The Great Recession and its Aftermath: What Role for Structural Changes?

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Jesse Rothstein*

University of California, Berkeley and NBER

Abstract

The last six years have been disastrous for many workers, and particularly so for those with low human capital or other forms of disadvantage. One explanation is that the labor market has not yet recovered from the Great Recession, officially dated 2007 through 2009, and that the poor labor market outcomes of young and non-college workers are primarily attributable to the combination of deficient aggregate labor demand and greater sensitivity of marginal workers to cyclical conditions. A second attributes the recent outcomes to structural problems in the labor market. These have importantly different policy implications: Cyclical explanations imply that the main challenge is to raise aggregate labor demand and that if this is done many of the patterns seen in the last several years will revert to their prior trends. Structural explanations, by contrast, suggest the recent experience is the "new normal," absent policy responses to encourage more (or different) labor supply.

This paper reviews recent data for evidence on the two explanations, focusing on wage trends as an indicator of the relative importance of labor supply and demand. It presents empirical evidence on the distribution of wage changes over the last several years, disaggregating labor markets (by industry, geography, or skill level) as much as the data will permit, as indicators of the relative importance of supply and demand. There is little evidence of wage pressure in any quantitatively important labor markets, suggesting that cyclical factors are primarily responsible for recent outcomes. There remains a strong need for policies promoting cyclical recovery, and there is little reason in the data to worry that these policies risk triggering wage inflation.

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I. Introduction

In a 2004 speech titled "The Great Moderation", Ben Bernanke – then a member of the Board of Governors of the Federal Reserve but soon to become the chairman – discussed the apparently substantial decline in macroeconomic volatility over the last decades of the 20th century. He argued that this was in important part attributable to improved monetary policy, and he expressed optimism that the moderation would persist into the future (Bernanke 2004).

Within four years of that speech, the U.S. had fallen into the "Great Recession." Between the fourth quarter of 2007 and the second quarter of 2009, real GDP fell by over 5 percent. The unemployment rate rose from a low of 4.4 percent in May 2007 to a high of 10.0 percent in October 2009, for a 29-month increase of 5.6 percentage points. This far exceeded the largest previous post-war increase over a similar duration, 3.9 percentage points in 1973-75.

The National Bureau of Economic Research (NBER) dated the business cycle trough in June 2009. But the labor market has been extremely slow to recover, and all of the available metrics indicate substantial continuing weakness. Although real output recovered its pre-recession peak in the third quarter of 2011, payroll employment only reached its December 2007 level in May of 2014. The unemployment rate remained above 8% for 43 consecutive months and above 7% for 60 months, each the longest such period since World War II. As of this writing, it has fallen to 6.3%, but most of the decline came from reduced labor force participation rather than increased employment. The employment-to-population ratio, which fell by an unprecedented 4.9 percentage points between December 2006 and December 2009, has hovered around 58.5% for more than four years and shows little sign of recovery; in May 2014 it stood at 58.9%.

Early in the recovery, some observers were quick to diagnose structural problems that were impeding what would otherwise have been a quick cyclical recovery. In a 2010 speech, for example, Narayana Kocherlakota, President of the Federal Reserve Bank of Minneapolis, stated that "Firms have jobs, but can't find appropriate workers. The workers want to work, but can't find appropriate jobs. There are many possible sources of mismatch—geography, skills, demography—and they are probably all at work"

(Kocherlakota 2010).[1] This view was eventually discredited by the evidence, as it became clear that – at least at that time – labor market slack was high in nearly all sizeable labor markets.[2]

But as the weak recovery has dragged on, it has become harder to resist the view that this is the "new normal," and that we are destined for a future of low employment rates and a substantial class of individuals – disproportionately low-skilled – who are more or less permanently detached from the labor market.

This paper reviews data on labor market outcomes over the period since the recession, focusing on the experience of less skilled workers. I argue that there is no basis for concluding that the recent past represents "the new normal" or that labor demand has tilted more rapidly away from low-skilled workers than at other times in recent decades. Rather, the evidence indicates that aggregate labor demand remains very weak. Less skilled workers' outcomes have always been particularly sensitive to the business cycle, worsening by far more in downturns than do those of more skilled workers and then improving by more when the economy recovers. Thus, if the economy remains deep in a cyclical trough, it is not surprising that less skilled workers have suffered disproportionately, and it is reasonable to expect that this suffering will ease substantially if and when aggregate labor demand recovers.

An important possibility is that cyclical labor demand shortfalls that extend for many years may *create* structural problems, as idle workers' human capital gradually depreciates and they become increasingly disconnected from the labor market such that they are unable or unwilling to take new jobs when they finally become available. This idea has gained currency as an explanation for our current situation. For example, Krueger, Cramer, and Cho (2013) argue that the long-term unemployed exert little or no pressure on the labor market, and conclude that extra-market measures such as expanded social welfare programs will be needed to support those who remain in this state.

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[1] See also Sahin, Song, Topa, and Violante (2011).

[2] See Diamond (2010); Mishel, Shierholz, and Edwards (2010); Mishel (2011); Rothstein (2012a); and Lazear and Spletzer (2012). The Congressional Budget Office (2012) is more favorable toward structural hypotheses but nevertheless concludes that aggregate demand shortfalls are the primary source of the high unemployment rate.

This hypothesis has an important implication: If true, it means that even a labor market that appears to be quite slack from the perspective of workers can be tight from the perspective of employers, who see relatively few qualified, available workers to hire (see, e.g., Hall 2014). Employers facing tight labor markets should bid up the wage in order to attract workers. Labor demand shortfalls, by contrast, would have an opposite effect, as unemployed workers to bid down equilibrium wages as they compete for the few available jobs.[3] I thus emphasize the examination of wage trends for evidence about the appropriate diagnosis of the current situation.

The remainder of the paper proceeds as follows. In Section II, I review the overall state of the labor market and the onset of the Great Recession. In Section III, I explore the extent to which the downturn or subsequent slow recovery has proceeded evenly across skill groups, demography, or geography. Section IV presents estimates of the cyclical sensitivity of subgroup unemployment rates, and compares different groups' experiences to what one would have predicted given the heterogeneity in this sensitivity. Section V presents the analysis of wage trends. Section VI presents analyses of long-term unemployment and labor force participation. Section VII discusses the implications for policy.

II. The state of the aggregate labor market

Figure 1 shows the time paths of aggregate employment, the unemployment rate, and the employment-population ratio from 2004 forward. The figure makes clear that the sharpest downturn was in late 2008 and early 2009, when over a six-month period the economy lost 4.5 million jobs. Job losses continued until February 2010, but employment has grown consistently since then – the only exception being a blip due to temporary hiring associated with the 2010 census – at an average rate of about 165,000 new jobs per month since February 2010. This is only a bit faster than is needed to keep up with population growth, and as a result the employment-population ratio, which fell from 62.9% in January 2008 to 58.2% in December 2009, has hovered in a very narrow range around 58.5% for over four years. Thus, while, the unemployment rate has fallen

[3] Of course, the failure of wages to fall quickly in response to labor demand shortfalls is a longstanding and still unresolved puzzle; see, e.g., Bewley (1999).

from its peak of 10.0% in October 2009 to 6.3% in May 2014 -- just matching its peak level in the previous business cycle -- this decline is almost entirely attributable to falling labor force participation among the non-employed.

Figure 2 shows hires, involuntary displacements, and quits, as measured in the Job Openings and Labor Turnover Survey (JOLTS). During the 2008-2009 crisis, the layoff rate spiked to above 150% its pre-recession level, while the hire and quit rates fell to about 70% and 60% of their earlier levels, respectively. Layoffs peaked in early 2009 and returned to their pre-recession levels by early 2010. Hires and quits bottomed out somewhat later, in the middle months of 2009, and have recovered only very slowly since then. Each remains notably below its pre-recession levels,

Figure 3 shows the Beveridge Curve, relating job openings to the unemployment rate. One expects these measures to be inversely related: In tight labor markets with low unemployment, jobs are filled slowly and the job openings rate is therefore high, while when unemployment is high vacancies are filled quickly and there are few jobs open at any given time. In search models of the labor market, shifts in the relationship between the two series can indicate changes in the efficiency of the labor market matching process (Blanchard and Diamond, 1989).

As Figure 3 illustrates, in 2008 and the first half of 2009 job openings fell steadily as the unemployment rate rose. Starting in mid-2009, however, job openings began rising even as unemployment stagnated, and then when unemployment began falling in mid-2010 the job openings rate continued to rise at a rate consistent with the pre-2009 slope. Thus, it appears that the Beveridge Curve has shifted upward, with a given unemployment rate supporting a job openings rate about 0.75 points higher than it would have before the crisis.

A number of commentators have interpreted this apparent shift in the Beveridge Curve as diagnostic of increases in structural unemployment. In this view, an increase in labor demand can be inferred from rising job openings, and the failure of the unemployment rate to fall faster than it has indicates that the currently unemployed are unable or unwilling to fill the newly created positions. This inference is supported by Krueger et al.'s (2013) recent analysis of the duration of unemployment, which argues that a Beveridge Curve that uses the short-term unemployment rate – the share of the

labor force that has been unemployed for six months or less – does not appear to have shifted in the same way (see also Ghayad and Dickens 2012).

But while the shift in the Beveridge Curve is certainly consistent with a structural change, it is important to be cautious. There is at least some reason to think that part or all of the shift reflects changes in the meaning of a job opening rather than increases in the difficulty of finding qualified workers.

Job openings are well defined if hiring is a binary decision on the firm's part, as in many search models: Once a decision is made to hire another worker, a job opening is posted and the first applicant who arrives (perhaps subject to some well-defined, fixed minimum qualifications) is hired. This, of course, is not realistic. Both the wage and the required qualifications are choice variables that can influence the rate at which posted openings are filled.[4]

Consider a firm with labor demand curve $L^D = f(w)$, with $f'<0$. So long as wages are set exogenously, job openings are well defined as the difference between $f(w^*)$ – where w^* is the externally determined wage – and the firm's current employment. But if wages are not fixed there is no unique number of openings.[5] A firm might decide to offer wage $w_{low} < w^*$ for an additional $f(w_{low})-f(w^*)$ positions, knowing that these jobs are likely to remain open for longer than would a position offering w^*. Similarly, the firm might hold out for better-qualified workers, extending its search, or might be less choosy in order to hire more quickly (Diamond 2010). Either decision affects the number of measured job openings and the job-filling rate, but neither reflects changes in labor market matching efficiency.

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[4] Even when the offered wage is not posted with the job advertisement the employer must decide on a bargaining stance once an otherwise suitable candidate is identified. Similarly, the employer sets both minimum qualifications to list with the position and its choosiness among workers meeting those qualifications. Finally, a firm planning to hire may do so without ever posting an official opening (Diamond 2010).

[5] This is of course the exact analogue to the somewhat more common claim that unemployment is always voluntary: Unemployment simply means that one's reservation wage has been set above the market price. In search models, there can be frictional unemployment and frictional job openings. But even in these models one might observe a range of reservation wages and wage offers, with frictional unemployment rising in the former and frictional vacancies declining in the latter.

These definitional issues may be unusually important now. In the past, employers seem to have been unwilling to take advantage of labor market weakness by offering lower wages to new hires than they have in the past, or by substantially increasing their required qualifications. The reasons for this are not well understood, but appear to include concerns about the morale of the newly-hired and the incumbent workers and worries that workers who accept low wages when business conditions are weak may be quite likely to leave the firm once conditions improve (Bewley, 1999). The saliency of these concerns may be in decline. Anecdotally, two-tier wage structures that distinguish between incumbent and newly hired workers have become increasingly common (Vlasic 2011). Moreover, at least some employers seem to be taking advantage of their strong bargaining positions to be much choosier among job applicants, raising qualifications and drawing out the hiring process with multiple rounds of interviews (Davis, Faberman and Haltiwanger, 2010). All of this could be raising the measured rate of job openings relative to the strength of underlying labor demand. This would be consistent with the divergent behavior of job openings and quits since mid 2009 – where the former appears to indicate tightness, the latter does not. It is thus important to look beyond the Beveridge Curve for evidence that could confirm or disprove the indication that there have been structural changes in the labor market.

III. Heterogeneity across industry, demography, and geography

Industry

Figure 4 shows the change in employment by broad industry group between December 2007 and December 2009 – roughly the period of employment contraction – and between December 2009 and December 2013.[6] Industry shares of December 2007 employment are shown in parentheses. The standard narrative holds that the financial services and real estate industries led us into the recession. However, these sectors did not see disproportionate job losses: the employment contractions in these industries in 2007-09 – 5.6% in finance and 9.1% in real estate – were comparable to the economy-

[6] I focus on December to December comparisons to avoid seasonal adjustment concerns. All changes are expressed as shares of employment in the industry in December 2007. Data are drawn from the Current Employment Statistics survey.

wide average.[7] In both absolute numbers and percentage terms, job losses were much larger in construction and durable goods manufacturing, which contracted by 25% and 20%, respectively.

Turning now to the period since the trough, we see growth in employment across nearly the entire private sector. The mining and logging sector is a clear outlier, with nearly 30% growth over four years. This is clearly a structural change. But mining and logging accounts for only about 0.5% of national employment. Most other sectors have not yet made up their losses during the recession, and those that have have grown only slightly. Only education, health, and lodging and food services have grown more than 6%, the growth of the working-age population, since December 2007. Notably, one sector where anecdotal stories about labor supply shortages have been common – information – has seen absolute declines in employment even in the post-2009 period.

Figure 5 shows variation in job openings across industries. The horizontal axis shows the increase in job openings by sector from December 2009 to December 2013, while the vertical axis shows employment growth in the sector over the same time period. Mining and logging is excluded from the figure as it is an enormous outlier: Its job openings rate rose by 2.1 percentage points and employment grew by 33%.

The changes in job openings and employment are positively correlated across industries (ρ=0.65 with mining/logging, 0.49 without).[8] This lends support to the view that job openings increases reflect employer difficulties in finding qualified workers. However, an inspection of the specific industries yields a more mixed picture. The industries with the largest increases in job openings were mining and logging, lodging and food services, transport and utilities, wholesale trade, and finance and insurance. With the exception of mining (and perhaps the natural resource-related portion of utilities), these are not sectors where it is likely that there are real labor supply shortages. Lodging and food services and the non-resource-related portion of transport and utilities do not rely on workers with specialized skills, and neither wholesale trade or finance and insurance have yet recovered their 2007 employment levels. Former workers from these

[7] This of course does not rule out the idea that a shock that began in the financial sector was the source of the general collapse in demand.

[8] This contrasts with the situation earlier in the recovery, when job openings and employment growth were uncorrelated (Rothstein 2012a).

sectors could presumably be hired back if the demand were present. The information sector, where technological changes requiring new skills are most likely to be an important component of labor demand and thus where structural labor supply shortages are most plausible, has had only a modest increase in job openings.

Once again, mining and logging stands out as the single clear locus of matching problems related to labor supply shortages. Increasing energy prices have led to dramatic expansions of this sector, and structural impediments – e.g., housing shortages in North Dakota – may be preventing the sector from growing even more quickly than it has.

Outside of mining and logging, the data generally appear consistent with the view that the increase in job openings reflects reduced recruiting effort, lower offered wages, or higher minimum qualifications rather than labor supply shortages in fast-growing sectors. However, it is also possible that *intra*-industry shifts in labor demand have created shortages of some particular types of workers within individual sectors that are masked by weakness in other subsectors. This is perhaps most plausible for the finance and information sectors, where one can easily imagine shortages of workers with experience with particular technologies. Unfortunately, job openings data are not available for detailed industries. However, in Section V I use wage data to explore the possibility of heterogeneity in labor market tightness within sectors.

Demography

Construction and manufacturing employment is heavily male and largely non-college-educated, so one might expect that low-skill men would have suffered disproportionately in the recession. Figure 6 shows the unemployment rate by gender and education in 2007, 2009, and the 12-month period from April 2013 through March 2014. Consistent with the industrial composition of the cyclical collapse, we see that unemployment rates of less educated men rose more from 2007 to 2009 than did those of more educated men. However, it is notable that low-skill workers had much higher unemployment rates than high-skill workers even in 2007, and that unemployment rates rose dramatically for low-skill women as well as for men. Averaging across the four education groups, women's unemployment rates rose 83% between 2007 and 2009, while men's rose 121%.

The third series in Figure 6 shows unemployment rates in 2013-14. These are lower than the 2009 levels but substantially higher than the 2007 levels in all eight groups. Declines since 2009 are much larger for men than for women at each education level, and are particularly large for non-college men. These patterns appear more consistent with a shortage of overall labor demand than with structural shifts that disfavor particular subgroups (e.g., the less educated).

Geography

Another important source of heterogeneity is geographic. The recession hit some areas – most famously, Sun Belt cities like Las Vegas where the housing boom was most pronounced – harder than others. Figure 7 plots state unemployment rates in December 2007 and December 2013. The grey line corresponds to a constant unemployment rate, while points above it indicate a higher unemployment rate in 2013 than in 2007. All but two states – Minnesota and North Dakota – lie above the line, and there are only 9 states (together accounting for under 8% of national employment in 2007) where the 2013 unemployment rate exceeds the 2007 rate by less than a full percentage point. Only 10 states, accounting for about 7% of national employment, had December 2013 unemployment rates below 5.0%.

Figure 8 repeats the exercise for metropolitan areas. We see more evidence of low unemployment rates here: 80 of 380 metropolitan areas, collectively with employment equal to 14% of the national metropolitan total, had December 2013 unemployment rates below 5%. But even at the metropolitan level there are only a few locations with lower unemployment rates than before the recession, and these are disproportionately small: The 17 areas with lower rates in December 2013 than in December 2007 had only 2.8% of 2007 national metropolitan employment.

An important caveat is that the pre-recession data might not reflect sustainable conditions. During the housing market bubble, a few areas – e.g., Las Vegas – may have had unemployment rates below their full-employment rates. However, the bubble had begun to burst well before December 2007, the date I use for the pre-recession situation. Nationally, the employment-to-population ratio was already 0.7 percentage point below

its December 2006 peak by that point. Recovering the end-of-2007 level of unemployment seems like a reasonable benchmark for recovery.

IV. Accounting for heterogeneity in cyclical sensitivity

The construction and manufacturing sectors have historically been more cyclical than the economy as a whole, and so one would expect low-skilled men to suffer more in any downturn. Similarly, youth unemployment has always been highly sensitive to economic conditions (Clark and Summers 1982). This differential sensitivity can account for most of the heterogeneity in outcomes seen above.

Figures 9, 10, and 11 illustrate this. For each industry (Figure 9), gender-education group (Figure 10), and age group (Figure 11), I plot the actual change in the unemployment rate between 2007 and 2013, as well as the change in unemployment that would have been expected given the past cyclical sensitivity of that group's unemployment and the magnitude of the cycle.[9] To form this prediction, for each group g I estimate a time series regression of the form:

$$u_{gt} = \alpha_g + u_{(-g)t}\beta_g + e_{gt}, \quad (1)$$

where u_{gt} is the unemployment rate for group g in month t and $u_{(-g)t}$ is the average unemployment rate in that month across all groups other than g.[10] A value of β_g greater than 1 indicates that group g is more cyclically sensitive than others. I estimate α_g and β_g using monthly observations from 1978 through 2007, then use these coefficients and the observed path of $u_{(-g)t}$ to forecast u_{gt} through 2013. The lighter bars in figures 9-11 illustrate the change in average forecast values from 2007 to 2013.[11]

The figures show that the vast majority of the across-group differences in unemployment growth between 2007 and 2013 are attributable to differences in cyclical sensitivity rather than to unique features of this business cycle. However, there are some anomalies. First, contrary to many discussions of the housing bust, construction industry

[9] Unemployed workers are assigned to the industry in which they last worked.

[10] I compute $u_{(-g)t}$ using fixed weights for each group h≠g over time, proportional to the group's average labor force share over the 1978 to 2013 period.

[11] Results are similar if I instead predict the change as the difference between the predicted 2013 rate and the *actual* 2007 rate. In either case, I focus on annual averages, though the prediction is conducted at the monthly level.

unemployment – which is extremely cyclical – was 2.1 percentage points *lower* in 2013 than would have been expected given the weak overall labor market, and the anomaly in durable goods manufacturing was even larger. In contrast, unemployment rose more than predicted in nearly every service industry (other than arts and accommodation and food) and in the federal government. Insofar as there have been structural shifts, they have apparently been *toward* the goods-producing industries and *away* from the high-skill services, though these shifts have been masked by the across-the-board cyclical decline.

Turning to Figure 10, the unemployment rate for men without high school diplomas – again, a group that is ordinarily very cyclically sensitive – rose by 1.5 percentage points less than expected, while unemployment rates for women at all education levels rose by more than expected.[12] Finally, Figure 11 indicates that over-65 workers, whose unemployment rate rose less than have those of younger workers, were nevertheless much more affected by this business cycle than by past cycles. By contrast, among those aged 25-34 the unemployment rate rose by much less than expected. As we will see below, labor force participation in this age group has declined substantially, while participation among those over 65 has risen.

Taken together, Figures 9-11 show that many of the gender, industry, and age patterns that are apparent in the raw data are simple characteristics of weak labor markets and not unique to the current situation. Unemployment rates remain higher than in 2007 for all ages, education levels, genders, and industries. Sectors that have been more cyclically sensitive in the past saw larger increases, but there is remarkably little heterogeneity beyond this. This pattern once more appears consistent with a shortfall in aggregate labor demand, and less so with a gradual adjustment to a technological or demand-driven shock that changed the composition of labor demand.

V. Evidence from wages

The evidence presented thus far suggests that differential outcomes over the last several years across education, gender, or age have been largely consistent with what past cyclical patterns would have implied given the ongoing apparent weakness of the labor

[12] Even in 2009 the unemployment rate for non-high-school men was a bit lower than would have been expected based on past patterns, while for more educated men the excess unemployment was quite small.

market. But many have argued that labor demand is not so weak anymore, and that the still depressed employment-to-population ratio reflects reductions in effective labor supply. Others see unevenness across geography or skill, arguing that there may still be demand shortages in some markets but that others have recovered to the point that they are now constrained by available supply.

Mismatches in the distribution of labor demand and labor supply across markets defined by skill or geography would produce tightness in at least some labor markets, while labor supply shifts would imply across-the-board tightness. This tightness should be directly observable in wages: If employers are facing shortages of suitable, interested workers, they should be responding by bidding up the wages of those workers who can be found. Thus, in this section I examine wage trends for evidence of tightness. I examine the aggregate labor market first, then turn to distinctions across sub-markets.

V.A. *Aggregate wages*

The solid line in Figure 12 graphs the 12-month change in real mean log hourly wages from 2005 through March 2014. These wages are calculated from the Current Population Survey Outgoing Rotation Groups, with imputed wages excluded. Details of the wage calculations are in the appendix. The figure shows that mean real wages have been largely stable since 2005, except for a period in late 2008 and 2009 when they rose at an annual rate of about 3%, and a period in 2011 when they fell at a -2% annual rate.[13] Outside of these periods, there has been little movement.

One concern about aggregate wage trends is composition changes: If the least skilled workers are the most likely to have lost their jobs in the Great Recession, changes in average wages will overstate what is experienced by individual workers. This could explain why wages appear to have risen quickly during 2008 and 2009, when employers were shedding workers and there is little other evidence of labor market tightness.

To address this concern, I use the longitudinal structure of the CPS to match observations on the same individual from month m and month m+12, excluding

[13] The price level was falling during much of the 2008-9 period of real wage growth; nominal wage growth actually slowed in the second half of 2008 and early 2009, from around 4% per year to under 2%. Similarly, the slowdown in real growth in late 2009 and early 2010 reflects stable nominal growth (at an annual rate of about 1.5%) and the return of mild inflation.

observations that cannot be matched or where the wage is unavailable in either month and holding constant the individual weight across the two periods.[14] The dashed line in Figure 12, labeled "composition-adjusted," shows the mean year-on-year change in mean wages for those who were employed in both periods. This shows that individuals who remained employed saw rising real wages, at a rate of 2-3% per year, throughout 2006-2009. The anomaly in 2008-2009 is much reduced here and plausibly consistent with sampling error. There is still no sign, however, that wage growth slowed before late 2009, when average changes fell to near zero. Weak growth reappeared in late 2011, but remains around 2%. Note that this overstates the growth for workers with constant characteristics as in this sample the year-on-year change incorporates the effect of aging by one year as well as any calendar time effects.

Workers rarely accept – or perhaps employers rarely demand – reductions in their nominal wages within existing jobs. This wage rigidity may be masking trends in the wages offered to new hires. To zero in on the latter, I take advantage of the fact that the CPS makes it possible to identify workers in the ORG sample who have started new jobs within the previous three months. The dotted line in Figure 12 shows the trend in mean wages for such workers. This series closely resembles the all workers series, with a similar pattern of rising real wages in 2008-2009 and falling real wages starting in early 2010. It shows even less sign of tightness in the most recent data than does the within-person wage growth series, with real wage growth around zero through the end of the sample.

V.B. Individual labor markets

Despite the aggregate slack that is evident in Figure 12, it is possible that particular labor markets were tighter. Table 1 shows the change in mean real wages of newly-hired workers between 2007-08 and 2012-14, by education, gender, age, and

[14] Roughly 40% of initial observations lack one-year-ahead wages, about two-thirds of the time because the individual cannot be matched to a year-ahead observation (due to having moved from the original home, to survey nonresponse, or to errors in the CPS identifiers) and the remainder because the person is surveyed in the follow-up but is no longer employed or lacks a valid wage. Attrition among the continuously employed may be correlated with wage growth. The reweighting exercise described in the text partially addresses this possibility.

industry. (Note that these are total changes over nearly five years, not annual rates of growth.) Across education-by-gender and age cells, only over-65 workers saw nontrivial wage increases over this period. Across industries, nontrivial wage changes are seen in mining and logging, durable goods manufacturing, information, and finance/insurance, though most of these are not statistically significant.

Again, composition changes may confound changes in mean real wages. The strategy used above of limiting the sample to workers with two observed wages cannot be used when studying new hires. As an alternative, I use a regression to adjust for changes in workers' observed characteristics. Specifically, I regress log real hourly wages for new hires in 2004-2006 on a quadratic in age; indicators for education-by-gender, state, and industry-by-education; and separate linear age terms for each gender-education group. I then use the coefficients to form predicted log wages for new hires in 2007 and later, and compare these to the observed wages. Columns 3 and 4 of Table 1 show the change in the mean log wage residual in each cell and the standard error for these changes. Controlling for changes in observable characteristics substantially reduces the apparent wage increase for older workers, and eliminates most of the positive industry changes as well. Only the mining and finance sectors appear to have meaningfully increased mean wages, adjusting for worker characteristics, since 2007-08, and only the latter of these is statistically significant.

There is thus no sign of mean wages being bid up at the level of education groups, age, or broad industrial sectors (with the possible exception of finance). Once again, however, it is possible that these market definitions are too coarse and that employers in particular submarkets are having trouble finding workers with suitable skills. Falling wages in other submarkets might make it impossible to detect rising wages for workers in short supply via examinations of highly aggregated averages.

It might be possible to see labor market tightness through rightward shifts in some portion of the overall wage distribution. To examine this, I examined the distribution of starting wages, adjusted for observable characteristics as in columns 3-4 of Table 1, in 2007-8 and 2012-14. The solid line in Figure 13 shows the change in wages at different percentiles in the new-hires wage distribution between the two periods. Not surprisingly, through most of the distribution real starting wages fell by between 3% and 4% over this

period. The upper tail – starting at around the 85th percentile – does seem to have shifted rightward somewhat, perhaps consistent with tightness in some individual labor markets. However, the changes are small – wage increases are below 3% everywhere and are below 2% at all but a couple of percentiles.

As in the analysis of mean wages by broad industry, the analysis of changes in the overall distribution of wages might miss heterogeneity across sub-markets. I do not track individual workers or labor markets over time, so an increase in wages in one submarket accompanied by a reduction in another submarket with slightly higher initial wages would not be easily distinguished from constancy in both.

The Current Population Survey sample is not large enough to permit detailed analysis of individual industries or geographic groups. As an alternative, I divide the sample into sub-groups based on other indicators of labor market tightness. In the upper left panel of Figure 14, I divide industrial sectors in half based on the increase in job openings between 2009 and 2013 (as plotted in Figure 5). The solid line shows the sectors with below average increases in openings and the dashed line those with above average increases. Wage declines are smaller in the latter industries, consistent with their labor markets being relatively tight. But even in these industries there is no sign of meaningful wage growth; moreover, what growth there is at the top of the conditional wage distribution is coming from industries that have not seen large increases in job openings.

The upper right panel focuses on geography. I divide metropolitan areas into two groups by their 2013 unemployment rates. The solid line shows the change in the distribution of starting wages for areas with unemployment rates above 7.3%; while the dashed line shows areas with rates below that point. Once more, the MSAs with lower unemployment rates saw smaller wage declines, but there is no sign of meaningful wage growth in these cities.

The final panel of Figure 14 examines skill levels. Using the same flexible wage regression used to predict wages for Table 1, I predict a wage level for each newly hired worker in the CPS. I divide workers in half based on this predicted wage, plotting the change in the distribution of starting wages for the less skilled group with a solid line and

the more skilled group with a dashed line. The two series are quite similar, with no indication of rapidly accelerating wages at any point in either group's distribution.

VI. Long-Term Unemployment and Labor Force Participation

The evidence presented thus far does not indicate meaningful upward pressure on wages in any identifiable labor market, consistent with the view that any labor supply shortages at this point are confined to a few small sections of the economy (e.g., mining and logging, or North Dakota). This appears to be somewhat at odds with the relatively quick decline of the unemployment rate, as seen in Figure 1 (though note that even in the most recent data the unemployment rate remains quite high). One hypothesis is that the unemployment rate is not adequately measuring the amount of slack in the labor market. This section investigates two aspects of this: Long-term unemployment, and labor force participation.

VI.A. Long-term unemployment

Figure 15 shows the long-term unemployment share – the fraction of the unemployed who have been out of work for 26 weeks or more – over time. This share rose dramatically during the Great Recession, to levels far above what had been seen previously. It has fallen slowly since then, but remains fully ten percentage points above the pre-2007 record.

Either reduced search effort among the unemployed or labor market mismatch would reduce the exit rate from unemployment and thus lengthen survival in unemployment. Of course, reductions in labor demand would have a similar effect. Nevertheless, many have interpreted the dramatic rise in employment durations in this cycle as indicative of reductions in job search effort (Barro, 2010). Krueger et al. (2013; see also Hall, 2014) conclude that the long-term unemployed are largely disconnected from the labor market, exerting little supply pressure.

The fourth column of Table 2 shows the long-term unemployment share in various demographic categories in 2013. This share is surprisingly constant across gender and education. Across ages, long-term unemployment is somewhat more prevalent among older workers, but the differences are relatively small except in the 16-

24 year old group (many of whom have not been in the labor force for long enough to reach long-term unemployment).

Figure 16 shows the probability that a worker who is unemployed for one month is reemployed in the following month. I compute reemployment rates following the procedure used by Rothstein (2012b) and Farber and Valletta (2013), counting individuals who transit from unemployment to employment, then immediately back to unemployment in the following month as having remained unemployed throughout. As discussed in the above-cited papers, many of these repeated transitions appear to derive from misclassification of labor force status in the middle month (see also Poterba and Summers, 1986).

In Figure 16, I show estimates for three categories of unemployed workers – those who have been unemployed 13 weeks or less in the initial month; those who have been out of work for between 14 and 25 weeks; and the long-term unemployed whose durations exceed 26 weeks. The figure shows that reemployment rates decline with unemployment duration, primarily when comparing short-term to medium-term unemployed. This might reflect hysteresis, employer discrimination among the unemployed (Kroft, Lange, and Notowidigdo, 2013), declines in search effort with unemployment duration (Krueger and Mueller, 2011), or heterogeneity in reemployment probability. Interestingly, however, the gap in exit rates between the short- and long-term unemployed did not widen dramatically even as the level of the exit rate fell during the recession. The gap at the end of the period is similar to that seen before 2008, though all groups' reemployment rates remain low.

Although there is no guarantee that this pattern of parallel movements will persist in the future, it appears likely based on recent history. If so, then we might expect that a robust labor market – if one ever arrives – will pull the long-term unemployed back from the margins of the market and into higher levels of attachment. Note, moreover, that there is no inconsistency between this optimistic view and the evidence (see, e.g., Kroft et al. 2013 and Krueger et al. 2014) that the long-term unemployed do not compete effectively with the short-term unemployed for work; under this story, if employer demand is robust enough to exhaust other sources of labor, firms will figure out ways to employ even those at the margins of the labor market (Baker and Bernstein, 2003).

VI.B. Labor force participation

Many workers who have been out of work for a long time wind up exiting the labor force, abandoning their search for jobs without having found one. These "missing workers" (Shierholz, 2014) might represent additional slack in the labor market, suggesting that the decline in the unemployment rate overstates the degree to which the market has tightened, or they might represent workers who have been scarred by their long term unemployment and who are unlikely to ever work again.

Figure 17A shows the labor force participation rate (LFPR) since 2004. Both male and female LFPRs turned downward during the recession, and both have fallen continuously since then. The total decline is about 4 percentage points for men and 2.5 p.p. for women.

One source of the decline in LFPRs is population aging, as the baby boom generation has entered into the normal retirement range during this period. Of interest for evaluating the likely impact of the recession is the change in the age-specific participation rate. Figure 17B shows changes between 2005/6 and 2012/13, disaggregated by age. For both genders, declines in LFPRs have been concentrated among the youngest workers, with the participation rates of those under age 20 falling by over ten percentage points. There has been little change in the participation rates of women aged 25-55, while male participation rates in this age range have fallen by only about 2-3 percentage points, with the largest declines among the youngest workers even in this range. Participation rates for both men and women over age 55 have risen fairly dramatically (albeit from relatively low levels).

It is unlikely that individuals under age 25 are permanently retired. A more plausible explanation is that these individuals have become discouraged by a weak labor market that offers few entry points. Past evidence indicates that there is real reason for concern about the future earnings prospects of those who finished school during the downturn (Kahn 2010; Oreopoulos et al. 2012). But it seems likely that they will be employable, at rates comparable to those seen for young people before the recession though likely at lower wages, if demand returns. One would be more concerned about a long shadow of the recession for workers at the later end of middle age, who might be

hard to entice back to the labor force after taking a forced early retirement. But the evidence suggests that this group's participation has not fallen dramatically.

VII. Discussion and Policy Implications

The recent performance of the U.S. labor market can fairly be described as catastrophic: The unemployment rate was above 8 percent for over three straight years and has only in the most recent data matched its level (6.3 percent) at the *peak* of the early-2000s downturn; the employment-population ratio has fallen by nearly 4 percentage points since 2007, with no sign of recovery in sight; and many subgroups – particularly the young and less educated, along with racial minority groups – are facing unemployment rates well into the double digits.

Many models that macroeconomists have used to understand business cycles have difficulty accounting for demand shortfalls that last for many years. In such models, sustained high levels of unemployment can arise only if there are structural impediments to labor market clearing – the unemployed are not looking very hard for work, have raised their reservation wages due to increased implicit taxes on work, or are in some sense unsuitable for the jobs that are available, perhaps because they lack the appropriate skills or are unwilling to move to where the jobs are.

Drawing in part on these models, many observers have concluded that structural impediments to recovery must be an important component of our current situation. The review of the evidence here offers no support for this diagnosis, however. The poor labor market outcomes for low-skilled workers are entirely consistent with cyclical explanations, as these workers have always been more sensitive to the business cycle. The most plausible sources of structural problems – labor supply disincentives due to conditional transfers like unemployment insurance or geographic immobility due to housing market frictions – do not appear to be quantitatively important.[15] And the

[15] Unemployment insurance extensions can explain only about 0.3 percentage points of the 2011 unemployment rate (Rothstein 2012b). With regard to geographic mobility, careful analyses indicate that mobility rates have changed little in recent years (Kaplan and Schulhofer-Wohl 2011), that any declines are concentrated among renters who should not have been directly affected by the decline in home values (Farber 2012), and that any "house lock" effect is quantitatively small (Schmitt and Warner 2011).

Beveridge Curve provides at best weakly suggestive evidence regarding the state of the matching function.

Indirect evidence also fails to support the claim. Structural explanations for inadequate recovery, whether due to supply reductions or to mismatch, imply that the labor market is actually much tighter than it appears, at least as viewed from the perspective of potential employers. There is no sign in the data that employers with jobs to fill are having trouble filling them, except perhaps in a few isolated and small submarkets such as resource extraction.

Finally, the unprecedented rise in long-term unemployment and decline in labor force participation, which some have pointed to in support of the structural unemployment hypothesis, is at a minimum more complex than this. The rise in long-term unemployment appears largely attributable to across-the-board reductions in reemployment rates, with no indication of particular declines for the long-term unemployed. And much of the decline in participation derives from young people who have not yet entered the labor market rather than from older workers taking early retirement, for whom hysteresis concerns may be most pronounced.

We can thus conclude that labor demand shortfalls continue to be an important feature of the labor market and the primary determinant of labor market performance, four years after the Great Recession began. This has a number of important implications for policy.

The popular debate has seen a wide variety of proposals about what could be done to promote faster labor market recovery. These can be divided, roughly, into four categories. One emphasizes traditional macroeconomic demand stimulus, either through fiscal or monetary policy. (The former is hard to imagine given current political configurations and the latter would require non-traditional strategies, given the zero lower bound on nominal interest rates. But no matter – at issue here is whether such policies would address the problem, not whether they would be feasible.) A second emphasizes human capital policy – training programs for displaced workers and more student aid. The third blames much or all of the weak labor market on improvident policies that have weakened the incentive to work, and prescribes cuts in taxes and means-tested benefits to restore incentives. Finally, the fourth category views ongoing deficient demand as

unavoidable and not amenable to policy, and suggests a new emphasis on income support programs for low-skill workers who are rapidly being made redundant by technological advances. Of course, there are no sharp divisions among these, and policies from two (or more) of these categories could well be implemented together.

The evidence presented here is strongly supportive of the first category of response. Where some would argue that increased aggregate demand will only create inflation as labor markets are already tight, the results above suggest that this is not the case. There is no reason to doubt that additional labor demand would improve employment outcomes, with particular benefits for low-skilled workers and other disadvantaged groups who suffer disproportionately from cyclical downturns. My results also counsel against many of the recommendations made by proponents of the other types of responses, or at least against the idea that these recommendations will help to address the short-run problems in the labor market. In particular:

- Education and training programs aimed at raising the skill distribution can be expected to yield positive returns in the long run, but are unlikely to do much to help the labor market in the short term when there are substantial demand shortfalls at all skill levels.
- Supply-side policies such as tax cuts or reductions in unemployment insurance or means-tested transfers will only increase the imbalance of labor supply to demand, driving down wages but doing little to increase employment. Moreover, the programs that would be cut are extremely important in a time of elevated unemployment; they are often all that stands between the families of long-unemployed workers and severe poverty (Rothstein and Valletta 2014).
- There is little indication that there have been changes since 2007 in the relative demand for low-skill workers beyond what one would expect from a severe recession. A decision to concentrate on the consequences of non-employment to the exclusion of efforts to raise employment would be to treat the symptoms rather than the disease, and risks a self-fulfilling prophecy whereby predictions of low employment rates lead policymakers to avoid taking steps that would prevent those predictions from coming to pass.

With that said, four caveats are in order. First, this is not the place to address the debates about the efficacy of fiscal or monetary policy (conventional or unconventional) at stimulating aggregate demand. The results here speak to the importance of accomplishing that goal, but not to the best way to do so.

Second, I have not addressed longer-run structural changes, such as deindustrialization or skill-biased technical change. Rather, I have focused exclusively on the very short run, looking for signs of structural explanations for changes between 2007 and the present. My analysis speaks to the question of whether increases in aggregate demand might return our labor market to something resembling its 2007 state, but not to whether further increases could reverse longer-run trends toward reduced male employment-population ratios and higher inequality. Indeed, some of the above policy responses – education and training programs and increased income support for low earners in particular – may make sense as a response to the long-term trend, even if they cannot be expected to contribute meaningfully in the short run.

Third, although I have found no sign to date of labor market tightness, it is possible that structural problems that are now being masked by low aggregate demand would become apparent in a stronger economic recovery. This bears watching as the recovery proceeds. There will likely be room for policies aimed at improving job matching – e.g., search and mobility assistance – though these should be seen as complements to rather than substitutes for policies aimed at stimulating demand.

Finally, and most important: An extremely long downturn is likely to cast a long shadow over our future prosperity, even if this shadow falls more on wages than on employment rates. Workers displaced in the early 1980s recession faced large declines in future earnings, amounting to 20% losses even 15 to 20 years after their initial displacement (von Wachter, Song, and Manchester 2011), and also saw substantial declines in their life expectancy (Sullivan and von Wachter 2009). Other research indicates that young people who enter the labor market during recessions see long-run negative earnings effects (Oreopoulos, von Wachter, and Heisz 2012; Kahn 2010) and that parental job loss hurts children's schooling and labor market outcomes (Oreopoulos, Page and Stevens 2008, Stevens and Schaller 2011, Ananat, Gassman-Pines, and Gibson-

Davis 2011). This evidence implies that every month that unemployment remains high is making us poorer for decades to come.

Unfortunately, there is little hope of avoiding these consequences. The downturn has already extended for over six years, and the labor market appears set to remain weak for some time to come. Even if successful macroeconomic management ensures that employment growth from here out matches the pace seen in 1994 – the period of fastest sustained growth in recent history, when employment grew by an average of 321,000 jobs per month – it will still be years before we reach anything that might be characterized as full employment (Greenstone and Looney 2012). And at a more moderate growth rate of 208,000 jobs per month – matching the best year to date of the current century – recovery will take a decade or more. Thus, while aggressive policies aimed at increasing aggregate demand quickly can help to limit the damage, even optimistic scenarios imply large ongoing costs.

Data Appendix

This appendix describes the data used for the wage analyses in Section VI. The basis for these analyses is a sample constructed by pooling the CPS Outgoing Rotation Groups (ORGs) from May 2004 through March 2014.

For hourly workers who do not report that they usually receive overtime pay or who report that their weekly hours vary, I use the self-reported hourly wage. For other workers, I use weekly earnings divided by weekly hours. Hours are constructed as usual hours on the primary job if that is available. If not, I use actual hours in the previous week if the individual had only one job and if these hours are consistent with the self-reported part-time/full-time status. Otherwise, hours are set to missing (as are wages if the hourly wage is not reported directly).

Constructed wages are topcoded at $2,884 per week, and topcoded wages are multiplied by 1.4. Wages are then adjusted for inflation using the monthly CPI-U series, and trimmed at $1 and $200 (in January 2001 dollars). Observations with allocated hourly wages (or weekly earnings, if those are used) are excluded.

Many of the analyses focus on newly-started jobs. These are identified by merging the ORG observation to the regular CPS observations in each of the three previous months. This produces a panel of up to 4 months. An individual is coded as starting a new job if he/she reported in any but the first of these months that she was in a different job than the month before or that her duties or occupation had changed, or if she moved from non-employed (and not on layoff) to employed during the panel.

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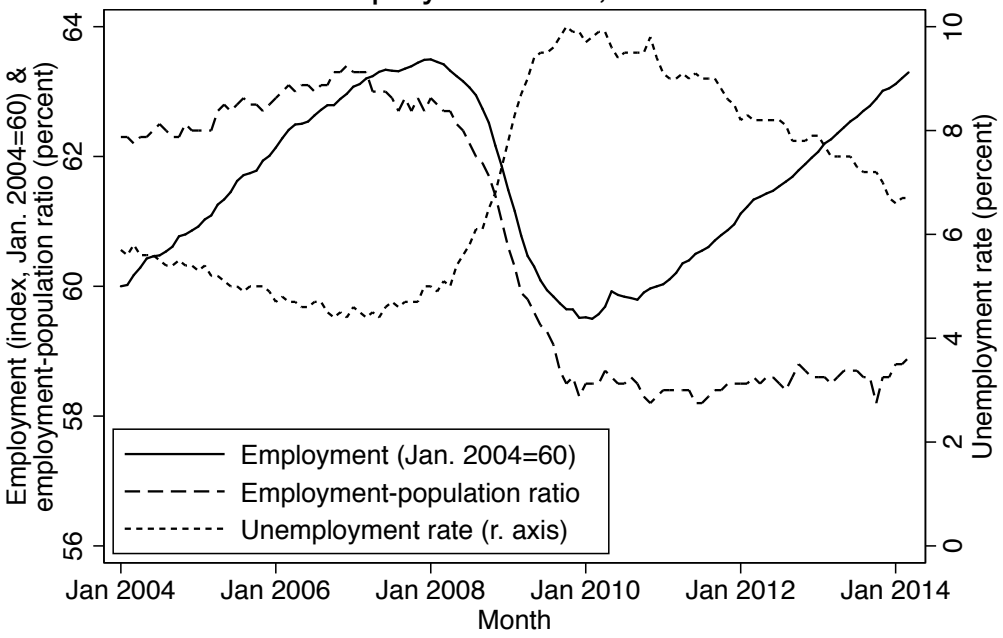
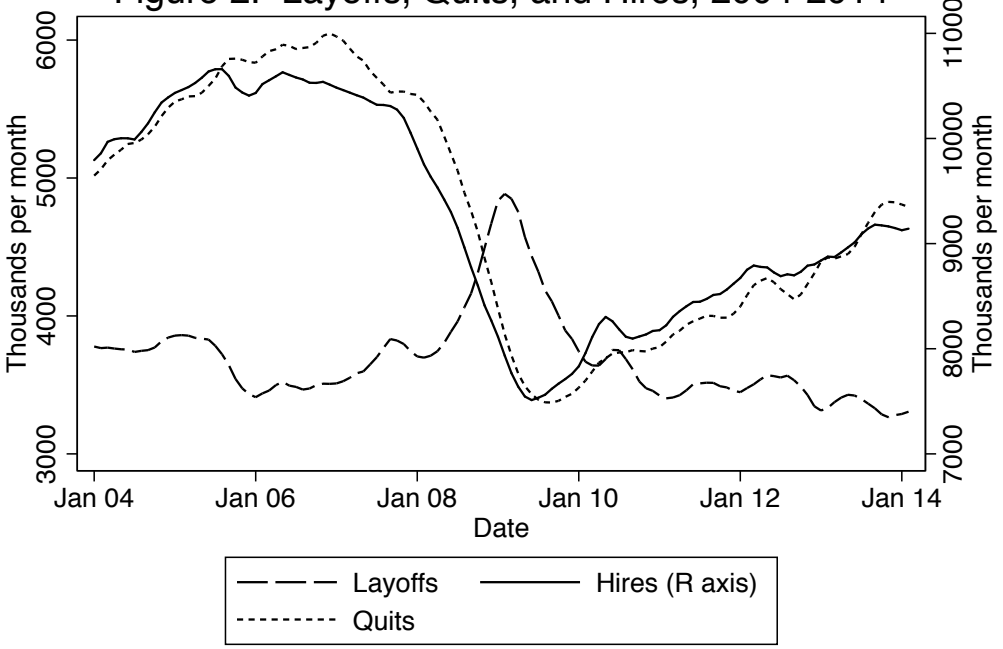
Figure 1. Employment, employment-population ratio, and unemployment rate, 2004-2014



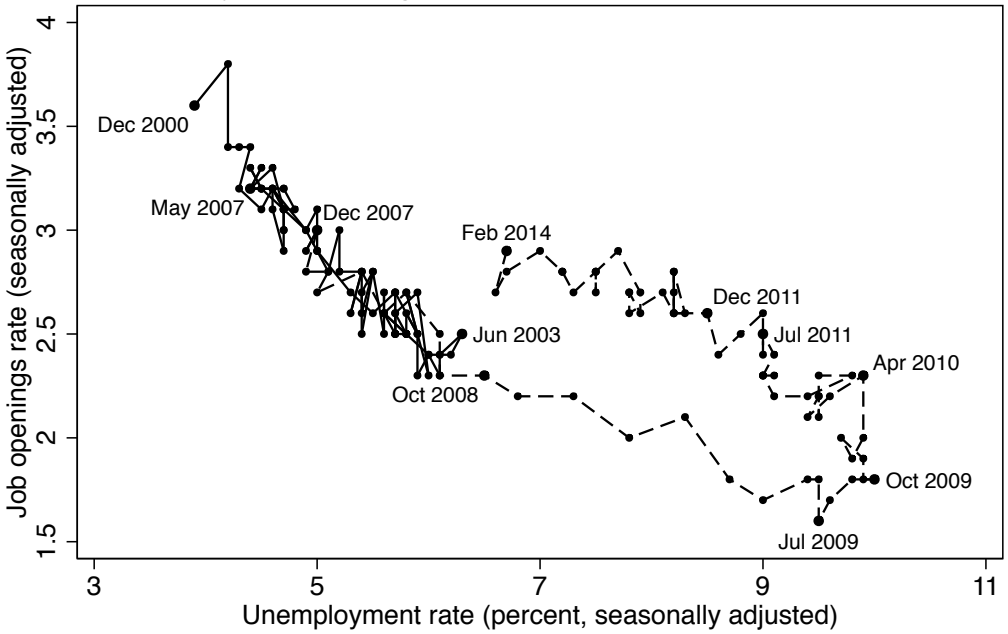
Source: Bureau of Labor Statistics, Current Population Survey and Current Employment Statistics.
Notes: All figures are seasonally adjusted.

Figure 2. Layoffs, Quits, and Hires, 2004-2014



Source: JOLTS. Series smoothed using a 3-month triangle smoother.

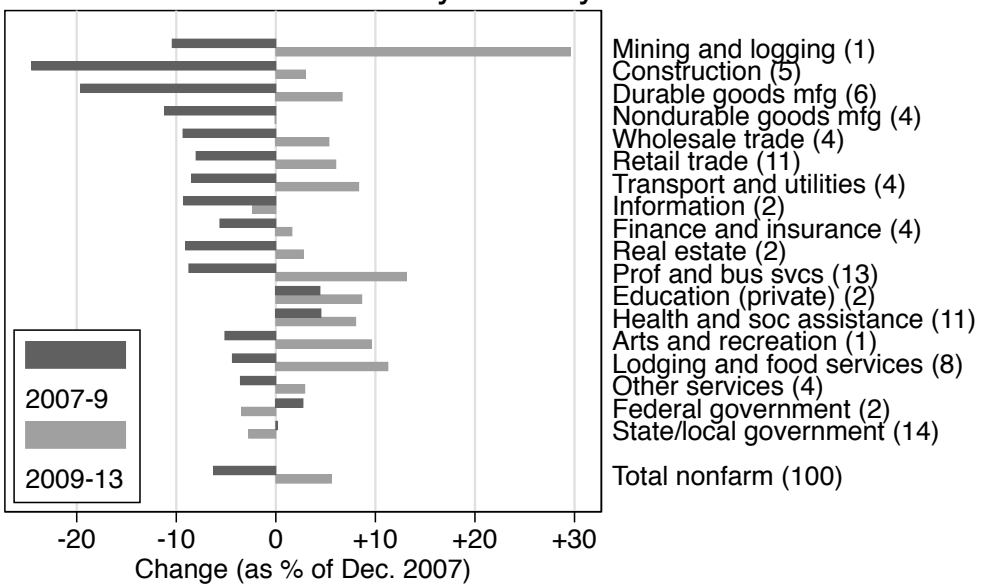
Figure 3. Beveridge Curve
(job openings and unemployment rates)



Source: Bureau of Labor Statistics, Job Openings and Labor Turnover Survey and Current Population Survey.

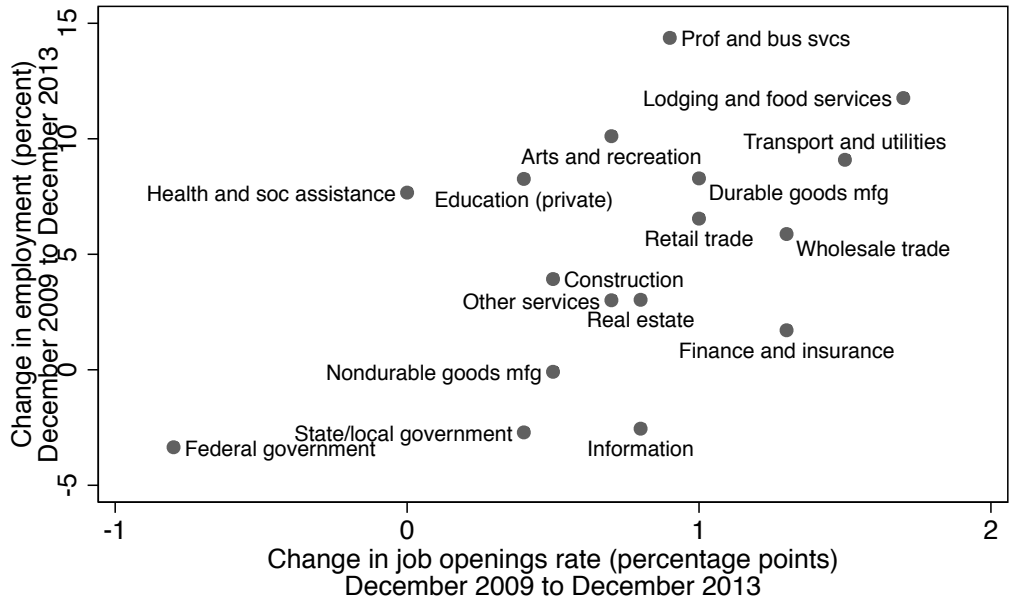
Notes: Rates are seasonally adjusted. December 2007-February 2014 portion is indicated by a dashed line.

Figure 4. Employment growth since December 2007, by industry



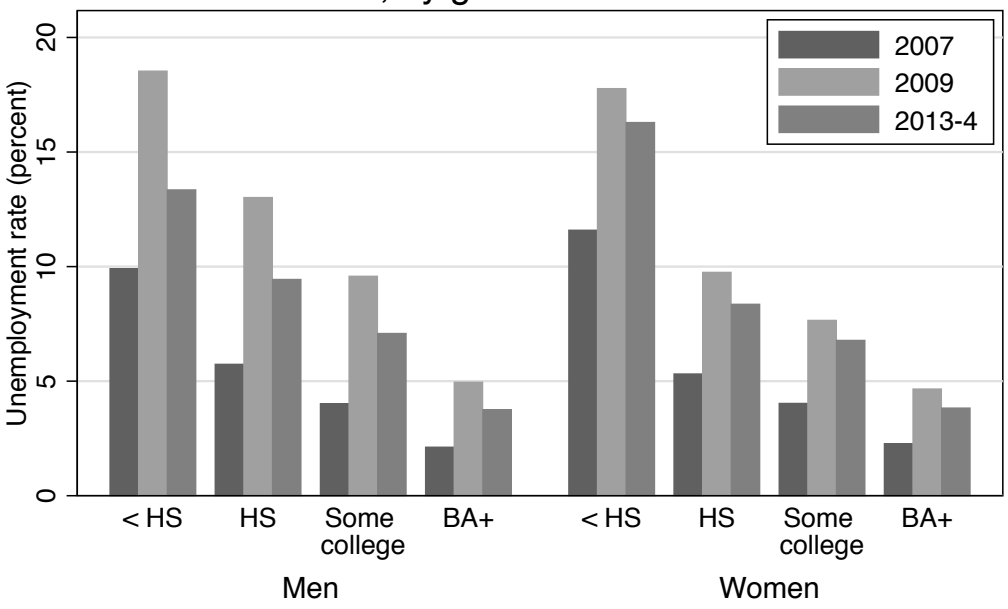
Source: Current Employment Statistics. Figure plots December-December changes, as a percent of December 2007 employment. Industry shares of December 2007 total nonfarm employment in parentheses.

Figure 5. Job openings and employment changes by industry, December 2009 to December 2013



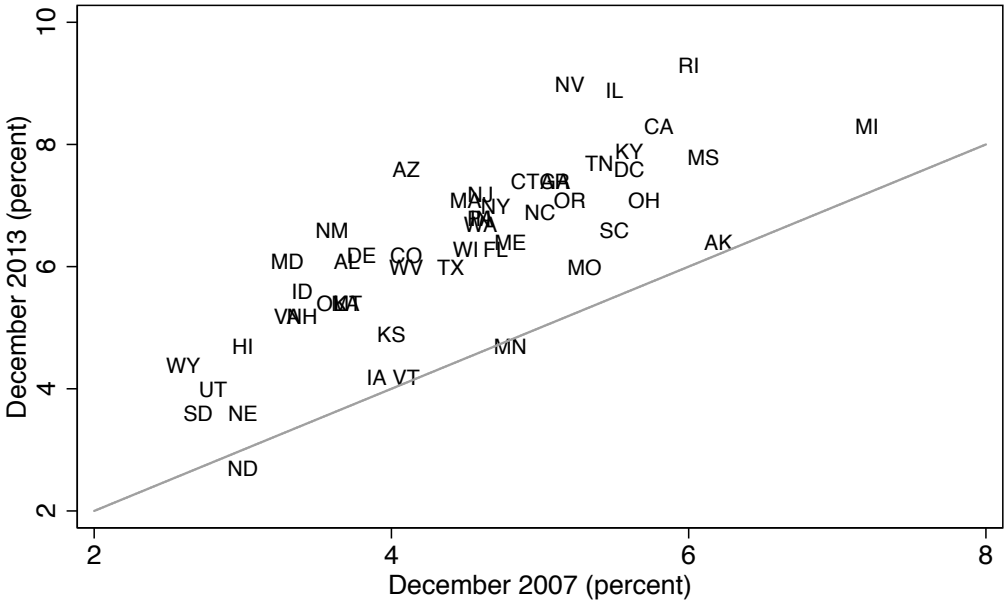
Source: JOLTS and CES. Mining (change in job openings rate +2.1, change in employment +33.0%) not sho

Figure 6. Unemployment rates in 2007, 2009, and 2013-4, by gender and education



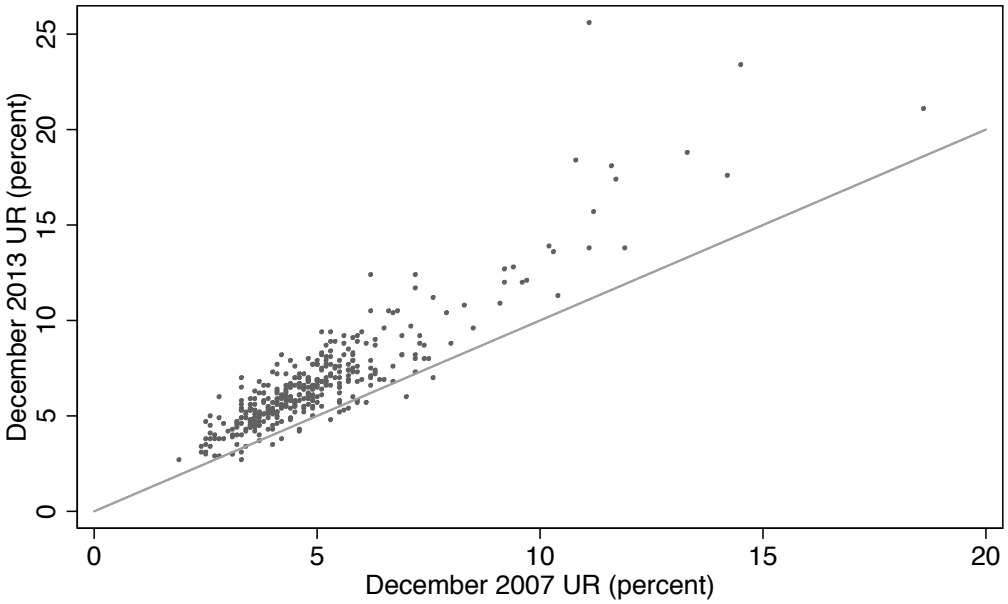
Source: CPS. 2013-4 data span April 2013-March 2014.

Figure 7. State unemployment rates, December 2007 and December 2013



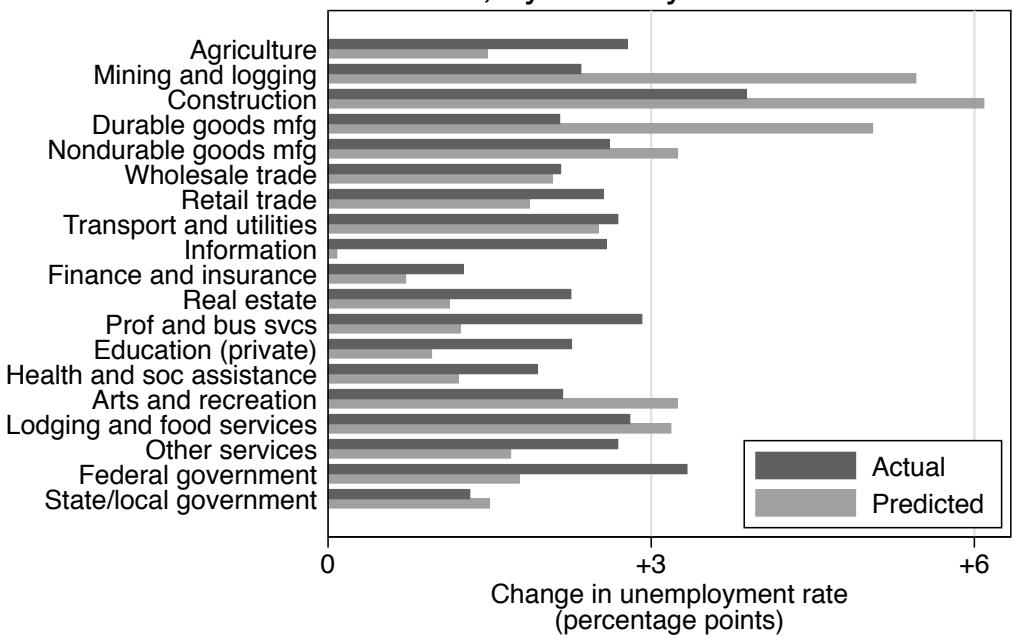
Source: Local Area Unemployment Statistics

Figure 8. Metropolitan area unemployment rates, December 2007 and December 2013



Source: Local Area Unemployment Statistics

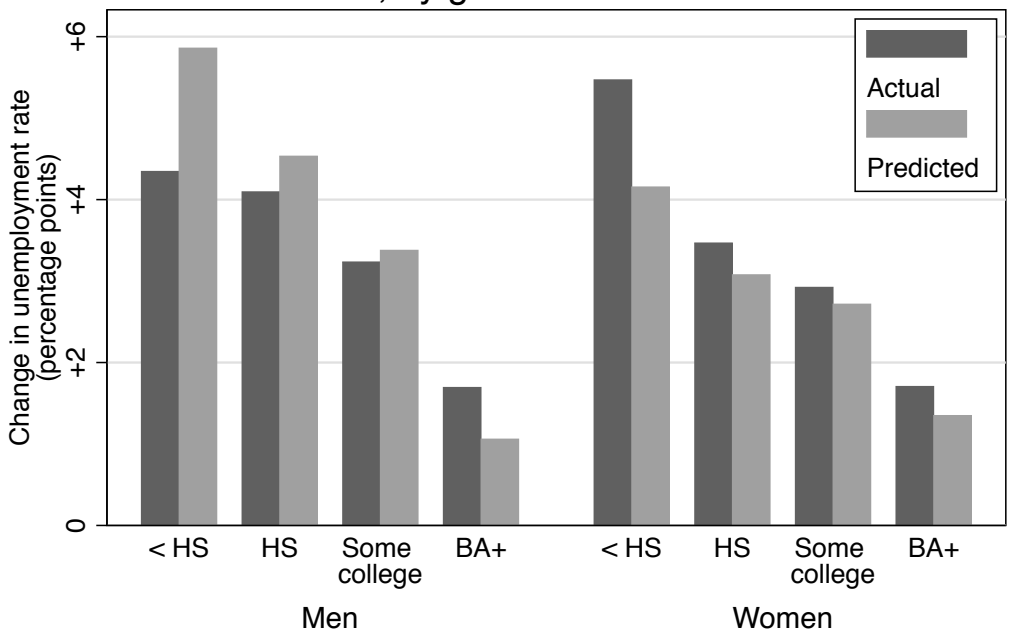
Figure 9. Actual and predicted change in unemployment rate, 2007-2013, by industry



Source: Bureau of Labor Statistics Current Population Survey.

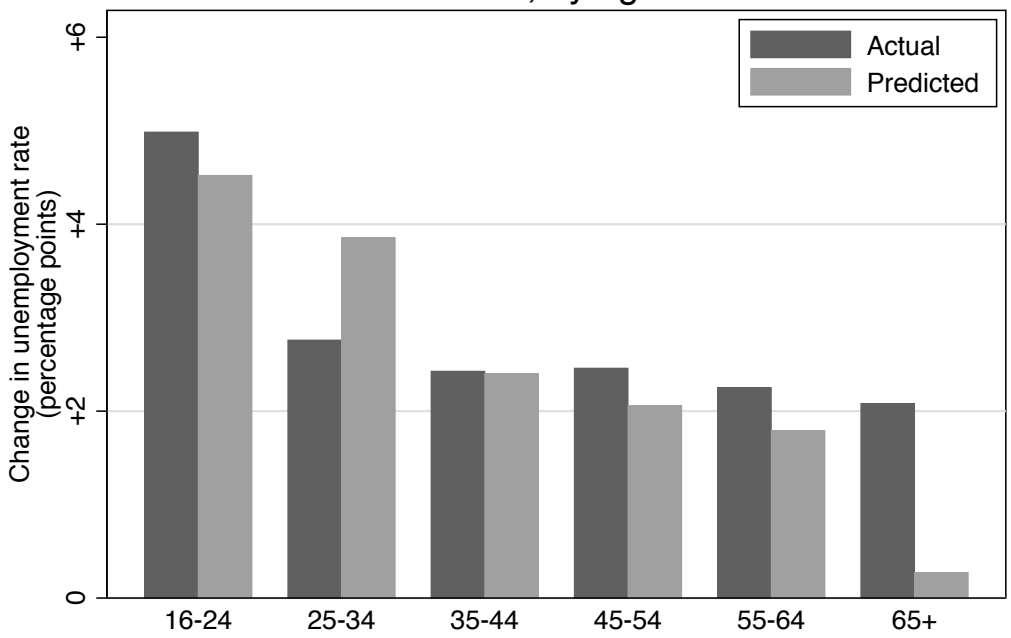
Notes: Change between the 2007 and the 2013 averages of non-seasonally-adjusted monthly unemployment rates. Predicted change is computed from the fitted values of a regression of the monthly unemployment rate in the industry on calendar month dummies and the unemployment rate across the rest of the labor force, using data from 1978-2007.

Figure 10. Actual and predicted change in unemployment rate, 2007-2013, by gender and education



Notes: See notes to Figure 9.

Fig 11. Actual and predicted change in unemployment rate, 2007-2013, by age



Notes: See notes to Figure 9.

Figure 8. Structural unemployment due to sectoral mismatch

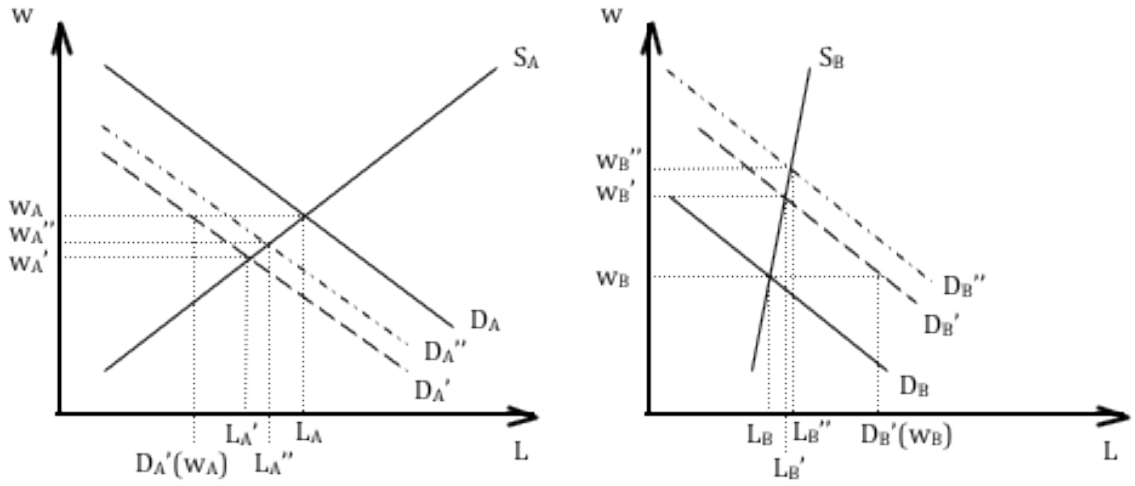
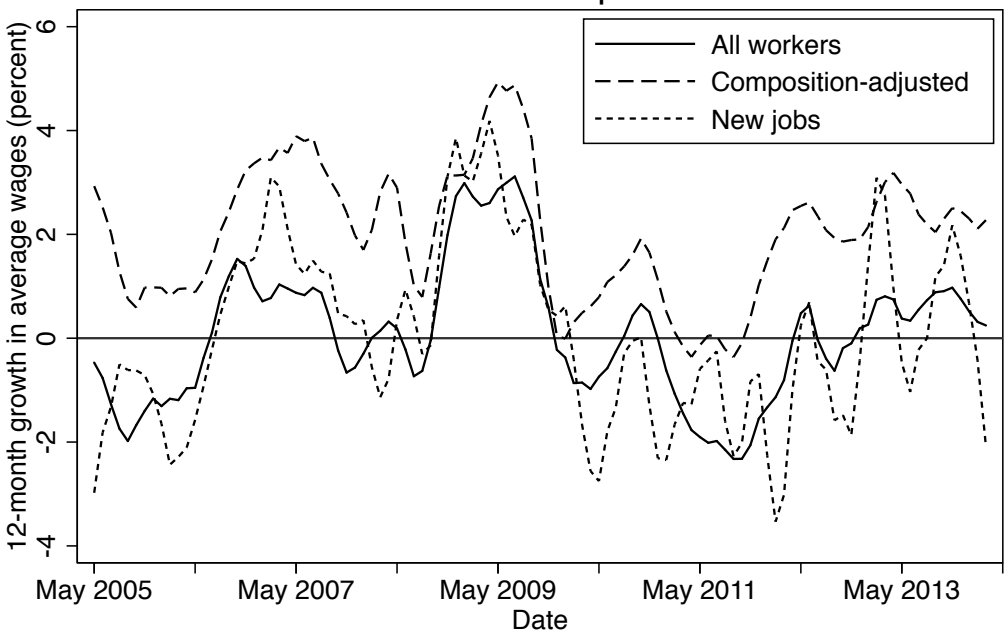
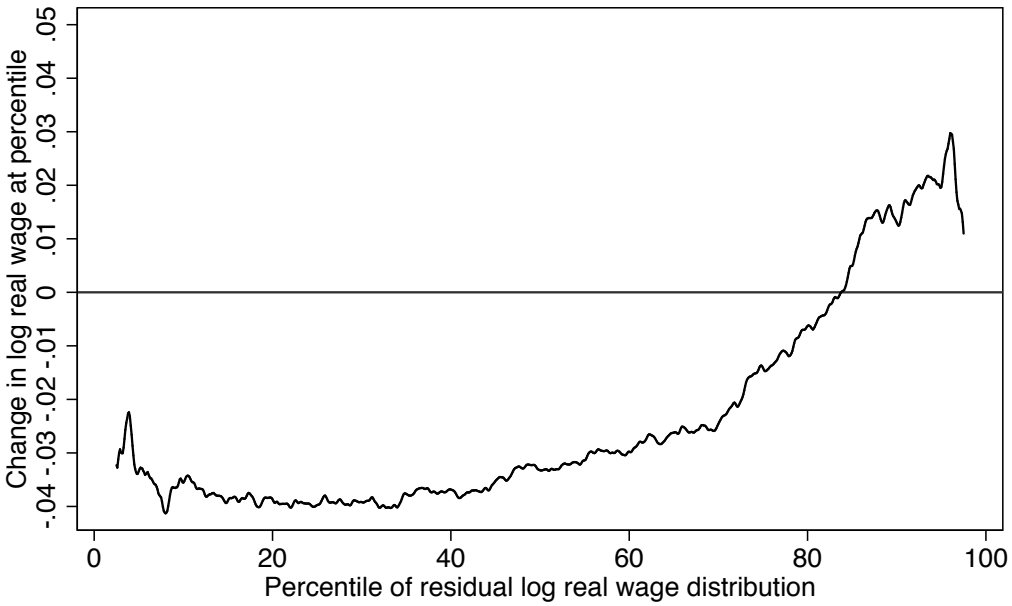


Figure 12. Twelve-month changes in mean wages, various subsamples



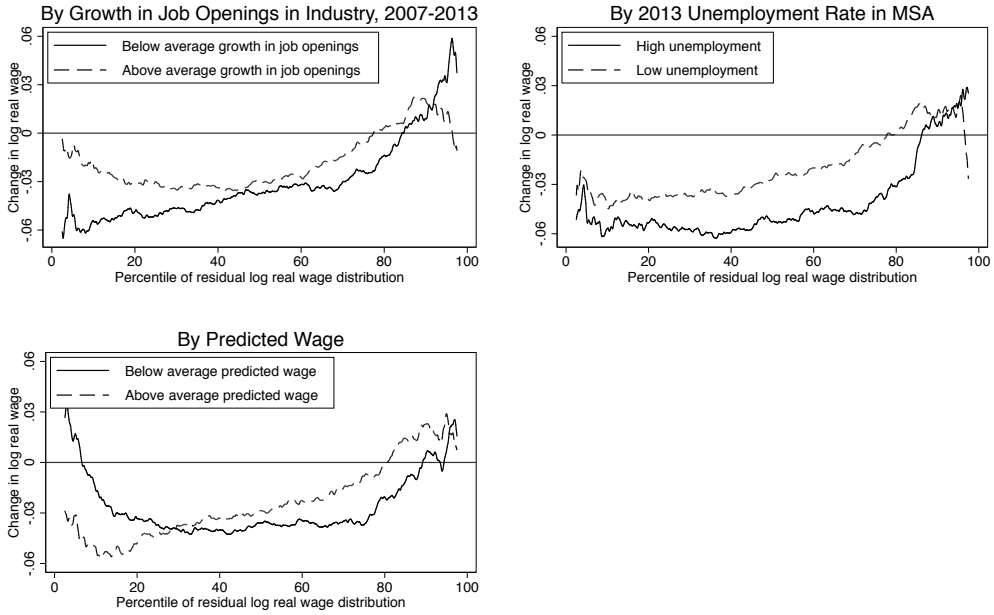
Source: Author's analysis of Current Population Survey data.
Notes: Composition-adjusted series compares wages within individuals across surveys 12 months apart. New jobs are those that started within the previous three months. All series are weighted by weekly hours and smoothed using a three-month triangle smoother.

Figure 13. Change in distribution of starting wages, 2007-8 to 2012-14



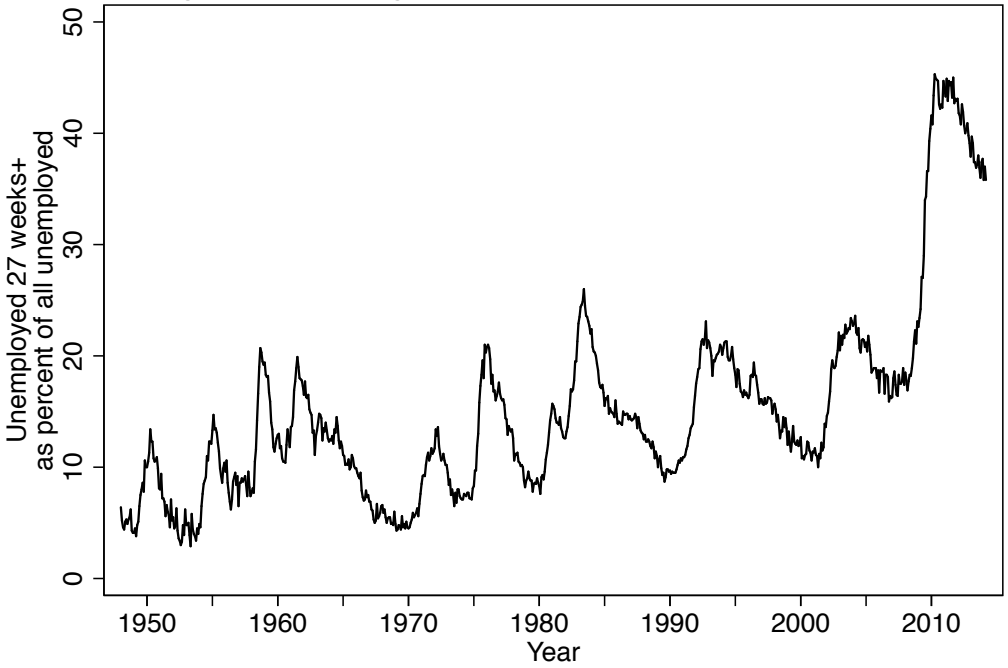
Notes: Starting wages are those on jobs that started within the previous three months. Wage distributions are weighted by weekly hours. Percentile changes are computed for each 0.1 percentage points, then smoothed across three adjacent points using a triangle smoother. Changes are not shown below the 2.5th or above the 97.5th percentile.

Figure 14. Change in distribution of starting wages, 2007-8 to 2012-14, by industry, MSA, or predicted wage



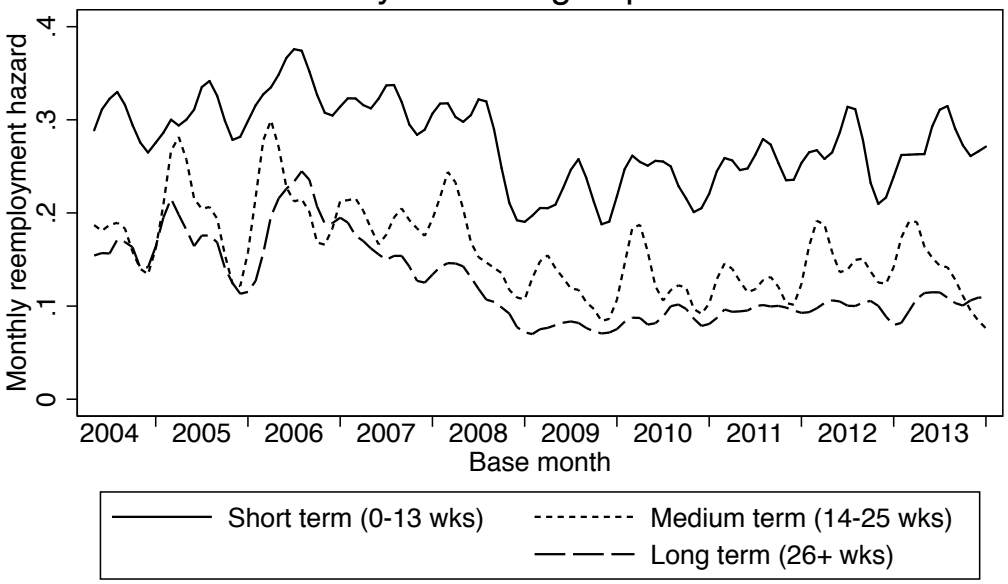
Notes: See notes to Figure 13.

Figure 15. Long-term unemployment share



Source: Bureau of Labor Statistics, Current Population Survey.
Notes: Series is seasonally adjusted.

Figure 16. Reemployment hazards for unemployed workers, by duration group



Notes: A U-E transition is counted as reemployment only if the worker does not return to unemployment the following month. Series are smoothed using a 5-month triangle smoother.

Figure 17A. Labor force participation rate, by gender
(not seasonally adjusted)

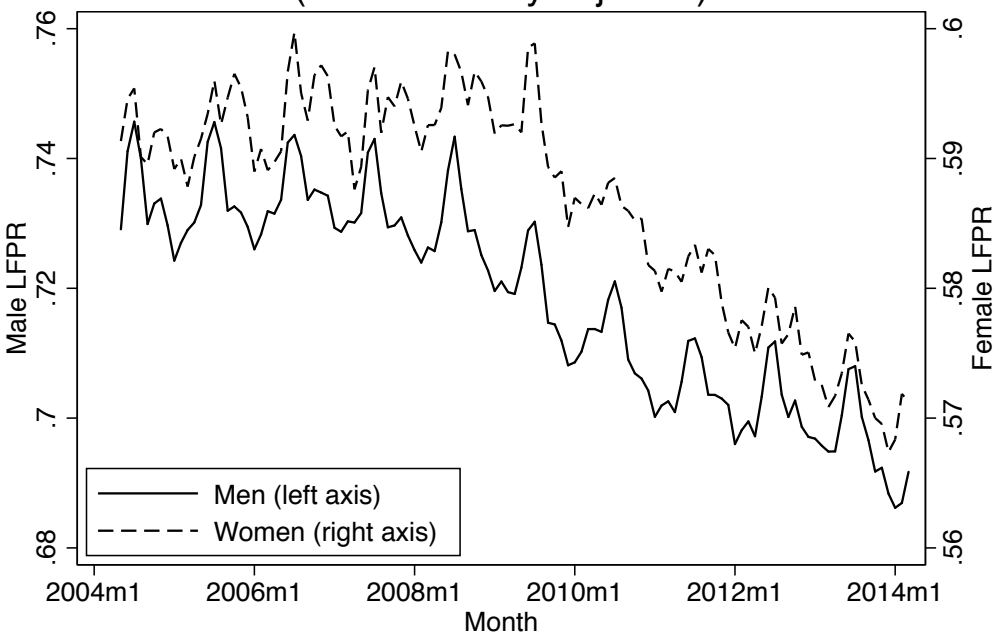
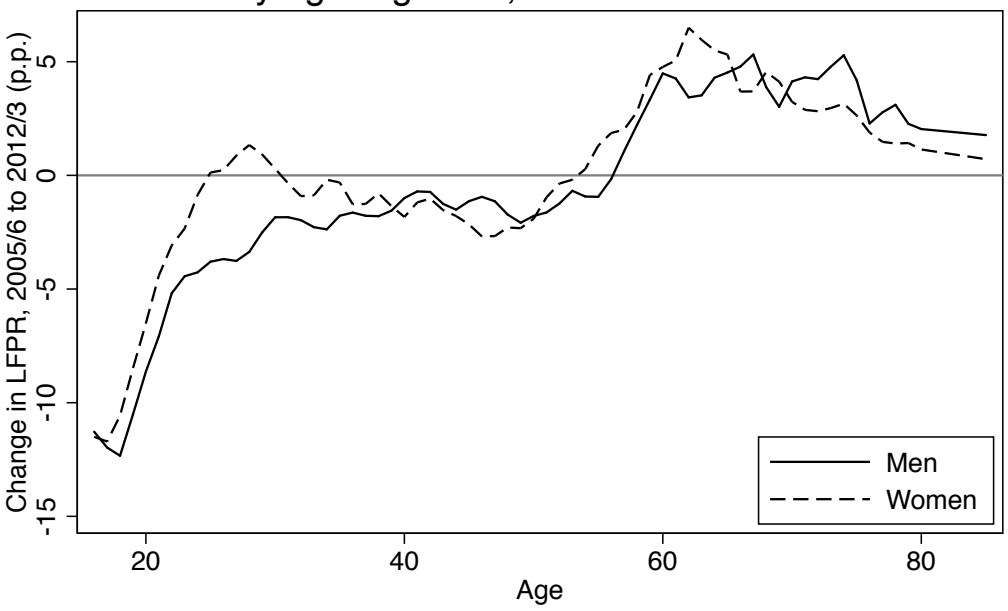


Figure 17B. Change in labor force participation
by age & gender, 2005/6-2012/3



Notes: Age-specific LFPRs smoothed using a 3-month triangle smoother

Table 1. Change in mean real wages of new hires, 2007/8 – 2010/11

	Unadjusted		Adjusted for observables	
	Mean (%)	SE (%)	Mean (%)	SE (%)
	(1)	(2)	(3)	(4)
Overall	-0.2	(0.5)	-2.3	(0.4)
By education and gender				
Male, less than HS	-0.1	(1.3)	-2.4	(1.2)
Male, HS diploma	-1.1	(1.2)	-2.6	(1.3)
Male, some college	-2.3	(1.0)	-2.3	(0.9)
Male, BA+	-1.8	(1.0)	-0.8	(0.9)
Female, less than HS	-5.2	(1.1)	-4.2	(1.0)
Female, HS diploma	-4.3	(0.9)	-2.8	(0.8)
Female, some college	-1.8	(1.2)	-1.9	(1.1)
Female, BA+	-3.4	(1.1)	-2.2	(1.0)
By age				
16-24	-2.6	(0.6)	-5.0	(0.6)
25-34	-1.0	(0.9)	-2.7	(0.7)
35-44	-2.3	(1.1)	-2.4	(0.9)
45-54	-2.0	(1.1)	-2.9	(0.9)
55-64	1.0	(1.3)	0.3	(1.1)
65+	11.8	(2.6)	4.8	(2.3)
By industry				
Agriculture	-0.6	(3.2)	-1.3	(3.0)
Mining and logging	5.9	(4.6)	3.5	(4.1)
Construction	1.0	(1.7)	-4.0	(1.5)
Durable goods mfg	4.2	(1.9)	0.0	(1.4)
Nondurable goods mfg	-0.5	(2.4)	-4.8	(1.9)
Wholesale trade	0.7	(3.0)	-3.9	(2.4)
Retail trade	-1.7	(1.1)	-4.1	(0.9)
Transport and utilities	2.8	(2.1)	1.6	(1.9)
Information	6.0	(3.5)	0.7	(2.8)
Finance and insurance	7.6	(2.3)	3.7	(1.8)
Real estate	-3.0	(3.7)	-7.2	(3.3)
Prof and bus svcs	-0.4	(1.6)	-4.0	(1.2)
Education (private)	1.8	(2.5)	1.3	(2.1)
Health and soc assistance	-1.1	(1.4)	-2.8	(1.1)
Arts and recreation	1.7	(3.0)	-5.3	(2.5)
Lodging and food services	1.1	(1.1)	-1.5	(1.0)
Other services	-2.7	(2.1)	-3.2	(1.8)
Federal government	0.7	(2.7)	-0.5	(2.3)
State/local government	-3.2	(1.2)	-3.5	(1.0)

Notes: 2012-4 data reflect April 2012 through March 2014. New hires are those who began their jobs within the previous three months. Adjusted estimates in columns 3-4 are the changes in mean residuals from a log wage regression, estimated on 2004-6 data, with controls for education-by-gender, state, and industry-by-education indicators, an age quadratic, and interactions of a linear age term with education-gender indicators. SEs in column 4 do not account for sampling error in the regression coefficients.

Table 2. Unemployment rates and long-term unemployment shares by demographic group, 2006 and 2013.

	Unemployment rate (%)		Long-term unemployment share	
	2006	2013	2006	2013
	(1)	(2)	(3)	(4)
Overall	4.6	7.4	21.2	41.3
By education and gender				
Male, less than HS	9.3	14.3	19.5	37.1
Male, HS diploma	5.7	9.8	22.9	42.7
Male, some college	3.9	7.3	21.6	41.3
Male, BA+	2.1	3.8	26.4	44.1
Female, less than HS	11.5	17.1	17.5	35.7
Female, HS diploma	5.4	8.8	21.1	43.2
Female, some college	4.2	7.0	20.1	40.6
Female, BA+	2.3	4.0	20.8	42.3
By age				
16-24	10.5	15.5	15.1	29.7
25-34	4.7	7.4	19.6	41.6
35-44	3.6	5.9	24.1	44.9
45-54	3.1	5.6	27.0	47.6
55-64	3.0	5.3	31.4	52.7
65+	2.9	5.3	24.4	48.8

Notes: The long-term unemployment share is the fraction of the unemployed who have been out of work 27 weeks or more.