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Is College Still Worth It?
The New Calculus of Falling Returns

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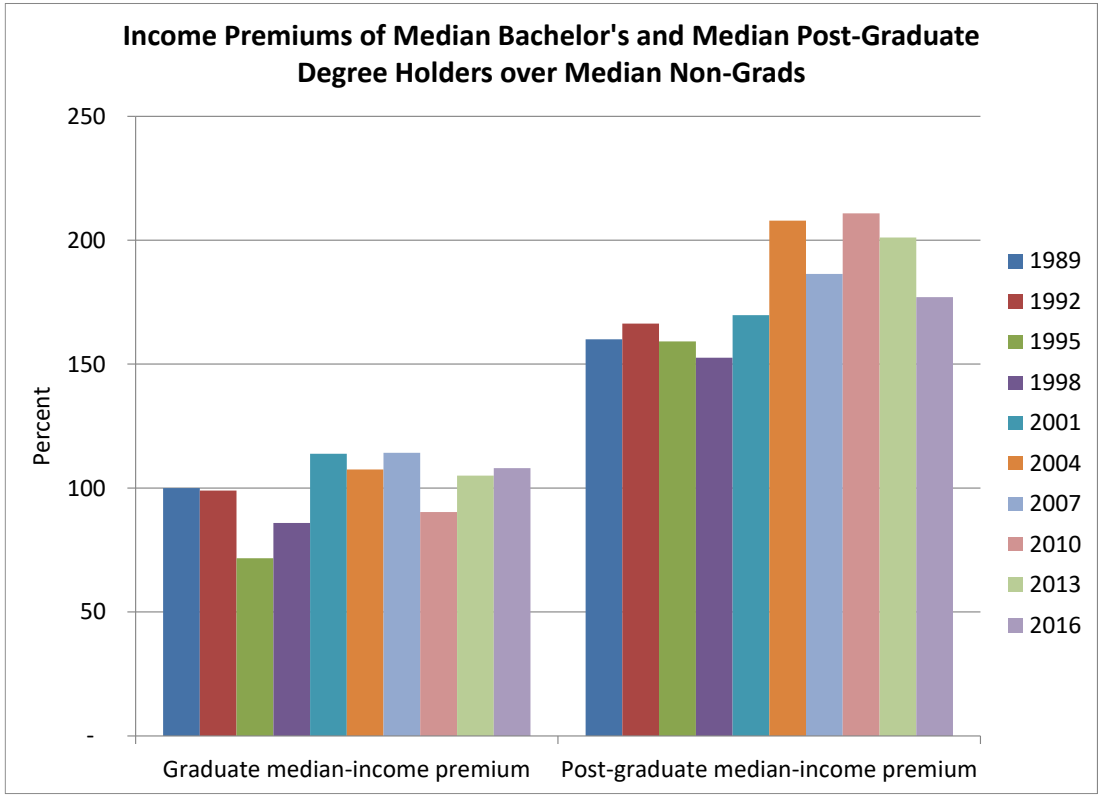
*These are our views alone and not necessarily those of the Federal Reserve Bank of St. Louis or the Federal Reserve System.

Is College Still Worth It?
The New Calculus of Falling Returns

- Pooled aggregate Survey of Consumer Finances (SCF) data show large and increasing college income and wealth premiums.
- Matching 4-year & post-grad degree holding families to non-grad families of same race/ethnicity & birth cohort weakens income, *eliminates* wealth premium for non-white 1980s cohort.
- New SCF data suggest that a substantial part of even our small premiums are spurious, due to inherited characteristics.
- Declining college wealth premiums may be due to luck of your birth year (asset prices); financial liberalization; rising college costs.

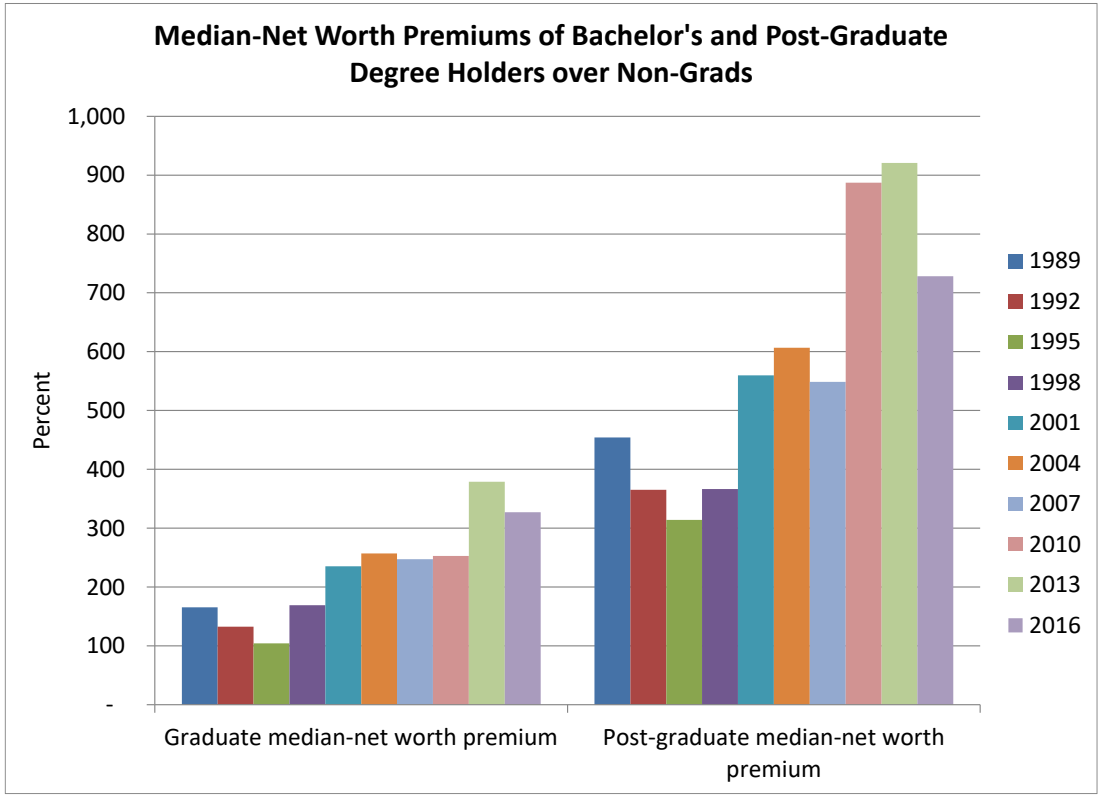
Pooled SCF Data: Large and Growing College Premiums

Income



Terminal bachelor's degree | **Post-graduate degree**

Wealth



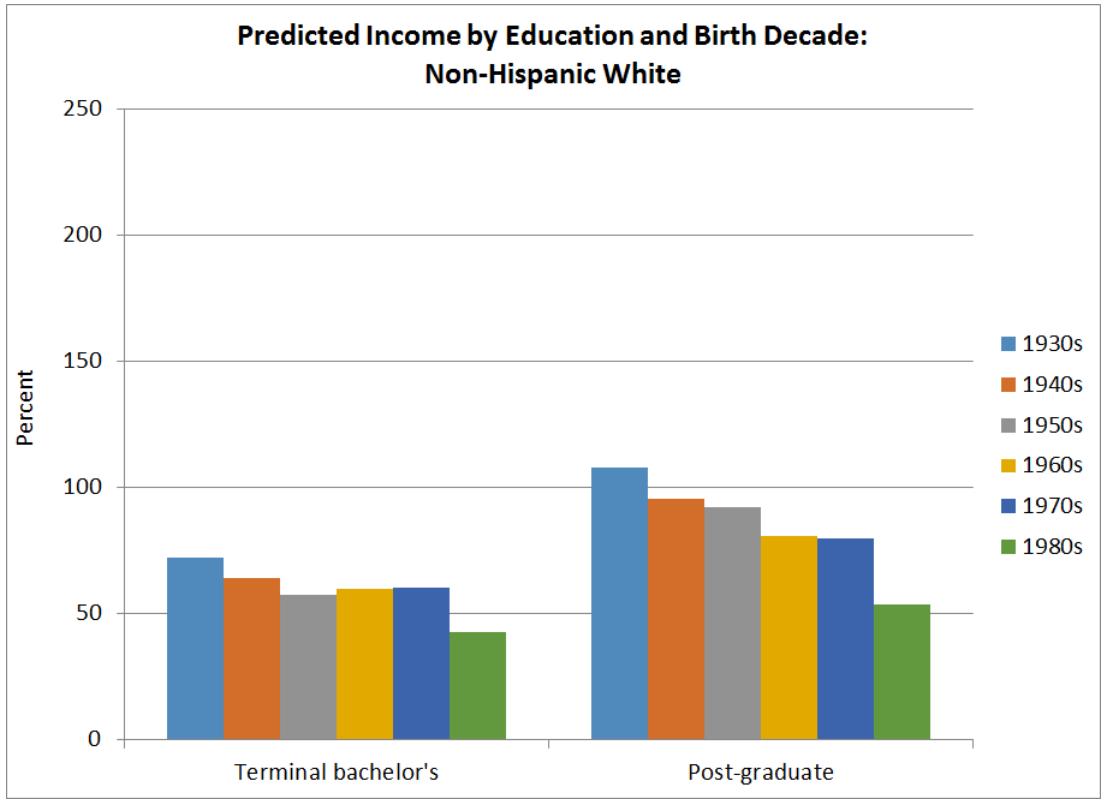
Terminal bachelor's degree | **Post-graduate degree**

Includes SCF families of all races and ethnicities, all ages and all birth years.

Our Estimates: Small, Shrinking College Premiums

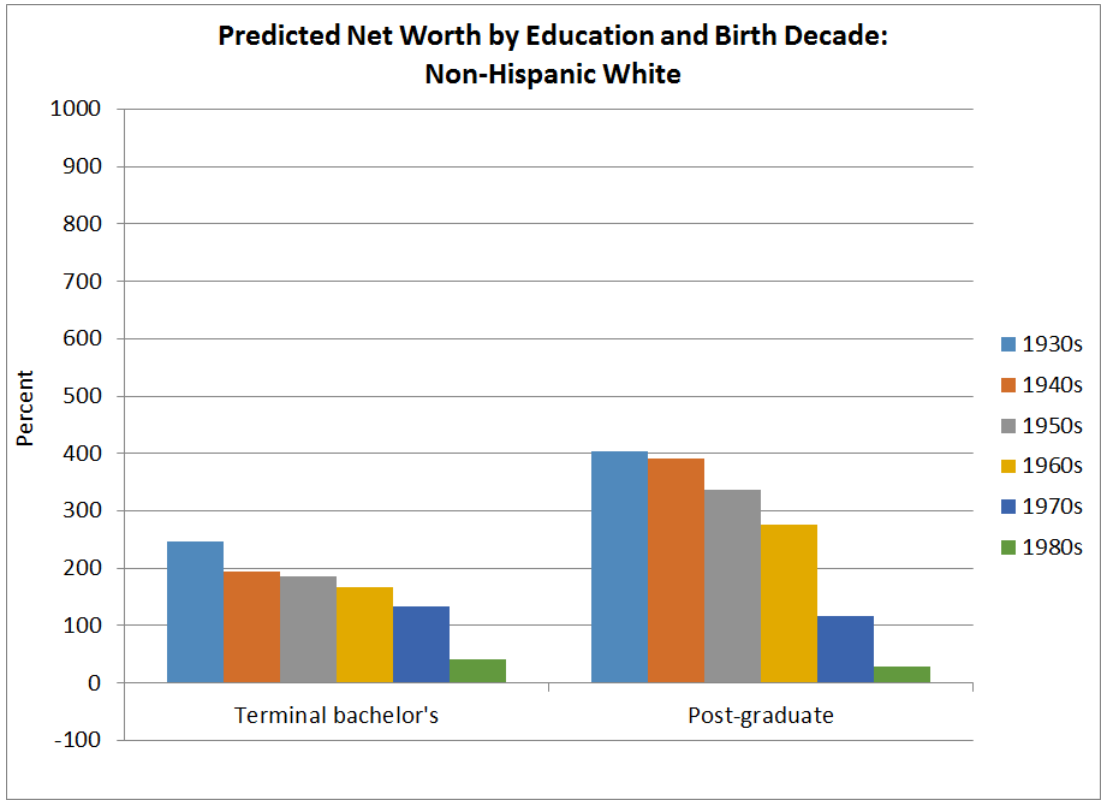
Non-Hispanic White

Income



Terminal bachelor's degree | **Post-graduate degree**

Wealth



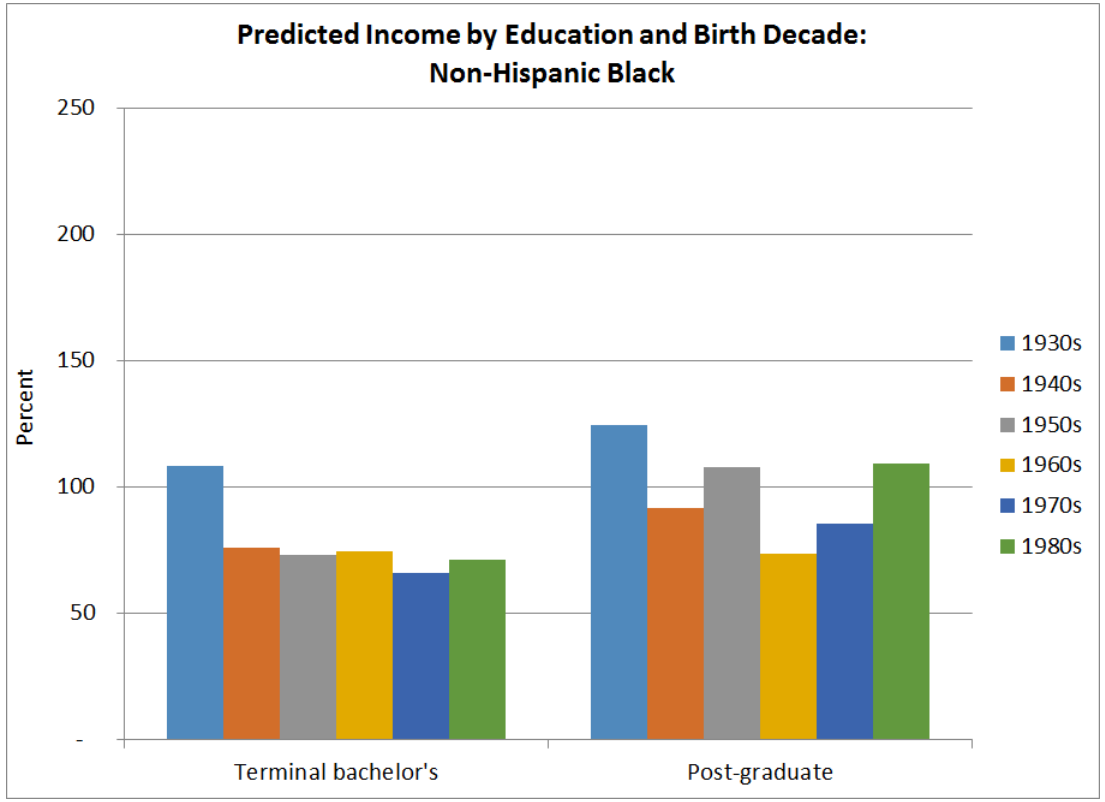
Terminal bachelor's degree | **Post-graduate degree**

Model includes SCF families of a particular race or ethnicity adjusted for family size and life cycle.

Our Estimates: Small, Shrinking College Premiums

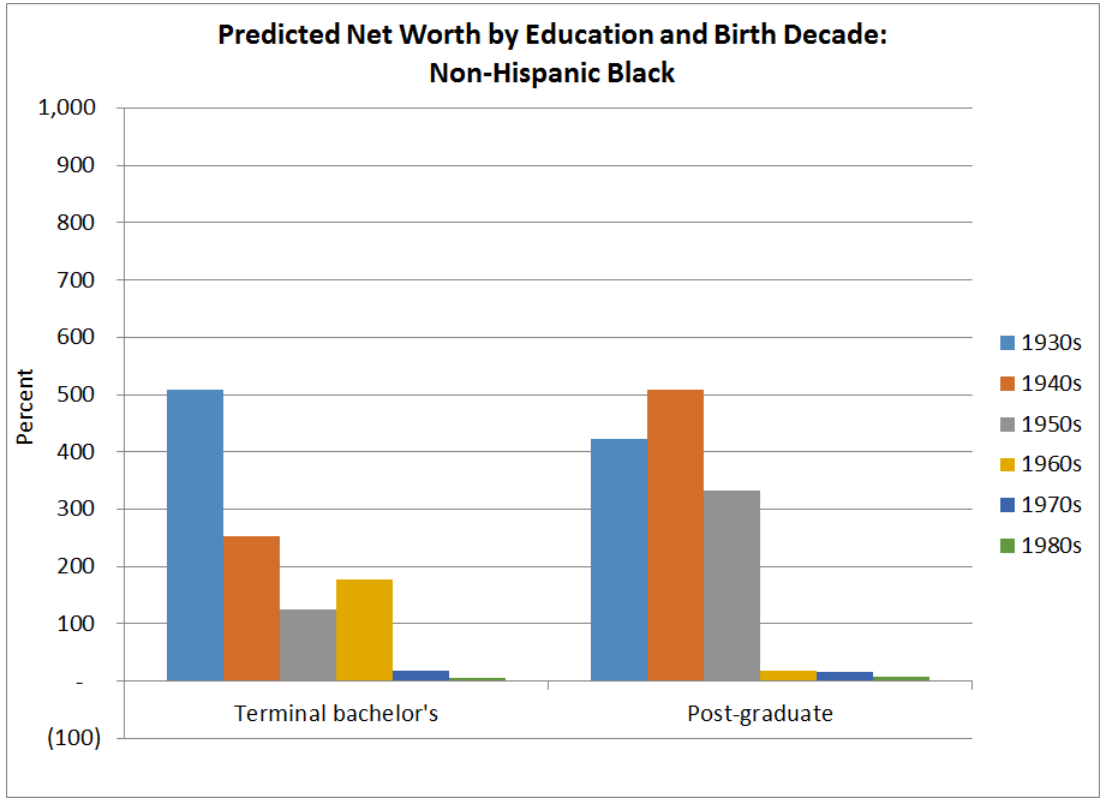
Non-Hispanic Black

Income



Terminal bachelor's degree | **Post-graduate degree**

Wealth



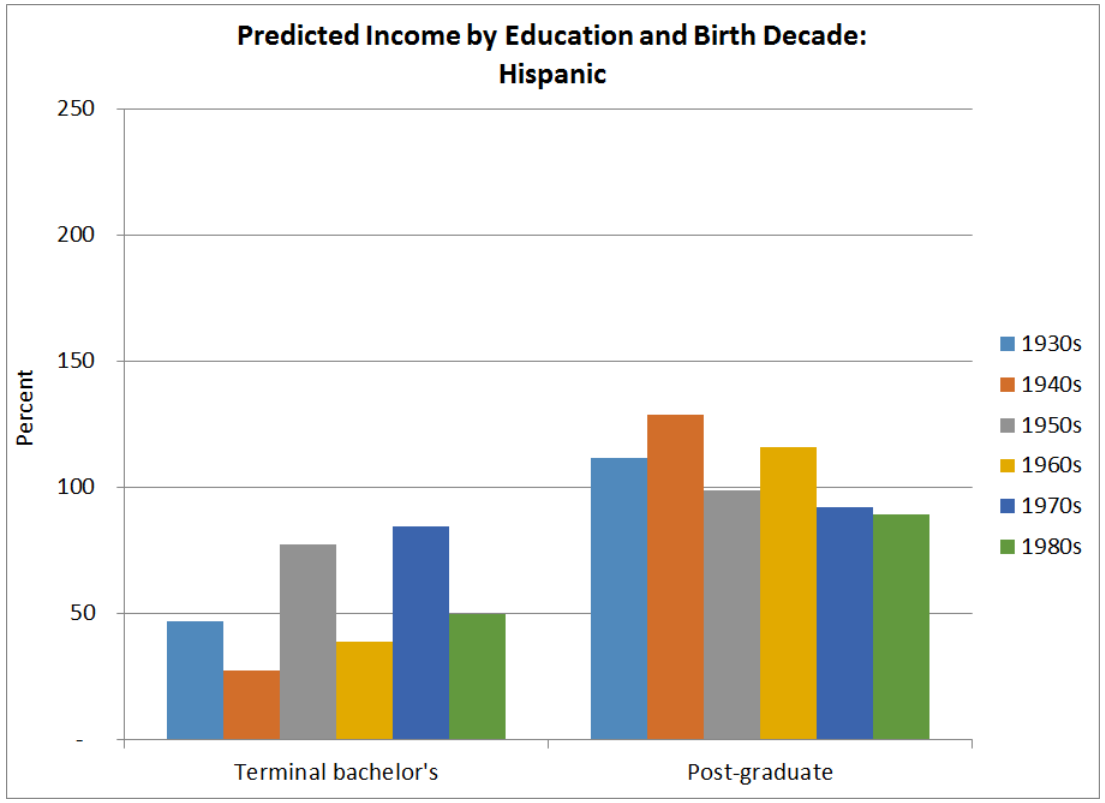
Terminal bachelor's degree | **Post-graduate degree**

Model includes SCF families of a particular race or ethnicity adjusted for family size and life cycle.

Our Estimates: Small, Shrinking College Premiums

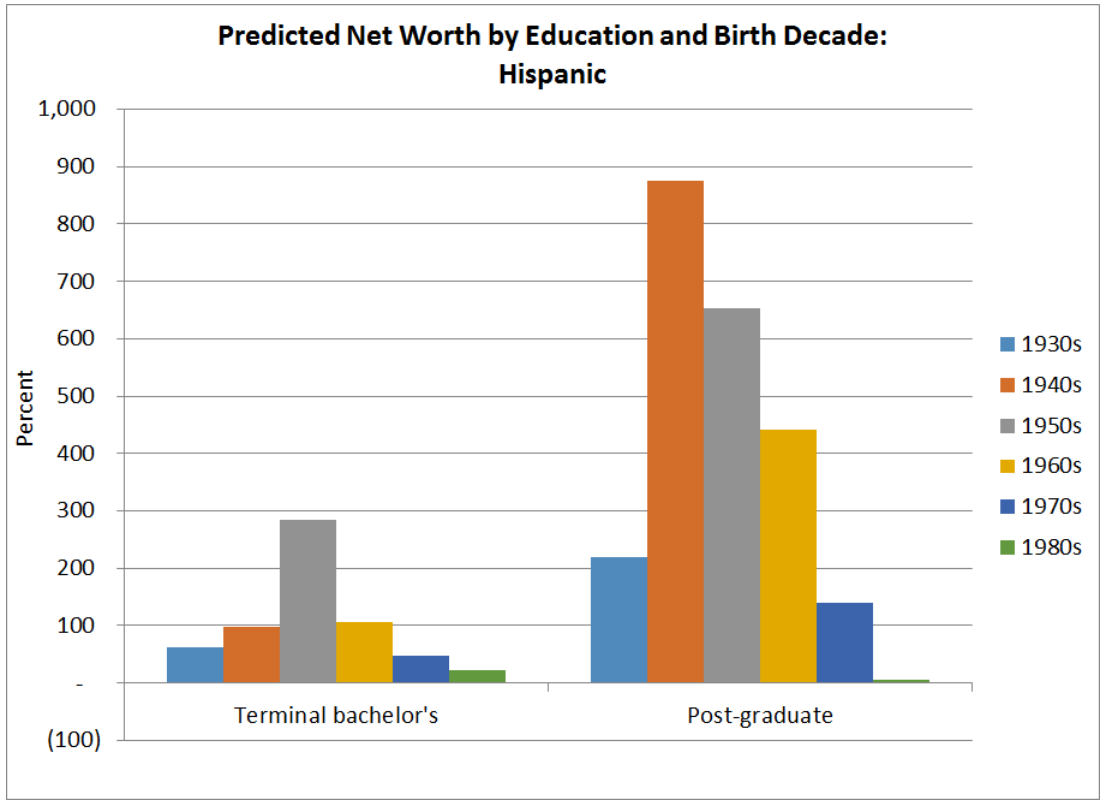
Hispanic of Any Race

Income



Terminal bachelor's degree | **Post-graduate degree**

Wealth



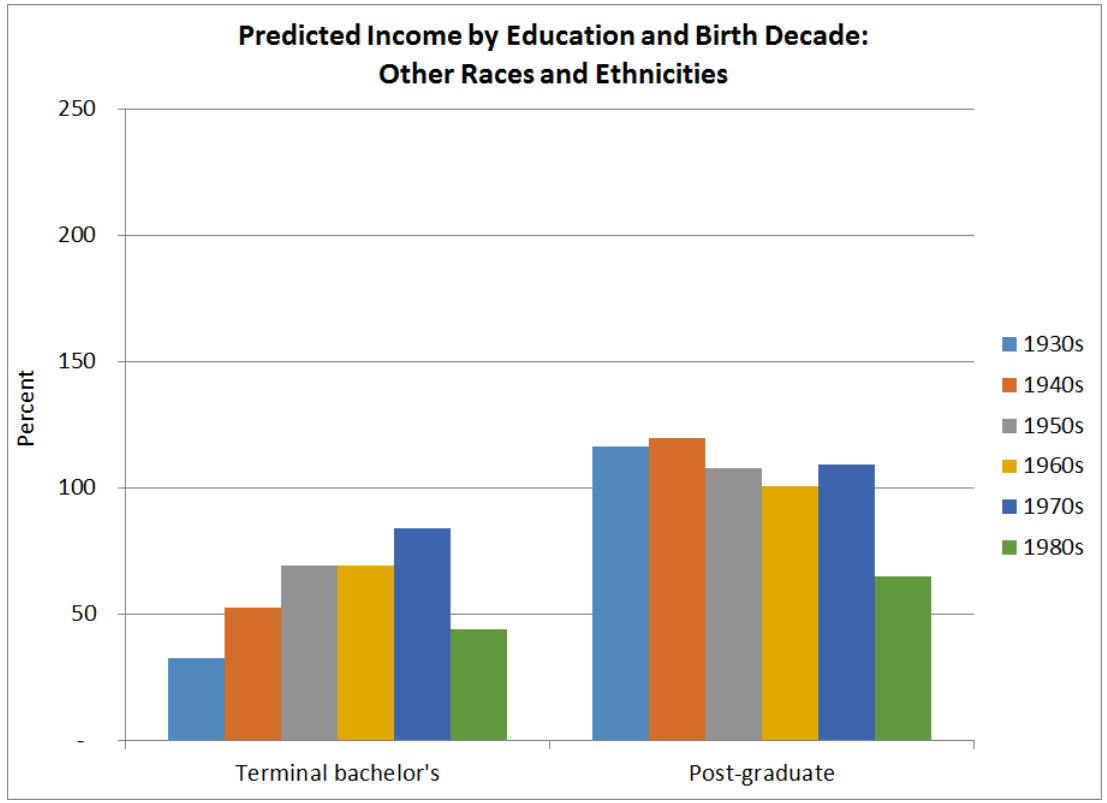
Terminal bachelor's degree | **Post-graduate degree**

Model includes SCF families of a particular race or ethnicity adjusted for family size and life cycle.

Our Estimates: Small, Shrinking College Premiums

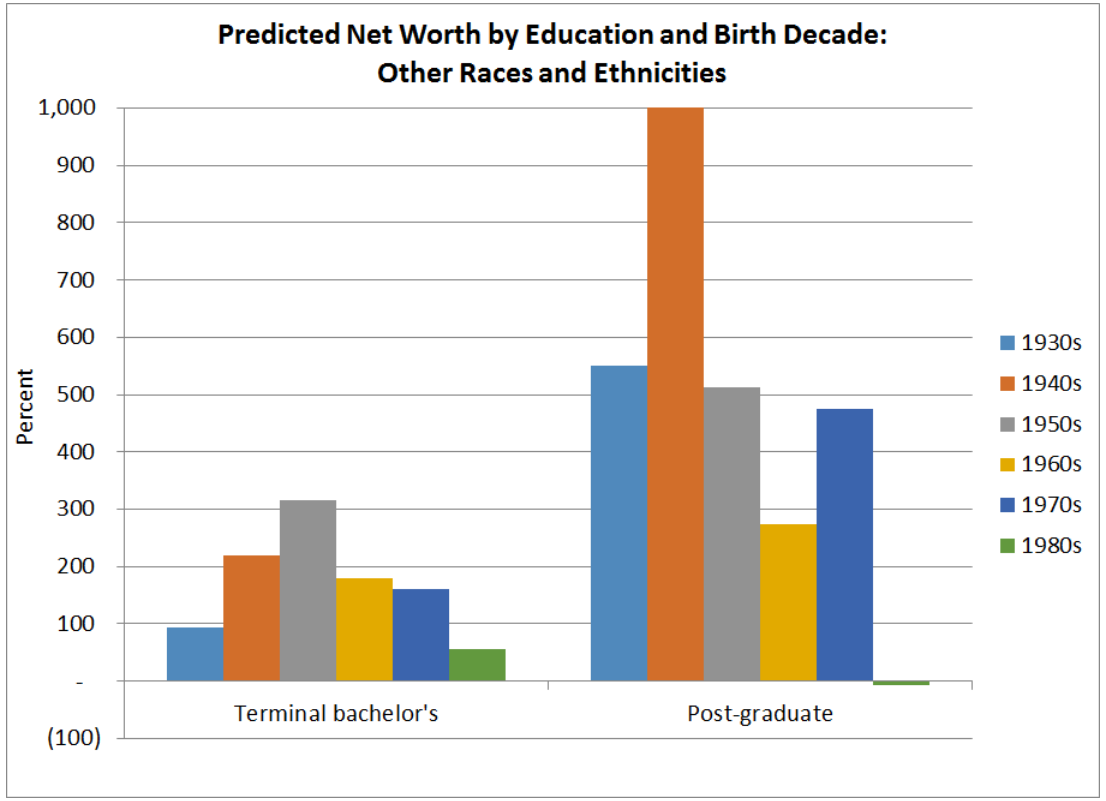
All Other Races and Ethnicities Including More than One

Income



Terminal bachelor's degree | **Post-graduate degree**

Wealth



Terminal bachelor's degree | **Post-graduate degree**

Model includes SCF families of a particular race or ethnicity adjusted for family size and life cycle.

Estimating College Income and Wealth Premiums

- Pooled Federal Reserve Survey of Consumer Finances (SCF) data, 1989-2016 (N = 47,776 families).
- Split the sample into four: 1) non-Hispanic white; 2) non-Hispanic African-American or black; 3) Hispanic of any race; 4) all other races and ethnicities, including more than one.
- Family classified by survey respondent's first identification.
- Divide family income/family wealth by square root of family size.
- Extract the average life-cycle component of income (wealth) using Age, Age Squared and Age Cubed.

Estimating College Income and Wealth Premiums

- Education of respondent: Binary variables for terminal bachelor's degree or post-graduate degree; excluded category is families without at least a four-year college degree.
- Birth year of respondent: Decadal cohort binary variables for 1930s, 1940s, 1950s, 1960s, 1970s, 1980, all other birth years; omitting binary variables sequentially across six specifications.
- Interaction terms (Education x Birth decade) to capture possible changes in income or wealth returns to education over time.
- Transformed to Log(Income) and Inverse Hyperbolic Sine(NW)

The Transformations and Estimating Equations

Usual income adjusted for family size $$U_i = \frac{u_i}{\sqrt{H_i}}$$

Log of size-adjusted usual income is a function of age, education, birth cohort and E x BC interactions.

$$\ln(U_i) = \beta_0 + \beta_1 A_i + \beta_2 A_i^2 + \beta_3 A_i^3 + \beta_4 G_i + \beta_5 P_i + \beta_6 C_{i,1} + \cdots + \beta_{6+k-1} C_{i,k-1} + \beta_{6+k} C_{i,1} * G_i + \cdots + \beta_{6+2k-1} C_{i,k-1} + \beta_{6+2k} C_{i,1} * P_i + \cdots + \beta_{6+3k-1} C_{i,k-1} + \varepsilon$$

Net worth (wealth) adjusted for family size $$W_i = \frac{w_i}{\sqrt{H_i}}$$

Inverse Hyperbolic Sine (IHS) of adjusted NW $$sinh^{-1}(\theta W_i) = \ln\left[\theta W_i + \left(\theta^2 W_i^2 + 1\right)^{\frac{1}{2}}\right]/\theta$$

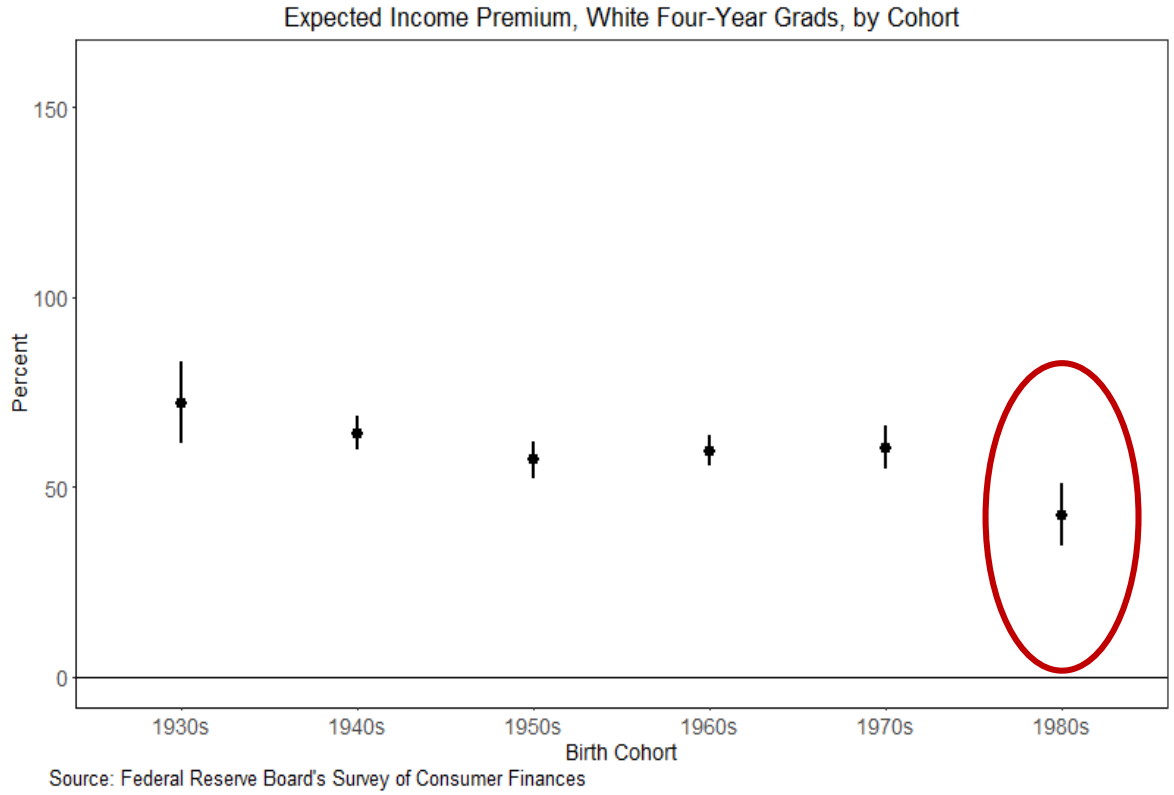
IHS of size-adjusted net worth is a function of age, education, birth cohort and E x BC interactions.

$$\mathrm{IHS}(W_i) = \beta_0 + \beta_1 A_i + \beta_2 A_i^2 + \beta_3 A_i^3 + \beta_4 G_i + \beta_5 P_i + \beta_6 C_{i,1} + \cdots + \beta_{6+k-1} C_{i,k-1} + \beta_{6+k} C_{i,1} * G_i + \cdots + \beta_{6+2k-1} C_{i,k-1} + \beta_{6+2k} C_{i,1} * P_i + \cdots + \beta_{6+3k-1} C_{i,k-1} + \varepsilon$$

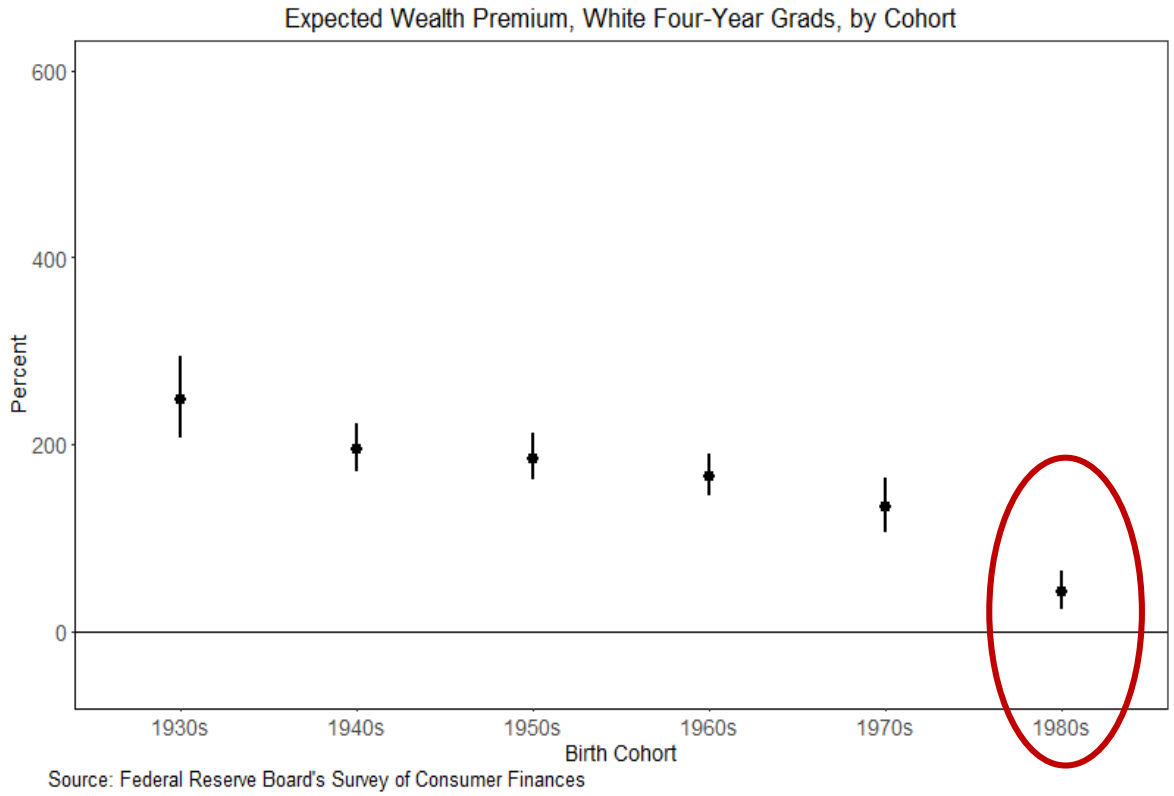
White Bachelor's Premiums: Weak for 1980s Cohort

Non-Hispanic White

Income



Wealth

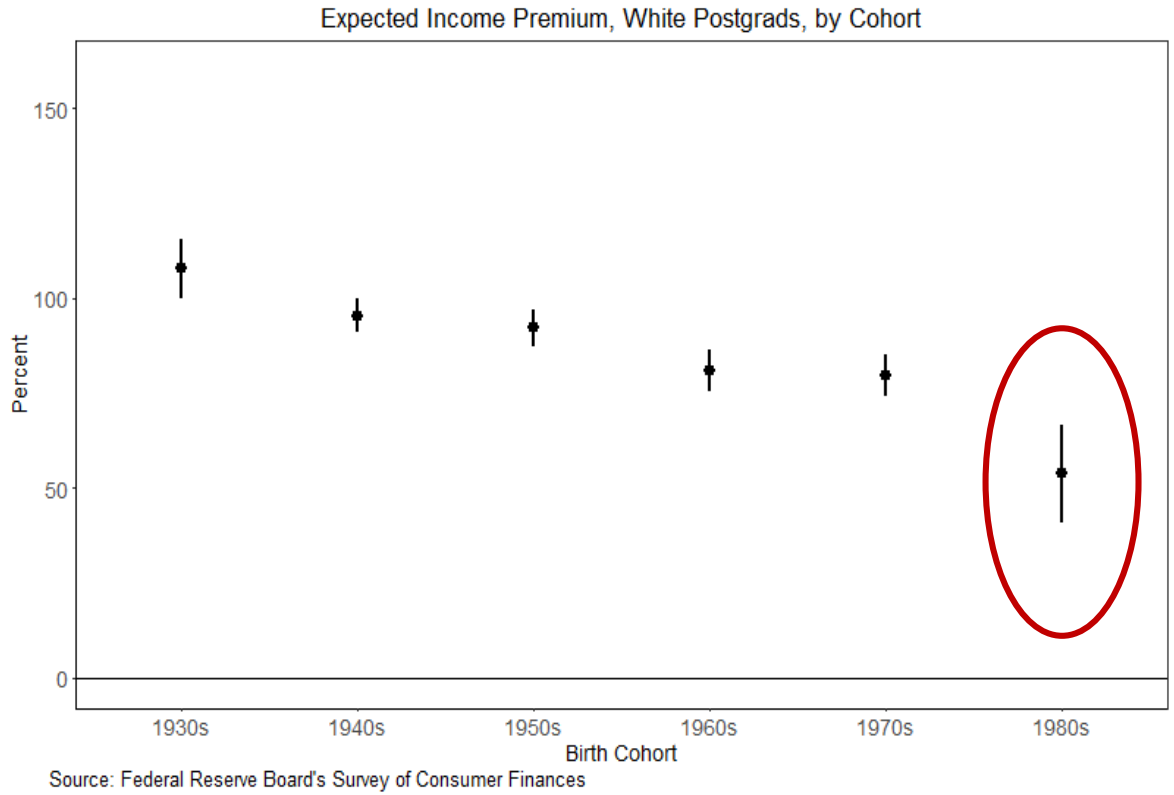


Model includes SCF families of a particular race or ethnicity adjusted for family size and life cycle.

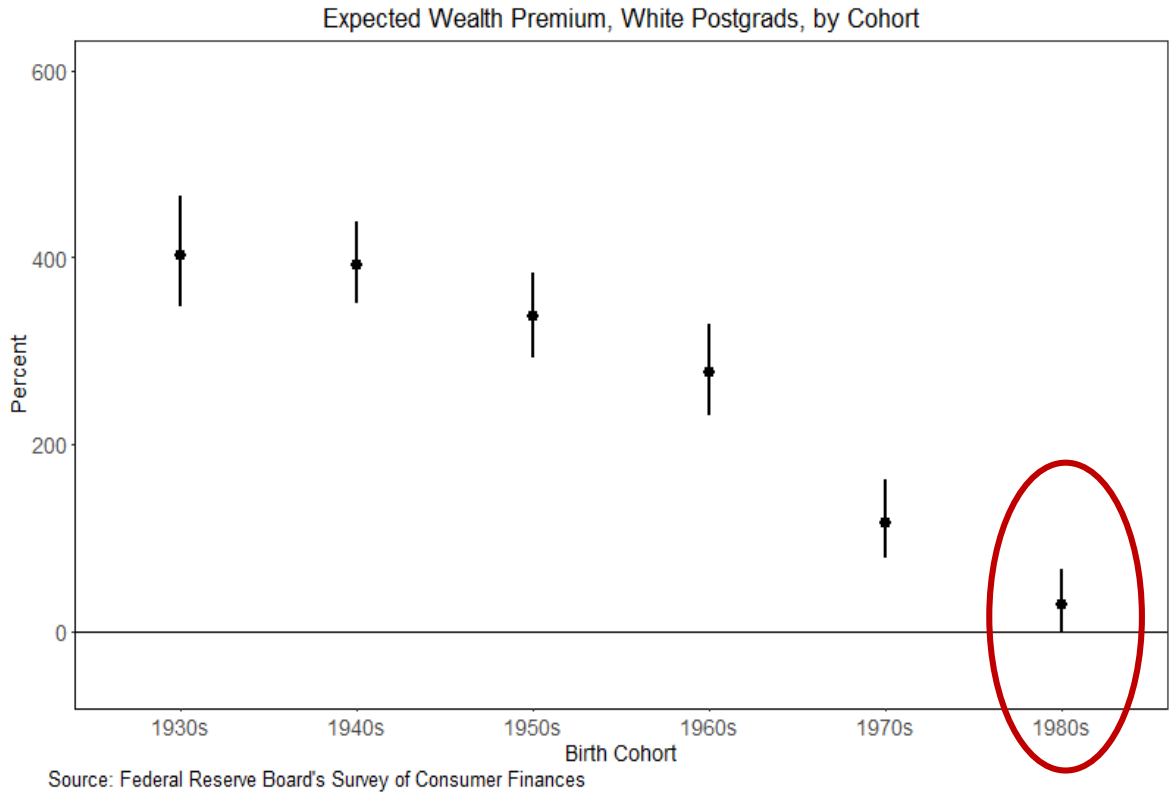
White Post-Grad Premiums: Weak for 1980s Cohort

Non-Hispanic White

Income



Wealth

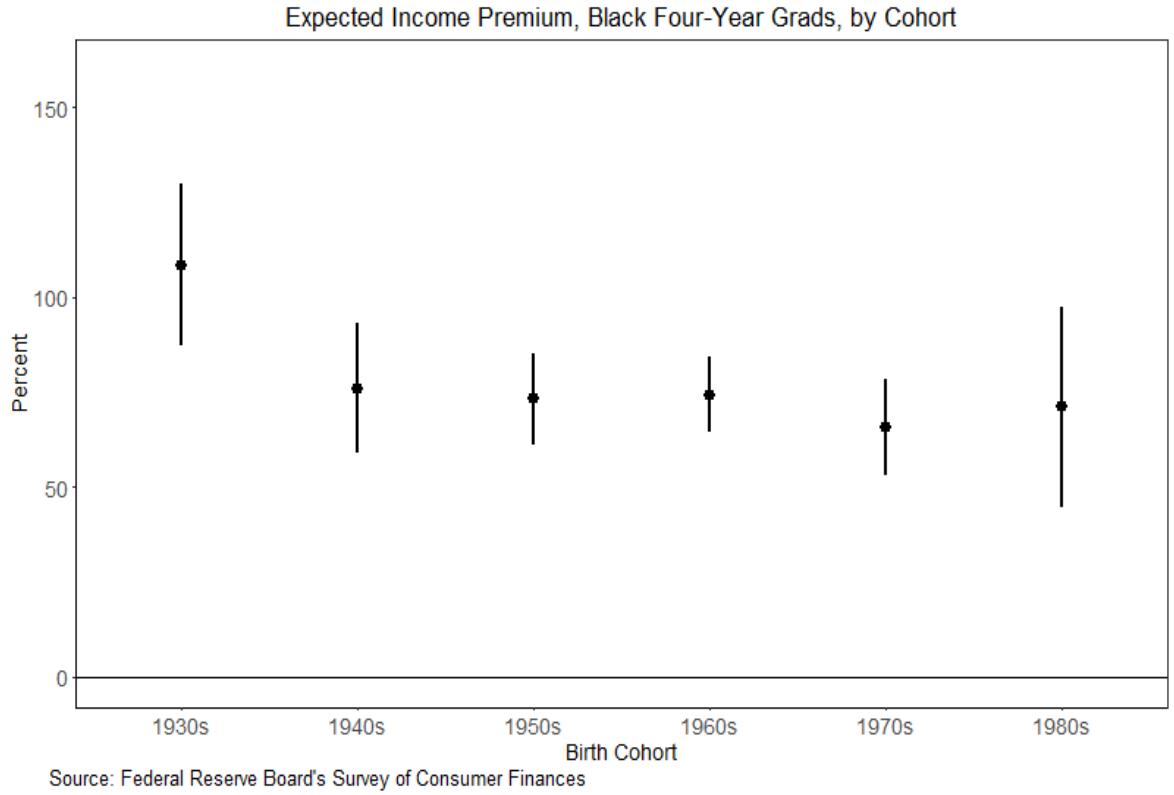


Model includes SCF families of a particular race or ethnicity adjusted for family size and life cycle.

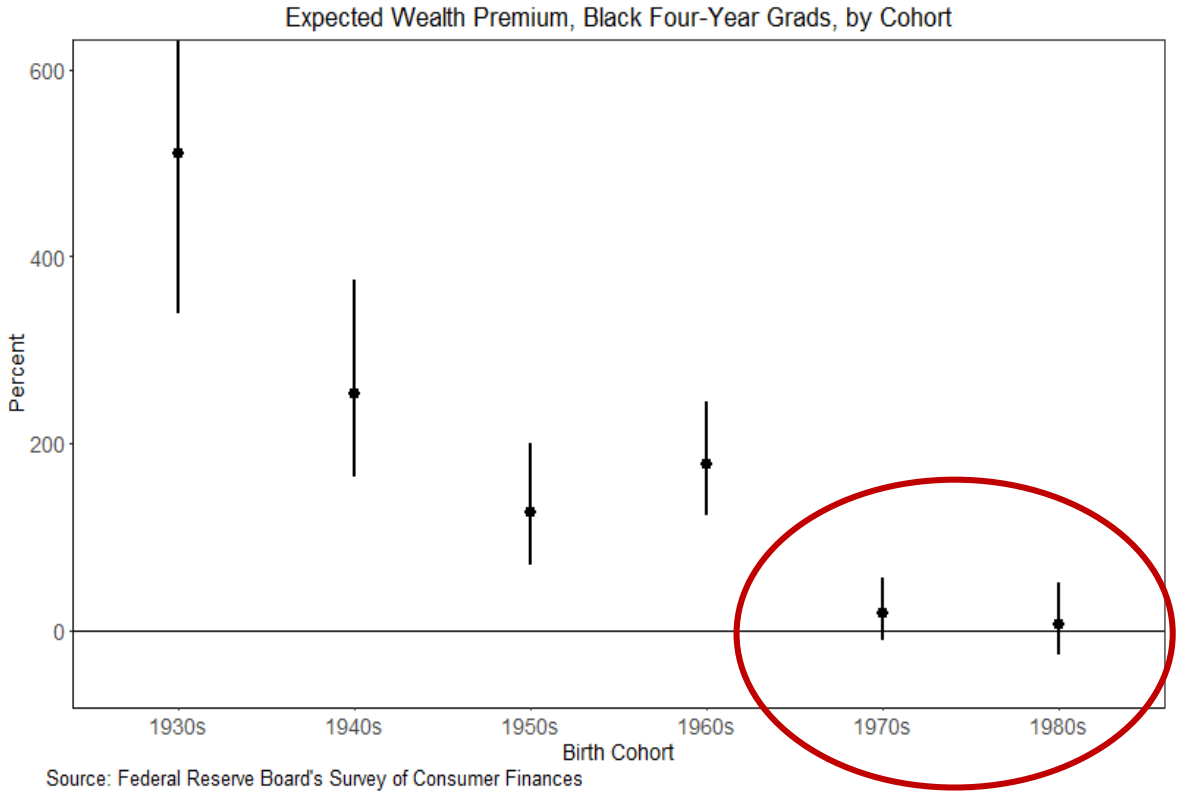
Black Bachelor's Wealth Premiums: Indistinguishable from Zero for 1970s & 1980s Cohorts

Non-Hispanic Black

Income



Wealth

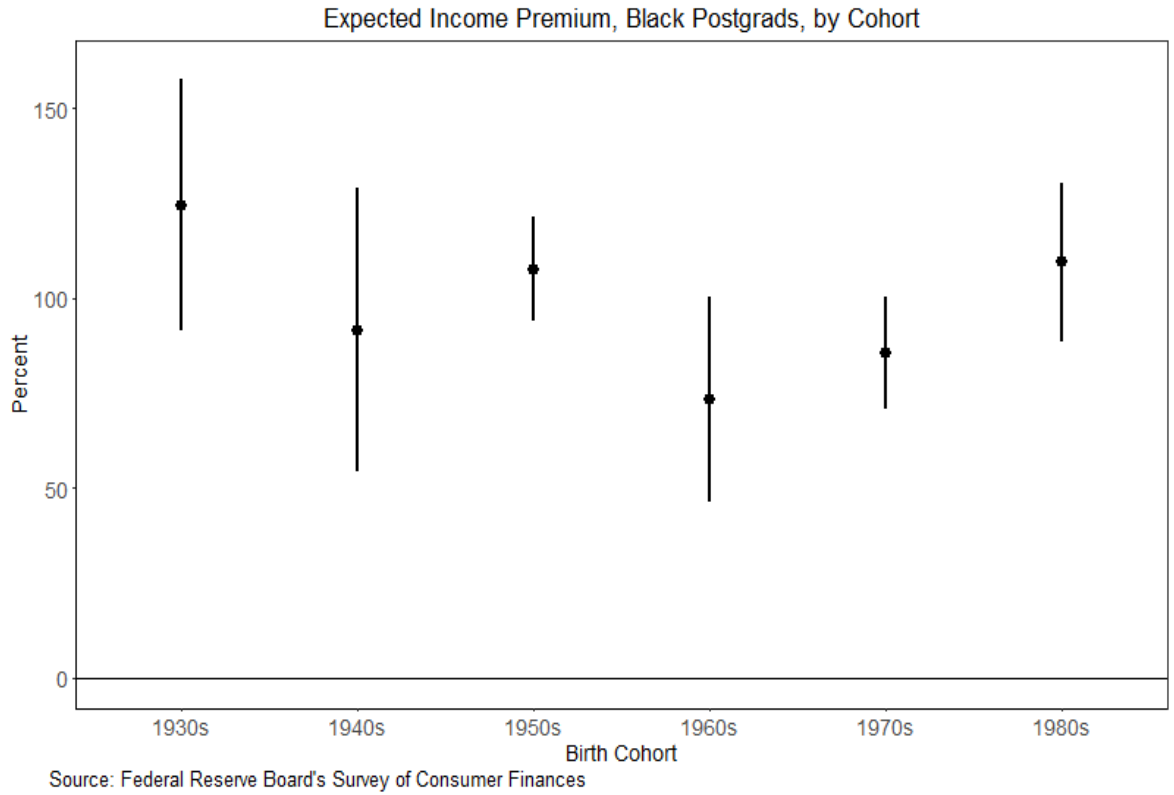


Model includes SCF families of a particular race or ethnicity adjusted for family size and life cycle.

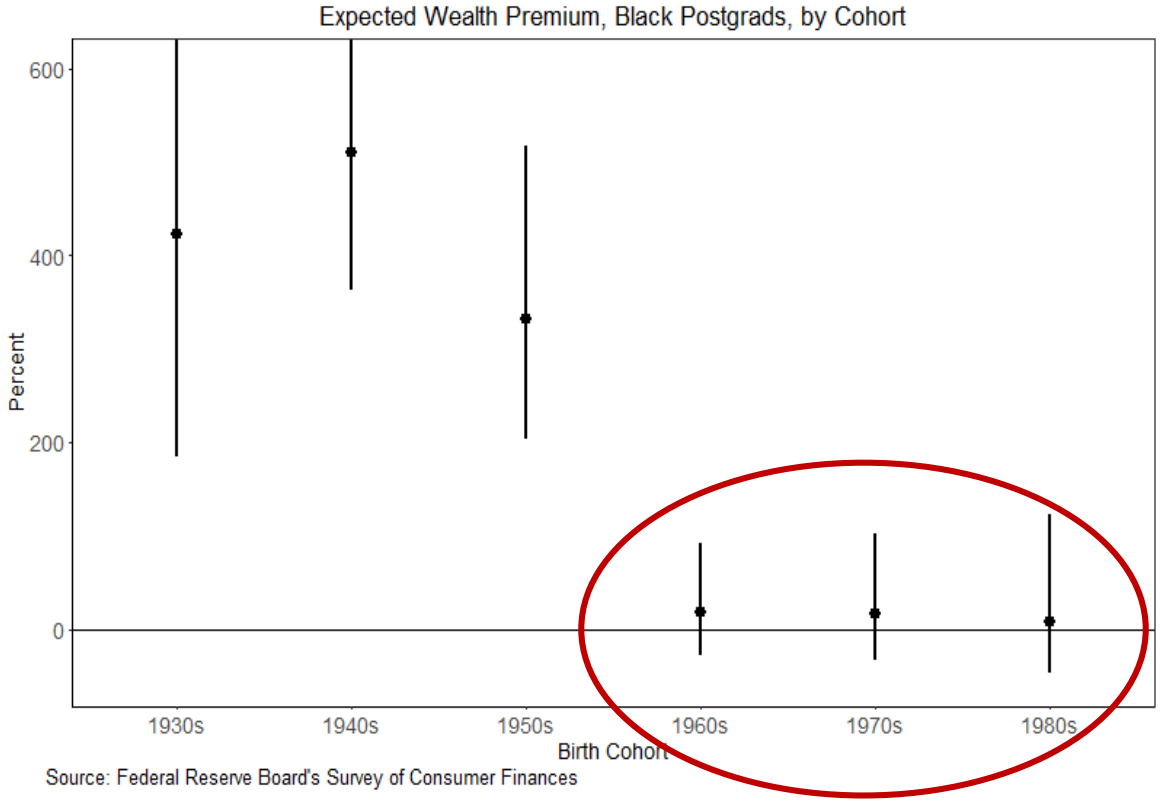
Black Post-Graduate Wealth Premiums: Indistinguishable from Zero for 1960s, 1970s, 1980s

Non-Hispanic Black

Income

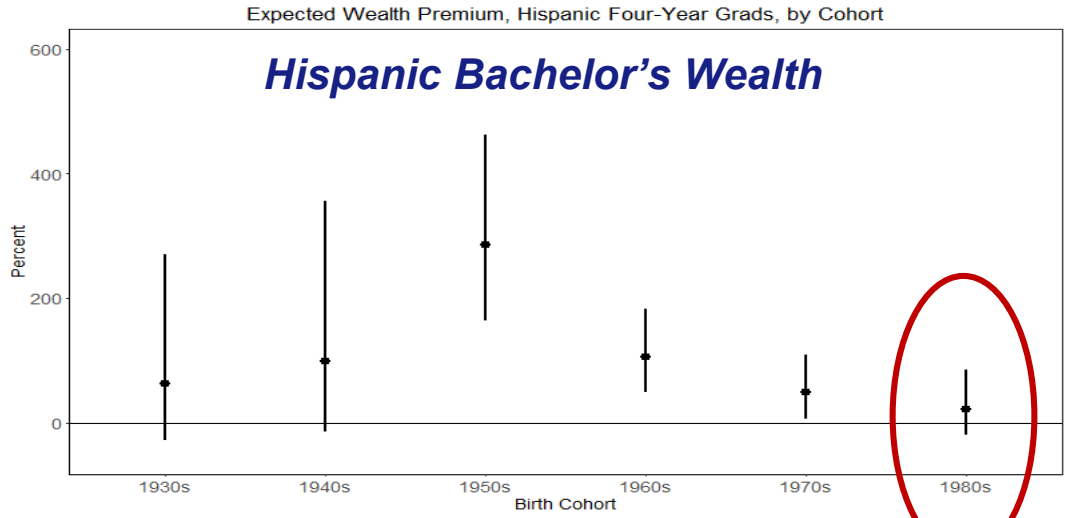


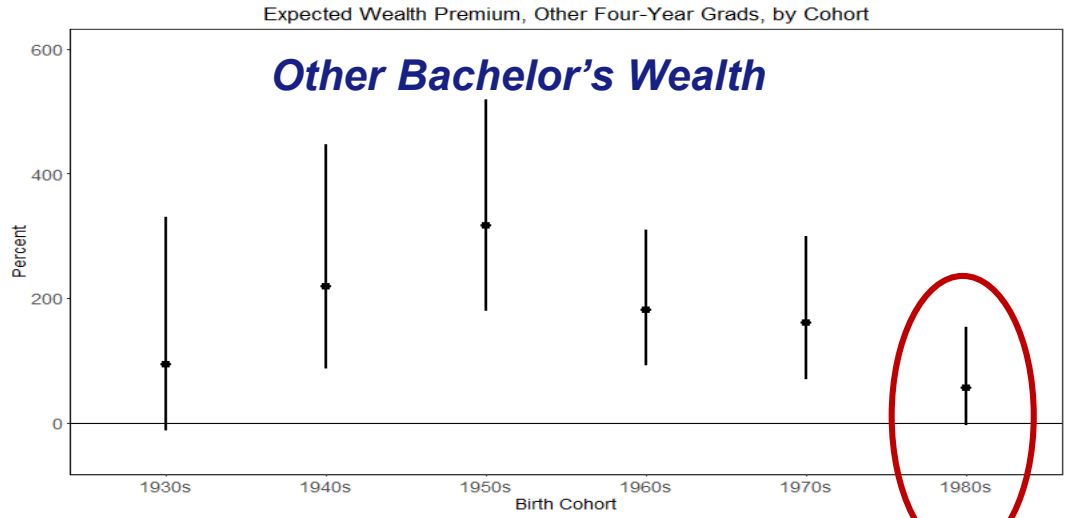
Wealth

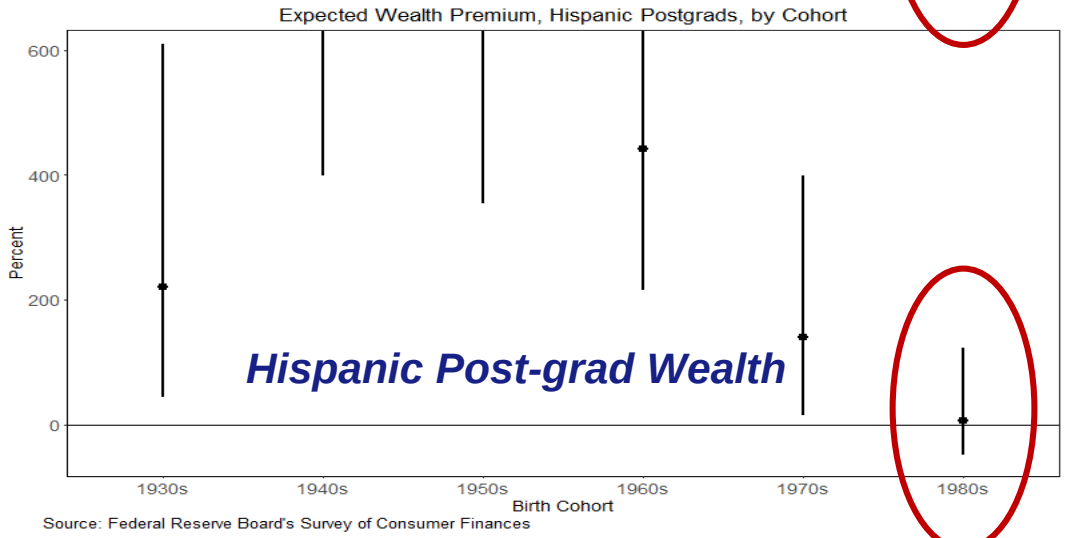


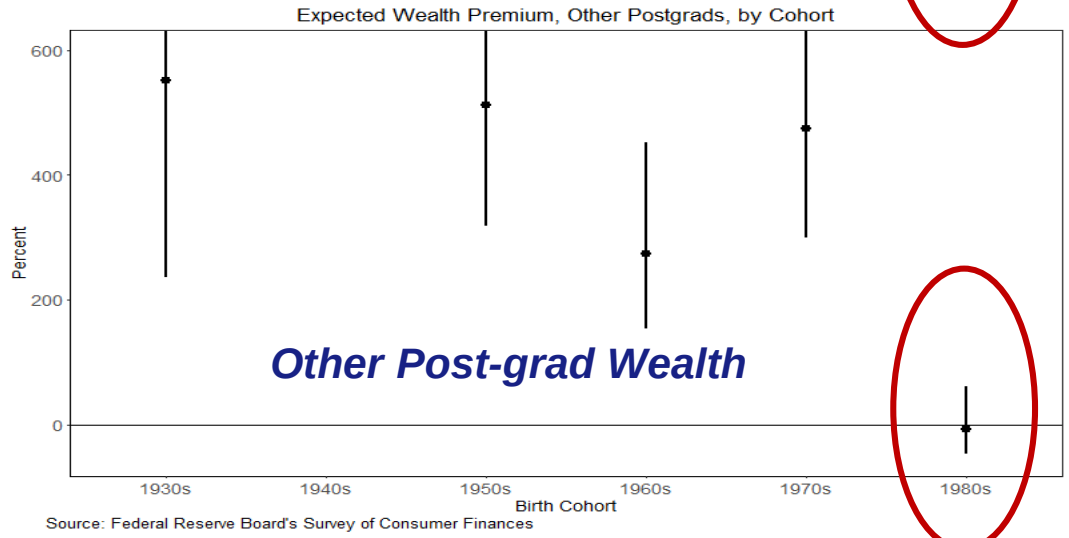
Model includes SCF families of a particular race or ethnicity adjusted for family size and life cycle.

Wealth Premiums for Hispanic, Other: 1980s Near Zero









Model includes SCF families of a particular race or ethnicity adjusted for family size and life cycle.

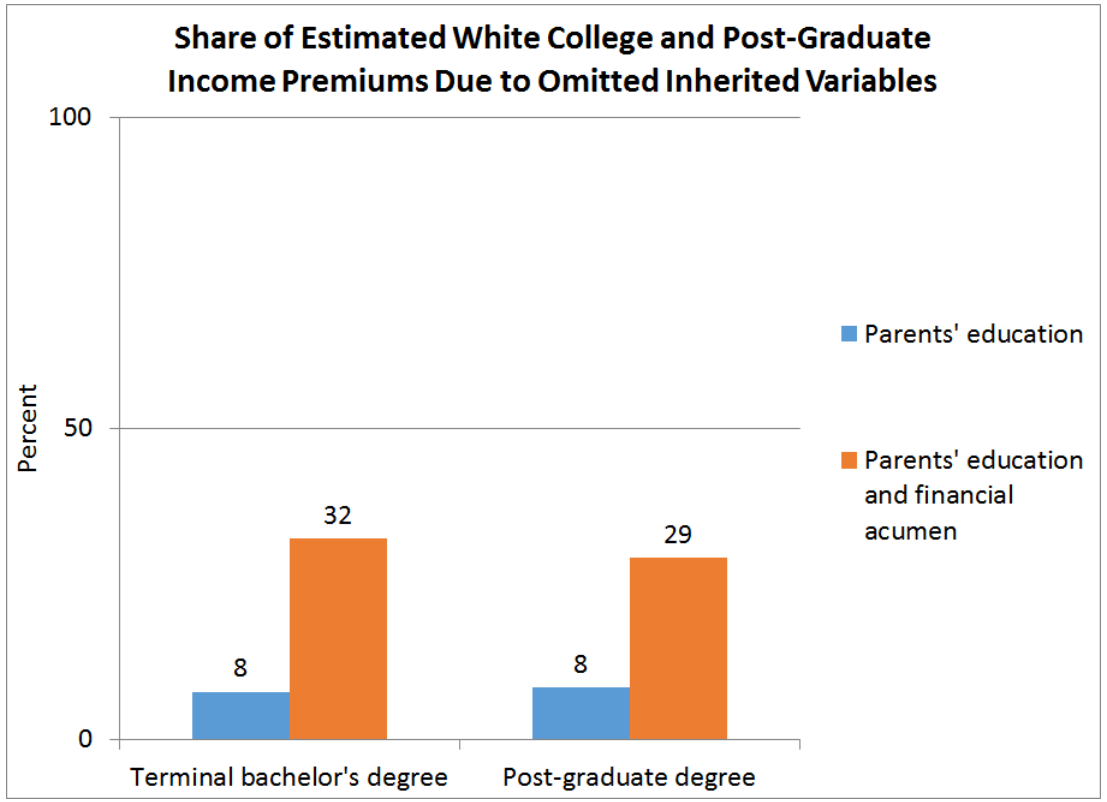
2016 SCF Data Suggest Even the Premiums We Find Are Overstated As Measures of College Returns

- College graduates are self-selected from the population, not randomly selected.
- Inherited characteristics, such as your parents' education, contribute to your educational outcomes.
- College "mediates" or channels some of your inherited characteristics into adult outcomes like income and wealth.
- Partly innate measures of financial acumen (financial knowledge, saving habits, risk tolerance) also shape outcomes.
- Some amount of measured college returns are spurious.

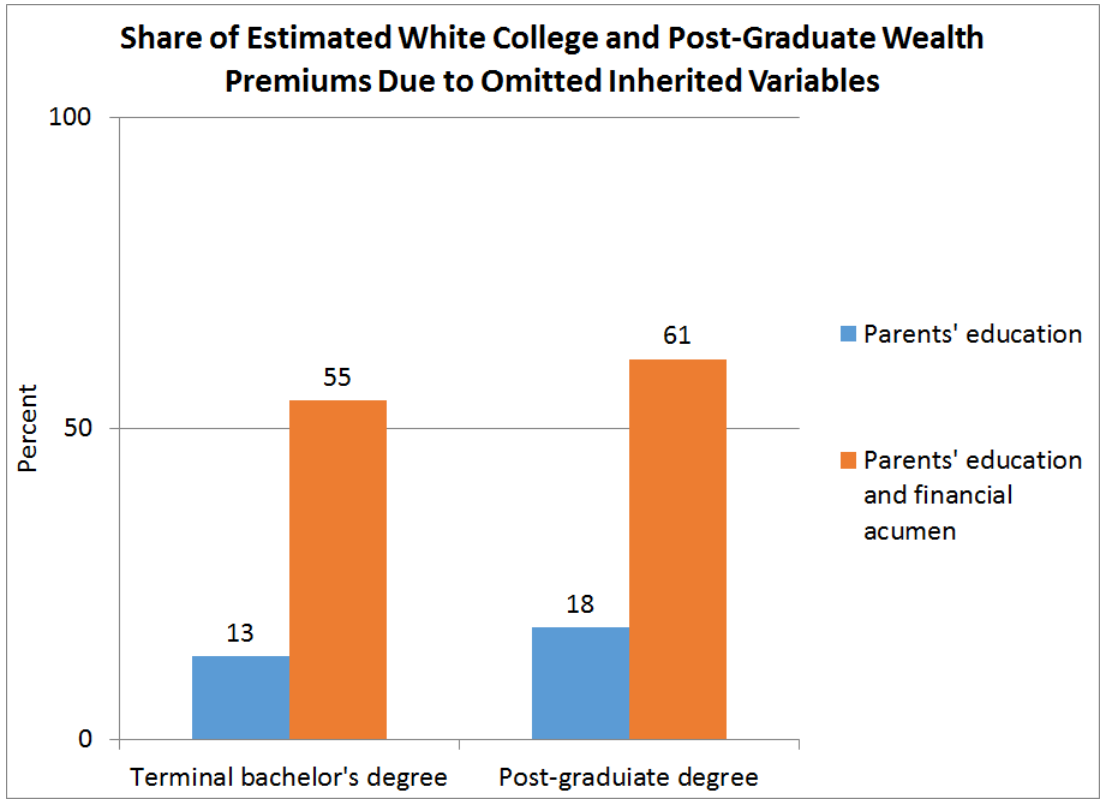
How Much of Estimated College Premiums Are Spurious?

Non-Hispanic White

Income



Wealth



Model includes 4,479 non-Hispanic white 2016 SCF families adjusted for family size and life cycle.

Why Have College Wealth Premiums Collapsed While Income Premiums Persist? Basic Facts

- College and post-grad *income* premiums generally have declined since the 1930s cohort...
- … but *all eight* 1980s-cohort income premiums are positive.
- College and post-grad *wealth* premiums also generally have declined since the 1930s cohort...
- *… resulting in seven of eight* 1980s-cohort wealth premiums being indistinguishable from zero (all except white bachelor's holders).
- All black and Hispanic 1970s wealth premiums are near zero, too.

What Must A Plausible Explanation Do?

- Differentiate between income and wealth outcomes—in particular, wealth-premium declines have been steeper and deeper.
- Be consistent with long-term trends in income and wealth.
- Avoid demographic explanations for which we control in our estimates, such as race and ethnicity or family size.

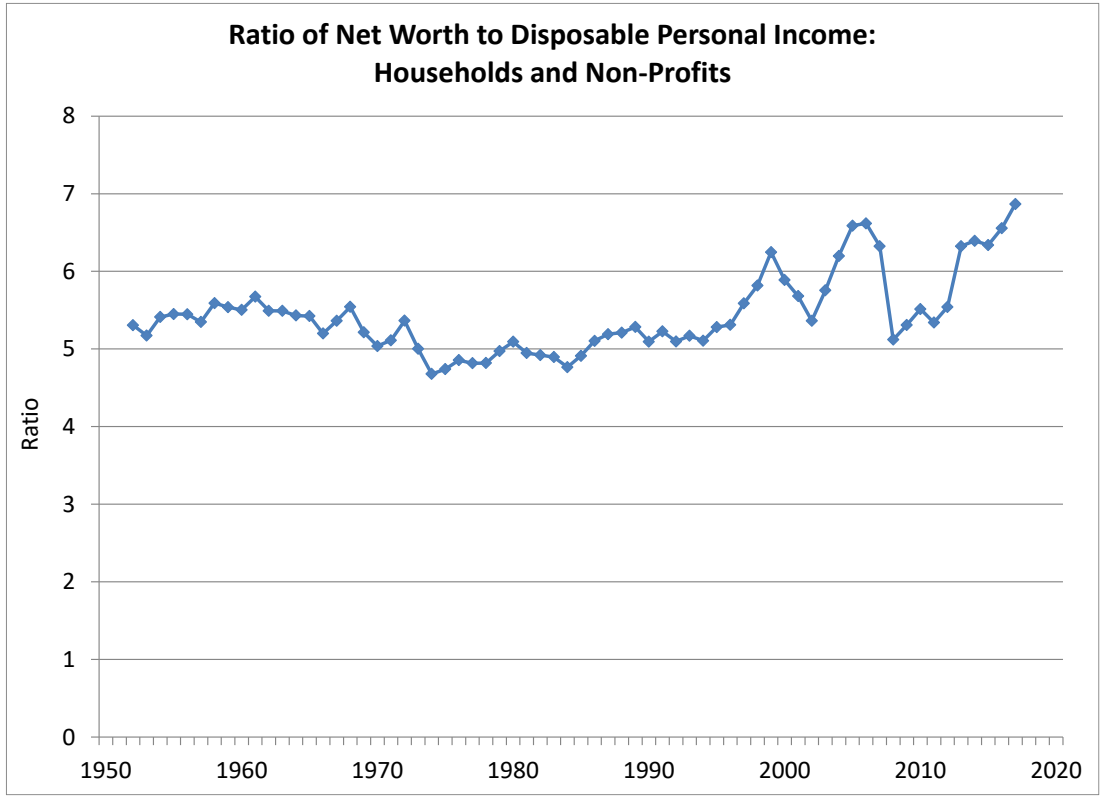
Examples of Implausible Explanations

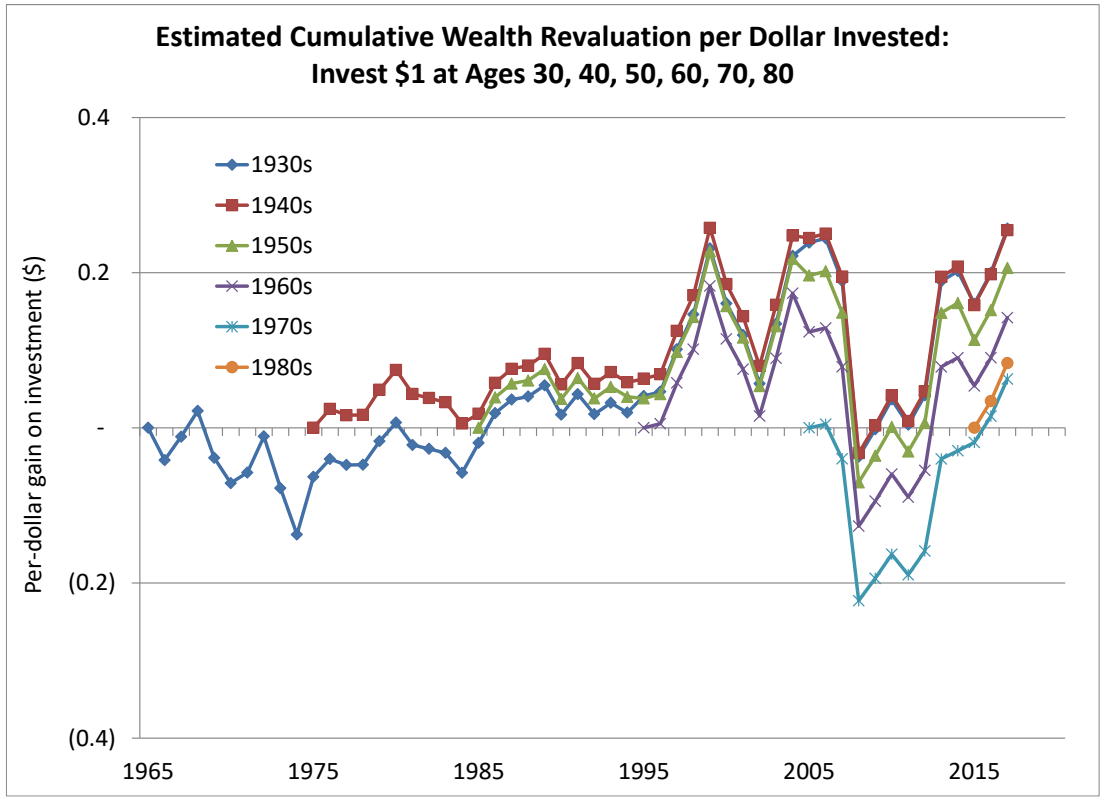
- Stagnation of the college wage premium, college-grad "underemployment" or other job-market problems.
  - Why not? Incomes have held up much better than wealth.
- The Great Recession and declining asset prices.
  - Why not? Youngest cohort had very little wealth to lose in 2007.
- Discrimination.
  - Why not? We find similar patterns within all races and ethnicities.
- Declining quality of college graduates (oversupply).
  - Why would it affect wealth much more than income?

Explanations We Find Plausible: 1) Unlucky Birth Years

- Asset valuations vary significantly over time.
- When you invest affects your eventual capital gains and losses.
- We simulate dollar-cost averaging investment outcomes for all cohorts between 1965 and 2017.
- Our proxy for asset valuation: (Household Wealth / Disposable Income).
- Best time to invest in U.S. assets: 1970s and early 1980s.
- Worst times to invest: 1999, 2003-07, 2013-18.

Simulated Capital Gains Match 1930s to 1970s Wealth

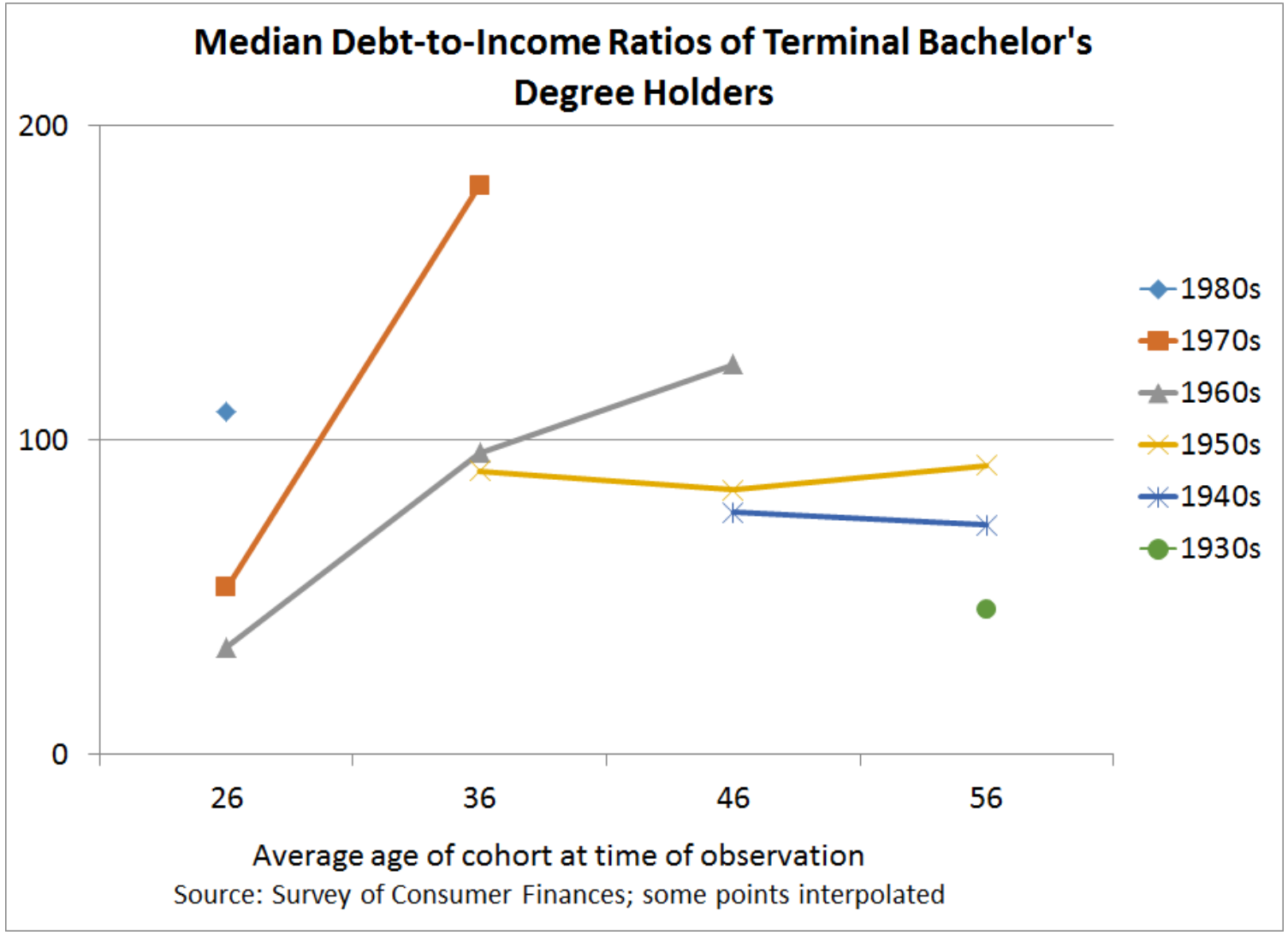




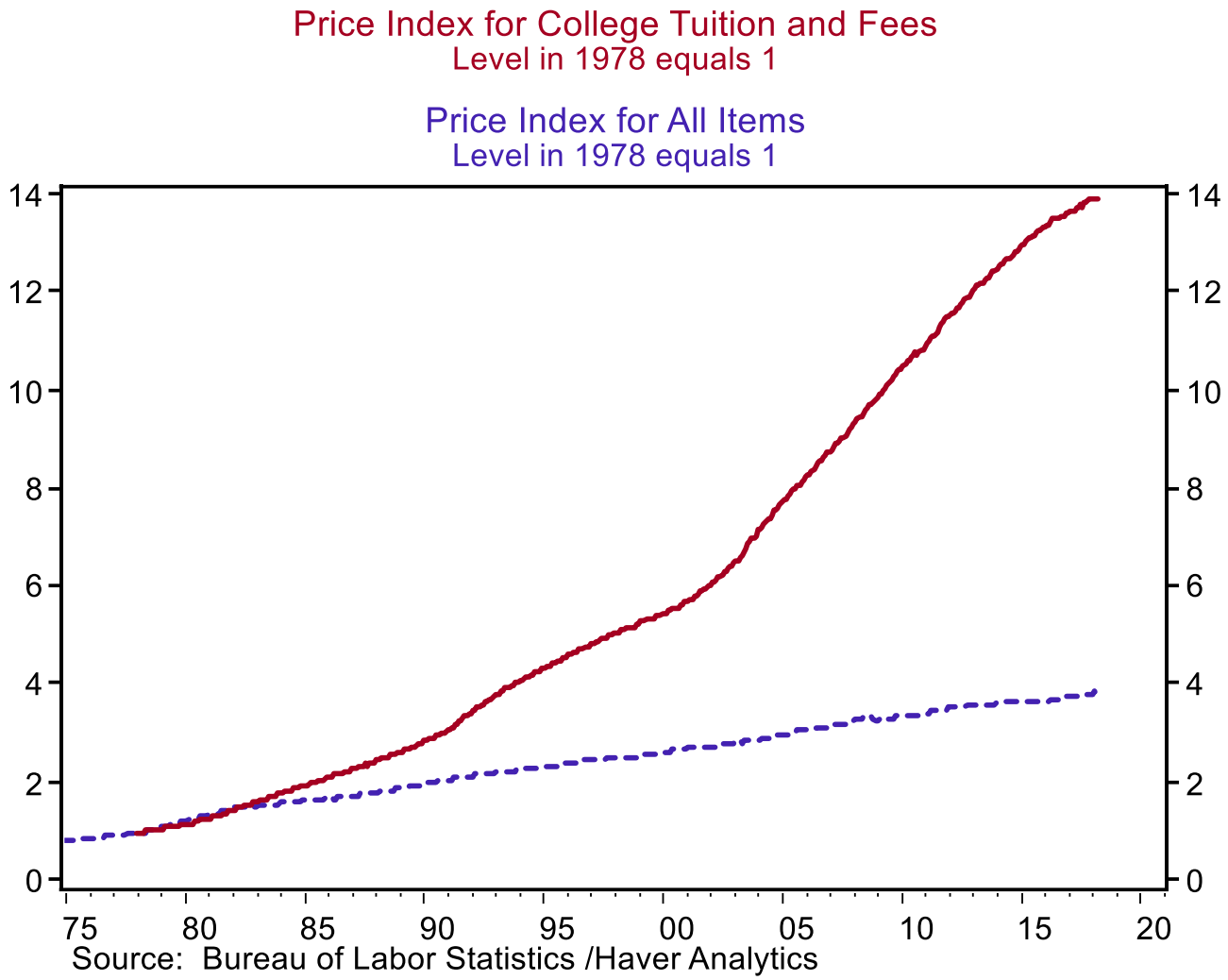
Explanations We Find Plausible: 2) Financial Liberalization

- Consumer finance has become increasingly deregulated and available to riskier borrowers.
- Young people are inexperienced and may make many financial mistakes, like over-borrowing or paying excessive interest rates and fees.
- Consumer borrowing can be expensive and dangerous.
- Successive cohorts of college graduates have increased their borrowing by large amounts.

Every College Cohort Borrows More than Its Predecessor



Explanations We Find Plausible: 3) Rising College Costs



- College tuition and fees have increased more than three times as fast as the all-items CPI since 1978 (14x vs. 4x).
- This includes discounts received so sticker prices went up even more.
- Excess tuition inflation increased after 2000, when 1980s cohort was in college.

In Sum: Is College Still Worth It?
The New Calculus of Falling Returns

- College *income* premiums have declined for recent cohorts but remain positive.
- College *wealth* premiums have plummeted across cohorts.
- Nearly all 1980s college cohorts' wealth premiums are indistinguishable from zero; true also for 1970s black & Hispanic.
- Declining college wealth premiums may be due to the luck of your birth year; financial liberalization; and rising college costs.
- On current wealth trends, college may not be worth it for many.