Degree by Age 25, by Family Income Quartile and Year of Birth



Source: Recreated from Bailey and Dynarsky (2011).

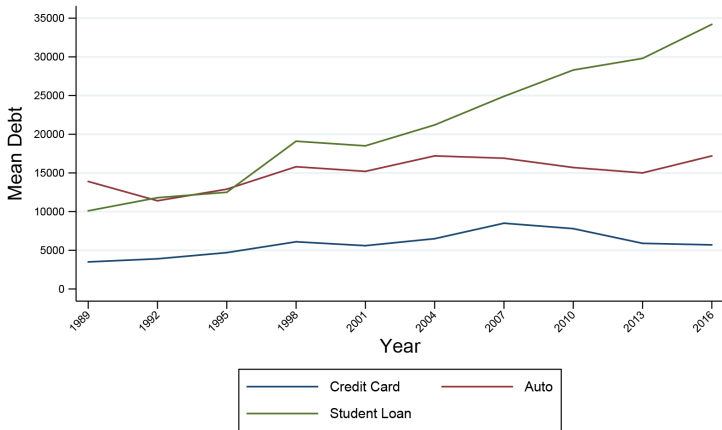
Tuition a Culprit?

Figure 17: Evolution of Average Tuition, Fees, Room & Board in the U.S. (2013 \$)



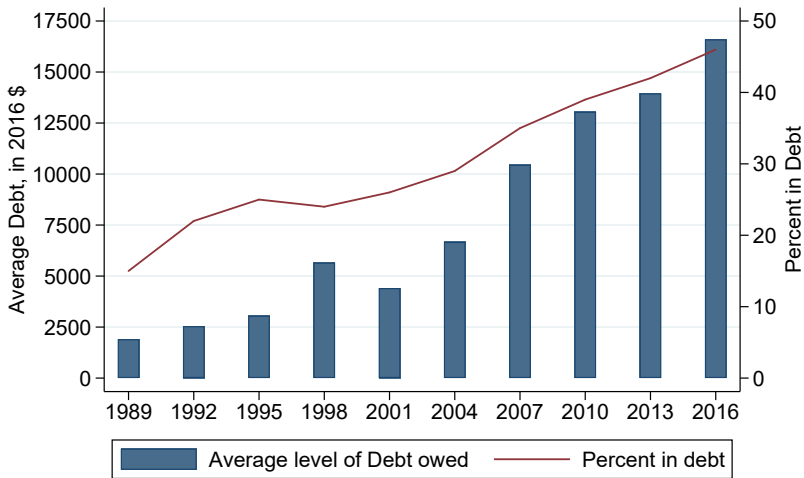
Source: Lochner and Monge-Naranjo (2016).

Figure 18: Average Debt Among Families with Debt, by Type



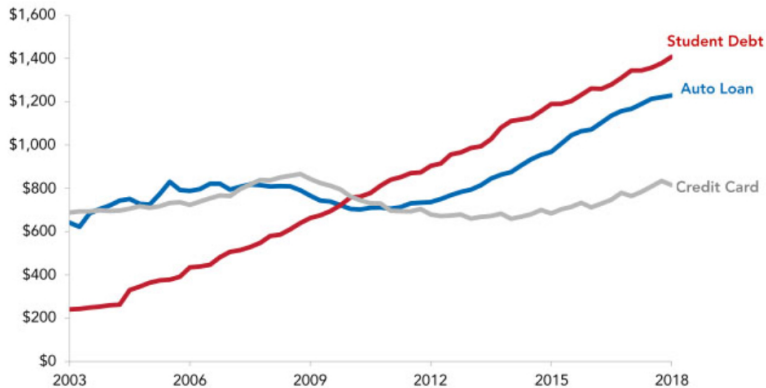
Note: From the Survey of Consumer Finances, Federal Reserve

Figure 19: Education Debt Among Households Led By A 25-34 year Old



Source: Data by Federal Reserve System, Survey of Consumer Finances. Calculations by PGPF.

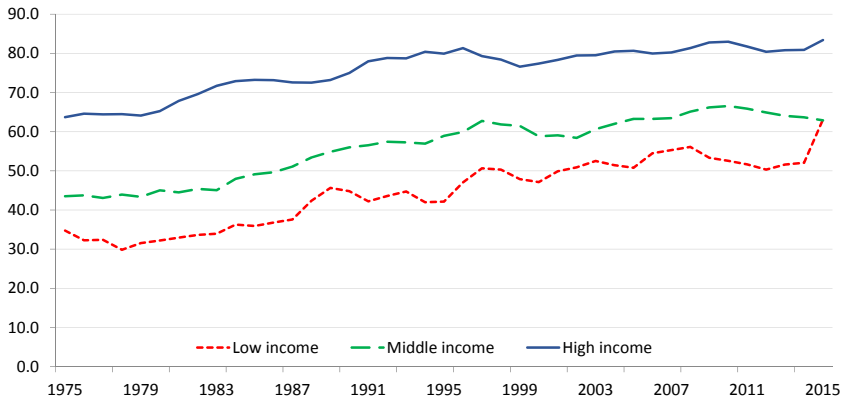
Figure 20: Total Debt (Billions of Dollars)



Source: Federal Reserve Bank of New York. Quarterly Report on Household Debt and Credit. July 2018. Compiled by PGPF.

Credit Constraints?

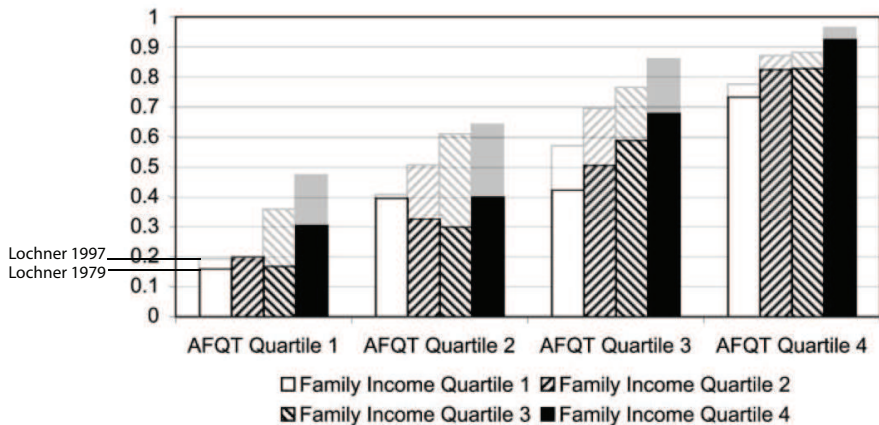
Figure 21: Percentage of High School Completers who were Enrolled in 2- or 4-year Colleges by the October Immediately Following High School Completion: 1973-2015



Note: A 3-year moving average is a weighted average of the year indicated, the year immediately preceding, and the year immediately following. For 1975 and 2014, a 2-year moving average is used: The moving average for income groups in 1975 reflects an average of 1975 and 1976, and the moving average for 2014 reflects an average of 2013 and 2014. Moving averages are used to produce more stable estimates.

Source: Digest of Education Statistics 2016, Table 302.30.

Figure 22: College attendance by AFQT and Family Income Quartiles (1979 and 1997 on one graph)



Source: Belley and Lochner (2007).

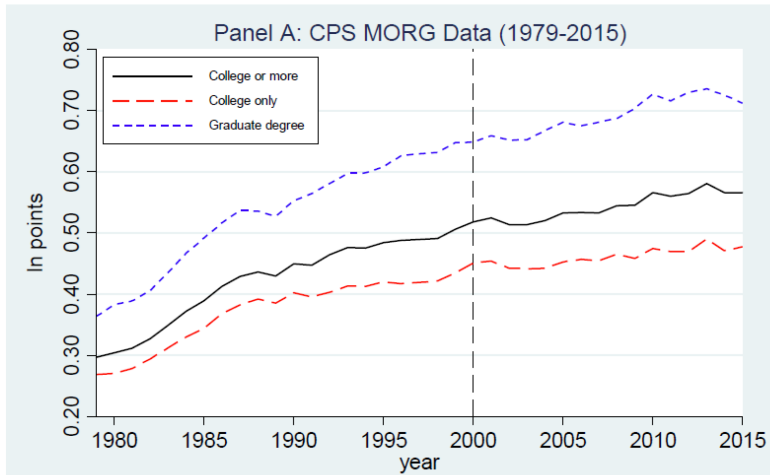
[Link to Additional Graphs on Credit Constraints](#)

Table 1: Educational Attainment Shares and Real Hourly Wages

	Panel A: Employment share					
	(1)	(2)	(3)	(4)	(5)	(6)
	<u>1980</u>	<u>1990</u>	<u>1992</u>	<u>2000</u>	<u>2010</u>	<u>2015</u>
No degree (<12 yrs. education)	0.197	0.130	0.115	0.099	0.082	0.077
High school degree	0.371	0.368	0.358	0.314	0.280	0.256
Some college	0.205	0.238	0.259	0.280	0.280	0.278
College only (4-year)	0.158	0.183	0.177	0.205	0.232	0.247
Graduate Degree	0.069	0.081	0.090	0.103	0.126	0.143
Graduate degree by type						
Master's			0.068	0.075	0.094	0.107
Professional			0.012	0.014	0.016	0.016
Doctoral			0.010	0.013	0.016	0.019

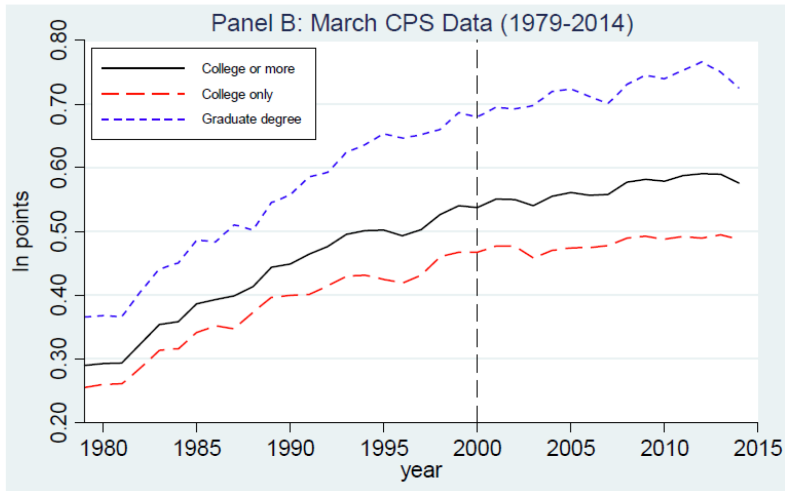
Source: Valletta (2019)

Figure 1: Estimated Higher Education Wage Premium, 1979-2015



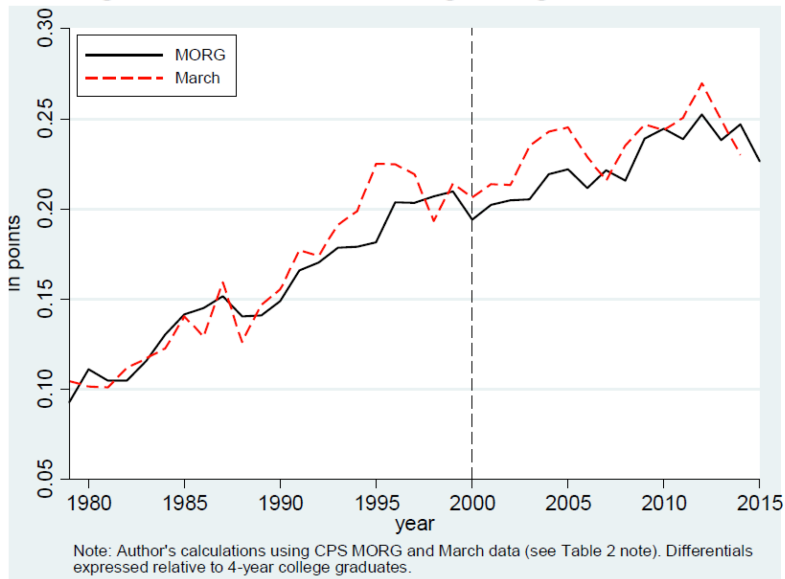
Source: Valletta (2019)

Figure 1: Estimated Higher Education Wage Premium, 1979-2015



Source: Valletta (2019)

Figure 2: Estimated Graduate Degree Wage Premium

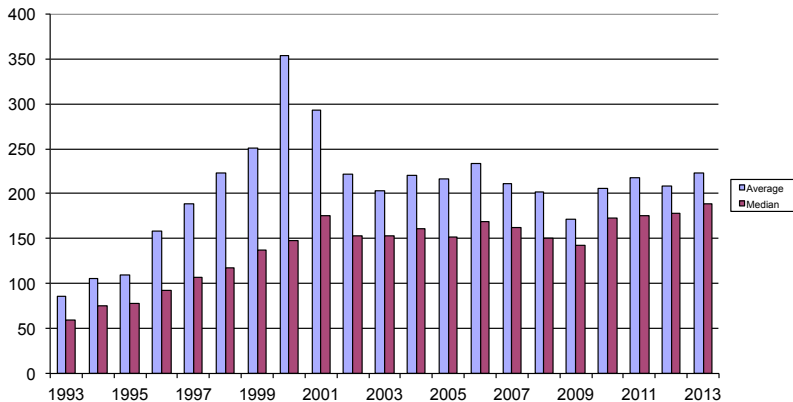


Source: Valletta (2019)

[Link to Remaining Valletta Slides](#)

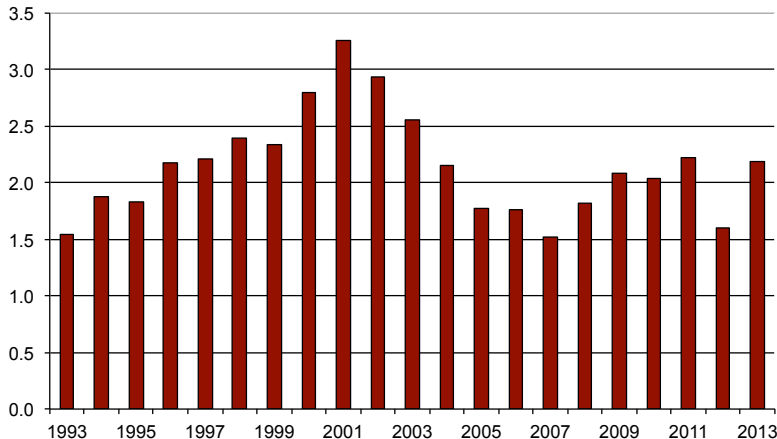
[Return to main text](#)

Figure 23: Average & Median Total Pay (estimated) of S&P 500 CEOs Relative to Median Household Income from 1993 to 2013



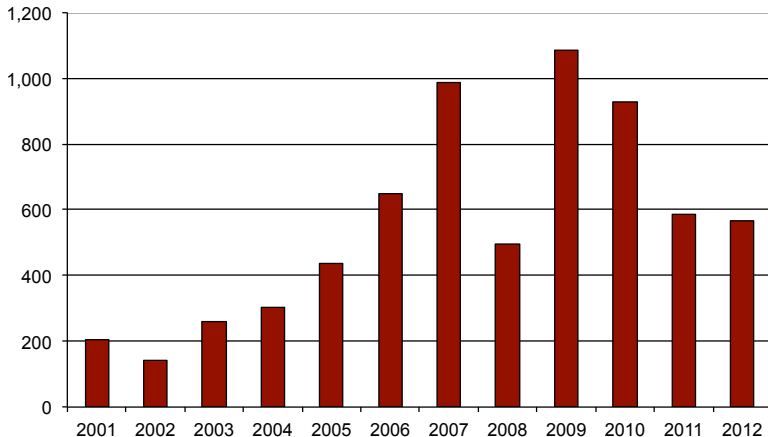
Source: ExecuComp, Census Accounts, Steven Kaplan, 2015.

Figure 24: Average Pay (Estimated) of S&P 500 CEOs Relative to Average AGI of Top 0.1% of Taxpayers from 1993 to 2013



Source: ExecuComp, Census Accounts, Steven Kaplan, 2015.

Figure 25: CEOs are not the only ones who earn more / earn a lot – Average Pay of Top 25 Hedge Fund Managers AR Magazine “Rich List” from 2001 to 2012 (in millions of \$2012)



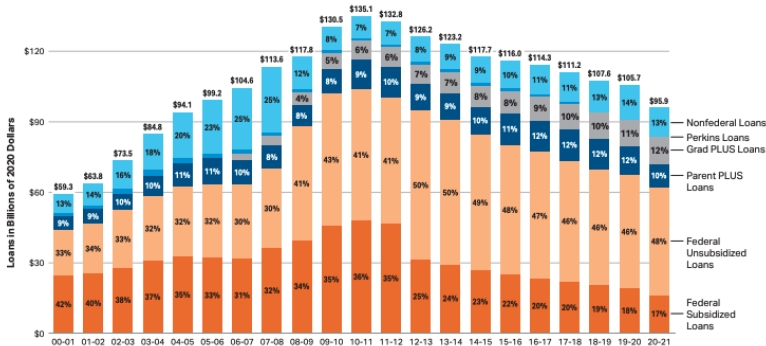
Source: ExecuComp, Census Accounts, Steven Kaplan, 2015.

[Return to main text](#)

[Link to Kaplan Slides](#)

Figure 26: Growth in Student Loan Disbursements in the U.S. (in 2020 \$)

FIGURE SA-6 Total Federal and Nonfederal Loans in 2020 Dollars by Type of Loan, 2000-01 to 2020-21

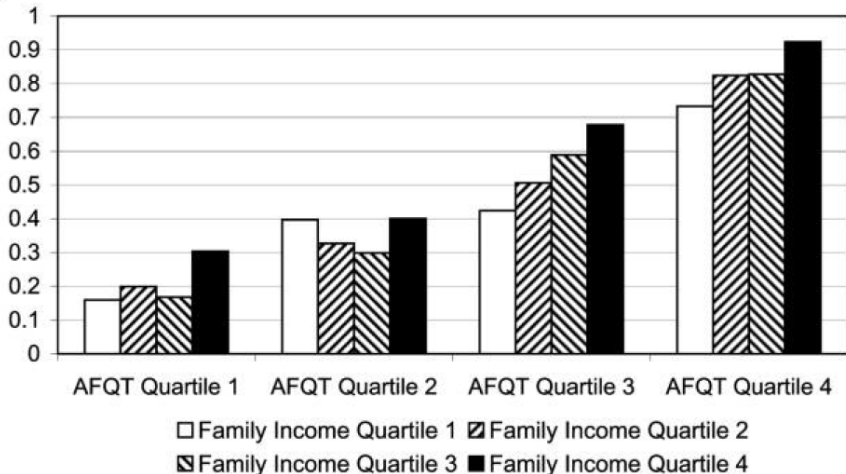


NOTE: Nonfederal loans include loans to students from states and institutions in addition to private loans issued by banks, credit unions, and other lenders. Values for nonfederal loans are best estimates and are less precise than federal loan amounts.

SOURCE: See page 51 for a list of sources for loans included in Figure SA-6.

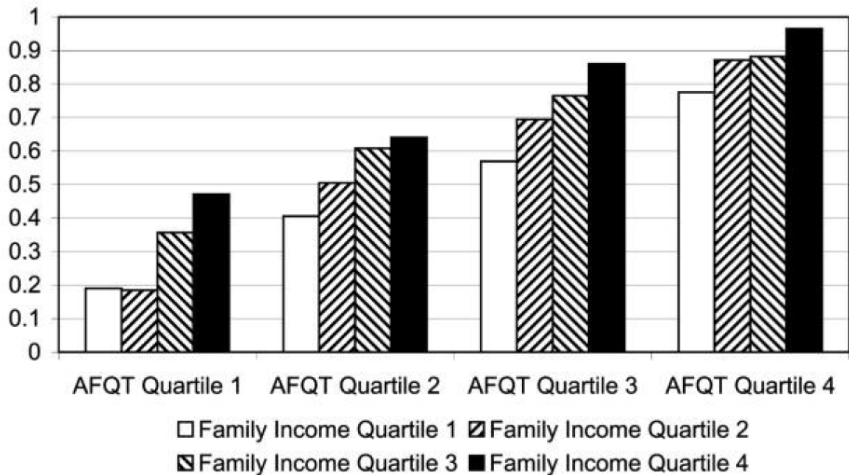
Source: College Board (2021).

Figure 27: College attendance by AFQT and Family Income Quartiles (1979)



Source: Belley and Lochner (2007).

Figure 28: College attendance by AFQT and Family Income Quartiles (1997)



Source: Belley and Lochner (2007).

[Return to main text](#)

Market or Racket? Do We Need a New Approach to Executive Pay?

by Steve Kaplan

University of Chicago Booth School of Business

[Return to main text](#)

Table 1: Educational Attainment Shares and Real Hourly Wages

	<u>Panel B: Real Hourly Wage (2015 \$) (averages by group)</u>					
	(1)	(2)	(3)	(4)	(5)	(6)
	<u>1980</u>	<u>1990</u>	<u>1992</u>	<u>2000</u>	<u>2010</u>	<u>2015</u>
No degree (<12 yrs. education)	14.19	12.84	12.47	13.03	13.22	13.56
High school degree	16.33	15.99	15.87	17.20	17.77	17.98
Some college	18.80	19.29	19.16	20.84	21.47	21.59
College only (4-year)	22.85	25.32	25.18	28.98	30.49	30.93
Graduate Degree	27.27	31.43	31.66	36.40	39.70	39.48
Graduate degree by type						
Master's			29.94	33.99	36.85	36.83
Professional			38.32	45.01	50.75	50.51
Doctoral			35.83	41.44	46.43	45.70

Note: Author's calculations from CPS monthly files (Panel A) and MORG files (Panel B); sample weights used. See Table 2 note for MORG sample description and counts. Master's degrees include MBAs along with a wide set of other master's degrees; professional degrees are J.D., M.D., and related.

Table 2: Composition-Adjusted Wage/Earnings Differentials
(log points, relative to high school graduates)

	Panel A: CPS MORG Data					
	(1)	(2)	(3)	(4)	(5)	(6)
	<u>1980</u>	<u>1990</u>	<u>1992</u>	<u>2000</u>	<u>2010</u>	<u>2015</u>
Full sample						
College degree or higher	0.304 (.003)	0.449 (.003)	0.464 (.003)	0.518 (.004)	0.566 (.004)	0.566 (.005)
College only (4-year)	0.270 (.004)	0.402 (.004)	0.403 (.004)	0.451 (.005)	0.475 (.005)	0.477 (.005)
Graduate degree	0.383 (.005)	0.553 (.005)	0.581 (.005)	0.648 (.006)	0.727 (.006)	0.712 (.006)
Observations	121001	123111	119014	83314	85397	76789
College degree or higher sample						
Graduate degree	0.111 (.006)	0.149 (.006)	0.170 (.006)	0.194 (.007)	0.245 (.006)	0.226 (.006)
Observations	27042	33334	32684	26789	32305	31572

Source: Valletta (2019)

[Return to main text](#)