THE CUMULATIVE ADVANTAGE OF A UNIONIZED CAREER FOR LIFETIME EARNINGS

ZACHARY PAROLIN AND TOM VANHEUVELEN*

Studies on labor union earnings premiums generally investigate their size through point-in-time estimates. This study posits, by contrast, that point-in-time estimates of the union premium overlook the cumulative earnings advantages of long-term, persistent union membership. Using a sample of men from the Panel Study of Income Dynamics from 1969 to 2019, the authors investigate how lifetime union membership contributes to earnings advantages. They find, first, that unionization throughout one's career is associated with a $1.3 million mean increase in lifetime earnings, larger than the average gains from completing college. Second, the lifetime earnings gains are channeled entirely through higher hourly wages and occur despite earlier-than-average retirement for persistently unionized men. Third, the union wage premium is not constant throughout a worker's career; instead it increases with more years of union membership. The cumulative advantages of union membership for workers' economic well-being are far greater than point-in-time estimates suggest.

Labor unions have been central to the economic well-being of American workers since the mid-20th century. The overwhelming majority of social science research finds a substantial wage premium associated with union membership (Card, Lemieux, and Riddell 2004; Western and Rosenfeld 2011; Rosenfeld 2014; VanHeuvelen 2018). In the United States and in other rich democracies, the rise and fall of organized labor has been central to trends in worker power, the share of income allocated to labor, and economic inequality (Freeman and Medoff 1984; Jacobs and Dirlam 2016; Kristal and Cohen 2017).

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For helpful comments and guidance, we are grateful to David Brady and participants of the Population Association of America conference. An Online Appendix is available at http://journals.sagepub.com/doi/suppl/10.1177/00197939221129261. For information regarding the data and/or computer programs used for this study, please address correspondence to zachary.parolin@unibocconi.it.

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Academic research is largely unified in acknowledging a union wage premium, and nearly all research considers the association between unionization and economic outcomes as occurring at a single point in time. Scholars typically model the wage premium as occurring statically using cross-sectional data (Western and Rosenfeld 2011), or as a longitudinal trend of individual wage trajectories while assuming the premium of joining a union remains stable across time points or career stages (VanHeuvelen 2018). Motivated by studies that extend the economic implications of the demise of organized labor beyond the direct impacts on hourly wages (Kristal 2013; Kristal and Cohen 2017), we argue that the typical method of measuring the union premium, while valuable, potentially misses organized labor's contribution to broader inequality and social mobility outcomes. Instead, the earnings benefits and employment stability produced by labor unions might accumulate among those workers who remain in union membership over an extended period of their career, resulting in substantial earnings differences between workers whose cumulative exposure to union membership varies. These career-long cumulative, or what we label *lifetime earnings*, differences may not be fully captured in point-in-time hourly wage differences, yet nevertheless may be central for fundamental stratification processes.

To develop our expectations, we draw on insights from life course theory (Elder 1994; Mayer 2009; Cheng 2014; Cheng, Tamborini, Kim, and Sakamoto 2019) and studies of lifetime earnings inequalities that assess unequal returns to educational attainment, race, and gender (Kim, Tamborini, and Sakamoto 2015, 2018; Tamborini, Kim, and Sakamoto 2015). These studies illustrate the implications of lifetime earnings differences, as such accumulated income differences can have unique impacts on a variety of social outcomes, including retirement patterns, life expectancy, well-being in old age, wealth, intergenerational transmission of resources, and intergenerational mobility (Tamborini et al. 2015; Carr 2019; Haan, Kemptner, and Lüthen 2020).

We extend beyond previous studies of lifetime earnings by identifying the mechanisms that contribute to union lifetime earnings premiums. Specifically, we use data from the Panel Study of Income Dynamics (PSID) from 1969 through 2019 to assess the accumulated earnings for household heads, aged 20 through 64, who were born in the mid-1950s. After assessing overall differences in lifetime earnings across workers with varying spells of union membership during their careers, we decompose lifetime earnings into three parts to assess union membership's contribution to each component: years worked, hours per year worked, and wage rate. Anticipating that the hourly wage rate is of central importance to union premiums, we also assess whether lifetime earnings premiums simply reflect the accumulation of point-in-time union premiums, or if more time spent in union membership accumulates into higher wage premiums.

Background

Unions, Wages, and Inequality

Labor unions have been perhaps the central American labor market institution of the past century, providing less-powerful, middle- and lower-paid workers improved bargaining positions, opportunity, and security. Thus, the past half century of decline in private-sector labor unions, from 33% in the 1950s to 6% today, has been one of the most consequential trends shaping the contemporary labor market (Freeman and Medoff 1984; Eidlin 2018; Bureau of Labor Statistics 2020; Milkman 2020). Union decline has contributed to increases in inequality and the stagnation of well-being among ordinary workers (Card et al. 2004; Western and Rosenfeld 2011; Wilmers 2017; Farber, Herbst, Kuziemko, and Naidu 2018; VanHeuvelen 2018; Parolin 2021). Union wage premiums typically accrue to those with otherwise less power and bargaining position in a modern economy, with effects particularly pronounced among those more marginalized economic positions, such as those with lower education, blue-collar workers, less-skilled workers, and workers who primarily perform routine-based tasks (Freeman and Medoff 1984; Maxwell 2008; Firpo, Fortin, and Lemieux 2009, 2018; Rosenfeld, Denice, and Laird 2016; Parolin 2021). Union premiums have proven to be remarkably consistent when compared across eras that vary in union strength, membership, and composition of union members (Farber et al. 2018). Scholars argue that deunionization and its subsequent effect on middle and lower wages contributed to around 25% of the total growth of wage inequality since the 1980s (Card et al. 2004).

Although the union wage premium has been thoroughly documented across the social sciences (Maxwell 2008; Western and Rosenfeld 2011; Rosenfeld 2014, 2019; Ahlquist 2017; Denice and Rosenfeld 2018), nearly all studies measure the association between union membership and wage attainment using a point-in-time estimate. Put differently, the influence of union membership on mean wage attainment, conditional on observed background characteristics, is assumed to be uniform across workers of varying ages and labor market experiences in either a sample of multiple time periods or a single year. Often, studies move beyond aggregated associates by estimating union premiums separately across cross-sectional survey waves to assess trends in union premiums across time. Such an approach introduces valuable information on temporal heterogeneity of point-in-time estimates, yet retains a constant union premium across individuals in any time period.

Some research examines variation of union wage premiums across the distribution of wages, thus emphasizing variation of wage effects across individuals (Brady, Baker, and Finnigan 2013; Firpo et al. 2018; Gomez and Lamb 2019; VanHeuvelen and Brady 2021). These studies show heterogeneity in union premiums across higher- and lower-earning workers, yet still

conceptualize union premiums as occurring constantly across points in a worker's life.

Still other studies approach the limitations of treating union premiums as point-in-time estimates by addressing the potential bias of time-invariant heterogeneity for union premiums. These studies use longitudinal data to assess how changes in union status within an individual's career associates with subsequent wage changes. These studies largely replicate the logic of time-invariant union premiums, however, as they focus primarily on the average association between wage change and joining a union. Thus, any variation of union effects across a person's career is assumed to be static (Rosenfeld and Kleykamp 2012; Rosenfeld 2014; VanHeuvelen 2018; Borjas 2019).

While such variations on point-in-time union wage effects have provided a critical foundation for stratification research, these studies all maintain, to some degree, union wage premiums as constant features across individual career trajectories. We argue that such an approach not only misses potential temporal heterogeneity that may be of interest to labor scholars but also may result in an underestimation of the consequences of unions on economic outcomes. We draw from two lines of research that motivate our extension of union premiums from a point-in-time measurement of wage attainment to one of an accumulation that occurs throughout an individual's adult work career, or what we label *lifetime earnings* (Tamborini et al. 2015).

First, scholars of life course theory (e.g., Mortimer and Shanahan 2006; Shanahan, Mortimer, and Johnson 2015) have argued that individual outcomes must be understood as long-term processes through which social, political, economic, and historical factors exert influence, and that atemporal snapshots of individual associations miss the contribution of dynamic events that accumulate over one's lifetime (Elder 1994; Mayer 2009; Cheng 2014; Cheng et al. 2019).

Whereas union membership may affect wage rates on average, a life course perspective questions the extent to which union stability of employment and power within the workplace create more beneficial longer-term employment dynamics, such as greater wage growth across one's career, more years spent in full-time employment, stability of working conditions within full-time employment, and retirement timing. All these factors should contribute to lifetime earnings differences among workers with varying levels of union membership.

Second, social scientists have investigated trends in lifetime earnings to advance beyond cross-sectional snapshots of earnings inequality (Friedman 1957; Houthakker 1959; Miller 1960; Wilkinson 1966; Guvenen, Kaplan, Song, and Weidner 2017). Others have assessed variation of lifetime earnings returns across groups, such as by education, gender, family background, or race (Kim et al. 2015, 2018; Tamborini et al. 2015; Sakamoto, Tamborini, and Kim 2018; Bloome and Furey 2020). For example,

Tamborini et al. (2015) found that for a sample of men born between 1932 and 1969, those with a college degree earned up to $1.3 million more than men without a high school degree over a 50-year period.

Similar investigations that stretch beyond a point-in-time association can be applied to the possible influence of unionization on earnings. The insights of life course theory, as outlined in studies on the broader labor market consequences of unions, motivate our connection of unions to lifetime earnings and suggest that the overall effect of unions on earnings may not fully align with point-in-time estimates. Kristal (2013), for example, showed that the decline of organized labor power has partially contributed to a broader decline in the total share of income held by labor (see also Kristal and Cohen 2017). Jung (2016, 2017) showed that labor unions actively resist, and sometimes blunt, the harshest consequences of corporate downsizing, suggesting greater security and stability in employment for unionized workers. Moreover, scholars have documented the many nonpecuniary benefits that unions provide to workers, such as stable work hours (Finnigan and Hale 2018), fringe benefits and pensions (Rosenfeld 2014), health insurance (Hagedorn, Paras, Greenwich, and Hagopian 2016), marriage stability (Schneider and Reich 2014), greater civil and social capital (Zullo 2011, 2013), and a more robust connection to political participation and influence (Rosenfeld 2014; Feigenbaum, Hertel-Fernandez, and Williamson 2018; Macdonald 2021). Simply put, the benefits of unions, which should either directly or indirectly contribute to economic well-being, are not restricted solely to hourly wage setting.

Reasons for Skepticism

Although we suspect that union benefits extend beyond measured point-in-time associations, numerous reasons suggest that we might not find a meaningful association between lifetime earnings and union membership. We focus on five possible reasons. First, unions have declined in their ability to influence the distribution of earnings. Jacobs and Myers (2014), for example, demonstrated that labor unions were able to reduce income inequality prior to the anti-labor Reagan administration of the 1980s, but not afterward. Similarly, Rosenfeld (2006) found that strike activities have declined in their ability to produce favorable outcomes for union members in recent decades. In the late 20th-century sample of workers we use in our study, unions simply may not be effective at raising earnings consistently enough to make a detectable impact on lifetime earnings.

Second, life course earnings dynamics may counteract point-in-time union premium effects. For example, Cheng (2014) decomposed intragenerational wage attainment patterns into multiple components, including group-specific trajectories and earnings volatility, while Ludwig and Brüderl (2018) demonstrated that static estimates of marriage premiums potentially miss the influence of broader earnings trajectories of

individuals within groups. These studies reveal a general point that union premiums may coexist with other temporally dynamic wage attainment processes that may vary unevenly across segments of the labor market. Perhaps union members have higher average wages, but non-union members have higher volatility of earnings and steeper earnings trajectories. The combination of these factors may result in a higher lifetime income on average among non-union members, despite union members having higher wages on average at any point in time.

Third, union premiums may not accumulate in any meaningful way to lifetime earnings. Consider a point-in-time estimate of a union premium of 15%. If we compare lifetime earnings between an individual who spent their whole career in a union and an individual who never spent time as a union member, we may simply find that the former has lifetime earnings that are 15% higher than the latter. In that case, the study of lifetime earnings would contribute nothing beyond point-in-time studies of union premiums.

Fourth, the combination of wage premiums and time spent in paid labor may result in negligible lifetime earnings differences overall, or union earnings may accumulate in ways that do not reflect advantageous characteristics of unionization. Union members are more likely to have fringe benefits such as pensions (Rosenfeld 2014) and so may enter into retirement earlier than non-union workers. These additional years spent outside the labor force during later years of adulthood may negate the earnings premiums received earlier in the career.

Fifth, and finally, competition from global sources of labor may undercut any cumulative union benefits for domestic workers (Magnani and Prentice 2003). The era considered in this study witnessed substantial innovations in information and communication technologies that assisted in polarizing wages and employment (Autor 2014), many of which enabled firms to relocate production overseas to reduce labor costs without sacrificing efficiency or coordination. Firms that capitalized on these innovations may outcompete unionized firms, meaning that consistently unionized employees could end up in declining companies that cannot remain competitive with more globalized firms, resulting in overall lower lifetime pay.

Higher Education as a Comparison Point

A full assessment of any union lifetime earnings premium requires a point of comparison to determine its substantive impact on economic outcomes. A logical comparison is the lifetime returns to a college degree, perhaps the most widely studied and influential social institution that helps determine one's economic attainment. During the latter half of the 20th century and the beginning of the 21st, highly educated workers have enjoyed, on average, substantial growth in earnings (Lemieux 2006; Goldin and Katz 2010; Hout 2012; Autor 2014). These high returns to a college degree have translated into substantial lifetime earnings differences: Men and women with a

bachelor's degree earn, on average, $900,000 and $650,000 more in their lifetime, respectively, compared to those with only a high school degree (Tamborini et al. 2015).[1]

An assessment of the union lifetime earnings premium alongside educational lifetime earnings premiums presents another opportunity to evaluate the consequences of unionization for upward earnings attainment. Labor unions have been shown to have the greatest consequence on wage attainment among lower- and middle-paid workers who lack high levels of educational attainment, whereas college-educated workers have been less likely to be members of unions compared to those with less education for much of the 20th century (Rosenfeld and Kleykamp 2012, see table 2). We therefore consider not only union and education premiums alongside one another but also union lifetime premiums among those with and without a college degree. We anticipate that educational attainment and unionization provide two largely non-overlapping pathways of upward economic opportunity.

Data and Methods

Our analytical framework proceeds in two steps. First, using the PSID, we measure and decompose the cumulative unions earning premium among adults throughout their careers. Second, we focus on the relationship between cumulative union membership and the size of the union wage premium. Our aim is to identify whether the lifetime union wage premium can be attributed to more years of union membership with a consistent union wage premium each year, or whether greater accumulated union membership also increases the relative union wage premium.

Data Source

Our primary data source is the PSID. It follows the same individuals throughout their careers and is uniquely suited to measure earnings and union membership over the life course. We use a file from the Berlin Social Science Center (WZB), the WZB-PSID, which combines data from the PSID and the Cross-National Equivalent File (CNEF) (Brady and Kohler 2022). The CNEF, which is a supplement to the PSID, provides higher-quality standardized measures of income incorporating taxes, tax credits, and transfers (Frick et al. 2007). WZB-PSID data are available from 1969 through 2019. We restrict our sample to men who were 25 years or younger between 1969 and 1973, and who are observed for at least 20 years in the PSID sample.[2]

[1]These comparisons differ from those above because the reference group is a high school degree, not less than a high school degree. Note, too, that Tamborini et al. found that those with a graduate degree earn $600,000 and $430,000 more than those with a bachelor's degree, respectively.

[2]Selective attrition based on union status could affect our results. We find, however, that respondents who were unionized more than half their careers had the same median number of years in the sample (37 years) as respondents unionized less than half their careers. Additionally, we control for total number of years in sample in our primary regression models, as detailed below.

These restrictions ensure that we are evaluating earnings across sufficiently long durations (most or all of an individual's potential working career). We measure cumulative earnings at age 65. Among individuals not in the PSID sample at age 65, we include them at their closest age below 65 (but not younger than age 58). This approach leads to a sample size of 1,080 men observed once between the ages of 58 and 65.

We must, unfortunately, restrict our sample to men for both practical and substantive reasons. Most centrally, the large majority of female earners are categorized as "spouse" in the PSID, and spouse union membership only began to be collected consistently in 1979. We thus cannot measure union membership for approximately a quarter of the potential career span for women. Similarly, if we replicate our analyses for women beginning in 1979, we can measure only through age 55 for those workers who entered the labor market at age 18. Furthermore, we run into multilayered selectivity issues for female employment and unionization in the cohort under study. In 1969, fewer than half of prime-aged women participated in the labor market. Many women in this cohort also faced significant normative pressure and discrimination following childbirth to remain at home, resulting in larger proportions of women in this cohort exiting the labor market (Goldin and Mitchell 2017). Labor unions in this period were male-dominated and had sexist practices of recruitment and upward advancement, particularly among the membership core and leadership structure (Lichenstein 2012). As a result, unionized women working in consistent, full-time employment were a select group overcoming a vast institutional system of gender discrimination, biasing comparisons that can be made across non-union and non-working women.

In Online Appendix B, we present several sensitivity tests with alternative specifications of our sample criteria. The sensitivity tests alter the total years-in-sample requirement, adjust the age-of-observation-before-1980 requirement, incorporate two top-coding adjustments, and alter the PSID subsamples used.

Decomposing Lifetime Earnings

Our primary outcome is lifetime individual earnings. We compute lifetime earnings as the total sum of real earnings (in 2021 USD) from employment that an individual receives throughout his career. We further decompose lifetime earnings into three components to isolate the mechanisms through which union membership influences lifetime earnings: total years worked, mean hours worked per year, and mean hourly wage (in real terms) across all years.[3] In equations that follow, we formalize our method

[3]Years with zero earnings are counted accordingly in an individual's cumulative earnings. Given that total years worked captures the number of years with (or without) employment and earnings, we do not include zero values for hourly wages or hours per year worked when computing the mean values of those respective indicators.

of decomposing lifetime earnings differences into its constitutive components. We define lifetime earnings for respondent i as L_i, annual earnings as y_i, and hourly wage as w_i. At its most general form, an individual i's lifetime earnings are simply the sum of their hourly wage, w_i, across every hour worked, a, in their career. This can be written as:

$$L_i = \sum_{a=1}^{A} w_a \tag{1}$$

Of course, in nearly all studies of wage attainment, respondents are assigned a single wage in a particular year, t, as representative of their annual earnings and annual hours worked, h. This is written as:

$$y_{it} = h_{it}\bar{w}_{it} \tag{2}$$

with the year-specific wage, $\bar{w}_{it}$, either calculated as $\frac{y_{it}}{h_{it}}$ or provided by the respondent. We extend this simplification device of wage rates in a particular year to the entire lifetime earnings of a respondent. We therefore rewrite lifetime earnings as the following:

$$L_i = T_i\bar{h}_i\bar{w}_i + \epsilon_i \tag{3}$$

T is the total years worked in a respondent's career; $\bar{h}_i$ is the average annual hours worked; and $\bar{w}_i$ is the average annual hourly wage rate. The term ϵ_i is the difference between $T_i\bar{h}_i\bar{w}_i$ and observed L_i. In our main analyses, we assume that ϵ_i equals zero and is uncorrelated with $T_i\bar{h}_i\bar{w}_i$ and thus drop it from analyses, although in supplemental analyses we find negligible differences between $T_i\bar{h}_i\bar{w}_i$ and L_i. Equation (3), when logged, $\ln(L_i)$, allows us to rewrite the right side as the sum of $\ln(T_i)$, $\ln(\bar{h}_i)$, and $\ln(\bar{w}_i)$. Doing so allows us to easily model and assess the contribution of each component independently to lifetime earnings.

Identifying the components of lifetime income allows us to effectively ascertain which mechanisms, if any, are primarily responsible for lifetime earnings differences. If unions primarily increase lifetime earnings through higher average annual hourly wages, we should detect union and non-union differences in $\bar{w}$ but not T_i or $\bar{h}_i$.

Income Adjustments

Given the change in top-coding adjustments in the PSID after 1992, we apply the pre-1992 top-coding rules across all years in the sample to maintain consistency. See Online Appendix B for sensitivity tests with alternative top-code adjustments. Additionally, the PSID switched from annual to biennial data collection in 1997. Thus, we must decide how to treat earnings during the missing years (i.e., 2008, 2010, 2012, 2014, 2016, 2018) when computing lifetime earnings. We adopt three distinct approaches to test the sensitivity of our results to varying treatment strategies. Our primary

approach applies what we refer to as a conservative imputation. If the person was employed in 2007 and 2009, for example, then we assume the person was employed in 2008 and use the mean of hours and wages of 2007 and 2009 to impute the missing value for 2008. If the person was *not* employed during one of the two bracketing years, then we take a conservative approach and apply a zero value for hours, wages, employment, and union in the gap year. Our second approach, linear interpolation, simply fills the gaps with the mean of the two non-missing values. Our third approach does not impute values for the missing years and instead computes lifetime earnings among the observed years in the sample. The results from the second and third approaches, presented in text Appendix A, do not meaningfully differ from those of our primary approach.

Measuring Retirement

Given that age of retirement affects lifetime earnings, and union membership may influence the age of retirement, we separately measure the probability that an individual retires at or before age 65. Retirement is inferred directly from an indicator within the PSID data that notes whether the individual is retired (as opposed to employed, not employed but active in the labor force, inactive but not retired, or other potential employment statuses).

Measuring Union Membership

We measure union membership based on a direct prompt in the PSID that asks whether the individual belongs to a union or works in a job that is covered by a union. We measure cumulative union membership as the total number of employed years that were covered by union membership. For example, if an individual worked 40 years, with 20 of those years spent in a union, the cumulative union membership is 50%.

Educational Attainment

After estimating the lifetime earnings premium associated with unionization, we re-examine this association separately among those with and without a college degree. We assess whether the individual received a college degree based on a specific prompt in the PSID that asks the respondent, "Do you have a college degree?" To maintain consistency in our samples, we assess whether a given person *ever* obtained a college degree and segment the samples accordingly.

Methods

We present three equations to detail our strategy to estimate the effect of cumulative union membership on 1) age of retirement, 2) lifetime earnings and its subcomponents, and 3) the union hourly wage premium. We

present the base specification for each model, though we also investigate heterogeneous effects by education status (comparing men who received a college degree and men who did not) for each estimate. First, we estimate the effect of lifetime union membership on age of retirement and likelihood of retirement by age 65. Specifically, we calculate:

$$Retired_{ist} = \beta_1 LifetimeUnion_i + \beta X_i + \tau_t + \sigma_s + \varepsilon_{ist} \quad (4)$$

In Equation (4), $Retired_{ist}$ is a binary indicator of whether the individual (i) observed in a given state (s) and year (t) is retired at age 65. *LifetimeUnion* is our measure of percentage of years employed as a union member for the individual, and β_1 is our primary coefficient of interest. Vector X includes a set of individual-level controls: educational attainment, total number of years observed in the sample, age (to capture any relevant variation among the 58- to 65-year-olds in the final sample), number of children, race/ethnicity, and the share of employed years in each 2-digit occupation category. We include year dummies (τ_t) for the final year in which the respondent is observed and state dummies (σ_s) to measure the state in which the individual lives in his final year of observation. After examining the relationship of lifetime union membership and retirement, we turn to estimating the lifetime earnings associated with lifetime union membership. Specifically, we calculate:

$$L_i = \beta_1 LifetimeUnion_i + \beta X_i + \tau_t + \sigma_s + \varepsilon_{ist} \quad (5)$$

In Equation (5), the outcome variable is the log of real lifetime earnings. In subsequent analyses, we supplant that with the subcomponents of lifetime earnings: the log of total years employed, the log of mean hours worked per year, and the log of one's mean hourly wage. Our primary coefficient of interest remains β_1, the association of lifetime union membership with our outcomes. Our control variables remain the same as in Equation (4). To contextualize the results after presenting the estimation results, we also present predicted real values of lifetime earnings for individuals at five levels of lifetime union membership: never unionized, unionized for 25%, 50%, 75%, or 100% of one's career. In doing so, we exponentiate the predicted logged values following our regression estimates to display the difference in total lifetime earnings across these various levels of union membership.

Because wage union premiums have been so central to previous research on the link between unionization and economic outcomes, we pay special attention to this component. Specifically, we assess whether the hourly wage premium is driven through 1) a consistent union wage premium collected each year of union membership or 2) a rising relative union wage premium attributable to accumulated union membership. To assess these possibilities, we expand our sample to include the final year of observation for each individual as well as observations from ages 21 through 65 for the individuals in

our final sample. We then focus on the hourly wage earned in the respective year of observation (no longer averaging across multiple years) and estimate the following:

$$\delta_{ist} = \beta_1 Union_i + \beta_2 \overline{Union}_i + \beta_3 \left(Union_i * \beta_1 \overline{Union}_i \right) + \beta_4 X_i + \tau_t + \sigma_s + [\theta_i +] \varepsilon_{ist} \quad (6)$$

In Equation (6), δ_{ist} is the log of the real hourly wage earned in the given year of observation. We first include a binary indicator of whether the individual is unionized in the given year (*Union*), as is common in cross-sectional estimates of the union wage premium. We supplement this with our cumulative union indicator, $\overline{Union}$, a time-varying indicator within persons that measures the mean share of employed years unionized from age 18 through the age during the year of observation. Thus, a 30-year-old who has been unionized 12 years out of 12 years of total employment will receive a value of 100% when measured at age 30. If he is employed but not unionized over the next two years, the value of the variable at age 32 would be 86% (12 years unionized /14 years employed). We interact the two indicators (see β_3) to estimate whether the union wage premium is greater for individuals who have been unionized for more years. We control for age, education status, race/ethnicity, and total share of years employed as a share of all years in the sample, and the share of employed years in each 2-digit occupation category. In an extension to the analysis, we also estimate models using individual fixed effects (see θ_i in brackets) to evaluate whether the results hold when focusing on within-person variation in the size of the union wage premiums.[4]

We benchmark our cross-sectional union wage premium against identical estimates from the US Current Population Survey's Merged Outgoing Rotation Groups (CPS MORG), a common source of cross-sectional data for measuring the union wage premium in the United States. We provide full details on the CPS MORG sample in Online Appendix C.[5] The benchmarking allows us to confirm that our cross-sectional estimates of the union wage premium from the PSID are common across the two samples before evaluating whether cumulative union membership enhances the relative union wage premium.

Findings

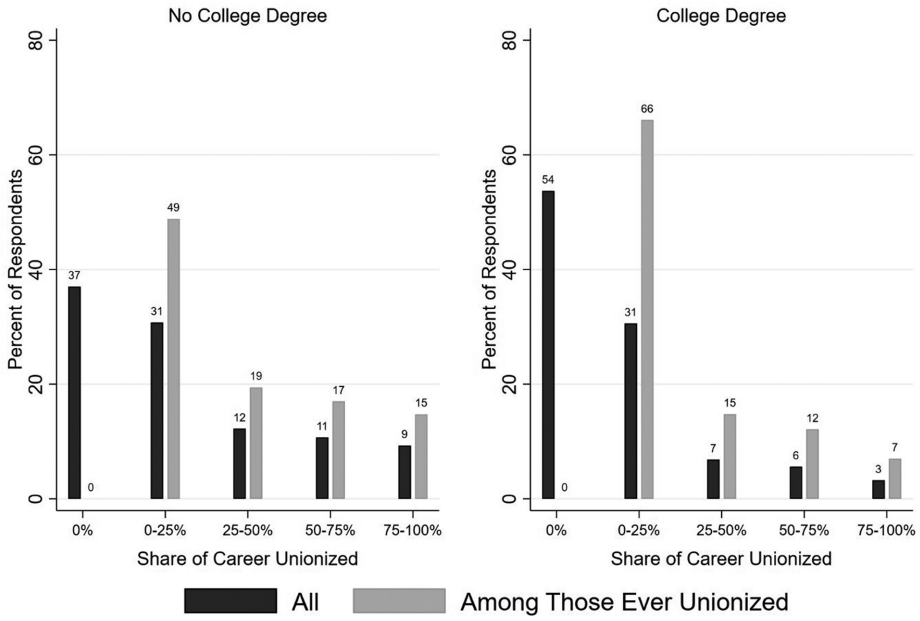
Descriptive Findings

Figure 1 presents the distribution of lifetime union membership among our sample of PSID respondents. The left panel presents results for individuals

[4]In our fixed-effects analyses, both union membership and share of career unionized to date are (or, have the potential to be) time-varying within all individuals. As a result, the base effects of union membership and share of career unionized to date do not drop out of the estimation results, as they would if they were treated as time-constant indicators within persons.

[5]The CPS MORG includes a year-long longitudinal component, but this time span is too short for the purposes of our study.

Figure 1. Rates of Lifetime Union Membership by Education Status



Notes: Authors' calculations from the Panel Study of Income Dynamics (PSID). Descriptive statistics limited to sample included in final analysis (n = 34,879 person-years among n = 1,080 persons). College degree indicates whether the respondent ever completed a college degree (constant variable for each respondent).

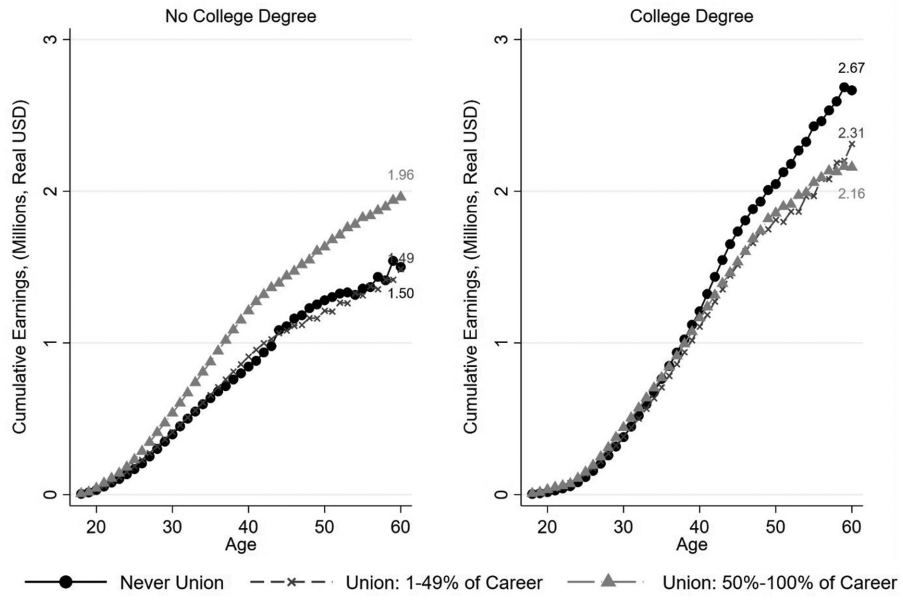
without a college degree, and the right panel for those with a college degree. The black bars represent the distribution for our full sample, and the gray bars represent the distribution among the subsample of respondents who were unionized for at least one year.

Among men without a college degree in our sample, 37% were never unionized. Among those unionized at least one year, 49% were unionized less than a quarter of their working careers and 19% were unionized between a quarter to just less than half of their working careers. By contrast, 32% of this group were unionized at least half of their working careers (15% between 50 and 75% of their working careers and 17% between 75 and 100% of their working careers).

Among individuals with a college degree, union membership is less common and with shorter average durations. Half of our sample of college graduates were never unionized. Among those who were unionized at least one year, two-thirds were unionized less than a quarter of their working careers, while 19% were unionized at least half of their working careers. College-educated workers are less likely to be unionized across their career, with 3% of this group spending 75 to 100% of their career unionized.

Figure 2 displays the cumulative earnings of individuals without a college degree (left panel) and with a college degree (right panel) by level of union

Figure 2. Mean of Cumulative Lifetime Earnings by Lifetime Union Membership (millions, 2021 USD)



Notes: Authors' calculations from the Panel Study of Income Dynamics (PSID). Descriptive statistics limited to sample included in final analysis (n = 34,879 person-years among n = 1,080 persons). Lifetime union membership is measured as a constant indicator for each individual based on share of employed years unionized in final year of observation. College degree is measured as a constant indicator for each individual based on whether the respondent ever completed a college degree. Earnings are measured in millions of 2021 USD.

membership (never unionized, unionized between 1 and 49% of career, or unionized at least half of career). The general pattern shows a widening cumulative earnings premium for the 50 to 100% unionized group, though no unconditional premium for the 1 to 49% union group relative to the never-unionized group. At age 60, for example, the average member of the 50 to 100% union group has earned $2 million in lifetime earnings, relative to approximately $1.5 million for the less- and never-unionized groups. The results for men with a college degree, however, are inverted (see right panel), likely because of the association of union membership and occupations worked.

Estimation Results

Given that earlier retirement is likely to affect cumulative earnings, we first estimate the effect of lifetime union membership on the probability of being retired at age 65 (or latest observed age between 58 and 65; our primary sample). Table 1 presents the findings.

Table 1. OLS Estimate of Relationship between Share of Years Unionized and Retirement Status at Age 65 (or Latest Observed Age between Age 58 and 65)

	(1) Retired	*(2) Retired*	*(3) Retired*
Share of employed years unionized	0.39***	0.27**	0.32***
	(0.07)	(0.08)	(0.10)
College degree		−0.03	−0.01
		(0.05)	(0.05)
Share of employed years unionized × College degree			−0.16
			(0.16)
Controls		Yes	Yes
Observations	1,080	1,080	1,080

Notes: Controls for age, race/ethnicity, share of years self-employed, total years in sample, disability status, number of children, state of residence, year of final observation, and share of employed years in each 2-digit occupation category. Outcome is a binary indicator of whether the respondent is retired (as opposed to employed, not employed but active in the labor force, inactive but not retired, or other potential employment statuses). OLS, ordinary least squares.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

The results in model 1 suggest that 100% lifetime union membership is associated with a 39 percentage point increase in likelihood of being retired at age 65. Model 2 adds a control for level of education (whether the individual obtained a college degree), and model 3 interacts educational attainment with share of years unionized to determine whether the effect of unionization on retirement varies by education. Results from model 2 show a negative but insignificant association between college attainment and retirement at age 65, conditional on occupation, disability status, and other covariates in the model (listed in the table notes).

Additionally, the interaction term in model 3 is negative, but not statistically significant. Thus, we cannot conclude that greater lifetime union membership has differential effects on the probability of retirement at age 65 for men with versus without a college degree. Instead, the conditional effect of greater union membership is positively associated with the probability of retirement by age 65 for all men in the sample.

Given that greater exposure to union membership is associated with a higher probability of retirement at or before age 65, the effect of union membership on lifetime earnings in our subsequent models may be biased downward. More time spent in union membership may both contribute to greater lifetime earnings and play a decommodifying role (i.e., reducing workers' dependence on consistent full-time employment to achieve economic well-being) during the end of one's working career. In that sense, the true value of cumulative union membership (beyond its association with financial gains) may likewise be understated in our subsequent models.

Table 2 presents the association of lifetime union membership with lifetime earnings and its three primary subcomponents: total years employed, mean hours worked per year, and the mean hourly wage. In model 1, the effect of lifetime union membership is positive and statistically significant.

Table 2. Association of Share of Employed Years Unionized and Lifetime Earnings

	(1) Log of lifetime earnings	*(2) Log, total adult years employed*	*(3) Log, mean hours per year*	*(4) Log, mean hourly wage*
Share of employed years unionized	0.48***	−0.01	−0.01	0.51***
	(0.07)	(0.02)	(0.03)	(0.06)
Observations	1,080	1,080	1,080	1,080

Notes: Controls for educational attainment, age, race/ethnicity, share of years self-employed, total years in sample, disability status, number of children, state of residence, year of final observation, and share of employed years in each 2-digit occupation category.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Specifically, the results suggest that 100% career union membership, compared to 0% career union membership, is associated with a 57% increase $((\exp(0.48)-1) \times 100)$ in lifetime earnings, independent of educational attainment, occupations worked, and other demographic and economic characteristics. We further explore the approximate dollar value of this lifetime wage premium below.

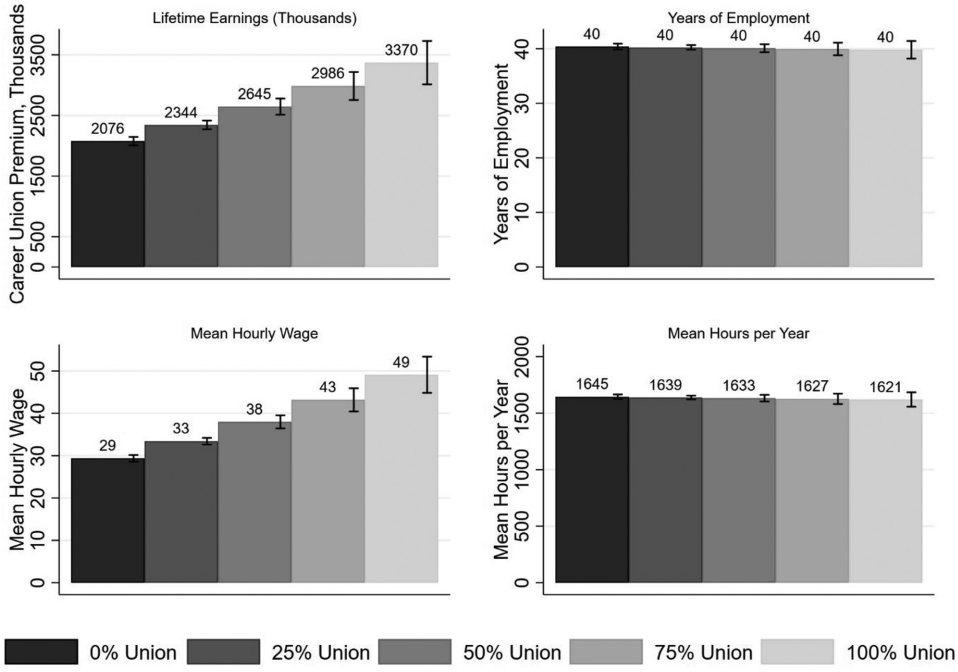
Models 2 and 3, respectively, show the association with years of total employment and the mean hours worked per year. In both cases, the association with lifetime union membership is substantively small, negative, and statistically insignificant. Thus, the entirety of the lifetime union earnings premium comes through increases in the mean hourly wage. Indeed, model 4 shows that an increase from 0 to 100% career union membership is associated with a 61% $((\exp(0.51)-1) \times 100)$ increase in an individual's mean hourly wage. Notably, while the lifetime earnings premium occurs exclusively through the union wage premium, the lifetime earnings premium somewhat understates the overall union wage premium because of the small negative associations for years employed and hours worked per year.

To place these findings into context, Figure 3 presents the predicted lifetime earnings (and its subcomponents) for the average retirement-age adult having spent 0, 25, 50, 75, and 100% of their career as a union member. We exponentiate the predicted logged values following our regression estimates to provide a more intuitive value of lifetime earnings.

The upper-left panel of Figure 3 illustrates the cumulative effect of union hourly wage premiums across the career. Workers who were union members for all their career are predicted to have earned $1.3 million (2021 USD) more compared to those who were never union members ($3.4 million compared to $2.1 million).

Whereas the results above present the mean effect of lifetime union membership across all respondents, Table 3 demonstrates heterogeneous effects by educational attainment. Specifically, Table 3 replicates Table 2, but with an interaction of our binary indicator of whether the respondent acquired a bachelor's degree.

Figure 3. Predicted Lifetime Earnings, Years of Employment, Mean Hourly Wage, and Mean Hours per Year by Lifetime Union Membership



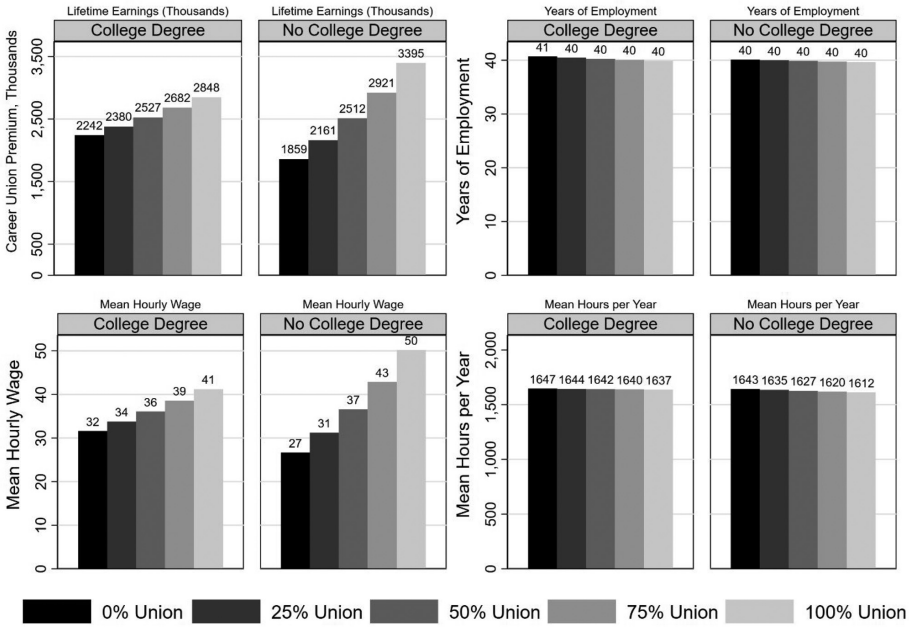
Notes: Results from Table 2. Mean hourly wages and hours per year measured among years in which adults were employed (no zero values included). Sensitivity tests using generalized linear models (GLM) regressing unlogged outcomes on lifetime union membership presented in text Appendix B. Error bars represent 95% confidence intervals.

Table 3. Heterogeneous Effects by Educational Attainment: Association of Share of Employed Years Unionized and Lifetime Earnings

	(1) Log of lifetime earnings	*(2) Log, total adult years employed*	*(3) Log, mean hours per year*	*(4) Log, mean hourly wage*
Share of employed years unionized	0.60***	−0.01	−0.02	0.63***
	(0.08)	(0.03)	(0.03)	(0.06)
College degree	0.19***	0.01	0.00	0.17***
	(0.05)	(0.02)	(0.02)	(0.05)
College degree × Share of employed years unionized	−0.36**	−0.01	0.01	−0.37**
	(0.14)	(0.04)	(0.05)	(0.11)
Observations	1,080	1,080	1,080	1,080

Notes: Controls for educational attainment, age, race/ethnicity, share of years self-employed, total years in sample, disability status, number of children, state of residence, year of final observation, and share of employed years in each 2-digit occupation category.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Figure 4. Predicted Lifetime Earnings, Years of Employment, Mean Hourly Wage, and Mean Hours per Year by Lifetime Union Membership and Highest Level of Educational Attainment



Notes: Results from Table 3. Mean hourly wages and hours per year measured among years in which adults were employed (no zero values included). Sensitivity tests using generalized linear models (GLM) regressing unlogged outcomes on lifetime union membership presented in text Appendix B.

Results in Table 3 highlight the central importance of union membership for less-educated workers. Model 1 shows that men with college degrees in our sample earn substantially more over their careers, by approximately 44% ($(\exp(.19)-1) \times 100)$), compared to those without a college degree. This finding is consistent with prior research on the college wage premium (Tamborini et al. 2015). Yet model 1 also shows that the effect of union membership on lifetime earnings premiums is primarily concentrated among men without a college degree, comparing the strong base effect of years unionized (for men without a college degree) to the negative, significant interaction term between years unionized and college degree (more than half the size as the base effect). The latter shows that mixing college and non-college workers understates the effect of unionization on lifetime earnings. Moreover, the wage gain for non-college workers reaching 100% career union membership (0.60 log points, or 67% gain) actually exceeds the wage gain associated with completing college (0.19 log points, or 44%). As before, we find that this effect is entirely concentrated in the accumulation of hourly wage premiums (model 4), rather than years or annual hours worked (models 2 and 3).

To contextualize these findings, Figure 4 presents the predicted lifetime earnings (and its subcomponents) for individuals with and without a college

Table 4. Cross-Sectional and Cumulative Union Wage Premiums

DV: Logged real hourly wage	*(1)* *CPS MORG, 1983–2019*	*(2)* *PSID, 1983–2019*	*(3)* *PSID, 1969–2019*	*(4)* *PSID, 1969–2019*	*(5)* *PSID, 1969–2019*	*(6)* *PSID, 1969–2019*
Union (binary)	0.27***	0.26***	0.27***	0.12***	0.17***	0.15***
	(0.01)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Share of employed years unionized at given age (SD)				−0.02	0.01	0.01
				(0.02)	(0.02)	(0.03)
Union × Share of employed years unionized at given age (SD)				0.12***	0.11***	0.07**
				(0.03)	(0.02)	(0.02)
Basic controls	Yes	Yes	Yes	Yes	Yes	Yes
Panel controls					Yes	Yes
Person fixed effects						Yes
Observations	1,379,128	15,271	20,445	20,445	20,445	20,445

Notes: Standard errors in parentheses. All models include state and year dummies. Basic controls include complete set of age dummies, education status, and race/ethnicity. Panel controls include share of years employed relative to all prior years in sample and share of years spent in each two-digit occupation group relative to all prior years in sample. All samples limited to men observed between ages 21 and 65. CPS MORG, Current Population Survey Merged Outgoing Rotation Groups; DV, dependent variable; PSID, Panel Study of Income Dynamics; SD, standard deviation.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

degree. The upper-left panel suggests that men without a college degree who are unionized less than half of their careers tend to earn less than individuals with a college degree, regardless of the lifetime union status of the college-educated workers. Notably, however, each step up in terms of lifetime union membership strongly benefits the lifetime earnings of the lower-educated workers. At 100% career union membership, the predicted lifetime earnings of the lower-educated worker ($3.4 million) exceeds the predicted earnings for college-educated workers. The results suggest that lower-educated workers who are unionized throughout their entire careers fully offset the college wage premium received by their higher-educated peers. The lower-left panel shows again that these results are driven entirely through the hourly wage advantage associated with greater union membership.

A Cumulative Union Wage Premium?

Thus far, the results suggest that greater lifetime union membership is associated with a large lifetime earnings premium, primarily channeled through increases in the mean hourly wage. The final part of our analysis follows Equation (6) in estimating whether the union hourly wage premium also increases with greater lifetime union membership or, by contrast, whether the beneficial effects on lifetime earnings are simply a result of more years of collecting a relatively stable union wage premium.

Models 1 and 2 in Table 4 present the cross-sectional union wage premium in the CPS MORG and PSID samples, respectively. Recall that we

apply the same years of observation, age ranges, and controls in both samples. The union hourly wage premiums are nearly identical in the two samples: Union membership at the time of observation is associated with a 0.27 (CPS MORG) or 0.26 (PSID) log point increase in hourly wages. Model 3 expands the PSID sample to include the full range of years (1969 onward) and finds a similar union wage premium, on average. That the cross-sectional union wage premium in the PSID aligns with that of the CPS MORG is unsurprising, perhaps, given the findings of previous studies that compared wage attainment across these data sets as well as union premiums (VanHeuvelen 2018). Nevertheless, our finding provides further confidence that the PSID produces results consistent with the source of data used most frequently to produce estimates of the union premium. In models 4, 5, and 6, we take advantage of the longitudinal nature of the PSID to estimate whether the union wage premium increases with more years unionized (independent of years worked, age, or other characteristics).

In model 4, adding the interaction of cumulative union membership with current union membership suggests the union hourly wage premium does, indeed, increase with more years unionized. These findings hold when additional controls (share of years employed and share of years employed in specific occupation groups) are added in model 5. Specifically, the results from model 5 suggest that the union hourly wage premium for a worker with the mean level of cumulative union membership (given that the continuous indicator is standardized in the interaction term) is 0.17 log points, two-thirds of the value observed in the cross-sectional estimate in model 3. Moreover, a one standard deviation increase in cumulative union membership increases the hourly union wage premium by two-thirds (an increase of 0.11 log points). Finally, model 6 adds individual fixed effects (FE), capturing all between-person variation in characteristics that might affect wages or the union wage premium. The interaction term is again positive and statistically significant, indicating that an individual's relative union premium is not necessarily constant over time, but instead increases with more accumulated years of union membership. In this more conservative estimate, a two standard deviation increase in cumulative union membership roughly doubles an individual's union wage premium. That said, the FE estimates do not fully resolve selection effects into and out of union membership.

Sensitivity Tests

We present several sensitivity tests in the text Appendices to evaluate the robustness of our results to various sample restrictions, top-coding adjustments, and estimation techniques. In Appendix A, we present the effect of lifetime union membership on lifetime earnings using alternative imputations for the PSID gap years beginning in 1997. In Appendix B, we re-estimate our lifetime union earnings premiums using generalized linear models (GLM) that regress the unlogged earnings components on lifetime

union membership using a log-link function and gamma distribution family (Denice and Rosenfeld 2018). In Online Appendix B, we present alternative estimates using various top-code adjustments and years-in-sample requirements. Our findings are consistent across each set of tests.

Discussion and Conclusion

The decline of labor unions has been central to studies of the rise of earnings inequality in the United States throughout recent decades. Generally, the influence of unions on workers' wages is conceptualized through a point-in-time earnings premium. This study, by contrast, proposes that such an approach understates the influence of unions on workers' earnings. First, point-in-time estimates of the union premium understate the role of unions in generating cumulative advantages that span the length of one's career. Second, the point-in-time estimates overlook how union premiums increase with more years of accumulated union membership. In addressing these shortcomings, we demonstrate that persistent union membership leads to rising union wage premiums that accumulate to estimated lifetime gains of $1.3 million (2021 USD), larger than the premium associated with obtaining a college degree.

We reach this conclusion using five decades of data from the PSID. We follow a cohort of men who joined the labor market in the early 1970s—from their first entry into employment through retirement—and track the variation in lifetime earnings that are associated with a greater share of one's career spent as a union member. Methodologically, we apply a decomposition framework to dissect lifetime earnings gains into total years employed, mean hours of work per year, and mean hourly wages. We find that the $1.3 million cumulative earnings advantages associated with persistent union membership are entirely channeled through hourly wage premiums. For men without a college degree, persistent union membership is roughly equivalent to the lifetime earnings premium associated with attaining a college degree found among the same sample, as well as in previous studies using administrative data (Tamborini et al. 2015). Moreover, these cumulative advantages occur despite a unionized career being associated with a higher probability of retirement by age 65. Thus, unionization associates with both higher overall earnings and an easier transition out of the labor market.

Note that the union earnings premium that contributes to larger lifetime earnings is not fully captured in the point-in-time wage premiums featured in prior studies. Drawing on life course theory and studies of lifetime earnings, we posit that union premiums may be notably larger for workers who have been unionized for a larger part of their careers (Elder 1994; Mayer 2009; Cheng 2014; Cheng et al. 2019). Our findings suggest this is the case: Our most conservative estimate suggests a two standard deviation increase in cumulative union membership roughly doubles an individual's union

wage premium compared to workers with less accumulated union membership but otherwise similar characteristics. In additional analyses, we also find that union membership at a younger age is associated with a stronger wage premium than union membership at older ages; this may suggest that the gains of union membership are even stronger for younger workers, perhaps because of the greater development of skills and establishment of a higher wage floor early in one's career.[6]

Our findings have consequences for understanding the role of labor in shaping trends in earnings inequality. We argue that the broader stratification literature has insufficiently identified and described the central role of union decline for the trajectory of American workers over time. Although labor scholars have repeatedly emphasized the importance of union decline for the decrease in and stagnation of well-being among lower-educated and blue-collar workers, our findings show that the fall of private-sector union membership, from approximately 33% in the 1950s to 6% today, and the decline of union power over wage setting, has resulted in a collapse of economic attainment equivalent to that of the loss of a college degree. Put differently, the decline in worker power can be conceptualized as losing an alternative institutional pathway available, at least to moderately skilled men, that could return a quality of life similar to that of a bachelor's degree. That this pathway to a substantial earnings premium is shut down for those less likely to attain a degree (Rosenfeld and Kleykamp 2012), especially moderately and lower-skilled men as well as less-educated racial minorities, represents a fundamental reshaping of the American labor market.[7]

We find it important to note that our estimates may themselves understate the true payoff of a unionized career. We focus on earnings from paid employment and thus bracket potential alternative sources of earnings that contribute to late-in-life well-being. Yet research shows that union membership is associated with a variety of fringe benefits, including receipt of a pension (Rosenfeld 2014). Thus, the earnings premium that we document that unionized workers can bring into their retirement years may be complemented by additional earnings.

In closing, we highlight limitations of our study. First, our results may come from a cohort that enjoyed the highest benefit of unionization. Our sample of men in the Baby Boomer cohort entered the labor market as union membership rates began to decline, with union power suffering substantial declines shortly thereafter during the Reagan administration (Viscelli 2016). Given strong declines in union membership, future cohorts may see smaller cumulative gains from union membership; in additional

[6]Estimating the hourly union wage premium in our cross-sectional models, we find that the union wage premium declines from an approximate 31% hourly wage advantage for unionized 20-year-olds to a 21% hourly wage advantage for unionized 60-year-olds.

[7]We suspect that these wage premiums accrue primarily through mechanisms such as seniority, work experience, and collective bargaining power. These factors should be especially consequential to lower-educated men, who might otherwise have limited pathways for upward attainment.

analyses, we find that this outcome is likely channeled through declines in union membership, rather than declines in the wage premium associated with union membership. Our findings suggest that the increasingly rare group of workers who are persistently unionized may nonetheless see similar gains as observed in this study. Additionally, we emphasize that our results are adjusted for time spent in specific occupation categories, which eases concerns that we simply detect occupation effects. Nevertheless, one might find significant variation of lifetime union earnings effects across other segments of the labor market, a possible extension for future research.

Labor unions have lifted the economic conditions of less-powerful workers. In the best case, a unionized career has provided an earnings premium that resembles that of a college degree, we find. In this sense, the economic importance of unionization has been substantially understated in previous research. Union premiums accrue across the life course in ways not fully captured by point-in-time studies.

Appendix A: Alternative Treatment of Gap Years

Table A.1. Association of Share of Employed Years Unionized (Continuous Indicator) and Lifetime Earnings

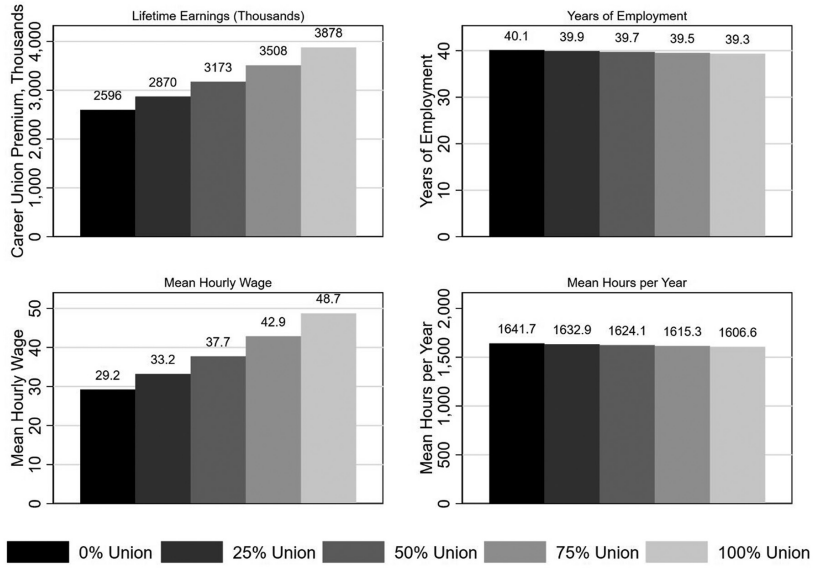
	(1) Log of lifetime earnings	*(2) Log, total adult years employed*	*(3) Log, mean hours per year*	*(4) Log, mean hourly wage*
Conservative imputation				
Share of employed years unionized	0.48***	−0.01	−0.01	0.51***
	(0.07)	(0.02)	(0.03)	(0.06)
Linear interpolation				
Share of employed years unionized	0.51***	−0.01	−0.01	0.52***
	(0.08)	(0.02)	(0.03)	(0.06)
No imputation				
Share of employed years unionized	0.48***	0.04**	−0.11***	0.54***
	(0.09)	(0.01)	(0.03)	(0.08)

Notes: Controls for educational attainment, total years in sample, calendar year of final observation of person, age bins, number of children, race/ethnicity, state, first occupation (2-digit category), and share of employed years in each 2-digit occupation category. *Conservative imputation* is our primary specification: If the person was employed in 2007 and 2009, then we assume the person was employed in 2008 and use the mean of hours and wages of 2007 and 2009 to impute the missing value for 2008. If the person was *not* employed during one of the two bracketing years, then we take a conservative approach and assign a zero value for hours, wages, employment, and union in the gap year. *Linear interpolation* fills the gaps with the mean of the two non-missing values, including a zero value if a respondent is not employed during one of the two bracketing years. *No imputation* does not impute values for the missing years and instead computes lifetime earnings among the observed years in the sample.

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

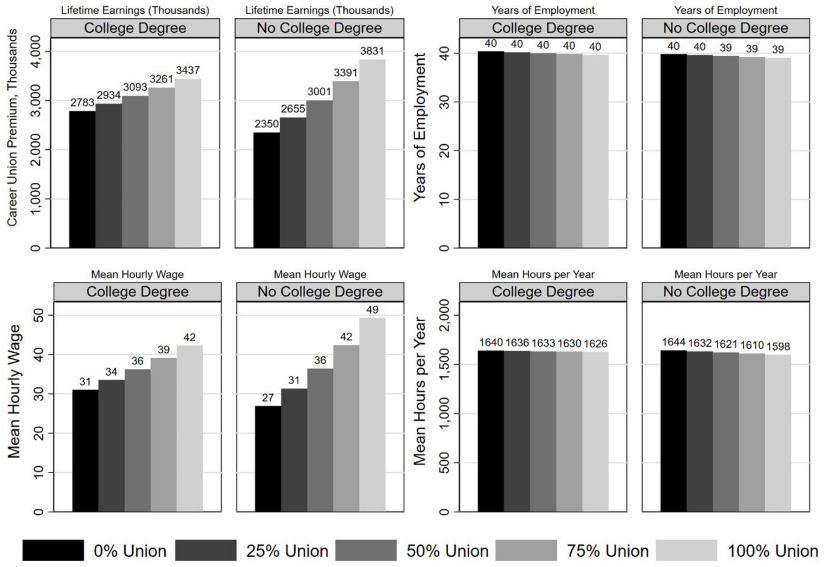
Appendix B: GLM Estimates

Figure B.1. Generalized Linear Model (GLM) Estimates of Lifetime Union Earnings Premium among Full Sample (2021 USD)



Notes: GLM estimates regressing unlogged earnings components on lifetime union membership and controls (specified in Equation (3)) using log-link and gamma distribution family.

Figure B.2. Generalized Linear Model (GLM) Estimates of Lifetime Union Earnings Premium by Education Status (2021 USD)



Notes: GLM estimates regressing unlogged earnings components on lifetime union membership and controls (specified in Equation (3)) using log-link and gamma distribution family.

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