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Understanding the relationship between real wage growth and labor market conditions

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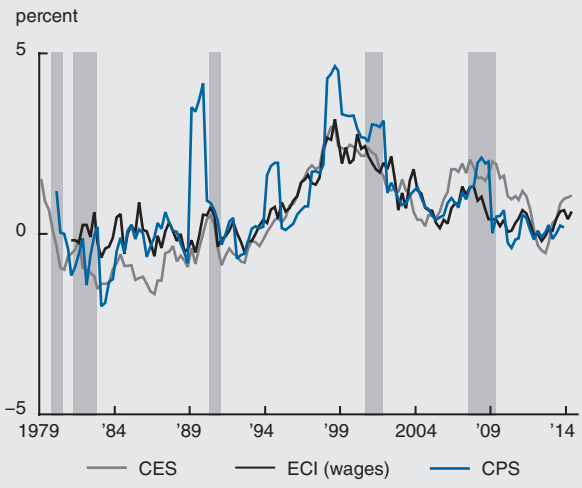
The authors find that the share of the labor force that is medium-term unemployed (five to 26 weeks unemployed) and the share working part time (less than 35 hours per week) involuntarily are strongly correlated with real wage growth. Moreover, they estimate that average real wage growth would have been between one-half of a percentage point and a full percentage point higher in June 2014 if 2005–07 labor market conditions had been restored, indicating that the slack in the jobs market still weighs heavily on the real wage prospects of U.S. workers.

While labor market conditions have improved markedly over the past few years, real wage growth remains disappointing. In this *Chicago Fed Letter*, we discuss the labor market conditions that have historically been associated with real wage growth. We document a strong correlation between real wage growth and medium-term unemployment and find a link between real wage growth and marginally attached labor force participants, particularly those working part time involuntarily for economic reasons.[1] As of June 2014, labor market conditions had yet to revert fully to pre-recessionary levels. If 2005–07 labor market conditions had been restored by then, we estimate that average real wage growth would have been roughly one-half of a percentage point to 1 percentage point higher. We also find that the impact of slack labor market conditions on real wage growth is stronger for those workers at the bottom of the wage distribution.

1. Real hourly wage growth, 1979–2014



Notes: The CES data are for 1979:Q1–2014:Q2, the ECI data for 1981:Q1–2014:Q2, and the CPS data for 1980:Q1–2013:Q4. All data are deflated by the Personal Consumption Expenditures Price Index. The shaded bars indicate recessions as defined by the National Bureau of Economic Research.

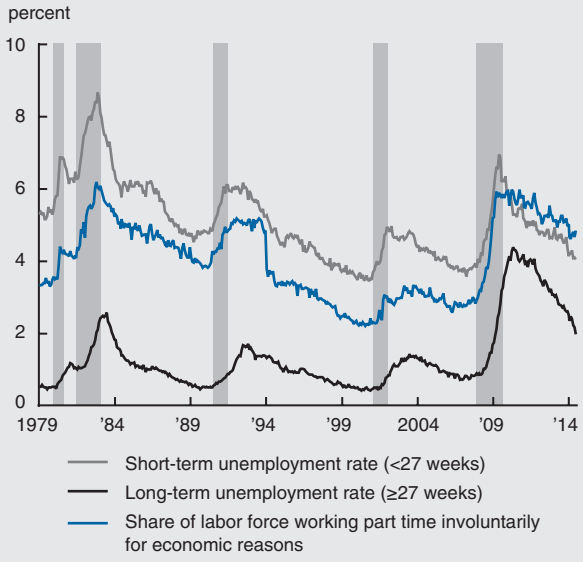
Sources: U.S. Bureau of Labor Statistics, *Current Employment Survey* (CES) and Employment Cost Index (ECI), from Haver Analytics; authors' calculations based on data from the U.S. Bureau of Labor Statistics, *Current Population Survey* (CPS).

Background

In figure 1, we plot quarterly real wage growth from 1979 through 2014, using three sources of average hourly wages from the U.S. Bureau of Labor Statistics (BLS): the *Current Employment Survey*, or CES (commonly referred to as the payroll survey); the Employment Cost Index, or ECI; and the *Current Population Survey*, or CPS (commonly referred to as the household survey). Real wage growth was particularly strong during the jobs boom of the late 1990s but has decelerated since then. During the 2008–09 recession, real wage growth fell but, perhaps surprisingly, not dramatically. Still, it has been slow to return to pre-2008 levels.

Historically, the national unemployment rate has been a useful predictor of real wage growth. However, that relationship, dubbed the "wage Phillips curve," broke down over the past five years. Given that the unemployment rate fell

2. Labor market conditions, 1979–2014



NOTES: All three data series are from January 1979 through June 2014. For details on those working part time involuntarily for economic reasons, see the text, particularly note 1. The shaded bars indicate recessions as defined by the National Bureau of Economic Research.

SOURCE: U.S. Bureau of Labor Statistics, *Current Population Survey*, from Haver Analytics.

from a peak of 10% during 2009 to 6.1% in June 2014, the historical relationship between the unemployment rate and real wages would have predicted real wage growth to have been 3.6 percentage points higher by mid-2014, according to our calculations using BLS data. Instead, real wage growth has been relatively flat over the past few years.

Many researchers have studied whether the duration of unemployment—in particular, the extent of long spells of unemployment—affects aggregate real wage growth.[2] Most of that research has historically been based on the European experience, but this topic has gained renewed interest in the United States as a result of the unprecedented increase in long-term unemployment since 2008 and the breakdown of the wage Phillips curve. A prominent example is a paper by Krueger, Cramer, and Cho,[3] in which the authors use national time-series data to conclude that U.S. real wage growth is strongly correlated with the short-term unemployment rate (STUR)—the fraction of the labor force that has been out of work for less than 27 weeks (gray line in figure 2)—but not with the long-term unemployment rate (LTUR)—the fraction of the labor force that has been out of work for at least 27 weeks (black line in figure 2). Combining this with evidence that the long-term unemployed have difficulty transitioning to employment regardless of the state of the local labor market, Krueger, Cramer, and Cho argue that the long-term unemployed are disconnected from the labor market and therefore have little impact on aggregate real wage growth.

What is real wage growth tied to?

National data is problematic for studying the relationship between various labor market conditions and wage growth. The national time series are relatively short, and many labor market measures, such as the LTUR and STUR, co-move, offering limited ability to distinguish the effects of particular labor market variables or other confounding factors. Moreover, wage growth is plausibly tied more closely to the relative strength of local or skill-specific labor markets than to the national market. Accordingly, we follow a long tradition of narrowing the definition of a labor market to a geographic area such as a state or metropolitan statistical area (MSA).[4] Using annual data derived from the outgoing rotation files of the CPS from 1982 through 2013, we generate estimates that associate demographically adjusted real wage growth in a state-year (e.g., Illinois in 2007) to a variety of measures of labor market conditions in that state-year while holding constant factors that impact real wage growth and are invariant to states or particular years.[5]

Figure 3 presents our estimates of the impact of a 1 percentage point change in a labor market condition on real wage growth (along with state cluster-corrected standard errors in parentheses). The labor market measures are listed in the left column. The remaining columns report the results from the statistical exercises (explained in note 5) that include different labor market measures or are estimated on different time periods.

The first column of numbers reports the results of a statistical model that includes only the STUR and the LTUR as labor market variables. In that specification, a 1 percentage point increase in the STUR leads to a change in real wage growth of –0.40 percentage points (standard error of 0.08 percentage points)—a statistically and economically significant correlation. For context, note that when the STUR rose from 4% in 2005–07 to 6.4% in 2009, we would expect real wage growth to decelerate by 1 percentage point, all else being equal. Similarly, a 1 percentage point increase in the LTUR translates into a change in real wage growth of –0.38 percentage points—which is similar in magnitude to the STUR effect and likewise statistically and economically significant. The LTUR rose from 0.9% in 2005–07 to 2.9% in 2009—an increase that would be associated with a 0.8 percentage point deceleration in real wage growth. The second column shows that the results are a little over half the size but still statistically significant and economically meaningful when we use just the past 20 years of data. Moreover, the results are broadly similar, although sometimes less precisely estimated, when we include both the contemporaneous and lagged unemployment rates in the analysis, use a sample of large MSAs rather than states, or do not adjust the wage data for demographics (not shown in figure 3). Strikingly, the association between the LTUR and real wage growth also shows up strongly in a sample where we include only the dozen states in each year with the highest STUR (12 states × 32 years = 384 observations)—i.e., the states where firms have access to a large pool of the recently unemployed (not shown in figure 3).

The STUR (and LTUR) data used to get the first two columns of results are from a heterogeneous group of job seekers. Therefore, we experimented with splitting the STUR into more-detailed groupings. One such example, reported in the third column, is made up of the very-short-term unemployment rate (VSTUR),

3. Impact of 1 percentage point change in labor market conditions on real wage growth

	1	2	3	4	5	6
Short-term unemployment rate	–0.40** (0.08)	–0.25* (0.11)				
Very-short-term unemployment rate			0.03 (0.11)	0.12 (0.11)	0.11 (0.11)	0.08 (0.07)
Medium-term unemployment rate			–0.71** (0.11)	–0.54** (0.10)	–0.38** (0.10)	–0.19** (0.05)
Long-term unemployment rate	–0.38** (0.09)	–0.21* (0.10)	–0.27** (0.09)	–0.06 (0.10)	0.06 (0.08)	0.01 (0.05)
Part time for economic reasons rate				–0.40** (0.09)	–0.32** (0.08)	–0.20** (0.04)
Wage measure	Average wage	Average wage	Average wage	Average wage	25th percentile wage	75th percentile wage
Time period	1982–2013	1994–2013	1982–2013	1982–2013	1982–2013	1982–2013

NOTES: See note 5 for the regression model. See the text for the definitions of the variables. The standard errors reported in parentheses are clustered at the state level. *Significant at the 5% level. **Significant at the 1% level.

SOURCE: Authors' calculations based on data from the U.S. Bureau of Labor Statistics, *Current Population Survey*.

which we define as the fraction of the labor force that has been out of work for less than five weeks, and the medium-term unemployment rate (MTUR), which again is the fraction of the labor force out of work for five to 26 weeks. We find no relationship between the VSTUR and real wage growth. Indeed, the VSTUR has little variation across the business cycle and has been on a long secular decline since the early 1980s. However, the MTUR seems to be strongly associated with declining real wage growth. Again, the results are of a similar flavor, although a little weaker, when we restrict the sample to the past 20 years (not shown in figure 3).

Although much of the discussion of the wage Phillips curve is focused on unemployment rates, it is reasonable to expect other measures of labor market conditions to matter. We looked at a variety that are calculable in the CPS—in particular, the share of the labor force working part time for economic reasons (the part time for economic reasons rate, or PTERR), the share of the working-age population that is not in the labor force (NILF) but wants a job,[6] the white prime-age (25–54 years old) male unemployment rate, the employment-to-population ratio, the share of the population that switched employers, and the share of the population that switched labor market status (e.g., those who went through unemployment-to-employment, employment-to-unemployment, NILF-to-unemployment, and unemployment-to-NILF transitions).

The PTERR stands out. Even after conditioning on the unemployment rates from the third column, the fourth column shows that a 1 percentage point increase in the PTERR is associated with a change of –0.40 percentage points in real wage growth (standard error of 0.09 percentage points). Conditioning on PTERR also reduces the impact of LTUR, to the point that this result is economically small and no longer statistically significant (see the fourth row, fourth column).[7] Notably, the share of the labor force working part time for noneconomic reasons (see note 7) has no impact on real wage growth or the other coefficients, including PTERR and STUR, in the statistical model. The PTERR results are particularly striking given that this rate has been elevated over the past six years (blue line in figure 2). The PTERR rose from 2.9% during 2005–07, peaked at 5.9% in 2009, and then fell back to only 4.8% as of June 2014.

Finally, the results discussed thus far relate to the growth of average real wages. The fifth and sixth columns report results for real wage growth at the 25th and 75th percentiles of a state's wage distribution. The impacts of a 1 percentage point jump in the MTUR and PTERR are particularly strong at the bottom of the wage distribution (the results for the 10th percentile wage are even stronger, though they are not shown); and for the most part, the effects decline monotonically, but always remain statistically significant, at higher wage levels. That is, the impact of slack labor market conditions is strongest for jobs that pay near the bottom of the wage distribution and is weakest, but still present, for jobs at the top.

Conclusion

Although our estimates are not meant to be interpreted as causal, they do suggest a strong association between real wage growth and medium-term unemployment, as well as a link between real wage growth and marginally attached workers, particularly those working part time involuntarily for economic reasons. What do these results imply about real wage growth today? We estimate that average real wage growth would have been roughly one-half of a percentage point to 1 percentage point higher in June 2014 if labor market conditions had been similar to those of 2005–07. Thus, it appears that the slack in the jobs market still weighs heavily on the real wage prospects of American workers.

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[1] Survey respondents reporting this labor force status to the U.S. Bureau of Labor Statistics (BLS) are currently working less than 35 hours per week for economic reasons such as "slack work or unfavorable business conditions, inability to find full-time work, or seasonal declines in demand." For details on how the BLS categorizes part-time workers, see www.bls.gov/news.release/empsit.t08.htm.

[2] See, e.g., Stephen Machin and Alan Manning, 1999, "The causes and consequences of longterm unemployment in Europe," in *Handbook of Labor Economics*, Orley C. Ashenfelter and David Card (eds.), Vol. 3C, Amsterdam: Elsevier / North-Holland, pp. 3085–3139.

[3] Alan B. Krueger, Judd Cramer, and David Cho, 2014, "Are the long-term unemployed on the margins of the labor market?," *Brookings Papers on Economic Activity*, Spring, forthcoming.

[4] Recent examples that use this strategy to estimate the price Phillips curve are Terry J. Fitzgerald and Juan Pablo Nicolini, 2014, "Is there a stable relationship between unemployment and future inflation? Evidence from U.S. cities," Federal Reserve Bank of Minneapolis, working paper, No. 713, May, and Michael T. Kiley, 2014, "An evaluation of the inflationary pressure associated with short- and long-term unemployment," Finance and Economics Discussion Series, Board of Governors of the Federal Reserve System, working paper, No. 2014-28, March 21. For the U.S. Census Bureau's MSA delineations, see www.census.gov/population/metro/.

[5] To derive our estimates, we perform a regression analysis—a statistical process that measures the degree of correlation between two variables. In particular, the regressions we perform take the following form:

$$Y_{it} = \alpha + \beta X_{it} + \gamma_i + \gamma_t + \varepsilon_{it},$$

where Y_{it} is wage growth in state i at time t, X_{it} is labor market conditions in state i and at time t, the γ_i and γ_t are state and year fixed effects, and ε_{it} is the error term. Note that β measures the relationship between X and Y, conditional on other right-hand-side variables, and is what we report in figure 3. The year fixed effects account for, among other factors, trends in U.S. price inflation, making the interpretation of Y_{it} a real wage growth measure. Prior to estimating this regression, we first scrub Y_{it} free of the influences of changes in the composition of the population—in particular, gender, education, a quartic in age, gender × education, gender × quartic in age, and marital status.

[6] The BLS defines NILF as individuals who have not actively looked for work in the previous four weeks; for more details and further NILF distinctions, see www.bls.gov/news.release/empsit.t16.htm.

[7] Part of this finding might be because the transition from long-term unemployment to part time for economic reasons is common. Using matched CPS data over the past ten years, we calculate that 26% of the long-term unemployed who find a job become part time for economic reasons, compared with 18% of the short-term unemployed who find work. By contrast, 32% of the short-term unemployed who find a job become part time for noneconomic reasons (e.g., child-care problems, family obligations, school, or Social Security limits on earnings in retirement), compared with 23% of the long-term unemployed who find work.