

MIT 14.662 Spring 2018: Lecture 1 – An Overview of Topics and Questions

David Autor, MIT and NBER

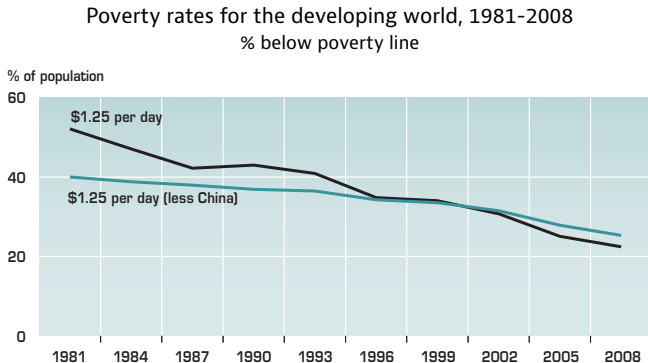
February 7, 2018

Agenda

- 1 Incomes: Levels, Growth, Inequality**
 - Household incomes
 - Wage Inequality
 - Intergenerational income mobility
- 2 Skills, Education, and Earnings**
 - Skills and educational attainment
 - Wage differentials by skill
 - Occupational change & employment polarization
- 3 Top Incomes and Superstars**
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- 5 The Importance of Place**
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- 7 Gender Differences in Education and Labor Markets**

Falling World Poverty, 1981 - 2008

Data: Poverty rates in developing countries have fallen sharply since the early 1980s, although much of the decline reflects China's economic resurgence.

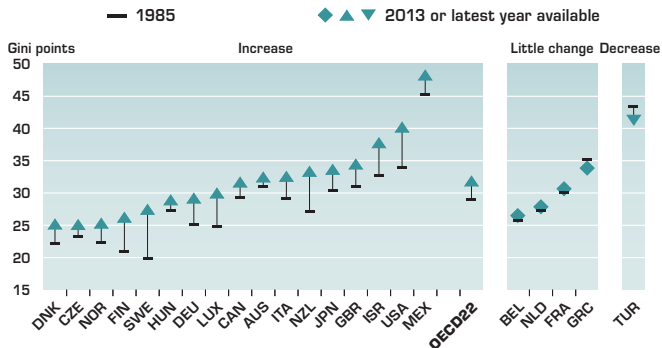


Source: OECD (2013), *Perspectives on Global Development 2013*,
<http://dx.doi.org/10.1787/888932812908>.

Income Ginis in OECD: Mid 1980s Through Approximately 2013

Data: Income inequality has increased in most OECD countries since the mid-1980s.

Gini measure of income inequality, mid-1980s and 2013

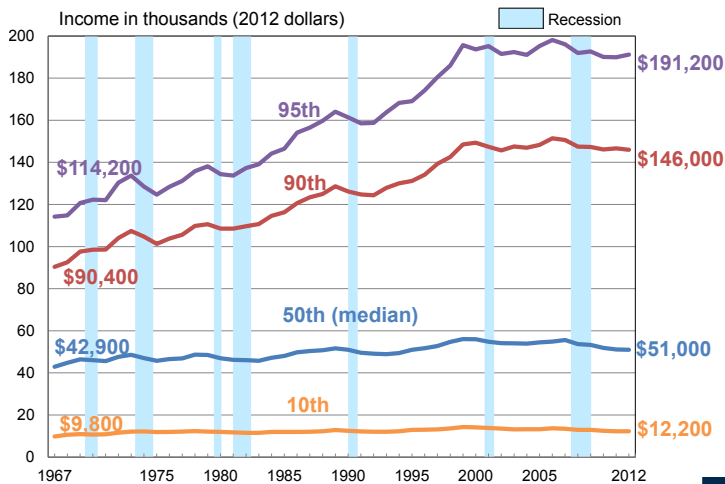


Source: OECD (2015), *In It Together: Why Less Inequality Benefits All*, <http://dx.doi.org/10.1787/888933207711>.

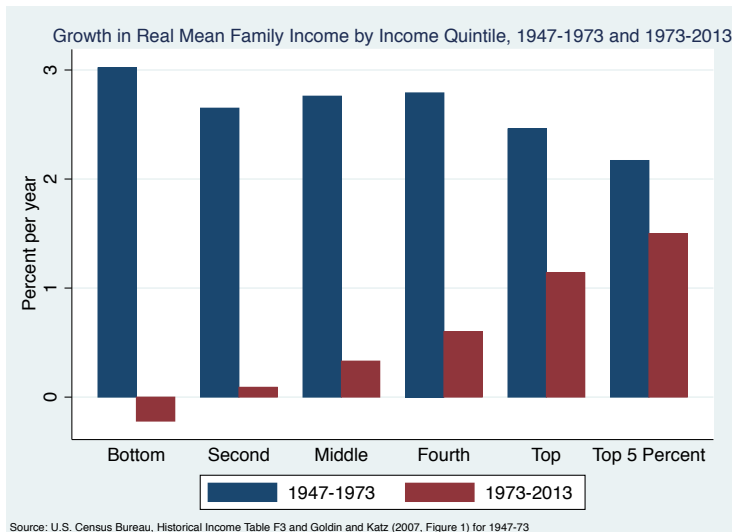
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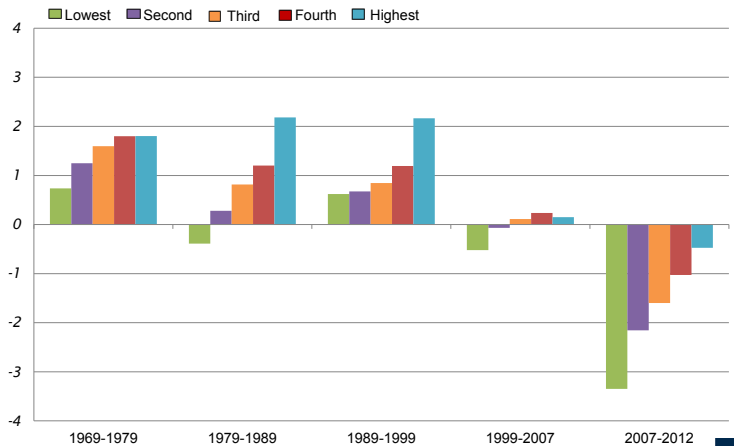
U.S. Real HH Incomes at Select Percentiles, 1967 - 2012



Growth in U.S. Real Mean Family Income by Quintile, 1947 – 1973 and 1973 – 2013



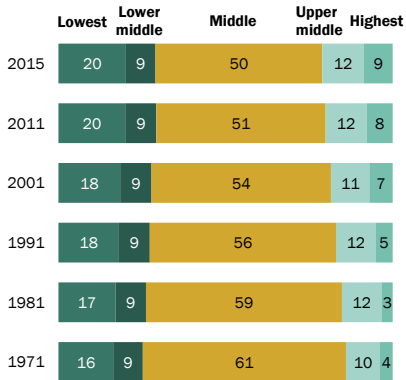
Average Annual Income % Change in Family Size-Adjusted Mean Income by Quintile



'Declining' U.S. 'Middle Class' 1971 – 2015

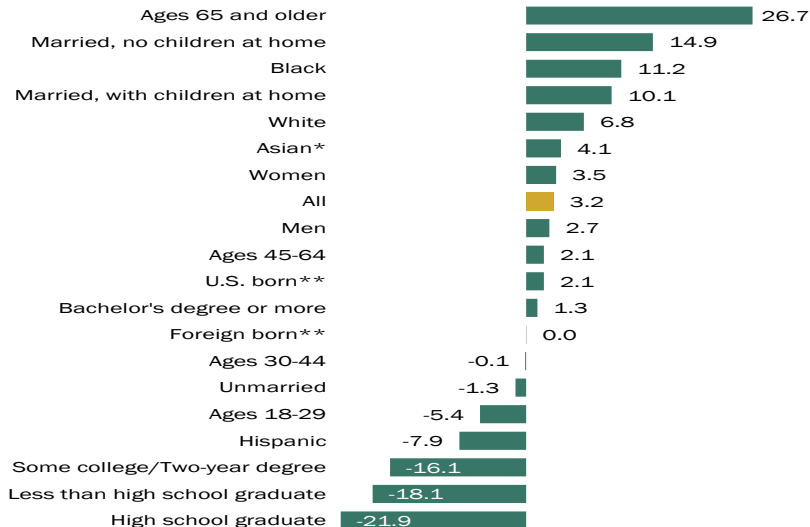
Share of adults living in middle-income households is falling

% of adults in each income tier



“Middle-income” households: Incomes that are two-thirds to double that of U.S. median household income (after adjusting for household size)

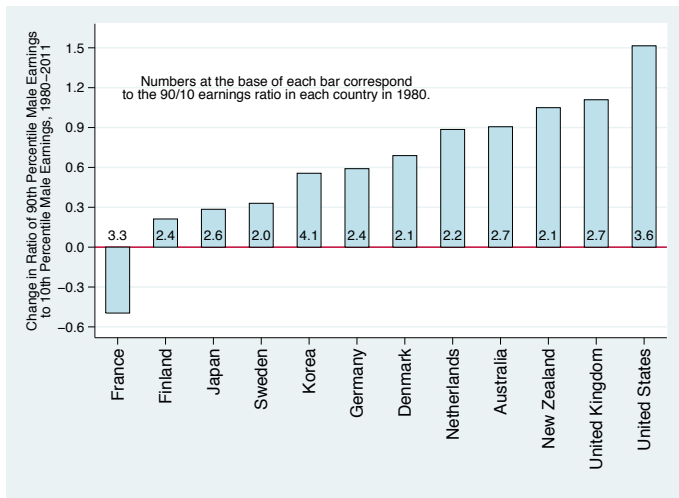
Δ Fraction 'Upper Class' – Δ Fraction 'Lower Class' 1971 – 2015



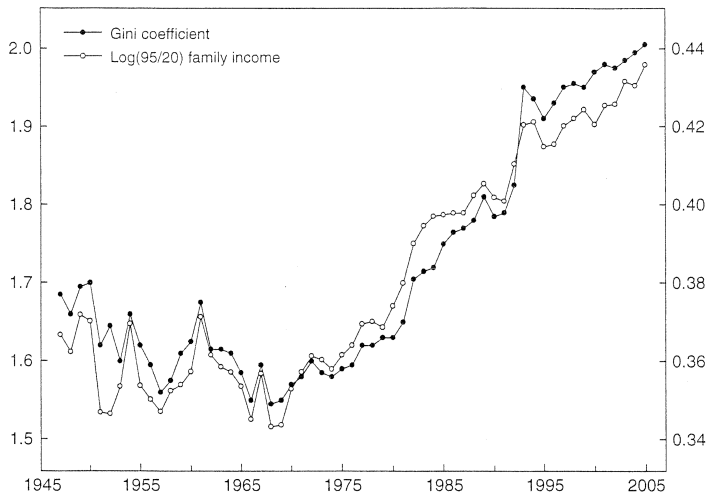
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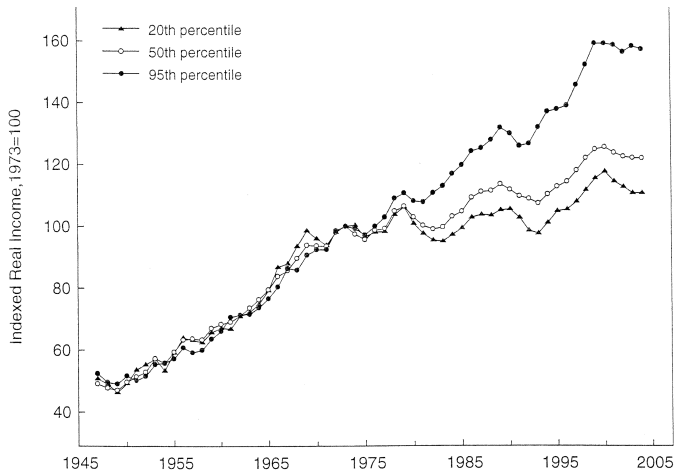
Changes in the 90/10 Ratio of Full-Time Male Earnings Across Twelve OECD Countries, 1980-2011



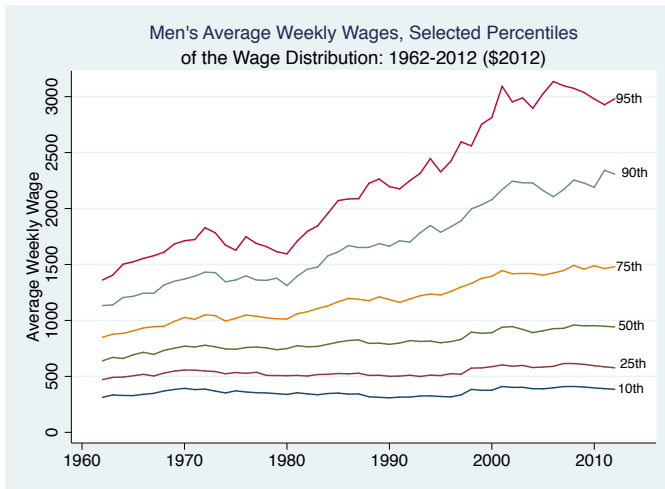
U.S. Earnings Inequality in the Post-War Era, 1945 - 2005



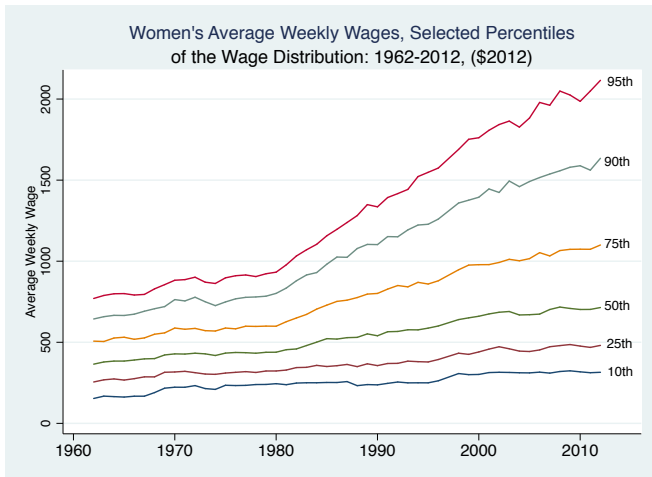
U.S. Indexed Real Incomes at the 20th, 50th and 95th Percentiles, 1945 – 2005



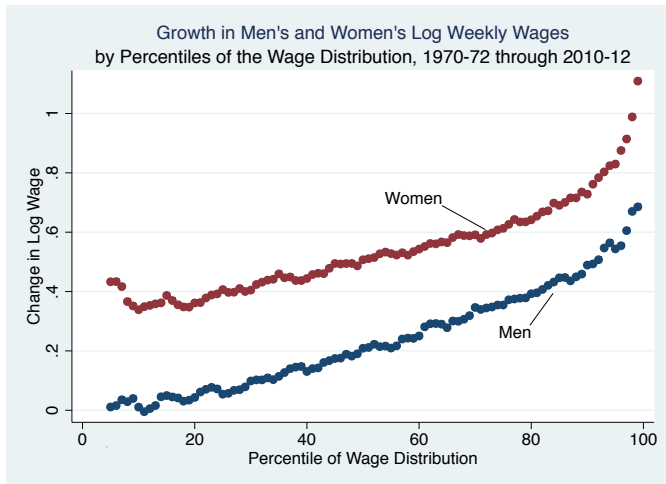
U.S. Real Weekly Wages (PCE Deflator) 1962 – 2012: Men



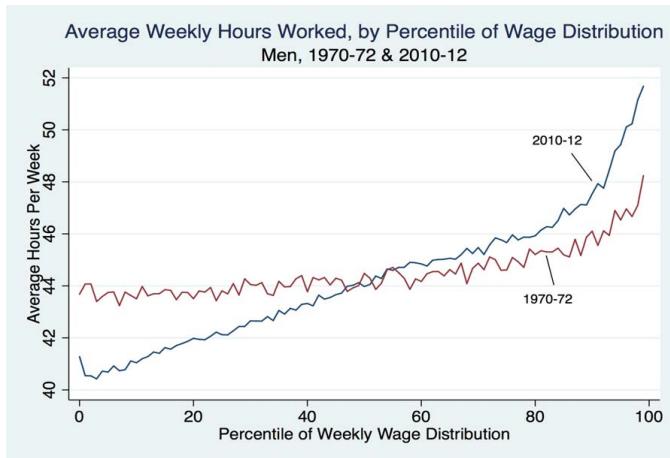
U.S. Real Weekly Wages (PCE Deflator) 1962 – 2012: Women



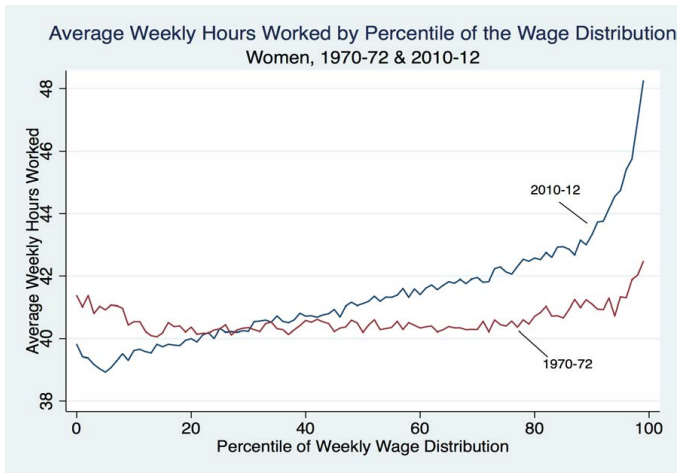
Growth in Log Real Weekly Wages 1970/72 – 2010/12



Average Hours Worked by Wage Percentile, 1970/2 and 2010/12: Men



Average Hours Worked by Wage Percentile, 1970/2 and 2010/12: Women



Evolution of Inequality in the UK, 1977 - 2006

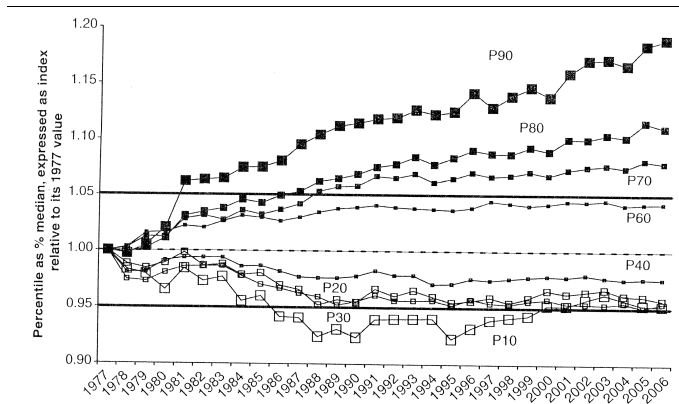
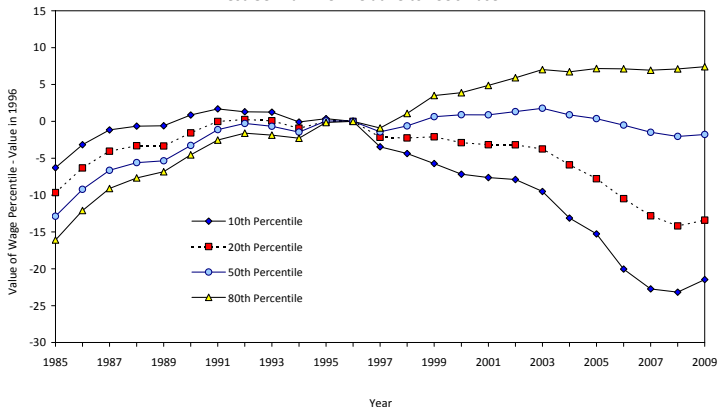


Figure 8 Changes in earnings deciles in the United Kingdom 1977–2006

Rise in West German Male Wage Inequality, 1985 - 2009

Figure 1a: Trends in Percentiles of Real Log Daily Wage
West German Men Relative to 1996 Base



Note: figure shows percentiles of log real daily wage for full time male workers on their main job, deviated from value of same percentile in 1996 and multiplied by 100.

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Countries with High Cross-Sectional Inequality Have Low Relative Earnings Mobility

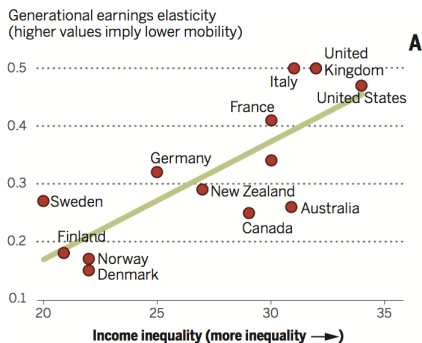
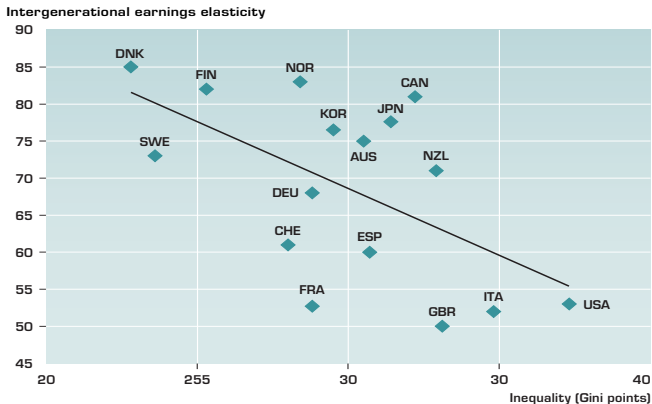


Fig. 5. Earnings inequality and economic mobility: Cross-national relationships. Reproduced from Corak [(44), figs. 1 and 4] with permission of the American Economic Association. In both panels, the mobility measure is equal to the intergenerational earnings “elasticity,” meaning the average proportional increase in a son’s adult earnings predicted by his father’s adult earnings measured approximately three decades earlier. A higher intergenerational earnings elasticity therefore implies lower intergenerational

OECD Thinks so Too...

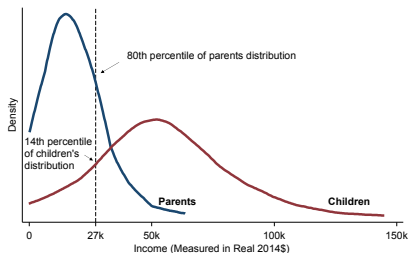
Inequality and mobility (intergenerational earnings elasticity) across OECD countries



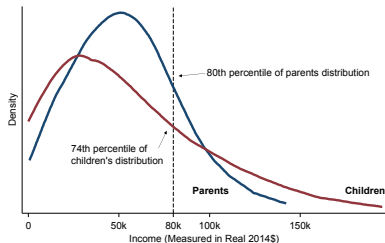
Source: OECD (2015), *In It Together: Why Less Inequality Benefits All*, <http://dx.doi.org/10.1787/888933207806>.

Comparing U.S. Parents' and Children's Income Distributions by Birth Cohort

B. Family Income Distributions: 1940 Birth Cohort



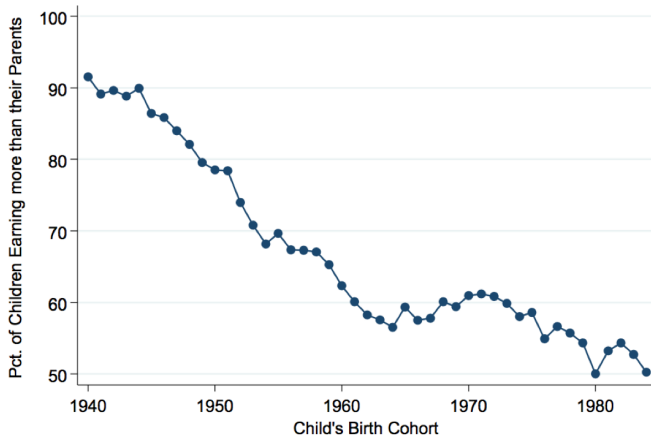
C. Family Income Distributions: 1980 Birth Cohort



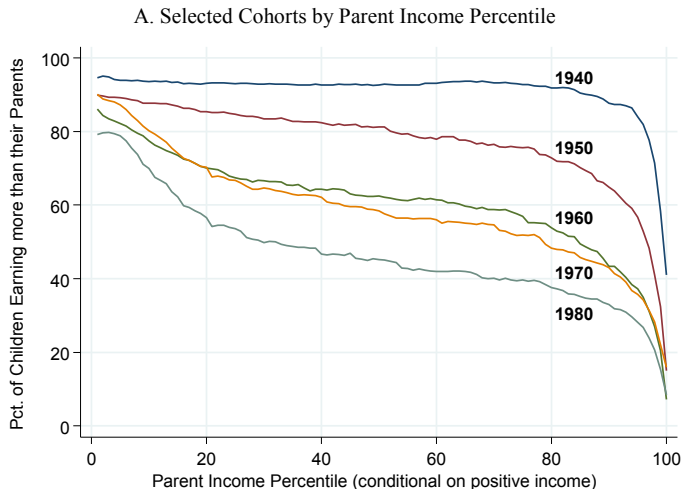
Chetty et al. 2017

Absolute Mobility: Children Earning More than Their Parents

B. Mean Rate of Absolute Mobility by Cohort

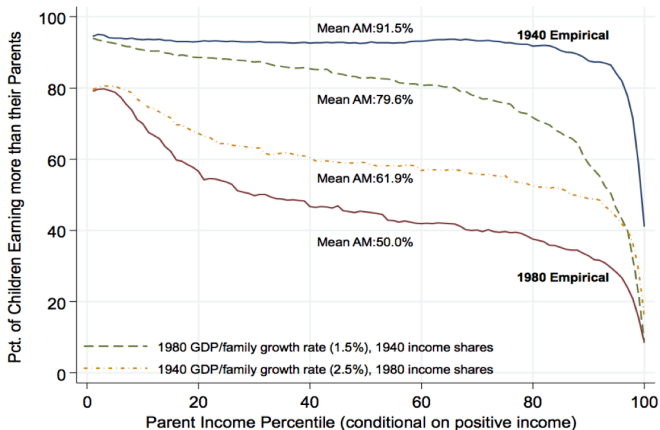


Absolute Mobility: Children Earning More than Their Parents



Counterfactuals for Absolute Mobility: Contributions of Slowing GDP growth vs. Rising Inequality

A. Counterfactual Rates of Absolute Mobility by Parent Income Percentile

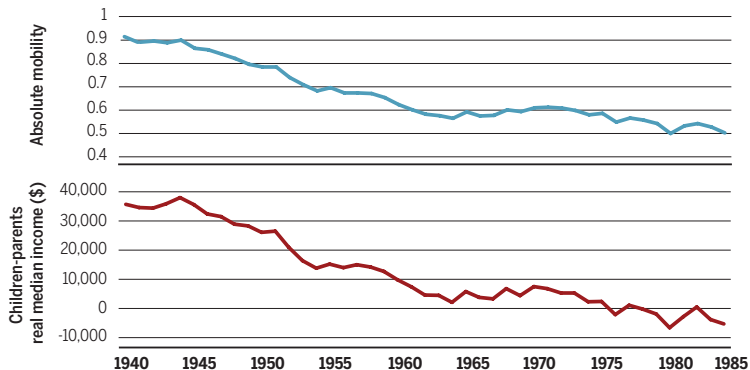


The Trend in Absolute Mobility is Extremely Highly Correlated with Trend in Intergenerational Income Growth

Mobility and child-parent income gap, linked over time

(Top) From online table 1, column CY, of Chetty *et al.* (see www.equality-of-opportunity.org/data/);

(bottom) from table S1 in Chetty *et al.* (1). Based on authors' calculations (see SM).



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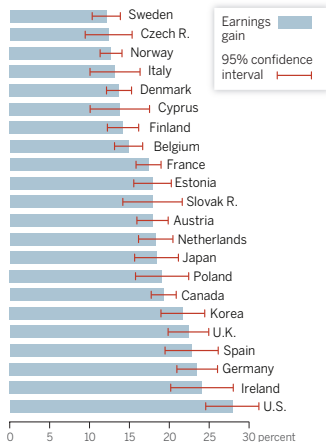
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Wage Returns to Measured Skills Are Substantial but Variable Across Countries

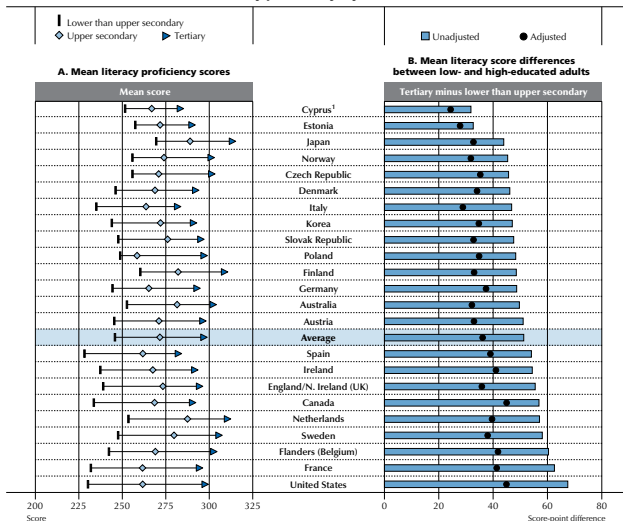
Cross-national differences in wage returns to skills, 2011–2013

Percentage increase for a one standard deviation increase in skill

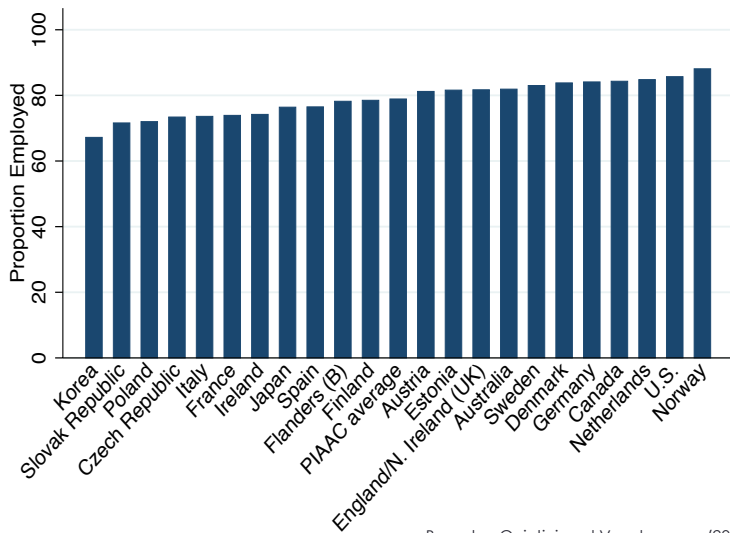


Measured Skills Highly Correlated with Education: Gaps in Literacy Proficiency by Education Group in OECD Countries

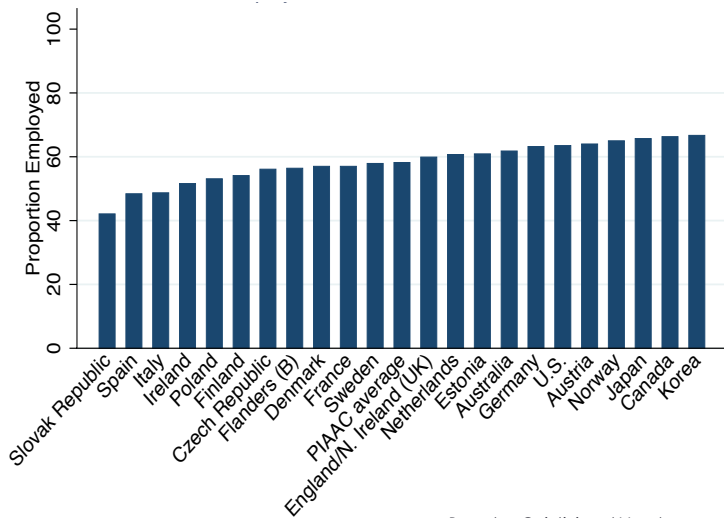
Differences in literacy proficiency, by educational attainment



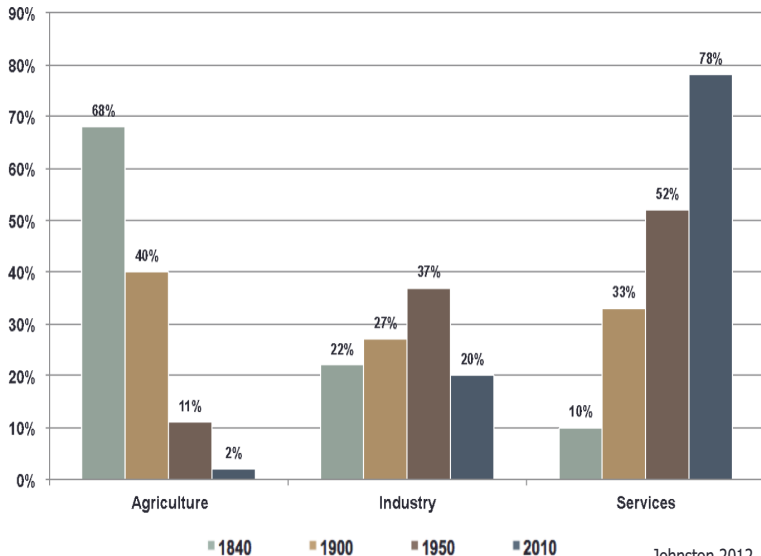
Emp Rates Uniformly High among Top Tercile PIAAC Scorers in 2012



Emp Rates Uniformly Low among Bottom Tercile PIAAC Scorers in 2012



Major Employment Transitions: Agriculture to Industry to Services



U.S. Educational Progression: Years of Completed Schooling by Birth Cohort, 1876 - 1975

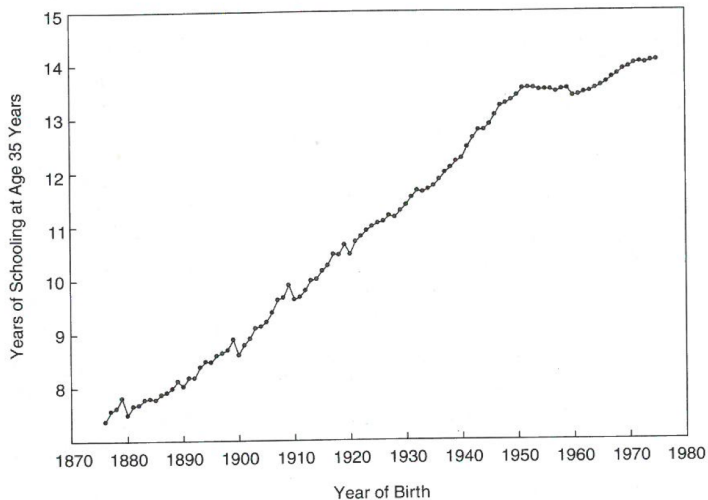


Figure 1.4. Years of Schooling by Birth Cohorts, U.S. Native-Born: 1876 to 1975.

Years of Completed Schooling by Birth Cohort and Sex, 1876 - 1975

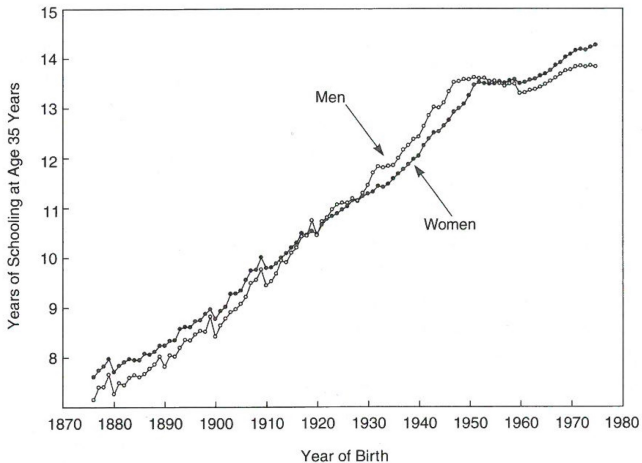


Figure 1.5. Years of Schooling by Birth Cohorts, U.S. Native-Born, by Sex: 1876 to 1975. This figure plots the mean years of completed schooling for U.S. native-born residents by birth cohort and sex, adjusted to age 35 using the approach described in the notes to Figure 1.4. Sources: 1940 to 2000 IPUMS.

U.S. High School Completion Rates by Birth Cohort 1930 – 1975

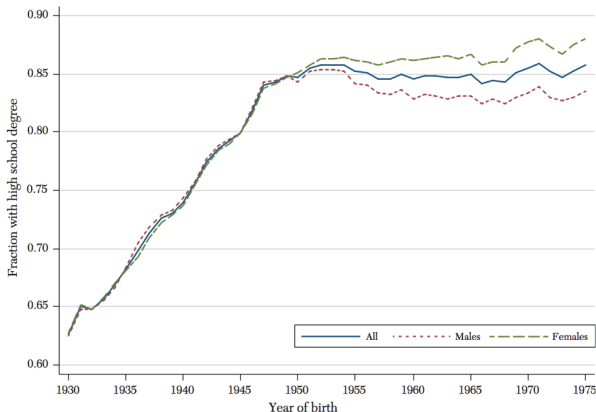


Figure 7. High School Completion Rates by Birth Cohort: 1930–1975

Source: Census IPUMS 1 percent samples for years 1960, 1970, 1980, 1990, and 2000. Sample includes adults ages 25 through 64 born after 1930 with nonmissing education. Plotted values correspond to predicted high school completion rates at age 35 by birth cohort. Predictions are obtained from an OLS regression of a high school completion dummy on sex by birth-year dummies and a quartic in age. Individuals are coded as high school graduates if they have completed twelve years of school (1960, 1970 and 1980 Census) or if they report a high school diploma or GED (1990 and 2000 Census).

U.S. College Completion Rates by Birth Cohort 1930 – 1975

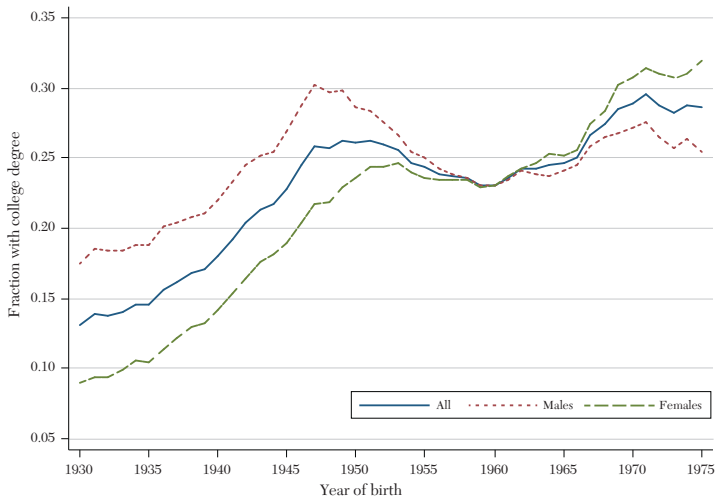
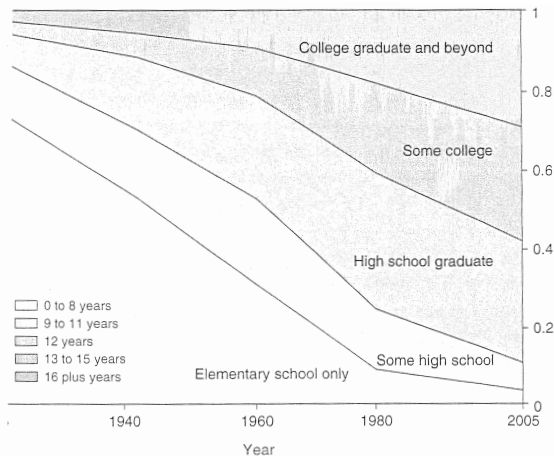


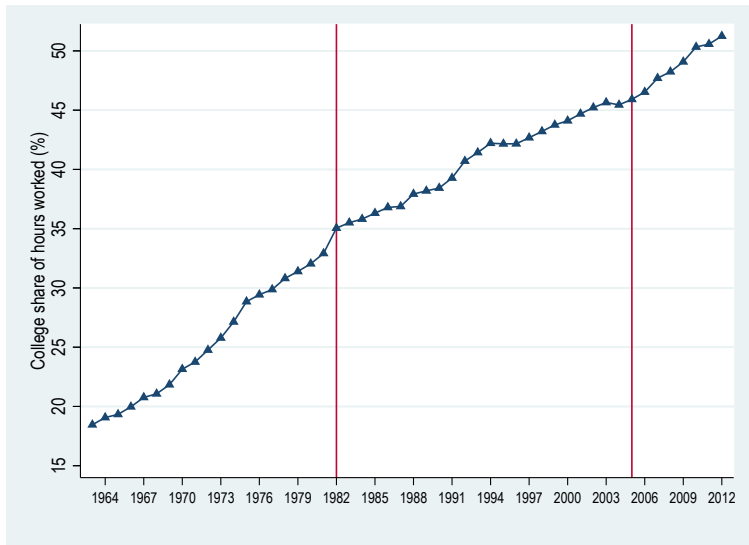
Figure 8. College Completion Rates by Birth Cohort: 1930–1975

Distribution of Educational Attainment of the U.S. Workforce, 1915 – 2005: So Low in 1915!

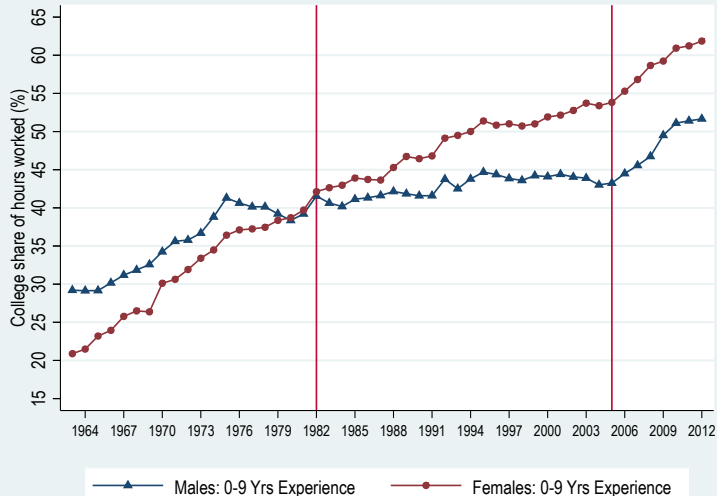


1.8. Distribution of Educational Attainment of the Workforce: 1915 to
Sources: See Table 1.2.

College Share of U.S. Hours Worked, 1963 - 2012

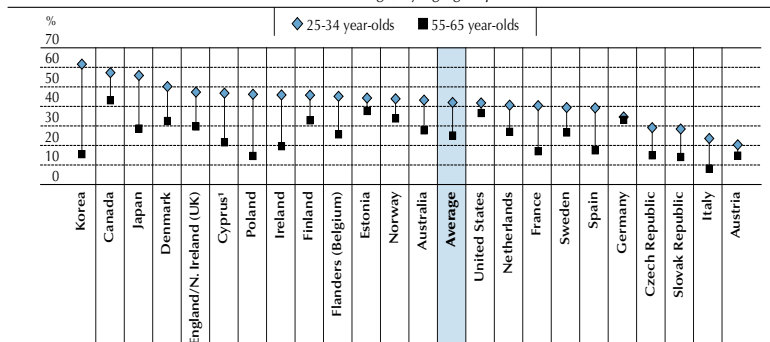


College Share of Hours Worked in the U.S. 1963 - 2012: Males and Females with <10 Years of Potential Experience



Tertiary Education Completion in OECD Countries as of 2012 by Age Groups, 25 – 34 and 55 – 65

Population with tertiary education
Percentage, by age group



1. See notes at the end of this chapter.

Countries are ranked in descending order of the percentage of 25-34 year-olds with tertiary education.

Source: Survey of Adult Skills (PIAAC) (2012), Table B2.2 in Annex B.

Agenda

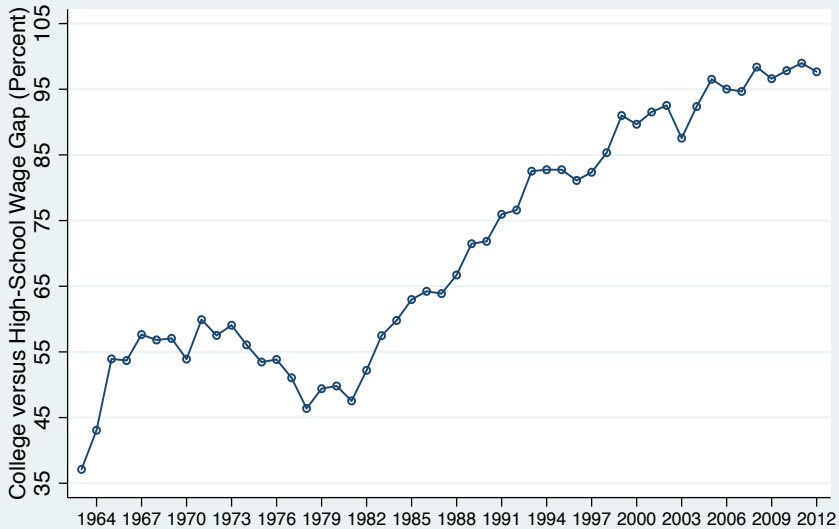
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Earnings Differentials between “College” and “High School” Young Adults 30 - 44 in OECD Countries, 2005

Country	Differential
Denmark	22%
Sweden	22%
Spain	30%
Australia	34%
Belgium	34%
Finland	38%
Italy	43%
Netherlands	47%
Austria	48%
France	48%
Korea	48%
Germany	50%
Ireland	59%
UK	61%

OECD (2007): Education at a Glance

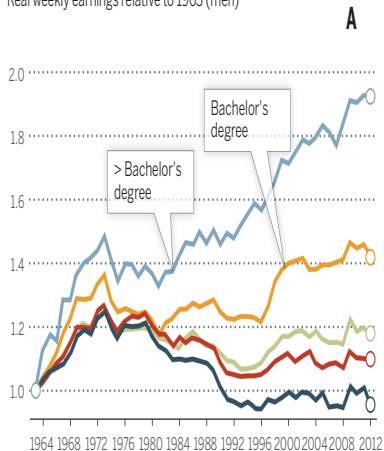
Indexed Real Full-Time Wages in U.S. by Sex and Education, 1963-2012: Rising Return Reflects (in part) Falling HS Level



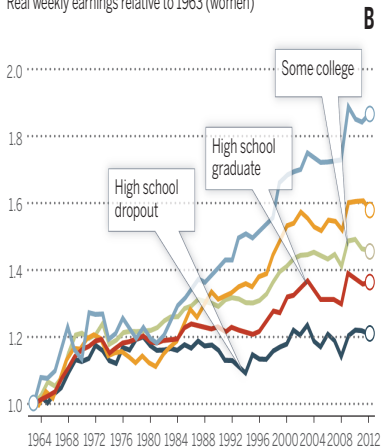
The U.S. College/High-School Premium, 1963 - 2012

Changes in real wage levels of full-time U.S. workers by sex and education, 1963-2012

Real weekly earnings relative to 1963 (men)



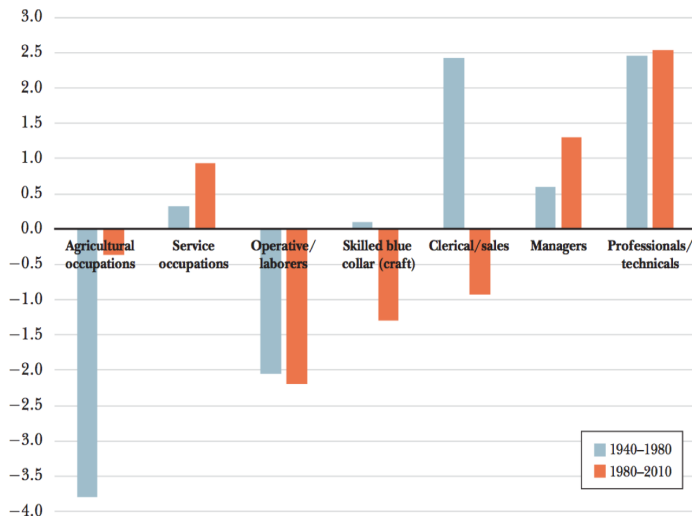
Real weekly earnings relative to 1963 (women)



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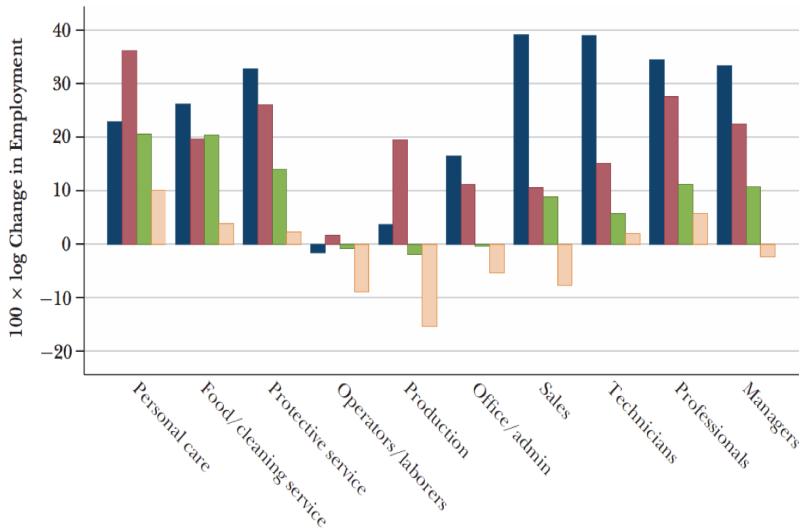
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Average Change per Decade in US Occupational Employment Shares for Two Periods: 1940–1980 and 1980–2010

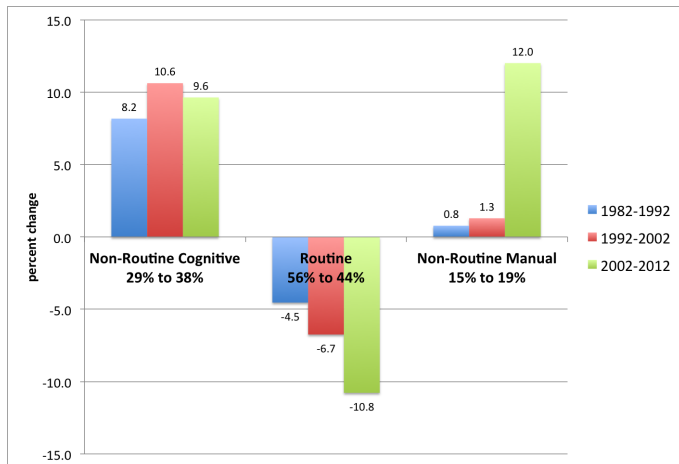


Occupational Polarization, 1979 – 2012

Percent Growth in Employment by Occupational Category

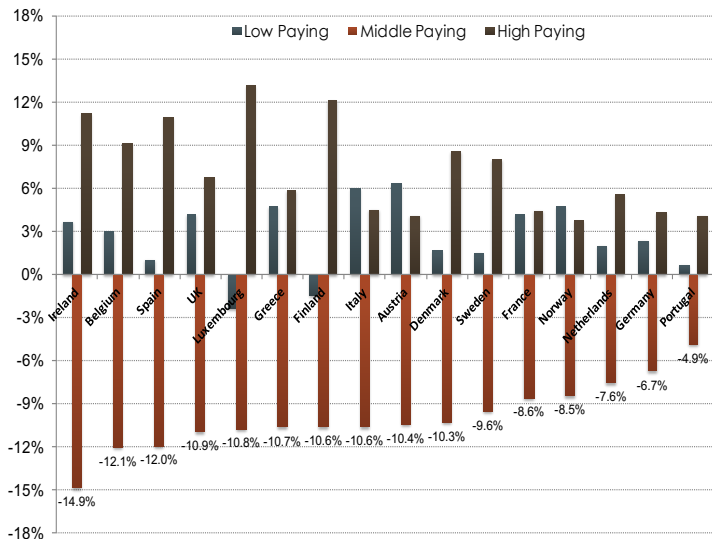


Occupational Polarization in the U.S., 1982 – 2012: An Aggregate View



Notes: Data from the Bureau of Labor Statistics, Current Population Survey. See Appendix A for details.

Employment Polarization in the European Union, 1993 - 2010



Occupational Polarization, 1979 – 1989, 1990-2007

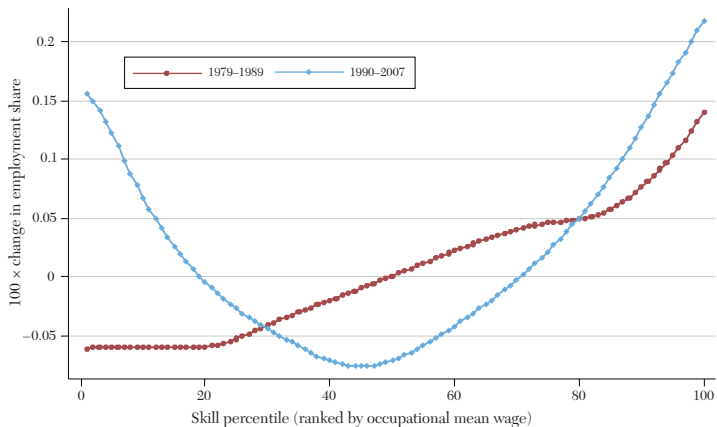
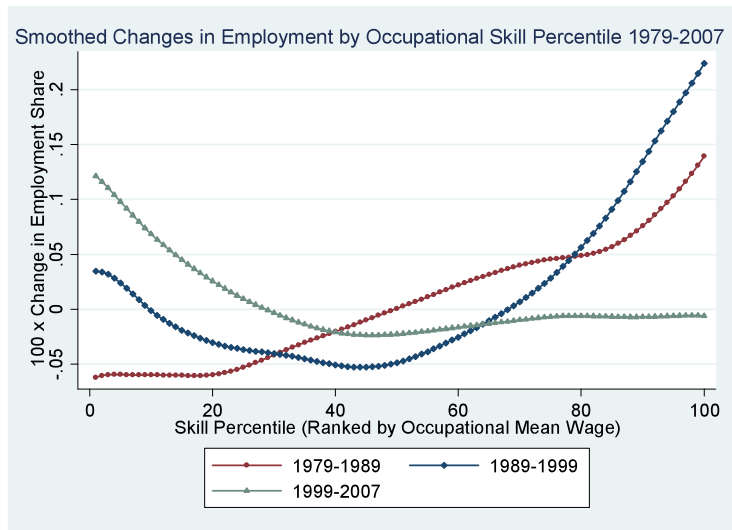


Figure 5. Smoothed Changes in Employment by Occupational Skill Percentile, 1979–2007

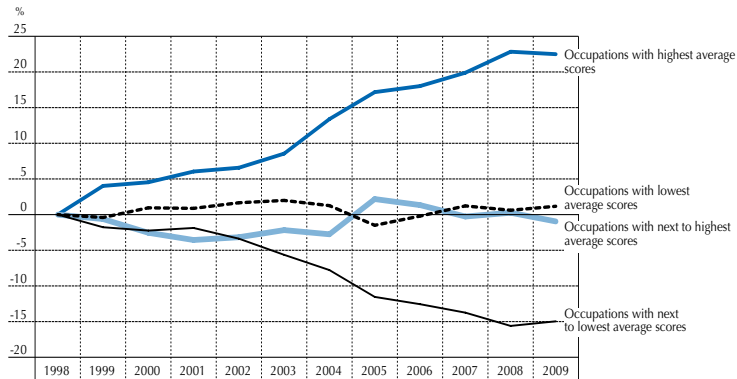
Occupational Polarization, 1979 – 2007, Detailed View



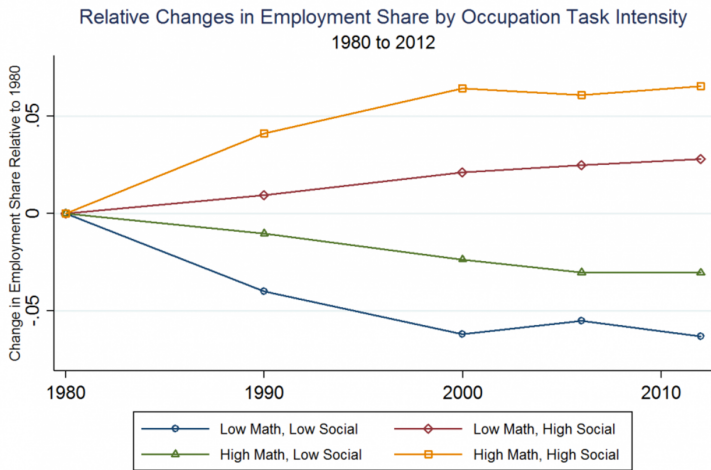
Evolution of Employment in Occupational Groups by Skills Proficiency, 1998 – 2009 (24 OECD Countries)

Evolution of employment in occupational groups defined by level of skills proficiency

Percentage change in the share of employment relative to 1998, by occupational groups defined by workers' average level of proficiency in literacy and numeracy



Growth of High-Math/High-Social Occupations 1980 - 2012



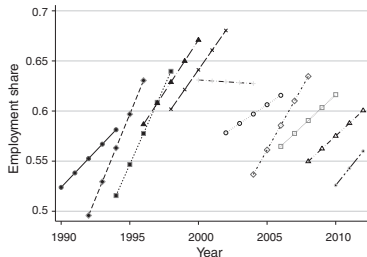
Occupational Task Intensity based on 1998 O*NET

Sources: 1980-2000 Census, 2005-2013 ACS

Occupational Skill and Wage Profiles of U.S. College Workers by Year of Labor Market Entry, 1990 - 2010

Declining Fortunes of Young College Workers Since 2000?

Panel A. Cognitive employment profiles



Panel B. Wage profiles

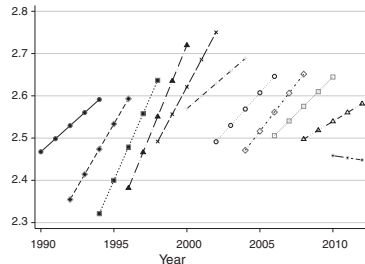
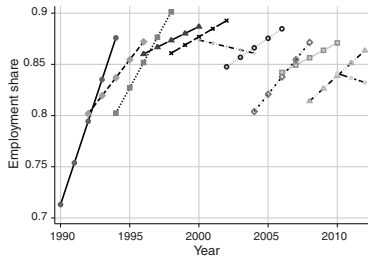


FIGURE 1. COGNITIVE EMPLOYMENT AND WAGE PROFILES FOR EXACTLY COLLEGE WORKERS

Occupational Skill and Wage Profiles of U.S. Post-College Workers by Year of Labor Market Entry, 1990 - 2010

Declining Fortunes of Young Post-College Workers Since 2000?

Panel A. Cognitive employment profiles



Panel B. Wage profiles

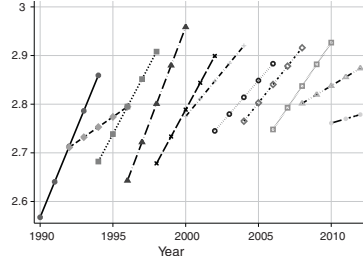


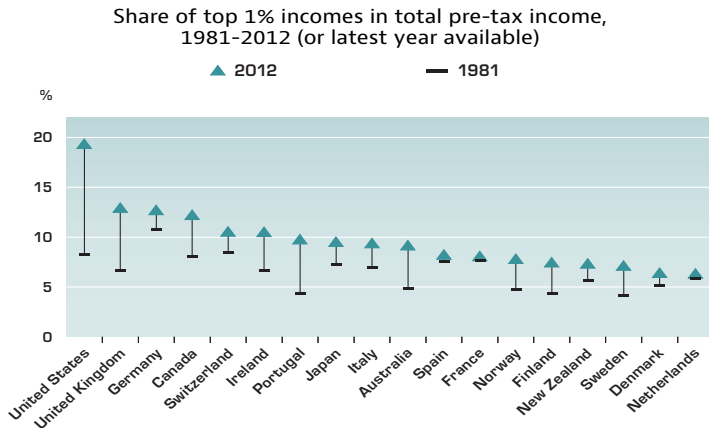
FIGURE 3. COGNITIVE EMPLOYMENT AND WAGE PROFILES FOR POST-COLLEGE WORKERS

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OECD Top 1% Income Shares, 1981 - 2012

Data: Top earners have increased their share of total earnings in most OECD countries since the 1980s.

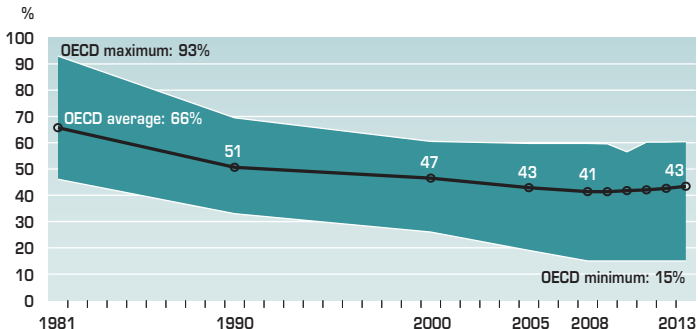


Source: OECD (2014), "Focus on Top Incomes and Taxation in OECD Countries: Was the crisis a game changer?", <http://dx.doi.org/10.1787/888932965953>.

OECD Income Taxes Becoming Less Progressive

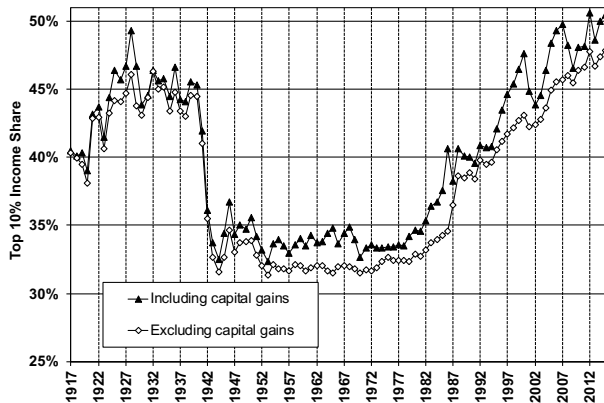
Data: Tax rates on top incomes fell substantially between the 1980s and the financial crisis.

Maximum, minimum and average statutory tax rates on top incomes in OECD countries, 1981-2013 (or latest)

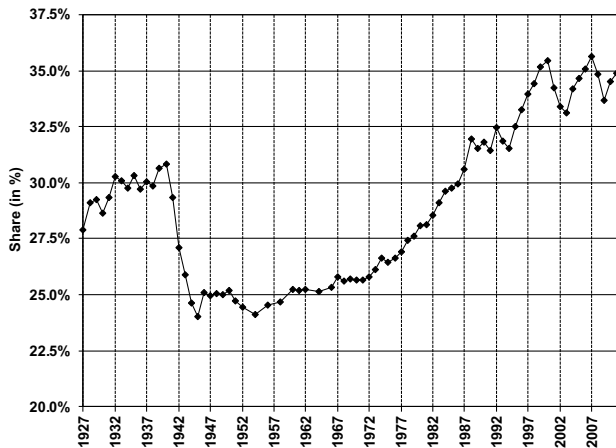


Source: OECD (2014), "Focus on Top Incomes and Taxation in OECD Countries: Was the crisis a game changer?", <http://dx.doi.org/10.1787/888932965953>.

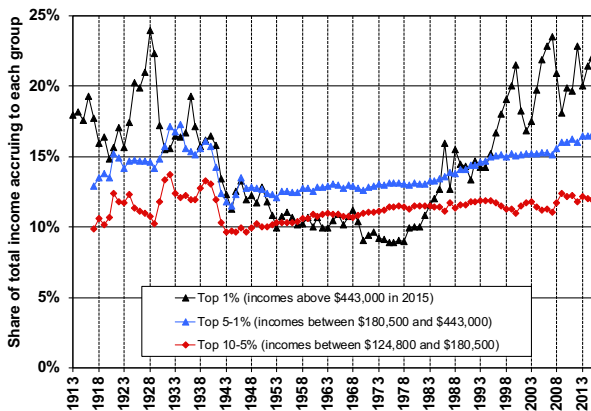
Top Decile Income U.S. Income Share, 1917 – 2015



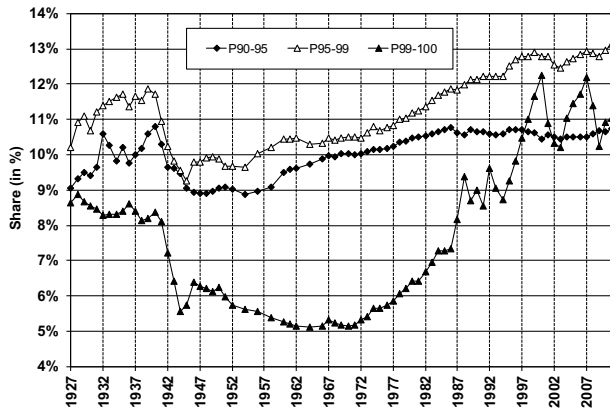
Top Decile Wage Share, 1917 – 2015



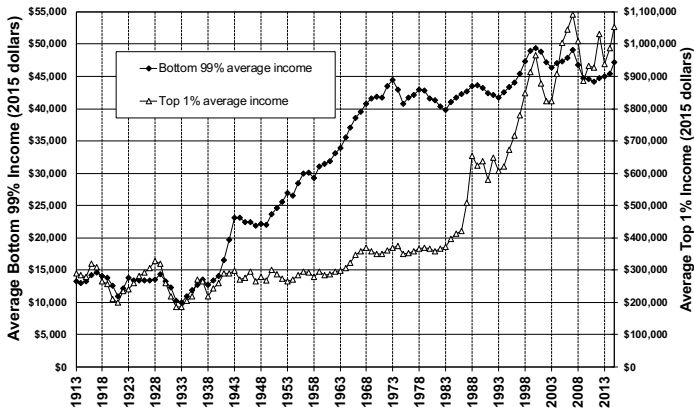
Top Decile U.S. Income Shares, 1917 – 2015: P1, P1-P5, P5-P10



Top Decile U.S. Wage Income Shares, 1917 – 2015: P1, P1-P5, P5-P10

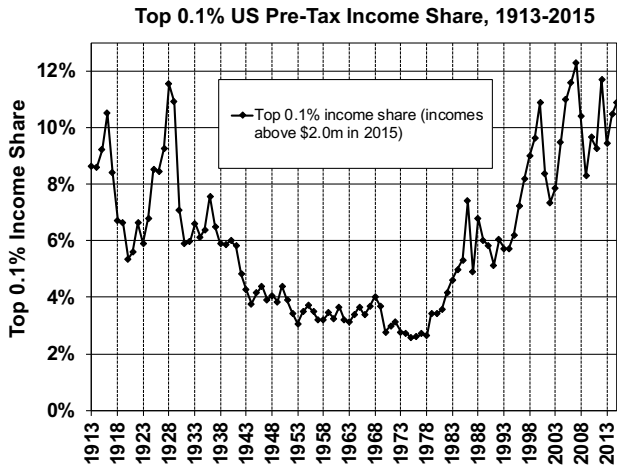


Average Real Wage Incomes: Top 1% and Bottom 99%



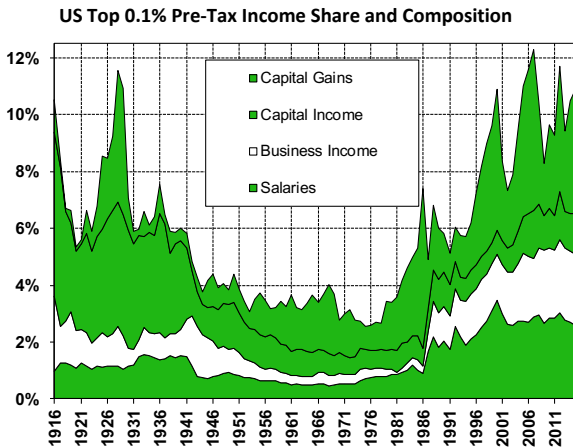
Piketty and Saez, 2003 (updated to 2015)

Top 0.1% Income Share, 1917 – 2015



Source: Piketty and Saez, 2003 updated to 2015. Series based on pre-tax cash market income including or excluding realized capital gains, and always excluding government transfers.

Top 0.1% Income Share, 1917 – 2015: Income Sources



Source: Piketty and Saez, 2003 updated to 2015. Series based on pre-tax cash market income including or excluding realized capital gains, and always excluding government transfers.

Top 1% Income Share: Anglophone Countries

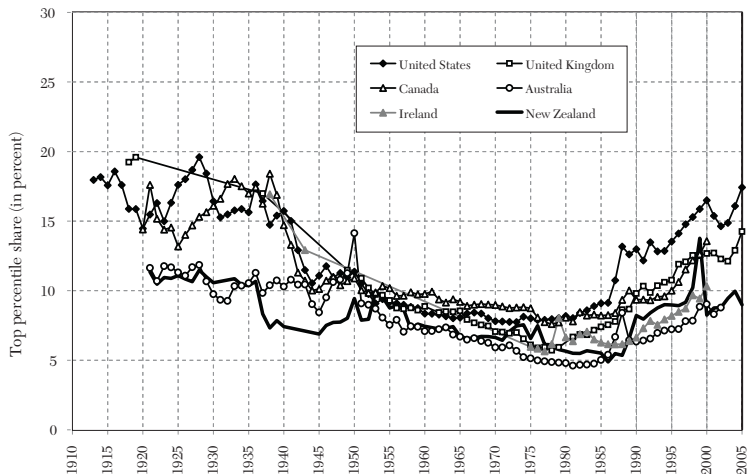


Figure 8. Top 1 Percent Share: English Speaking Countries (U-shaped), 1910–2005

Top 1% Income Share: Middle Europe and Japan

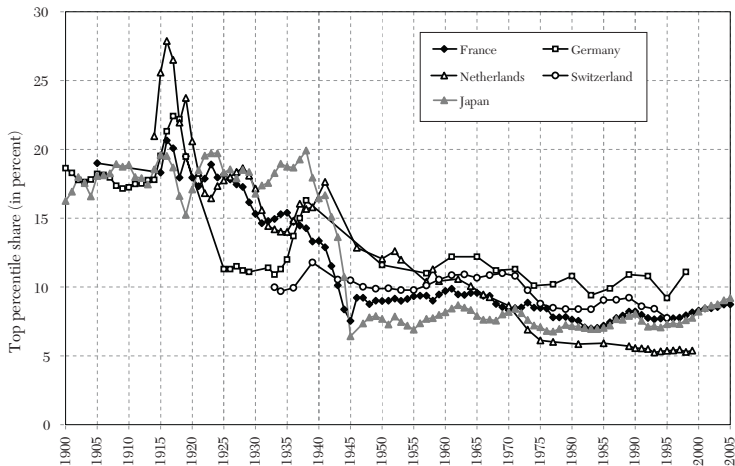


Figure 9. Top 1 Percent Share: Middle Europe and Japan (L-shaped), 1900–2005

Top 1% Income Share: Nordic Countries and Southern Europe

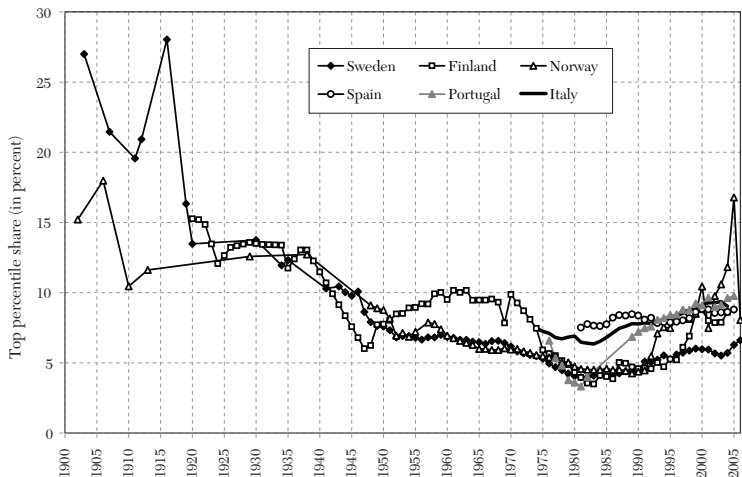


Figure 10. Top 1 Percent Share: Nordic and Southern Europe (U/L-shaped), 1900–2006

Top 1% Income Share: Developing Countries

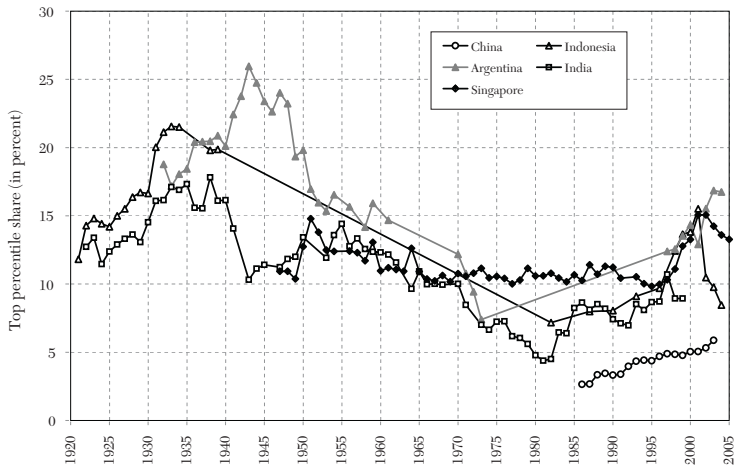


Figure 11. Top 1 Percent Share: Developing Countries, 1920–2005

Adding Capital Gains: US, Canada, Spain, Sweden and Finland

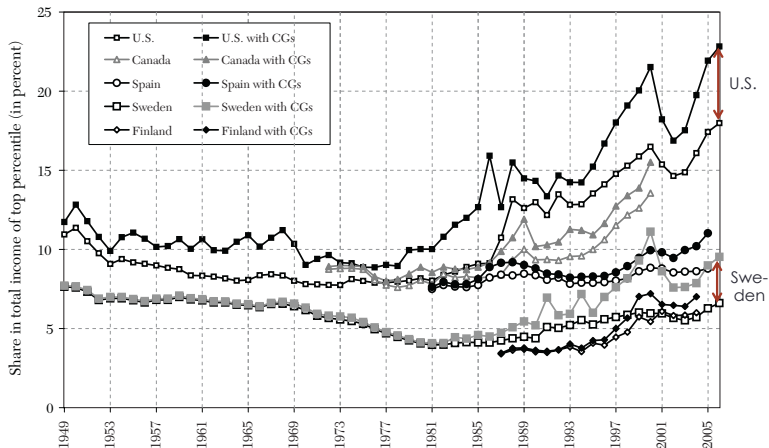
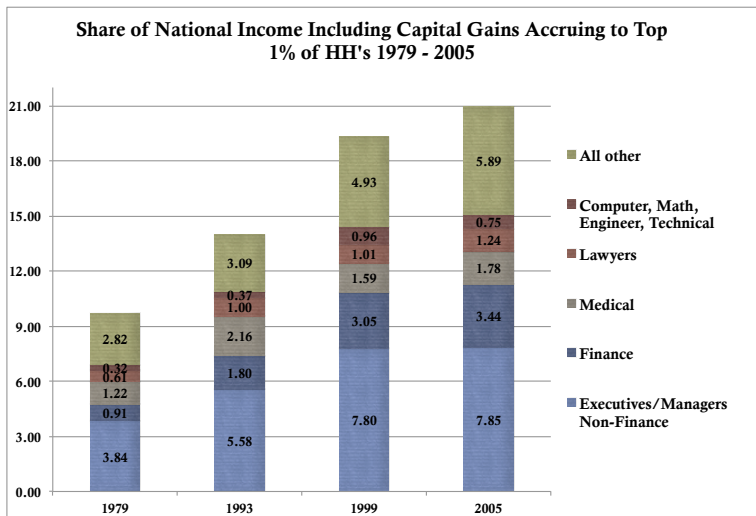
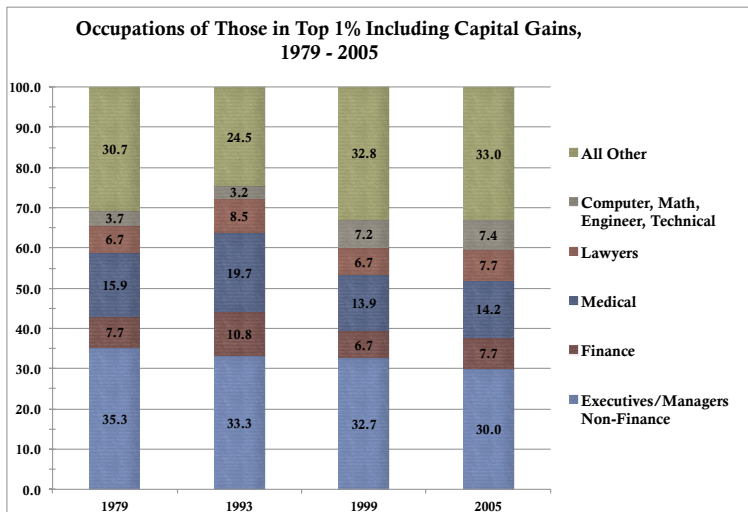


Figure 7. Effect of Capital Gains on Share of Top Percentile, 1949–2006

Occupations and National Income Shares of Top 1 Percent of Households, 1979 – 2005



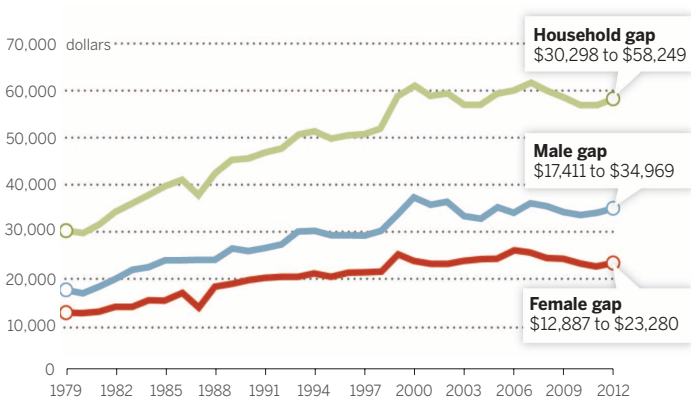
Occupations of the Top 1 Percent of U.S. Households, 1979 – 2005



Median Earnings Gap Between College & High School Grads Roughly Doubles between 1979 and 2012

College/high school median annual earnings gap, 1979–2012

In constant 2012 dollars



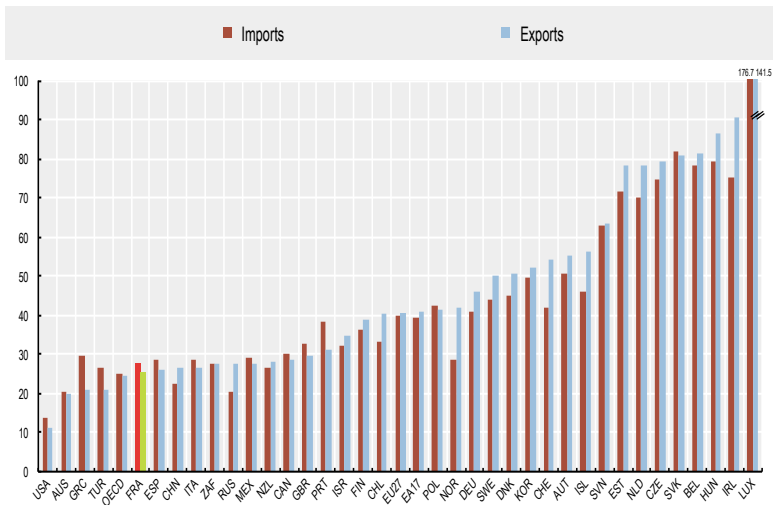
Agenda

- 1 Incomes: Levels, Growth, Inequality**
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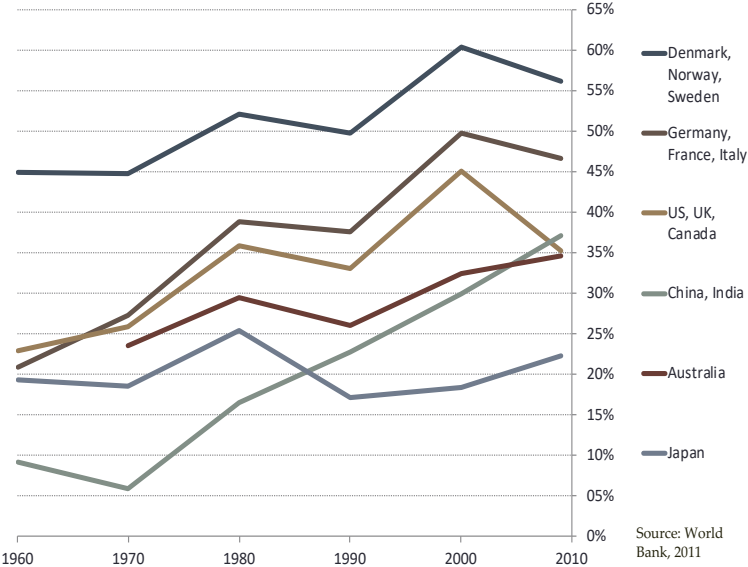
Small Economies Trade More as Share of GDP

International imports and exports in goods and services

As percentage of GDP, 2010 or latest available year



Merchandise Trade to GDP 1960 – 2009: Rising

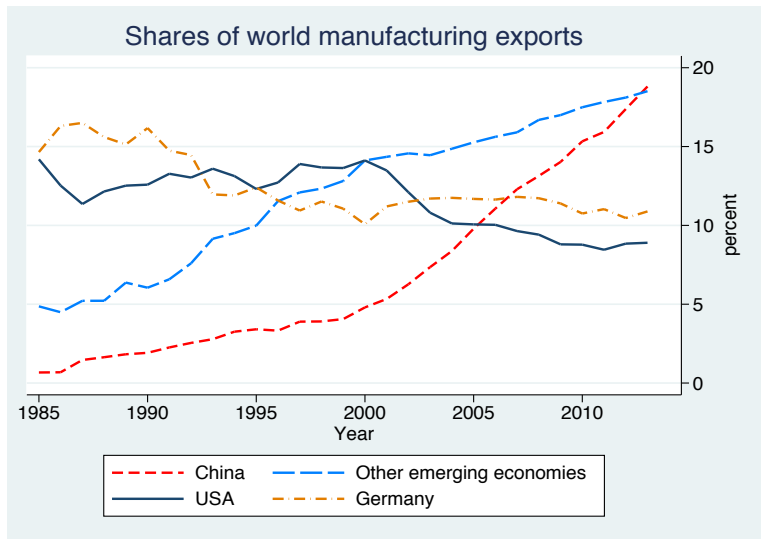


Rise of Middle-Income Countries in World Trade

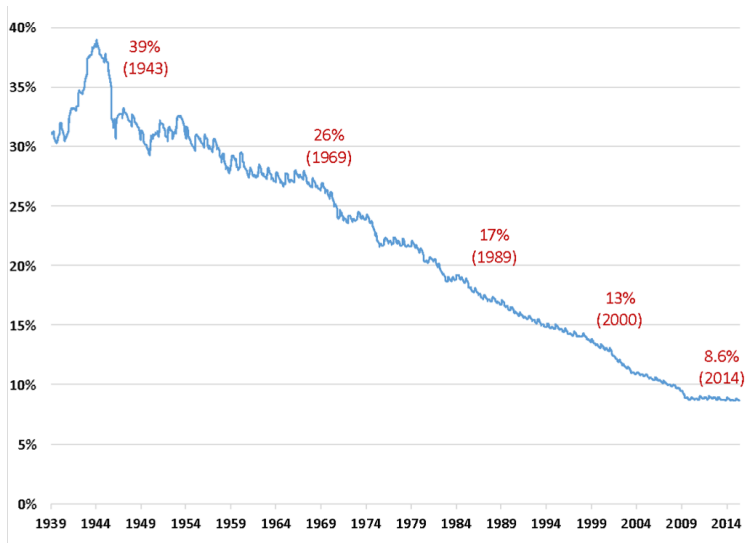
Exports and Imports Relative to GDP by Regional Trading Partner

Region	Trade partner	Exports to partner relative to regional GDP			Imports from partner relative to regional GDP		
		1994	2008	Percentage point change	1994	2008	Percentage point change
Low-income countries	Low-income countries	0.8%	3.2%	2.4	0.8%	3.2%	2.4
	Middle-income countries	4.5%	11.6%	7.1	6.0%	17.1%	11.1
	China, India	1.1%	8.3%	7.2	1.8%	10.7%	8.9
	High-income countries	20.0%	31.8%	11.8	15.1%	23.0%	7.9
	World	26.3%	55.0%	28.6	23.7%	54.0%	30.4
Mid-income countries	Low-income countries	0.7%	2.1%	1.4	0.5%	1.4%	0.9
	Middle-income countries	5.3%	15.6%	10.3	5.3%	15.6%	10.3
	China, India	2.2%	7.5%	5.3	2.4%	7.4%	5.0
	High-income countries	16.9%	29.6%	12.7	18.6%	26.0%	7.4
	World	25.1%	54.8%	29.8	26.8%	50.4%	23.6
China and India	Low-income countries	0.8%	2.7%	1.9	0.5%	2.1%	1.6
	Middle-income countries	9.5%	15.2%	5.7	8.6%	15.4%	6.8
	China, India	0.1%	1.2%	1.1	0.1%	1.2%	1.1
	High-income countries	14.3%	25.3%	11.0	9.8%	14.1%	4.3
	World	24.8%	44.4%	19.6	19.0%	32.7%	13.7
High-income countries	Low-income countries	0.3%	0.7%	0.4	0.5%	1.0%	0.5
	Middle-income countries	3.7%	6.6%	2.9	3.4%	7.5%	4.1
	China, India	0.5%	1.7%	1.2	0.7%	3.1%	2.4
	High-income countries	12.8%	16.9%	4.1	12.8%	16.9%	4.1
	World	17.4%	26.0%	8.6	17.4%	28.6%	11.2

China's Historic Rise as a World Manufacturing Power

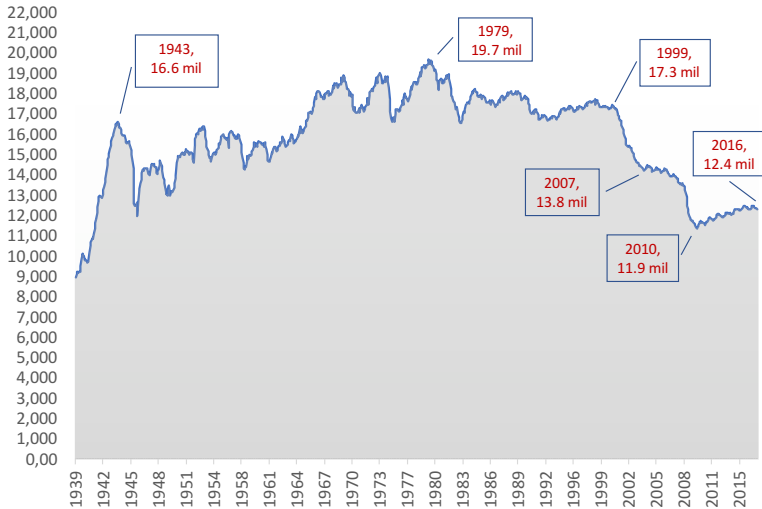


The Share of U.S. Employment in Manufacturing, 1939 – 2014



U.S. Manufacturing Employment Fell by 20% During 1999-2007, and by 32% During 1999-2016

U.S. Manufacturing Employment, 1939 - 2016 (1,000s)

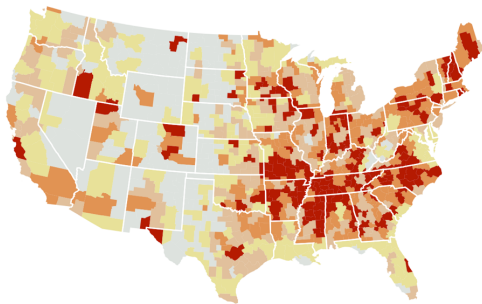


Unequal Gains: Parts of America Most Affected by China's Rising Manufacturing Prowess, 1990 – 2007

Most-affected areas of the U.S.

Colors show which areas were most affected by China's rise, based on the increase in Chinese imports per worker in each area from 1990 to 2007. Hovering over each area on the map will show a demographic breakdown of that area, below, and its most-affected industries, at right.

Most-affected 20% Second-highest 20% Middle 20% Second-lowest 20% Least-affected 20%



Most-affected industries

Most-affected industries, based on number of areas* Impact per worker†

Furniture and fixtures 196 areas \$44k

Games, toys, and children's vehicles 114 areas \$488k

Sporting and athletic goods 106 areas \$82k

Electronic components 87 areas \$65k

Plastics products 84 areas \$11k

Motor-vehicle parts and accessories 79 areas \$12k

Electronic computers 68 areas \$207k

Autor, Dorn, Hanson & Wall Street Journal, 2016

Regional Tariff Changes in Brazil 1990 - 1995

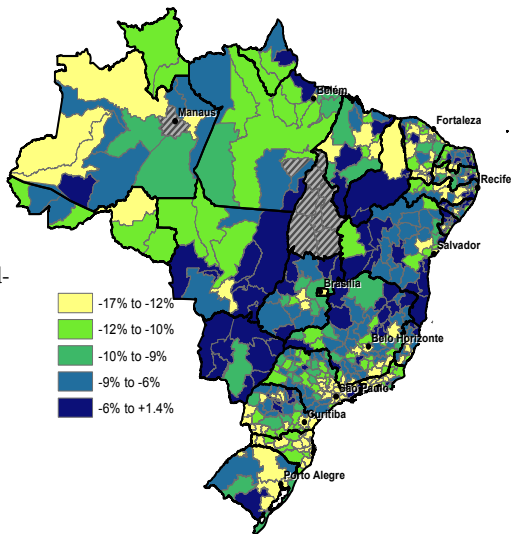
$$RTC_r = \sum_i \beta_{ri} d\ln(1 + \tau_i),$$

$$\beta_{ri} \equiv \frac{\lambda_{ri} \frac{1}{\varphi_i}}{\sum_j \lambda_{rj} \frac{1}{\varphi_j}}$$

τ_i is industry i 's tariff

λ_{ri} is i 's share of traded-sector employment in r

φ_i is one minus labor's share of VA in i

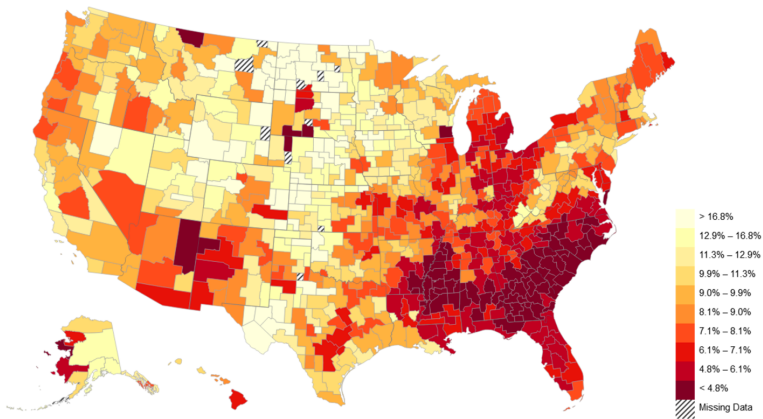


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The Geography of Upward Mobility in America

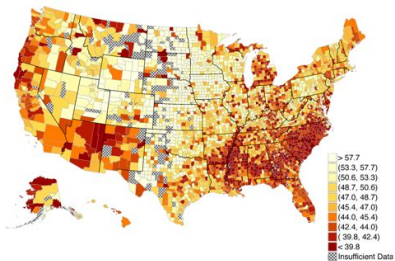
Children's Chances of Reaching Top 20% of Income Distribution Given Parents in Bottom 20%



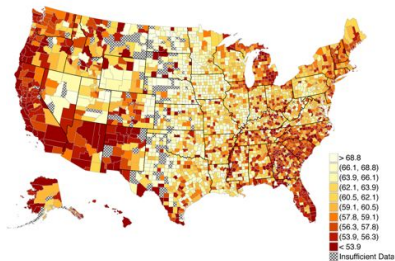
Chetty and Hendren, 2014

Children's Predicted Income Rank at Age 26 by Parents Income Percentile

C. For Children with Parent at the 25th Percentile (County)



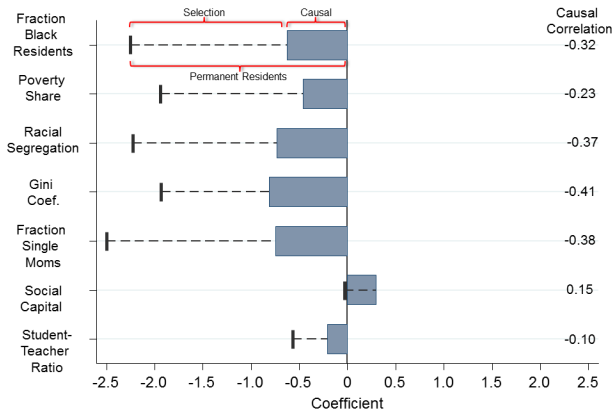
D. For Children with Parent at the 75th Percentile (County)



Chetty and Hendren 2018

'Causal Effects' of Place on Children of 25th Pctile HH's

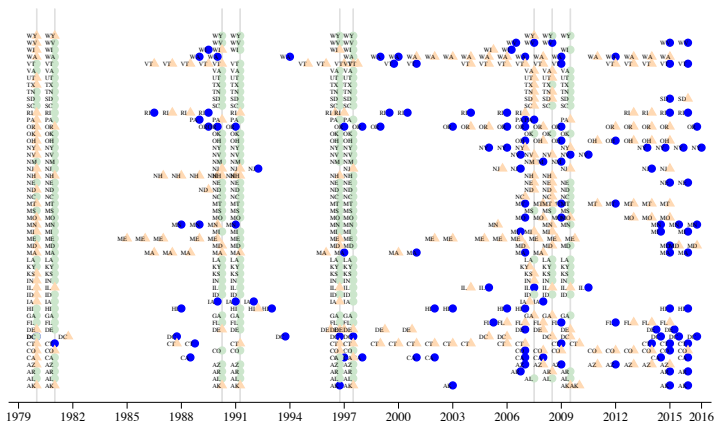
B. At the County Level; within CZs



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Minimum Wage Increases Between 1979 and 2016



Notes: The figure shows all MW increases between 1979 and 2016. There are a total of 516 minimum wage events used in estimating equation 4; the partially transparent orange triangles highlight small minimum wage changes where minimum wage increased less than \$0.25 (the size of our wage bins) or where less than 2 percent of the workforce earned between the new and the old minimum wage. The green circles indicate federal changes, which we exclude from our primary sample of treatments because the change in missing number of jobs, Δb , is only identified from time-series variation for these events as there are no “control states” with wage floors lower than the new minimum wage (see the text for details).

Minimum Wage Has Gone from Highly Binding to Irrelevant to Binding

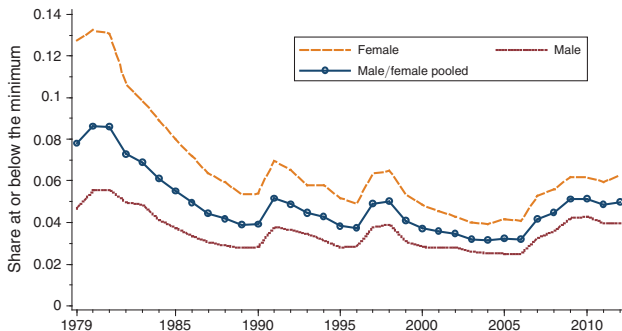


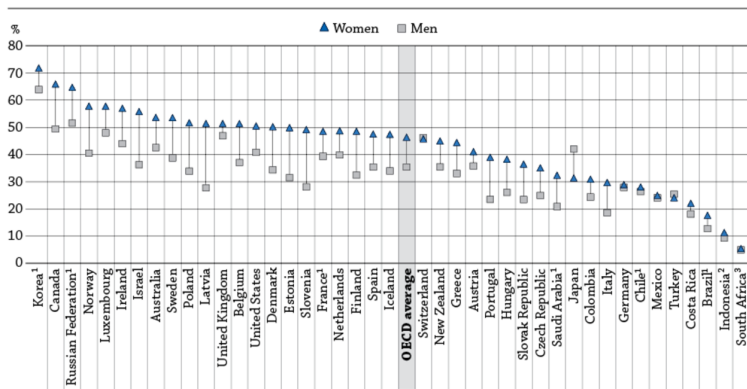
FIGURE 2. SHARE OF HOURS AT OR BELOW THE MINIMUM WAGE

Notes: The figure plots estimates of the share of hours worked for reported wages equal to or less than the applicable state or federal minimum wage, corresponding with data from columns 4 and 8 of Tables 1A and 1B.

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Percentage of 25-34 Year-Olds Who Have Attained Tertiary Education, by Gender (2014)



1. Brazil, Chile, France, Korea, Russian Federation, Saudi Arabia: Year of reference 2013.

2. Indonesia: Year of reference 2011.

3. South Africa: Year of reference 2012.

Countries are ranked in descending order of the percentage of women who attained tertiary education.

Years of Completed Schooling by Birth Cohort and Sex, 1876 - 1975

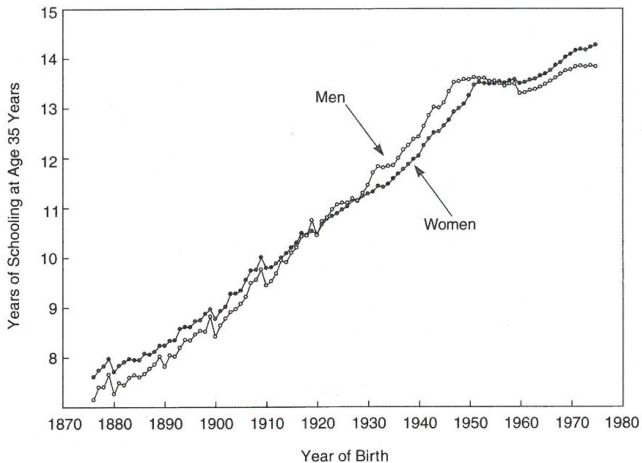
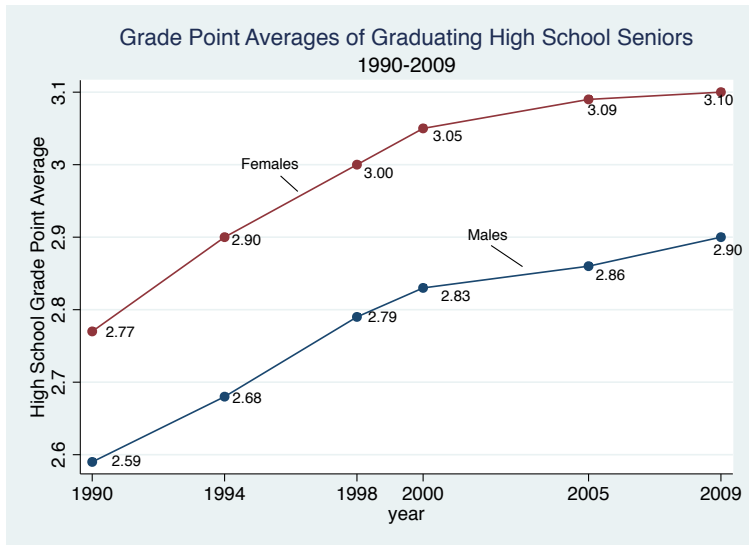
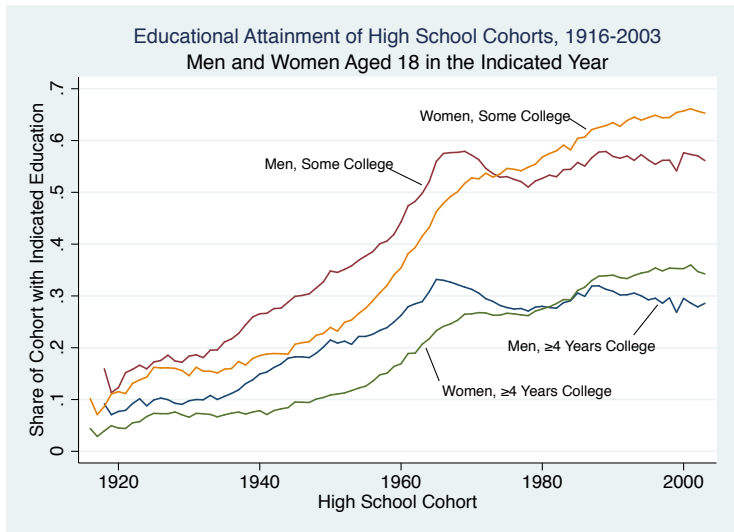


Figure 1.5. Years of Schooling by Birth Cohorts, U.S. Native-Born, by Sex: 1876 to 1975. This figure plots the mean years of completed schooling for U.S. native-born residents by birth cohort and sex, adjusted to age 35 using the approach described in the notes to Figure 1.4. Sources: 1940 to 2000 IPUMS.

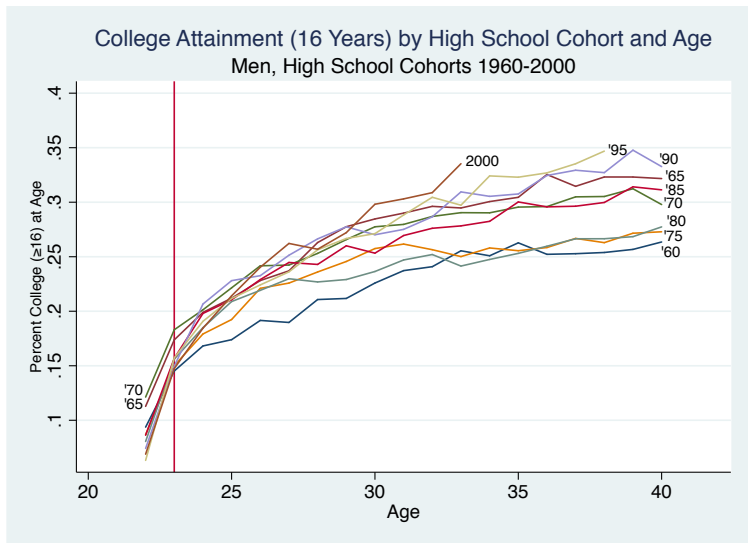
U.S. Women are Better Students than U.S. Men



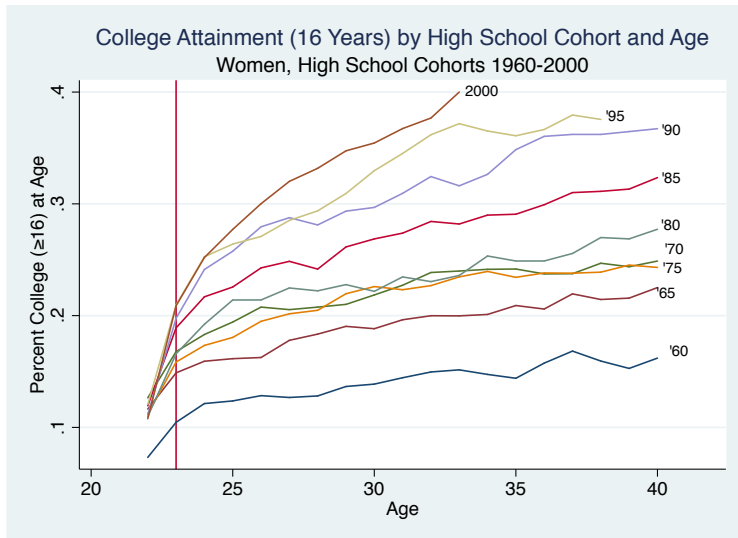
Educational Attainment by High School Graduates: Cohorts Completing High School 1916 – 2003



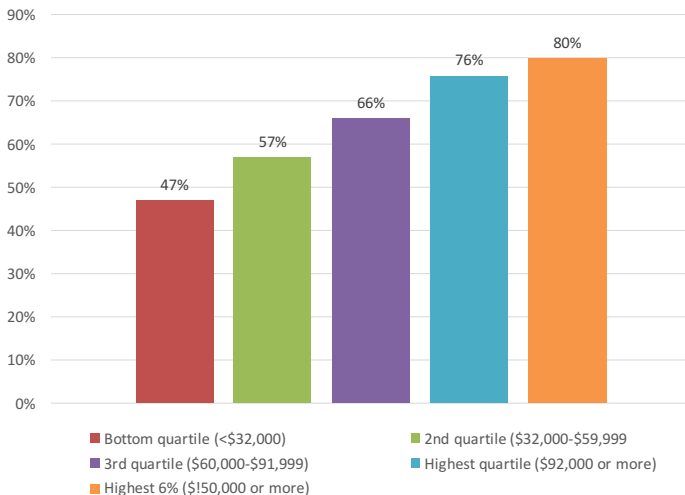
U.S. Men's College Attainment: Not Much Happening



U.S. Women's College Attainment: Big Gains



Failure to Launch: BA Attainment for Students Enrolling in a 4-Year College in 2003/04 by Family Income Quartile



National Center for Education Statistics, Beginning Postsecondary Students Longitudinal Study

14.662 requirements

Requirements

- 1 Weekly readings/comments
- 2 Four p-sets
- 3 Two research proposals
- 4 Final/general
- 5 Class participation