



# Has the college wage premium continued to rise? Evidence from multiple U.S. surveys<sup>☆</sup>



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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 general flattening in the CWP for birth cohorts 1970 and onward in each survey and even a decline for birth cohorts 1980–1984 in the NLSY. 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 answer important policy questions about intertemporal changes in the returns to skill.

## 1. Introduction

The college wage premium (CWP) measures the wage differential between college graduates and high school graduates and is the outcome of both demand and supply factors. 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 investigate 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. The flattening occurs for both men and women, although the CWP is noticeably higher for women than men in most birth cohorts in each of the data sets. Our findings corroborate recent studies that have documented declining employment prospects, income levels, and returns to skill among recent birth cohorts (see Beaudry, Green, & Sand, 2014, Guvenen, Kaplan, Song, and Weidner (2017), Valletta, and Gallipoli & Makridis, 2018). Surprisingly, we document a *decline* in the CWP in the NLSY for birth cohorts 1980–1984.

The five major household surveys we analyze 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);<sup>1</sup> and the Survey of Income and Program Participation (SIPP). In each survey and for each birth cohort, we estimate unconditional log wage regressions to calculate the CWP for full-time/full-year workers aged 25–34.<sup>2</sup> 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). We also examine the wage premium between graduate degree holders and college graduates (which we call the GWP) and find that this premium is gradually rising even as the CWP is flattening.

Our results have implications for the long and growing list of studies that examine cross-cohort changes in the returns to skill. Many studies

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<sup>1</sup> Given the sample size of PSID respondents, we only look at those born between 1950–1963. Thus, the PSID is not as informative to our analysis.

<sup>2</sup> We focus on this group because we are interested in as recent of data as possible. Analysis of other age groups is included in the online appendix, as well as Mincer (1974)-style specifications. Our results are largely unchanged.

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, & Lange, 2012; Ashworth, Hotz, Maurel, & Ransom, 2017; Bacolod & Hotz, 2006; Böhm, 2017; Castex & Dechter, 2014; Deming, 2017; Lee, Shin, & Lee, 2015), as well as the PSID (see Cortes, 2016; Yamaguchi, 2018, and others). To our knowledge, no studies have used the SIPP for these types of analysis.<sup>3</sup> Our findings suggest that researchers should not necessarily expect to see the same trends in each major survey. Furthermore, our findings serve as a stimulus to future research to quantify which specific factors are behind the flattening and decline that we find.

The remainder of the paper is organized as follows: the next section describes in more detail the data sets and key variables we use; Section 3 presents 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, Genadek, Goeken, Grover, & Sobek, 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 exactly 12 years of schooling, who hold exactly a high school diploma, or who hold exactly a GED. We define college graduates as those who completed exactly 16 years of schooling or who hold exactly a bachelor's degree. We define graduate-degree holders as those who have at least 17 years of schooling or hold an advanced 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 h during the year. In the Census/ACS and NLSY, full-time workers work at least 35 h per week and at least 40 weeks in the past year. In the SIPP they work at least 30 h per week in at least 90% of the observed non-school months.

<sup>3</sup> This may be because the SIPP is structured similarly to the CPS but has been collected over a shorter period of time, or because the SIPP is collected with the intent to more precisely measure people at the bottom of the income distribution.

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

## 3. Methodology & results

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

### 3.1. Methodology

To estimate unconditional wage premia, we estimate weighted regression models of the following form for individuals aged 25–34, separately for each birth cohort  $c$  and for each survey  $s$ :<sup>4</sup>

$$\ln w_{isc} = \alpha_{0sc} + \alpha_{1sc} gradHS_{isc} + \alpha_{2sc} grad4yr_{isc} + \alpha_{3sc} graduateDeg_{isc} + \varepsilon_{isc} \quad (3.1)$$

where  $w_{isc}$  is the log hourly wage for individual  $i$  in birth cohort  $c$  in survey  $s$ , and the right-hand side variables are indicators for cumulative educational attainment:  $gradHS_{isc}$  for a high school diploma (or GED),  $grad4yr_{isc}$  for a bachelor's degree, and  $graduateDeg_{isc}$  for a graduate degree.<sup>5</sup> Given these definitions,  $\alpha_{0sc}$  measures the average log wage of high school dropouts,  $\alpha_{1sc}$  the wage premium for holding exactly a high school diploma (relative to not completing high school), and  $\alpha_{2sc}$  the wage premium for holding exactly a bachelor's degree (relative to completing high school), i.e. the CWP.<sup>6</sup> Finally,  $\alpha_{3sc}$  measures the wage premium for holding a graduate degree (relative to a bachelor's degree).

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

### 3.2. Results

Our main findings are graphically reported in Fig. 1. This figure plots a smoothed version of the  $\alpha_2$  vector in (3.1) across birth cohorts (on the x-axis) and surveys (separate lines).<sup>7</sup> Smoothing is done using local linear regression (LOWESS).<sup>8</sup> 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 for birth cohorts 1980–1984 in the NLSY. 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. There is some further suggestive evidence that there is a decline in the CWP for the SIPP. However, given that the last SIPP panel ends 3–4 years before the other data sets, we interpret its results with caution.

The flattening of the CWP happens to both men and women in each of these surveys, though women have a higher CWP in any given birth cohort across most data sets. This finding ties in with recent work on women's educational attainment and marriage markets (Becker, Hubbard, & Murphy, 2010; Chiappori, Iyigun, & Weiss, 2009; Chiappori, Salanié, & Weiss, 2017).

<sup>4</sup> Each regression is weighted by the individual sampling weights of each survey. 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.

<sup>5</sup> Those who complete some college but do not receive a bachelor's degree are not included in this analysis.

<sup>6</sup> In results not reported, but available upon request, we analyze an alternative form of (3.1) where we group college dropouts in with high school graduates and graduate degree holders in with college graduates. We find similar trends in the CWP, although the magnitudes are different. We also investigate estimates adjusting for labor market experience in a Mincer (1974)-type model and see patterns similar to our main specification.

<sup>7</sup> The PSID line disappears after the 1960s due to sample sizes by birth cohort that become unreliably small.

<sup>8</sup> The unsmoothed version of Fig. 1 is reported in the online appendix.

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