Do Unemployment Insurance Extensions Reduce Skill Mismatches?[**]

Ammar Farooq, Georgetown University

Adriana Kugler, Georgetown University and NBER[#]

Abstract

Unemployment Insurance (UI) benefits help people cope with financial losses during periods of unemployment, but have also been found to prolong unemployment spells in the U.S. and several European countries. At the same time, there is mixed evidence from European countries on whether extended UI benefits lead to high paid and better quality jobs. We examine the impact of UI extensions introduced during and in the aftermath of the Great Recession in the U.S. on wages, skill match quality and turnover after unemployment. Using the Current Population Survey, we find that longer UI duration increases wages in the job immediately after and up to one year after unemployment and reduces separations to unemployment one year after exiting unemployment. Furthermore, we find that longer UI durations increase the probability of being in a job with higher education requirements compared to the previous job and reduce the likelihood of being over-qualified in that job. This novel evidence on UI benefits reducing skill mismatches is consistent with productivity and welfare improvements in economies with more generous UI systems.

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[#] Adriana Kugler is the corresponding author: Adriana.Kugler@georgetown.edu, McCourt School of Public Policy, 37th and O Streets, NW, Washington, D.C. 20056.

1. Introduction

Since the 1970s, the U.S. government has introduced extended unemployment insurance during periods of very high unemployment. Severe recessions, and the elevated levels of unemployment that accompanies them, can make it increasingly difficult for the unemployed to find jobs and generate duration dependence. Thus, extending unemployment benefits can be particularly important to avoid unemployment from staying at permanently high levels and generating hysteresis.

These extensions were particularly important during the Great Recession when unemployment increased rapidly. In the aftermath of the Great Recession, the unemployment rate spiked to nearly 10%, driven largely by large drops in demand and increases in layoffs. The substantial increase in the number of unemployed led to an unprecedented increase in the duration of unemployment benefits from the usual 26 weeks to as long as 99 weeks in some states. The main motivation behind these policy changes was to ensure that workers who lost their jobs during or after the Great Recession did not suffer as large a drop in their incomes, which would only exacerbate the drop-in consumption and slow down the recovery.

In this project, we examine the impact of unemployment insurance extensions during and in the aftermath of the Great Recession on the quality of matches formed by job seekers. We ask whether workers who had access to unemployment benefits for a longer period of time are able to find jobs that are better attuned to their skills and whether they lead to higher wages and stable employment. Several papers have established that the UI extensions we study here do lead to longer periods in unemployment rather than out of the labor force (e.g., Rothstein 2011; Farber and Valletta, 2015; Farber, Rothstein and Valletta, 2015). However, in this paper we examine if this policy allows the unemployed to find a job that is a better for their qualifications and to find

jobs that pay more and lead to lower separation to non-employment in the future. This paper, thus, focuses on a policy that not only prevents drastic drops in consumption, well-being and poverty, but that also potentially improves the functioning of the labor market and allows for better reallocation.

To answer our questions, we exploit the extensions of UI benefits, which varied across states from 2008 to 2013. During the Great Recession, the federal government extended UI benefits beyond basic state benefits of typically 26 weeks. It created a tiered system, which typically extended benefits for 20 for all states and farther extended benefits to up to 99 weeks to higher unemployment states. Moreover, since the two programs, Extended Unemployment Compensation (EUC) and Unemployment Benefits (EB) programs were introduced and approved by Congress through legislation, they were extended for periods of time, which would then expire and then were extended again under different legislation. This generates variation over time and across states, which we exploit in our analysis. Uur identification is a difference-in-difference strategy with before and after periods and control and treatment states subject to shorter or longer periods of unemployment benefits.

We use the Current Population Survey's monthly data files to study the impact of these policy changes from 2008 to 2013. The monthly data files allow us to follow individuals through time to examine exposure to the program through periods of unemployment and examine the impact of the available benefits to workers on their future earnings, the fit of their skills to the job, and future retention in the job.

We find that the longer the benefits available to workers, the higher the wages upon exit from unemployment and this difference stays positive up to one year later. Moreover, we find that the longer UI available benefits are, the higher the educational requirements in the

occupation in the new job and the less likely workers are to be over-educated in the job. This has important implications since is implied that skill mismatches are potentially reduced. We also find that the longer an unemployed is exposed to benefits the more the person is likely to remain in the job one year after. Consequently, increased access to UI during periods of unemployment increases the quality of job matches but also increases job stability.

Section 2 describes the related literature as well as the institutional changes in UI benefits during the Great Recession. Section 3 describes the MORG data and construction of the variables. Section 4 describes the identification strategy and Section 5 presents the results. Section 6 concludes.

2. Literature Review and UI Extensions

A. Contribution to Existing Research

The effectiveness of UI benefits has become a hotly debated topic in academic and policy circles. A robust result in the empirical literature analyzing the impact of UI benefits is that they increase the duration of unemployment. This result has been interpreted from two different perspectives. One interpretation of the above result is that UI decreases the job search efforts of workers because it raises the reservation wage of job seekers and/or because it generates moral hazard. This can lead to persistently higher unemployment and negate the usefulness of UI in reducing unemployment. The other perspective is that UI benefits relaxes credit constraints for households and allows the unemployed to search longer for more appropriate jobs.

Earlier research such as work by Moffit (1985), Katz and Meyer (1990), Meyer (1990) and Hunt (1998) found support for the first interpretation. Moffitt (1985) finds higher UI benefit levels prolong the length of unemployment spells. Katz and Meyer (1990) find that an increase in one week of potential benefits increases the unemployment spell by a fifth of a week. Hunt

(1995) finds that the increased duration of UI benefits in Germany reduced exits from unemployment in Germany by a similar magnitude as in the U.S. These papers find that increased UI generosity prolongs unemployment spells. Some researchers, such as Mulligan (2012) and Barro (2010) argued that the extension of UI benefits during the Great Recession might have explained the persistence of high levels of unemployment even after the end of the last recession. The extensions of UI during and after the Great Recession, indeed, provided researchers with another opportunity to study the potential disincentive effects of UI. The main result from these studies (e.g., Rothstein 2011; Farber and Valletta, 2015; Farber, Rothstein and Valletta, 2015) using data from the United States is that extended UI resulted in a small but significant decrease in the probability of leaving unemployment. Importantly, all of these studies conclude that a substantial part of this decline can be explained by a reduction in the probability of leaving the labor force rather than a reduction in the job finding rate. Thus, the overall conclusion from these studies is that the disincentive effects of UI during the Great Recession were not as high as those documented by older studies. However, Kroft and Notowidigdo (2016) argue that the disincentive effects of UI might be limited in a deep recession since the return to job search is lower because of the weak labor market demand or due to labor market hysteresis. Hagedorn et al. (2015) explore whether the higher reservation wages of workers due to extended UI reduces the incentives of firms to create jobs and they find a large negative impact of UI extensions on vacancy creation. These results are in sharp contrast to the work of Marinescu (2015) who found that UI extensions did not lead to a decrease in demand using data from a large online job board. Overall, Kroft and Notowidigdo (2016) found that the positive welfare effect from consumption smoothing outweighed the negative effects of UI.

Another interpretation of the positive relationship between UI generosity and

unemployment duration is that UI subsidizes the job search of workers, allowing them to alleviate budget constraints and, thus, leading him/her to search for better matches rather than accepting the first job that they are offered. Chetty (2008) finds that the effect of benefits on unemployment durations is greater for liquidity constrained households in the U.S. Moreover, he finds that this 'liquidity effect' of UI accounts for 60% of the increase in durations while the moral hazard effect only accounts for 40%, and that there are welfare gains as a result of increased unemployment spells. Acemoglu and Shimer (1999, 2000) develop a model that shows that more generous UI encourages risk-averse workers to seek higher productivity jobs and they show that the model fits well the labor market for high-skilled U.S. workers. Moreover, they find that generous UI is optimal in a world in which workers are risk-averse.

The effect on subsequent match quality has been mostly ignored in the literature partly because it is difficult to measure the quality of a match. Recent work has, however, made attempts to answer this question using data on re-employment wages and stability of jobs upon re-employment from European countries. Card et al. (2007) look at the effect of cash-on-hand on the job search behavior of the non-employed in Austria. They find that cash-on-hand, including severance payments and extended UI benefits, leads to a decrease in the job finding rate on average and the increase in search duration has no effect on subsequent job quality. Similarly, Lalive (2007) and Van Ours and Vodopivec (2008) find no effect of UI extensions on re-employment wages in Austria and Slovania, respectively. In contrast, Schmieder et al. (2016) find a negative effect of UI benefit duration on wages in Germany, but no effect when conditioning on non-employment durations. By contrast, Nekoei and Weber (2016) exploit a regression discontinuity and find a positive effect of unemployment benefit duration on wages in Austria. The latter is the first study to find a positive effect of UI on re-employment wages in the

literature.

Theoretically, the impact of UI duration on match quality and/or wages could be ambiguous. Longer UI duration could allow workers to search for better matches and, hence, receive higher wages upon re-employment. However, if a worker's skills depreciate during unemployment spells, then longer search periods induced by extend UI could lead to lower wages upon re-employment. Even if there is no skill depreciation, but employers use the length of unemployment spells as a signal of unobserved worker quality (e.g., see Kroft et al., 2013), then one may observe lower quality of matches for workers with access to extended UI.

This paper helps to fill a gap in the literature on the impacts of UI on the quality of job matches. As indicated above, the previous literature has emphasized the potential detrimental effects of UI on search behavior and unemployment. The few papers looking at the impact of UI on the quality of matches use earnings data. Our project, instead, analyzes the effects on match quality by using the education and occupation of re-employed workers together with the U.S. Department of Labor's O*NET database to determine the education and experience requirements of each occupation and to determine the degree of mismatch between workers' actual education and the education requirements in their occupations after re-employment.

B. UI Extensions During the Great Recession

During and after the Great Recession two major legislative programs were responsible for the extension of Unemployment benefits' duration. These two programs were: the temporary Emergency Unemployment Compensation (EUC) program and the permanently authorized Extended Benefits (EB) program.

Federally-funded temporary benefit extension programs have been introduced during recessions since the 1950s. These programs have changed over time in name, duration, and conditions to quality, but all provide additional weeks for unemployment insurance benefits after individuals exhaust their state unemployment benefits. Temporary Unemployment Compensation (TUC) programs were introduced between June of 1958 and June of 1959, April 1961 and June of 1962, and January of 1972 and March of 1973 for an additional period of 13 weeks and then again between March of 2002 and March of 2004 for up to 13 or 26 weeks. Federal Supplemental Benefits or Compensation (FSB or FSC) programs were introduced between January 1975 and January of 1978 and September of 1982 and June of 1985 for various lengths of time. The benefit programs were renamed Emergency Unemployment Compensation (EUC) Programs between November 1991 and April 1994 and between July of 2008 and January of 2014.

The EUC 2008 Program introduced in the last recession was extended several times and became increasingly more complicated by adding more levels or tiers over time. Initially, EUC 08 was introduced from July 2008 to March 2009 and allowed the unemployed to claim an additional 13 weeks of benefits (see Figure 1.A). In November 2008, the program expanded to allow 20 instead of 13 weeks of benefits. Between March and December 2009, the program changed from a one tier to a two-tier program, with those in the first tier getting 20 weeks and those in the second tier getting an additional 13 weeks of benefits (see Figure 1.B). Between December of 2009 and February 2010, four tiers were introduced in which the first tier offered an additional 20 weeks, the second tier offered 14 extra weeks, the third tier offered 13 extra weeks to those in states with a 3-month average unemployment rate of at least 6% and the last tier offered 6 additional weeks of unemployment benefits to those in states with a 3-month

average total unemployment rate of at least 8.5% (see Figure 1.C). This same four-tier program was then extended six more times through new legislation until May 2012. From May to September 2012, the program went back to a four tier system with benefits of up to 20, 14, 13, and 6 weeks in Tiers 1 through 4, respectively. Starting in June 2012, the second tier required a three-month total unemployment of at least 6% in the state to qualify and the third and fourth tiers now required at least 7% and 9% total unemployment rates. Finally, between September 2012 and January 2014, the program changed the four Tiers maximum benefit weeks to 14, 14, 9 and 10, respectively (see Figure 1.D). This means that benefit duration varied continuously over time during a given year. Benefit duration also varied widely across states, since the states could trigger on and off tiers 3 and 4 during most of this period due to changes in their unemployment rates qualifying or not to receive federal funding. During the last period since June 2012, states could also trigger on or off from Tier 2.

Aside from the various changes in the Emergency Unemployment Compensation Program, which extended benefits temporarily during the Great Recession, a permanent federally supported Extended Benefits (EB) program has existed in the U.S. since the 1970s. In 1970, Congress approved the Federal-State Extended Unemployment Compensation Act, which approved financial support to extend benefits for individuals who exhaust their state UI benefits when unemployment rates are high. In particular, the EB Program extends benefits by 13 and 20 weeks if the 3-month total unemployment benefit exceeds 6.5% and 8.5%, respectively. Additional weeks of benefits from the EB Program can be claimed by the unemployed, once they have exhausted the extended weeks of benefits in different tiers from the EUC program. This means that initially, when EUC allowed for an additional 13 weeks, the maximum weeks an unemployed in a state with very high unemployment state could qualify for was 59 weeks in

total. However, during the most generous time, when four tiers were in place, the maximum weeks would had been 99 weeks (26 weeks of regular benefits, 53 weeks of EUC, 20 weeks of EB). Figure 2 shows the minimum, maximum and median weeks of total benefits that can be claimed across U.S. states from the period from January 2008 through January 2014. Like the previous figure, Figure 2 illustrates the large variation in benefits between states with the longest and shortest durations of potential benefits as well as the wide variation over time in the generosity of duration of benefits. The triggering "on" and "off" of EB and tiers 3 and 4 of EUC depend on the unemployment rates in the states. It is not surprising, thus, that the duration of potential benefits lengthened in 2009 and remain high even into 2012 and only until half way through 2012 started to decline. Consequently, this illustrates the importance of controlling for the unemployment rate in the specifications below since by construction the benefits are determined by the unemployment rate and the tightness of the labor market itself affects the quality of jobs workers can get.

Below, we exploit this statutory variation in potential benefits across states at different points in time and combine it with information on the weeks of unemployment to determine the available benefits for an individual living in a given state at a point in time.

3. Data Description

We use the Monthly Data files from the Current Population Survey for the period 2008-2013. Households in the CPS are interviewed four months, then let go for eight months, then interviewed again for another four months. Every month one eighth of the households enter the sample and a similar number leave the sample. Households are asked questions about wage income and hours worked in their fourth and eighth interviews. These are called the Merged Outgoing Rotation Group (MORG) files and we only use information from these files when

analyzing wage outcomes. We leverage this unique structure of the CPS sample to construct longitudinal histories of workers to analyze short and medium term outcomes in the labor market.

In the CPS monthly sample, we have access to extensive demographic and labor market information, including information on current employment occupation, past occupation (for those who are unemployed), education, age, gender, race, marital status, and state. In addition, we merged data from the Local Area Unemployment Statistics (LAUS), which has unemployment rates for every state every month.

We use the longitudinal and rotating structure of the CPS data to construct two different samples for our analysis. First, we link individuals from one month to the next using household and individual identifiers following the procedure outlined by Shimer (2012). In order to rule out spurious matches based on household and individual identifiers we perform checks such as the sex and the age of the individual is consistent from one month to the next. We call this sample the short-term transitions sample. This enables us to analyze employment outcomes of individuals who transition out of unemployment to employment for each month. Since we are interested in the effect of UI benefit durations on the outcomes of workers exiting from unemployment, we restrict our attention to workers who made a transition from unemployment to employment from one month to the next.

Our main explanatory variable is the available unemployment benefits at the individual level, which we calculate as the total UI benefits in the state at a point in time minus the duration of unemployment for an unemployed individual in the sample. We construct this by using the statutory unemployment insurance that changed over the period of the Great Recession and its

aftermath in different states and over the course of 2008-2013 by month. The CPS includes a question about the duration of unemployment for an unemployed individual, hence one can construct the available UI for a person in a state at a point in time.

To construct our key dependent variables on the quality of matches, we use data from the U.S. Labor Department's O*NET database, which identifies the educational requirements for jobs in different occupations. The O*NET program collects data on requirements for entry level jobs, work styles and task content within occupations by surveying each occupation's working population. For educational requirements, we rely on the following question asked of current employees: "If someone was being hired to perform this job, indicate the level of education that would be required." The survey respondents are reminded that this does not refer to the level of education that an incumbent or current employee has achieved. Respondents are given the following options: less than high school, high school, some college, associate' some college, associate and graduate degree.

To assign a required level of education to each occupation, we use the distribution of responses of the incumbents. We convert categorical education requirements from O*NET to years of education and use the distribution of responses to construct a weighted average "years of education" required for each occupation. For example, if the 80% respondents in the O*NET survey respond that a Ph.D. is required to perform the job of an Economist while 20% say that a Masters' degree is required then we assign 17.6 (0.8 x 18 + 0.2 x 16) years of education as the requirement for Economists. Our first dependent variable is the difference between the new occupation's required years of education and the previous occupation's required years of education for workers who made a transition from unemployment to employment. Notice that this variable would take a value of 0 for workers who do not change their occupation upon re-

employment. Our second dependent variable measures the difference between the education attainment (years) of the worker and the required level of education of the occupation[1]. This number can be positive or negative reflecting whether a person is over-qualified or under-qualified for their job. We also use the mode of the responses as the required level of education for each occupation and use that alternative measure for robustness checks.

Table 1 reports the descriptive statistics of the variables from the short-term transition sample. Row 2 of table 1 shows that on average people who make an occupation switch when exiting unemployment, end up in a job where the education requirement is lower than the previous occupation. The estimates in row 3 show that, according to our measure, college graduates are more likely to be over-qualified in their jobs while non-college workers are more likely to be under-qualified when they exit unemployment. Table 1 also shows that the unemployment rate is higher in states with higher available UI benefits and the maximum UI benefits. This highlights the challenges in estimating the causal impact of UI benefit program as they are extended in states which have higher unemployment rates and consequently a weak labor market.

We also use the CPS monthly data file from IPUMS[2] to construct longitudinal histories of workers several months apart. In order to do so we use the personal identifiers provided by IPUMS. Our goal is to measure medium term labor market outcomes of workers who exit the labor market in a particular point in time. To this end, we first restrict our sample to workers who have participated in all the 8-months in the CPS and we use individual weights from the 8th month in our analysis. Since we are interested in long-term outcomes, we also restrict our sample

[1] Mismatch = Attained Education – Required Education
[2] https://cps.ipums.org/cps/.

to workers who transitioned from unemployment to employment in months 1 through 3 of the sample and analyze their outcomes on months 5 through 8. We refer to this sample as the longitudinal sample.

Our explanatory variable for the longitudinal sample is the available unemployment benefits at the individual level in the month that the individual made the transition from unemployment to employment. For example, if a worker was unemployed in month 2 and was employed in month 3, we use the available UI benefits in month 2 for that worker. We again construct this variable by using the statutory unemployment insurance benefits and the duration of unemployment for an unemployed individual.

The dependent variables for the longitudinal sample include the log of hourly wages in month 4 of the sample, the log of hourly wages in month 8 of the sample and a measure of employment stability, which takes a value of 1 if the worker is continuously employed in months 5 through 8 while they are in the CPS sample. An important point to note about the wages is that we only observe wages for those who are employed while they are in month 4 or month 8 of the CPS sample and hence our analysis for wages is restricted to those individuals,

Table 2 provides the descriptive statistics for the longitudinal sample. It shows that on average 35% of college graduates and around 50% of non-college workers slip back into unemployment within one year of exiting unemployment. It also shows the presence wage growth in the sample as wages in month 8 are higher than wages in month 4 of the CPS.

4. Empirical Methodology

We estimate the impact of UI extensions by regressing wages and the mismatch indicators on the available UI benefits, individual characteristics, time effects, state effects and regional trends. In

essence our estimation strategy is similar to the work of Rothstein (2011), Farber and Valletta, (2015) and Farber, Rothstein and Valletta (2015) who also use individual level data from the CPS. Importantly, we control for fixed factors that could affect a given state, but we will also control for the unemployment rate as well as polynomials and lags of the unemployment rate. These controls are very important because during the period of our analysis, UI was extended in states with worse labor market conditions. Since worse labor market conditions may be related to hiring into worse jobs but also coincides with extended benefits, this may bias downwards the effects of UI generosity on the quality of matches. Furthermore, we also include year, month, state fixed effects and regional trends. The model is estimated using the following regression:

$$Y_{isrtm} = \varphi \times \text{Available UI Benefits}_{st} + \psi_0 \times UR_{stm} + \psi_1 \times UR_{stm}^2 + \psi_2 \times UR_{stm}^3 + \psi_3 \times UR_{stm-1} + \psi_4 \times UR_{stm-2} + \delta \times UR_{stm} + \beta X_{isrt} + \kappa_s + \tau_t + \mu_m + \Omega_{rtm} + \varepsilon_{isrtm}$$

where Y_{isrtm} is the re-employment wage and job quality or the education mismatch measures. Available UI Benefits_{istm} measures the available duration of benefits in each state during each month for a given individual i. In addition, the X's include controls for age, education, race gender, and marital status. We control for state effects(κ_S), year effects (τ_t) and month effects (μ_m) to contrast states with more and less generous UI benefits and before and after the statutory changes. Ω_{rtm} are region-specific time trends that allow the time trend to vary in each of the large nine regions of the country as defined by the Census Bureau (New England, Mid-Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, and Pacific). We also include the $\text{Unemployment Rate}_{stm}$ and the quadratic, cube and lagged unemployment rate to disentangle the impact of the policy changes from the impact of weak labor demand on match quality.

We then include the following 2-level interactions: year × month, year × state, and month

× state, as controls in our specifications and estimate the following model:

$$Y_{isrtm} = \varphi \times \text{Available UI Benefits}_{st} + \psi_0 \times UR_{stm} + \psi_1 \times UR_{stm}^2 + \psi_2 \times UR_{stm}^3$$

$$+ \psi_3 \times UR_{stm-1} + \psi_4 \times UR_{stm-2} + \delta \times UR_{stm} + \beta X_{isrt} + \kappa_s + \tau_t + \mu_m + \kappa_s \times \tau_t$$

$$+ \kappa_s \times \mu_m + \tau_t \times \mu_m + \varepsilon_{isrtm}$$

The two-level interactions allow for states to have differential time effects as well as states to have differential monthly or seasonal effects. Thus, this model exploits the monthly variation at each moment in time across states, thus purging differential variation of states in the business cycle.

5. Effects of UI benefit Duration on Match Quality

Our results show a positive impact of available benefits on wages for non-college workers and a positive impact of UI benefits on match quality for both college and non-college workers.

Table 3 shows the effects of UI benefits on the difference in education requirements of the occupation upon exiting compared to the worker's last one. The dependent variable is continuous and can take on positive or negative values. The descriptive statistics table, table 1, shows that for all workers, college and non-college workers the average value of this variable is negative, except for non-college workers in states with above median duration of UI benefits. This implies that on average workers are moving to occupations with lower skill requirements when they exit unemployment compared to their occupation before unemployment. Table 3 shows that the effect of UI benefits in positive and significant for both the complete sample and for college and non-college workers separately as well. Workers who have access to longer duration UI benefits can find jobs that have higher education requirements than the ones they

were doing before. Thus, we find evidence that having safety net that allows workers to search longer can lead to "occupation upgrading". The estimate from column (4) implies that an additional 26 weeks of UI benefits would allow workers to end up in jobs where the education requirement is 0.06 years higher which is greater in magnitude than the mean of this measure for the entire sample. For college workers, the estimates from column (6) imply that an additional 26 weeks of UI benefits would lead to workers ending up in jobs where the education requirement is 0.09 years higher which almost as high as the mean for this group. The magnitude of the effect is even higher for non-college workers. Column (8) shows than an additional 26 weeks of UI benefits would allow workers to end up in jobs where the education requirement is 0.06 years higher which is higher than the mean for these workers in absolute value.

Table 4 shows the impacts of available benefits on re-employment wages. We find positive effects for the entire sample and for non-college workers and positive but insignificant effects of an additional week of UI benefits on the re-employment wages of college workers. Columns 1-4 show that for the effect of having an additional week of UI benefits is positive and significant for the entire sample. The magnitude of the estimate in column (4) implies that if the UI benefits in a state are increased by 26 weeks then we can expect that the hourly wages would be 12.2% higher upon exiting unemployment. As one can see from Table 2, the average hourly wages upon exiting unemployment for all workers is approximately $6.53, hence a 12.2% increase would imply that average wages rise by $0.80. Column (8) shows the effect for non-college workers which implies that an additional 26 weeks of UI benefits would result in 13% higher hourly wages. Columns (5) and (6) show the impact for college workers under different specifications. Without the two-way fixed effects, we get positive and significant effects on re-employment wages of college workers with magnitudes that are approximately half of the entire

sample. However, the significance and the magnitude decreases as we add the two-way fixed effects to our model and the estimates are not distinguishable from zero.

Table 5 and 6 use our longitudinal sample from the CPS to analyze outcomes of workers one year later when the workers re-enter the sample. The dependent variable in table 5 is log of hourly wages in month 8 of the CPS. The sample of analysis is restricted to workers who exit unemployment in months 1-3 of the CPS. Column (4) of table 5 shows that 26 additional weeks of UI benefits at the time of exiting unemployment would result in those workers having 11.8% higher wages one year later which is approximately the same difference as that at the time of exiting unemployment. For non-college workers, column (8) shows that an additional 26 weeks would result in those workers having 11.2% higher wages one year later. For college workers, we find effects which are of similar economic magnitude but they are less precisely estimated. These results show that workers in states with lower UI benefit durations do not catch up in terms of wages over time, the wage differentials do persist for at least one year and possibly more. Part of this can be explained by decreased job security of those who had access to lower UI benefits which we analyze in table 6.

While medium-term wages are an important measure of match quality, another medium-term measure of higher match quality is reduced turnover and separation to unemployment. In table 6, we ask whether workers who exit unemployment in months 1-3 are continuously employed in months 5-8 and how this relates UI benefit duration. Column (4) of table 6 shows that workers with 26 additional weeks of UI benefits would increase their probability of being continuously employed in month 5-8 by approximately 3 percentage points. The continuous employment rate for our sample is 54%, which suggests that 26 additional weeks of UI benefits would increase continuous employment by 5.5%. Columns (6) and (8) shows comparable results

for college and non-college workers, where the magnitude of the co-efficient implies that an additional 26 weeks of UI benefits would increase continuous employment by approximately 4 percentage points and 3 percentage points respectively.

Finally, we analyze whether access to longer UI benefits leads to any decreases in mismatch between worker education and the skills required for the job. Table 7 shows the impact of UI on mismatch between worker skills and the skill requirements of the job. This measure is in terms of years of education and as can be seen from table 1, college graduates are on average over-qualified for their jobs while non-college workers are under-qualified for their jobs. Columns (4), (6) and (8) of table 7 show that longer duration UI benefits decrease the incidence of educational mismatch for college workers and there are no effects for non-college workers. An additional 26 weeks would reduce educational mismatch for college workers by 0.12 years which represents a decline of 6% from the mean level of educational mismatch for all college workers making transitions from unemployment to employment in our sample.

6. Conclusion

In this paper, we have analyzed whether extending UI benefits allows workers to search for higher paying jobs and jobs that are a better match for their skills. Focusing on the sample of workers who transitioned from unemployment to employment during 2008-2013, we find that workers who had access to 26 weeks longer UI benefits had 12 % higher pay on average and the pay difference persisted for at least a year. Furthermore, we find evidence that longer UI benefits lead to "occupation upgrading" and reduce skill mismatches. Those with longer UI benefits can find jobs where the education requirements are higher than those in their past jobs. This directly impacts skill mismatches and we observe that the degree of mismatch in educational attainment and requirement of jobs decreases for those with access to longer UI durations. Finally, we show

that those with 26 weeks longer UI benefits at the time of exit from unemployment have more stable employment relationships and are at least 5.5% less likely to transition back to unemployment within a year of their exit from unemployment.

We interpret our results as supportive of the hypothesis that having access to UI benefits allows workers to search for jobs that are not just high paying but are also a better fit for their skills. Higher wages and reduced turnover show that workers might have found jobs that are a better match for their unobserved skills. At the same time, we provide evidence of declining observable skill mismatch and occupation upgrading to complement these findings. Overall, our results suggest that the post-employment outcomes of workers should be an important factor in the debate around the duration and generosity of UI programs.

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Table 1 - Descriptive statistics

				College Graduate			Non-College Workers		
	All States	Sample of Below Median Available Benefits	Sample of Above Median Available Benefits	All States	Sample of Below Median Available Benefits	Sample of Above Median Available Benefits	All States	Sample of Below Median Available Benefits	Sample of Above Median Available Benefits
Maximum UI Thresholds	68.95	60.77	77.76	70.24	62.07	78.13	68.65	60.49	77.67
	(23.20)	(22.73)	(20.30)	(22.48)	(22.23)	(19.74)	(23.36)	(22.83)	(20.44)
Move to a job with Higher Education Requirement	0.815	0.802	0.829	0.790	0.782	0.797	0.821	0.807	0.837
	(0.388)	(0.398)	(0.376)	(0.407)	(0.413)	(0.402)	(0.383)	(0.395)	(0.369)
Difference in Education Requirement (new minus old occupation)	-0.0405	-0.0540	-0.0261	-0.116	-0.0998	-0.132	-0.0226	-0.0439	0.000753
	(1.353)	(1.377)	(1.326)	(1.701)	(1.775)	(1.628)	(1.256)	(1.272)	(1.237)
Education Mismatch (Years)	0.131	0.142	0.119	1.829	1.820	1.838	-0.255	-0.215	-0.299
	(1.895)	(1.864)	(1.929)	(1.754)	(1.749)	(1.759)	(1.705)	(1.684)	(1.726)
Years of Education	12.99	12.97	13.01	16.34	16.33	16.35	12.22	12.25	12.19
	(2.126)	(2.080)	(2.175)	(0.582)	(0.580)	(0.583)	(1.522)	(1.498)	(1.548)
Unemployment Rate	7.961	7.363	8.606	7.983	7.388	8.557	7.956	7.357	8.617
	(2.184)	(2.197)	(1.977)	(2.095)	(2.117)	(1.906)	(2.204)	(2.214)	(1.994)
Age	36.83	37.07	36.57	41.69	41.95	41.44	35.72	36.03	35.38
	(14.48)	(14.37)	(14.59)	(13.89)	(13.59)	(14.18)	(14.38)	(14.32)	(14.44)
White	0.809	0.787	0.832	0.817	0.801	0.832	0.807	0.784	0.832
	(0.393)	(0.409)	(0.374)	(0.387)	(0.400)	(0.374)	(0.395)	(0.411)	(0.374)
Black	0.119	0.132	0.105	0.0959	0.110	0.0819	0.124	0.137	0.110
	(0.324)	(0.338)	(0.306)	(0.295)	(0.314)	(0.274)	(0.330)	(0.343)	(0.313)
Asian	0.0300	0.0294	0.0306	0.0661	0.0656	0.0666	0.0217	0.0217	0.0218
	(0.171)	(0.169)	(0.172)	(0.249)	(0.248)	(0.249)	(0.146)	(0.146)	(0.146)
American Indian	0.0154	0.0186	0.0119	0.00475	0.00621	0.00333	0.0178	0.0212	0.0140
	(0.123)	(0.135)	(0.108)	(0.0687)	(0.0786)	(0.0576)	(0.132)	(0.144)	(0.118)
Male	0.583	0.587	0.578	0.473	0.503	0.444	0.608	0.605	0.611
	(0.493)	(0.492)	(0.494)	(0.499)	(0.500)	(0.497)	(0.488)	(0.489)	(0.488)
Married	0.406	0.403	0.409	0.535	0.524	0.545	0.376	0.377	0.375
	(0.491)	(0.491)	(0.492)	(0.499)	(0.500)	(0.498)	(0.484)	(0.485)	(0.484)
Observations	15872	8232	7640	2950	1449	1501	12922	6783	6139

Mean coefficients; sd in parentheses

Table 2 - Descriptive statistics for Longitudinal Data

				College Workers			Non-College Workers		
	All States	Sample of Below Median Available Benefits	Sample of Above Median Available Benefits	All States	Sample of Below Median Available Benefits	Sample of Above Median Available Benefits	All States	Sample of Below Median Available Benefits	Sample of Above Median Available Benefits
Wages in Month 8 (log)	1.625	1.592	1.673	1.964	1.919	2.030	1.543	1.515	1.584
	(1.323)	(1.323)	(1.322)	(1.506)	(1.517)	(1.486)	(1.262)	(1.261)	(1.263)
Wages in Mont 4 (log)	1.877	1.840	1.932	2.097	2.042	2.175	1.824	1.792	1.872
	(1.206)	(1.206)	(1.204)	(1.421)	(1.428)	(1.408)	(1.142)	(1.142)	(1.140)
Employment Stability	0.539	0.531	0.552	0.632	0.623	0.646	0.517	0.509	0.529
	(0.498)	(0.499)	(0.497)	(0.482)	(0.485)	(0.478)	(0.500)	(0.500)	(0.499)
Age	38.83	39.07	38.47	44.16	44.55	43.60	37.55	37.78	37.20
	(15.08)	(15.09)	(15.08)	(13.48)	(13.35)	(13.65)	(15.17)	(15.18)	(15.14)
White	0.825	0.814	0.842	0.844	0.839	0.850	0.821	0.808	0.840
	(0.380)	(0.389)	(0.365)	(0.363)	(0.368)	(0.357)	(0.384)	(0.394)	(0.366)
Male	0.573	0.582	0.559	0.469	0.498	0.429	0.598	0.602	0.592
	(0.495)	(0.493)	(0.497)	(0.499)	(0.500)	(0.495)	(0.490)	(0.490)	(0.492)
Married	0.455	0.448	0.464	0.592	0.588	0.598	0.422	0.416	0.431
	(0.498)	(0.497)	(0.499)	(0.492)	(0.492)	(0.491)	(0.494)	(0.493)	(0.495)
Unemployment rate	8.013	7.441	8.703	8.066	7.562	8.661	8.000	7.412	8.713
	(2.176)	(2.166)	(1.978)	(2.100)	(2.123)	(1.908)	(2.193)	(2.175)	(1.995)
Observations	15729	9441	6288	3048	1800	1248	12681	7641	5040

Mean coefficients; sd in parentheses

Table 3- New job has higher skill requirement in terms of years of education as dependent variable- Max Available benefits as Explanatory Variable

					College Workers		Non-College Workers	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Regional Trends	Two-Way Fixed Effects		Two-Way Fixed Effects		Two-Way Fixed Effects
Available Benefits	0.00235***	0.00235***	0.00242***	0.00243***	0.00204	0.00342*	0.00237***	0.00236***
	(0.000517)	(0.000547)	(0.000550)	(0.000518)	(0.00136)	(0.00181)	(0.000543)	(0.000585)
Unem Rate(UR)	0.244	0.244	0.175	0.309	0.625	3.392	0.235	0.494
	(0.223)	(0.195)	(0.213)	(0.684)	(0.499)	(2.532)	(0.200)	(0.705)
UR-square	-0.0320	-0.0320*	-0.0240	-0.0307	-0.0229	-0.451*	-0.0399**	-0.0485
	(0.0227)	(0.0183)	(0.0196)	(0.0570)	(0.0470)	(0.268)	(0.0178)	(0.0667)
UR-cube	0.00137	0.00137**	0.00109	0.00134	0.00110	0.0201**	0.00164**	0.00157
	(0.000858)	(0.000656)	(0.000710)	(0.00185)	(0.00181)	(0.00885)	(0.000641)	(0.00230)
UR-lag1	0.0435	0.0435	0.0456	0.00451	-1.459**	-1.672	0.270	0.335
	(0.214)	(0.201)	(0.205)	(0.326)	(0.662)	(1.210)	(0.219)	(0.317)
UR-lag2	-0.117	-0.117	-0.132	-0.220	0.838**	1.211	-0.252*	-0.433**
	(0.119)	(0.132)	(0.131)	(0.216)	(0.379)	(0.829)	(0.135)	(0.198)
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	13584	13584	13584	13584	2567	2567	11017	11017

Notes: The table reports results from a Linear Probability Model. All specifications include the following further controls: Dummies for Race, Education, marital status, gender and a square polynomial in age.
* p<0.10,** p<0.05, ***p<0.01

Table 4- Wages Upon Exit from U - Available Benefits as Explanatory Variable

					College Workers		Non-College Workers	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Regional Trends	Two-Way Fixed Effects		Two-Way Fixed Effects		Two-Way Fixed Effects
Available Benefits	0.00392***	0.00392***	0.00398***	0.00471***	0.00226*	0.00163	0.00423***	0.00500***
	(0.000506)	(0.000506)	(0.000507)	(0.000538)	(0.00133)	(0.00184)	(0.000564)	(0.000633)
Unem Rate(UR)	0.204	0.204	0.163	-0.0841	-0.0258	-2.528	0.182	0.304
	(0.199)	(0.199)	(0.199)	(0.532)	(0.507)	(2.542)	(0.224)	(0.645)
UR-square	-0.0342*	-0.0342*	-0.0316	-0.0229	-0.0637	0.188	-0.0200	-0.0509
	(0.0196)	(0.0196)	(0.0189)	(0.0449)	(0.0542)	(0.231)	(0.0208)	(0.0592)
UR-cube	0.00118	0.00118	0.00109	0.000951	0.00157	-0.00727	0.000782	0.00199
	(0.000734)	(0.000734)	(0.000696)	(0.00145)	(0.00210)	(0.00743)	(0.000782)	(0.00200)
UR-lag1	0.207	0.207	0.205	0.305	0.870*	0.726	0.0644	0.235
	(0.257)	(0.257)	(0.256)	(0.309)	(0.447)	(0.817)	(0.278)	(0.320)
UR-lag2	-0.146	-0.146	-0.131	-0.112	-0.269	0.143	-0.111	-0.120
	(0.132)	(0.132)	(0.132)	(0.189)	(0.214)	(0.722)	(0.147)	(0.194)
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	12961	12961	12961	12961	2528	2528	10433	10433

Notes: The table reports results from a Linear Probability Model. All specifications include the following further controls: Dummies for Race, Education, marital status, gender and a square polynomial in age.
* p<0.10,** p<0.05, ***p<0.01

Table 5- Wages One year later - Available Benefits as Explanatory Variable

					College Workers		Non-College Workers	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Regional Trends	Two-Way Fixed Effects		Two-Way Fixed Effects		Two-Way Fixed Effects
Available Benefits	0.00384***	0.00384***	0.00384***	0.00455***	0.00407***	0.00404	0.00382***	0.00434***
	(0.000502)	(0.000502)	(0.000511)	(0.000513)	(0.00137)	(0.00243)	(0.000582)	(0.000602)
Unem Rate(UR)	-0.208	-0.208	-0.194	-0.343	-1.034	-2.900	-0.0563	-0.0355
	(0.175)	(0.175)	(0.199)	(0.408)	(0.725)	(2.067)	(0.150)	(0.420)
UR-square	-0.00156	-0.00156	-0.00311	-0.0149	0.0308	0.234	-0.00690	-0.0419
	(0.0156)	(0.0156)	(0.0166)	(0.0404)	(0.0573)	(0.189)	(0.0170)	(0.0402)
UR-cube	0.0000345	0.0000345	0.0000989	0.000746	-0.00127	-0.00809	0.000260	0.00186
	(0.000557)	(0.000557)	(0.000591)	(0.00137)	(0.00210)	(0.00655)	(0.000629)	(0.00139)
UR-lag1	0.397*	0.397*	0.395	0.565**	1.383**	0.903	0.214	0.371
	(0.237)	(0.237)	(0.237)	(0.251)	(0.531)	(0.906)	(0.229)	(0.246)
UR-lag2	-0.219	-0.219	-0.220	-0.281*	-0.628**	-0.0659	-0.147	-0.175
	(0.136)	(0.136)	(0.133)	(0.161)	(0.292)	(0.644)	(0.129)	(0.166)
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	12961	12961	12961	12961	2528	2528	10433	10433

Notes: The table reports results from a Linear Probability Model. All specifications include the following further controls: Dummies for Race, Education, marital status, gender and a square polynomial in age.
* p<0.10,** p<0.05, ***p<0.01

Table 6- Employment Stability - Available Benefits as Explanatory Variable

					College Workers		Non-College Workers	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Regional Trends	Two-Way Fixed Effects		Two-Way Fixed Effects		Two-Way Fixed Effects
Available Benefits	0.000920***	0.000920***	0.000912***	0.00108***	0.00131***	0.00148**	0.000814***	0.000909***
	(0.000230)	(0.000230)	(0.000231)	(0.000219)	(0.000341)	(0.000715)	(0.000260)	(0.000256)
Unem Rate(UR)	-0.0766	-0.0766	-0.0925	-0.0572	-0.311	0.308	-0.0287	-0.0382
	(0.0627)	(0.0627)	(0.0715)	(0.173)	(0.197)	(0.693)	(0.0698)	(0.172)
UR-square	-0.00356	-0.00356	-0.00210	-0.00983	0.0253	-0.0343	-0.00865	-0.00791
	(0.00759)	(0.00759)	(0.00823)	(0.0173)	(0.0215)	(0.0608)	(0.00753)	(0.0184)
UR-cube	0.000165	0.000165	0.000121	0.000586	-0.00113	0.00121	0.000387	0.000486
	(0.000272)	(0.000272)	(0.000293)	(0.000591)	(0.000810)	(0.00174)	(0.000265)	(0.000616)
UR-lag1	0.138	0.138	0.138	0.115	0.200	0.0367	0.119	0.0297
	(0.0839)	(0.0839)	(0.0848)	(0.106)	(0.219)	(0.285)	(0.0944)	(0.117)
UR-lag2	-0.0466	-0.0466	-0.0496	-0.0619	-0.0750	0.0721	-0.0375	-0.00701
	(0.0467)	(0.0467)	(0.0461)	(0.0599)	(0.130)	(0.297)	(0.0528)	(0.0644)
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	12961	12961	12961	12961	2528	2528	10433	10433

Notes: The table reports results from a Linear Probability Model. All specifications include the following further controls: Dummies for Race, Education, marital status, gender and a square polynomial in age.
* p<0.10,** p<0.05, ***p<0.01

Table 7- Mismatch in terms of Years of Education - Max Available benefits as Explanatory Variable

					College Workers		Non-College Workers	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Regional Trends	Two-Way Fixed Effects		Two-Way Fixed Effects		Two-Way Fixed Effects
Available Benefits	-0.000430	-0.000430	-0.000403	-0.000714	-0.00248**	-0.00448**	0.00000221	0.000177
	(0.000467)	(0.000510)	(0.000490)	(0.000569)	(0.000938)	(0.00198)	(0.000547)	(0.000560)
Unem Rate(UR)	-0.113	-0.113	-0.138	-1.010*	0.0653	-1.239	-0.156	-0.897
	(0.203)	(0.159)	(0.190)	(0.528)	(0.691)	(2.520)	(0.129)	(0.680)
UR-square	0.0200	0.0200	0.0221	0.109*	0.0442	0.246	0.0203	0.0928
	(0.0206)	(0.0156)	(0.0176)	(0.0596)	(0.0687)	(0.236)	(0.0142)	(0.0741)
UR-cube	-0.000934	-0.000934	-0.00101	-0.00406*	-0.00255	-0.0110	-0.000804	-0.00348
	(0.000777)	(0.000581)	(0.000650)	(0.00214)	(0.00248)	(0.00812)	(0.000552)	(0.00263)
UR-lag1	-0.191	-0.191	-0.185	-0.349	-0.338	-0.360	-0.206	-0.406
	(0.198)	(0.170)	(0.168)	(0.257)	(0.705)	(0.880)	(0.221)	(0.289)
UR-lag2	0.213*	0.213**	0.208**	0.424***	0.303	0.104	0.205*	0.452***
	(0.110)	(0.0902)	(0.0909)	(0.141)	(0.345)	(0.481)	(0.114)	(0.149)
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Standard Errors	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	14806	14806	14806	14806	2710	2710	12096	12096

Notes: The table reports results from a Linear Probability Model. All specifications include the following further controls: Dummies for Race, Education, marital status, gender and a square polynomial in age.
* p<0.10,** p<0.05, ***p<0.01

Figures

Figure 1.A: One Tiered EUC Program, July 2008 - March 2009

Regular UI	EUC Tier 1
Up To 26 Weeks	Up To 13 Weeks, Up to 20 Weeks from Novermber 2008

Figure 1.B: Two Tiered EUC Program, March 2009 - December 2009

Regular UI	EUC Tier 1	EUC Tier 2
Up To 26 Weeks	Up To 20 Weeks	Up To 13 Weeks

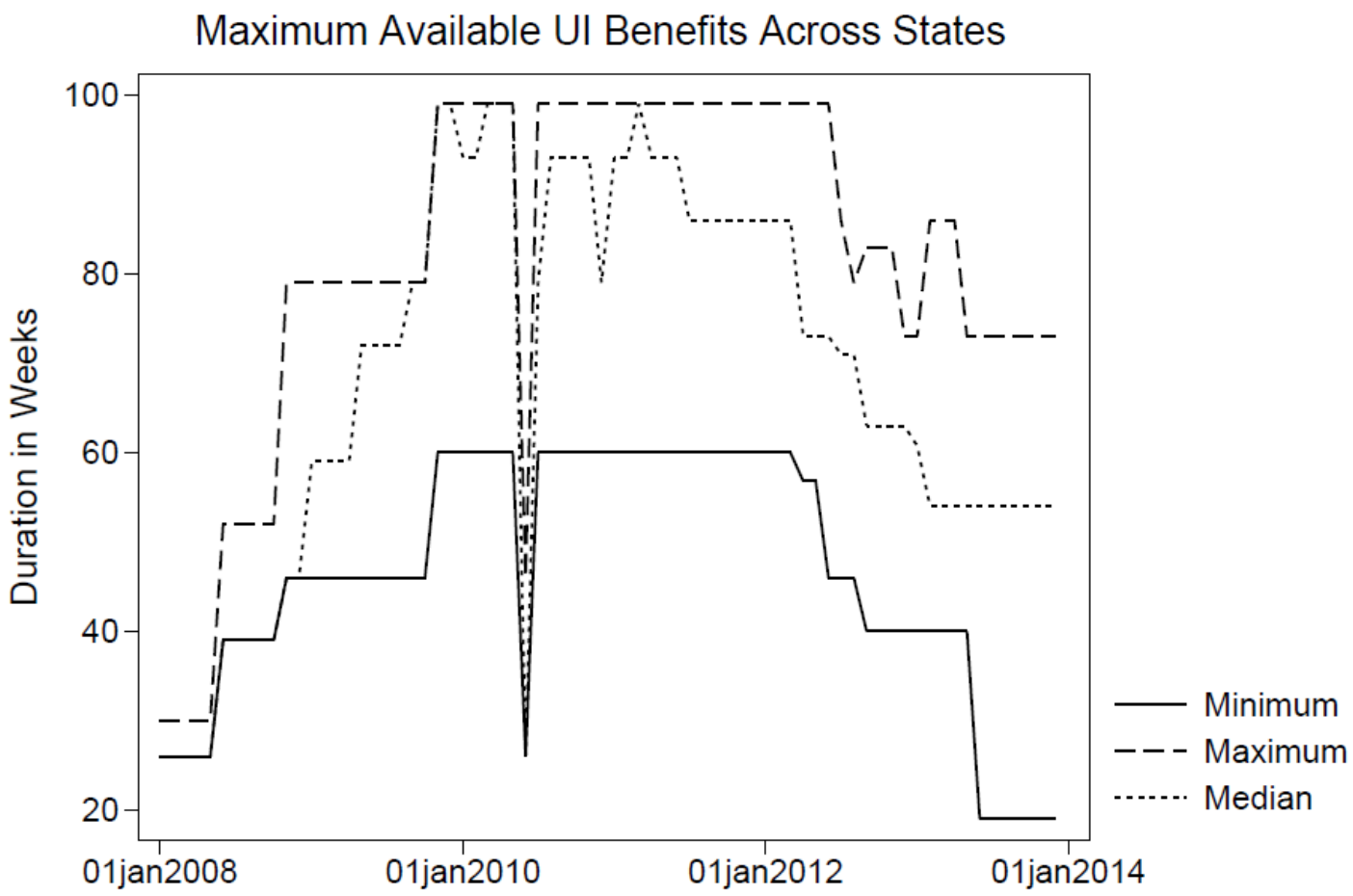
Figure 1.C: Four Tiered EUC Program, December 2009 – May 2012

Regular UI	EUC Tier 1	EUC Tier 2	EUC Tier 3	EUC Tier 4
Up To 26 Weeks	Up To 20 Weeks	Up To 14 Weeks	Up To 13 Weeks	Up To 6 Weeks

Figure 1.D: Four Tiered EUC Program, May 2012 – September 2012

Regular UI	EUC Tier 1	EUC Tier 2	EUC Tier 3	EUC Tier 4
Up To 26 Weeks	Up To 14 Weeks	Up To 14 Weeks	Up To 9 Weeks	Up To 10 Weeks

Figure 2


Maximum Available UI Benefits Across States
Duration in Weeks
100
80
60
40
20
01jan2008
01jan2010
01jan2012
01jan2014
Minimum
Maximum
Median