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## College grads earn less if they grew up poor

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## College grads earn less if they grew up poor, by Tim Bartik and Brad Hershbein

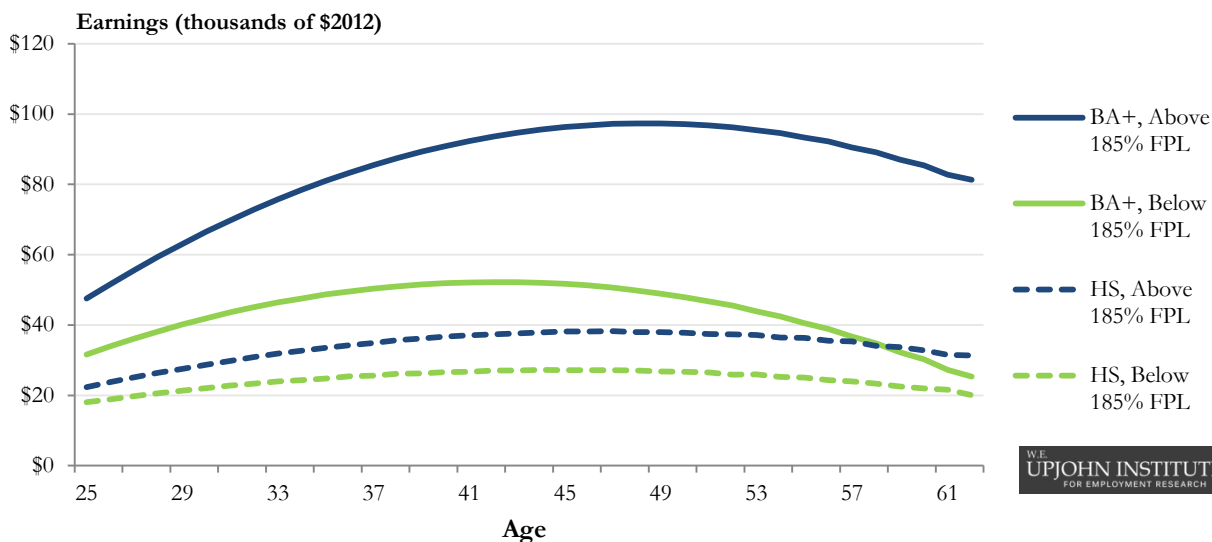
In ongoing work, Institute researchers [Tim Bartik](#) and [Brad Hershbein](#) have recently discovered that the increase in lifetime earnings from having a bachelor's degree, relative to having just a high school diploma, is much smaller for people who grew up poor than it is for people who grew up wealthier. This is a new and surprising finding that has not been uncovered by any previous research, in part because until recently researchers have not had adequate data on both family background and earnings over an entire career.

Using the [Panel Study of Income Dynamics](#) (PSID), a survey that has tracked the same families and their descendants since the late 1960s, the researchers compare career earnings for people who achieved different levels of education by age 25, and whose parents had incomes above and below 185 percent of the federal poverty level (FPL)—the eligibility threshold for the federal assisted lunch program. Because the survey follows individuals for so long, one can observe survey respondents from the time they are in high school—when family income is measured—nearly through retirement ages.

The researchers find that college graduates who came from families with incomes above the 185 percent FPL threshold earn 162 percent more over their careers than high school graduates from the same income group. On the other hand, college graduates who came from families with incomes below the 185 percent FPL threshold earned only 91 percent more over their careers than high school graduates from the same income group.<sup>1</sup>

When earnings are smoothed and adjusted for inflation, career earnings profiles look like those in Figure 1.<sup>2</sup> The blue lines correspond to individuals who grew up in households with incomes above 185 percent of the FPL; the green lines correspond to individuals who grew in households with lower incomes. For the first group, the increase in observed earnings between high school graduates (dashed line) and those with at least a bachelor's degree (solid line) is considerable over the entire career. For the second (poorer) group, the increase is more modest.

**Figure 1 Fitted Earnings Profiles by Education and High School Family Income**



<sup>1</sup> To obtain these numbers, inflation-adjusted earnings (i.e., “real” earnings) at each age and for each group were discounted at a 3 percent annual rate from the point of view of an 18-year-old. This discounting procedure creates a present value, the sum of money that if received by an 18-year-old and invested at a 3 percent annual rate of return would yield the total earnings observed over the entire career between ages 25 and 62. Three percent is a commonly used real discount rate in economic analyses that compares future benefits against present costs.

<sup>2</sup> The smoothing is done by regressing earnings on a quadratic polynomial in “potential work experience,” which is defined here (and customarily by economists) as: age minus years of education minus 6. See notes to figures.

SOURCE: Authors' calculations from the Panel Study of Income Dynamics

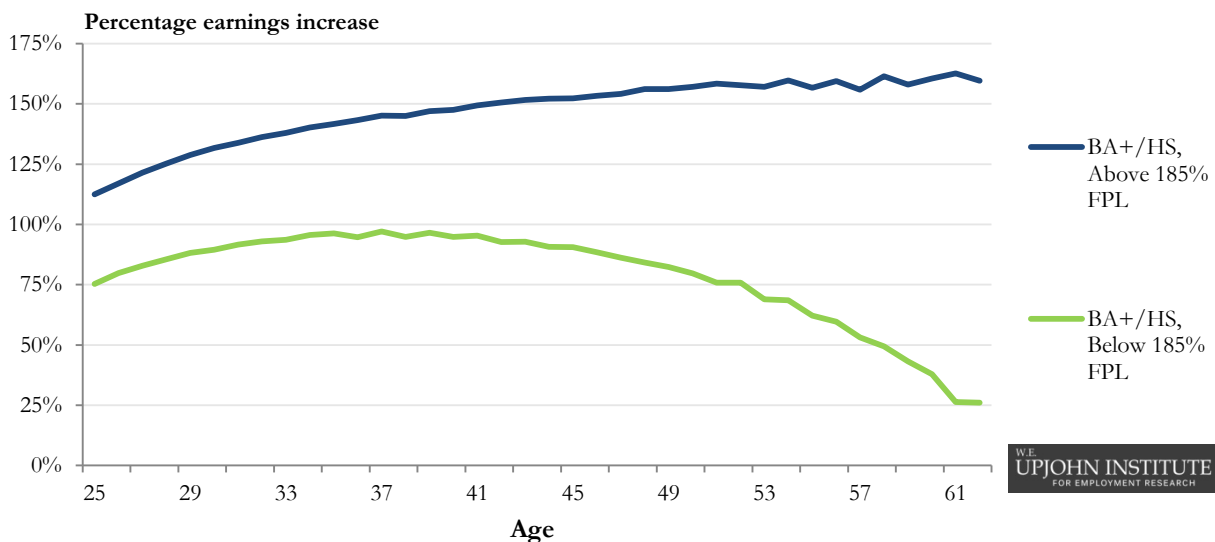
NOTE: Profiles are fitted values from a regression of earnings on a quadratic in potential experience (age minus years of schooling minus 6) and survey year dummies. "BA+" includes bachelor's and higher degrees; "HS" includes those with a high school diploma or 12 or 13 years of schooling.

The differences across these two groups in the college earnings boost is mostly due to the much higher earnings levels of bachelor's graduates who come from higher-income families. In contrast, for individuals who end up obtaining only a high school diploma, career earnings are less associated with their parental income backgrounds. In other words, having higher-income parents pays off more for individuals who go on to get a bachelor's degree.

Three additional features of the graph are worth pointing out. First, for those who grew up poor, career earnings peak in the early 40s regardless of education. For the individuals who grew up in more economically fortunate circumstances, earnings peak later, in their mid to late 40s. Second, earnings increase much faster in early career for bachelor's graduates who grew up above 185 percent of the FPL than for their less-fortunate but equally educated peers. In fact, for bachelor's graduates who grew up poor, earnings between the ages of 25 and 40 increase only as quickly, in proportional terms, as do earnings for high school graduates who didn't grow up poor. Third, earnings for bachelor's graduates who grew up poor decrease substantially in late career: by their late 50s, earnings have fallen to the same level as at the start of their careers. Bachelor's graduates from higher-income families experience a much smaller decline.

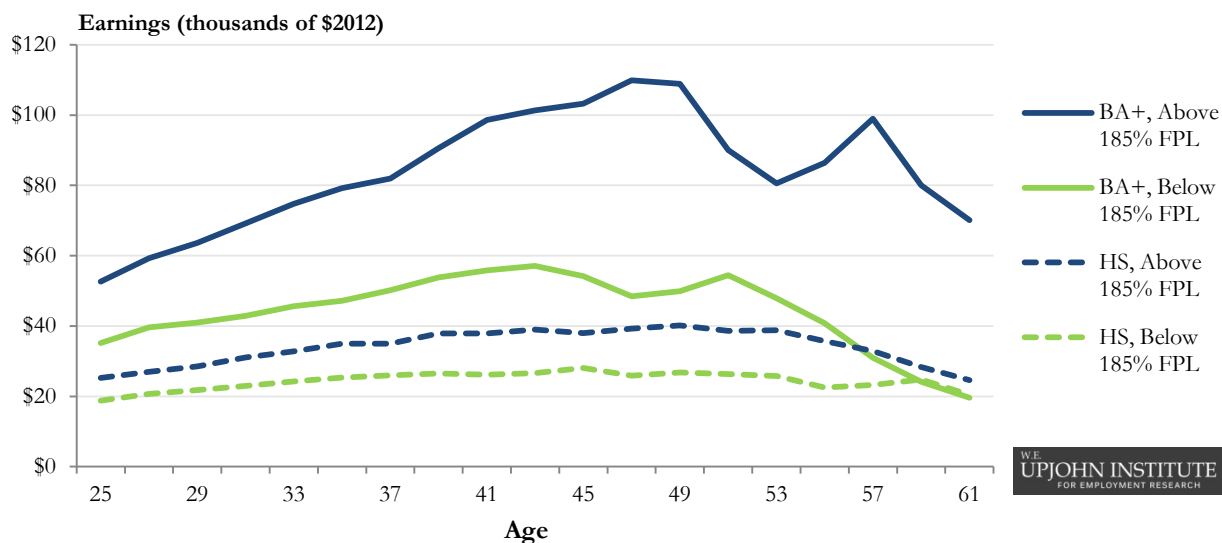
The earnings gains for bachelor's degree holders relative to high school graduates can be more clearly seen in Figure 2, which plots the percentage earnings boost by age for each income group. Whereas this education premium increases over the entire career for individuals who grew up above 185 percent of the FPL, the premium peaks—and at a much lower level—by age 40 for individuals who grew up poor. The large gap in the earnings premium by family income background in late career might suggest that the overall career gap is driven by what happens later in life. However, because earnings are discounted back to an equivalent measured at age 18 in order to construct the career gap, the smaller education premium for people who grew up poor is roughly constant over the career in discounted terms.

**Figure 2 Earnings Premium to Bachelor's Degree Relative to High School, by Family Income and Age**



The smoothed series in Figures 1 and 2 have the advantage of highlighting the overall trends in earnings over the career, especially in late career, when the data become relatively sparse. The qualitative findings do not change, however, if the actual (non-smoothed) earnings by age are plotted instead. Figure 3 thus shows the unsmoothed series. As expected, the earnings profiles become noisier, or more volatile, in late career, especially for bachelor’s graduates. Nonetheless, the cumulative (discounted) earnings premium for bachelor’s graduates relative to high school graduates, for each income group, is almost identical to that from using the smoothed series.

**Figure 3 Estimated Earnings Profiles by Education and High School Family Income, by Precise Age**



NOTE: Profiles are fitted values from a regression of earnings on dummies for each year of potential experience (age minus years of schooling minus 6) and dummies for survey year. “BA+” includes bachelor’s and higher degrees; “HS” includes those with a high school diploma or 12 or 13 years of schooling.

One possibility for the large difference in the apparent return to a bachelor’s degree by family income background is that individuals who grew up in higher-income families and earned a bachelor’s degree were also more likely to earn a graduate degree, which tends to boost earnings. Figure 4 addresses this possibility by examining only exact high school and bachelor’s graduates; individuals with a graduate degree (or high school graduates who obtain some years of a college education but no degree) are *not* included. Even with this restriction, the graph looks remarkably similar to Figure 3. Bachelor’s graduates from non-poor families earn 158 percent more over their careers than high school graduates from the same income group. The bachelor’s degree premium for individuals from poor families is only 93 percent. These numbers are barely changed from the original numbers (162 percent and 91 percent) that included individuals with graduate degrees, so advanced education plays only a small role at best in the divergence.

**Figure 4 Estimated Earnings Profiles by *Exact* Education and High School Family Income, by Precise Age**

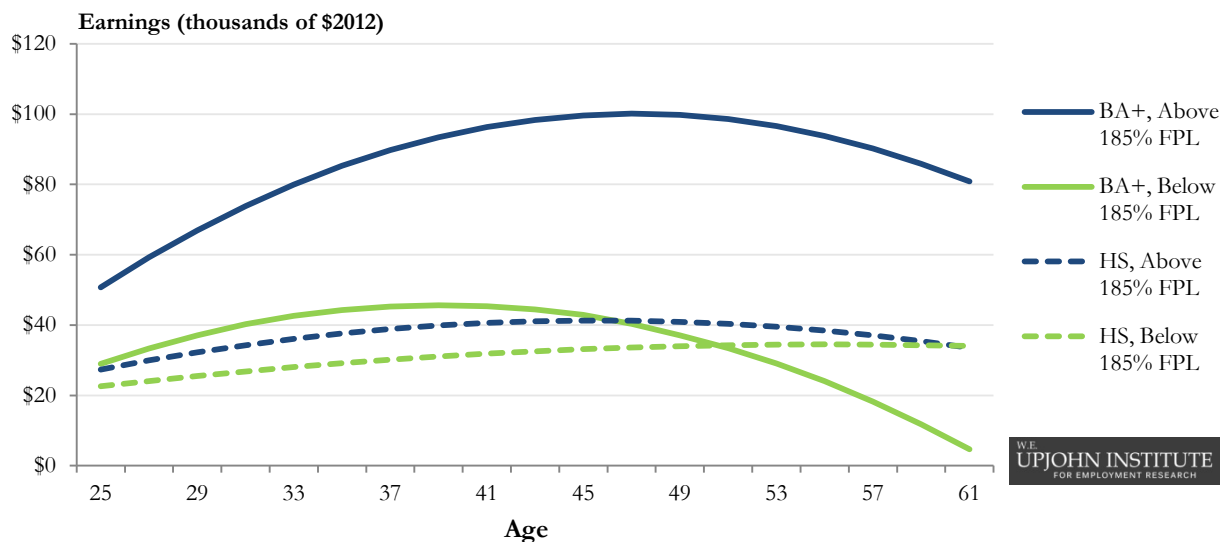


NOTE: Profiles are fitted values from a regression of earnings on dummies for each year of potential experience (age minus years of schooling minus 6) and dummies for survey year. “BA” includes exactly bachelor’s degrees; “HS” includes those with exactly a high school diploma.

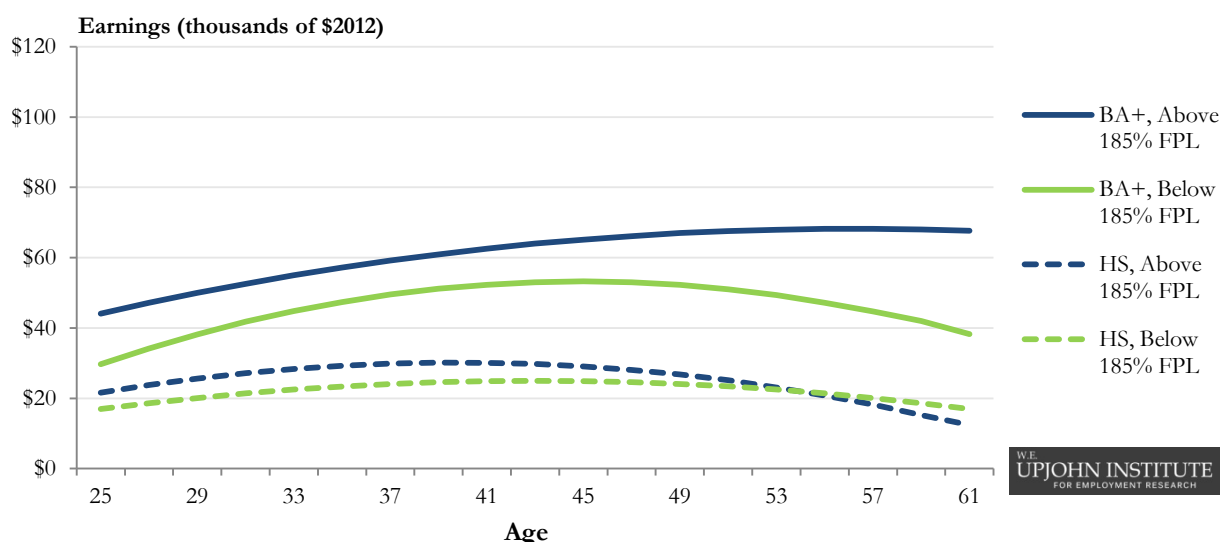
It is also important to determine whether the gap in the education premium by family income background is in fact driven by economic status and not by race. That is, because blacks are more likely than whites to grow up in low-income families, it is possible that the observed gap reflects racial differences rather than economic ones.<sup>3</sup> This turns out not to be the case. Figures 5 and 6 present smoothed earnings profiles by education and family income, as in Figure 1, but separately for whites and blacks. As shown in Figure 5, the differential returns to a bachelor’s degree by family income background are, if anything, larger for whites than for the overall sample. Whites who grew up poor and earned bachelor’s degrees earn only very slightly more through mid-career than whites who grew up in better economic circumstances and earned no postsecondary degree; after mid-career the pattern actually reverses. In discounted career earnings, white bachelor’s graduates who grew up above 185 percent of the FPL earned 128 percent more than white high school graduates from a similar economic background. For whites who grew up poor, the career education premium was just 21 percent. These numbers should be treated with some caution, as relatively few whites who grew up poor in the sample earned a bachelor’s degree, and even fewer were observed in late career. Nonetheless, the gaps are too large to be due entirely to statistical noise.

<sup>3</sup> The PSID’s sampling frame unfortunately does not permit analysis of career earnings for Latinos or other racial and ethnic groups, as they were not sufficiently oversampled until rather late into the fielding of the survey.

**Figure 5 Fitted Earnings Profiles by Education and High School Family Income, Whites**



**Figure 6 Fitted Earnings Profiles by Education and High School Family Income, Blacks**



NOTE: For both Figure 5 and Figure 6, profiles are fitted values from a regression of earnings on a quadratic in potential experience (age minus years of schooling minus 6) and survey year dummies. “BA+” includes bachelor’s and higher degrees; “HS” includes those with a high school diploma or 12 or 13 years of schooling.

Figure 6 shows the analogous graph for blacks. Although the levels of earnings are clearly lower than for white individuals in each of the education and income groups, the relative earnings boost from a bachelor’s degree is much more similar across income groups for blacks than for whites. In fact, black bachelor’s degree graduates who grew up poor earned a discounted career earnings premium over their high school graduate peers (105 percent) that is almost as large as the equivalent premium for blacks who grew up in families above the low-income threshold (128 percent). These graphs thus show that the lower returns for a bachelor’s degree for people from low-income backgrounds are not driven by the experiences of blacks, but instead seem to be due more to the experience of whites.<sup>4</sup>

<sup>4</sup> These inferences do not change substantially if earnings by exact age are used instead, although the smaller samples when separating results by race lead to quite noisy earnings profiles.

The different pattern for whites and blacks help explain why different returns to education by family income background have not previously been noticed in research examining racial differences in the returns to college. In analyses using the American Community Survey, Bartik and Hershbein (and their colleague Marta Lachowska) have found that the observed earnings premium to a college education appears to be of a similar percentage size for both whites and blacks.<sup>5</sup> As this new research from the PSID suggests, the average premium to a college education for all whites reflects quite divergent returns for whites from different parental income backgrounds. In contrast, the percentage returns to a college education for blacks are more similar across parental income backgrounds. Race and economic class in America interact in surprising ways. The ways in which low parental income affects the economic return to college does not generalize to the ways race affects the economic return to college.

Although the analysis here has highlighted several new stylized facts, it clearly provokes [more questions than it answers](#). Bartik and Hershbein plan to release an Upjohn Institute report later this year that provides a more thorough investigation of these patterns, including the extent to which they are found in other data sets and time periods, and how various characteristics—from childhood and neighborhood factors to college experience and occupation choice—can explain them.

### **Technical Note**

As with most complex surveys, respondents in the PSID are given sample weights to account for non-random selection into the survey as well as participation in later waves and other factors. The results presented here did *not* use the sample weights, both for simplicity and because researchers do not fully agree on which weights would be appropriate for this type of analysis. Nonetheless, if the sample longitudinal weights are used, the qualitative findings described above still hold; in fact, the overall disparity in the bachelor's earnings premium between income groups grows larger than what is shown above. The one exception is for blacks, where the use of weights completely eliminates (or even slightly reverses) the gap in the observed bachelor's degree earnings premium between income groups.

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<sup>5</sup> See the forthcoming working paper by Bartik, Hershbein, and Lachowska, “The Merits of Universal Scholarships: Benefit-Cost Evidence from the Kalamazoo Promise.”