Unions, Wages and Hours

David G. Blanchflower

Bruce V. Rauner Professor of Economics,
Department of Economics, Dartmouth College,
Adam Smith Business School, University of Glasgow,
IZA, GLO and NBER
Blanchflower@dartmouth.edu

and

Alex Bryson

Professor of Quantitative Social Science
Social Research Institute
University College London,
NIESR and IZA
a.bryson@ucl.ac.uk

May 9th 2024

Abstract

We examine union-non-union differentials in wages and hours in the United States over the last 50 years using data from the Current Population Survey (CPS). The regression-adjusted difference between union members' and non-members' hourly earnings has been falling since the Great Recession. The union differential in weekly wages has been more stable. Although it fell by around 5 log points during COVID it remains 15 log points. This weekly earnings differential arises from both a higher hourly wage of around 10 log points and longer working hours (5 log points). The working hours differential partly reflects unions' ability to tackle under-employment, such that union workers work closer to the hours they desire than their non-union counterparts. The traditional focus on hourly wage differentials underplays the important role trade unions play in maintaining members' weekly earnings by ensuring workers receive the paid hours they desire.

JEL Codes: J51; J22.

Key words: trade union membership; union wage differentials; weekly earnings; hourly earnings; hours; under-employment

1. Introduction

Across much of the industrialized developed world the proportion of workers joining trade unions – union density - has been in decline for decades (Table 1). This is particularly evident in English-speaking countries, including the United States, where unions usually organize workplace-by-workplace to establish collective bargaining rights. Table 1 indicates that union density in the United States has fallen by around two-thirds in the last sixty years (from 31% in 1960 to 10% in 2020).

The monotonic decline since the late 1970s is driven by decline in the private sector, whereas density has remained relatively stable in the public sector (Chart 1).[1] Table 2 shows the change in union density rates in the United States across different sub-populations since 1973. Over the course of fifty years union density fell from 24% to 10% across the whole economy. The declines are most dramatic among males (from 31% to 10%), those with less than college education (26% to 9%) and in Manufacturing (39% to 8%). The unionization rate for those with college education or above remained at around 11%. Only in the public sector was there a notable rise in unionization rates.

Nevertheless, running linear regression models for union membership in the period shortly after the Great Recession and again during COVID we find the correlates of membership have remained similar over time. The probability of union membership is lower for women, the better educated, those in the private sector, and is hump-shaped in age, but all of these associations have weakened a little over time (Appendix Table A1a). There is also substantial spatial variation with membership probabilities highest in Connecticut and Hawaii and lowest in North Carolina and Virginia. The regression-adjusted rankings are similar to the underlying raw membership rates by state (Appendix Table A1b).

Organizing workplaces in countries like the United States and the United Kingdom has proven increasingly difficult over the years, with some arguing the difficulties stem from supply-side problems associated with unions being cost-disease organizations (Willman et al., 2020) whilst others emphasize a decline in the demand for the union good (Farber, 1987). Either way, decline in union density threatens to undermine union bargaining power which is predicated on unions' ability to monopolize the supply of labor to employers to strengthen their hand in pay negotiations.

It is usually assumed that the decline in aggregate union density necessarily means pay differentials between union and non-union workers – often referred to as the union wage premium - will have declined compared with the period of peak union strength. Some have asserted that a shift in bargaining power towards employers and away from organized labor lies behind the recent decline in labor's share of gross domestic output in OECD countries (Guschanski and Onaran, 2022) and may also help explain a decline in rent-sharing (Stansbury and Summers, 2020). However, this prediction may not hold for a variety of reasons.

First, union decline may have occurred disproportionately in workplaces with weaker unions: if unions with greater bargaining strength remain relatively unaffected by aggregate decline in union

[1] The Bureau of Labor Statistics reports that 14.4 million wage and salary workers were union members in 2023 with a union density rate of 10.0%, little changed from the previous year. In 1983 there had been 17.7 million union members accounting for 20.1% of workers. https://www.bls.gov/news.release/pdf/union2.pdf

numbers – perhaps because they are organized in firms with larger rents to share – the bargaining power of unions remaining in place could be at least as high as it was in the past. Some support for this proposition comes from the workplace-level analyses of unionization in Britain in the 1990s and 2000s which indicated that many workplaces continued to have high union membership rates (Millward et al., 2000) and that unions continued to organize firms with high rents to share (Brown et al., 2009).

Second, a decline in the incidence or power of trade unions may reduce the union threat effect in the non-union sector, such that non-union employers may be less inclined to shadow union-set wages than in the past, leading to a maintenance in wage differentials across the union and non-union sectors (Fortin et al., 2021).

Third, there have been marked changes in the composition of the union and non-union sectors over time. As discussed above, the nature of workers in the union sector has changed. Compared to past decades, union workers are less likely to be drawn from the ranks of blue-collar workers, and are more likely to work in professional occupations, often in the public sector. They are more likely to be female than they were in the past and are more highly educated. The compositional differences need to be accounted for when examining trends in the adjusted union wage premium over time. It is not clear, a priori, what the implications of these compositional differences might be for trends in the adjusted union wage premium over time (Frandsen, 2021).

A fourth consideration is the nature of competition for goods and services. Globalization has the potential to undermine union bargaining power by increasing the price sensitivity of demand for goods and services. If increased price elasticity of demand for goods and services limits employers' opportunities to pass on a union wage mark up to customers, this may limit unions' ability to extract wage gains from employers. However, evidence to date indicates that non-union workers face similar constraints and, in the absence of union bargaining power, are less equipped than unionized workers to resist pressures to downwardly adjust wages in the face of import penetration. As a result, the union wage premium is *larger* in sectors facing higher import penetration (Blanchflower and Bryson, 2003). Business cycle effects operate in a similar fashion: when demand for goods and services falls placing pressure on employers to lower wages the effects are felt disproportionately in the non-union sector (Blanchflower and Bryson, 2003).

It is against this backdrop that we reexamine the size of the union wage premium in the United States over five decades, from 1973-2023 using data from the Current Population Survey (CPS). In doing so, we update evidence from Blanchflower and Bryson (2004a, 2004b) who examined these data through 2002. Our series thus extends the period over which the premium has been estimated some 21 years to include the Great Recession of 2008 and the COVID pandemic of 2020.

We also extend the union wage premium literature for the United States by estimating not only differences in log hourly earnings, which is the usual metric in the literature, but also log weekly earnings. There are strong reasons to do so. Workers are likely concerned about hourly wages, and the returns to hourly wages they can derive from union membership, relative to the wage they might otherwise receive through market-set wages. But they may also derive utility from their overall weekly earnings, and thus the combination of hourly wages and the number of hours they

are able to work. Weekly earnings are a good measure of the total value a worker might derive from their job, as well as being important in establishing what that worker's household is able to consume.

A recent literature indicates that many workers wish to work more hours than their employer is able to offer them, what is known as 'under-employment' (Bell and Blanchflower, 2019; 2021). This may be due, in part, to employers' ability to limit labor costs by tailoring their demand for labor to the timing of demand for their goods and services, something they are increasingly able to do through the deployment of new technologies such as 'gig' platforms. If unions are able to resist downward pressure on hours worked, this can help union workers maintain weekly earnings relative to that of non-union workers. Theoretically, it is possible for trade unions to do this if they are engaged in efficient bargaining with employers whereupon they negotiate over wages and labor demand simultaneously (Bryson, 2004). On the other hand, if most bargaining resembles a right-to-manage model in which unions bargain solely over wages while employers determine employment subject to the bargained wage, unions' ability to set a higher hourly wage through wage bargaining could come at the expense of hours worked.

The remainder of the paper is structured as follows. Section Two presents our data and estimation methods. Section Three reports results, beginning with trends in weekly earnings and the union wage differential in log weekly earnings (Section 3.1). Then in Section 3.2 we turn to the union differential in log hourly earnings. Section 3.3 examines union differentials in working hours before we turn to the role unions play in tackling under-employment. Section Four discusses the implications of our results and concludes.

2. Data and Estimation

We examine union wage and hours differentials in the United States using individual level cross-section, nationally representative data from the Outgoing Rotation Group files of the Current Population Survey (CPS) for the period (1983-2023). We have previously used these data in earlier papers. In Blanchflower and Bryson (2004a, 2004b), for example, we looked at these CPS data for the period 1983-2002. Blanchflower (1999), for example, used data from 1983 and 1993. We also make use of data from the May CPS files from 1973-1981.[2]

For this paper we obtained the annual MORG files for the years 1983-2023 from the NBER website.[3] Respondents are included in the CPS eight times in total over a period of twelve months. They are in first for four months, then not interviewed for four months and then again are interviewed in a further four months. Earnings and union status are available in months 4 and 8, the so-called Outgoing Rotations and these are the samples we use here.

2.1: Earnings measures

The weekly wage data in the CPS are top coded to prevent high earning individuals being identified (Appendix Table 2). For the years 1983-1988 the top-code was $999. It then switched to $1,923 from 1989 to 1997 and then $2,885 from 1998 through March 2023. There are no top codes for

[2] An example of papers that have estimated union wage differentials using the CPS include Bloch and Kuskin (1978), Parsley (1980), Baugh and Stone (1980), Card (1996) and Belman and Voos (2006). See especially also Lewis, 1963, 1986, Mincer (1981) and Booth and Bryan (2004).

[3] https://www.nber.org/research/data/current-population-survey-cps-merged-outgoing-rotation-group-earnings-data.

the other nine months in 2023. We follow the standard practice of multiplying the top code values by 1.5 in all years through 2022 and through March in 2023.[4] From April 2023 the top codes changed, and we do not impose the 1.5 rule.[5] In the first three months of 2023 the top codes were 2884.61 or an annual wage of $150,000. So, the mean value of the top code was $4326.915 or $225,000 a year. The percent of earners who were top coded was 7.6% in January, 7.3% in February and in 7.5% in March. In April-December the top values were $9,999.99 and there were 7.8% above $2,884 and the mean of the values above that was $4,437.67, close to the values allocated in earlier months (and years).

In addition, as noted in Blanchflower and Bryson (2004a, 2004b) following Hirsch and Schumacher (2004), there is an issue of non-response to this wage question, so the BLS imputes values. It turns out that they do not include union status in their imputation equations which biases estimated union wage differentials downwards. Bollinger and Hirsch (2006) examine match bias arising from earnings imputation. Wage regressions including attributes not used as imputation match criteria (e.g., union) are severely biased. Match bias also arises, they note, with attributes used as match criteria but matched imperfectly. Imperfect matching on schooling (age) flattens earnings profiles within education (age) groups and creates jumps across groups. See also Bollinger et al. (2019). Hence in what follows we omit individuals who had their weekly usual earnings imputed using the variable I25d. We examine in detail the 2021-2023 files. In these 35.5% of earnings are imputed or 138,376/389,646 observations. Of those that do not have imputed values 7.2% have top codes, with a higher percentage in the non-union sector (7.5%) than in the union (4.6%) in the data prior to April 2023.

As Macpherson and Hirsch (2023) note, there is an issue here as to what is the best measure to use to calculate union effects. One problem is that the proportion of employees who are hourly paid has declined over time and many people, including the two authors, do not have a set number of hours. Most workers are likely to know their annual wage as they report it in their tax returns.[6] Dividing that number by 52 is probably doable for most people. Some workers may work less than 52 weeks, but the majority do not, and if they do then they can divide their annual income by a smaller number. For many, the number of hours varies by week. Over time the non-response rate to the weekly earnings question has risen sharply and as a result the BLS imputes data. We deal with that issue below.

In estimating hourly wage equations, we follow the method used by Unionstats.com where we define hourly earnings as weekly earnings/usual hours, after we have applied the top codes and when that is not available, we use hours last week. For the remainder, if an hourly wage is reported we use that. Once again, we drop imputed values.

2.2: Hours worked

The BLS does not report separate average hours by union status, but this is available from the MORG micro data. We report usual hours weighted with the *weight* variable available in the data

[4] Card et al (2020) use a multiple of 1.4 as a top code.

[5] https://www.census.gov/programs-surveys/cps/technical-documentation/user-notes/2023-cps-puf-changes.html

[6] Weeks worked is reported in the annual social and economic supplements conducted in March each year. Wage data reported there for the prior year are examined in Blanchflower and Oswald (1994). In the March 2023 March Supplement (weighted) file the mean number of weeks worked last year (n=72,937) was 47.5 with 78% working 52 weeks and 5.2% less than twenty weeks.

sets. At the outset we should note that hours in CPS are higher than those reported by the BLS using data at the level of the firm from the Current Employment Survey (CES). The differences have been addressed in earlier papers (Abraham, Spletzer and Stewart, 1998, 1999). Frazis and Stewart (2010) extended that early work and found that "*much of the difference in levels between the two series can be explained by differences in the workers covered (all private nonagricultural workers versus production and nonsupervisory workers), differences in the way average weekly hours are computed in the two surveys (person-based in the CPS and job-based in the CES), and differences in the hours concept (hours worked in CPS versus hours paid in CES)*."

3. Results

3.1: Weekly Earnings Differentials

Median real weekly earnings in the CPS were fairly static in the two decades prior to the late 1990s, rising in the early 2000s, stabilizing again in the period to 2014 before rising steadily until peaking in the second quarter of 2020. They dropped with COVID, only to begin recovering again in the fourth quarter of 2022, remaining at historically high levels in quarter 4 of 2023 (Appendix Chart A1). Establishment level mean weekly earnings were also fairly flat through to the Great Recession but started rising thereafter, with a huge spike early in COVID followed by a short period of downward wage adjustment, then further growth since early 2022 (Appendix Chart A2).

The Bureau of Labor Statistics' annual reports provide data on both weekly and hourly wages of full-time wage and salary workers based on the CPS data we use below. Weekly wage data are available quarterly, whereas the hourly wage data are available annually and are reported as medians. Data are reported in current dollars as well as in constant, real dollars and we examine trends in both.[7] Table 3 presents the BLS series on median usual weekly earnings for full-time wage and salary employees since 2000 by union membership status derived from CPS. The raw gaps in weekly median earnings are large, rising to 30% just prior to the Great Recession. Although there is substantial year-on-year variance in the size of the gap it begins to close from 2014/15 and converges more rapidly in the COVID era. The gap of 16% in 2023 is 58 percent of the gap that existed in 2000. Of note is the much more rapid rise in wages in the non-union sector in the post-COVID period from 2021-2023 (11.8%) compared with union sector increases (8.0%).

In Table 4 we present union membership log earnings differentials for each separate year over 50 years between 1973 and 2023. Column 3 presents unadjusted weekly earnings differentials which are also plotted with the blue dotted line in Chart 2. These are the differentials in mean weekly earnings of all workers (full-time and part-time). In the first 15 years the differential is around 50 log points after which it declines, albeit slowly, to 35 log points by 2019, only to drop more quickly with the on-set of COVID. By 2023 the unadjusted weekly wage differential is 27 log points, nearly half what it was 50 years previously. The regression adjusted weekly wage gap in column 4 is round two-fifths of the raw differential and, notwithstanding quite a bit of year-to-year variance, is relatively stable until the on-set of COVID in 2020 whereupon it falls 5 log points and remains there. It is 15 log points in 2023.

[7] They are available for union and non-union workers: https://www.bls.gov/webapps/legacy/cpslutab2.htm

In Table 5 column 1 we run six log weekly wage equations for groups of years (1983-1991, 1992-1999, 2000-2006, 2007-2013, 2014-2020 and 2021-2023) to recover the union member-non-member differential in the CPS having adjusted for plausibly exogenous controls (age, gender, race, education, state, industry, sector and year). These equations help smooth year-to-year variance and account for between 44 and 48 percent of the variance in log weekly earnings. We present the regression-adjusted union log weekly wage premium together with the t-statistic. In the 1980s the differential was 17 log points. It rises by around 5 log points in the 1990s, then remains roughly stable until the COVID period whereupon it falls back 5 log points to around where it was in the 1980s. This pattern is very different from movement in the raw gap, a point illustrated by comparing the blue dotted and green solid lines in Chart 2 which plots the data in Table 4. Movements in the log weekly union earnings differential since the early 1980s seem similar in the whole economy and the private sector only (Charts 2 and 3).

Table 6 focuses on the most recent period, 2021-2023, to estimate sensitivity of the log weekly wage differential in the CPS to alternative model specifications. We can see that the raw differential of 27 log points (or 32.7% if presented as the anti-log of the coefficient minus 1) in column 1 (where year dummies are the only regressors) is nearly halved with the introduction of personal controls in column 2. But it remains around 15-18 log points thereafter irrespective of model specification and is 18 log points in the model with the fullest set of controls (column 6 which includes 2-digit occupation codes and marital status as used in www.unionstats.com). Results are very similar if we use an alternative method developed by Hirsch and Macpherson in unionstats.com to account for top coding.[8]

3.2: Hourly Earnings Differentials

Hourly earnings differentials by union membership status are presented for each year between 1973 and 2023 in Table 4. Column 1 presents the unadjusted differential. In 1973 union members were earning around one-third more than non-members in hourly earnings (34 log points), but this had halved to 17.5 log points by 2023. The differential is at or above 30 log points for all but two years through to the end of the 20th Century, but remains below 30 log points subsequently, with a decline in the coefficient apparent from around 2013-2014 which gathers pace with the advent of COVID.

The hourly adjusted union wage premium presented in column 2 of Table 4 is substantially smaller than the unadjusted gap and varies less over the course of the half century. It peaks in 1978 and 1984 at 16.3 log points and is lowest in 1979 at 8.8 log points. However, it does fall with the advent of COVID from 11.75 log points in 2019 just prior to COVID to 9.0 log points in 2023. But year-to-year variance is large too: for instance, the differential falls from 16.3 log points in 1978 to 8.8 log points in 1979.

To get a clearer picture of trends in the hourly union wage differential we turn to column 2 of Table 5 where we present six equations for grouped years from 1983-1991 to 2021-2023. The hourly union wage differential of 11.5 log points in the 1980s rises to 15-16 log points in the period

[8] The website www.unionstats.com utilizes the MORG data files of the CPS adjusting the top-codes rather differently using separate values by gender obtained by fitting a Poisson distribution. They also use a broadly similar set of controls but add narrow occupation and marital status. They also exclude individuals with imputed values for usual weekly earnings. Results using these top codes are reported in Appendix Table 3.

through to 2013. However, it drops back to its 1980s level from 2014, and drops below 10 log points during COVID. The hourly differential therefore follows a time pattern that is similar to the weekly wage differential in column 1 of Table 5.

Table 7 examines the sensitivity of the union differential in log hourly wages to model specification for the whole economy. The raw differential of 18.6 log points (column 1) drops by more than two-fifths controlling solely for personal controls (column 2). But the addition of extra controls makes little difference. Indeed, in the fullest model specification in column 6 which accounts for 43 percent of the variance in log hourly earnings, the union differential is up to 12.3 log points.

As previous studies have shown (Blanchflower and Bryson, 2004a) there is substantial heterogeneity in union wage differentials across person and job type. Wage returns to unionization tend to be higher for less educated workers and non-whites, both in weekly and hourly earnings (Table 8). The fact that the weekly union differential in earnings is considerably higher than the hourly differential indicates that there is a significant, and positive, hours premium for union workers, an issue we turn to next.

3.3: Log Hours Differentials by Union Status

Table 9 plots mean usual weekly hours for each of the last 50 years for union members and non-members respectively. They are remarkably stable for union members across the whole period at either 39 or 40 hours. By the end of the period in 2023 union members were working 0.1 hours per week more than in 1973.

Throughout the series non-members worked 2-3 hours less per week – roughly 3-6 percent less according to the union coefficient in column 3. The raw differential closed a little in the 1980s and 1990s because non-members' hours rose a little, trends which can be seen more clearly in Chart 5.

If we look at the distribution of usual hours worked in the CPS in 2021-2023 by union status in the table below, we see that 68% of union workers work precisely 40 hours each week, reflecting contractual hours, as compared with around 63% of non-union workers. The likelihood of having more than forty hours is approximately the same for union and non-union workers at around 15%. Non-union workers are more likely to have twenty hours or less (8.5% vs 3.3%).

	Hours		Cumulative hours	
	Non-union	Union	Non-union	Union
1-9 hours	1.3	0.34	1.3	0.34
10-19 hours	3.55	1.16	4.85	1.5
20	3.63	1.75	8.48	3.25
21-29 hours	3.53	2.19	12.01	5.44
30-34 hours	4.32	3.14	16.33	8.58
35 hours	2.83	3.38	19.16	11.96
36-39	2.61	3.88	21.77	15.84
40	63.12	68.17	84.89	84.01
41-49	5.13	5.3	90.02	89.31
50	5.55	5.17	95.57	94.48

51-59	1.32	1.7	96.89	96.18
60+	3.02	3.78	99.91	99.96

Table 5 column 3 shows the regression-adjusted differential in log usual weekly hours has been pretty much constant since the early 1980s at around 4 log points. Table 10 confirms this to be the case in the COVID era: whereas the inclusion of personal controls reduces the union differential by around a half (moving from columns 1 to 2) it stays at around 4-5 log points irrespective of what other controls are included.

The findings are informative because one reason often given for the counter-cyclical hourly union wage premium observed in various studies (e.g. Blanchflower and Bryson, 2004a) is the belief that union hours are more 'sticky' than non-union wages in recession. There is little evidence of that here at least in terms of usual weekly hours.

Our results contribute to a sparse literature since there is very little empirical evidence on union hours differentials. The earliest two papers had small sample sizes and were restricted to construction and in the earliest paper by Perloff and Sickles (1982) to men only.[9] They found a *negative* union hours differential of around -4% using data from the May 1973-1975 CPS files.[10] Allen (1984) examined hours usually worked, for men and women, in the May 1973-1975 CPS files also for construction workers and found the mean was 40.2 for both union and non-union workers.[11] He included females in his sample of 5588, but there were only 310 women including only six non-union. He regressed weekly hours on union membership, age and its square, schooling, whether the individual lived in an SMSA, region, industry, occupation and year for males and found the union coefficient was .007 (SE=.009) and in logs -.863 (0.255). Thus, he concluded rather surprisingly given he found no significant union effects at all that, "*the CPS results indicate that if there is any difference at all in hours of union and non-union employees it is that union employees work fewer hours*" (pp. 267-268).

In contrast Trejo (1993) finds a *positive* union hours effect using the May 1985 CPS which we replicate above. He reports for a private, non-agricultural sub-sample of workers not in temporary jobs and who dot hold double jobs union hours were 40.5 and non-union 38.5. Trejo also found positive union effects among both blue- and white-collar workers, in manufacturing, trade and service industries. He found no significant union hours effect in construction, which turns out to be rather special.

Earle and Pencavel (1990) found from the May 1979 CPS files that weekly hours were longer for non-union than union workers for white men (43.6 and 42.3 hours respectively) but the reverse was the case for white women (38.3 and 35.3); non-white men (41.1 and 40.5) and non-white women (38.4 and 37.5). We went back and examined the same data file. They reported there were 9,580 (29,970) observations on white men, 6,957 (22,327) on white women, 1,075 (3,381) on

[9] Sample sizes were not reported although the authors do state they dropped women from their analysis "*because there were only 20 of them*", (footnote 15 p184).
[10] Perloff and Sickles (1982) report sample mean union hours of 34.74 and non-union hours of 36.41.
[11] Allen also examined the weekly hours of 3883 construction workers using the 1973 PSID and found that union workers had fewer hours per week (41.1 versus 43.0).

nonwhite men, and 1,022 (3,279) on nonwhite women.[12] This contrasts with the much larger sample size we used, in parentheses by group above. We find that hours for all groups are higher not lower for union than non-union. White men who were union members 41.6 vs 41.0 for non-union; not white men 40.9 and 38.9; white women 37.7 and 33.4 and non-white women 38.3 and 34.8 respectively.

We then ran a log hours regression for each of the four race*gender groups with controls for age and its square, education, state and industry as above and the coefficients on the union variable, t-statistic and sample size are as follows. The overall equation includes controls for the gender*race groups.

White men	.0022 (0.44)	28920
Non-white men	.0551 (3.54)	3,237
White women	.1506 (15.02)	21,498
Non-white women	.0592 (3.38)	3,146

Earle and Pencavel (1990) reported in their Table 3 a regression of weekly hours with occupation and industry dummies where the union coefficient was significantly positive for both white and non-white women, insignificant for non-white men and significantly negative for white men. As a check we went back to the 2021-2023 MORG files and re-estimated the specification in Table 11 column 5 by the four race*gender groups. All four now have positive and significant union effects.

	Union	Non-Union	Union coefficient (t-statistic)	N
White men	42.0	40.5	.0324 (10.62)	125,549
Non-white men	40.9	39.5	.0350 (9.15)	63,518
White women	39.1	36.7	.0637 (15.10)	119,084
Non-white women	38.5	36.9	.0370 (7.61)	62,389

We also find results entirely inconsistent with the findings of Allen (1984), Perloff and Sickles (1982) and consistent with Trejo (1993) using the same May CPS files for these and other May files from 1973-1987 as well as in every MORG since 1983 for all industries. **Unions have a positive not a negative impact on usual working hours**. Prior to 1981 union status was reported in all rotation groups but then was restricted to the outgoing rotations from 1981, hence the fall in sample size.

3.4: Under-employment and part-time employment for economic reasons

Bell and Blanchflower (2021) developed a measure they called U7, which is the number of people who report being part-time for economic reasons as a proportion of total employment. This series along with the unemployment rate (U3) is plotted in Appendix Chart A3. It shows a big rise in

[12] They imposed restrictive criteria but this does not appear to explain the differences although they do more than halve sample sizes - "*individuals must have earnings data and be in rotation groups 3, 4, 7, and 8; dual-job holders are excluded; individuals must be older than 15 years and younger than 66 years of age; individuals with missing data on union membership, union coverage, or hours or weeks worked were omitted; individuals were omitted whose reported age was less than their years of schooling plus six; and those working in agriculture or in private household service were deleted*".

under-employment after the Great Recession followed by gradual decline until it spiked during COVID. This matters, given that Blanchflower, Bryson and Sperling (2024) have shown that U7 and the employment rate both enter wage equations in the period since 2008, while the unemployment rate U3 does not.

Below we report the weighted distribution among workers (n=375,681) in terms of their full-time and part-time status using the 2021-2023 MORG. We can see that there is a higher proportion of full-timers in the union sector and a lower percent of workers who are underemployed than is the case in the non-union sector. The union, part-time differential, is negative. We calculate the underemployment rate U7 as the number of part-time for economic reasons, which includes those who are usually full-time and usually part-time as 2.7% in the non-union sector and 1.7% in the union sector.

	Non-union	Union
1. FT 35+ hours	77.00	83.39
2. PT For Economic Reasons, Usually FT*	0.88	0.77
3. PT For Non-Economic Reasons, Usually FT	5.55	7.71
4. PT Hours, Usually PT For Economic Reasons*	1.82	0.97
5. PT Hours, Usually PT For Non-Economic	13.54	6.74
6. FT Hours, Usually PT For Economic Reasons	0.11	0.07
7. FT Hours, Usually PT For Non-Economic Reasons	0.41	0.36
U7 % (2+4)	2.70	1.74

In Table 11 we look at union-non-union differentials in under-employment (U7) in 2021-2023 where under-employment is defined as per Bell and Blanchflower (2021) as 1 if part-time for economic reasons, zero otherwise. Union workers are less likely to be underemployed, regardless of model specification. The time series plotted in Chart 10 reports the individual year by year estimates of the union-non-union differential in hours and underemployment. The underemployment differential fell sharply after the Great Recession indicating a fall in under-employment for union versus non-union workers but rose subsequently.

Column 4 of Table 5 reports union-non-union differentials in underemployment for six blocks of years and confirms that the union differential is negative and statistically significant throughout. It seems reasonable to assume, therefore, that part of the union hours differential is related to unions' ability to ensure their members are offered their desired hours of work.

4. Discussion and Conclusions

We have examined union-non-union differentials in wages and hours in the United States over the last 50 years using data from the CPS. The regression-adjusted difference between union members' and non-members' hourly earnings has been falling since the Great Recession, but remains around 10 log points. Although raw differences between union members' and non-members' weekly earnings have fallen markedly since the early 1970s the regression-adjusted differential is much more stable. The union differential in weekly wages has fallen by around 5 log points since COVID but remains over 15 log points – similar to the differential in the 1980s.

This weekly earnings differential arises from both a higher hourly wage of around 10 log points and longer working hours (5 log points).

The working hours differential partly reflects unions' ability to tackle under-employment, such that union workers work closer to the hours they desire than their non-union counterparts. The traditional focus on hourly wage differentials underplays the important role trade unions play in maintaining members' weekly earnings by ensuring workers receive the paid hours they desire.

The stability in the regression-adjusted weekly and hourly earnings differentials across a half century is quite striking. It is true that the weekly union wage premium has dropped since COVID, and that the hourly union wage premium was falling even before the pandemic, but both remain large and substantial in 2023. The trends are not consistent with a world in which trade unions have lost all bargaining power although, as noted at the outset, these premia are not necessarily driven exclusively by unions' collective bargaining prowess. Other factors may be at play, including a possible 'batting average' (Metcalf, 1989) effect arising from unions' ability to maintain their presence in workplaces with larger rents to share.

What is perhaps most striking is the role unions play in raising hours. It is a role that has not emerged clearly from the earlier literature but is important for the welfare of workers whose consumption is dependent not only on a decent hourly wage, but the offer of sufficient paid hours of work.

References

Abraham KG, Spletzer JR, and Stewart JC (1998), 'Divergent trends in alternative wage series', in *Labor statistics measurement issues,* NBER Studies in Income and Wealth, vol. 60, ed. J. Haltiwanger, ME Manser, and R Topel: 293–324, Chicago: University of Chicago Press.

——— (1999), 'Why do different wage series tell different stories?', *American Economic Review Papers and Proceedings* 89 (2): 34–39. https://doi.org/10.1257/aer.89.2.34

Allen S (1984), 'Unionized construction workers are more productive', *The Quarterly Journal of Economics*, 99(2): 251–274. https://doi.org/10.2307/1885525

Baugh WH and Stone JA (1982), 'Teachers, unions, and wages in the 1970s: unionism now pays', *Industrial and Labor Relations Review*, 35(3): 368-376. https://doi.org/10.1177/001979398203500306

Belman D and Voos PB (2006), 'Union wages and union decline: evidence from the construction industry', *Industrial and Labor Relations Review*, 60(1) https://doi.org/10.1177/001979398203500306

Bell DNF and Blanchflower DG (2018), 'Underemployment and the lack of wage pressure in the UK', *National Institute Economic Review*, No. 243: R53-R61.

Bell DNF and Blanchflower DG (2019), 'The well-being of the overemployed and the underemployed and the rise in depression in the UK', *Journal of Economic Behavior and Organization*, 161

Bell DNF and Blanchflower DG (2021), 'Underemployment in the United States and Europe', *Industrial and Labor Relations Review*, 74(1): 56–94

Blanchflower DG (2007), 'International patterns of union membership', *British Journal of Industrial Relations*, 45(1). https://doi.org/10.1111/j.1467-8543.2007.00600.x

Blanchflower DG (1999), 'Changes over time in union relative wage effects in Great Britain and the United States', in *Essays in Honour of Bernard Corry and Maurice Peston. Volume 2. The History and Practice of Economics*, edited by Daniel S; Arestis P; Grahl J, Edward Elgar: 3-32.

Blanchflower DG (1986), 'What effect do unions have on relative wages in Great Britain?', *British Journal of Industrial Relations*, 24(2): 195-204. https://doi.org/10.1111/j.1467-8543.1986.tb00681.x

Blanchflower DG (1984), 'Union relative wage effects; a cross-section analysis using establishment data', *British Journal of Industrial Relations*, 22(3): 311-332. https://doi.org/10.1111/j.1467-8543.1984.tb00170.x

Blanchflower D and Bryson A (2003) 'Changes over time in union relative wage effects in the UK and the US Revisited', chapter 7 in *International Handbook of Trade Unions*, John T.

Addison and Claus Schnabel (eds.), Edward Elgar, Cheltenham England and Northampton Mass., USA

Blanchflower DG and Bryson A (2004a), 'What effects do unions have on wages now and would Freeman and Medoff be surprised?', *Journal of Labor Research*, 25(3): 383-414 and in *What Do Unions Do: The Evidence Twenty Years Later?* edited by James T. Bennett and Bruce E. Kaufman. https://doi.org/10.1007/s12122-004-1022-9

Blanchflower DG and Bryson A (2004b), 'Union relative wage effects in the USA and the UK', *Proceedings of the Industrial Relations Research Association*: 133-140.

Blanchflower DG and Bryson A (2010), 'The wage impact of trade unions in the UK public and private sectors', *Economi*ca, 77(305): 92-109.

Blanchflower D, Bryson AJ and Sperling J (2024), 'The wage curve after the Great Recession', *Economica*, https://doi.org/10.1111/ecca.12515

Blanchflower DG and Freeman RB (1992), 'Going different ways: unionism in the US and other OECD countries', *Industrial Relations*: 56-79, reprinted in *Labor Market Institutions and the Future Role Of Unions* edited by M. Bognanno and M. Kleiner, Blackwell, 1992. https://doi.org/10.1111/j.1468-232X.1992.tb00298.x

Blanchflower DG and Millward N (1988), 'Trade unions and employment change: an analysis of British establishment data', *European Economic Review*, 32: 717-726. https://doi.org/10.1016/0014-2921(88)90220-6

Blanchflower DG, Millward N and Oswald AJ (1991), 'Unionism and employment behaviour', *Economic Journal*, 101(407): 815-834. https://doi.org/10.2307/2233857

Blanchflower DG and Oswald AJ (1994), *The Wage Curve*, MIT Press, Cambridge, MA.

Blanchflower DG, Oswald AJ and Garrett M (1990), 'Insider power in wage determination', *Economica*, 57(226): 143-170. https://doi.org/10.2307/2554158

Bloch FE and Kuskin MS (1978), 'Unions and wages: wage determination in the union and nonunion sectors', Industrial and Labor Relations Review, 31(2): 183- https://doi.org/10.1177/001979397803100206

Bollinger CR and Hirsch BT (2006), 'Match bias from earnings imputation in the Population Survey: the case of imperfect matching', *Journal of Labor Economics*, 24(3): 483–519. https://doi.org/10.1086/504276

Bollinger CR, Hirsch BT, Hokayem CM, and Zilia JP (2019). 'Trouble in the tails? What we know about earnings nonresponse thirty years after Lillard, Smith, and Welch', *Journal of Political Economy,* 127(5): 2143–85. https://doi.org/10.1086/701807
(lweek union age agesq female i.race i.grade priv i.state, absorb(ind), if I25d==0

Booth AL and Bryan ML (2004), 'The union membership wage-premium puzzle: is there a free rider problem?', *Industrial and Labor Relations Review*, 57: 402-421.

Brown W, Bryson A and Forth J (2009) 'Competition and the retreat from collective bargaining', Chapter 2 in W. Brown, A. Bryson, J. Forth and K. Whitfield (eds.) *The Evolution of the Modern Workplace*: 22-47, Cambridge University Press.

Bryson A (2004) 'Unions and employment growth in British workplaces during the 1990s: a panel analysis', *Scottish Journal of Political Economy*, 51(4): 477-506.

Card D (1996), 'The effect of unions on the structure of wages: a longitudinal analysis', *Econometrica*, 64(4): 957-979. https://doi.org/10.2307/2171852

Card D, Lemieux T and Riddell C (2020), 'Unions and wage inequality: The roles of gender, skill and public sector employment, *Canadian Journal of Economics*, 53(1): 140-173. https://doi.org/10.1111/caje.12432

Earle JS and Pencavel J (1990), 'Hours of work and trade unionism', *Journal of Labor Economics*, 8(1), Part 2: Essays in Honor of Albert Rees: S150-S174. https://doi.org/10.1086/298248

Fang T and Hartley J (2022), 'Evolution of union wages and determinants' in *Handbook of Labor, Human Resources and Population Economics* edited by K. Zimmermann, Springer: 1-40. https://link.springer.com/referenceworkentry/10.1007/978-3-319-57365-6_374-1

Farber H (1987), 'The recent decline of unionization in the United States', *Science*, 238, 4829: 915-920. https://doi.org/10.1126/science.238.4829.915

Fortin NM, Lemieux T and Lloyd N (2021) 'Labor market institutions and the distribution of wages: the role of spillover effects' *Journal of Labor Economics,* 39, 52: S369–S412.

Frandsen B (2021), 'The surprising impacts of unionization: evidence from matched employer-employee data', *Journal of Labor Economics*, 39, 4: 861-894. https://doi.org/10.1086/711852

Frazis H and Stewart J (2010), 'Why do BLS hours series tell different stories about trends in hours worked? In *Labor in the New Economy*, 2010, edited by KG Abraham, JR Spletzer and M Harper, NBER and University of Chicago Press: 343-372.

Freeman R and Medoff J (1984), *What Do Unions Do*? Basic Books, New York.

Guschanski A and Onaran O (2022) 'The decline in the wage share: falling bargaining power of labour or technological progress? Industry-level evidence from the OECD', *Socio-Economic Review,* 20, 3: 1091-1124

Hirsch BT and Macpherson DA (2003), 'Union Membership and Coverage Database from the Current Population Survey: Note', *Industrial and Labor Relations Review*, 56(2): 349–354. https://doi.org/10.1177/001979390305600208

Hirsch B and Schumacher EJ (2004), 'Match bias in wage gap estimates due to earnings imputation', *Journal of Labor Economics*, 22(3): 689-722. https://doi.org/10.1086/383112

Lewis HG (1963), *Unionism and Relative Wages in the United States*, Chicago, University of Chicago Press.

Lewis HG (1986), *Union Relative Wage Effects: a Survey,* Chicago, University of Chicago Press.

Macpherson DA and Hirsch BT (2023), 'Five decades of CPS wages, methods, and union-nonunion wage gaps at Unionstats.Com', *Industrial Relations: A Journal of Economy and Society*, 62(4): 439-452. https://doi.org/10.1111/irel.12330

Metcalf D (1989), 'Water notes dry up: the impact of the Donovan reform proposals and Thatcherism at work on labour productivity in British manufacturing industry', *British Journal of Industrial Relations*, 271(1): 1-31. https://doi.org/10.1111/j.1467-8543.1989.tb00206.x

Millward, N., Bryson, A. and Forth, J. (2000), *All Change at Work?*, Routledge, London.

Mincer, J. (1981), 'Union effects: wages, turnover and job training, NBER Working paper #808.

OECD (2024) "Trade Unions: Trade union density", *OECD Employment and Labour Market Statistics* (database) https://doi.org/10.1787/data-00371-en (accessed on 07 May 2024).

Parsley CJ (1980), 'Labor union effects on wage gains: a survey of recent literature', *Journal of Economic Literature*, 18(1): 1-31. https://www.jstor.org/stable/2723890

Perloff JM and Sickles RC (1987), 'Union wage, hours, and earnings differentials in the construction industry', *Journal of Labor Economics*, 5(2); 174-210. https://doi.org/10.1086/298143

Stansbury A. and Summers L. H. (2020) 'The declining worker power hypothesis: an explanation for the recent evolution of the American economy', *Brookings Papers on Economic Activity,*

Trejo SJ (1993), 'Overtime pay, overtime hours, and labor unions', *Journal of Labor Economics,* 11(2): 253-278. https://doi.org/10.1086/298296

Willman, P., Bryson, A. and Forth, J. (2020), 'UK trade unions and the problem of collective action', *British Journal of Industrial Relations*, 58, 2: 447-470.

Table 1. Union density rates by country.

Time	1960	1970	1980	1990	2000	2010	2018	2019	2020
Australia	54	44	50	41	25	18	14		
Austria	60	57	52	47	37	29	26	26	
Belgium	42	42	53	51	57	53	50	49	
Canada	30	32	34	34	28	27	26	26	27
Denmark	59	61	77	74	75	68	68	67	
Finland	32	51	69	73	74	71	60	59	
France	20	22	19	11	11	11	11*.		
Germany	35	32	35	31	25	19	17	16	
Ireland	45	53	57	51	36	32	24	25	26
Italy	29	36	50	39	35	35	33	33	
Japan	32	35	31	25	22	18	17	17	
Korea		13	15	17	11	10	12		
Netherlands	42	38	35	25	22	20	17	15	
New Zealand		56	69		22	21	18		
Norway	60	57	58	59	54	51	50	50	
Spain			13	14	18	18	13	13	
Sweden	65	67	78	82	81	68	66	65	
Switzerland	31	25	28	23	21	18	14		
UK	41	45	52	40	30	27	23	24	
USA	31	27	22	16	13	11	10	10	10
OECD - Total	38	38	37	29	21	18	16	16	

Source: OECD (2024) *=2016

Table 2. Union membership density rates (%), 1973-2023. Source: Unionstats.com

	1973	1983	1993	2003	2013	2023
All	24.0	20.1	15.7	12.9	11.2	10.0
Men	30.6	24.7	18.2	14.3	11.9	10.4
Women	13.9	14.6	12.9	11.4	10.5	9.5
Less than college	26.3	20.8	15.6	12.2	10.4	9.1
College	11.6	17.6	15.9	14.5	12.9	11.2
White male	29.9	24.0	17.8	14.0	11.7	10.3
White female	13.2	13.5	11.2	10.8	10.3	9.3
Black male	37.4	31.7	23.1	18.3	14.8	13.1
Black female	18.9	22.7	18.7	15.0	12.6	10.6
Hispanic male	36.0	24.1	15.9	11.0	9.4	9.1
Hispanic female	22.7	16.5	13.1	10.2	9.4	8.7
Public sector	23.0	36.7	37.4	37.2	35.3	32.5
Private sector	24.2	16.5	11.0	8.2	6.7	6.0
Construction	38.1	28.0	21.3	17.5	15.3	11.5
Manufacturing	38.8	27.9	19.1	13.5	10.2	8.1
Services	11.9	17.1	14.8	11.5	10.5	9.5

Table 3. BLS median usual weekly earnings (second quartile), Employed full time, Wage and salary workers, by union membership status

Year	Union	Non-union	%
2000	$691	$543	27.3
2001	711	576	23.4
2002	738	587	25.7
2003	760	599	26.9
2004	781	612	27.6
2005	801	622	28.8
2006	833	642	29.8
2007	863	663	30.2
2008	886	691	28.2
2009	908	710	27.9
2010	917	717	27.9
2011	938	729	28.7
2012	943	742	27.1
2013	950	750	26.7
2014	970	763	27.1
2015	980	776	26.3
2016	1004	802	25.2
2017	1041	829	25.6
2018	1051	860	22.2
2019	1095	892	22.8
2020	1144	958	19.4
2021	1169	975	19.9
2022	1216	1029	18.2
2023	1263	1090	15.9
Δ21-23%	8.0%	11.8%	

% refers to unadjusted differentials. Source: BLS. https://www.bls.gov/cps/cpslutabs.htm

Table 4. Union log wage coefficients, 1983-2023 sample size refers to weekly pay Controls are age and its square, female, private sector, race, state, industry and education and exclude those with imputed earnings based on I25d.

	Hourly pay		Weekly pay		N
	Unadjusted	Adjusted	Unadjusted	Adjusted	
May CPS					
1973	.3367 (49.90)	.1303 (22.43)	.5178 (52.95)	.1855 (24.31)	41,517
1974	.3422 (50.67)	.1456 (24.53)	.5084 (51.77)	.2041 (25.40)	39,734
1975	.3400 (50.03)	.1350 (23.34)	.5139 (51.62)	.1946 (25.12)	40,408
1976	.3447 (49.96)	.1383 (23.26)	.5112 (50.49)	.1903 (23.86)	38,832
1977	.3986 (65.70)	.1777 (34.52)	.5787 (64.11)	.2425 (34.44)	49,146
1978	.3835 (61.10)	.1632 (30.23)	.5634 (60.43)	.2245 (30.41)	45,599
1979	.2907 (36.23)	.0881 (11.66)	.4387 (39.85)	.1413 (15.00)	26,408
1980	.3198 (31.90)	.1136 (13,24)	.4841 (32.75)	.1874 (15.71)	16,616
1981	.3244 (30.44)	.1137 (12.43)	.4841 (30.78)	.1778 (14.00)	15,179
MORG CPS					
1983	.3680 (92.55)	.1579 (44.74)	.5089 (98.29)	.2196 (52.21)	149,824
1984	.3719 (100.59)	.1632 (54.77)	.5080 (96.46)	.2222 (51.93)	151,063
1985	.3678 (97.55)	.1548 (51,01)	.4964 (93.49)	.2102 (48.68)	154,428
1986	.3631 (95.44)	.1510 (49.14)	.4918 (92.20)	.2064 (47.50)	159,910
1987	.3696 (94.38)	.1493 (47.16)	.4984 (91.10)	.2075 (46.40)	155,955
1988	.3726 (91.28)	.1464 (44.23)	.4998 (88.11)	.2036 (43.74)	148,057
1989	.3366 (87.65)	.1319 (41.17)	.4506 (86.41)	.1883 (43.23)	169,907
1990	.3245 (40.72)	.1278 (40.72)	.4293 (84.69)	.1819 (42.78)	177,267
1991	.3134 (82.77)	.1185 (37.41)	.4172 (81.21)	.1724 (39.78)	171,699
1992	.3134 (81.45)	.1291 (40.29)	.4154 (79.77)	.1813 (41.95)	169,488
1993	.3222 (82.78)	.1361 (41.70)	.4277 (81.36)	.1957 (44.61)	166,452
1994*	.3110 (76.89)	.1310 (37.59)	.4205 (76.95)	.1998 (43.07)	170,232
1995*	.2943 (71.68)	.1230 (34.94)	.3987 (71.90)	.1882 (39.97)	169,781
1996	.3476 (70.55)	.1606 (39.45)	.4597 (68.62)	.2339 (42.22)	118,160
1997	.3400 (69.57)	.1583 (38.90)	.4526 (67.88)	.2293 (41.40)	120,302
1998	.3250 (65.89)	.1539 (37.25)	.4424 (65.34)	.2244 (39.85)	119,621
1999	.3085 (61.08)	.1481 (35.38)	.4297 (62.55)	.2289 (40.38)	115,080
2000	.2949 (58.00)	.1376 (32.81)	.4030 (58.73)	.2069 (36.51)	112,821
2001	.2934 (58.49)	.1430 (34.41)	.3976 (58.53)	.2089 (37.19)	118,192
2002	.2933 (58.75)	.1548 (36.13)	.4052 (38.55)	.2139 (38.55)	127,967
2003	.2928 (53.54)	.1551 (31.43)	.3985 (55.75)	.2133 (34.52)	122,806
2004	.2987 (55.04)	.1526 (31.98)	.4104 (57.25)	.2152 (35.39)	121,393
2005	.2923 (53.16)	.1590 (32.92)	.3980 (55.21)	.2218 (36.24)	123,504
2006	.2836 (51.11)	.1513 (30.93)	.3850 (53.09)	.2080 (33.76)	123,008
2007	.2906 (51.51)	.1531 (30.23)	.3844 (52.70)	.2061 (32.85)	123,309
2008	.2838 (52.01)	.1322 (27.69)	.3775 (51.79)	.2058 (32.81)	121,879
2009	.2842 (51.31)	.1313 (26.81)	.3840 (51.11)	.2076 (31.65)	118,860
2010	.2955 (49.49)	.1285 (24.30)	.4090 (51.91)	.2189 (31.72)	112,671
2011	.2979 (50.59)	.1390 (26.86)	.4134 (52.67)	.2335 (34.07)	109,952
2012	.2965 (46.43)	.1400 (24.62)	.3973 (49.90)	.2197 (32.10)	111,254
2013	.2838 (45.31)	.1319 (24.61)	.3920 (47.36)	.2182 (30.87)	107,791
2014	.2759 (43.56)	.1320 (24.27)	.3851 (46.35)	.2167 (30.45)	106,375
2015	.2657 (40.47)	.1177 (20.88)	.3767 (43.97)	.2077 (28.33)	101,917
2016	.2610 (39.37)	.1240 (21.88)	.3785 (43.53)	.2186 (29.48)	103,408
2017	.2642 (39.20)	.1291 (22.20)	.3765 (43.11)	.2164 (29.04)	102,209
2018	.2432 (35.65)	.1139 (19.43)	.3550 (39.72)	.2046 (26.69)	99,130
2019	.2466 (36.44)	.1175 (19.74)	.3543 (40.15)	.2033 (26.60)	95,435
2020	.1976 (25.97)	.0900 (13.17)	.2978 (31.25)	.1588 (18.90)	85,755
2021	.2003 (25.64)	.1013 (14.49)	.2845 (29.75)	.1525 (18.43)	84,272
2022	.1829 (23.02)	.1088 (15.19)	.2703 (27.81)	.1634 (19.41)	84,321
2023	.1750 (22.64)	.0897 (12.94)	.2675 (27.91)	.1483 (18.00)	82,399

Table 5. Union-Non-Union Differentials, 1983-2023

	Log weekly wages	Log hourly wages	Log hours	Underemployment
a) 2021-2023				
Union	.1547 (32.28)	.0998 (24.61)	.0445 (22.42)	-.0053 (5.92)
N	250,992	250,804	370,540	389,646
Adjusted R^2	.4412	.3742	.1933	.0203
b) 2014-2020				
Union	.2052 (71.94)	.1188 (53.63)	.0485 (41.13)	-.0084 (13.35)
N	694,229	684,326	1,049,910	1,110,198
Adjusted R^2	.4412	.4327	.1987	.0281
c) 2007-2013				
Union	.2157 (85.64)	.1519 (72.71)	.0453 (40.07)	-.0117 (17.47)
N	805,716	804,665	1,112,037	1,187,696
Adjusted R^2	.4504	.3976	.2100	.0394
d) 2000-2006				
Union	.2143 (95.83)	.1547 (88.37)	.0395 (37.45)	-.0060 (12.00)
N	849,691	847,367	1,145,579	1,233,186
Adjusted R^2	.4768	.4408	.2185	.0394
e) 1992-1999				
Union	.2094 (104.43	.1591 (103.13)	.0423 (43.43)	-.0103 (20.00)
N	851,979	851,373	1,252,162	1,316,067
Adjusted R^2	.4768	.4697	.2317	.0304
f) 1983-1991				
Union	.1681 (111.81)	.1151 (102.01)	.0470 (54.46)	-.0105 (20.87)
N	1,438,910	1,438,436	1,603,341	1,603,025
Adjusted R^2	.4758	.4408	.2316	.0412

Controls are age and its square, female, private sector, race, state, industry, race, year and education. Wage equations exclude those with imputed earnings based on I25d.

Table 6. Union Log Weekly Wage Equations, 2021-2023 using topcode * 1.5

Union	.2743 (49.37)	.1538 (28.92)	.1707 (35.01)	.1454 (29.52)	.1547 (32.28)	.1816 (39.30)
Private sector	No	-.0367 (8.45)	.1170 (28.85)	.1116 (27.58)	-.0026 (0.42)	-.0184 (3.18)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Personal controls	No	Yes	Yes	Yes	Yes	Yes
Education dummies	No	No	Yes	Yes	Yes	Yes
State dummies	No	No	No	Yes	Yes	Yes
Industry dummies	No	No	No	No	Yes	Yes
Occupation dummies	No	No	No	No	No	Yes
Marital status	No	No	No	No	No	Yes
N	250,992	250,992	250,992	250,992	250,992	250,992
Adjusted R^2	.0120	.1962	.3257	.3392	.4220	.4889

Personal controls are age and its square, gender and race.

Table 7. Union Log Hourly Wage Equations, 2021-2023.

Union	.1863 (41.21)	.1078 (23.99)	.1241 (30.35)	.0862 (21.00)	.0998 (24.61)	.1230 (31.12)
Private sector	No	-.0383 (11.01)	.0900 (27.81)	.0973 (25.14)	.0075 (1.45)	-.0049 (0.99)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Personal controls	No	Yes	Yes	Yes	Yes	Yes
Education dummies	No	No	Yes	Yes	Yes	Yes
State dummies	No	No	No	Yes	Yes	Yes
Industry dummies	No	No	No	No	Yes	Yes
Occupation dummies	No	No	No	No	No	Yes
Marital status	No	No	No	No	No	Yes
N	250,804	250,804	250,804	250,804	250,804	250,804
Adjusted R^2	.0108	.1312	.2828	.3055	.3742	.4343

Personal controls are age, age squared, gender, race, and private sector

Table 8. Union Wage differentials using all controls from col 5 of Tables 5 (weekly) and Table 7 (hourly) and topcodes *1.5 in tables above, 2021-2023 (%)

	Weekly	Hourly		Weekly	Hourly
HS Dropout	28.1	18.1	2021	16.5	10.7
HS Graduate	25.3	18.1	2022	17.8	11.5
Associate's degree	20.7	13.8	2023	16.0	9.4
Bachelor's degree	9.3	4.5	Public sector	17.3	8.3
Postgraduate degree	5.7	3.3	Private sector	16.2	12.0
White non-Hispanic	17.2	9.7	Female	16.0	8.2
Black	15.3	11.4	Male	16.2	10.0
Native	28.7	20.2	All	16.7	10.5
Asian	16.1	8.6			
Other	19.1	11.0			
White Hispanic	19.7	14.9			

Sample is for those with no imputed earnings (I25d=0).

Controls are age, age^2, gender, race, education, state and industry. Coefficient is anti-logged minus 1 to change to a percentage.

Table 9. Unions and hours from the May CPS 1973-1987 and MORG CPS files, 1983-2023

	Weighted means			
	Union	Non-Union	Log Union coefficient (t-statistic)	N
May CPS				
1973	40.3	37.4	+.0507 (9.50)	48,524
1974	40.1	37.4	+.0552 (10.15)	47,212
1975	40.0	37.1	+.0573 (10.56)	46,576
1976	40.0	37.2	+.0492 (8.88)	45,220
1977	40.2	37.2	+.0611 (12.57)	56,293
1978	40.4	37.3	+.0569 (11.75)	54,051
1979	40.4	37.4	+.0562 (17.5)	56,801
1980	40.0	37.3	+.0669 (15.96)	66,325
1981	39.9	36.9	+.0608 (7.00)	15,452
1983	39.6	36.6	+.0765 (8.02)	13,941
1984	39.8	37.0	+.0692 (7.14)	14,609
1985	39.8	37.2	+.0582 (6.35)	14,774
1986	40.1	37.2	+.0494 (5.43)	14,961
1987	40.1	37.3	+.0521 (5.26)	14,951
MORG CPS				
1983	39.6	37.1	+.0568 (21.78)	173,751
1984	40.0	37.5	+.0535 (20.79)	177,072
1985	40.0	37.6	+.0504 (19.58)	180,084
1986	40.1	37.6	+.0519 (19.82)	178,969
1987	40.2	37.8	+.0525 (20.07)	180,310
1988	40.3	37.9	+.0524 (19.46)	173,006
1989	40.4	38.0	+.0510 (19.03)	176,411
1990	40.2	38.0	+.0484 (18.73)	182,184
1991	40.0	37.9	+.0445 (16.97)	179,560
1992	40.0	37.9	+.0464 (17.54)	176,658
1993	40.2	38.1	+.0513 (19.13)	174,595
1994	40.0	38.4	+.0405 (15.09)	160,682
1995	40.1	38.5	+.0361 (13.43)	159,738
1996	40.2	38.6	+.0354 (12.21)	141,538
1997	40.3	38.6	+.0369 (12.73)	144,297
1998	40.5	38.7	+.0350 (12.20)	146,104
1999	40.4	38.7	+.0416 (14.61)	148,550
2000	40.4	38.9	+.0334 (11.95)	150,379
2001	40.2	38.7	+.0345 (12.57)	159,481
2002	40.1	38.6	+.0360 (13.24)	171,560
2003	40.0	38.5	+.0366 (13.20)	167,642
2004	40.3	38.5	+.0421 (14.80)	164,526
2005	40.2	38.6	+.0440 (15.72)	165,789
2006	40.3	38.8	+.0400 (14.16)	166,202
2007	40.2	38.7	+.0410 (14.58)	165,583
2008	40.1	38.5	+.0416 (14.76)	163,739
2009	39.7	38.0	+.0451 (15.22)	158,626
2010	39.9	38.0	+.0479 (15.74)	157,063
2011	39.8	38.1	+.0478 (15.61)	155,885
2012	39.9	38.2	+.0442 (14.33)	155,439
2013	40.0	38.3	+.0437 (14.32)	155,702
2014	40.2	38.4	+.0509 (16.85)	157,204
2015	40.3	38.4	+.0521 (17.25)	155,989
2016	40.3	38.3	+.0475 (15.44)	156,724
2017	40.4	38.4	+.0474 (15.31)	155,083
2018	40.5	38.5	+.0491 (15.73)	151,614
2019	40.4	38.5	+.0463 (14.55)	146,340
2020	40.3	38.6	+.0432 (13.24)	126,956
2021	40.2	38.6	+.0393 (11.75)	127,265
2022	40.5	38.6	+.0459 (13.31)	123,437
2023	40.4	38.4	+.0510 (14.54)	119,838

Controls are age and its square, female, education, race, state and industry

Table 10. OLS Log Usual Hours Equations, 2021-2023.

Union	.0744 (37.56)	.0391 (19.98)	.0393 (20.27)	.0504 (25.59)	.0445 (22.42)	.0465 (23.53)
Private sector	No	.0050 (3.12)	+.0092 (5.77)	.0079 (4.87)	-.0092 (3.68)	-.0120 (4.86)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Personal controls	No	Yes	Yes	Yes	Yes	Yes
Education dummies	No	No	Yes	Yes	Yes	Yes
State dummies	No	No	No	Yes	Yes	Yes
Industry dummies	No	No	No	No	Yes	Yes
Occupation dummies	No	No	No	No	No	Yes
Marital status	No	No	No	No	No	Yes
N	370,540	370,540	370,540	370,540	370,540	370,540
Adjusted R^2	.0039	.1246	.1463	.1504	.1933	.2352

2021-2023 weighted union hours=40.4 and non-union hours=38.5.
Personal controls are age, age squared, gender, race, and private sector and 78 industry controls. Does not restrict with I25d

Table 11. OLS Underemployment Equations, 2021-2023. Dependent variable is U7 =ptfer/employment

Union	-.0085 (10.01)	-.0022 (2.46)	-.0022 (2.52)	-.0049 (5.41)	-.0053 (5.71)	-.0065 (6.99)
Private sector	No	.0107 (14.91)	.0071 (9.69)	.0066 (8.97)	.0066 (5.63)	.0065 (5.46)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Personal controls	No	Yes	Yes	Yes	Yes	Yes
Education dummies	No	No	Yes	Yes	Yes	Yes
State dummies	No	No	No	Yes	Yes	Yes
Industry dummies	No	No	No	No	Yes	Yes
Occupation dummies	No	No	No	No	No	Yes
Marital status	No	No	No	No	No	Yes
N	375,681	375,681	375,681	375,681	375,681	375,681
Adjusted R^2	.0004	.0108	.0071	.0121	.0119	.0276

2021-2023 weighted union U7=1.64% and non-union=2.61%. Excludes those not at work usually FT or PT.
Personal controls are age, age squared, gender and race. Does not restrict with I25d

Chart 1. Union density rates in the United States - from unionstats.com

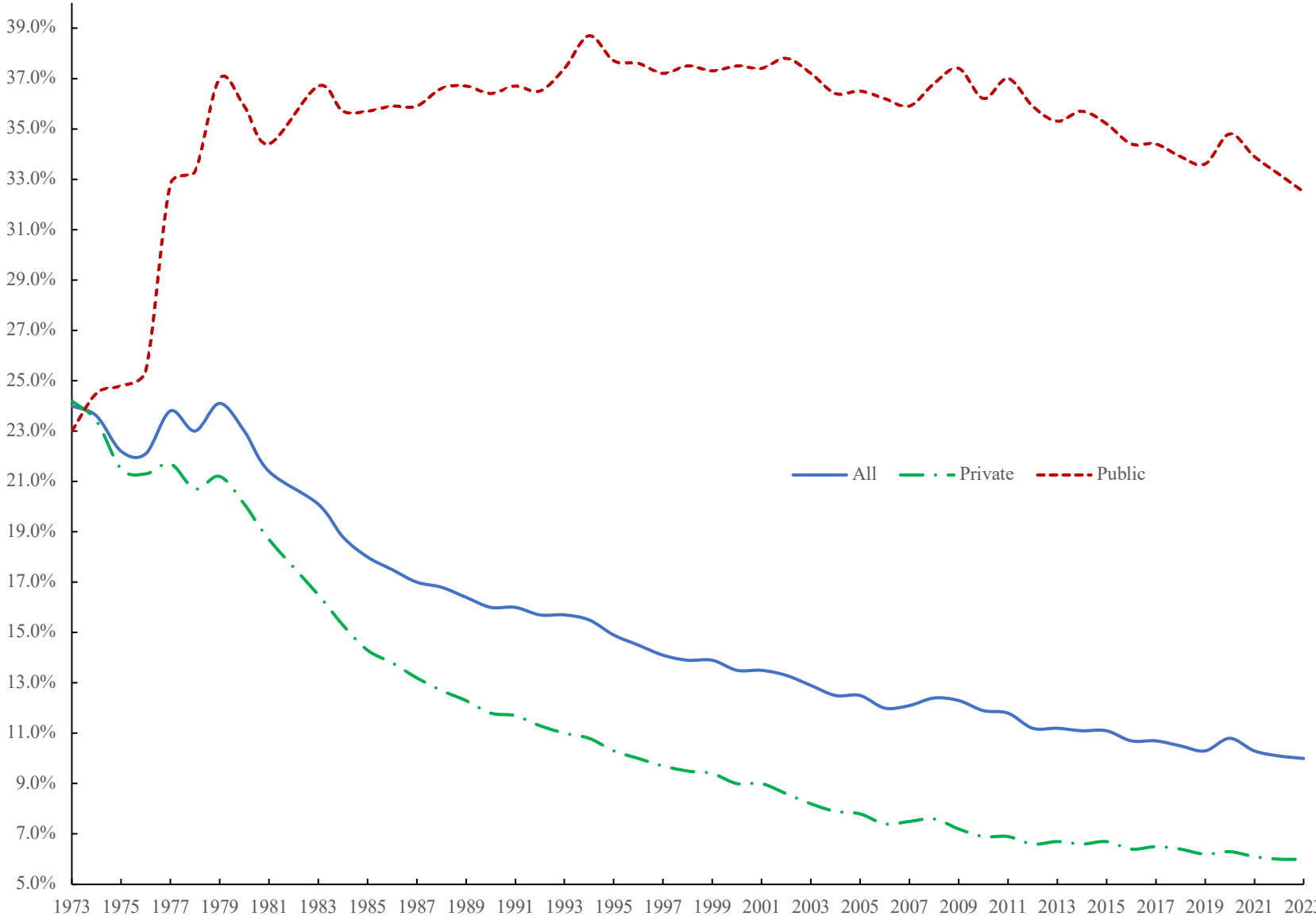


Chart 2. Weekly union wage differentials (coefficients antilogged minus 1)

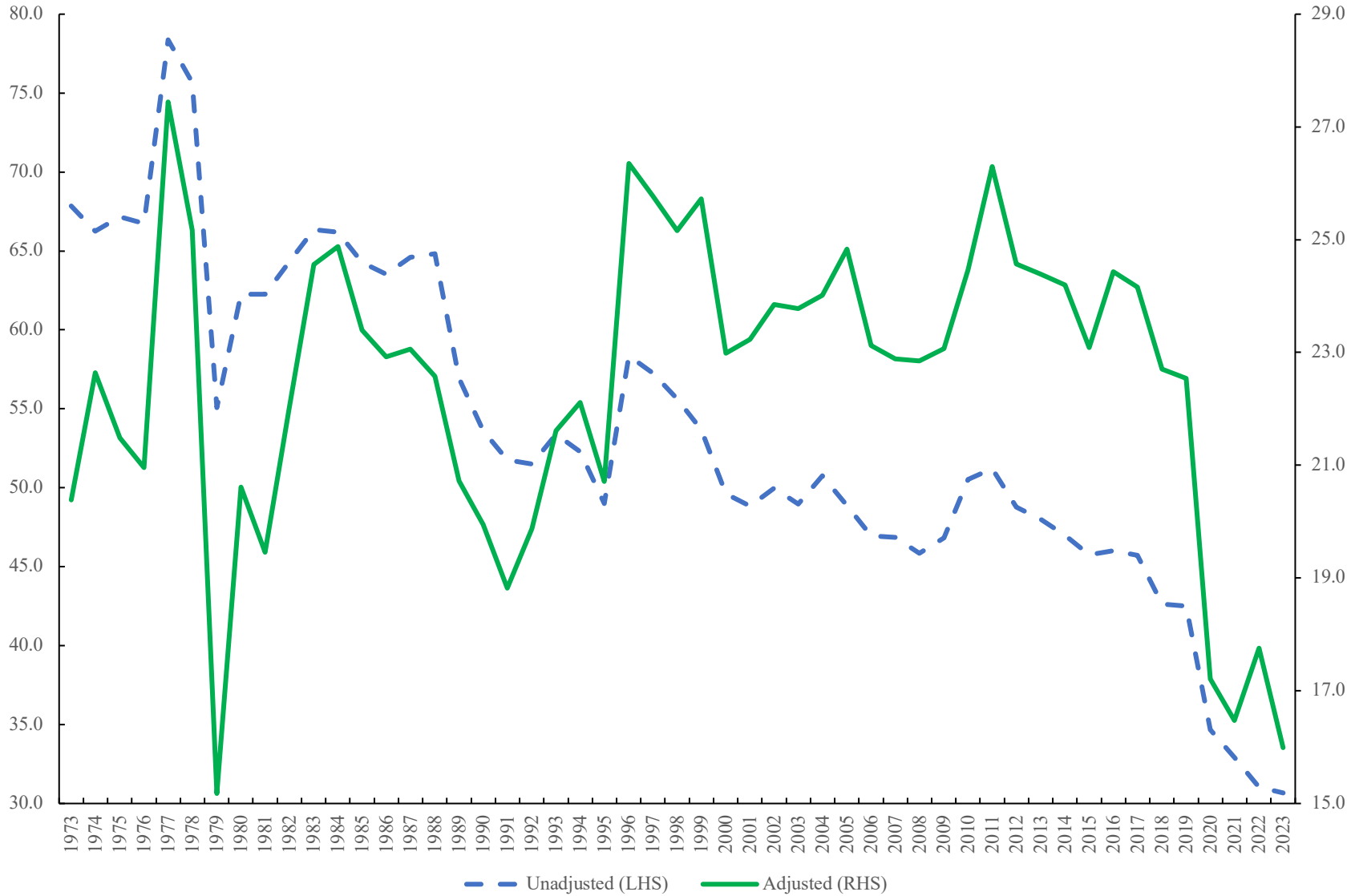


Chart 3. Adjusted union private sector wage differentials, 1983-2023.

Chart 4. Hourly wage differentials

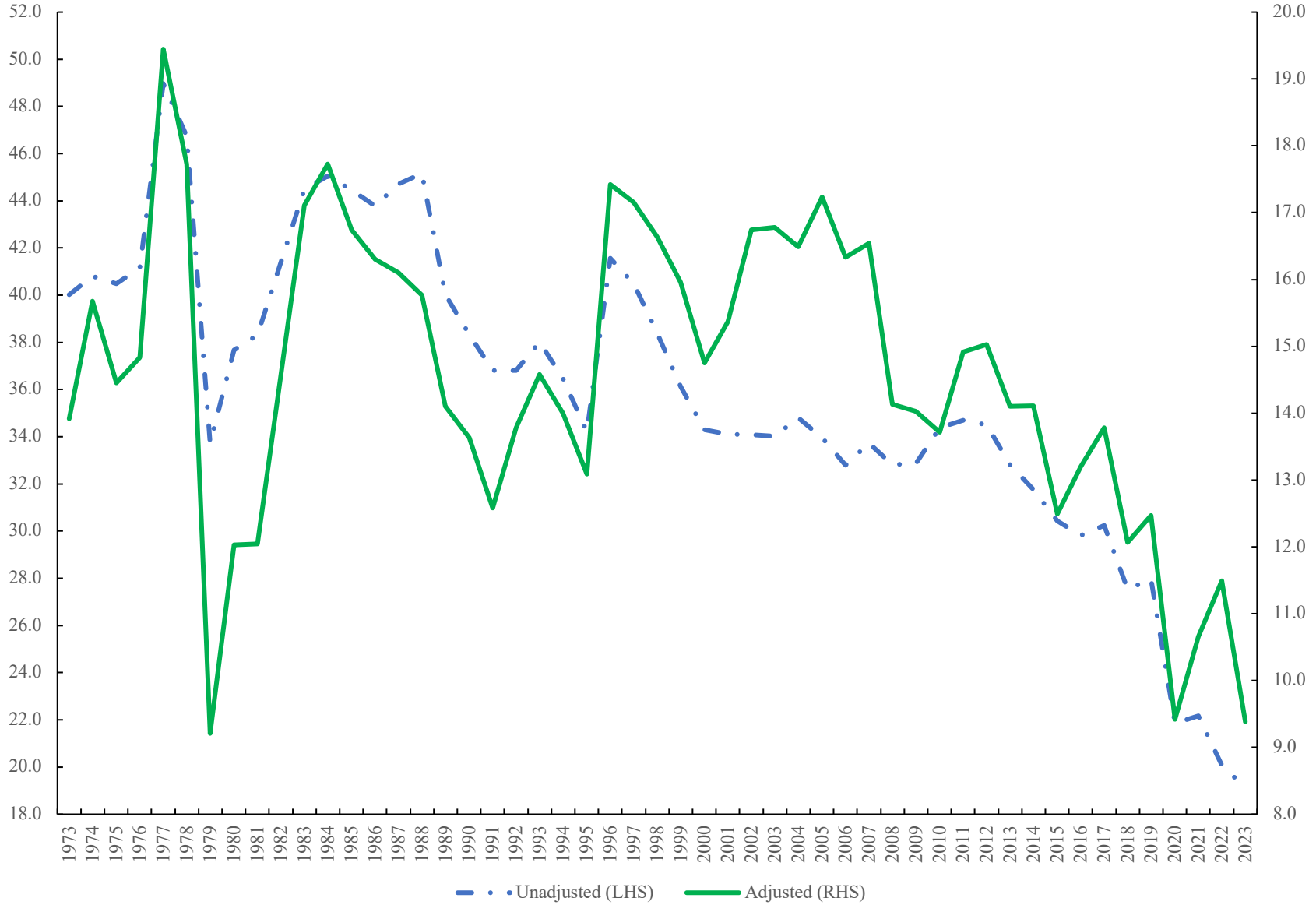


Chart 5. Union and non-union usual hours, 1983-2023

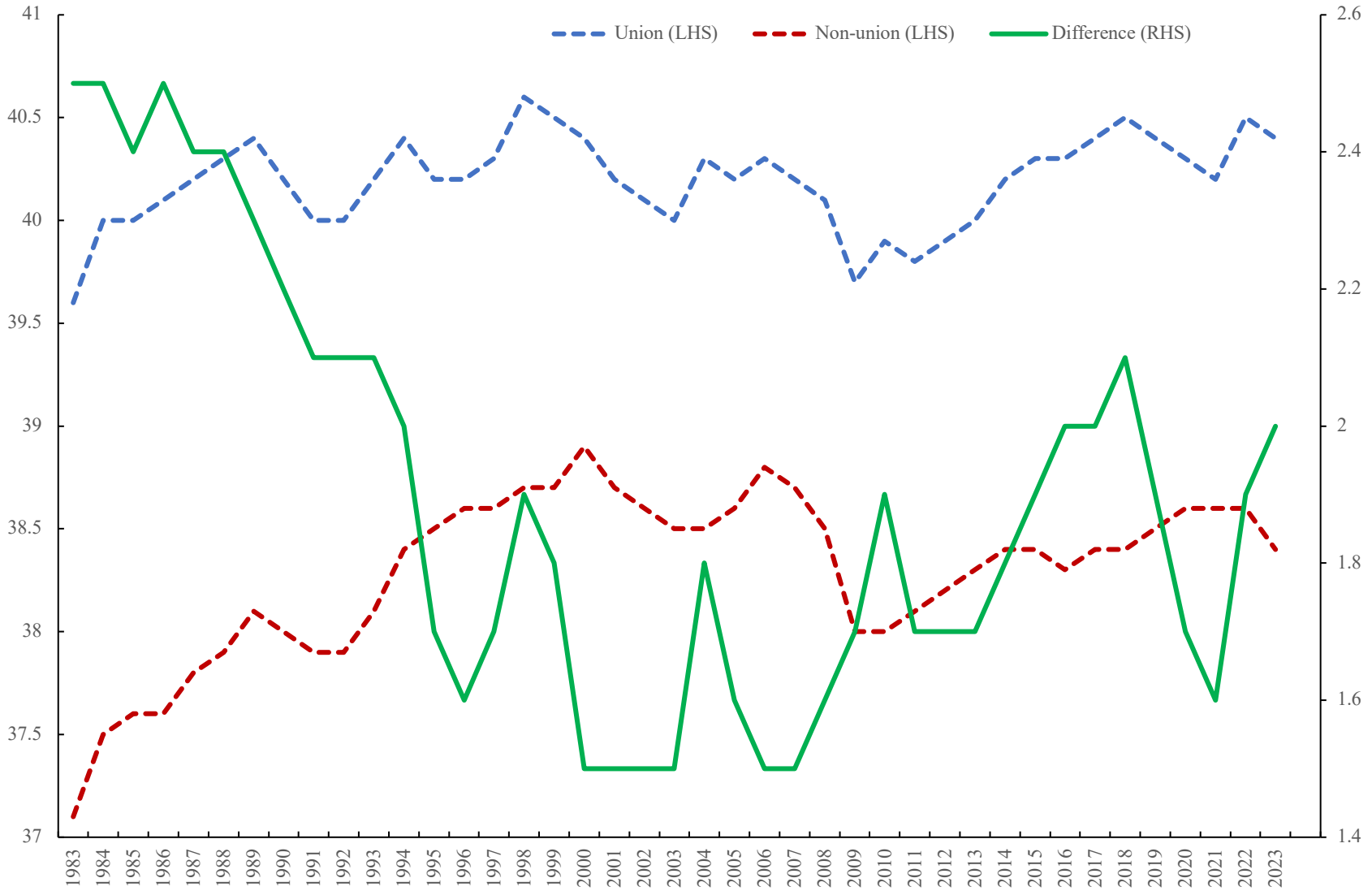
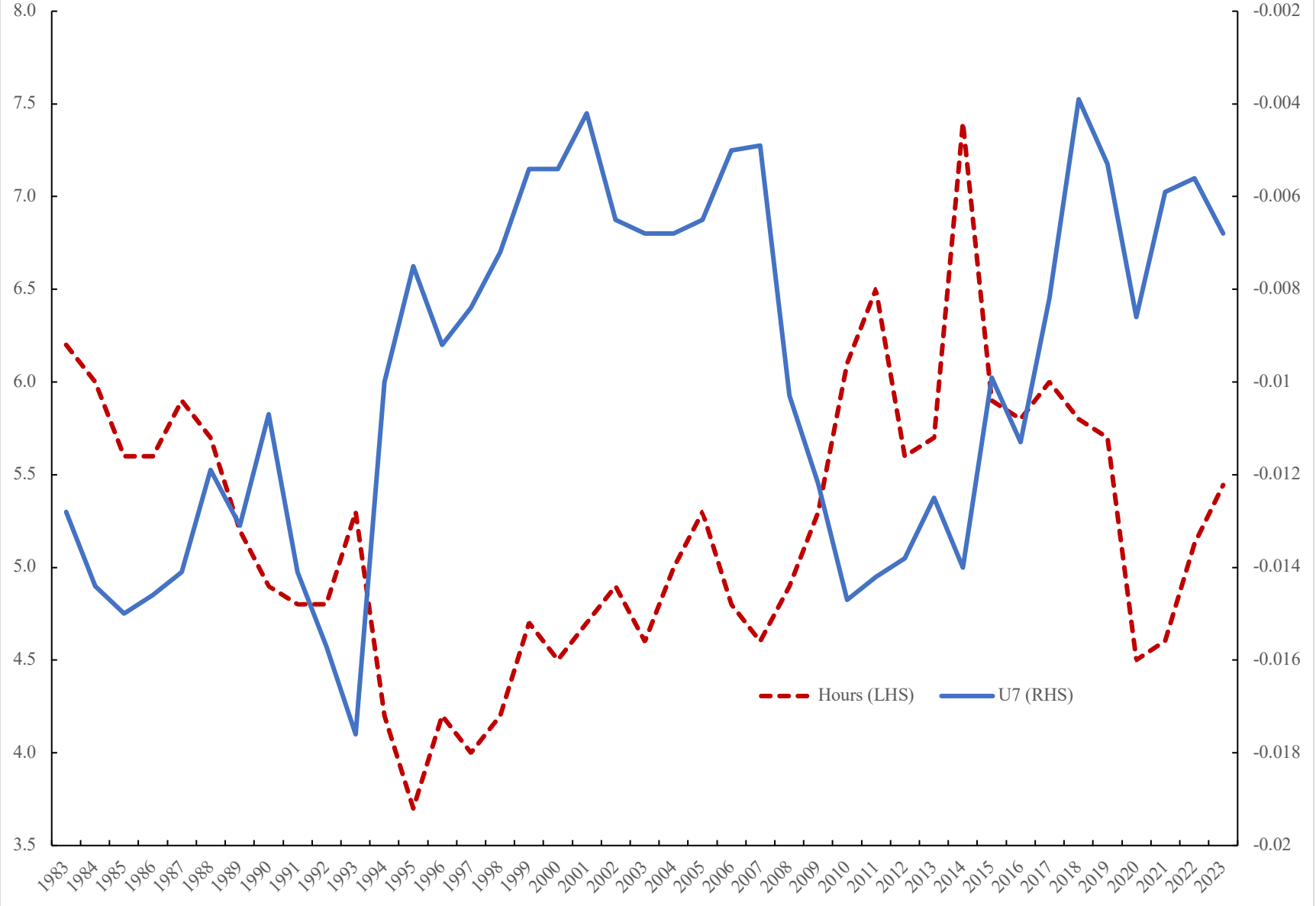
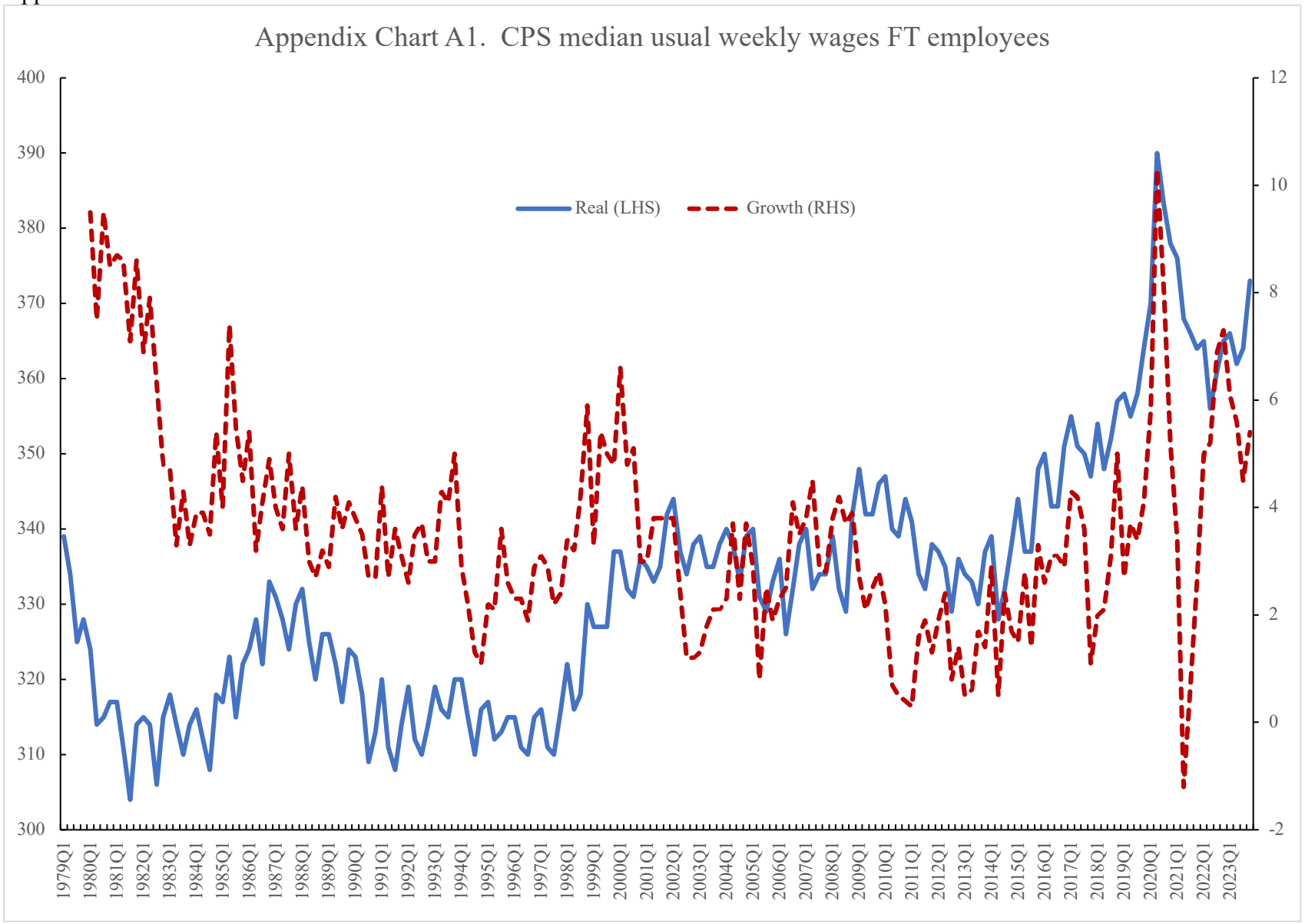


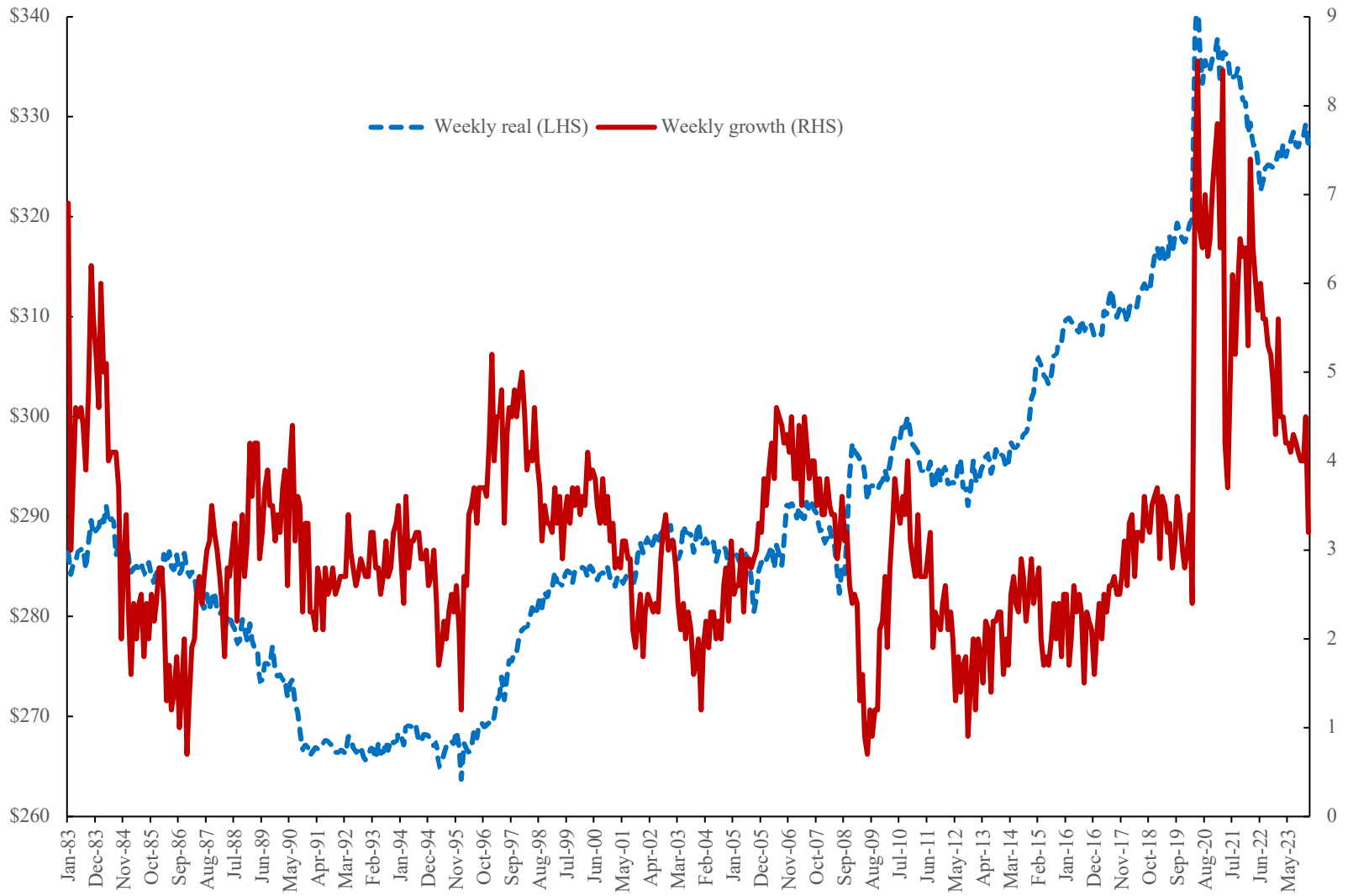
Chart 10. Hours and underemployment union differentials



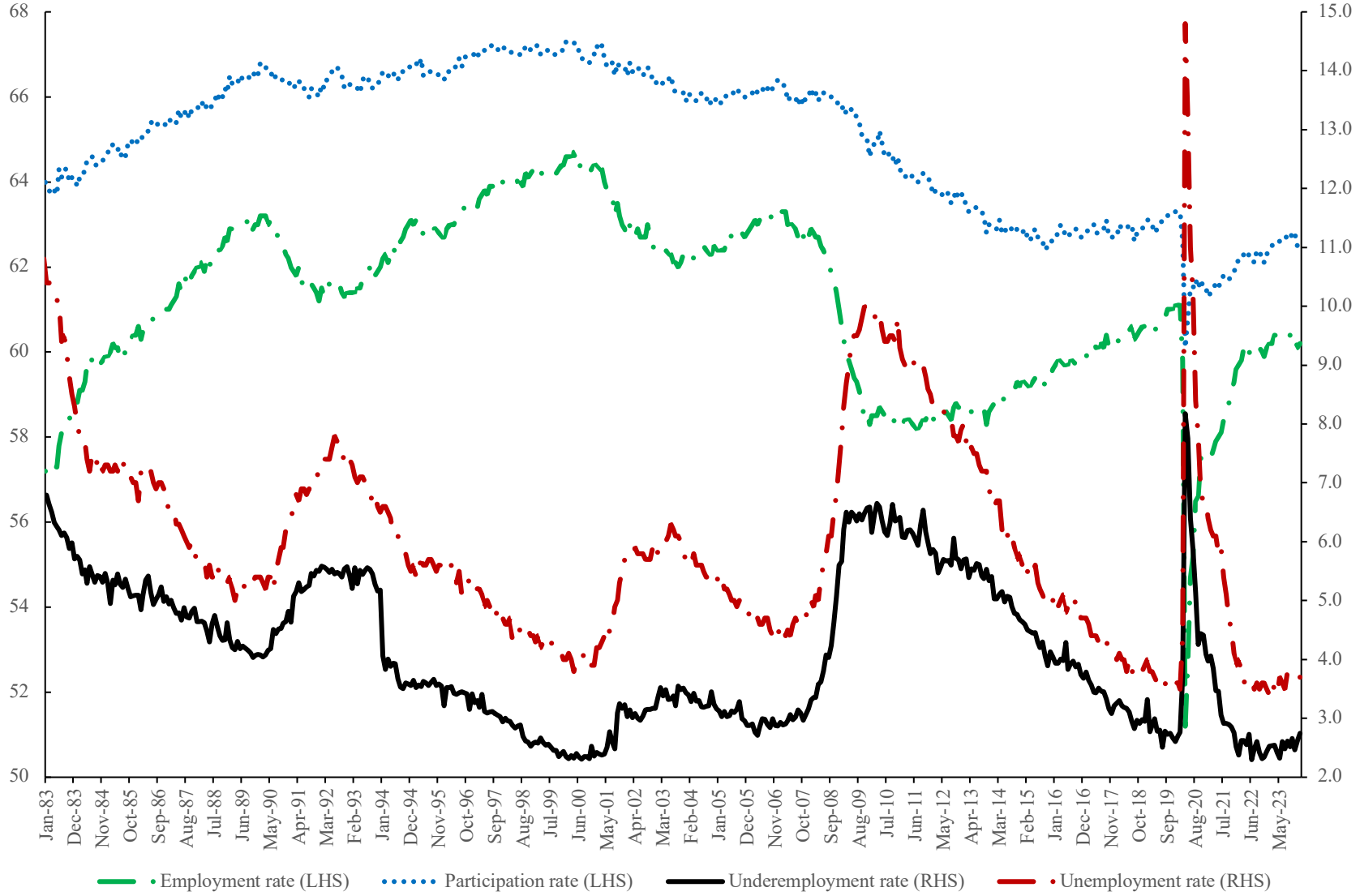
Appendix Charts



Appendix Chart A2. Weekly earnings Production and Non-Supervisory Workers from the establishment survey



Appendix Chart A3: Labor Market Monthly Aggregates, 1983-2024



Appendix Table 1a: Union membership OLS equations

	2007-2013	2021-2023
Age	.0085 (74.02)	.0059 (32.26)
Age^2 *100	-.0088 (66.08)	-.0062 (30.26)
Female	-.0348 (63.34)	-.0223 (24.73)
Private sector	-.2883 (385.23)	-.2427 (191.70)
Black Only	.0254 (25.58)	.0174 (11.05)
American Indian	-.0493 (16.95)	-.0308 (7.06)
Asian Only	-.0280 (20.27)	-.0302 (15.69)
Other races	-.0071 (1.66)	.0003 (0.11)
White hispanic	-.0036 (3.55)	-.0024 (1.63)
1st - 4th grade	.0034 (0.43)	.0022 (0.16)
5th or 6th	.0061 (0.85)	-.0012 (0.09)
7th or 8th	.0118 (1.63)	.0044 (0.34)
9th	.0206 (2.88)	.0061 (0.47)
10th	.0333 (4.74)	.0159 (1.23)
11th	.0332 (4.79)	.0154 (1.22)
12th grade no diploma	.0267 (3.70)	.0164 (1.27)
High school graduate	.0438 (6.50)	.0285 (2.31)
Some college but no degree	.0346 (5.14)	.0277 (2.25)
Associate’s degree occupational	.0533 (7.80)	.0454 (3.64)
Associate’s degree academic	.0352 (5.16)	.0256 (2.06)
Bachelor's degree	.0168 (2.50)	.0085 (0.70)
Master's degree	.0538 (7.93)	.0331 (2.68)
Professional degree	-.0350 (4.95)	-.0148 (1.16)
Doctorate degree	-.0361 (5.11)	-.0136 (1.08)
AK	-.0085 (3.17)	.0728 (13.86)
AZ	-.0054 (1.83)	-.0049 (1.04)
AR	.0412 (13.89)	-.0199 (4.30)
CA	.0606 (20.88)	.1011 (28.81)
CO	.0473 (17.57)	.0011 (0.24)
CT	.1229 (50.58)	.0887 (16.55)
DE	.0609 (22.06)	.0219 (4.16)
DC	.0365 (14.33)	-.0009 (0.19)
FL	.0218 (8.41)	-.0087 (2.33)
GA	-.0045 (1.54)	-.0206 (4.76)
HI	.0471 (18.49)	.1628 (32.21)
ID	.0676 (24.81)	-.0162 (3.55)
IL	.0256 (9.29)	.0746 (18.16)
IN	.0444 (16.94)	.0258 (5.59)
IA	-.0084 (3.07)	.0079 (1.57)
KS	-.0133 (4.57)	.0269 (5.44)
KY	-.0587 (19.20)	.0129 (2.43)
LA	-.0655 (22.24)	-.0292 (6.69)
ME	-.0397 (13.65)	.0404 (6.67)
MD	-.0540 (18.00)	.0212 (4.24)

MA	-.0064 (2.16)	.0750 (17.60)
MI	-.0241 (9.10)	.0794 (18.45)
MN	-.0515 (16.95)	.0852 (17.59)
MS	-.0896 (32.99)	-.0186 (3.97)
MO	-.0037 (1.09)	.0314 (6.59)
MT	-.0924 (32.65)	.0440 (9.40)
NE	-.0907 (28.38)	.0077 (1.58)
NV	-.0846 (30.37)	.067*4 (*13.45*)*
NH	-.0573 (23.17)	.0372 (7.59)
NJ	-.0287 (9.34)	.0985 (22.10)
NM	-.0688 (21.87)	-.0018 (0.38)
NY	-.0281 (8.29)	.1450 (37.33)
NC	-.0921 (25.29)	-.0337 (7.98)
ND	-.0801 (23.52)	-.0067 (1.46)
OH	-.0765 (21.63)	.0598 (14.09)
OK	-.0610 (18.75)	-.0091 (1.86)
OR	-.0638 (26.86)	.0942 (20.08)
PA	.0039 (1.12)	.0729 (17.81)
RI	-.0665 (19.90)	.0947 (16.73)
SC	-.0692 (22.50)	-.0500 (10.62)
SD	-.0363 (13.32)	-.0208 (4.09)
TN	-.0769 (20.86)	-.0057 (1.27)
TX	-.0451 (13.85)	-.0174 (4.79)
UT	-.0617 (19.54)	-.0204 (4.52)
VT	.0442 (14.73)	.0622 (12.44)
VA	.0748 (25.93)	-.0389 (8.73)
WA	.0451 (14.54)	.1096 (24.52)
WV	.0613 (26.99)	.0136 (2.97)
WI	.0862 (27.47)	.0168 (3.52)
WY	.1110 (35.38)	-.0342 (6.98)
Constant	.1574	.1310
Adjusted R^2	.1293	.1585
N	375,681	1,187,696

Reference categories: white; no education; Alabama

Appendix Table 1b. Unionization rates by state

	1983	1993	2003	2013	2023
Alabama	16.9	14.7	8.1	10.8	7.4
Alaska	24.9	20.0	22.3	23.1	14.8
Arizona	11.4	7.6	5.2	5.0	4.2
Arkansas	11.0	8.3	4.8	3.5	5.1
California	21.9	17.8	16.8	16.4	15.4
Colorado	13.6	9.8	7.8	7.6	6.9
Connecticut	22.7	18.7	15.4	13.5	15.8
Delaware	20.1	15.3	11.4	10.3	8.9
District of Columbia	19.5	13.8	14.6	9.3	9.1
Florida	10.2	7.7	6.1	5.4	4.7
Georgia	11.9	6.7	6.7	5.3	4.6
Hawaii	29.2	28.2	23.8	22.1	24.1
Idaho	12.5	10.2	7.0	4.7	4.5
Illinois	24.2	21.0	17.9	15.7	12.8
Indiana	24.9	18.5	11.8	9.3	8.0
Iowa	17.2	12.8	11.5	10.1	7.1
Kansas	13.7	9.8	7.9	7.5	8.8
Kentucky	17.9	12.7	10.4	11.2	8.8
Louisiana	13.8	9.4	6.5	4.3	4.3
Maine	21.0	14.0	12.8	11.1	9.1
Maryland	18.5	15.5	14.3	11.6	10.7
Massachusetts	23.7	17.2	14.2	13.6	12.6
Michigan	30.4	24.4	21.9	16.2	12.8
Minnesota	23.2	21.1	17.0	14.3	13.2
Mississippi	9.9	7.5	5.0	3.6	7.0
Missouri	20.8	14.2	13.2	8.7	9.3
Montana	18.3	18.6	14.0	13.0	11.8
Nebraska	13.6	10.8	7.9	7.2	7.2
Nevada	22.4	17.7	14.4	14.6	12.4
New Hampshire	11.5	8.2	9.3	9.5	9.3
New Jersey	26.9	22.2	19.5	16.0	16.1
New Mexico	11.8	8.0	7.6	6.2	7.5
New York	32.5	28.7	24.6	24.3	20.6
North Carolina	7.6	5.6	3.1	3.0	2.7
North Dakota	13.2	9.0	7.3	6.4	6.2
Ohio	25.1	20.7	16.7	12.7	12.5
Oklahoma	11.5	9.6	6.8	7.5	6.8
Oregon	22.3	19.6	15.7	13.9	14.1
Pennsylvania	27.5	18.9	15.1	12.7	13.0
Rhode Island	21.5	17.9	17.0	16.9	12.4
South Carolina	5.9	4.2	4.2	3.7	2.3
South Dakota	11.5	7.9	5.4	4.7	3.6
Tennessee	15.1	11.0	7.5	6.1	6.0
Texas	9.7	7.5	5.6	4.8	4.5

Utah	15.2	9.8	5.2	3.9	4.1
Vermont	12.6	9.9	9.7	10.9	14.3
Virginia	11.7	8.6	6.5	5.0	4.3
Washington	27.1	23.8	19.7	18.9	16.5
West Virginia	25.3	17.5	13.1	12.7	8.7
Wisconsin	23.8	19.3	15.9	12.3	7.4
Wyoming	13.9	10.8	8.0	5.7	5.6

Appendix Table 2. Unionstats.com topcodes

Year	Top code	Males	Females	Year	Top code	Males	Females
1973	$999	$1,376	$1,356	2017	$2,885	$4,989	$4,741
1974	$999	$1,391	$1,304	2018	$2,885	$5,182	$4,797
1975	$999	$1,420	$1,330	2019	$2,885	$5,181	$4,803
1976	$999	$1,394	$1,329	2020	$2,885	$5,357	$4,868
1977	$999	$1,403	$1,318	2021	$2,885	$5,667	$4,962
1978	$999	$1,399	$1,329	2022	$2,885	$5,729	$4,908
1979	$999	$1,387	$1,321	2023*	$2,885	$5,598	$5,188
1980	$999	$1,385	$1,298	Notes 2023 April to Dec no top-codes			
1981	$999	$1,405	$1,299				
1982	$999	$1,438	$1,315				
1983	$999	$1,462	$1,319				
1984	$999	$1,484	$1,342				
1985	$999	$1,498	$1,353				
1986	$999	$1,532	$1,349				
1987	$999	$1,539	$1,377				
1988	$999	$1,595	$1,379				
1989	$1,923	$2,825	$2,586				
1990	$1,923	$2,872	$2,607				
1991	$1,923	$2,906	$2,643				
1992	$1,923	$2,898	$2,674				
1993	$1,923	$2,937	$2,673				
1994	$1,923	$2,936	$2,721				
1995	$1,923	$2,922	$2,711				
1996	$1,923	$2,929	$2,719				
1997	$1,923	$2,950	$2,776				
1998	$2,885	$4,437	$4,149				
1999	$2,885	$4,442	$4,133				
2000	$2,885	$4,499	$4,185				
2001	$2,885	$4,512	$4,241				
2002	$2,885	$4,558	$4,245				
2003	$2,885	$4,554	$4,240				
2004	$2,885	$4,636	$4,251				
2005	$2,885	$4,678	$4,255				
2006	$2,885	$4,689	$4,332				
2007	$2,885	$4,668	$4,342				
2008	$2,885	$4,775	$4,397				
2009	$2,885	$4,833	$4,430				
2010	$2,885	$4,889	$4,445				
2011	$2,885	$4,844	$4,491				
2012	$2,885	$4,954	$4,534				
2013	$2,885	$4,987	$4,563				
2014	$2,885	$4,960	$4,577				
2015	$2,885	$5,097	$4,686				
2016	$2,885	$5,175	$4,660				

Appendix Table 3. Union Log Weekly Wage Equations, 2021-2023 using Unionstats.com topcodes

Union	.2710 (47.94)	.1504 (27.76)	.1681 (33.87)	.1419 (28.31)	.1524 (31.23)	.1806 (38.37)
Private sector	No	-.0340 (10.48)	.1235 (29.92)	.1179 (28.62)	-.0013 (0.20)	-.0174 (2.95)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Personal controls	No	Yes	Yes	Yes	Yes	Yes
Education dummies	No	No	Yes	Yes	Yes	Yes
State dummies	No	No	No	Yes	Yes	Yes
Industry dummies	No	No	No	No	Yes	Yes
Occupation dummies	No	No	No	No	No	Yes
Marital status	No	No	No	No	No	Yes
N	250,992	250,992	250,992	250,992	250,992	250,992
Adjusted R^2	.0109	.1927	.3240	.3379	.4206	.4843

Personal controls are age and its square, gender and race.