Unemployment Insurance in the Great Recession: Moral Hazard and Consumption Smoothing

by

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(Under the Direction of Ronald S. Warren, Jr.)

Abstract

Many empirical studies of the effect of unemployment insurance on unemployment duration and job match quality use data from before 2000. These data exclude the recessions that occurred after the millennium change, in 2001-2002 and the Great Recession in 2007-2009. Given the persistent mass unemployment that characterized this decade, it is inappropriate to project these earlier results onto the current labor market. This thesis analyzes recent panels of the Survey of Income and Program Participation, ranging from 2001-2012, to measure the disincentive effects of unemployment insurance on job search. I find evidence of consumption smoothing by individuals in the poorest quintiles of the sample, while those in the richest quintiles exhibit waiting behavior.

Index words: Unemployment Insurance, Moral Hazard, Consumption Smoothing

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Table of Contents

List of Figures

List of Tables

Chapter 1

Introduction and Literature Review

As with most markets for insurance, moral hazard is a problem for the unemployment insurance (UI) market. Search theory predicts that UI benefits decrease labor supply. This is a classic result from public finance that is traditionally interpreted as moral hazard[1]. By replacing earned income, UI benefits distort the relative prices of consumption and leisure. Since people prefer leisure and are work-averse, receipt of UI benefits diminishes the incentive for job search by elevating workers' reservation wages, an effect that Gruber (1994) describes as a subsidy to leisure. The theoretical consequences of UI eligibility extensions are longer durations of unemployment and higher rates of unemployment. Many conservative politicians appeal to moral hazard in their arguments to reduce unemployment insurance benefits or to avoid extending them. This argument is endorsed by many mainstream economists, including Barro (2010). The moral hazard argument focuses on the "value of unemployment" (Howell and Azizoglu, 2011), although in practice these disincentive effects are attenuated, since UI recipients lose benefits when they turn down reasonable employment opportunities. Still, unemployment insurance decreases the amount of time unemployed workers search each week and increases the duration of unemployment spells on average (Krueger and Mueller, 2011, 2008).

While one effect of UI may be increased duration of unemployment, this effect is due not only to moral hazard but also a second channel, which may improve social welfare by mitigating the psychological effects and future employment costs of long term unemployment (Howell and Azizoglu, 2011). It is a widely accepted theoretical result and empirical finding that agents prefer to maintain a constant level of consumption and, therefore, plan intertemporal consumption around their expected lifetime earnings, contingent upon the information available to them[2]. As a consequence, they do not change consumption in response to exogenous shocks to income. This effect is called consumption smoothing. When future income is uncertain due to risk in future employment status, for instance, risk-averse individuals exhibit precautionary saving when economic conditions are favorable in order to achieve the same level of consumption in less favorable economic conditions through dissaving. In a standard model of precautionary savings, individuals with a higher risk of adverse employment status spend less in the current period in order to save as a precaution against that adverse outcome in a future period.

[1]See Moffitt and Nicholson (1982), Moffitt (1985), Katz and Meyer (1990), and Card and Levine (2000).
[2]For an extensive history of the study of precautionary, savings see Browning and Lusardi (1995).

There is an extensive literature, both theoretical and empirical [3], on consumption smoothing and precautionary savings which suggests that a majority of the savings in the United States is a buffer against adverse income shocks (Carroll, 1996). Mody et al. (2012) find that the onset of the Great Recession increased precautionary savings, reducing consumption and GDP growth in several countries. Gruber (1999) finds that those who receive more generous UI benefits draw down their savings more slowly than those who receive less generous benefits. This finding is evidence that households use savings along with UI benefits to smooth consumption over transitory income shocks. Another key result from Gruber (1999) is that less than a third of his sample, drawn from the 1984-1992 waves of the SIPP, is able to replace even 10% of the income lost in an unemployment spell with their ex-ante savings. These households use UI benefits to mitigate shortfalls in their precautionary savings; UI benefits effectively slacken a liquidity constraint for households and individuals who are unable to smooth consumption. According to Chetty (2008), as many as half of those who lost jobs in the United States reported no liquid wealth at the time of job loss. UI increases cash on hand, allowing the claimant to enjoy more consumption and reduce the urgency of finding a job (Card et al., 2007). Having cash on hand is important because many households face financial commitments that they cannot alter in the short-run, i.e. mortgages, student loans, utilities, and child care. Without UI, these households would be required to reduce, or in some cases entirely forgo, their consumption of goods most consider essential, like food and medicine.

UI could also afford the claimant both the appropriate amount of time to spend on the search required to obtain a good job match and possibly the ability to hire childcare or employ an agent, talent scout, or headhunter. Furthermore, the extension of UI could induce the accumulation of additional human capital in the form of more education or job-skill retraining. Finally, because it is more costly to search farther from home, UI benefits could allow for the widening of search boundaries. Akerlof et al. (1990) models an economy that features a "lock-in effect," where agents who maximize their net present lifetime utility face a fixed cost of accepting a new job, namely the opportunity cost of finding a better job in the future. Those individuals will, therefore, wait to be locked into a "good" job when one becomes available rather than immediately accepting a "dead end" job in which the individual will never realize a competitive wage when the business cycle improves and new entrants enjoy rising wages. The consequences of these intertemporal decisions are that optimizing workers may voluntarily remain unemployed during a recession until the macroeconomy recovers and good jobs are again.

One of the first papers to try to measure the net social benefits of UI was Hansen and Imrohoroglu (1992), who simulate a dynamic general equilibrium model of an economy with unemployment insurance. Assuming

[3] Important theoretical advancements include Caballero (1991); Zeldes (1989); Deaton (1991); Carroll (1996). Related empirical studies include Mody et al. (2012); Carroll and Samwick (1998); Engen and Gruber (1995).

no moral hazard, the consumption smoothing benefits of UI are very high. They introduce moral hazard by allowing agents to reject a job offer to collect UI benefits. Assuming various levels of risk aversion and moral hazard, they show that it is possible for the moral hazard costs to offset completely the social benefits of UI.

Gruber (1994) also focuses on measuring the social benefits of UI using reduced-form estimation of the relationship between food consumption changes during periods of unemployment and the level of UI generosity. He finds strong evidence of consumption smoothing benefits from UI and concludes that people would consume about 15% less food without UI benefits.

After estimating the relative importance of liquidity benefits and moral hazard costs from unemployment insurance benefits, Chetty (2008) uses the a method of sufficient statistics to estimate the social benefit and optimal levels of income replacement for unemployment insurance. This method is very different from structurally estimating the model's primitives, such as the curvature of the utility function and level of moral hazard, and numerically simulating the policy changes. Instead, Chetty identifies a pair of reduced-form elasticities which are sufficient statistics for the welfare analysis he proposes to conduct. The advantage of this approach is that these elasticities are less model dependent, so conclusions drawn from the empirical analysis are likely to be more robust to alternative structural assumptions.

The literature focuses on the 1980's and 1990's, when the U.S. economy and labor market were relatively strong. Because the economic climate surrounding the Great Recession was drastically different than in preceding decades, it is not appropriate to extrapolate from empirical results using data from this earlier period. Specifically, during the Great Recession the U.S. faced mass persistent unemployment at levels not experienced since the recession of the early 1980's, eventually peaking at 10.2% in 2009. Over six million people collected UI benefits, and some qualified for an unprecedented 99 weeks of benefit receipt. I measure the role of liquidity effects on job search intensity in light of the mass unemployment and extended UI benefits that characterized the labor market in the first decade of the new millennium. To perform this analysis, I use information provided by the Department of Labor to update the UI calculator used by Chetty (2008), extending it through 2001-2012. The analysis uses data from the 2001, 2004, and 2008 panels of the SIPP and exploits the variation in UI policies across states. I first perform a graphical analysis and then estimate Cox Hazard models of unemployment duration. The social benefits of UI are predicted to be greater during the Great Recession than during normal economic times, especially since many asset portfolios were decimated and unemployment spells were extraordinarily long. These long spells of unemployment further depleted personal savings and made liquidity constraints binding. The disincentive effects on job search of UI are predicted to be smaller when the labor market is weak. Workers are more likely to accept a job if it is offered to them, since they know they are unlikely to find many better alternatives.

Chapter 2

Theory

2.1 The Job Search Model

The model is borrowed from Chetty (2008). Consider a discrete-time framework where agents live for T periods $\{0, \cdots, T-1\}$[1]. In period 0, the agent becomes unemployed and searches with intensity s_t, which is normalized to the probability of receiving a job offer in the current period. The cost of searching is characterized by a strictly increasing and convex function $\psi(s_t)$. A search is successful if the agent receives a job offer, in which case he will begin working in period t to earn a fixed pre-tax wage w_t and continues working until T.[2] The working agent is taxed at τ to finance the unemployment insurance and will consume c_t^e, which yields utility $v(c_t)$[3]. The assets belonging to an agent prior to job loss are A_0 and are given exogenously.

If the search is unsuccessful and the agent does not receive a job offer, he remains unemployed and receives the unemployment insurance benefit $b_t < w_t$. The unemployed agent consumes c_t^u, which gives him utility $u(c_t)$, and his search will start again in period $t+1$.

The value function for an agent whose search was successful in period t conditional on beginning the period with assets A_t is

$$V_t(A_t) = \max_{A_{t+1} \geq L} v(A_t - A_{t+1} + w_t - \tau) + V_{t+1}(A_{t+1}) \tag{2.1}$$

where L is the lower bound on assets.

The value function for an agent who remains unemployed is

$$U_t(A_t) = \max_{A_{t+1} \geq L} u(A_t - A_{t+1} + b_t) + J_{t+1}(A_{t+1}) \tag{2.2}$$

where

$$J_t(A_t) = \max_{s_t} s_t V_t(A_t) + (1 - s_t) U_t(A_t) - \psi(s_t) \tag{2.3}$$

[1]For simplicity, the agents' time discount rate and the interest rate are assumed to be zero.
[2]A fixed wage eliminates reservation wage choices.
[3]Assume that u and v are strictly concave utility functions.

is the value of entering period t without a job but with assets A_t. Both V_t and U_t are concave. The unemployed agent chooses s_t to maximize expected utility in t. The optimality condition

$$\psi'(s_t) = V_t(A_t) - U_t(A_t) \tag{2.4}$$

describes how the agent equates the marginal cost and marginal benefit of search effort, characterized by the difference between the optimized values of employment and unemployment.

2.2 Decomposition of UI effects

To conceptualize the two distinct channels through which UI affects search behavior, consider the *ceteris paribus* effect on search intensity in period t of a one dollar change in benefits

$$\frac{\partial s_t}{\partial b_t} = -\frac{u'(c_t^u)}{\psi''(s_t)}. \tag{2.5}$$

Also consider the *ceteris paribus* effects of increases in assets and wages on the search intensity in period t

$$\frac{\partial s_t}{\partial A_t} = \frac{v'(c_t^e) - u'(c_t^u)}{\psi''(s_t)} \leq 0 \tag{2.6}$$

$$\frac{\partial s_t}{\partial w_t} = \frac{v'(c_t^e)}{\psi''(s_t)} > 0. \tag{2.7}$$

The effect of an increase in assets reflects the difference between marginal utilities of consumption when employed and unemployed, because an increase of cash on hand lowers the marginal benefit of searching by raising the value of being unemployed relative to the value of being employed.

The effect of an increase in wages increases the marginal benefit of searching by raising the value of being employed. Combining these effects yields Chetty's search-model analog to the Slutsky decomposition:

$$\frac{\partial s_t}{\partial b_t} = \frac{\partial s_t}{\partial A_t} - \frac{\partial s_t}{\partial w_t}. \tag{2.8}$$

The first term on the right-hand side is the liquidity effect, and the second term is the moral hazard (disincentive) effect. The higher UI benefit lowers the agent's net wage ($w_t - \tau - b_t$), thereby reducing the incentive to search. I will estimate the effects of UI benefits on unemployment durations for liquidity constrained and unconstrained individuals, and interpret the results in both a consumption smoothing and a moral hazard framework. For example, if the effects are much larger in the constrained group, then the liquidity effect most likely dominates the moral hazard effect. I also estimate the UI benefit-unemployment-duration elasticity for the constrained and unconstrained groups using variation in the state and year unemployment benefit levels.

Chapter 3

Data

The data are from the Survey of Income Program Participation (SIPP) panels over the period 2001 to 2012. I acquired the data files and extraction files from the NBER. SIPP, which is administered by the U.S. Census Bureau, uses a four-month recall period for each wave of panels that last between two-and-a-half and four years. Besides having a relatively large sample size, the advantage of using SIPP, rather than more popular data sets such as the Current Population Survey (CPS) or Panel Study of Income Dynamics (PSID), is that SIPP collects data specifically to measure the effectiveness of government programs, including unemployment insurance. These data include labor force status, program participation, income data, tax data, asset holdings, including mortgages and saving behavior, and other costs associated with living, i.e. child-care and food costs. It is imperative to have asset data to determine whether individuals are liquidity constrained or are able to smooth consumption.

While SIPP is a rich dataset, it does not include information on the actual weekly unemployment benefits received by a respondent. For this reason, I use an updated UI calculator to simulate the weekly benefit and duration for which each individual is eligible, based on information from the work history of that individual. I use information on work history to calculate the duration of unemployment, equal to the weeks elapsed from the termination of the former job until the start of the next job[1]. Information about each state's policies for UI qualification and UI benefit calculation comes from the Department of Labor Employment and Training Administration.[2] I use this information to update the UI calculator used by Gruber (1994) and Chetty (2008).

I restrict the data to include only prime-age males (18-65) who report searching for a job, who are not temporarily unemployed, and who have at least a three month work history in the survey. The first restriction is not uncommon in the literature, and I make the final restriction so that I can simulate the receipt of unemployment benefits for an individual based on his work history. Table 1 contains the summary statistics for the sample. All monetary values are in real 2005 dollars. The average recipient of UI benefits is a 41 year old high school graduate making an annual salary of $35,606. Individuals from the income quintiles below the median are younger and less educated. They are also less likely to be married or have a working

[1] I censor durations at 50 weeks to focus on the first year of search behavior and avoid outliers.
[2] http://workforcesecurity.doleta.gov/unemploy/statelaws.asp

spouse. Although their weekly UI benefits are less, their replacement rates are slightly higher. Individuals in these lower quintiles have much less liquid wealth and home equity and are more likely to be renting their homes.

It is interesting to compare my sample with the sample from Chetty (2008), which is constructed from SIPP panels spanning 1985-2000. The individuals in my sample are older, more likely to have a working spouse, and have much longer spells of unemployment despite having much more liquid wealth and home equity. While agents in Chetty's sample would struggle to smooth consumption with a median liquid wealth, net of debt, of just $128, my sample has a much larger value of $6,727 of net liquidity with which they could smooth consumption. Comparing across quintiles in my sample, most of this wealth comes from the fourth and fifth quintiles; the median agent in the first quintile is encumbered with $12,027 of debt beyond his liquid assets, and the median agent in the second quintile has $0 liquid wealth net of debt. This will be an important consideration in the analysis that follows.

Table 1: Summary Statistics by Net Liquid Wealth

		Quintile of Net Liquid Wealth				
	Pooled	1	2	3	4	5
Observations:	2684	378	341	346	375	323
		(<$-2,150)	($-2,135-$124)	($128-$16,700)	($16,745-$94,136)	($94,373-$3,393,825)
PRIOR TO OR AT JOB LOSS:						
Mean Annual Wage	$35,606	$31,601	$22,779	$32,227	$43,892	$56,013
Median Annual Wage	$28,256	$27,955	$19,946	$27,932	$37,163	$42,929
Age	41.4	37.5	38.7	40	42	45.3
Years of Education	12.7	12.4	11.5	12.2	13.3	14.1
Percent Married	61%	60%	50%	52%	66%	70%
Percent with Working Spouse	40%	37%	25%	33%	48%	49%
POST JOB LOSS:						
Weekly UI Benefits	$213	$202	$181	$204	$246	$260
Replacement Rate	51%	51%	53%	52%	51%	48%
Mean Unemployment Duration (weeks)	25	21	23	23	21	25
Median Unemployment Duration (weeks)	21	18	21	17.5	16	19
ASSETS AND LIABILITIES:						
Mean Liquid Wealth	$77,829	$4,769	$994	$8,723	$51,973	$353,797
Median Liquid Wealth	$8,681	$1,000	$0	$6,565	$47,228	$217,883
Mean Unsecured Debt	$9,537	$24,494	$1,397	$3,027	$6,456	$11,555
Median Unsecured Debt	$1,954	$13,027	$0	$393	$1,932	$1,303
Mean Home Equity	$61,885	$32,162	$16,811	$30,991	$89,148	$139,896
Median Home Equity	$18,201	$10,856	$0	$1,525	$47,756	$101,471
Percent Paying Mortgage	53%	53%	29%	44%	70%	69%
Percent Renting	33%	39%	59%	44%	20%	11%

Notes: Values are means unless otherwise denoted. Monetary values are in real 2005 dollars. Pooled sample includes 2684 prime-age males who report searching for a job, are not temporarily laid off, take up UI benefits within a month of layoff, and have at least a three-month work history in the dataset. The sample is reduced by 1279 when conditioning on net liquid wealth. Replacement rate is defined as the weekly UI benefit divided by weekly earnings. Unemployment duration is defined as the number of weeks elapsed from the end of the last job to the start of a new job. Liquid wealth is defined as total wealth minus home, business, and vehicle equity. Net liquid wealth is liquid wealth minus unsecured debt.

Chapter 4

Estimation

4.1 Estimation Strategy

My strategy is to estimate the effect of UI benefits on unemployment spell duration for both liquidity constrained and unconstrained households. Because I do not have data on consumption for households while they are employed or unemployed, I cannot observe how they smooth consumption. Browning and Crossley (2001), Bloemen and Stancanelli (2005), and Sullivan (2008) demonstrate that households with few assets at the time of unemployment suffer drops in consumption that are mitigated by UI benefits, while households with more assets have little sensitivity in consumption in response to UI benefits. Based on these results, I use as a proxy for the ability of the household to smooth consumption the extent to which it is liquidity constrained, by observing their asset holdings. Based on liquid assets net of unsecured debt, I split the sample into quintiles. Then, I exploit the variation in benefit levels across states to estimate the effects of UI benefits on unemployment spell duration for each group separately. Table 1 presents summary statistics for the pooled sample and for each of the five quintiles. As secondary proxies for constrained households, I use spousal work status and obligation to make a mortgage payment. Single-earner households have larger drops in consumption, and should therefore be more constrained (Browning and Crossley, 2001). Most homeowners will not sell their homes during an unemployment spell, though renters are likely to move as a result of a job loss. Consequently, individuals with a mortgage are more constrained than renters and less able to smooth their consumption (Gruber, 1999).

In order to analyze the duration of unemployment spells, I employ a nonparametric duration model. Nonparametric duration models are advantageous in that, unlike their parametric counterparts, they do not impose a prior structure on the data. I employ Kaplan-Meier hazard functions in my graphical analysis and follow Greene (2008) for my description. Assume observations of durations are sorted in ascending order such that $t_1 \leq t_2$ and so forth, and assume further that no observation is censored. Let there be K distinct survival times, denoted T_k. The risk set at time T_k are n_k individuals whose observed durations are no less than T_k. I denote the number of observed spells completed at time T_k as h_k. The estimator of the survivor function is

$$\hat{S}(T_k) = \prod_{i=1}^{k} \frac{n_i - h_i}{n_i}$$

and the estimator of the hazard rate is

$$\hat{\lambda}(T_k) = \frac{h_k}{n_k}.$$

Next, I employ Cox proportional hazard models. This is a semi-parametric method for analyzing the effects of covariates on the hazard rate. The proportionality of the model implies a multiplicative relationship between covariates and the hazard

$$\lambda(t_i) = e^{(\mathbf{x}_i'\boldsymbol{\beta})\lambda_0(t_i)}$$

where λ_0 is the baseline hazard, which represents how the hazard changes over time given the baseline level of the covariates. Cox's partial likelihood estimator is a method for estimating $\boldsymbol{\beta}$ without estimating the baseline hazard. At any time T_k the risk set R_k is comprised of all individuals whose exit time is at least T_k, or all of the individuals who are still in the sample at time T_k. The probability that exactly one individual in the risk set exits at time T_k is

$$Prob[t_i = T_k | R_k] = \frac{e^{\mathbf{x}_i'\boldsymbol{\beta}}}{\sum_{j \in R_k} e^{\boldsymbol{x}_j'\boldsymbol{\beta}}}.$$

The baseline hazard is, therefore, eliminated by conditioning. The parameter estimates are obtained by maximizing the partial likelihood, given in logs by

$$ln\, L(\beta) = \sum_{k=1}^{K} [\boldsymbol{x_i'\beta} - ln \sum_{j \in R_k} e^{\mathbf{x}_j'\boldsymbol{\beta}}].$$

4.2 Graphical Analysis

First, I consider graphical evidence on the effect of unemployment insurance benefits on unemployment spell durations. Following Chetty (2008), I plot the Kaplan-Meier survival curves of two groups of UI claimants, those in state/year pairs with average weekly benefits above the sample median and those with average weekly benefits below the sample median. These curves represent the probability of an individual in the sample remaining unemployed after t weeks. The resulting charts show the extent to which higher UI benefits lead to different job-finding rates for households within the various net liquid asset quintiles. The difference between the survival curves in a given quintile can be attributed to the differences in UI benefits. To be sure that the different benefit-duration elasticities observed across quintiles are not a result of the levels of income and UI benefits alone, I check if the replacement rate, the percent of income replaced by benefits, is similar across the quintiles. The replacement rates observed are all approximately 50% and are consistent with the literature.

4.3 Cox Hazard Models

Next, I estimate the Cox proportional hazard model

$$ln\, h_{i,t} = \alpha_t + \beta_1 lnUI_i + \beta_2 t \times lnUI_i + \beta_3 X_{i,t} \tag{4.1}$$

where $h_{i,t}$ is the unemployment exit hazard for person i in week t of a spell of unemployment, α_t is the baseline hazard rate in week t, UI_i is the benefit that person i receives, and $X_{i,t}$ is a vector of control variables including state, year, and pre-unemployment occupation fixed effects, pre-unemployment wage, wealth, age, education, and marital status. I cluster the standard errors by state[1]. β_1 measures the elasticity of the hazard rate with respect to UI benefits at the beginning of the period and is expected to be negative. β_2 captures the time effects of UI benefits on hazard rates. I have no clear prediction about the sign of β_2. This is because the effect of UI benefits could increase over time, since as the number of weeks UI benefits are available decreases people search more intensely, or it could be decreasing, since households that have less cash on hand as a result of a prolonged unemployment spell are increasingly constrained and, consequently, more sensitive to the receipt of UI benefits.

An important consideration for studying any duration model is duration dependence, the extent to which hazards change over time. Duration dependence can take two forms. The first, spurious dependence, arises from unobserved heterogeneity in the data. In the context of unemployment, some individuals in the sample are more likely to find a job, thereby exiting unemployment. As time goes on, those who have a high likelihood of finding a job are removed from the data, and those who are less likely to find work remain. If the characteristics influencing this propensity are not accounted for in the model, estimates of the hazard will fall over time. The method for correcting spurious dependence is exactly the same as the method for correcting omitted variable bias; include the omitted controls to improve the specification.

The second form of duration dependence is referred to as "state dependence" or "true" duration dependence, and arises when the hazard at any point in time depends on the amount of time elapsed. Unlike spurious dependence, state dependence has economically interesting implications. Unemployed persons with long spells of unemployment are less likely to find a job, either because they lack the necessary skills or

[1]The standard errors are robust to clustering by individual.

qualifications and more qualified candidates are offered jobs first (or these credentials become outdated) or because potential employers perceive this to be the case. The longer the unemployment spell, the more intense are these "scarring" effects. Kroft et al. (2012) find that employers are more forgiving of long unemployment spells when the job market is slack, as it was during the Great Recession; when few are able to find a job, the duration of unemployment is not a good proxy for the quality of a worker. While true duration dependence may bias my estimates, the bias is likely dampened by the poor state of the job market.

Chapter 5

Results

5.1 Graphical Results

Figure 1 shows that more generous UI benefits do not have an impact on the job-finding rates of the poorest individuals in the sample. After 15 weeks, 69% of individuals from state/year pairs with higher benefits remain unemployed, compared with 66% of individuals from state/year pairs with less generous benefits. After 20 weeks, 49% of individuals with higher benefits are unemployed, compared with 54% of individuals who receive lower benefits. The curve representing more generous states remains below the curve representing less generous states from 17 weeks on. A Wilcoxon test for equality fails to reject the null hypothesis that the survival curves are identical with $p = 0.89$. Figure 2 shows very small effects of UI benefits on unemployment durations for individuals in the second quintile of net liquid wealth. After 15 weeks, 78% of individuals eligible for higher UI benefits remain unemployed, compared with 74% who are eligible for less generous benefits. After 25 weeks, 52% remain unemployed from more generous states, compared with 47% from less generous states. Figure 3 shows that UI does not have an impact of job-finding rates for persons in the third quintile. After 15 weeks, 68% of individuals from state/year pairs with higher benefits and individuals from less generous state/year pairs remain unemployed. After 35 weeks, 32% of both groups remain unemployed. For the lower quintiles of wealth, there is little graphical evidence for any effect of UI on unemployment spell duration.

The UI benefit effects are most pronounced for the fourth quintile of net liquid wealth, as shown in Figure 4, where after 20 weeks 60% of individuals from state/year pairs with higher UI benefits remain unemployed versus 44% of those from state/year pairs with less generous UI benefits. The effects are still evident in Figure 5, which depicts the quintile with the most liquidity, in which 65% of individuals from state/year pairs with more generous UI benefits remain unemployed after 20 weeks compared with just 58% of those from state/year pairs with low UI benefits. These results are the opposite of those found in previous studies, where the effects of more generous UI benefits on unemployment spell durations are more pronounced among individuals in the lower quintiles of liquid wealth.

For a better indication of whether the effects of UI benefits on spell durations are driven by moral hazard or consumption smoothing, I turn to the analysis of mortgage-holding households. In order to investigate further the importance of constraints on the effects of UI on unemployment spell durations, I conduct an analysis similar to the one above, but this time for those with and without mortgages. Figure 6 shows the survival curves for households constrained by mortgages. There is no noticeable difference in the curves until after 20 weeks, when 61% of those from more generous state/year pairs remain unemployed versus 56% who are eligible for less generous UI benefits. A Wilcoxon test for equality rejects the null hypothesis that the two survival curves are identical, with $p = 0.02$. In contrast, for households that are not paying a mortgage and are, therefore, less constrained, there is no effect of UI benefits on spell duration, as shown in Figure 7. For this group, a Wilcoxon test for equality fails to reject the null hypothesis that the survival curves are identical with $p = 0.78$. UI has little effect on the duration of unemployment for the unconstrained group, which indicates that UI benefits are likely to induce little moral hazard among these households. This result is consistent with the findings of Chetty (2008).

As a final check on the role of constraints in the job-finding of unemployed households, I plot the Kaplan-Meier survival curves for households with a working spouse and households where the spouse does not work. Which households are more constrained is a contentious point in the literature. On one hand, a single-earner may have more flexibility since, upon unemployment, his spouse can also enter the labor force to try to maintain their prior standard of living. On the other hand, households with two incomes should have added intertemporal smoothing capacity (Browning and Crossley, 2001). Figure 8 shows that households with a working spouse are more responsive to UI benefits. After 25 weeks, 55% of households with working spouses from state/year pairs that are, on average, more generous remain unemployed versus just 45% of similar households from less generous state/year pairs. A Wilcoxon test for equality rejects the null hypothesis that the survival curves are identical, with $p = 0.01$. In contrast, Figure 9 shows that single-earnings households are unresponsive to UI benefits. After 15 weeks, 71% of single-earner households from both generous and less generous state/year pairs are unemployed. After 30 weeks, 43% of single-earner households from less generous state/year pairs remain unemployed compared with just 42% of similar households from generous state/year pairs. A Wilcoxon test for equality fails to reject the null hypothesis that the survival curves are identical with $p = 0.73$. Assuming that the dual-income households are less constrained than single-earner households, these results are consistent with the quintile analysis above, where more constrained households are less responsive to UI benefits.

5.2 Cox Hazard Model Estimates

Table 2 presents the results of the Cox Hazard Model estimation. In the first specification, I fit the model specified in equation (4.1) on the full sample in order to estimate the unconditional effect of UI benefits on the hazard rate. The specification relies on the identifying variation of UI benefits across states and includes controls for wealth, age, education, marital status, and fixed effects for time invariant controls including state, year, and pre-unemployment occupation. Creating a dummy variable for each of several hundred occupations makes the model too collinear to fit, so instead I include the 23 major occupation classes utilized in the Standard Occupational Classification System (SOC)[1]. The coefficient reported in the first column of Table 2 indicates a 4.5% reduction in the hazard rate for the pooled sample in response to a 10% increase in UI benefits, and this is statistically significant at the 99% confidence level. This estimate is consistent with the literature, though slightly smaller as predicted.

I then stratify the sample by quintiles of net liquid assets and estimate the model for each quintile in order to observe the heterogeneity across quintiles in the effects of UI benefits on hazard rates. Chetty (2008) observes that the effect of UI benefits declines monotonically with net wealth, and this pattern is observed in each of his specifications. I observe no such pattern. Instead, the estimated coefficients are consistent with the graphical evidence. The largest (negative) effect is observed in the fifth quintile, where a 10% increase in UI benefits results in a 8.9% decrease in the hazard rate, which is statistically significant at the 95% confidence level. The effects are much weaker for the other quintiles, although the coefficients are still negative[2]. The factors driving the differences in the results reported in this study are likely related to the macroeconomic climate in the Great Recession, such as high and persistent unemployment, stagnant growth, and cautious lending behavior from banks. Furthermore, the differing asset and debt positions of my sample relative to Chetty's, as discussed in section 3, may help explain the difference in the results.

The next specification matches the first one precisely, except that the sample is stratified by wealth. It includes full controls and state, year, and occupation fixed effects. Again, UI benefits have the largest effect on hazard rates in the fifth quintile; a 105% decrease in the hazard rate resulting from a 10% increase in UI benefits. The signs of the remaining coefficients are unchanged, although their magnitudes are slightly larger. The next two specifications serve as robustness checks for changes in the definition of b_t. In the first specifications, the average weekly benefit of the individuals' state/year pair proxies for b_t. In the fourth specification, b_t is defined as the maximum weekly benefit in the individual's state/year pair. When maximum weekly benefit proxies for b_t, the coefficients for each quintile except the second change sign, and the coefficient for the third quintile implies a 159% increase in the hazard rate in response to a 10% increase in UI benefits. This result is statistically significant at the 99% level. The magnitude of the coefficient in the fifth quintile is much smaller in this specification than in the other specifications. These different results for this specification could be due to the limited variation in the maximum UI benefit, which is very similar in most states and

[1] http://www.bls.gov/SOC/

[2] Unlike the previous study, neither the null hypothesis that UI benefits have the same effect on hazard rates for the first and fourth quartile nor the null hypothesis that UI benefits have the same effect on hazard rates for below-median wealth and above-median wealth households is rejected, with p-values equal to 0.15 and 0.27 respectively.

years. In the fifth specification, b_t is the individual's simulated weekly benefit amount. Except for the first quintile, the sign of the coefficients in this specification is negative, and the magnitudes more closely reflect the coefficients from the third specification. One notable difference is in the fourth quintile, where a 10% increase in UI benefits is associated with a 17% decrease in the hazard rate, a result that is statistically significant at the 95% confidence level. A second difference is for the second quintile; however, neither of these coefficients is statistically significant.

The final specification includes controls for mortgage-holding and non-mortgage-holding households. The covariates for this model are the same as the covariates in the third specification, except that the variables are interacted with the mortgage indicator rather than the quintile indicators. The estimates reflect a slightly larger effect of UI benefits on hazard rates for households without a mortgage. I also test the robustness of the results by first omitting households in both the bottom-5 and top-5 percentiles of net liquid wealth from the sample and then omitting households from both the bottom-10 and top-10 percentiles of net liquid wealth. I find no substantial changes to the results upon making these changes.

5.3 Calibration: Liquidity Effect vs. Moral Hazard

Using Chetty's (2008) estimate of the elasticity of unemployment duration with respect to an increase in liquid assets, I calibrate the search model to determine the fraction of the effect of UI benefits on unemployment duration attributable to consumption smoothing relative to moral hazard. Because the replacement rate in the current sample is nearly the same as the replacement rate of the previous sample, a comparison of the calibrations of the proportion of the effect of UI due to the liquidity channel versus the moral hazard channel is informative[3] :

$$\frac{\partial s_0}{\partial a}|_B / \frac{\partial s_0}{\partial b}.$$

In order to calibrate the model, I use the full-controls estimate from Table 5.1 and Chetty's full-controls estimate of the elasticity of the hazard rate with respect to a severance payment. Using these estimates, the fraction of the total effect that is attributable to the liquidity effect is given by

$$\frac{exp(-0.23) - 1}{exp(-0.45) - 1} \times \frac{26}{21.4} = 0.69.$$

Thus, 69% of the effect of marginal changes in UI benefit levels is due to the liquidity effect relative to moral hazard. This estimate is 9% higher than Chetty's estimate, and is consistent with my prediction that

[3]It is likely that individuals in the current sample are more sensitive to an increase in liquid assets now than they would have been in Chetty's sample. This bias leads me to underestimate the proportion of the liquidity effect of UI benefits on duration relative to moral hazard.

the Great Recession increased the effects of UI benefits through the liquidity channel rather than through the moral hazard channel. This outcome is particularly important in considering UI policies, such as duration maximums and eligibility requirements. For instance, if the economy is weak and unemployment is very high, at least nine cents more of each dollar paid out in UI benefits will be put towards easing liquidity constraints, especially in households with low net liquid wealth. Both liquidity constrained and unconstrained households facing unemployment in a severe recession would benefit from extended eligibility durations. Liquidity constrained households would find themselves less constrained, and unconstrained households appear use the more generous allowance to continue searching for good jobs.

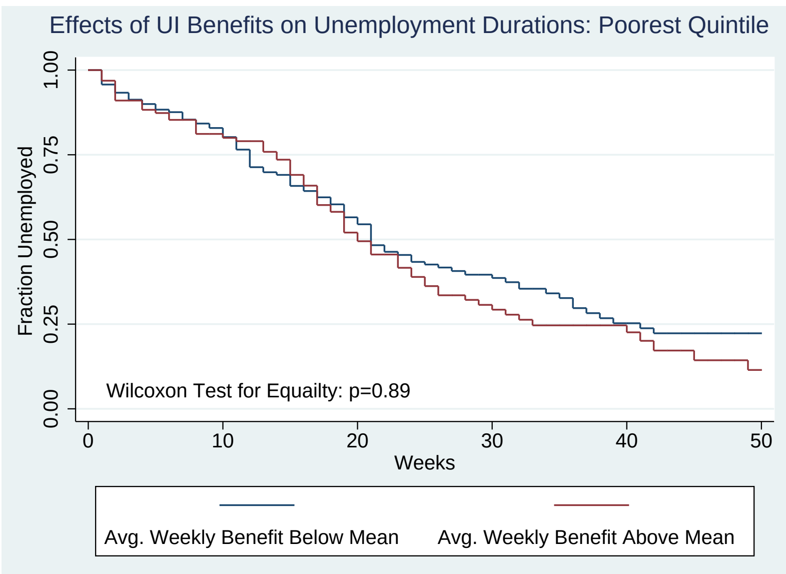

Figure 1: Kaplan-Meier survival functions for two groups of individuals from households in the SIPP sample in the lowest quintile of real net liquid wealth, those in state/year pairs with average weekly UI benefits (WBA) above the sample mean and those with state/year pairs with average WBA's below the mean.

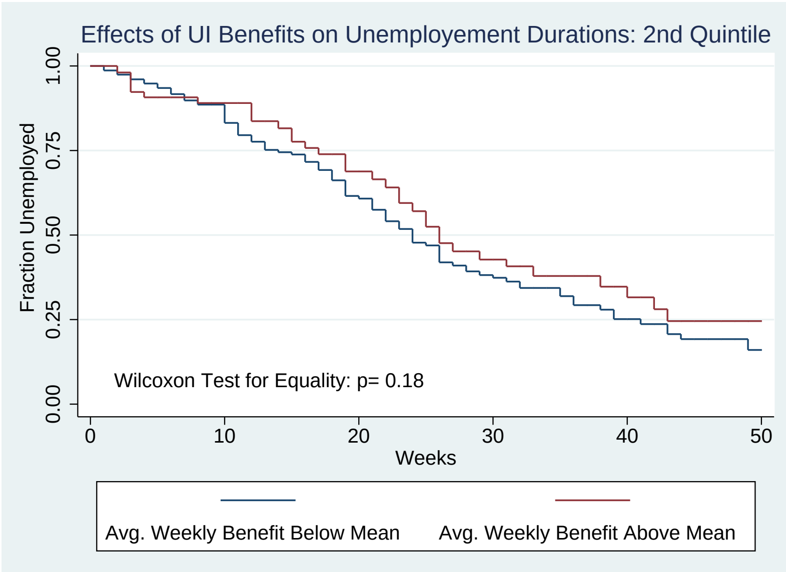

Figure 2: Kaplan-Meier survival functions for two groups of individuals from households in the SIPP sample in the second quintile of real net liquid wealth, those in state/year pairs with average weekly UI benefits (WBA) above the sample mean and those with state/year pairs with average WBA's below the mean.

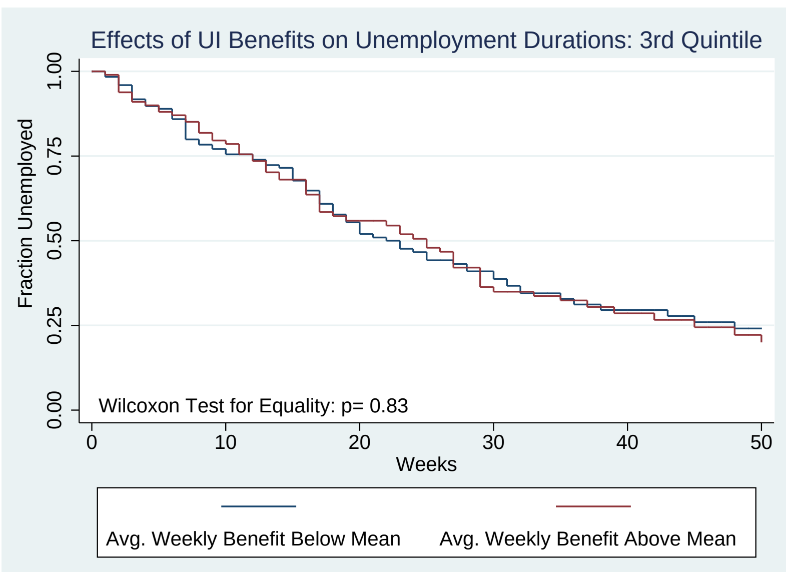

Figure 3: Kaplan-Meier survival functions for two groups of individuals from households in the SIPP sample in the third quintile of real net liquid wealth, those in state/year pairs with average weekly UI benefits (WBA) above the sample mean and those with state/year pairs with average WBA's below the mean.

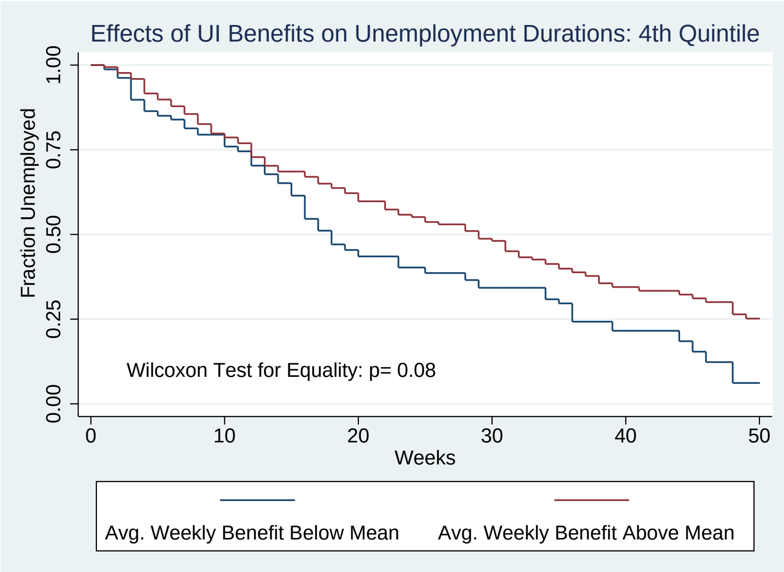

Figure 4: Kaplan-Meier survival functions for two groups of individuals from households in the SIPP sample in the fourth quintile of real net liquid wealth, those in state/year pairs with average weekly UI benefits (WBA) above the sample mean and those with state/year pairs with average WBA's below the mean.

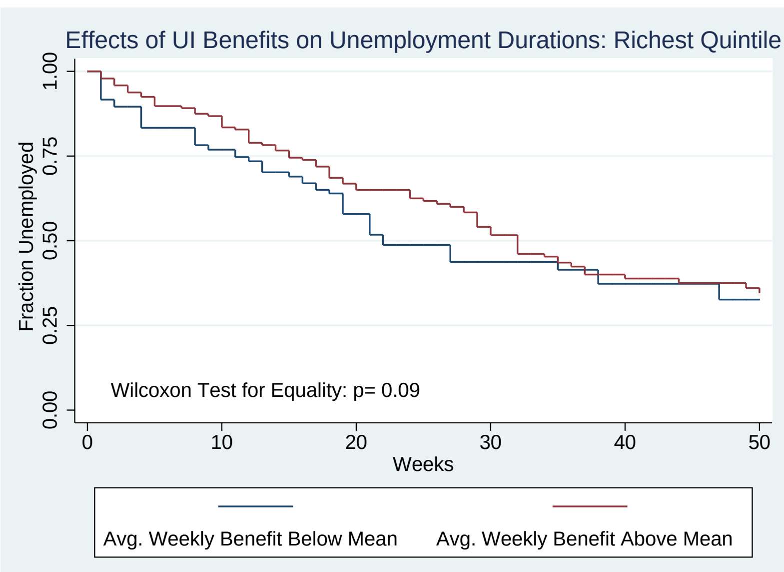

Figure 5: Kaplan-Meier survival functions for two groups of individuals from households in the SIPP sample in the richest quintile of real net liquid wealth, those in state/year pairs with average weekly UI benefits (WBA) above the sample mean and those with state/year pairs with average WBA's below the mean.

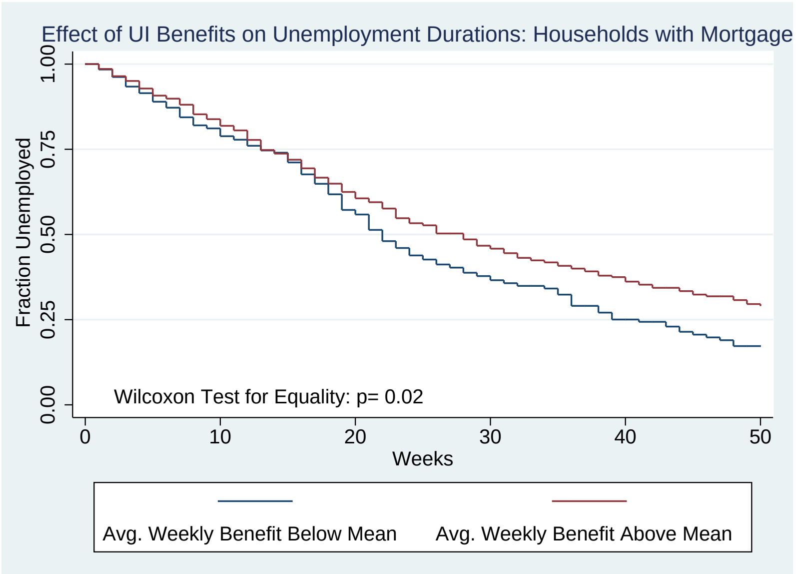

Figure 6: is constructed in the same manner as Figures 1-5. Figure 6 includes all households that make mortgage payments and Figure 7 includes all others.

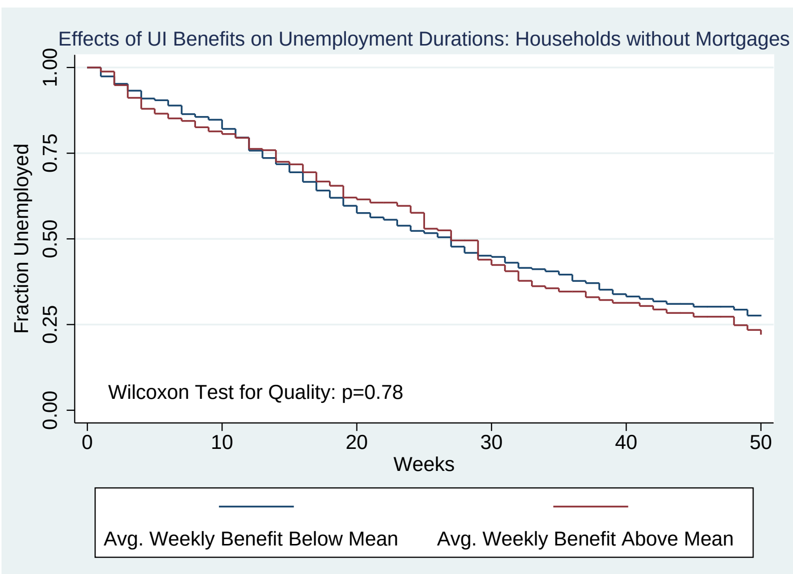

Figure 7: is constructed in the same manner as Figures 1-5. Figure 6 includes all households that make mortgage payments and Figure 7 includes all others.

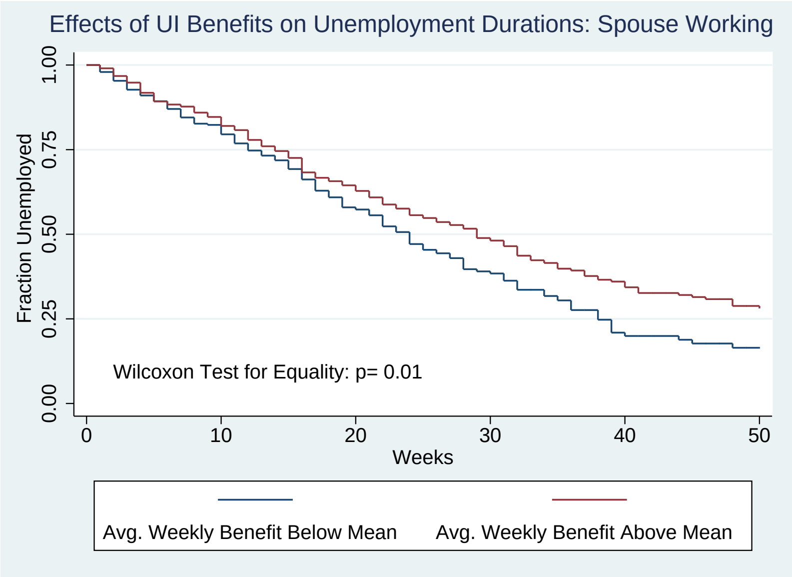

Figure 8: is constructed in the same manner as Figures 1-5. Figure 8 includes all households with a spouse that works and Figure 9 includes all others.

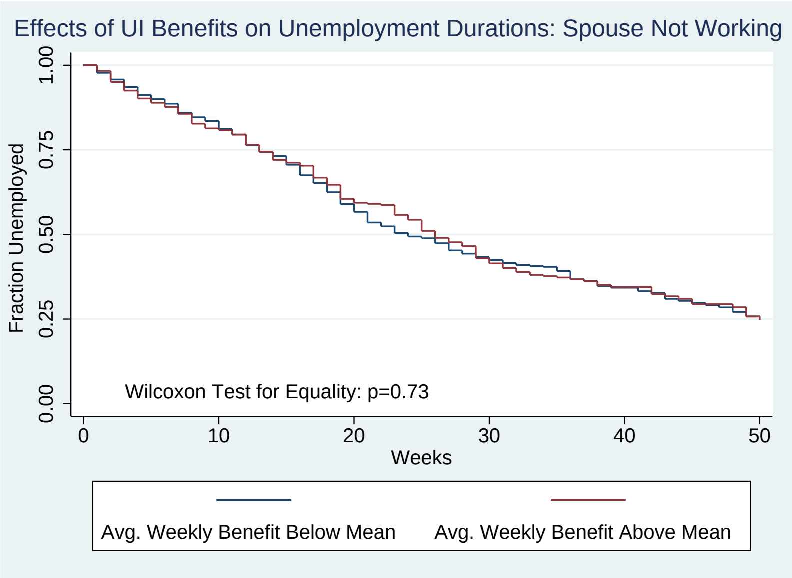

Figure 9: is constructed in the same manner as Figures 1-5. Figure 8 includes all households with a spouse that works and Figure 9 includes all others.

Table 2: Effect of UI Benefits: Cox Hazard Model Estimates

	Pooled	Stratified	Stratified w/ Full Controls			Mortgage
	Full Controls	No Controls	Avg WBA	Max WBA	Ind. WBA	Full Controls
log UI benefits	-0.448**					
	(0.137)					
Q1 x log UI Benefits		-0.067	-0.055	1.048	0.064	
		(0.241)	(0.311)	(0.696)	(0.252)	
Q2 x log UI Benefits		-0.430	-0.582	-0.431	-0.100	
		(0.247)	(0.461)	(0.571)	(0.335)	
Q3 x log UI Benefits		-0.253	-0.339	1.586**	-0.299	
		(0.253)	(0.450)	(0.487)	(0.308)	
Q4 x log UI Benefits		-0.224	-0.427	0.210	-0.166**	
		(0.251)	(0.347)	(0.575)	(0.224)	
Q5 x log UI Benefits		-0.891*	-1.047*	0.155	-1.159	
		(0.437)	(0.455)	(0.649)	(0.385)	
mortg. x log UI Benefits						-0.184
						(0.343)
no mortg. x log UI Benefits						-0.397
spell wk. x log UI Benefits	x					(0.300)
spell wk. x log UI int. w/ netliq or mortg		x	x	x	x	x
state, year, occ. fixed effects	x		x	x	x	x
occ. interactions with netliq or mortg.			x	x	x	x
mortgage = no mortgage p-value						0.551
Number of spells	2639	1405	1277	1277	1277	1213

Notes: Values are means unless otherwise denoted. One asterisk represents statistical significance at the 95% confidence level. Two asterisks represent statistical significance at the 99% level. Monetary values are in real 2005 dollars. Sample includes 2684 prime-age males who report searching for a job, are not temporarily laid off, take up UI benefits within a month of the layoff, and have at least a three-month work history in the dataset. Replacement rate is defined as the weekly UI benefit divided by weekly earnings. Unemployment duration is defined as the number of weeks elapsed from the end of the last job to the start of a new job. Liquid wealth is defined as total wealth minus home, business, and vehicle equity. net liquid wealth is liquid wealth minus unsecured debt.

Chapter 6

Conclusion

This study used data from SIPP to measure the effects of UI benefits on the job-finding rates of individuals who were unemployed during the Great Recession. The results reported here varied from studies that used data from the 1980's and 1990's. For lower quintiles of net liquid wealth, there is little or no effect of UI benefits on job-finding rates. It is possible that these households faced binding budget constraints regardless of the amount of the UI benefits they received, and therefore chose to take jobs whenever they were offered. The extremely low amount of net liquid assets these households hold compared with comparable households in the earlier samples suggests that they were likely unable to smooth consumption in the face of exogenous income shocks like those that prevailed during the Great Recession.

On the other hand, households in this time frame with more liquid assets net of debt are more sensitive to UI benefits. The result could be driven by household characteristics, since members of households in these upper quintiles are much more likely to be married and to have a working spouse. The ailing job market could be a second factor driving this result; people in these quintiles may have been less willing to accept a job that pays significantly less than the job they were separated from and may have been more willing to continue to accept UI benefits while looking for a job better suited to their work experience. It is plausible that these individuals were, as the title of Akerlof's work suggests, "Waiting for Work" in the long term. Since these individuals are more educated and presumably more experienced in skilled jobs, they should have been able to find work but instead appeared to be holding out for improved opportunities in the job market as the economy emerged from the Great Recession.

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Appendix: Description of the Federal-State Unemployment Insurance Program

In the United States, the Federal-State Unemployment Insurance Program provides payments for workers who are unemployed through no fault of their own and meet eligibility requirements set forth by their states of residence. These temporary benefits are intended to help unemployed workers smooth consumption over transitory income shocks. State laws set the rules for unemployment insurance eligibility, the benefit amounts, and the length of time benefits are offered, subject to federal guidelines.

Most states fund unemployment insurance by taxing employers. These payroll taxes are collected by the IRS and deposited into state trust funds managed by the United States Treasury. Unemployment insurance taxes are (imperfectly) experience-rated: firms that lay off workers at a relatively high rate generally pay a higher tax rate to cover the higher cost of insuring their workers.

Since the 1930's, each state and the District of Columbia has required a minimum duration of employment, referred to as a "base period", and level of earnings for a worker to be eligible to receive unemployment insurance benefits. In most states, the base period is the first four completed calendar quarters, or about 52 weeks, prior to the filing of a claim. Claimants must continue to file a new claim on a weekly or biweekly basis in which they report their earnings from work and job offers and refusals from the previous week. Some claimants may be asked to interview at the Unemployment Insurance Claims Office and will lose eligibility if they fail to attend. Additionally, claimants might be required to register for work with the State Employment Service, which provides assistance in job searching and information on the current labor market, to remain eligible for unemployment insurance benefits. Some states allow benefit recipients to work part time or attend school or job training, but may withdraw eligibility if a recipient declines a suitable job offer. Farmers, the self-employed, and those who earn too little are never eligible for unemployment insurance benefits[1].

One important consideration is the extremely low take-up rate of unemployment insurance benefits. Less than 40 percent of those eligible claim UI benefits. There are several possible explanations for why someone might forgo collecting unemployment insurance benefits. First, some eligible claimants are ignorant of their eligibility or do not know the procedures for claiming benefits. Second, there may be uncertainty about the amount of weekly benefits they might receive. In some cases, the perceived weekly benefit might be very low relative to the cost of collecting it, especially when the unemployment spell is expected to be very short. Several studies find that the most common reason for low take-up in favorable economic conditions

[1] http://workforcesecurity.doleta.gov/unemploy/uifactsheet.asp

is that individuals expect to find work soon; some workers may be unemployed temporarily and others may have standing job offers from friends, former colleagues, or former employers[2]. Some claimants might be too prideful to claim their benefits as a result of self-perceived stigma. Finally, some unemployed workers might have sufficient assets to smooth transitory shocks to income without collecting unemployment insurance benefits.

In normal economic times, unemployed workers in most states are eligible for up to 26 weeks of UI following job loss. In comparison to other developed countries, especially those in Western Europe where UI is available for a year or more, these benefits are among the least generous.

During times of high unemployment, Congress has extended the maximum duration for the receipt of unemployment insurance benefits. In each recession since the 1950's, Congress has extended the statutory availability of benefits. Additionally, since 1974 the President has been authorized to provide assistance to individuals who are unemployed as a direct result of major disasters, such as Hurricane Sandy. UI benefits act as an automatic stabilizer to maintain consumption in a depressed economy[3].

[2]See Card and Levine (2000) and Anderson and Meyer (1997).
[3]http://workforcesecurity.doleta.gov/unemploy/extenben.asp