Has the College Wage Premium Continued to Rise? Evidence from Multiple U.S. Surveys*

Jared Ashworth†
Pepperdine University

Tyler Ransom‡
University of Oklahoma and IZA

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Abstract

This paper examines trends in the college wage premium (CWP) by birth cohort across the five major household surveys in the United States: the Census/ACS, CPS, NLSY, PSID, and SIPP. We document a flattening in the CWP for birth cohorts 1978 and onward in each survey and even a decline for birth cohorts 1980–1985 in the NLSY and SIPP. We discuss potential reasons for this finding and show that the empirical discrepancy is not a function of differences in composition across surveys. Our results provide crucial context for the vast economic literatures that use these surveys to measure returns to skill, and intertemporal changes in those returns.

JEL Classification: I26, J30

Keywords: College Wage Premium, Returns to Education

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†Corresponding author. E-mail: jared.ashworth@pepperdine.edu

‡E-mail: ransom@ou.edu

1 Introduction

The college wage premium (CWP) measures the wage differential between college graduates and high school graduates and is commonly understood to measure an economy's demand for skilled labor. A well-documented and seminal point in the economic history of the United States is when the CWP suddenly rose in the 1980s and continued to rise throughout the 1990s and into the early 2000s. We ask whether this trend has continued to hold more recently and how consistently the trend holds across commonly used surveys.

Using the five major U.S. household surveys, we document a substantial rise in the CWP in each of the surveys for birth cohorts 1950–1970. However, this was followed by a flattening thereafter. This finding corroborates recent studies that have documented declining employment and income prospects and declining returns to skill among recent birth cohorts (see Beaudry, Green, and Sand (2014), Guvenen et al. (2017), Valletta (Forthcoming), and Gallipoli and Makridis (2018)). Surprisingly, we document a *decline* in the CWP in the SIPP and NLSY for birth cohorts 1978–1984. The decline is more pronounced among men than women.

The five major household surveys are the Decennial Census 5% Public Use Micro Sample (hereafter Census) and the American Community Survey (ACS); the Current Population Survey Outgoing Rotation Groups (CPS); the 1979 and 1997 National Longitudinal Surveys of Youth (NLSY79 and NLSY97); the Panel Study of Income Dynamics (PSID); and the Survey of Income and Program Participation (SIPP). In each survey and for each birth cohort, we estimate unconditional and Mincer (1974)-style log wage regressions to calculate the CWP for full-time/full-year workers aged 25–34.[1] Ours is the first study to compare trends in the CWP across these five commonly-used household surveys.

We investigate whether our findings can be explained by differences across surveys in the levels of observed characteristics such as demographic, education, or employment variables. We find no major discrepancies. We conclude that the differences are likely due to differences in survey architecture (i.e. sample size and collection methods, or whether the survey is repeated cross-section versus longitudinal).

Our results have implications for the long and growing list of studies that examine cross-cohort changes in the returns to skill. Many studies use the CPS or decennial Censuses for this type of research (see Goldin and Katz, 2007, and many others), but there are a growing number of studies using the NLSY (see, e.g. Altonji, Bharadwaj, and Lange, 2012; Ashworth et al., 2017; Bacolod and Hotz, 2006; Böhm, 2017; Castex and Dechter, 2014; Lee, Shin, and Lee, 2015; Deming, 2017), as well as the PSID (see Cortes, 2016; Yamaguchi, 2018, and

[1] Analysis for other age groups is available in the online appendix.

others). Our findings suggest that researchers should not necessarily expect to see the same trends in each major survey. Furthermore, to the extent that the CWP does in fact measure demand for skill, we document that this demand is leveling off and may even be declining. This leveling off is correlated with a stark decline in the labor force participation rate of men in birth cohorts 1978–1984.

The remainder of the paper is organized as follows: the next section briefly discusses in more detail the data sets and key variables we use; Section 3 discusses our key results; and Section 4 offers discussions and conclusions.

2 Data

In this section we briefly describe the data sets used in our analysis. As mentioned previously, we use the five major US household surveys spanning birth cohorts 1950–1985: the 1980, 1990, and 2000 Census 5% Public Use Micro Samples and the 2001-2016 ACS (Ruggles et al., 2017); the CPS-ORG; the NLSY79 and NLSY97; the PSID; and the SIPP. In the interest of brevity and due to the well-known nature of each of these surveys, we refer the reader to the online appendix for additional details regarding the structure and mechanics of each survey.

2.1 Key variables

Here we briefly discuss our construction of the three main variables that enter our analysis: wages, educational attainment, and employment status. We restrict our attention to full-time, full-year workers in each of our analyses that follow.

We define wages as hourly earnings, which are constructed in various ways depending on the survey. In the NLSY, workers report hourly earnings even if they work at a salaried job. In the CPS and SIPP, workers who are paid by the hour report hourly earnings. For the Census/ACS and the PSID, and for salaried workers in the CPS and SIPP, we compute hourly earnings as the annual, monthly, or weekly wage income divided by the hours worked in the corresponding year, month, or week. We express all wage or income variables in \$1982-84 using the CPI-U.

Educational attainment is taken from respondent reports in each survey. We define high school graduates as those who completed at least 12 years of schooling, who hold at least a high school diploma, or who hold a GED. We define college graduates as those who completed at least 16 years of schooling or who hold at least a bachelor's degree.

Employment status is defined as full-time, part-time, or not employed. To the extent possible, we attempt to focus on full-time full-year workers. This classification slightly

differs by dataset. In the CPS, workers report working full-time but not full-year because they are surveyed about only a recent workweek. In the PSID, full-time workers work more than 1500 hours during the year. In the Census/ACS and NLSY, full-time workers work at least 35 hours per week and at least 40 weeks in the past year. In the SIPP they work at least 30 hours per week in at least 90% of the observed non-school months.

Additional details on each of our three main variables are available in the appendix.

3 Methodology & Results

This section briefly introduces our methodology and reports and discusses our main findings.

3.1 Methodology

To estimate the unconditional CWP, we estimate weighted regression models of the following form for individuals aged 25–34, separately for each birth cohort c and for each survey s:[2]

$$\ln w_{isc} = \alpha_{0sc} + \alpha_{1sc} gradHS_{isc} + \alpha_{2sc} grad4yr_{isc} + \varepsilon_{isc} \tag{3.1}$$

where w_{isc} is the log hourly wage, $gradHS_{isc}$ is an indicator for if individual i in birth cohort c in survey s holds at least a high school diploma (or GED) and where $grad4yr_{isc}$ is an indicator for if the individual has completed at least a bachelor's degree. Thus, α_{0sc} measures the average log wage of high school dropouts, α_{1sc} the wage premium for holding a high school diploma (relative to not completing high school), and α_{2sc} measures the wage premium for holding a bachelor's degree (relative to completing high school), i.e. the CWP.[3]

We also estimate the CWP corrected for observable differences across individuals. Our main specification is a variant of the Mincer (1974) model:

$$\ln w_{isc} = \beta_{0sc} + \beta_{1sc} gradHS_{isc} + \beta_{2sc} grad4yr_{isc} + \beta_{3sc} S_{isc} + \beta_{4sc} X_{isc} + \beta_{5sc} X_{isc}^2 + \eta_{isc} \tag{3.2}$$

where S_{isc} measures the individual's years of completed schooling, and X_{isc} the individual's years of potential work experience, measured as age (in years) minus years of completed schooling minus six.

[2] We also explore other age ranges (reported in the online appendix). The trends are similar, although as we consider higher age ranges, we lose the ability to measure wages for later birth cohorts.

[3] In results not reported, but available upon request, we repeat this analysis for those with *exactly* a high school diploma and *exactly* a bachelor's degree. We find similar trends in the CWP, although the magnitudes are different.

We present and discuss estimates of (3.1) and (3.2) in the following subsection.

3.2 Results

Our main findings are graphically reported in Figure 1. This figure plots a smoothed version of the α_2 vector in (3.1) across birth cohorts (on the x-axis) and surveys (separate lines).[4] Smoothing is done using local linear regression (LOWESS).[5] The main finding is that, while all five surveys show a steep increase in the CWP for birth cohorts 1950 through about 1965, there is a distinct flattening beginning around birth cohort 1970. We even observe a decline in the CWP in the NLSY and SIPP for those born after 1977. This decline is more pronounced among men than women. To visualize the amount of uncertainty in our estimates, we include a 95% confidence band around the NLSY estimates. These do not intersect with the ACS or CPS lines for the later birth cohorts in question.

We further explore trends in the CWP by considering a measure of the wage premium that is purged of some forms of selection. In Figure 2 we present smoothed estimates of the β_2 vector in (3.2).[6] This graph again shows a flattening for birth cohorts after the early 1970s, with the NLSY and SIPP each having a lower measured CWP for the youngest cohorts. For each survey, the CWP from the Mincer model is roughly half the amount of the raw CWP. Examining the 95% confidence bands shows that the NLSY and SIPP are not significantly different from the ACS and CPS for the youngest cohorts, with the exception of the 1982 and 1983 cohorts for men and the 1980 and 1981 cohorts for women.

Overall, our results of a flattening CWP are consistent with the findings of Beaudry, Green, and Sand (2014), Guvenen et al. (2017), and Valletta (Forthcoming) who respectively document declining probability of obtaining cognitive jobs early in their careers for college graduates in more recent birth cohorts, declining lifetime income for more recent birth cohorts, and a recent flattening of the CWP. Our study is the first to document the apparent decline in the CWP for recent cohorts in both the NLSY and SIPP, though (Ashworth et al., 2017) indirectly document the decline in the NLSY.

One remaining question is whether these surveys consistently measure education, wages, employment, and demographics. We present graphical evidence that they do, in fact, consistently measure these outcomes among the population of full-time, full-year workers. Figures 3, 4, and 5 respectively show cohort-specific averages of college graduates, high school graduates, and full-time workers. Similar figures for demographics can be found in the online

[4]The PSID line disappears after the 1960s due to sample sizes by birth cohort that become unreliably small.

[5]The unsmoothed version of Figure 1 is reported in the online appendix.

[6]The unsmoothed version of Figure 2 is reported in the online appendix.

appendix.

We assess the robustness of our findings by examining alternate age ranges, dropping imputed earnings in the CPS (Hirsch and Schumacher, 2004; Bollinger and Hirsch, 2006, 2013), and using log earnings instead of log wages for the ACS (Baum-Snow and Neal, 2009). These results are reported in the online appendix or available from the authors upon request. None of our findings is meaningfully affected.

4 Discussion & Conclusions

The most plausible explanation for our finding that the NLSY and SIPP differ from the CPS and ACS with respect to measuring the CWP has to do with survey architecture. The NLSY and SIPP are longitudinal studies, whereas the ACS and CPS are repeated cross sections. The goals of each survey are sufficiently different that the surveys might end up with different measures of wages and hence different measures of the CWP. Furthermore, longitudinal surveys are subject to non-random attrition.[7] This could explain some of the discrepancies, although we argue that if non-random attrition were problematic, it would show up in significant differences of key observable variables. Furthermore, attrition tends to be negatively selected, which would imply—if anything—an *upward* bias in the CWP.

Another potential, though less plausible, explanation is the Great Recession. This recession impacted post-1977 birth cohorts most strongly, which can be seen in Figure 5 as a steep decline in male full-time employment rates for those cohorts. What is puzzling, and what makes this explanation less plausible, is that there does not seem to be any explanation for why the Great Recession would affect the NLSY or SIPP any differently than the ACS or CPS.

A primary implication of our findings is that the demand for skill is flattening and may even be falling, to the extent that the CWP actually measures skill demand. This interpretation is consistent with recent literature cited above that has documented declining income and employment prospects for younger birth cohorts. A secondary implication is that researchers should not necessarily expect the NLSY and SIPP to look the same as the CPS in terms of CWP dynamics. Thus, whether the "correct" CWP is the one measured by the ACS, the CPS, or some other survey, is an open question. It behooves researchers to take note of the differences across surveys.

[7] See the online appendix for a comparison of attrition rates in the NLSY79 and NLSY97.

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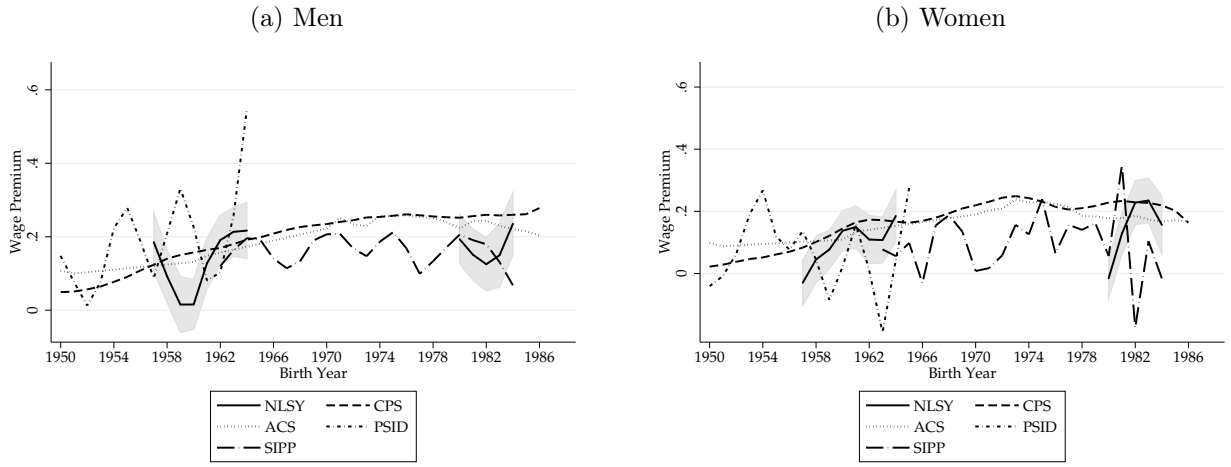
Figures and Tables

Figure 1: Raw (smoothed) college wage premium (25–34 year olds) by birth cohort across five U.S. surveys

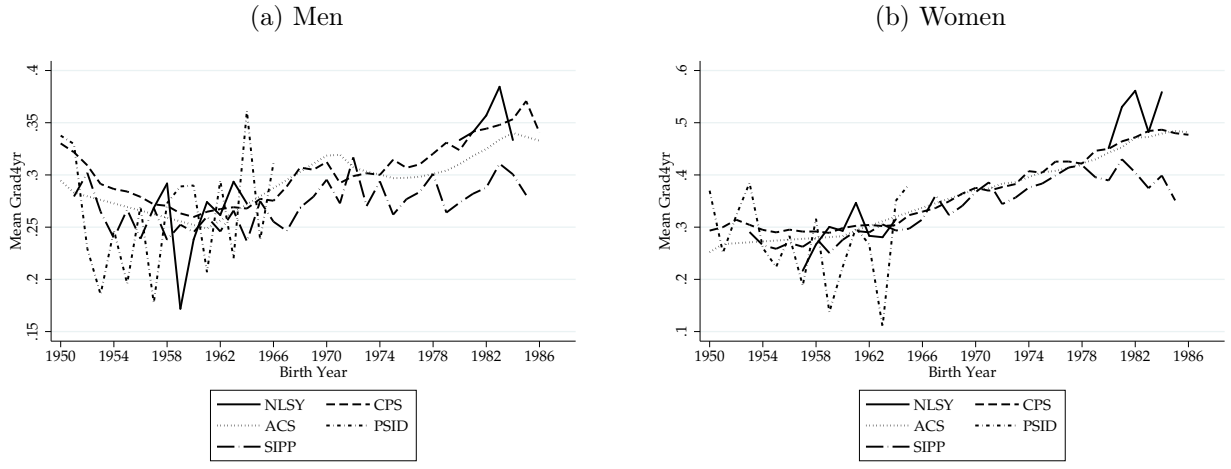
Notes: The above figures plot the difference in log wages between college graduates and high school graduates by birth cohort, smoothed using local linear regression (LOWESS). Sample includes only those who are working full-time, full-year and who are between the ages of 25–34. Each point on each line requires an underlying sample of $N \geq 400$. All statistics are computed using the sampling weights provided by each survey. The ACS series is restricted to birth cohorts 1950 and 1951 for the 1980 Census, 1960 and 1961 for the 1990 Census, and 1970 and 1971 for the 2000 Census. For additional details regarding construction of the data, see the online appendix.

Figure 2: Mincer college wage premium (25–34 year olds) by birth cohort across five U.S. surveys



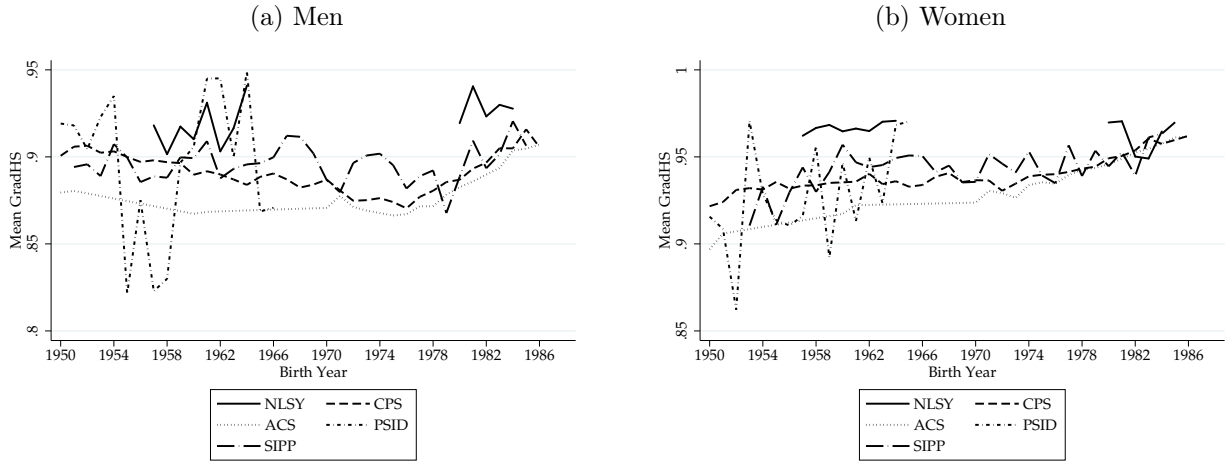
Notes: The above figures plot the difference in log wages between college graduates and high school graduates by birth cohort, adjusted for observable skills using the classic Mincer (1974) model. See note to Figure 1.

Figure 3: Raw college graduation rates (25–34 year olds) by birth cohort across five U.S. surveys



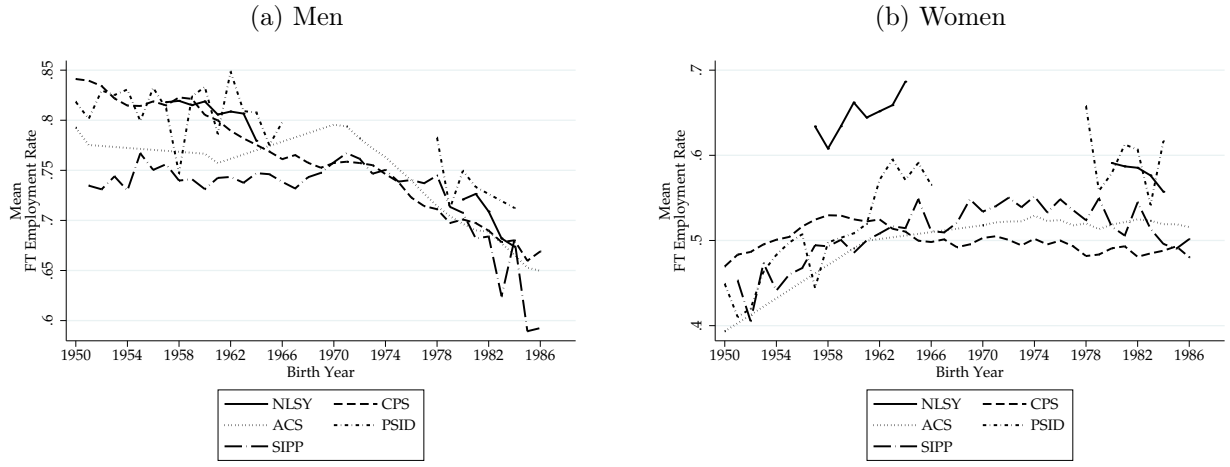
Notes: The above figures plot the proportion of the population that are college graduates by birth cohort. See note to Figure 1.

Figure 4: Raw high school graduation rates (25–34 year olds) by birth cohort across five U.S. surveys



Notes: The above figures plot the proportion of the population that are high school graduates by birth cohort. See note to Figure 1.

Figure 5: Raw full-time, full-year employment rates (25–34 year olds) by birth cohort across five U.S. surveys



Notes: The above figures plot the proportion of the population that are employed full-time, full-year by birth cohort. See note to Figure 1.