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Article

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ORIGINAL ARTICLE

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What factors contributed to changes in employment during and after the Great Recession?

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Abstract

Unemployment increased drastically over the course of the Great Recession from 4.5 percent prior to the recession to 10 percent at its peak in October 2009. Since then, the unemployment rate has come down steadily, and it stood at 5.8 percent in November 2014. Based on existing analyses and some new evidence, this paper establishes that much of the change in unemployment during the Great Recession and during the recovery can be attributed to cyclical factors rather than structural factors. The paper then presents new suggestive evidence to quantify the employment impacts of various counter-cyclical policies introduced during this time. We conduct a counter-factual and find that employment would have been between 4.2 percent and 4.5 percent lower had it not been because of the spending in Medicaid injected in local economies by the Recovery Act. In addition, we conduct a differences-in-differences and triple difference analysis, which suggests that the Work Opportunity Tax Credits increased the likelihood of employment by about 4.7 percent for disconnected youth but had no effect on disabled and unemployed veterans. Finally, we also find evidence that suggests that the Hiring Incentive to Restore Employment (HIRE) Act increased employment of the unemployed by 2.6 percent and that the reemployment reforms introduced in 2012 as part of the UI extensions increased employment by 6 percent for the long-term unemployed.

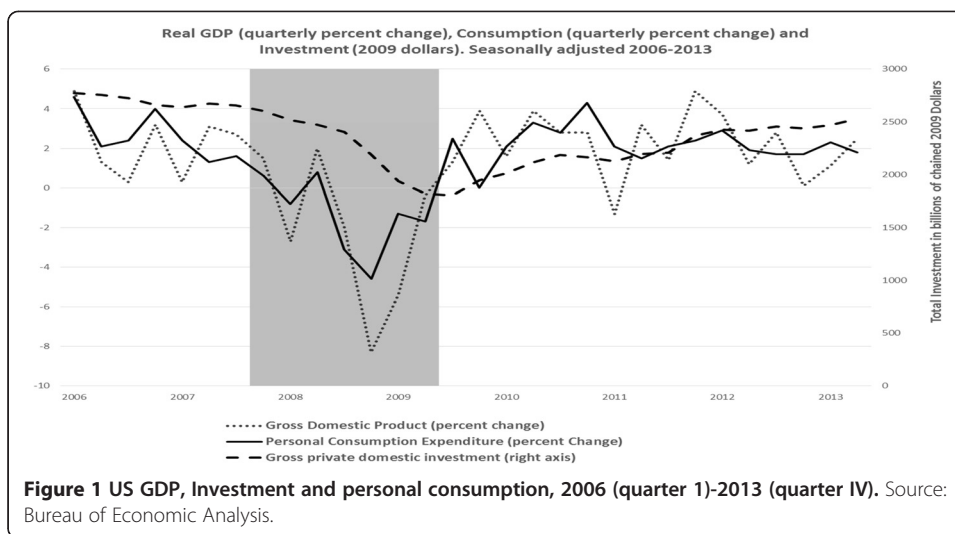
JEL codes: JE24, J23, J63, J64, J65, J68

Keywords: Employment; Labor demand; Unemployment incidence; Job search; Unemployment insurance; Tax credits; Hiring subsidies

1 Introduction

In December 2007, the US economy entered into the deepest recession since the Great Depression. Like other recessions precipitated by financial crises, the Great Recession was accompanied by a substantial contraction in aggregate demand. Following the crisis, there were sharp drops in consumer spending and to a lesser extent in investment. This translated into a drastic fall in output, which hit a low point in the fourth quarter of 2008 with a contraction of real GDP of 8.3 percent. Figure 1 shows that by the beginning of 2010, the economy had turned around in terms of GDP, consumption and investment, though these remain low by historical standards.

Just as the goods, services, financial, credit, and housing markets were all affected by the Great Recession, so was the labor market. The sharp contraction in demand



generated massive layoffs, a sharp drop in employment and a rise in unemployment. While total employment and private sector employment have been growing steadily by 178,000 jobs per month and 188,000 jobs per month on average, respectively, since February 2010,¹ the loss of jobs during the Great Recession was so great that the economy only recently (in May 2014) recovered the 8.7 million jobs it lost. Unemployment reached a peak of 10 percent in October 2010 and has been declining steadily since. Indeed, the share of the short-term unemployed has returned to pre-recession levels, so the continued high unemployment reflects the larger share of long-term unemployed during the recovery. As explained below, the large share of long-term unemployed has important implications in terms of the speed at which the unemployment rate can continue to fall.

In Section 2, we discuss the severity of the labor market downturn during the Great Recession. In Section 3, we review past evidence and present some new evidence on the extent to which unemployment during the Great Recession and the recovery can be attributed to cyclical or structural factors. In Section 4, we explain the policy tools used during this period and present some evidence of their employment impacts during the recession and later during the recovery. We conclude in Section 5.

2 The labor market during the Great Recession and recovery

As the Great Recession evolved, the unemployment rate rose sharply from a low of 4.5 percent the year prior to the recession in June 2007 to a peak of 10 percent in October 2009. As Table 1 shows, this rise of 5.5 percentage points in the unemployment rate between the 2007 low and the 2009 high is unprecedented for any post-WWII recession period. However, this table shows that the drop of 4.2 percent after the recession is higher than the average drop of 2.75 percent over the last nine previous recessions. While it is argued that this recovery has been particularly slow, this is not apparent from the drops in unemployment after previous recessions shown in Table 1 and in Figure 2. In fact, the fall in the unemployment rate has been greater during this most recent recovery than during the recovery of the early and late 1950s, the late 1960s, the early 1970s, the early 1990s, and the early 2000's.

What has been atypical relative to all other recoveries going back to the early 1970s is that government jobs have not contributed to this recovery. In fact, the fall in

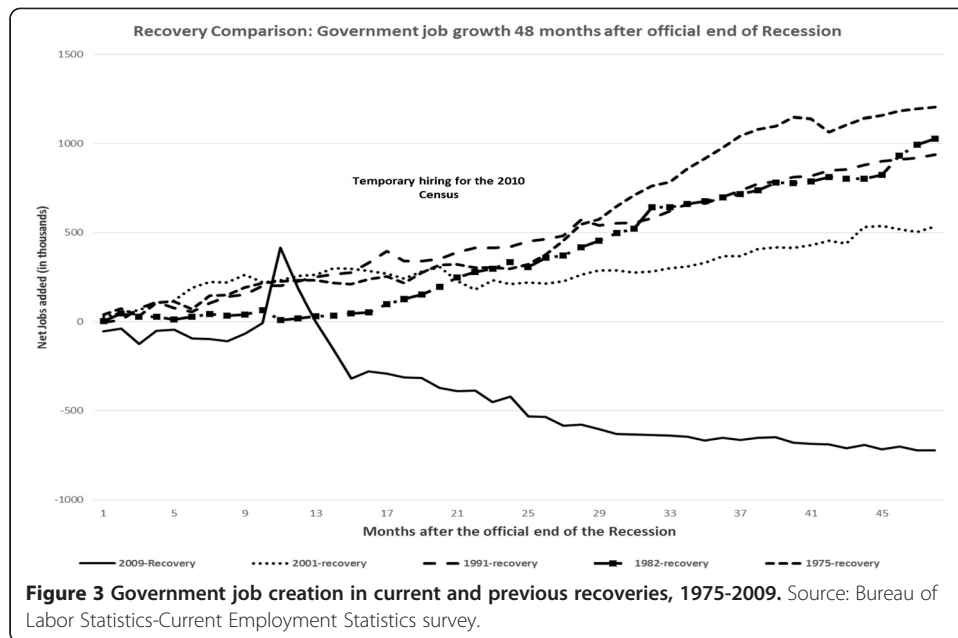
Table 1 Changes in unemployment rates during each post-war recession and recovery

Recession	Lowest unemployment rate in the year before start of recession	Highest unemployment rate during or after the official end of recession	Difference from trough to peak
Nov-48	3.7	7	3.3
Jul-53	2.6	6	3.4
Aug-57	4	7.4	3.4
Apr-60	5.2	7	1.8
Dec-69	3.4	6	2.6
Nov-73	4.8	8.9	4.1
Jan-80	5.9	10.7	4.8
Jul-90	5.3	7.6	2.3
Mar-01	3.9	6.2	2.3
Dec-07	4.5	10.0	5.5

Recession	Highest unemployment rate during or after the official end of recession	Lowest unemployment rate in the recovery (up to 6 years after the recession)	Difference from peak to trough
Nov-48	7	2.6	4.4
Jul-53	6	4	2
Aug-57	7.4	5.1	2.3
Apr-60	7	3.7	3.3
Dec-69	6	4.8	1.2
Nov-73	8.9	5.7	3.2
Jan-80	10.7	6.6	4.1
Jul-90	7.6	5	2.6
Mar-01	6.2	4.5	1.7
Dec-07	10.0	5.8	4.2

government jobs has held back the economy from a healthier employment recovery. Figure 3 shows government employment changes during recoveries of the 1970s, 1980s, 1990s, and 2000s as well as during the most recent recovery. This figure shows that every other recovery has been accompanied by government job growth, with the exception of the recovery from the Great Recession. While the role of government jobs on employment during previous recoveries had always been positive, the role of



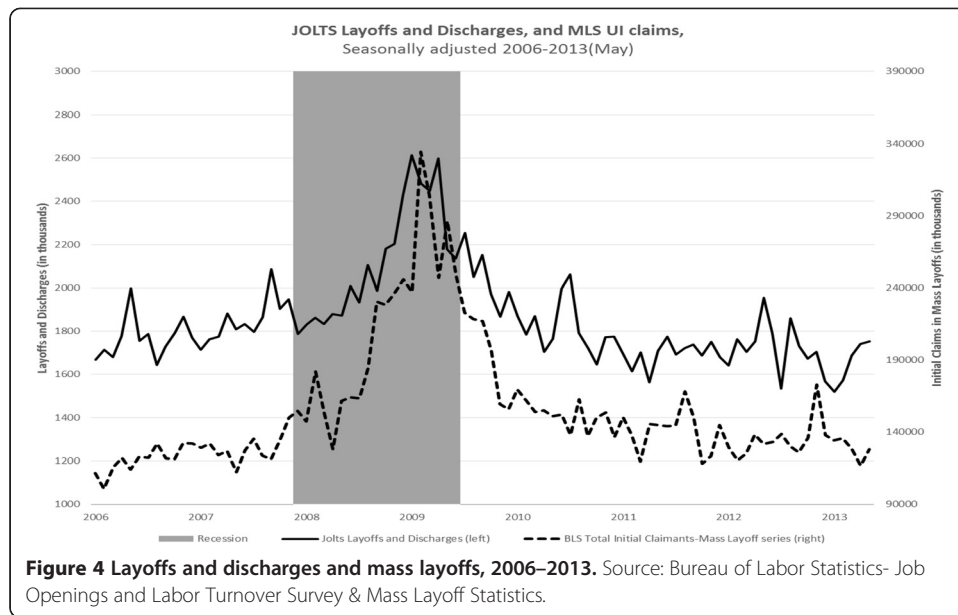


government jobs has been declining over the past decades since the 1970s. By contrast, the recent recovery has seen a large decline in government jobs, with the exception of the few months surrounding the hiring for the 2010 Census. In fact, close to 600,000 government jobs have been shed during this recovery.

Much of the rise and sustained unemployment can be explained by private sector job losses during the recession and public sector job losses during the recovery. In addition, a big part of the sustained unemployment can be explained by the inability of people to exit unemployment as private sector employers have not been creating enough jobs, and public sector employers have not created jobs on net during this period.

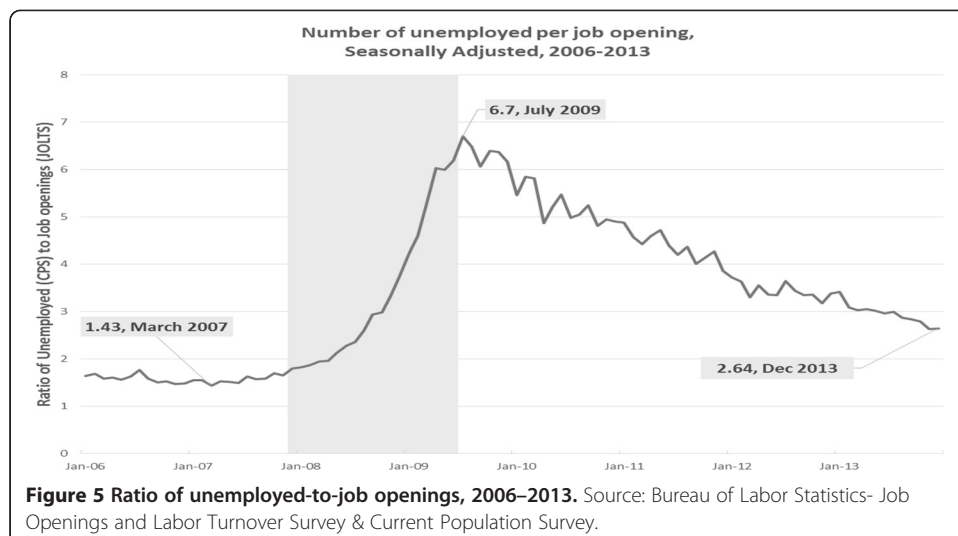
Figure 4 shows the drastic increase in layoffs during this time, with layoffs increasing by over 50 percent during the Great Recession. The vast majority of these discharges were the result of mass layoffs of more than 50 individuals. At the height of the recession, all dismissals were due to mass layoffs. Yet, there were also many experiencing individual layoffs before the peak of the recession. Since then, employers have substantially reduced mass and individual layoffs, and these are currently below the pre-recession levels in 2006. As shown in Figure 5, because there were so many individuals losing their jobs and so few new jobs created, the ratio of the number of unemployed to job vacancies reached a high of close to 7 unemployed per vacancy in July 2009 – the highest ratio since JOLTS data has been collected. As fewer people entered into unemployment and more jobs have been added, this has now dropped to about 3 unemployed per vacancy.

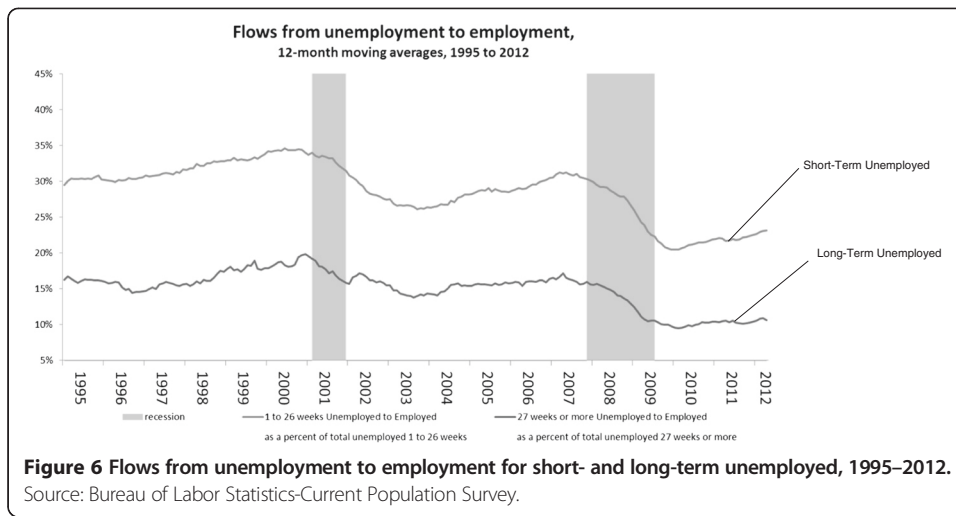
Figure 6 shows that the chances of finding a job within the last month for an individual who has been unemployed for less than 6 months is over 20 percent, and the chances of finding a job within the last month for an individual who has been unemployed for more than 6 months is a little over 10 percent. This is because while job-to-job turnover substantially declined during the recession, there are still many employed looking for work that enter new jobs directly from other employment.² For example, even today, there are still 6.9 million part-time workers who would rather be working full time and who continue to look for full-time work. In addition, there are



many individuals among those classified as out of the labor force that would like a job and would enter directly into jobs. There are 2.1 million marginally attached workers who are willing and available for work but did not look for work during the past month, which means that many workers entering new jobs come directly from the pool of individuals out of the labor force.³

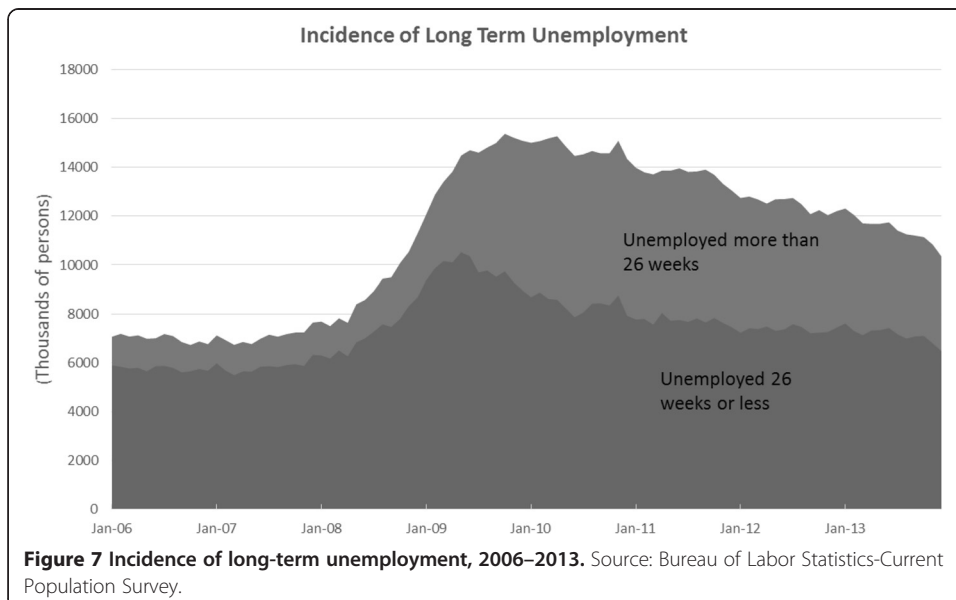
The evidence above shows that the short- and long-term unemployed are not equally likely to find jobs, and the unemployed, and in particular the long-term unemployed, may have to compete for jobs with currently employed workers and even with workers who have been out of the labor force. Indeed, there is evidence of duration dependence, which implies that it is harder to exit unemployment the longer an individual has been unemployed. Kroft et al. (2014) indeed find that duration dependence can account for much of the increase in long-term unemployment. The share of the long-term unemployed increased sharply during the Great Recession. While the long-term unemployed comprised less than 15 percent of all the unemployed prior to the recession,





by April 2010, 44 percent of the unemployed had been unemployed for more than 6 months. Figure 7 does show a slow decline in the share of the long-term unemployed in the past two years, with this share now standing at 30.7 percent – still high by pre-recession standards.

There are a number of reasons why the long-term unemployed may find it harder to find jobs than the short-term unemployed and contribute to keeping the share of the long-term unemployed and overall unemployment high. First, employers may simply take employment status or duration of unemployment as a signal of worker quality. Even though the extent of mass layoffs suggests that employment status and unemployment duration were probably relatively bad signals of quality during the Great Recession,⁴ in their audit study, Kroft et al. (2012) find evidence of substantial statistical discrimination against the long-term unemployed. Second, the unemployed, and in particular the long-term unemployed, may find it much more difficult to find a job because individuals may lose their skills and motivation as they remain longer in



unemployment. This may be because they are either less skilled or less desirable to hire as their spells of unemployment prolong. Third, the unemployed, may have less access to information about jobs because those in their networks may also be unemployed, and many jobs are filled through informal channels. There is anecdotal evidence that many employers turned to using informal channels during the recovery as a way to save on recruiting costs given the abundance of potential applicants. In fact, the share of individuals searching for work through family and friends grew from 19.7 percent in 2006 to 26.4 percent in 2007, then to 28 percent in 2008, and has stayed at over 32 percent since 2009.⁵ This increased reliance on family and friends as a way to find jobs has occurred even though networks are likely less effective in generating job offers on average given the higher unemployment today.⁶ Finally, as the financial assets of the unemployed deplete the longer they have been in unemployment, it becomes harder to pay for transportation, to move to take a job and to pay for other costs associated with looking for jobs.

This section shows that the Great Recession was atypical in terms of the drastic impact it had on the labor market. All measures show large losses for workers, including extensive mass layoffs, widespread drops in employment, a steep rise in unemployment, and greater difficulty in finding employment. In addition, this section shows that the recovery after the Great Recession was different in that government jobs have delayed rather than sped up the recovery of the labor market, as in past recessions. Finally, even though the labor market is back to where it was in terms of most indicators, the Great Recession has been different in that it has had a long-lasting impact in the labor market because of its effect on long-term unemployment. The share of long-term unemployed is twice the pre-recession share, and the long-term unemployed face numerous difficulties finding employment even as the economy has continued to recover.

3 Cyclical vs. structural unemployment during the great recession and beyond

In this section, we explore how much of the unemployment during the Great Recession and beyond was cyclical and how much reflected mismatches and other structural challenges faced by the economy. Below, we review the large body of past evidence and present some new evidence pointing to the unemployment problem being largely driven by cyclical factors during this period. Yet, the evidence also indicates that some new problems have emerged in the labor market which could potentially turn into structural factors if they persist over the years to come.

3.1 Evidence from Okun's law

A number of previous studies have re-estimated Okun's Law during the Great Recession and recovery. These studies show that much of the change in unemployment is due to changes in GDP and that the persistent high unemployment is due to a slow recovery in GDP. Arteta et al. (2011) show that the majority of movements in unemployment since the Great Recession were due to changes in output. According to this study, the drop in GDP can explain 63 percent of the rise in unemployment during the recession. Similarly, about 57 percent of the drop in unemployment during the recovery can be explained by the rise in GDP. This indicates that both during the recession and during the recovery, cyclical factors were key in explaining changes in unemployment and that cyclical factors have remained important during the recovery. Importantly, Ball et al. (2012) find that the relation between the change in

unemployment and the change in GDP has been stable over the periods 1990–91, 2001, and 2007–09. Rather, they conclude that the strength of economic growth relative to the trend is what has been different during these periods.

In Okun's law, the rest of the changes in unemployment are considered as unexplained or explained by factors not included in the regression. These could be factors such as skill, sectoral, or regional mismatches.⁷ Thus, an extension of Okun's Law would include measures of mismatches in the regression. Estevão and Tsounta (2011) estimate a relation of changes in unemployment at the state level on changes in gross state product (GSP), a measure of skill mismatches in the state, and a measure of geographical immobility. This study finds that much of the change in state unemployment can be explained by GSP and that only about 0.5 percentage points of the increase in the NAIRU can be explained by skill gaps.

3.2 Evidence from the Beveridge curve

The Beveridge Curve, which establishes the relation between the job openings rate and the unemployment rate, is yet another way to disentangle how much of the change in unemployment is due to cyclical factors and how much is due to other factors. The Beveridge Curve, estimated by the Bureau of Labor Statistics over the last decade,⁸ shows that during the early 2000s, unemployment increased and the job openings declined starting in November 2001 until around November 2007. These movements along the Beveridge Curve are consistent with cyclical factors driving the changes in unemployment during this period. In December 2007, the unemployment rate increased rapidly together with much slower drops in the job openings rate. These movements since 2007 are also consistent with cyclical factors driving these changes. In October 2009, the unemployment rate started to drop and the job openings rate started to rise. The backward movement to the Northwest points to a decline in cyclical unemployment. Yet, the fall in unemployment has not been fast enough to match the rise in the job openings rate. This indicates that for a given job openings rate, the unemployment rate is higher than it used to be, pointing potentially to the rise in the importance of structural factors.

A number of studies have examined and explained this shift in detail. Diamond (2013) explains that the Beveridge Curve may be using proxies rather than the correct measures of those searching for work and the right measure of job openings. Indeed, the unemployment rate may not capture everyone looking for work. Diamond (2013) does a thorough analysis of flows from and to employment, unemployment, and out of the labor force and finds transitions of similar magnitudes from non-employment to employment and back as from unemployment to employment and back. This is indicative that many of those classified as out of the labor force may be actively looking for work. In addition, Davis et al. (2012) have found that the speed of filling vacancies and the proportion of hiring varies by industry and over the business cycle. For instance, the industry composition of job openings has been changing over time, with many fewer job openings in construction, which have short durations, and many more job openings in health and education, which have longer durations. Given that long durations imply low closing rates of vacancies or high job opening rates, then one may worry that changes in the composition of vacancies may be accounting for the high opening rate associated with the same unemployment rate as before.

Ghayad and Dickens (2012) disaggregate the unemployment-vacancy relationship by industry, age, education, and duration of unemployment and by blue- and white-collar groups to understand if the shifts in the aggregate Beveridge Curve are driven by particular groups. They find that the outward shift in the Beveridge Curve was common among all major industries, all age groups, all education groups and among blue- and white-collar workers. What is noteworthy is that the outward shift in the Beveridge Curve is only evident for the long-term unemployed. Thus, whether this shift becomes a structural problem will depend on how permanent the obstacles faced by the long-term unemployed become and on how effective the policies to help the long-term unemployed, discussed in the following section, have been.

Finally, Daly et al. (2012) indicate that a longer series to estimate the Beveridge Curve, like the one they construct using the Help-Wanted Index to go back to the 1960s, shows that the shift in the Beveridge Curve observed in the current cycle is within the range of what occurred in past business cycles. Moreover, when they combine the Beveridge Curve with the Job Creation Curve, they estimate an increase in the natural rate of unemployment of between 0.4 and 1.4 percentage points, or between 7 percent and 25 percent of the rise in unemployment during the last recession.

3.3 Evidence of mismatches

Lazear and Spletzer (2012) conduct a rigorous quantification of the extent of mismatches and find that changes in industrial mismatch are cyclical. They construct an industrial mismatch index using JOLTS and CPS data and they find that the index was the same in 2011 as prior to the Great Recession. Instead, they find that industrial mismatches increased sharply because unemployment went up in every industry, exceeding the number of vacancies in every industry. Much of the increase in the gap between unemployment and vacancies during the recession and the subsequent decline during the recovery can be explained by four industries: health services, government, construction and manufacturing. Lazear and Spletzer (2012) also estimate an occupational mismatch index and find that this is much higher than the industrial mismatch index, but, like the industrial mismatch, it is pro-cyclical, and the occupational mismatch index has already returned to its pre-recession level. Importantly, they point out that mismatch indices were higher during this period because unemployment was higher in all industries and occupations and not because the skills desired by employers are less in line with what they desired in the past.

In fact, this is exactly what is borne out when employers are asked about their ability to find workers qualified to fill their vacancies. Only 6 percent of employers in 2012 and 5 percent of employers in 2013 reported the low quality of labor as a major concern for their businesses. Moreover, finding qualified applicants was less of a concern during the recovery than it was before the recession. In 2013, 36 percent of employers reported that there were too few or no qualified applicants, compared to 41 percent in 2012 and 48 percent in 2007.⁹ By contrast, employers continue to report poor sales as one of their top concerns. In 2012, about 21 percent of employers reported poor sales as their most important challenge, and around 17 percent of employers continue to report poor sales as a major challenge in 2013. This suggests that aggregate demand problems are more prominent in employers' decisions than skill gaps problems. It also suggests that skill gaps were there before the recession and after the recession, but do not appear to have become more pronounced in the view of employers.

Another approach towards estimating the extent of mismatches is to directly estimate the efficiency of matching in the economy instead of estimating the relation between the unemployment rate and measures of mismatches. Estimating matching functions of employment on the number of unemployed and the number of vacancies allows for estimating the parameters of the matching function and the efficiency of matching parameter. Sahin et al. (2014) estimate matching functions using recent data from the Current Population Survey, the Job Openings and Labor Turnover Survey (JOLTS), and the Conference Board's Help Wanted Online (HWOL) which covers the universe of online U.S. job advertisements. They find that mismatches across industries and 3-digit occupations can only explain a third of the total observed increase in the recent rise in the unemployment rate.

Barlevi (2011) also estimates matching functions using a Cobb-Douglas specification and using data on unemployment from Haver analytics and vacancy data from JOLTS for the period from 2000 to 2011. He finds that the reduced matching productivity from normal times (defined as 2000-August 2008) to the end of 2011 can explain an increase in unemployment to 7.1 percent. Given that the rise in unemployment from his defined normal times was 5.3 percent and 9.3 during the period after, then mismatches could explain 45 percent of the rise in unemployment, and 55 percent would be explained by other factors. However, Barlevi (2011) acknowledges that his assumption of a fixed ratio of the value of a job to the cost of filling a vacancy leads to an over-estimate of the effect of mismatches and, thus, provides an upper bound of the impact. Given these two studies, the impact of mismatch ranges between 33 percent and 45 percent (with the latter being an upper bound), while the impact of other factors (including slack demand) account for between 67 percent and 55 percent of the rise in unemployment during the Great Recession.

In contrast to industry and occupational mismatches, the study by Dickens (2010), which looks at geographic mismatch, finds no evidence at all of mismatches in this dimension. This study and others (Lazear and Spletzer, 2012; Elsby et al., 2011) provide support to the broadly accepted view that housing lock and the inability to move to look for jobs due to the lackluster housing market cannot account for any of the increase in unemployment.

Overall, this section shows that regardless of the method used to identify the relative importance of demand and structural factors in explaining the rise in unemployment, the answer is always the same – the majority of the increase in unemployment can be explained by cyclical factors rather than structural factors.¹⁰ Nonetheless, the evidence does provide a range of estimates of the importance of structural factors ranging from 25 percent for estimates from the Beveridge Curve, to 33 percent using the most credible mismatch function estimates, and to 40 percent when relying on Okun's law.

4 Policies to address the unemployment problem

It is clear from the previous sections that there were two key factors contributing to unemployment that needed to be addressed during the recession and recovery. The most important challenge facing employers and workers during the Great Recession, and even through the recovery, was slack demand. In addition, labor markets are now facing new problems during the recovery which were not present prior to the Great Recession. In particular, the large rise in the fraction of long-term unemployed made it

more difficult to bring down the unemployment rate during this time period. The majority of measures introduced to address unemployment during this period, thus, focused on different policies to stimulate labor demand. Later, during the recovery, policy measures focused on how to aid the long-term unemployed.

4.1 Impact of fiscal spending on employment: American recovery and reinvestment act

In 2009, the American Recovery and Reinvestment Act (ARRA) generated a large fiscal stimulus. The Recovery Act introduced \$840 billion in government spending directed towards tax benefits; contracts, grants and loans; and entitlements. The initial spending was divided into \$290.7 billion for tax benefits including individual tax credits, tax incentives for businesses, energy incentives, and manufacturing incentives. Another \$261.2 billion was spent on contracts, grants, and loans for education, transportation, infrastructure, energy and the environment, research and development, housing, health, and job training. Finally, a total of \$264.4 billion was spent in entitlements, including \$105.7 billion, which was spent on Medicaid and Medicare, mostly for Medicaid Grants to States, another \$61.3 billion was spent on unemployment insurance programs and the rest on family services and energy and housing subsidies.¹¹ The economic rationale behind this spending was based on the evidence on fiscal multipliers and the idea that public spending would spur economic activity in the private sector. The implication for the labor market was that government spending would have an impact on direct job creation and, at the same time, induce hiring in the private sector. In December 2010, the government passed the Middle Class Tax Relief Act of 2010, introducing another large packet of fiscal spending of close to \$700 billion that also financed tax cuts and income support programs.

The time-series evidence suggests that fiscal spending was effective. Employment losses quickly lessened after the passing for the Recovery Act, and employment growth started a year later. In fact, employment reignited again 7 months after GDP picked up. Indeed, this is in line with the usual lag between GDP and employment growth.¹² Likewise, employment appears to have grown at a faster pace after the additional fiscal stimulus was introduced in December 2010. A problem with this evidence is that it is not possible to distinguish if that employment growth would have taken place even without the stimulus.

Thus, panel data evidence is more useful to disentangle the causal effect of the stimulus. Feyrer and Sacerdote (2011) indeed present evidence from panel data that exploits the fact that different states and localities received different amounts of stimulus funds over that time period. Their study finds a broad range of fiscal multipliers from 0, for expenditures on education, to 2, for support programs for low-income households and infrastructure. More importantly, Feyrer and Sacerdote (2011) find that regions of the country that received more recovery funds experienced faster employment growth during the recession and recovery. They found that a state's receipt of \$100,000 generated between half a job and one job. Another study by Chodorow-Reich et al. (2012) finds that recovery fund outlays in Medicaid expenditures had substantial impacts on job creation. By focusing on Medicaid outlays, they are able to address the endogeneity of state receipt by instrumenting the Recovery Act funds for Medicaid with previous expenditures in Medicaid in the state. They find that a state's receipt of a marginal \$100,000 in Medicaid outlays generates 3.8 additional job-years, with 84 percent of those new job-years created outside of government, health, and education.

We use the Feyrer and Sacerdote (2011) and the Chodorow-Reich et al. (2012) estimates to construct counter-factuals of the employment impact of the fiscal expenditures and the multiplier effects introduced by the Recovery Act. To conduct this counter-factual exercise we take the lower bound of the Feyrer and Sacerdote (2011) study and assume that the entire amount of \$840 billion of expenditures from the Recovery Act was evenly distributed over the course of the Recovery Act. We then determine what employment would have been if the Recovery Act was not passed. Although this is not a perfect counter-factual exercise, it provides an estimate on the effectiveness of the various fiscal programs on employment creation. We find that employment would have been, on average, 72,000 lower per month without the Recovery Act or about 63% to 67% lower. However, since Recovery Act resources may have gone to those states which were ready to start investments and support contracts, or by contrast the federal government may have distributed entitlements to those places that needed them the most, the Feyrer and Sacerdote (2011) multiplier may be biased up or down.

The counter-factual employment using the Chodorow-Reich et al. (2012) multiplier is smaller. While Chodorow-Reich et al. (2012) found a bigger multiplier, the amounts spent in Medicaid were much smaller. This multiplier is credible since their estimation strategy takes into account the potential endogeneity of the distribution of resources to different states. Applying the \$88 billion allocated to Medicaid funds in the original Recovery Act, the counter-factual shows much smaller reductions in employment of 5,000 jobs per month, on average, or between 4.2 percent and 4.5 percent had the Recovery Act not spent resources in Medicaid. While these results are smaller, these effects are more reliable.

4.2 Impacts of tax credits and subsidies for employers

4.2.1 Impact of the work opportunity tax credits (WOTC)

Work Opportunity Tax Credits (WOTC) were first introduced in 1996. These were tax credits to employers hiring workers in specific target groups. Work Opportunity Tax Credits were introduced to incentivize employers to hire people from groups generally considered to have low skill levels and, thus, less likely to find employment. The target groups covered by WOTC have been expanded or changed a few times since 1996. More recently, these credits were expanded during the period covering the recession. The passage of the U.S. Troops Readiness, Veteran's Care, Katrina Recovery and Iraq Accountability Act of 2007 expanded the tax credits until August 21, 2011 to cover disabled veterans who were discharged from active duty in the past year. Before this, WOTC credits covered members of families receiving TANF, veterans who were members of families receiving food stamps, 18–39 year olds who were members of families receiving food stamps, ex-felons, SSI recipients and those in communities designated as empowerment zones, enterprise communities, and renewal communities.

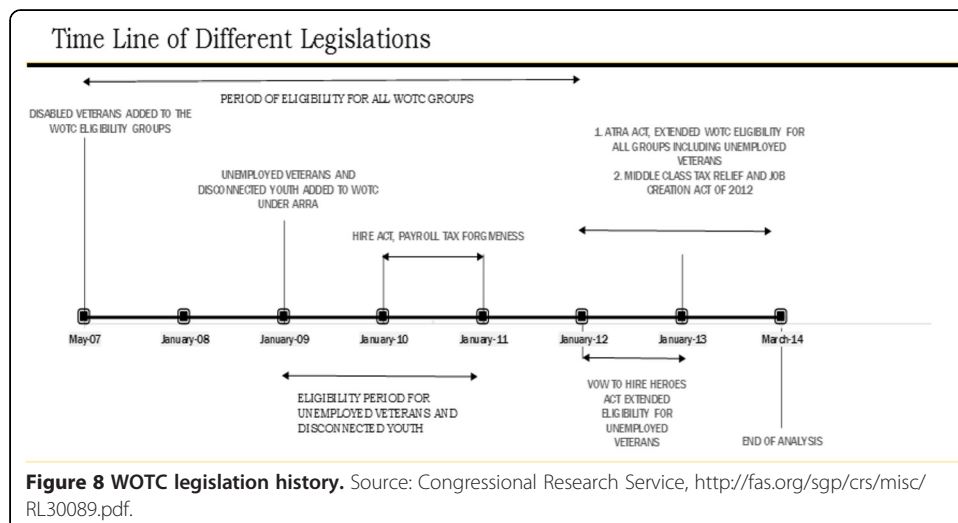
The Recovery Act further included \$32.6 billion in tax credits to provide incentives for employers to hire members of two additional groups until December 31, 2010. The two groups for which WOTC was expanded included: unemployed veterans who were discharged in the past 5 years and who had collected unemployment insurance payments for at least 4 weeks in the past 12 months, and disconnected youth aged 16–24 years old who had neither regularly worked nor attended school in the past 6 months. While these credits expired in December 31, 2010, on November 21, 2011, Congress passed the VOW to Hire Heroes Act, which extended tax credits for unemployed veterans who first

benefited from the Recovery Act WOTCs. The VOW act expired on December 31, 2012. The timeline below describes the introduction and expiration of these credits and the reforms, which are discussed in more detailed in the next two sections (Figure 8).

4.2.2 Impact of the work opportunity tax credits (WOTC) on veterans

To examine the impact of these credits, we do a difference-in-difference analysis to compare the treatment groups to non-treated veterans. For veterans there are two treatment groups. The first is the group of disabled veterans who were discharged in the last year. The second is the group of unemployed veterans who have received UI for at least 4 weeks in the past year and who were discharged from active duty in the past 5 years. Since the Current Population Survey, which we use for our analysis, does not allow us to identify collection of UI in the past year, we can only identify those that were unemployed for at least 4 weeks in the past year. Given that not all of the unemployed qualify for UI benefits, this group will include some who would not have qualified for the credits, but this is the best that can be done with CPS data. Similarly, we cannot identify disabled veterans discharged in the past year or unemployed veterans discharged in the past 5 years. The best we can do with the CPS is identify those discharged from active duty since 2001. In this case too, we may be including some individuals in the treatment group who would not have qualified for WOTC. We then focus on the years 2008, 2009, 2010 and 2011 for disabled veterans and on the years 2009, 2010, and 2012 for the group of unemployed veterans. The analysis leaves out TANF and SNAP recipients to avoid including in the comparison group individuals who continued to benefit from the earlier tax credits introduced before the 2007 U.S. Troops Readiness Act and the 2009 Recovery Act. Unfortunately, we cannot identify ex-felons, those receiving SSI, or those in designated communities, so the comparison group will have some who may have still benefited from WOTCs. We also do a difference-in-difference-in-difference analysis in which we also use non-veterans (disabled non-veterans and unemployed non-veterans) as comparison groups.

Table 2 presents descriptive statistics using CPS data for those affected by WOTCs. The table shows that disabled veterans and unemployed veterans have lower employment than other veterans and the population as a whole, and they are more likely to be male and more educated than the population as a whole. Since the treated groups are



different from the control groups, for the DD and triple difference strategies to be valid, it has to be the case that the treatment and comparison groups had similar pre-treatment trends. Figure 9 shows that the pre-treatment employment trends of disabled veterans and disabled non-veterans move roughly in tandem for the two groups. Figure 10 similarly shows that pre-treatment employment of unemployed veterans and non-veterans moved roughly similarly for these two groups.

Table 3 shows the difference-in-difference estimates for disabled and unemployed workers. Columns (1) and (2) show the results for all veterans and Columns (5) and (6) show the results for those discharged after 2001. All specifications control for age, a quadratic term for age, education indicators, gender, and race. Columns (2) and (6) include state and year fixed effects. When we focus on all veterans, the results show an increase in the likelihood of employment after exposure to WOTC of 0.05. However, the impact disappears when focusing on those discharged since 2001. Columns (3), (4), (7) and (8) show results for unemployed veterans. As for disabled veterans, the result on all unemployed veterans suggests an increase in the likelihood of employment of close to 0.02 due to WOTC, but the effect disappears when focusing on those recently discharged from active duty.

Table 4 uses the non-veterans also as potential comparison groups by doing a triple difference analysis which controls for veteran status, disabled status, unemployment status, post-treatment indicator, interactions of veteran with disabled and veteran with unemployment, and interaction of each of these with the post-treatment indicator to allow for the possibility that veterans, the disabled, or the unemployment faced different situations after WOTCs were introduced. These results, like the double difference results, suggest an impact of WOTC on disabled veterans, but the impacts disappear when focusing on those recently discharged. Also, in this case, the impact of unemployed veterans disappears altogether.

Heaton (2012) has done similar analysis using the American Community Survey (ACS) and double and triple difference specifications. Our results are remarkably similar to those of Heaton (2012) when focusing on all veterans even though he uses a different source of data. However, Heaton (2012) fails to take into account that one of the requirements to qualify for WOTC was to have been recently discharged. While we cannot perfectly identify those discharged 1 and 5 years ago, we can at least identify those discharged since 2001. This makes a big difference – the impact of WOTC on veterans disappears.

4.2.3 Impact of the work opportunity tax credits (WOTC) on disconnected youth

As explained above, the Recovery Act not only extended credits for unemployed veterans but also for disconnected youth. Disconnected youth are defined as those between 16 and 24 years of age who are not working or have not been in school in the past year. Table 2 shows that disconnected youth have lower employment, have been looking for work longer, and are more likely to have dropped out of high school or to have only a high school degree. Thus, it is clear that disconnected youth and other youth groups are likely to be different. Figure 11 directly compares pre-treatment trends of disconnected and non-disconnected youth between 16–24 years of age. The figure shows that the trends move roughly together for the two groups.

Table 5 shows results of the double difference regressions for disconnected youth. Columns (1) and (2) both include the demographic controls, but Column (2) also

Table 2 Descriptive statistics for different WOTC eligible groups

	Full sample	Veterans	Disabled veterans	Disabled Veterans Before WOTC Eligibility (Pre-2008)	Disabled veterans during WOTC eligibility (Post-2008)	Unemployed veterans	Unemployed Veterans Before WOTC eligibility (Pre- 2010)	Unemployed veterans during WOTC eligibility (Post-2010)	Youths (16–24 year olds)	Disconnected youth	Disconnected youth before WOTC eligibility (Pre- 2010)	Disconnected youth after WOTC eligibility (Post- 2010)
Employed	0.729 (0.444)	0.730 (0.444)	0.549 (0.498)	0.561 (0.496)	0.545 (0.498)	0.627 (0.484)	0.643 (0.479)	0.604 (0.489)	0.485 (0.500)	0.340 (0.474)	0.350 (0.477)	0.326 (0.469)
Weeks looking for work	1.405 (6.162)	1.364 (6.070)	1.244 (5.803)	1.057 (5.203)	1.310 (6.012)	20.90 (12.66)	19.68 (12.27)	22.72 (13.02)	1.597 (6.550)	4.706 (12.05)	4.151 (11.32)	5.557 (13.06)
Male	0.480 (0.500)	0.903 (0.296)	0.896 (0.306)	0.905 (0.293)	0.891 (0.312)	0.894 (0.308)	0.896 (0.306)	0.892 (0.311)	0.508 (0.500)	0.472 (0.499)	0.452 (0.498)	0.502 (0.500)
Less than H.S.	0.117 (0.321)	0.0373 (0.189)	0.0326 (0.178)	0.0427 (0.202)	0.0276 (0.164)	0.0390 (0.194)	0.0435 (0.204)	0.0322 (0.176)	0.431 (0.495)	0.308 (0.462)	0.341 (0.474)	0.259 (0.438)
H.S. diploma	0.299 (0.458)	0.329 (0.470)	0.264 (0.441)	0.268 (0.443)	0.260 (0.439)	0.370 (0.483)	0.374 (0.484)	0.364 (0.481)	0.210 (0.407)	0.432 (0.495)	0.426 (0.495)	0.442 (0.497)
Some college	0.294 (0.456)	0.380 (0.485)	0.444 (0.497)	0.448 (0.497)	0.442 (0.497)	0.418 (0.493)	0.415 (0.493)	0.423 (0.494)	0.299 (0.458)	0.180 (0.384)	0.162 (0.369)	0.206 (0.404)
Bachelor's and higher	0.290 (0.454)	0.253 (0.435)	0.260 (0.439)	0.241 (0.428)	0.271 (0.444)	0.173 (0.378)	0.167 (0.373)	0.181 (0.385)	0.0600 (0.237)	0.0799 (0.271)	0.0709 (0.257)	0.0937 (0.291)
White	0.795 (0.404)	0.809 (0.393)	0.793 (0.405)	0.808 (0.394)	0.787 (0.409)	0.793 (0.405)	0.801 (0.399)	0.782 (0.413)	0.796 (0.403)	0.753 (0.432)	0.756 (0.430)	0.747 (0.435)
Black	0.115 (0.319)	0.128 (0.334)	0.140 (0.347)	0.127 (0.333)	0.144 (0.351)	0.136 (0.342)	0.132 (0.338)	0.142 (0.349)	0.108 (0.310)	0.143 (0.350)	0.145 (0.352)	0.141 (0.348)
No. Observations	141,3820	100,591	8,223	3,140	5,733	6,517	3,906	2,611	260,842	32,656	19,766	12,890

Notes: Mean coefficients; SD in parentheses. Unemployed Veterans are defined as veterans who had searched for more than 4 weeks for work during the last year. Disconnected Youth are defined as 16–24 year olds who are not enrolled in school and who worked less than 26 weeks in the previous year. Data is from Annual Social and Economic (ASEC) supplement of the Current Population Survey spanning the years 2003–2013.

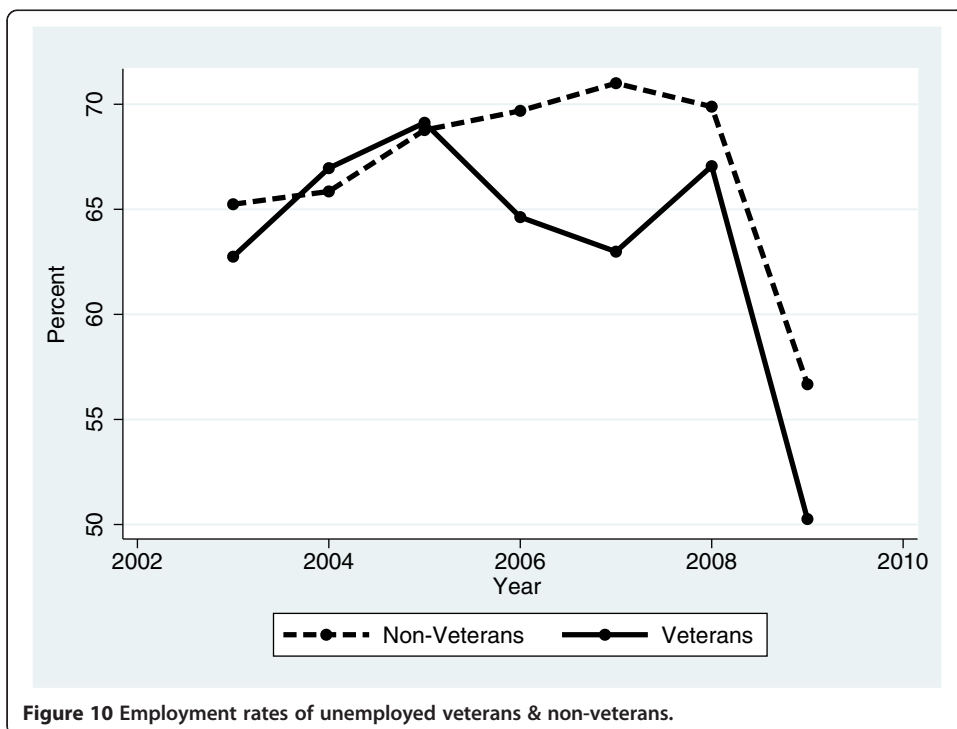
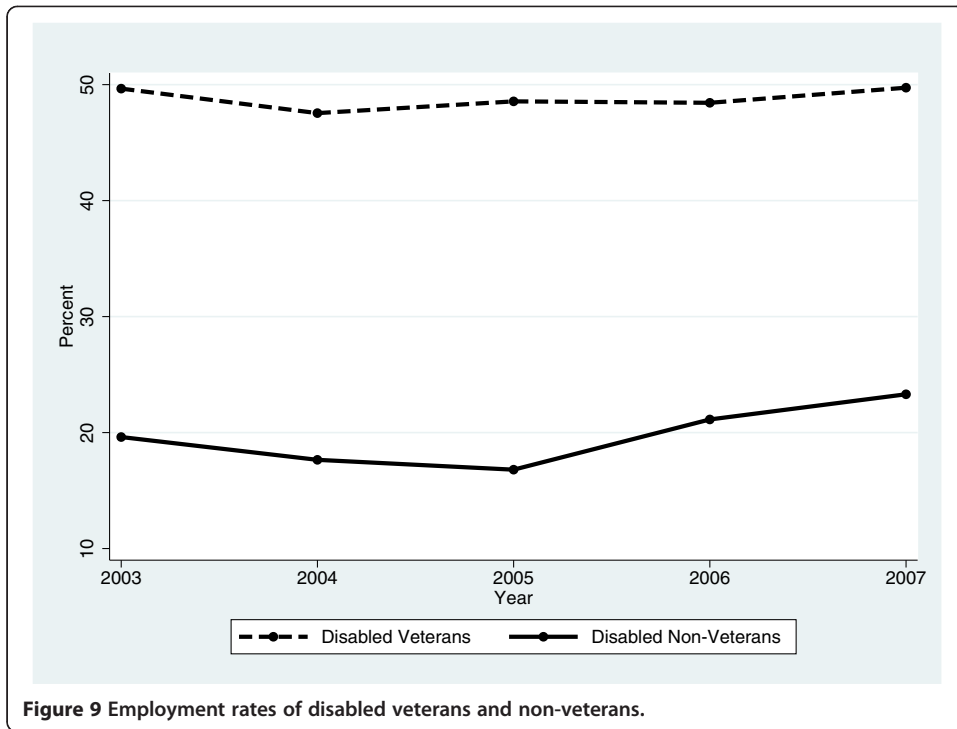


Table 3 Difference-in-difference (DD) effects of work opportunity tax credits (WOTC) on disabled veterans and unemployed veterans

	All veterans				Recent veterans only			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Disabled veteran X WOTC eligibility period for disabled veterans	0.0491*** (5.57)	0.0471*** (4.83)	0.0499*** (5.69)	0.0501*** (5.72)	-0.0127 (-0.30)	-0.0115 (-0.30)	-0.0043 (-0.10)	0.0003 (0.01)
Disabled veteran dummy	-0.237*** (-24.95)	-0.212*** (-27.84)	-0.239*** (-25.13)	-0.242*** (-25.31)	-0.0641 (-1.48)	-0.0635* (-1.72)	-0.0706 (-1.62)	-0.0801* (-1.81)
WOTC eligibility period for disabled veterans	-0.0416*** (-13.99)	-0.0393*** (-5.23)	-0.0204*** (-5.00)	-0.0129* (-1.89)	-0.0634*** (-5.53)	-0.0397** (-1.97)	-0.0182 (-1.18)	-0.0105 (-0.49)
Unemployed veterans X WOTC eligibility period for unemployed veterans			0.0203** (1.97)	0.0181* (1.75)			0.0208 (0.76)	0.0188 (0.68)
Unemployed veterans dummy			-0.167*** (-20.06)	-0.163*** (-19.58)			-0.128*** (-4.32)	-0.121*** (-4.11)
WOTC eligibility period for unemployed veterans			-0.0308*** (-7.15)	-0.0295*** (-3.55)			-0.0609*** (-5.36)	-0.0484*** (-2.65)
State fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Time fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	100,584	100,591	100,584	100,584	9,505	9,514	9,505	9,505

Notes: The table above reports marginal effects from probit models. Demographic controls include age, a quadratic in age, dummies for education attainment, and gender and race dummies. Unemployed Veterans are defined as veterans who had searched for more than 4 weeks for work during the last year. Data for this table was restricted to veterans only. Data is from Annual Social and Economic (ASEC) supplement of the Current Population Survey spanning the years 2003–2013.

t statistics in parenthesis.

*p < 0.10, **p < 0.05, ***p < 0.01.

Table 4 Difference-in-difference-in-difference (DDD) effects of work opportunity tax credits (WOTC) on disabled veterans and unemployed veterans

	All veterans eligible for WOTC based on employment history				Only recent veterans eligible for WOTC based on employment history			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Disabled X veteran X WOTC eligibility period for disabled veterans	0.0472*** (4.06)	0.0485*** (4.20)	0.0471*** (4.06)	0.0480*** (4.16)	-0.0193 (-0.45)	-0.0180 (-0.43)	-0.00910 (-0.22)	-0.0084 (-0.20)
Disabled X WOTC eligibility period for disabled veterans	0.00847 (0.86)	0.00766 (0.78)	0.00952 (0.97)	0.00870 (0.89)	0.0169*** (2.71)	0.0164*** (2.63)	0.0166*** (2.66)	0.0162*** (2.59)
Veteran X WOTC eligibility period for disabled veterans	-0.0182*** (-5.71)	-0.0185*** (-5.81)	-0.0139*** (-3.26)	-0.0144*** (-3.36)	-0.0402*** (-2.65)	-0.0310** (-2.08)	-0.00807 (-0.47)	-0.0005 (-0.03)
Disabled X veteran	0.154*** (33.90)	0.152*** (32.99)	0.154*** (34.11)	0.152*** (33.23)	0.174*** (13.00)	0.172*** (12.71)	0.171*** (12.40)	0.169*** (12.13)
Disabled dummy	-0.560*** (-77.57)	-0.559*** (-76.79)	-0.563*** (-78.36)	-0.562*** (-77.58)	-0.442*** (-76.49)	-0.442*** (-76.36)	-0.444*** (-77.05)	-0.445*** (-76.91)
Veteran dummy	-0.0137*** (-5.85)	-0.0145*** (-6.17)	-0.0114*** (-4.77)	-0.0121*** (-5.05)	0.00567 (0.45)	-0.00208 (-0.16)	0.00948 (0.74)	0.00235 (0.18)
WOTC eligibility period for disabled veterans	-0.0168*** (-21.24)	-0.0147*** (-7.12)	-0.0100*** (-9.07)	-0.0266*** (-14.66)	-0.0174*** (-22.69)	-0.0151*** (-7.39)	-0.0107*** (-9.97)	-0.0271*** (-15.14)
Unemployed X veterans X WOTC eligibility period for unemployed veterans			0.0118 (0.95)	0.0105 (0.84)			0.0155 (0.48)	0.0130 (0.40)
Unemployed X veterans			-0.0295*** (-3.86)	-0.0296*** (-3.88)			-0.0199 (-0.72)	-0.0175 (-0.64)
Veterans X WOTC eligibility period for unemployed veterans			-0.00888** (-2.04)	-0.00824* (-1.89)			-0.0447*** (-3.22)	-0.0447*** (-3.22)
Unemployed X WOTC eligibility period for unemployed veterans			0.00983*** (3.00)	0.0093*** (2.82)			0.0109*** (3.43)	0.0103*** (3.24)
WOTC eligibility period for unemployed veterans			-0.0102*** (-8.82)	0.0111*** (5.41)			-0.0103*** (-9.21)	0.0110*** (5.41)
Unemployed dummy			-0.119*** (-48.30)	-0.117*** (-47.60)			-0.122*** (-51.18)	-0.120*** (-50.46)

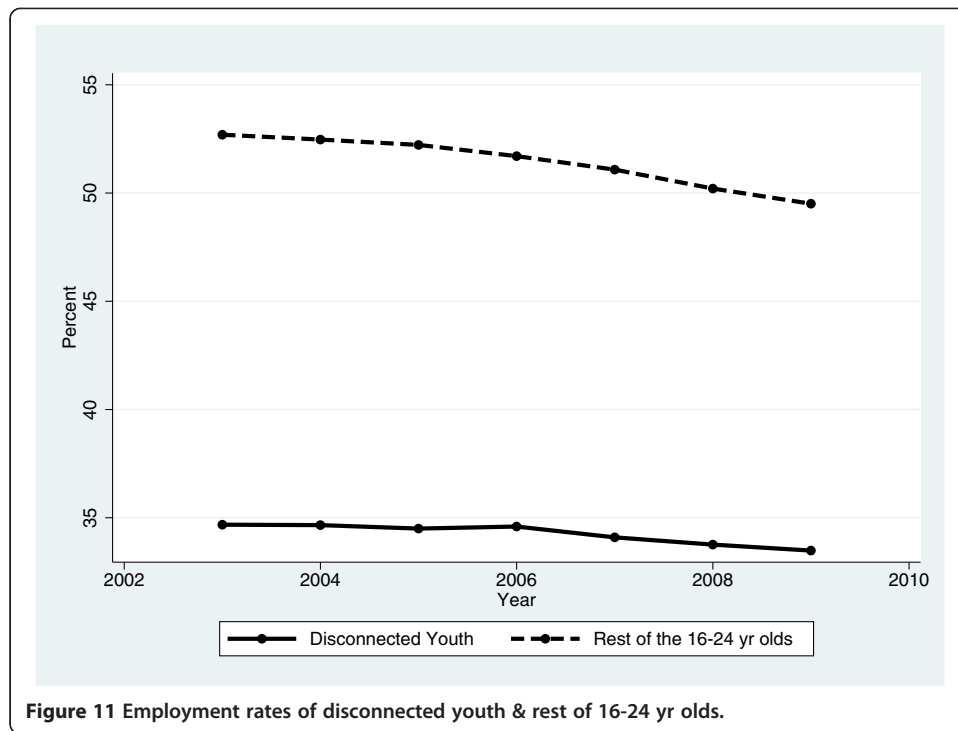
Table 4 Difference-in-difference-in-difference (DDD) effects of work opportunity tax credits (WOTC) on disabled veterans and unemployed veterans (Continued)

State fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Time fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	1,285,543	1,285,543	1,285,543	1,285,543	1,285,543	1,285,543	1,285,543	1,285,543

Notes: The table above reports marginal effects from a probit model. Demographic controls include age, a quadratic in age, dummies for educational attainment, and dummies for gender and race. Unemployed Veterans are defined as veterans who had searched for more than 4 weeks for work during the last year. Unemployed dummy refers to all individuals in the sample who had searched for more than 4 weeks during the last year. Data for this table leaves out individuals who could have qualified for WOTC, including SNAP and TANF recipients. Data is from Annual Social and Economic (ASEC) supplement of the Current Population Survey spanning the years 2003–2013.

t statistics in parenthesis.

*p < 0.10, **p < 0.05, ***p < 0.01.



includes state and time fixed effects. The results are similar with or without state and time fixed effects and show that the likelihood of employment of disconnected youth increased by 0.015, or an increase of 4.7 percent, relative to the pre-treatment employment for this group.

We find mixed results of targeted tax credits on employment. While we find a positive and non-trivial impact on the employment of disconnected youth, we do not find evidence of an impact on veterans. Previous evidence on tax credits is

Table 5 Difference-in-difference (DD) effects of work opportunity tax credits (WOTC) on disconnected youth under the ARRA

	(1)	(2)
Disconnected youth X WOTC eligibility period	0.0152* (1.83)	0.0157* (1.88)
Disconnected youth	-0.289*** (-101.09)	-0.285*** (-98.47)
WOTC eligibility period (Under ARRA)	-0.0688*** (-22.97)	-0.0236*** (-4.00)
State fixed effects	No	Yes
Time fixed effects	No	Yes
Demographic controls	Yes	Yes
N	260,841	260,841

Notes: The table above reports marginal effects from a probit model. Demographic controls include age, a quadratic in age, dummies for educational attainment, and gender and race dummies. Disconnected Youth are defined as 16–24 year olds who are not enrolled in school and who worked less than 26 weeks in the previous year. Data for this table is restricted to 16 to 24-year-olds and leaves out individuals who could have qualified for WOTC, including SNAP and TANF recipients. Data is from Annual Social and Economic (ASEC) supplement of the Current Population Survey spanning the years 2003–2013.

t statistics in parenthesis.

*p < 0.10, **p < 0.05, ***p < 0.01.

also mixed. Katz (1998) finds that the Targeted Jobs Tax Credit, a major wage subsidy program for the economically disadvantaged introduced between 1979 and 1991 had modest but positive employment effects. Hamersma (2008) argues that the WOTC had minimal effects on the employment of targeted groups because of low take-up of the credits. Burtless' (1985) analysis of a randomized targeted wage subsidy program in Dayton, Ohio suggests that vouchers may have even hurt the targeted groups by stigmatizing them. Our results are a little smaller than the ones reported by Katz (1998) for disadvantaged youth of a reduction in employment of 7.7 percent due to the discontinuation of the Targeted Jobs Tax Credit, though the TJTC applied to an older age group of 23 to 24-year-olds, who Katz (1998) argues are more attached to the labor force and, thus, more likely to benefit from the credits¹³.

4.2.4 Impact of the Hiring Incentives to Restore Employment (HIRE) Act

An alternative to tax credits attached to individual groups are tax credits provided to employers hiring any workers, which would avoid the problem of stigmatization. In March 18, 2010 the Hiring Incentives to Restore Employment (HIRE) Act was passed, which instead gave a direct payroll tax exemption of 6.2 percent to employers hiring unemployed individuals who had been unemployed for at least 60 days or who worked less than 40 hours (part-time workers) in the last 60 days. The HIRE Act expired on December 31, 2010. While there has been no evaluation of this program, at the time, the Treasury Department indicated that there were 3.2 million jobs created which, in principle, qualified for these credits over the time period during which the credits were effective. Here we attempt to quantify the impact of the HIRE Act.

Table 6 presents descriptive statistics for those who qualified for the HIRE Act. We define these as those who have been unemployed for at least 60 days in the past year. Those who qualify have lower employment and have searched more. They are also more likely to be male and African American, and they are more likely to be high school drop outs or to have only a high school degree. The first row in Table 7 reports the interaction between eligibility for the HIRE Act and an indicator for 2011, since the CPS reports employment in March for the previous past year. The specification controls for demographic characteristics, an indicator of whether the person is eligible, and state and time fixed effects. The results show that the HIRE increased employment by 1.6 percentage points or 2.6 percent relative to the employment for this group pre-HIRE Act.

Grijalva and Neumark (2013) similarly find that state tax credits increased employment for the unemployed, but that the effects were not large. By contrast, evaluations of similar tax credits in other countries suggest that these credits have been effective in encouraging hiring. Kugler (2011) presents an extensive literature review with evidence on the effectiveness of payroll tax cuts for employers from a number of natural experiments around the world as well as from cross-country panel data studies. While there is no data on take-up of credits from the HIRE Act, there was a perception that take-up of the hiring credits was low, and this may be one reason why the impact was not bigger.

4.3 Employment impacts of policies to get the long-term unemployed back to work

As shown in Figure 7, those unemployed for more than six months are about half as likely to find a job as those who have been unemployed for less than six months. Yet,

Table 6 Descriptive statistics for different unemployed groups

	Full sample	HIRE act eligible	HIRE act eligible pre-2011	HIRE act eligible post-2012	Long term unemployed	Long term unemployed pre-2013	Long term unemployed 2013 & 2014
Employed	0.729 (0.444)	0.609 (0.488)	0.605 (0.489)	0.623 (0.485)	0.540 (0.498)	0.536 (0.499)	0.563 (0.496)
Weeks looking for work	1.405 (6.162)	23.62 (11.77)	22.96 (11.57)	24.62 (12.00)	34.08 (7.984)	34.04 (7.961)	34.30 (8.100)
Male	0.480 (0.500)	0.544 (0.498)	0.541 (0.498)	0.540 (0.498)	0.533 (0.499)	0.534 (0.499)	0.529 (0.499)
Less than H.S.	0.117 (0.321)	0.173 (0.378)	0.181 (0.385)	0.156 (0.363)	0.184 (0.388)	0.188 (0.391)	0.164 (0.370)
H.S. degree	0.299 (0.458)	0.349 (0.477)	0.356 (0.479)	0.334 (0.472)	0.360 (0.480)	0.362 (0.481)	0.346 (0.476)
Some college	0.294 (0.456)	0.287 (0.452)	0.278 (0.448)	0.308 (0.462)	0.281 (0.450)	0.277 (0.447)	0.304 (0.460)
Bachelor's and higher	0.290 (0.454)	0.191 (0.393)	0.185 (0.388)	0.202 (0.402)	0.175 (0.380)	0.173 (0.378)	0.186 (0.389)
White	0.795 (0.404)	0.761 (0.427)	0.763 (0.425)	0.750 (0.433)	0.729 (0.444)	0.729 (0.444)	0.727 (0.446)
Black	0.115 (0.319)	0.145 (0.352)	0.142 (0.349)	0.155 (0.362)	0.168 (0.374)	0.167 (0.373)	0.174 (0.380)
No. Observations	1,413,820	74,985	48,004	18,839	35,368	29,687	5,681

Notes: Mean coefficients; SD in parentheses. HIRE eligible are defined as workers who searched for at least 60 days in the past year. Long Term Unemployed (LTU) are defined as unemployed who were unemployed for six month or more in the last year. Data is from Annual Social and Economic (ASEC) supplement of the Current Population Survey spanning the years 2003–2013.

the share of long-term unemployed increased sharply during the Great Recession and remains twice as high as before the recession.

Yet, under most states' unemployment systems, individuals are entitled to unemployment benefits for up to 26 weeks, and the replacement rate is close to 50%. Given that long-term unemployment rises during recessions, over the past several decades, emergency unemployment compensation has been extended 8 times to provide additional unemployment benefits to the long-term unemployed.

During this last recession, emergency unemployment compensation (EUC) was first introduced in June 2008, then extended in February and November of 2009, and again in December 2010, February 2012, and January 2013. The initial program introduced two 'tiers' of additional weeks of benefits. In November of 2009, the program was expanded to include two additional tiers. While the exact weeks and qualification for each tier has changed with each new extension, the current four tiers have been in place since 2009. The latest extension of EUC in January 2013 provided 14 additional weeks of benefits in the first tier to all states. The second tier provided 14 additional weeks for states with unemployment rates over 6 percent. Tier 3 provided 9 additional weeks if the unemployment rate is above 7 percent, and tier 4 provided 10 additional weeks if the unemployment rate is above 9 percent. The rationale in providing more weeks of benefits in those states with higher unemployment is that those are precisely the places where the long-term unemployed will be facing the biggest hurdles in getting jobs. In addition to emergency unemployment compensation, extended benefits (EB) trigger in for up to 20 weeks in states where the unemployment rate is above 6% and remains above what it was in the past three years.

Table 7 Difference-in-difference (DD) effects of unemployment assistance programs on the employment of the long-term unemployed

	(1)	(2)
HIRE eligible X 2011	0.0184*** (3.57)	0.0159*** (3.07)
HIRE eligible	-0.0894*** (-33.62)	-0.0875*** (-32.98)
2011 Year dummy	-0.0174*** (-11.49)	
LTU X LTU assistance period	0.0327*** (5.39)	0.0304*** (4.97)
Long Term Unemployed (LTU)	-0.106*** (-26.47)	-0.102*** (-25.53)
LTU assistance period (2013,2014)	-0.00895*** (-7.66)	0.0106*** (5.02)
State fixed effects	No	Yes
Time fixed effects	No	Yes
Demographic controls	Yes	Yes
N	1,199,947	1,199,947

Notes: The table above reports marginal effects from probit models. Demographic controls include age, a quadratic of age, dummies for educational attainment, and gender and race dummies. HIRE eligible are defined as workers who searched for at least 60 days in the past year. Long Term Unemployed (LTU) are defined as unemployed who were unemployed for six months or more in the last year. Data for this table leaves out any individuals eligible for WOTC, including SNAP and TANF recipients. Data is from Annual Social and Economic (ASEC) supplement of the Current Population Survey spanning the years 2003–2013.
t statistics in parenthesis.

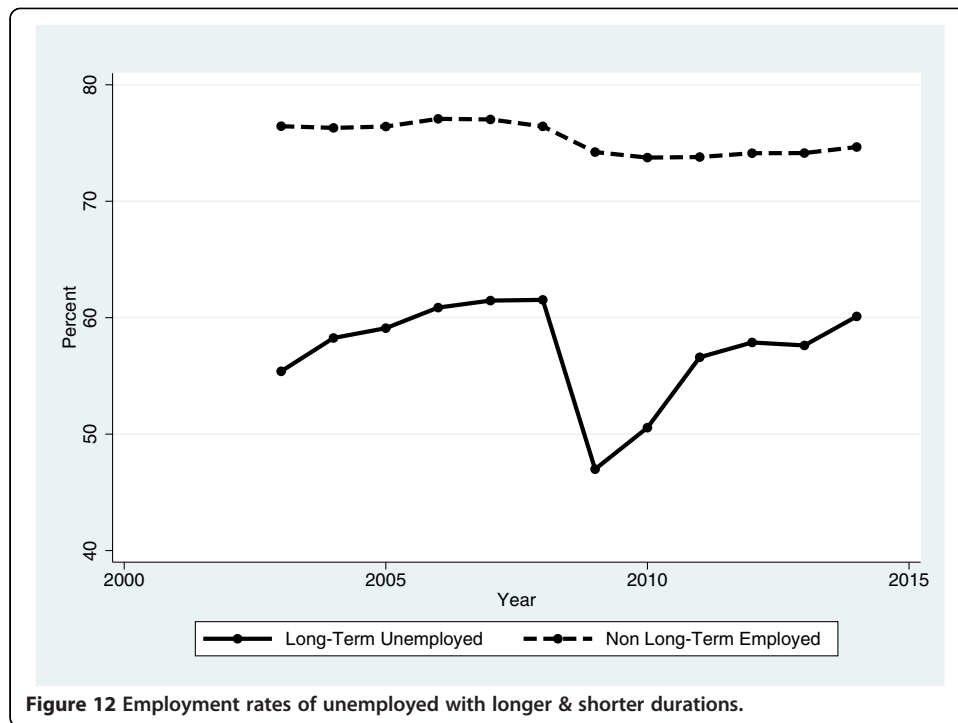
*p < 0.10, **p < 0.05, ***p < 0.01.

These extensions have provided income support to close to 25 million workers and their families since the beginning of the recession and have helped many of these families from falling into poverty. However, one concern with unemployment benefits extensions is that they may generate a moral hazard and cause people to search less and to lower their acceptance of jobs. Yet, there are a number of reasons why extending unemployment benefits may be beneficial on economic grounds. First, unemployment benefits are an automatic stabilizer and avoid big consumption drops by households facing unemployment. Gruber (1997) finds that consumption drops by 22% for those without unemployment benefits while only dropping by 7% among those receiving unemployment benefits. Also, Vroman (2010) finds a multiplier of 2 for unemployment insurance. This means that the economies of entire regions and states where the long-term unemployed received benefits grew by twice as much as the benefits received in those states.¹⁴ Second, Krueger and Mueller (in progress) find that unemployment benefits help the unemployed stay attached to the labor force rather than going into disability insurance. Both Rothstein (2011) and Farber and Valletta (2013) find that the unemployment insurance extensions reduced exits from unemployment but that this was largely due to reductions in exits from the labor force rather than a decrease in exits to employment. This is particularly important given the decline in labor force participation which started in 2000 and which has continued during the recession and also given the rise in disability insurance enrollments since the 1980s. These studies suggest that while the UI extensions may prolong unemployment, this is not because the unemployed are turning down job offers but because they are staying attached to the labor force rather than going into disability or stopping their job searches.¹⁵ Also,

Chetty (2008) shows evidence that unemployment benefits may also provide liquidity to individuals during periods of unemployment, which may improve the quality of the jobs they get. Finally, Farooq and Kugler (2013) find that public insurance programs increase labor mobility by increasing occupational and industry mobility but also mobility into self-employment and wage employment.

In addition to extending the period of time for which individuals can receive unemployment benefits, the Middle Class Tax Relief and Job Creation Act of 2012 introduced important reforms to help the long-term unemployed get back to work. First, the 2012 act introduced reemployment assistance and eligibility assessments (REAs) for those getting additional unemployment insurance. The REAs required in-person check-ins in UI offices, skill assessments, and job search counseling during those visits for the long-term unemployed. This proposal was based on a number of studies of randomized trials in Nevada, Minnesota, Illinois and Florida showing substantial reemployment effects. Michaelides et al. (2012) showed that UI recipients who were randomly assigned to REAs were 15 percent less likely to exhaust benefits, reduced the period for which they received benefits by 3 weeks, and increased their earnings by 18% in the 6 quarters following participation in REAs. Second, the reform introduced a self-employment assistance (SEA) program which allows the long-term unemployed to continue using UI benefits while setting up their own business. Benus (2009) evaluated a similar program, the Growing America through Entrepreneurship (GATE) program introduced in Pennsylvania, Minnesota, and Maine, which randomly assigned half of the people to training and business counseling and provided assistance in applying for business financing, and found that those assigned to the program were 6 percent more likely to own a business, were likely to start their business sooner, and their businesses had greater longevity. They also found that the program was most effective among those receiving UI. Benus et al. (1994) and Benus et al. (1995) also show positive employment impacts from the Self Employment Enterprise Demonstration (SEED) and the Massachusetts Enterprise Program, which allowed the unemployed to continue claiming benefits while receiving entrepreneurial training and setting up a new business.

Table 6 shows descriptive statistics for the long-term unemployed and other groups. The long-term unemployed are less likely to be employed and to have searched longer for work. They are also more likely to be male and African American and to have dropped out of high school or to have only a high school degree. Figure 12 shows the pre-treatment employment for the long-term unemployed and those unemployed for less than six months. While the short-term unemployed have higher employment throughout, the trends are similar, except that the long-term unemployed experienced much sharper drops in employment both in the 2001 and 2009 recessions. Table 7 shows the results from a regression that interacts the long-term unemployment dummy for those unemployed for more than 6 months with the 2012 and 2013 dummies, after the WOTC and HIRE Act were no longer in effect, but when the REAs were already in effect. The results are reported in row 4 of Columns (1) and (2), and they suggest that the introduction of REAs increased employment by 3 percentage points or 6 percent for the long-term unemployed. While the effect is not directly comparable with the studies cited above, the effect seems somewhat weaker compared to the randomized trial states which spent similar amounts on eligibility assessments and reemployment (\$85 vs. \$200



per long-term unemployed). Given evidence of duration dependence and evidence on statistical discrimination against the long-term unemployed, this is an important step towards avoiding hystereses in the U.S. labor market.

5 Conclusion

This paper documents the severity of the Great Recession on the labor market and presents evidence that the majority of the sharp rise in unemployment during the Great Recession was generated by cyclical as opposed to structural factors. This paper also presents new evidence on whether different policies introduced to help address the cyclical unemployment problem helped to increase employment. The tools included direct fiscal spending as well as broad and targeted hiring tax credits. The most reliable results from a counter-factual exercise show that employment would have been 4.5% lower had it not been for the spending on Medicaid from the Recovery Act. In addition, the results suggest that the targeted Work Opportunity Tax Credits increased employment for disconnected youth by 4.7 percent. However, the credits seemed to have been ineffective for disabled and unemployed veterans, which could be due to lack of take-up since employers appeared to have been increasing the hiring of all veteran groups during this time. Finally, measures targeted toward the long-term unemployed seemed to have been somewhat effective. The HIRE Act appears to have increased employment by 2.6 percent for those unemployed for more than 2 months; though, take up was low probably due to the complicated rules to qualify for the hiring credit. The Reemployment and Eligibility Assessments introduced in 2012 as part of the extension of unemployment benefits appear to have had greater impacts on those unemployed for

more than six months. The REAs appear to have helped to boost employment for the long-term unemployed by 6 percent. All in all, the reduction of the unemployment rate from the high of 10 percent in October 2009 to the current rate of 5.8 percent probably was helped by the various measures taken to help boost labor demand and support the long-term unemployed get back to work.

6 Endnotes

¹These average job growth numbers refer to growth during the period from February 2010 to November 2014.

²See Hyatt and McEntarfer (2012).

³See BLS's *The Employment Situation* (November 2014). Also, Hyatt and McEntarfer (2012) report a sizable flow from employment to out of the labor force and back to employment.

⁴See Kugler and Saint-Paul (2004) for a model that shows why employers would want to use employment status as a signal of worker quality. Kugler and Saint-Paul (2004) also present evidence that employers in the U.S. prefer hiring out of the pool of the employed, rather than out of the pool of unemployed, when it is costly to hire and dismiss workers.

⁵Shares of unemployed using friends as a search method come from the Bureau of Labor Statistics' Labor Force statistics calculated from the Current Population Survey: <http://www.bls.gov/cps/tables.html>.

⁶One reason why employers may prefer using informal channels is to save on monitoring and screening costs. Kugler (2003) shows that while informal channels may generate fewer offers and applicants, they generate access to high paying jobs, and they save employers on monitoring costs.

⁷If mismatches were correlated with GDP growth, this would bias upwards the estimate in Okun's Law. However, since sectoral and skill mismatches are most likely to be a drag on growth, this means that mismatches are likely negatively related to GDP growth and are, thus, likely to bias downwards the estimates in Okun's Law relation.

⁸See the following link from BLS: http://www.bls.gov/opub/ted/2013/ted_20130612.htm.

⁹Various reports from the National Federation of Independent Businesses.

¹⁰Others instead argue that the increase in unemployment is due to a decrease in the incentives to work due to extended unemployment benefits and other programs introduced by the Recovery Act (Mulligan 2014). If this story was correct, this should reduce labor supply and push up wages, but Rothstein (2011) presents evidence showing that wages fell rather than increased during the Great Recession and recovery. Moreover, there is no evidence that the increased unemployment largely results from decreased desire to work. Instead, the increase in the number of people out of the labor force is driven by individuals who indicate they are available for work and would like to get a job but who are unable to. The number of marginally attached workers more than doubled during the Great Recession and recovery, increasing from 1.3 million in December of 2007 and hitting a high of 2.8 million as late as January 2011 (*Employment Situation* BLS releases: http://www.bls.gov/schedule/archives/empst_nr.htm). Moreover, close to half of the marginally attached were discouraged workers who had given up looking for

a job because they believed no jobs were available. Likewise, the number of part-timers for economic reasons (those who work part-time but would prefer to work full time) was 4.7 million at the time of the official start of the recession and almost doubled, hitting a high of 9.3 million, in October 2009 (Employment Situation BLS releases: http://www.bls.gov/schedule/archives/empsit_nr.htm).

¹¹Information on the amounts spent on various programs by the ARRA comes from <http://www.recovery.gov/arra/Transparency/RecoveryData/Pages/JobSummary.aspx>.

¹²Hamermesh (1993) surveys the literature on GDP and employment and shows that employment typically lags GDP by about two quarters.

¹³Neumark (2011) provides a good summary of the research in this area.

¹⁴The fact that those who receive UI are less likely to reduce their consumption and that UI disbursements have big multiplier effects are inconsistent with Mulligan's hypothesis that UI generates both a voluntary reduction in effort and consumption by households that causes both longer unemployment durations and lower propensity to consume.

¹⁵The fact that more generous UI receipts are not associated with lower exits out of unemployment due to greater attachment to the labor force is also inconsistent with the hypothesis that UI prolongs unemployment due to lower search effort.

Competing interests

The IZA Journal of Labor Policy is committed to the IZA Guiding Principles of Research Integrity. The authors declare that they have observed these principles.

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References

- Arteta C, Fischer S, Klein M (2011) Breaking Okun's Law? A Cross Country Comparison, 2009-2011. Department of the Treasury, Mimeo, U.S.
- Ball L, Daniel L, Prakash L (2012) Is Okun's Law Fit at 50? Paper presented at the 13th Jacques Polak Research Conference, IMF, D.C., November 8-9, 2012
- Barlevi G (2011). Evaluating the Role of Labor market Mismatch in Rising Unemployment. *Economic Perspectives*, Vol. 35, No. 2011-3
- Benus J, Johnson T, Wood M (1994) First impact analysis of the Washington State self-employment and enterprise development (SEED) demonstration. Unemployment Insurance Occasional Paper 94-1, Washington D.C
- Benus J, Johnson T, Wood M, Grover N, Shen T (1995) Final impact analysis of the Washington and Massachusetts self-employment demonstrations. Unemployment Insurance Occasional Paper 95-4, Washington, D.C, DOL/ETA/UIS Final Report
- Benus J, Shen T, Zhang S, Chan M, Hansen B (2009). Growing America Through Entrepreneurship: Final Evaluation of Project GATE. IMPAQ International
- Burtless G (1985) Are targeted wage subsidies harmful – evidence from a wage voucher experiment. *Indust Labor Relat Rev* 39(1):105
- Chetty R (2008) Moral Hazard versus Liquidity and Optimal Unemployment Insurance. *J Polit Econ* 116(2):173-234
- Chodorow-Reich G, Feiveson L, Liscow Z, Coolston WG (2012) Does state fiscal relief during recessions increase employment? Evidence from the American recovery and reinvestment act. *Am Econ J* 4(3):118-145
- Daly M, Hobijn B, Sahin A, Valletta R (2012) A Rising natural rate of unemployment: transitory or permanent? *J Econ Perspect* 26(3):3-26

- Davis S, Jason F, John H (2012) Recruiting Intensity During and After the Great Recession: National and Industry Evidence. NBER Working Paper No. 17762
- Diamond P (2013) Cyclical unemployment, structural unemployment. *IMF Econ Rev* 61(3):410–455
- Dickens WT (2010) Has the Recession Increased the NAIRU? In academic advisory meeting of the Federal Reserve Board of Governors, vol. 12
- Elsby MWL, Hobijn B, Şahin A, Valletta RG, Stevenson B, Langan A (2011) The Labor Market in the Great Recession—An Update to September 2011 [with Comment and Discussion]. *Brookings Papers on Econ Act* 353–384
- Estevão M, Tsounta E (2011) Has the Great Recession raised US structural unemployment? International Monetary Fund, Washington, DC
- Farber H, Valletta R (2013) Do Extended Unemployment Benefits Lengthen Unemployment Spells? Evidence from Recent Cycles in the US Labor Market. National Bureau of Economic Research No. w19048
- Farooq A, Kugler A (2013) The Impact of Tax and Transfer Programs on Labor Mobility. Mimeo
- Feyrer J, Sacerdote B (2011) Did the stimulus stimulate? Real time estimates of the effects of the American Recovery and Reinvestment. National Bureau of Economic Research Act. No. w16759
- Ghayad R, Dickens W (2012) What can we learn by disaggregating the unemployment-vacancy relationship? *Public Policy Briefs* 12-13
- Grijalva D, Neumark D (2013) The Employment Effects of State Hiring Credits During and After the Great Recession. Mimeo
- Gruber J (1997) The consumption smoothing benefits of unemployment insurance. *Am Econ Rev* 87(1):192–205
- Hammersma S (2008) The effects of an employer subsidy on employment outcomes: a study of the work opportunity and welfare-to-work tax credits. *J Policy Anal Manage* 27(3):498–520
- Heaton P (2012). The Effects of Hiring Tax Credits on Employment of Disabled Veterans. RAND, National Defense Research Institute, Occasional Paper
- Hyatt H, McEntarfer E (2012) Job-to-Job Flows in the Great Recession. *The Am Econ Rev* 102(3):580–583
- Katz L (1998) Wage Subsidies for the Disadvantaged. In: Freeman R, Gottchalk P (eds) *Generating Jobs*. Russell Sage, New York, pp 21–53
- Kroft K, Lange F, Notowidigdo MJ, Katz LF (2014) Long-term unemployment and the Great Recession: the role of composition, duration dependence, and non-participation. Working Paper
- Kroft K, Lange F, Notowidigdo M (2012) Duration Dependence and Labor Market Conditions: Theory and Evidence from a Field Experiment. *Q J Econ* 128(3):1123–1167
- Krueger A, Mueller A. Applications for Disability Insurance and the Extension of UI Benefits: New Evidence from a Survey of Unemployed Workers. in progress
- Kugler A (2003) Employee Referrals and Efficiency Wages. *Labour Econ* 10(5):531–556
- Kugler A (2011) Is there an Anti-labor bias of Taxes? A Survey of the Evidence from Latin America and Around the World. Inter-American Development Bank
- Kugler A, Saint-Paul G (2004) How do Firing Costs affect Workers Flows in a World with Adverse Selection? *J Labor Econ* 22(3):553–584
- Lazear EP, Spletzer JR (2012) The United States labor market: Status quo or a new normal? National Bureau of Economic Research No. w18386
- Michaelides M, Poe-Yanagata E, Benus J, Turancharetti D (2012) Impact of the Reemployment Eligibility Assessment (REA) Initiative in Nevada. IMPAQ
- Mulligan CB (2014) Uncertainty, redistribution, and the labor market since 2007. *IZA J Labor Policy* 3(1):8
- Neumark D (2011) Policies to Encourage Job Creation: Hiring Credits vs. Worker Subsidies. National Bureau of Economic Research, NBER Working Paper 16866, Cambridge Mass
- Rothstein J (2011) Unemployment Insurance and Job Search in the Great Recession. *Brookings Papers Econ Act Fall* 43(2):143–213
- Sahin A, Song J, Topa G, Violante G (2014) Mismatch Unemployment. *Am Econ Rev* 104(11):3529–3564
- Vroman W (2010) Role of Unemployment Insurance as an Automatic Stabilizer During a Recession. DIANE Publishing

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