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Three Essays on Unemployment Insurance in the 21st Century

Lewis H. Warren
University of Kentucky, l.warren@uky.edu
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Lewis H. Warren, Student

Dr. James P. Ziliak, Major Professor

Dr. Jenny A. Minier, Director of Graduate Studies

THREE ESSAYS ON UNEMPLOYMENT INSURANCE IN THE 21ST CENTURY

DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Business and Economics
at the University of Kentucky

By: Lewis H. Warren

Lexington, Kentucky

Director: Dr. James P. Ziliak, Carol Martin Gatton Chair in Microeconomics and

Director of the University of Kentucky Center for Poverty Research

Lexington, Kentucky

2016

ABSTRACT OF DISSERTATION

THREE ESSAYS ON UNEMPLOYMENT INSURANCE IN THE 21ST CENTURY

My dissertation consists of three essays focusing on unemployment insurance (UI) and how it affects recipients. The first essay examines how UI generosity affects the search intensity of recipients through matching American Time Use Survey respondents to all of their observations in the Current Population Survey (CPS), the population from which they are drawn. Earnings from the CPS are then run through a benefit calculator that determines eligibility and benefit amounts which are used to determine how UI generosity affects search times. The second essay uses the Survey of Income and Program Participation to examine how lesser known policies affecting UI eligibility of workers with limited earnings histories, part-time workers, voluntary job leavers, and expanding benefit amounts for individuals with children affect unemployment duration. The third essay examines how liquidity constraints affect the consumption smoothing benefits of UI. Using the Panel Study of Income Dynamics from 1968-2012, I find that the consumption smoothing benefits of UI that past studies have found are primarily concentrated on the 27% of households that do not have other means of smoothing consumption. For these households, a 10 percentage-point increase in the replacement rate reduces the decline in consumption by between 3.5-4.9% using food consumption and 1.5-2.1% using imputed total consumption.

KEYWORDS: Unemployment, Unemployment Insurance, Time Use, Consumption

Lewis H. Warren
Student

June 30, 2016
Date

THREE ESSAYS ON UNEMPLOYMENT INSURANCE IN THE 21ST CENTURY

By

Lewis H. Warren

Dr. James P. Ziliak

_____

Director of Dissertation

Dr. Jenny A. Minier

_____

Director of Graduate Studies

June 30, 2016

_____

Date

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1 Introduction

Unemployment insurance (UI) has been one of the most studied safety-net programs in the United States. The program is of interest to researchers because the large amount of money spent on the program and because the program is often thought to increase unemployment duration as it lowers recipients cost of being unemployed. For example Moffitt (1985), Solon (1985), Meyer (1990), and others have found that a 10% increase in benefit levels increases spell duration by an average of between 3-8%.

There are several potential explanations for this explored in the literature including that UI could be reducing search intensity, increasing reservation wages leading some individuals to not accept job offers, or it could be providing individuals more time to seek higher quality employment matches. My first essay focuses on how UI generosity affects search intensity. This has been an area of growing interest in recent years due to the high levels of unemployment following the Great Recession and has led to several papers examining how UI generosity affects time use with much of the research using the American Time Use Survey (see Krueger and Mueller (2010), DeLoach and Kurt (2013), Mukoyama, Patterson, Sahin (2013), Guler and Taskin (2013)).

However, one limitation with the American Time Use Survey is that no questions are asked regarding UI eligibility or benefit amounts. This has led several authors to impute eligibility based off of the cause of unemployment and use the state maximum weekly benefit amount (WBA) as a proxy for UI generosity while assuming that individuals are eligible for the maximum number of potential weeks of UI benefits in their state (see Krueger and Mueller (2010), DeLoach and Kurt (2013), Mukoyama,

Patterson, Sahin (2014), Guler and Taskin (2013)).

While this imputation procedure has been helpful in the literature for examining the effects of UI generosity on search intensity, there are three primary concerns with the approach. First, without observing base period earnings, it is not possible to know if an individual was ever monetarily eligible for UI. Second, since base period earnings are unobserved, the approach is unable to estimate the actual benefit amount and instead relies on variations in the state maximum WBA. Given that only around 33% of UI recipients receive the maximum WBA, the procedure could largely overstate UI generosity for a large fraction of the sample. Third, in many states it is possible to qualify for significantly less than 26 weeks of benefits and thus the imputation procedure might incorrectly assign 26 weeks to individuals that are eligible for fewer weeks, which has led to some individuals that have surpassed their potential weeks of benefits being considered eligible.[1]

To address these concerns, this essay expands the current literature through fully simulating monetary eligibility and entitlement to UI at the individual level. To simulate monetary eligibility and entitlement, work histories of unemployed respondents were obtained through fully matching American Time Use Survey respondents to all of their observations in the Current Population Survey, the population from which they are drawn. The results suggest that higher replacement rates are associated with large reductions in time spent searching for a job during normal economic conditions with elasticity estimates ranging from -2.2 to -6.4. However, the results are more mitigated during the Great Recession and post-recession period with higher replacement rates being

[1] This is especially important for the years 2008-2013 as individuals who qualified for less than 26 weeks of state benefits had their potential weeks of emergency benefits scaled down proportionally.

associated with small and statistically insignificant effects on time spent searching for a job, although these results appear to be partially driven by the years 2009 and 2010 which were at the height of the labor market decline. The results also suggest that variations in potential weeks of benefits remaining do not appear to affect search times, although for the 2003-2007 period measurement error could be driving this result.

The second essay explores the growing heterogeneity in the populations that receive UI. Over the last decade, several states have modernized their UI systems to expand coverage to many groups that have historically been excluded from receiving UI including expanding benefits to individuals with limited earnings histories, unemployed part-time workers, voluntary job leavers with compelling reasons, and increased benefit amounts for individuals with children. The policies were core components of UI modernization incentive payments made as part of the American Recovery and Reinvestment Act of 2009. After the modernizations, 39 states offered more favorable earnings tests to individuals with limited earnings histories, 28 states offered benefits to part-time workers, 24 states offered benefits to voluntary job leavers with compelling reasons, while 14 states have expanded benefit amounts for individuals with children.

Using the Survey of Income and Program Participation from 1996-2012, I examine how these policies affect recipiency and unemployment duration. The results suggest that more favorable earnings tests, paying benefits to unemployed part-time workers, and paying increased benefit amounts for individuals with children lead to large increases in recipiency. Moreover, I find that part-time unemployed workers and voluntary job leavers have spell durations that are around 6 weeks less than traditional claimants, while individuals with limited earnings histories and individuals that received

additional payments for having children had similar spell durations to traditional claimants.

The third essay examines whether UI helps recipients to smooth consumption, which has been a question of growing interest in recent years. It has been well documented that income declines during unemployment are on average significantly larger than declines in consumption, which speaks to the fact that many individuals have other means of smoothing consumption. Given this, there is much interest in the degree that UI smooths consumption which is an important question for three main reasons. First, governments spend large amounts of money on UI. To this point, total cumulative government spending on UI in the United States exceeded half a trillion dollars from 2007-2012. Second, UI is often touted to produce a Keynesian stimulus effect where most people who receive UI spend the dollars that they receive quickly which helps to increase aggregate demand and ultimately employment. Such an effect only happens if UI affects consumption. Third, the degree that UI smooths consumption is one of the three key parameters need to identify optimal UI benefits (see Bailey (1978) and Chetty (2006) who generalizes Bailey's work).

There has been a small literature that examines the consumption smoothing benefits of UI in the United States. Gruber (1997) uses food consumption data from the Panel Study of Income Dynamics from 1968-1987 to find that a 10 percentage-point increase in the replacement rate reduces the drop in consumption by 2.8%. Kroft and Notowidigdo (2015) expand Gruber's model and find that Gruber's finding does not vary throughout the business cycle. East and Kuka (2015) extend Gruber's analysis to the 1968-2011 period. They find that the consumption smoothing benefits of UI largely

declined in the 1990s and that UI no longer smoothes consumption. However, two challenges with this literature have been that little is known about how UI smooths aggregate consumption (rather than simply food consumption) or how liquidity affects the consumption smoothing benefits of UI.

To address these concerns, I use food consumption and a more comprehensive measure of consumption based on Attanasio and Pistaferri (2014) and impute wealth following Zeldes (1989) using the Panel Study of Income Dynamics from 1968-2012 to show that the consumption smoothing benefits of UI for prime-age recipients have remained fairly constant over time. My primary findings are twofold. First, the consumption smoothing benefits of UI that past studies have found are primarily concentrated on the 27% of households that do not have other means of smoothing consumption. For these households, a 10 percentage-point increase in the replacement rate reduces the decline in consumption by between 3.5-4.9% using food consumption and 1.5-2.1% using imputed total consumption. Second, I find that the consumption smoothing benefits of UI have remained fairly constant over time using both food consumption and imputed total consumption and that more generous UI benefits help to smooth consumption for households that do not have other means of smoothing consumption.

2 Reassessing the Effects of Unemployment Insurance Generosity on Search Intensity: New Evidence from Earnings Histories

2.1 Introduction

Since the onset of the Great Recession, there has been a renewed debate among policymakers about how UI generosity affects unemployed individuals' reemployment probabilities. Much of the debate has focused on whether more generous UI benefits reduce how much effort recipients put into job search. This has led to a growing interest among researchers about how UI generosity affects time use with much of the research using the American Time Use Survey (see Krueger and Mueller (2010), DeLoach and Kurt (2013), Mukoyama, Patterson, Sahin (2013), Guler and Taskin (2013)). However, one limitation with the American Time Use Survey is that no information is asked in the survey regarding unemployment insurance eligibility or receipt. This has led several authors to impute UI eligibility based off of the cause of unemployment and use the state maximum weekly benefit amount as a proxy for UI generosity while also assuming that individuals are eligible for the maximum number of potential weeks of UI benefits in their state. However the concern with this imputation procedure is that individuals might not have sufficient past earnings to qualify for UI and only around 35% of eligible individuals qualify for the state maximum weekly benefit amount and hence it might not be an appropriate proxy for an individual's actual benefit amount (see Krueger and Meyer (2002)). Furthermore, in several states it is possible to qualify for significantly less than the maximum number of potential weeks of benefits. To address these concerns, I obtain earnings histories of ATUS respondents and use this information to simulate UI eligibility, benefit amounts, and potential weeks of benefits.

To obtain earnings histories, this essay takes advantage of the fact that the American Time Use Survey (ATUS) is drawn from the eighth and final wave of the Current Population Survey (CPS). The CPS provides valuable information about ATUS respondents' past earnings during their base period, the period where UI eligibility, benefit levels, and potential weeks of benefits are determined. To obtain ATUS respondents' past earnings, I longitudinally match each respondent's CPS observations across all eight waves of the survey. I then determine the number of CPS observations that fall within each respondent's base period. Respondents can have up to four CPS observations in their base period and I exclude respondents with less than four observations from the analysis. I then use respondents' hours worked during each wave of their base period and their hourly wage to determine base period earnings.

Base period earnings are then run through a simulation program. The simulation biannually captures the structure of each state UI system to determine monetary eligibility, weekly benefit amounts, and potential weeks of benefits for each respondent for the period preceding and following the Great Recession from 2003-2013. The simulation is the first to fully simulate eligibility, weekly benefit amounts, and potential weeks of benefits for all extended and emergency benefits stemming from the Great Recession. The simulation suggest that approximately 17% of individuals included in past studies were ineligible for UI while over two-thirds of eligible respondents received benefits less than the maximum weekly benefit amount. I then exclude the 17% of ineligible respondents included in past studies and focus the analysis on variations in each respondent's individual replacement rate which was not possible in past studies as both the weekly benefit amount and base period earnings were unobserved.

The results suggest that higher replacement rates are associated with large reductions in time spent searching for a job during normal economic conditions with elasticities ranging from -2.2 to -6.4, which are larger in magnitude than past studies have found which relied on state variation in UI generosity. However, the results are more mitigated during the Great Recession and post-recession period with higher replacement rates being associated with small and statistically insignificant effects on search times, with elasticity estimates ranging from -.6 to 0, although the years 2009 and 2010 which were at the height of the labor market decline appear to be partially driving these results. Overall, the results suggest that the moral hazard that more generous replacement rates can induce might be more mitigated during adverse economic conditions. However, the results suggest that variations in potential weeks of benefits remaining do not appear to affect search times, although for the 2003-2007 period measurement error could be driving this result. The findings suggest that optimal replacement rates might vary throughout the business cycle.

2.2 Literature Review

Since its inception in the United States in the late 1930s, there has always been a great deal of concern that UI produces a "moral hazard" effect where leisure is subsidized through unemployment insurance and this "moral hazard" effect is often assumed to be increasing in UI generosity. As predicted by UI search models such as Mortensen (1977) and Moffitt and Nicholson (1982), UI lowers search intensity and raises reservation wages of recipients in both the replacement rate and duration of potential benefits. There is also a large empirical literature that examines the effects of increased benefit amounts

on spell duration. For example Moffitt (1985), Solon (1985), Meyer (1990), and others have found that a 10% increase in benefit levels increases spell duration by an average of between 3-8%. There has also been a large literature that examines how increases in potential weeks of benefits affect spell duration. For example, Moffitt (1985), Solon (1985), Katz and Meyer (1990), Card and Levine (2000), and others have found that a one week increase in potential benefits increases spell duration by between .08-.30 weeks.

There has also been a renewed interest in how additional potential weeks of benefits affect spell duration during the Great Recession as potential weeks of benefits reached up to 99 weeks for certain individuals. Farber and Valletta (2015) and Rothstein (2011) find a small but statistical increase in unemployment caused by the large increase in potential weeks of benefits, although their findings appear to be coming from decreases in the labor force exit rate rather than reductions in the job finding rate. While estimates vary widely, most research suggests that more generous unemployment benefits in terms of benefit amounts and potential weeks of benefits increase spell duration although the size of this effect might vary throughout the business cycle. There are several potential explanations for this explored in the literature including that UI could be reducing search intensity, increasing reservation wages leading some individuals to not accept job offers, or it could be providing individuals more time to seek higher quality employment matches.[2]

[2] For papers about UI generosity and reservation wages see Feldstein and Poterba (1984), Shimer and Werning (2007), and Krueger and Mueller (2016). For papers about UI generosity and match quality see Centeno (2004) and Schmieder, von Wachter, and Bender (2011).

This essay focuses on the effects of unemployment insurance generosity on the search intensity of the unemployed, which has been an area of growing interest in recent years. Historically since the inception of requiring active job search for unemployment classification in the United States in 1940, most survey datasets have asked respondents about whether they have searched for a job in the last four weeks as this is a necessary requirement for being considered unemployed.[3] However conditional upon search, most datasets provide little information about search intensity in terms of how much effort an individual puts into searching for a job.

Historically this has led to little being known about the search intensity of individuals that report searching through effort level or time spent searching. However, in recent years several papers have attempted to examine the search intensity of the unemployed. Shimer (2004) examines how search intensity varies throughout the business cycle. Using the CPS, Shimer proxies for search intensity of individuals using the number of search methods that respondents reported using during the four weeks preceding the CPS interview. Shimer hypothesizes that more methods of search imply a higher level of search intensity. Shimer's findings suggest that search intensity is acyclical.

Other papers have examined the search intensity of young cohorts using the National Longitudinal Study of Youth 1979 (NLSY79). Holzer (1988) examines the search methods and intensity of unemployed males aged 16-23 using the 1981 panel of the NLSY79. Like most surveys, the NLSY79 asks non-employed respondents the types

[3] See Card (2011) for the origins of the unemployment rate.

of search methods that they used in the past four weeks while the 1981 panel included a job search questionnaire that asked respondents about the amount of time that they had spent on each type of job search for the week preceding the survey. Holzer finds that the most productive search methods were contacting friends and relatives and direct applications without referral which also had the highest levels of search intensity among the youth male cohort that Holzer examined. Paserman (2008) uses the NLSY79 from 1985-1996 to estimate the degree of hyperbolic discounting for job search. To estimate the convexity of the cost function of searching, Paserman uses the NLSY 1981 job search questionnaire to obtain data on time spent on various methods of search and their effectiveness. Paserman finds a large degree of hyperbolic discounting among low and medium wage workers.

Another recent method of examining search intensity has been to use time use data from the ATUS. Krueger and Mueller (2010) examine the effects of unemployment insurance generosity on the search intensity of the unemployed using the ATUS from 2003-2007. Since information relating to UI eligibility or receipt is not provided in the ATUS or CPS monthly files, Krueger and Mueller impute UI eligibility based on the cause of unemployment and spell duration. They then use the state maximum weekly benefit for the given year to proxy as an indicator of UI generosity. Krueger and Mueller's findings suggest that more generous UI benefits (increases in the state maximum weekly benefit) are associated with lower levels of search intensity with elasticity estimates between -1.6 to -2.2. Guler and Taskin (2013) use the ATUS from 2003-2008 while also imputing UI eligibility and using the state maximum weekly

benefit as a proxy for UI generosity to examine how UI affects household production.[4] Their findings suggest that there is a negative relationship between household production and UI generosity. Other papers have used similar UI imputation procedures with time use data. DeLoach and Kurt (2013) use the ATUS from 2003-2011, to examine the effects of macroeconomic shocks on search intensity. DeLoach and Kurt estimate a similar model to that of Krueger and Mueller (2010) while including additional controls to model for macroeconomic shocks. While assuming maximum weeks of benefits, they model for both extended and emergency unemployment benefits. For the analysis DeLoach and Kurt include the log of the vacancy to unemployment rate from the Job Openings and Labor Turnover Survey (JOLTS), log of housing prices from Case-Shiller, and in certain specifications homeownership. DeLoach and Kurt find that deteriorating labor market conditions reduce search intensity, while the effects are mitigated by declines in household wealth.

In addition to not providing information about UI eligibility or receipt another limitation with the ATUS is that sample sizes are quite limited, especially for unemployed individuals that searched for employment over the ATUS observation period which is 24 hours. To address this, Mukoyama, Patterson, and Sahin (2013) examine how job search behavior varies over the business cycle using the ATUS to impute search intensity in the CPS. To do this they first examine how search times vary by type of search and number of types of search, which is essentially an empirical test of Shimer (2004) that more methods of search implies a higher search intensity. After finding that

[4] Guler and Taskin define household production as activities that are used for the production of goods and services at home instead of purchasing such goods and services from a market.

more methods of search on average lead to higher levels of search time, Mukoyama et al. impute search time spent in the CPS based on the number and type of methods that CPS respondents reported undertaking, which takes advantage of the ATUS providing both the number of search methods and time spent searching over the 24 hour diary day. Similar to DeLoach and Kurt, Mukoyama et al. assume the maximum weeks of benefits and model both extended and emergency unemployment benefits. Their findings suggest that aggregate job search intensity is countercyclical at both the extensive and intensive margins. Aguiar, Hurst, and Karabarbounis (2013) use data from the ATUS from 2003-2010 to examine time use during the Great Recession. They find that job search replaces between 2-6% of foregone hours worked, while home production and leisure absorb approximately 30% and 50% of forgone hours worked, respectively.

As noted above, one limitation with the American Time Use Survey is that no information is asked in the survey regarding UI eligibility or receipt. This has led several authors (Krueger and Mueller (2010), DeLoach and Kurt (2013), Mukoyama et al. (2013), and Guler and Taskin (2013)) to impute UI eligibility based on the cause of unemployment where voluntary job leavers and new and reentrants are ineligible for benefits while classifying all other unemployed individuals with spells less than the maximum potential weeks of benefits as being eligible.[5] The logic behind this approach is that voluntary job leavers have often been excluded from receiving UI and that new and reentrants often lack sufficient earnings to qualify for UI. After eligibility has been

[5] A growing number of papers have used a similar procedure on CPS data to impute UI eligibility (see Valletta and Kuang (2010), Farber and Valletta (2015), and Rothstein (2011)).

imputed, the procedure then uses the state maximum weekly benefit amount for the year that the spell was observed to proxy as an indicator of UI generosity.

While this imputation procedure has been helpful in the literature for examining the effects of UI receipt on search intensity, there are three primary concerns with the approach. First, without observing base period earnings, it is not possible to know if an individual was ever monetarily eligible for UI during the course of the unemployment spell. This has led several authors to include monetarily ineligible individuals in their samples. Second, since base period earnings are unobserved, the approach is unable to estimate the actual benefit amount that an individual would receive and instead relies on variations in the state maximum weekly benefit amount. Given that only around 35% of UI recipients receive the maximum weekly benefit amount, the procedure could grossly overstate UI generosity for a large fraction of the sample. This can be seen in Table 2.1 for 2013 as actual UI payments can vary significantly from the state maximum weekly benefit amount. For example as displayed in Table 2.1, benefits can range from 33-674 dollars in Massachusetts, meaning that someone receiving a 33 dollar benefit would get a proxy value of 674 dollars (the state maximum weekly benefit amount) while someone receiving the same 33 dollar benefit in Mississippi would get a proxy value of 235 dollars. Moreover, the percentage of recipients receiving the maximum weekly benefit can vary significantly by state. Third, weeks of benefits are often determined by base period earnings, where 26 weeks of state benefits is often the maximum potential weeks of benefits in most states.[6] However in many states, it is possible to qualify for

[6] At the start of 2013, Arkansas, Florida, Georgia, Michigan, Missouri, and South Carolina had maximum potential weeks of benefits between 20-25 weeks while Montana and Massachusetts offered maximums between 28-30 weeks.

significantly less than 26 weeks of benefits and thus the imputation procedure might incorrectly assign 26 weeks to individuals that are eligible for significantly fewer weeks.[7] This could mean that if the duration of an individual's unemployment spell has surpassed the actual weeks of benefits available to the individual but is less than 26 weeks, the procedure would misclassify the individual as still being eligible for UI when the individual would actually no longer be eligible for UI.[8] To address these concerns, I obtain work histories of unemployed respondents through fully matching ATUS respondents to all of their observations in the CPS, the population from which they are drawn. This allows for full simulation of UI eligibility, weekly benefit amounts, and potential weeks of benefits.

2.3 Data

To examine the relationship between UI generosity and search intensity, I use data from the ATUS from 2003-2013. Since the ATUS provides no direct information about UI eligibility, I match ATUS respondents to their longitudinal data from the CPS, the dataset from which the ATUS is drawn. I then run earnings histories of unemployed respondents through a simulation program that calculates UI eligibility, benefit amounts, and potential weeks of benefits available. In the remainder of this section, I discuss the ATUS and CPS as well as the matching procedure and simulations used for the analysis.

[7] The exceptions to this being Connecticut, Hawaii, Illinois, Louisiana, Maryland, New Hampshire, New York, and West Virginia which follow uniform distributions of 26 potential weeks of benefits.
[8] This is especially important for the years 2008-2013, as the EUC Tiers required recipients to qualify for 26 weeks of state benefits to obtain the maximum number of potential weeks of benefits. Individuals who qualified for less than 26 weeks of state benefits had their potential weeks of EUC benefits scaled down proportionally.

2.3.1 The American Time Use Survey

The ATUS is the primary source of how, where, and with whom Americans spend their time. The survey is produced by the Bureau of Labor Statistics and has been collecting monthly data since 2003. The ATUS population is drawn from the 8th (and final) wave of the CPS, and interviews are conducted 2-5 months after the final CPS observation is taken. Sample households are selected based on the characteristics of the CPS reference person (the person who provided the household information during the CPS interviews), and the respondent is then randomly selected from the list of adults (age 15 or older) from within the household. Sample sizes for 2003 are 1,700 time diaries per month and this number was cut to 1,100 starting in 2004 due to budgetary cuts. The total sample size collected from 2003 through 2013 is 148,345. To avoid retirement effects, attention is focused on individuals age 20-65 that report being unemployed at the time of the ATUS interview. For an individual to be considered unemployed they cannot have a job, they must be available for a job, and must have actively sought employment in the past four weeks. In total, there are 5,555 unemployed individuals in the ATUS between the ages of 20-65 from 2003-2013 (see Table 2.2).[9]

The ATUS records time use data on a multitude of activities. More precisely, respondents report each activity they undertook in the past 24 hours (from 4 a.m. to 4 a.m., ending on the interview day), how long they spent on that activity, where that activity took place, and who was with them while they undertook the activity. The ATUS only records primary activities and excludes secondary activities. Given this,

[9] In the United States, active job search in the past four weeks is necessary for being considered unemployed. Moreover, the reference week for employment status in the ATUS is defined as the 7 days prior to the interview, while in the CPS the reference week is the week prior to the interview.

respondents cannot report multiple activities occurring simultaneously and must report the activity that they were primarily engaged in. The primary variable of interest for this analysis is total time spent searching for a job. This includes things such as all time spent on active and passive job search, time spent interviewing, and all other time related to job search. In 2013, unemployed individuals in the U.S. spent on average 28 minutes per day on activities related to finding a job (including travel related to job search). Search times averaged 34 minutes per day on weekdays and 14 minutes per day on weekends. However, only 16% of unemployed respondents searched for a job on their diary day implying significantly longer search times conditional upon search of approximately three hours on weekdays and two and a half hours on weekends.

While primarily asking time use questions, the survey also updates some information that was collected during the eighth wave of the CPS that could have changed since that interview. Of this updated information, the primary variables of interest to this analysis are a subset of labor force questions from the CPS. The ATUS provides individuals' labor force status using five groups: employed, employed not at work during the reference week, unemployed, unemployed on layoff, and not in the labor force. More precisely, the ATUS asks all questions used in the CPS to determine if individuals are unemployed. This includes questions relating to if an individual has a job, is available for a job, and questions relating to if an individual has searched for a job in the last four weeks. If an individual searched for a job then the types of search methods that the individual used are also provided. The ATUS also provides information on recall status for individuals on layoff, whether individuals that are not in the labor force and are over the age of 55 want a job, and hours worked for employed individuals. However, the

ATUS excludes several important CPS variables including unemployment duration and reason for unemployment.[10] Moreover, like the CPS monthly files, no information is asked relating to UI receipt or eligibility.

2.3.2 Matching CPS files and Constructing Base Period Earnings

Since the ATUS provides no information regarding UI eligibility, benefit amounts, and potential weeks of benefits, I first obtain ATUS respondents' labor force histories from the respondents' CPS observations. The CPS follows a format where individuals are in the survey for four months then they are excluded from the survey for eight months and then reenter the survey for four additional months for a total of up to eight months in the survey over a sixteen month period. Since the CPS follows houses (the physical location) rather than households, respondents can have anywhere from 1-8 CPS interviews, although all ATUS respondents have an eighth wave CPS observation. The CPS provides information on labor force status, hours worked, and wage earnings which are taken twice during the fourth and eighth waves of the survey.

To create earnings histories, I first match individual's basic monthly CPS files using respondents' household id, household number, family number, individual line number, initial month and year in sample, and state which combined uniquely identify individuals across time. The matching procedure produces an unbalanced panel of

[10] To address these limitations, I model unemployment duration using unemployment duration from the CPS plus the time between surveys for individuals that were unemployed during both the eighth wave of the CPS and the ATUS. For individuals that become unemployed between the CPS and ATUS, I model duration as the midpoint between the two surveys, where the surveys are typically 2-5 months apart. Overall 35% of individuals in the sample are unemployed in both the CPS and ATUS with this occurring for 26% of the sample for the 2003-2007 period and for 40% of the sample for the 2008-2013 period.

respondents' observations ranging from 1-8 CPS observations. However as noted by Madrian and Lefgren (1999) a significant number of matched individuals in the CPS have discrepancies in their data such as changes in sex, race, education, or age that are implausible. To address these discrepancies, an algorithm was used where individuals are excluded from the analysis if their sex or race differs across any CPS observations that fall within a respondent's base period (the period where UI earnings test are conducted) or if discrepancies in age fall outside of a four year range for such observations. ATUS respondents are then matched to the longitudinal CPS files using a similar match validation technique.

After matching the CPS files, respondents' CPS labor force status, hours worked, and wage earnings are used to construct base period earnings, and in turn to determine monetary eligibility for UI. Almost all states have base periods that use past earnings consisting of the earliest 4 of the last 5 completed calendar quarters preceding the filing of the UI claim to test for monetary eligibility.[11] These exclude the last completed quarter before the filing of a claim. Moreover, several states have implemented alternative base periods which generally test the last 4 completed quarters if an individual does not qualify under a traditional base period. ATUS respondents can have anywhere from 0-4 CPS observations during their base period, depending on the duration of their spell and the number of CPS interviews the respondent participated in. To construct base period earnings, I limit the analysis to individuals with four CPS observations during their base period or individuals that have three observations during their base period and

[11] Since the initial claim date is not provided in the ATUS or CPS, I use the spell start date which is often the same day (or week) as the initial claim date.

have four observations during their alternative base period conditional on their states adopting alternative base periods before their spell start date.[12]

To determine base period earnings, I first determine each respondent's hourly wage rate. For earnings, I primarily rely on reported wage earnings which are taken in the fourth and eighth months of the CPS (the outgoing rotation groups). Because earnings are only asked during the fourth and eighth waves of the survey, 17% of respondents have no reported earnings (or have imputed earnings) in the CPS even though many of these individuals held employment during their base periods. In the case that an individual had no reported earnings or the individual's earnings were imputed, I use predicted hourly wage calculated using CPS earnings files from 2004-2005. To do this, I estimate a wage equation used by Krueger and Mueller (2010) which they use to predict all of their observations hourly earnings of the form:

$$(2.1) \quad \log(w_{ist}) = \alpha + Z_{ist}\,\beta + d_s + e_{ist}$$

where w_{ist} is hourly wage, Z_{ist} controls for age, age squared, education controls for high school degree or less; some college; and college degree, female, and d_s are state fixed effects. The wage equation was estimated using 319,813 workers from CPS Merged Outgoing Rotation Groups (MORGs) files from 2004 and 2005. The sample size of 319,813 was obtained through excluding students, self-employed, self-incorporated, and employed individuals with hourly earnings of less than $1 or more than $200.[13] I then

[12] Restricting the sample to respondents with four base period observations produces the most accurate estimates of UI eligibility, benefit amounts, and potential weeks of benefits but comes at a cost of slightly reducing the sample size. I also explore estimates using three base period observations although the results become noisier when using less than four base period observations.

[13] Following Krueger and Mueller, I adjust wages to account for topcoding.

use the wage equation to predict unemployed individuals' hourly wage rate and use this to calculate base period earnings for individuals that I do not observe their earnings or have imputed earnings values in the CPS.[14]

I then examine the hours worked for each employed CPS respondent that I observe during their base period and multiply this by the individual's hourly wage. Individuals that are unemployed or not in the labor force for a given month during their base period (or alternative base period if available) receive a value of zero for the month.[15] I then scale my earnings measure up to an annualized amount which provides base period earnings (see Chetty (2008), Gruber and Cullen (2000), Levine (1993), and LaLumia (2013) for examples of papers that use simulation programs for UI with scaled up earnings).[16]

2.3.3 UI Eligibility, Benefit Amounts, and Potential Weeks of Benefits

To determine if unemployed ATUS respondents have sufficient earnings to qualify for UI, I run each unemployed ATUS respondent through a simulation program

[14] If an individual has earnings reported in both outgoing rotation groups then I use the earnings from the earlier period.

[15] A small number of respondents have industry and occupation codes that indicate that they are teachers and professors. It is possible that these individuals could be receiving wage income during summer months even while reporting zero hours of employment. When these individuals report zero hours worked during summer months, I exclude them from the analysis.

[16] Another option would be to use the CPS March Supplement (The ASEC) and merge this to the ATUS. The primary advantage of this is that the ASEC provides the weeks worked (and wage income) over the last calendar year. However, there are two primary disadvantages to this approach. First, less than 25% of ATUS respondents have a valid ASEC observation, which is significantly lower than using full monthly files which leads to match rates over 50%. Second, the advantage of knowing weeks worked (and wage income) over the last calendar year is somewhat limited by the fact that a calendar year generally does not correspond to an individual's base period unless the individual became unemployed between April-June using a traditional base period. Given this any benefits from using the March CPS files instead of the full monthly CPS files are likely outweighed by the cost.

that determines if the respondent has sufficient base period earnings to qualify for UI for the individual's state of residence. The simulation is created using data from The Employment and Training Administration's "Significant Provisions of State Unemployment Insurance Laws" publications for various years combined with other administrative records from state agencies. If an individual has sufficient earnings to qualify for UI then the simulation also calculates the individual's weekly benefit amount including any dependent allowances when applicable.[17] While reported recipiency and benefit amounts are latent in this analysis, there are two main advantages of using simulated eligibility and benefits rather than reported benefits. First, UI take-up is endogenous. As noted by Blank and Card (1991) take-up rates among eligibles are typically around 67%. If take-up is correlated with search intensity then using actual benefits received would lead to a biased coefficient estimate on benefits received. Second, UI receipt is often unreported and misreported in survey data. As noted by Meyer, Mok, and Sullivan (2009), UI receipt is often unreported with average yearly reporting rates of 73.8% in the PSID, 74.7% in the SIPP, and 79.2% in the ASEC (March CPS). Hence simulation based methods can help to address these concerns.

The simulation then calculates the number of potential weeks of benefits that each individual is eligible for, which is typically between 12-26 weeks depending on the individuals' base period earnings and the state where the UI claim is based. The

[17] Dependent allowances are additional monetary payments made by states to eligible UI recipients who have qualifying dependents. The states that pay dependent allowances at some point during the sample period are Alaska, District of Columbia, Illinois, Iowa, Maine, Maryland, Massachusetts, Michigan, New Jersey, New Mexico, Ohio, Pennsylvania, Rhode Island, and Tennessee. Dependent allowances can range from a minimum of $5 per week in Pennsylvania (with one qualifying dependent) up to $300 per week in Massachusetts (with twelve qualifying dependents; $25 per dependent).

simulation also calculates all potential weeks of extended and emergency benefits using Trigger Notices for EB and EUC from The Employment and Training Administration. This is important as potential weeks of benefits reached as many as 99 weeks during the Great Recession and individuals in the data can be eligible for 1-99 potential weeks of benefits.[18] Aggregate unemployment and aggregate unemployment claims by type of claim and year are displayed in Figure 2.1.

In addition to monetary conditions, all states also have non-monetary conditions that can exclude voluntary job leavers, individuals not available for full-time employment, individuals fired for cause, and individuals that are eligible for UI but not actively seeking employment, among other requirements. To address non-monetary conditions, I also impose restrictions similar to Krueger and Mueller (2010). To do this, I use data from both the ATUS as well as the final wave of the CPS which is provided in the ATUS to classify each of the 5,555 unemployed individuals between the ages of 20-65 into four groups: On Temporary Layoff (N=703), New and Reentrants (N=2,125), Voluntary Job Leavers (N=138), and Job Losers (N=2,589). More specifically unemployed individuals are classified as:

- **On Temporary Layoff:** if they are classified as on layoff during the ATUS interview.

- **New and Reentrants:** if they were not in the labor force in the CPS and were unemployed in the ATUS and those that were unemployed in the CPS and

[18] State benefits can range from 1-30 weeks for eligible individuals, while extended benefits can range from 0-20 weeks, and emergency unemployment compensation can range from 0-53 weeks (although jointly they can only run for a maximum of 99 weeks).

indicated they were either a New or Reentrant and were still unemployed in the ATUS.

- **Voluntary Job Leavers:** those who were unemployed in the CPS and indicated they voluntarily left their job and remain unemployed in the ATUS.

- **Job Losers:** those who were unemployed in the CPS and indicated that they had lost their job with no expectation of recall, individuals that were unemployed in the CPS whose temporary jobs had ended, and individuals that were employed in the CPS and subsequently became unemployed with no expectation of recall.

I then classify New and Reentrants and Voluntary Job Leavers as ineligible for UI as many states have historically excluded Voluntary Job Leavers from receiving UI while New and Reentrants typically lack sufficient wage earnings during their base period to qualify for UI.[19] I then classify monetarily eligible Job Losers and those On Temporary Layoff with weeks remaining as eligible for UI and assign them their individual replacement rate. I focus my analysis on Job Losers as they are the largest of the groups and they are also most likely to satisfy non-monetary conditions needed to qualify for UI while excluding individuals On Temporary Layoff as they likely face different incentives than Job Losers (see Feldstein (1976), Feldstein (1978), and Topel (1983)).

[19] Using my simulations, it is possible to test if New and Reentrants have sufficient wage earnings during their base period to qualify for UI. For New and Reentrants between the ages of 20-65 with durations below their states' maximum potential weeks of benefits including extended and emergency benefits, one third (33.6%) are monetarily eligible for UI. However, there is still some concern about whether these individuals satisfy non-monetary conditions which are more difficult to address. Furthermore, many states offer benefits to voluntary job leavers if they view the reason for the voluntary exit as a compelling family reason, although this cannot be observed in the data.

2.3.4 Sample Characteristics

Sample characteristics are displayed in Table 2.2. There are 5,555 unemployed individuals in the ATUS between the ages of 20-65 from 2003-2013 with 2,589 of these individuals being classified as Job Losers. Of the Job Losers, 2,017 had unemployment durations below their states' maximum potential weeks of benefits including all extended and emergency benefits.[20] Of these, 1,060 have four observed observations during their base period. For Job Losers with four observations in their base period and satisfying the match quality algorithm, there are 1,013 such individuals implying that the procedure is able to match half (50.22%) of the Job Losers that are potentially eligible for UI in the ATUS between the ages of 20-65.

Each of the 1,013 potentially eligible Job Losers with four valid base period observations satisfying the match quality algorithm were then run through a UI simulation program that biennially captures the structure of each state UI system to determine monetary eligibility, weekly benefit amounts, and potential weeks of benefits for each respondent. Of these, 144 (14.2%) have observed base period earnings that are insufficient to be monetarily eligible for UI while 28 (2.8%) were eligible for less than the maximum weeks of benefits and had exceeded their maximum potential weeks of benefits implying that 17% of observed Job Losers are ineligible from receiving UI. After excluding the 17% of Job Losers that are ineligible for UI, the sample is composed of 841 monetarily eligible respondents that have not surpassed their maximum potential weeks of benefits. I then exclude 18 individuals from the analysis that have replacement rates above 100% or that make the minimum weekly benefit amount as this can lead to

[20] I also exclude a small number of individuals that worked part-time during their base period and live in states that don't pay benefits to individuals seeking part-time employment.

extremely large replacement rates in many states.[21] This leaves a sample of 823 individuals from 2003-2013 that are still eligible for UI with unemployment durations ranging from 5-61 weeks.[22] For these individuals, the average replacement rate is 48.12%.[23] Moreover 32.20% of these individuals make the maximum weekly benefit in their state which is consistent with Krueger and Meyer (2002) estimate of approximately 35%.

Table 2.3 displays weighted means of each variable included in the model stratified by year as well as a comparison to the weighted means of all Job Losers aged 20-65 that have unemployment durations less than their states' maximum potential weeks of benefits. For 2003-2013 mean job search was 60 minutes per day compared to 56 minutes for all Job Losers with the difference being slightly more pronounced for the 2003-2007 period. The average age of the sample is 41 years compared to 39 years for all Job Losers. The sample is slightly more educated than Job Losers with 25% of the sample having a college degree compared to 21% of Job Losers. Females makeup 42% of the sample compared to 43% of Job Losers. Moreover, the sample is slightly more likely to have a partner than Job Losers with 59% of the sample having a partner relative to 53% of Job Losers. The largest difference between the sample and Job Losers is homeownership with 71% of individuals in the sample being homeowners relative to

[21] Since the state minimum weekly benefit amount is often legislated by law, it is possible to qualify for UI in many states with earnings less than what is needed to qualify for the minimum weekly benefit amount using a state's UI benefit formula which can lead to large replacement rates.
[22] Since individuals can be in the CPS for a period spanning 16 months and the ATUS interview is typically conducted 2-5 months after the final CPS observation, the longest spell that I am able to observe is 61 weeks with the average spell length being 12.9 weeks given that UI base periods typically span a year.
[23] When applicable, the replacement rate includes a $25 benefit increase in UI benefits from the American Recovery and Reinvestment Act that was available from February 2009 until December 2010 for claims filed before May 27, 2010.

58% of Job Losers.[24] With the exception of homeownership, the means in Table 2.3 suggest that the sample and Job Losers are similar in regards to the variables used in the analysis.

2.4 Model

For the 823 ATUS respondents meeting this criterion from 2003-2013, I model search intensity following Krueger and Mueller (2010) while replacing log of maximum weekly benefit with each respondents' UI replacement rate. My model is then of the form:

$$(2.2) \quad Search_{ist} = \alpha + \beta_1 \text{ Replacement Rate}_{ist} + \beta_2 \log(\widehat{w}_{ist}) + \beta_3 \, dp_s + X_{ist} \, \pi_1 + d_t + u_{ist}$$

where $Search_{ist}$ is total minutes of the diary day that were devoted to job search, $\text{Replacement Rate}_{ist}$ is the ratio of each individual's weekly benefit amount to the individual's average weekly wage during the individual's base period, $\widehat{w}_{is}$ is the predicted hourly wage of worker i in state s, dp_s is a dispersion parameter created from the wage equation in Section 2.3, X_{ist} controls for age, age squared, education controls for high school degree or less; some college; and college degree, female, partner, children in the household, interactions between female and partner and female and children, weekend, and d_t are month and year fixed effects.[25] Standard errors are clustered by state. Moreover, all regressions are weighted using official survey weights. To isolate the

[24] This difference is primarily caused by the CPS following houses (the physical location) rather than individuals which increases the likelihood that individuals that move frequently will be excluded from the analysis. To address this difference, I include additional controls in certain specifications that control for homeownership.

[25] I also estimate models that include state fixed effects. These models don't meaningfully change my main findings and are available upon request.

component of UI variation that is only a function of variations in state UI generosity, I follow Gruber (1997) and instrument each individual's replacement rate with a simulated replacement rate. To create the simulated replacement rate, I run each of the 823 UI eligible individuals from the 2003-2013 period through the simulation program for each state-year cell and calculate the average replacement rate biannually.[26] [27] To ensure the validity of the instrument, F-Statistics for the significance of the instrument excluded from the structural model are included after each IV model. The F-Statistics across all specifications range from 12-67 and hence the instrument does not appear to be weak (see Staiger and Stock (1997) and Stock and Yogo (2005)).

To address the large changes in economic conditions and increases in potential weeks of UI benefits during the Great Recession, I stratify the sample into the 2003-2007 period and 2008-2013 period as well as including the entire sample period from 2003-2013. I also include additional macroeconomic controls in certain specifications to control for variations in economic conditions throughout the period. These include controls for the monthly state unemployment rate at the time of the ATUS observation, homeownership, the real value of the Case-Shiller National Home Price Index, the interaction between homeownership and the real value of the Case-Shiller National Home Price Index, and the real value of the S&P500. In these specifications, I also include a

[26] For similar applications used in the Medicaid literature see Currie and Gruber (1996), Gruber and Yelowitz (1999), and Brown, Kowalski, and Lurie (2014). Moreover, using the state average and maximum weekly benefits amounts divided by the state average weekly wage from administrative sources produces similar results.

[27] Krueger and Mueller (2010) include corresponding IV models using state level variation in UI generosity where they instrument for the state average weekly benefit amount using the state maximum weekly benefit amount in certain specifications.

control for expected potential weeks of benefits remaining to account for the large number of potential weeks of benefits that were available during the 2008-2013 period.

2.5.1 Results

The results for how UI generosity affects search intensity are displayed in Table 2.4. The results suggest that for the entire sample period from 2003-2013, higher replacement rates are associated with reductions in search intensity. The baseline estimates suggest that each percentage-point increase in an individual's replacement rate is on average associated with a 1.24 minute per day reduction in search times producing an elasticity of -1.0 while the IV estimates suggest a reduction of 1.43 minutes per day producing and elasticity of -1.2 with an average search time of 60 minutes per day. However, given the large amount of unemployment and lack of employment opportunities that arose following the Great Recession, the estimates for this period are much larger in magnitude when the years 2009-2010 are excluded from the analysis (See Table 2.6, Specification 6). For the 2003-2013 period (excluding 2009 and 2010), the baseline estimates suggest that each percentage-point increase in an individual's replacement rate is on average associated with a 1.56 minute per day reduction in search times producing an elasticity of -1.2 while the IV estimates suggest a reduction of 5.60 minutes per day producing and elasticity of -4.2 with an average search time of 64 minutes per day. While the results suggest that higher replacement rates are associated with reductions in search intensity, the stratified sample suggests that there are large differences in the effect of UI generosity in the pre and post periods of the Great Recession.

The results suggest that for the 2003-2007 period, higher replacement rates were associated with large reductions in search intensity. The baseline estimates suggest that each percentage-point increase in an individual's replacement rate is on average associated with a 2.65 minute per day reduction in search times implying an elasticity of -2.2 while the IV estimates suggest a much larger reduction of 7.04 minutes per day implying an elasticity of -5.8 with an average search time of 58 minutes per day. The elasticities are larger in magnitude than Krueger and Mueller (2010) OLS estimate of -1.6 for all Job Losers for the 2003-2007 period using the maximum weekly benefit.[28] However, since I am estimating this on a subsample of Krueger and Mueller's sample while excluding 16% of respondents that I observe that were never monetarily eligible for UI or had exceeded their maximum weeks of benefits, it is possible that sample heterogeneity is driving these differences. To test for sample heterogeneity, I reestimate Krueger and Mueller's OLS model for my sample of 285 individuals and obtain an elasticity estimate of -1.5 which is slightly smaller in magnitude than Krueger and Mueller's estimate for all Job Losers with durations below the state maximum potential weeks of benefits of -1.6 implying that sample heterogeneity is not driving these differences. My elasticity estimates between -2.2 and -5.8 suggest that reductions in search times caused by increases in UI generosity for this period are much larger than previously thought.

[28] Since Krueger and Mueller are using the maximum weekly benefit as a proxy for the generosity of the weekly benefit amount and since the replacement rate = (weekly benefit amount / the average weekly wage in the base period)*100, a 1% increase in UI generosity would increase the weekly benefit amount and hence the replacement rate by 1% which allows for the direct comparison between elasticities for the maximum weekly benefit amount and the replacement rate.

While the results in Table 2.4 suggest that for the 2003-2007 period higher replacement rates were associated with large reductions in time spent searching for a job, the effects are much smaller for the 2008-2013 period. The baseline estimates suggest that each percentage-point increase in an individual's replacement rate is on average associated with a .72 minute reduction per day in search times implying an elasticity of -.6 while the IV estimates suggest no reduction with a coefficient of zero and an elasticity of 0, with both coefficients being statistically insignificant. The average search time was 62 minutes per day over this period. For the 2008-2013 period (excluding 2009 and 2010 and displayed in Table 2.6), the baseline estimates suggest that each percentage-point increase in an individual's replacement rate is on average associated with a .62 minute per day reduction in search times producing an elasticity of -.4 while the IV estimates suggest a reduction of 4.33 minutes per day producing and elasticity of -2.8 with an average search time of 69 minutes per day. The results suggest that higher replacement rates had little effect on search intensity during the Great Recession and the period following the Great Recession, although the years 2009 and 2010 which were at the height of the labor market decline appear to be partially driving these results.

2.5.2 Additional Macro Controls and Potential Weeks of Benefits

One concern with these estimates is the large variation in economic conditions that occurred throughout the 2003-2013 period as well as the large amount of potential weeks of benefits available from 2008-2013. To address these concerns, I estimate the equation:

$$(2.3) \quad Search_{ist} = \alpha + \beta_1 \text{ Replacement Rate}_{ist} + \beta_2 \log(\hat{w}_{ist}) + \beta_3 dp_s + X_{ist}\pi_1 + Z_{st}\pi_2 + \lambda \text{ Weeks}_{ist} + d_t + u_{ist}$$

which is similar to Equation 2.2 while also including vector Z_{st} which controls for the macroeconomic conditions faced by the individual and $Weeks_{ist}$ which controls for known potential weeks of benefits remaining. The vector Z_{st} controls for the seasonally adjusted monthly state unemployment rate, homeownership, the log of the real Case-Shiller National Home Price Index, the interaction between homeownership and the log of the real Case-Shiller National Home Price Index, and the log of the real value of the S&P500. The variable $Weeks_{ist}$ controls for weeks of benefits remaining that an informed individual would have expected if current economic conditions persisted. Given the structure of EUC rollout, most individuals in the ATUS would not have known how many potential weeks of benefits they would ultimately be eligible for during the 2008-2013 period. To address this concern, I construct a variable that captures the number of potential weeks of benefits an individual would have expected to have remaining if current laws and economic conditions persisted at the time of the ATUS interview.[29]

The results are displayed in Table 2.5. The coefficients on replacement rate are similar to those in Table 2.4 with elasticity estimates of -2.2 to -6.4 for the 2003-2007 period and elasticity estimates of around 0 for the 2008-2013 period. The coefficients on potential weeks of benefits remaining are small and statistically insignificant. For the 2003-2007 period, this might be due to measurement error through not knowing potential weeks of benefits remaining for the 74% of individuals where unemployment duration is

[29] I also explore other measures of potential weeks of benefits remaining including total and continuous potential weeks of benefits remaining based off of my simulation as well as other measures of potential weeks remaining. Since most of the measures are highly correlated, interchanging these variables produces similar results.

unobserved and calculated as the midpoint between the 2-5 months between the CPS and ATUS. For these 74% of individuals, the error in weeks remaining can be as much as 4-11 weeks (depending on the time between the CPS and ATUS) which is large considering that the average expected potential weeks remaining for this period is 17 weeks as displayed in Table 2.3. Hence measurement error could be driving this result. For the 2008-2013 period, the coefficient on expected potential weeks remaining is essentially zero. Since unemployment duration is observed for 40% of this sample and the maximum potential error is much smaller (still 4-11 weeks) relative to average expected potential weeks remaining which is 37 weeks, measurement error is a much smaller concern for this period. This suggests that having more potential weeks of benefits remaining leads to little variation in search times for the 2008-2013 period. This is consistent with Farber and Valletta (2015) and Rothstein (2011) findings that expansions in potential weeks of benefits had small effects on reemployment probabilities and were primarily caused by individuals not exiting the labor force. Overall, the results suggest that higher replacement rates are associated with large reductions in search intensity during normal economic conditions, while the effects appear to be small and statistically insignificant during adverse economic conditions. Moreover, variations in potential weeks of benefits remaining do not appear to be associated with deviations in search times although measurement error could be driving this result for the 2003-2007 period.

2.5.3 Additional Specification Checks

In this section I use alternate specifications to consider the robustness of the results. The coefficients for the replacement rate are displayed in Table 2.6 and are

displayed by year and whether macroeconomic controls and expected potential weeks of benefits remaining were included in the models. The coefficients on expected potential weeks of benefits remaining are not included in Table 2.6 but are not statistically significant in any of the specifications the variable is included in.

One potential concern with the 2008-2013 estimates is that selection is driving the results. Given the large decline in the employment population rate over the period and the large increase in unemployment, one possibility is that individuals with low levels of labor force attachment remained unemployed rather than exiting the labor force to remain eligible for the large number of potential weeks of benefits available during this period. To address this concern, I reestimate Equation 2.2 and 2.3 on populations who are less sensitive to labor force transitions throughout the business cycle. Specification 1 reestimates Equation 2.2 and 2.3 for individuals aged 25-55. Individuals in this age range typically have a higher degree of labor force attachment than younger and older cohorts. Specification 2 looks at individuals without an employed partner since these individuals' change in household income is more sensitive to variations in the replacement rate, while Specification 3 looks at individuals aged 25-55 that don't have an employed partner. Overall, the results are similar to those including the entire sample of eligible Job Losers and suggest that selection is not driving the results.

Specification 4 includes each individual's weekly benefit amount in the baseline model. The inclusion of the individual weekly benefit amount has little effect on the replacement rate and its coefficients are small and statistically insignificant in each of the models. The final specification, Specification 5 estimates Equation 2.2 and 2.3 for the post 2007 period and the entire sample period while excluding data from 2009 and 2010

to ensure that these years which were at the peak of the labor market decline are not driving the results. For the 2008-2013 results (excluding 2009 and 2010), the coefficients are negative and larger in magnitude than the estimates including 2009 and 2010 but are still statistically insignificant. For the 2003-2013 period (excluding 2009 and 2010), the coefficients are negative and larger in magnitude than the estimates including 2009 and 2010. This suggest that increases in UI generosity appear to lead to large reductions in search intensity although these results are mitigated by the large number of unemployed and lack of job openings for the 2009-2010 period. In all, the specification checks suggest that the baseline results are robust.

2.5.4 Policy Implications

Overall the results indicate that more generous UI benefit amounts are associated with large reductions in search times during normal economic conditions although the effects appear to be more mitigated during the Great Recession and post-recession period with higher replacement rates having little effect on search times. This is important as search is an important means to finding reemployment. Krueger & Mueller (2010) find that a one hour increase in search times increases the likelihood of reemployment by 1.83 percentage-points for the sample of 18-24 year olds in the 1981 panel of the NLSY which asked unemployed respondents their search times.[30] Holzer (1988), using the same supplement, finds that more methods of search greatly increases job offer and

[30] Krueger and Mueller (2010) also use this supplement to test if length based sampling in the ATUS creates a selection problem where people with higher levels of search intensity are more likely to exit unemployment and be excluded from the sample relative to those with lower levels of search, which is a common problem in survey datasets. Krueger and Mueller find that length based sampling appears to only produce a minor bias on average search times with OLS estimates of 1 minute and IV estimates using "rather extreme assumptions" of around 8 minutes between week 13 and 39.

reemployment likelihoods. Given that search appears to be an important means to finding reemployment, the large elasticity estimates for the 2003-2007 period of -2.2 to -6.4 suggest that higher replacement rates could significantly reduce search intensity leading to reduced reemployment probabilities during normal economic conditions. The estimates are larger in magnitude than Krueger and Mueller (2010) elasticity estimates of -1.6 to -2.2, suggesting that higher replacement rates might induce a higher degree of moral hazard than previously thought during normal economic conditions. Moreover, variations in potential weeks of benefits remaining does not appear to affect search times for the 2003-2007 period, although measurement error might be driving this result.

However the results are more mitigated for the 2008-2013 period encompassing the Great Recession with higher replacement rates and more potential weeks of benefits remaining being associated with small and statistically insignificant effects on search times. The finding that potential weeks of benefits remaining has little effect on search times is consistent with much of the literature that has studied how the large potential weeks of benefits during the Great Recession affected reemployment probabilities (see Farber and Valletta (2015), Hagedorn, Karahan, Manovskii, and Mitman (2013), and Rothstein (2011)). Similarly, larger replacement rates don't appear to be leading to lower levels of search intensity during the Great Recession and selection does not appear to be driving these results.

Overall, the results suggest that the moral hazard that UI produces through higher benefit amounts appears to be larger than previously thought during normal economic conditions. However, these effects appear to be more mitigated during the Great Recession and post-recession period with higher replacement rates having little effect on

search times, although the years 2009 and 2010 which were at the height of the labor market decline appear to be partially driving this result. The findings are complementary to much of the recent work studying optimal UI benefits over the business cycle (see Kroft and Notowidigdo (2015), Landais, Michaillat, and Saez (2013), and Schmieder, von Wachter, and Bender (2012)).

2.6 Conclusion

This essay provides the first nationally representative estimates of how unemployment insurance generosity in the United States affects the search intensity of unemployed individuals using individual level variation in UI generosity. The essay expands the current literature through matching American Time Use Survey respondents to all of their observations in the Current Population Survey, the population from which they are drawn, and simulating monetary eligibility and entitlement to unemployment insurance at the individual level where past studies have been unable to examine monetary eligibility and have relied on state variations in the maximum weekly benefit amount which can differ significantly from an individual's actual benefit amount. The simulation is the first to fully simulate eligibility, weekly benefit amounts, and potential weeks of benefits for all extended and emergency benefits stemming from the Great Recession.

The results suggest that higher replacement rates are associated with large reductions in time spent searching for a job during the 2003-2007 period. However the results are more mitigated for the 2008-2013 period encompassing the Great Recession with higher replacement rates being associated with small and statistically insignificant

effects on search times. The results also suggest that variations in potential weeks of benefits remaining are not associated with deviations in search times over either period, although this could partially be due to measurement error for the 2003-2007 period. The results suggest that the moral hazard that more generous replacement rates can induce might be more mitigated during adverse economic conditions, especially at the height of the labor market decline during 2009 and 2010. This finding supports the view that optimal unemployment insurance replacement rates could be tied to labor market conditions, as more adverse economic conditions appear to reduce the moral hazard that more generous replacement rates are thought to bring about.

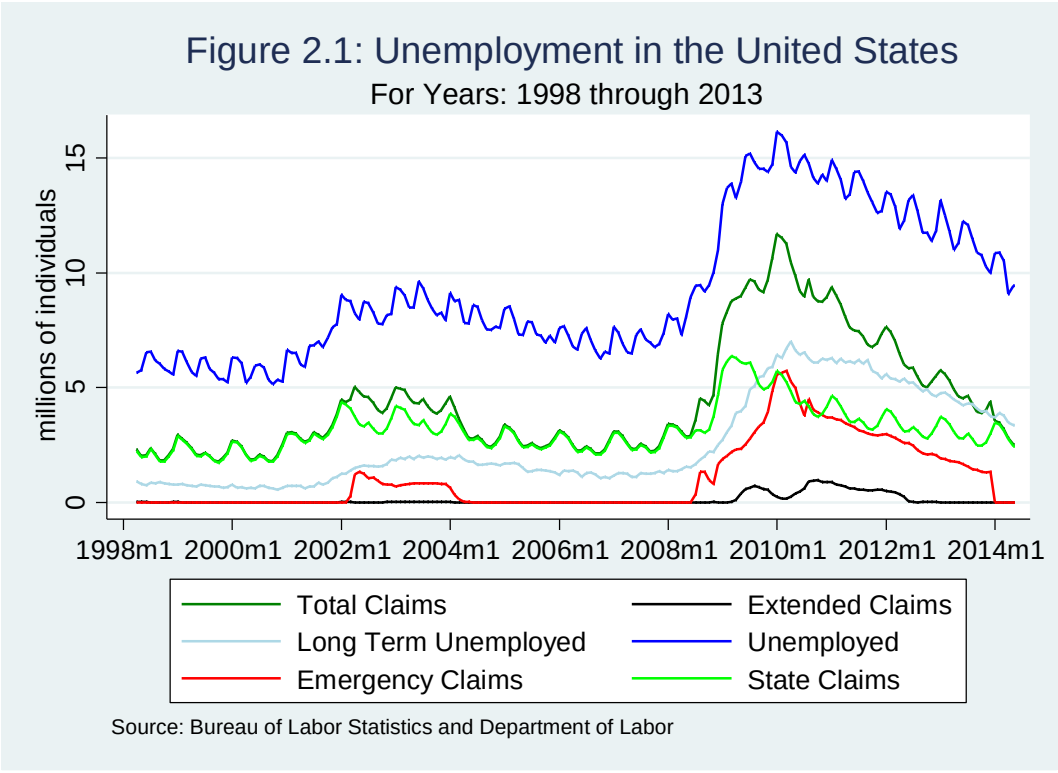


Figure 2.1: Unemployment in the United States
For Years: 1998 through 2013
millions of individuals
0
5
10
15
1998m1
2000m1
2002m1
2004m1
2006m1
2008m1
2010m1
2012m1
2014m1
Total Claims
Long Term Unemployed
Emergency Claims
Extended Claims
Unemployed
State Claims
Source: Bureau of Labor Statistics and Department of Labor

Table 2.1 - UI Benefits in Dollars and Weeks by State for 2013[a]

State	Min-WBA	Max-WBA	Average WBA	Average Weekly Wage	Min-Weeks	Max-Weeks
Alabama	45	265	207	794	15	26
Alaska	56	370	250	965	16	26
Arizona	122	240	221	866	12	26
Arkansas	81	451	289	736	9	25
California	40	450	301	1,083	14	26
Colorado	25	466	356	978	13	26
Connecticut	15	591	345	1,230	26	26
Delaware	20	330	245	1,002	24	26
D.C.	50	359	299	1,523	19	26
Florida	32	275	231	822	12	23
Georgia	44	330	267	909	6	20
Hawaii	5	534	424	781	26	26
Idaho	72	357	264	693	10	26
Illinois	51	413	324	1,016	26	26
Indiana	37	390	243	799	8	26
Iowa	59	396	337	780	7	26
Kansas	114	456	341	791	10	26
Kentucky	39	415	292	773	15	26
Louisiana	10	247	207	849	26	26
Maine	65	372	285	718	22	26
Maryland	50	430	329	996	26	26
Massachusetts	33	674	424	1,197	10	30
Michigan	117	362	293	899	14	20
Minnesota	24	393	376	970	11	26
Mississippi	30	235	194	683	13	26
Missouri	35	320	242	824	8	20
Montana	127	446	290	695	8	28
Nebraska	70	362	276	746	12	26
Nevada	16	402	308	822	12	26
New Hampshire	32	427	287	941	26	26
New Jersey	87	624	398	1,141	1	26
New Mexico	76	407	303	750	16	26
New York	64	405	308	1,276	26	26
North Carolina	46	535	290	833	13	26
North Dakota	43	516	396	947	12	26
Ohio	115	413	318	847	20	26
Oklahoma	16	386	293	809	18	26
Oregon	122	524	316	843	3	26
Pennsylvania	70	573	360	934	18	26
Rhode Island	45	566	351	870	15	26
South Carolina	42	326	248	747	13	20
South Dakota	28	333	276	680	15	26
Tennessee	30	275	235	843	13	26
Texas	62	440	341	999	10	26
Utah	26	479	345	794	10	26
Vermont	69	425	313	780	21	26
Virginia	54	378	295	990	12	26
Washington	143	604	387	1,012	1	26
West Virginia	24	424	275	748	26	26
Wisconsin	54	363	276	803	14	26
Wyoming	33	459	359	859	11	26

a. Minimum and maximum values for benefits and potential weeks of benefits are as of January 1, 2013.

Table 2.2: Determining UI Eligible Individuals and Sample Properties
For individuals age 20-65

Specification	2003-2007	2008-2013	2003-2013
Unemployed	2,171	3,384	5,555
By Unemployment Type:			
New or Reentrant	819	1,306	2,125
On Temporary Layoff	344	359	703
Job Leaver	65	73	138
Job Loser	943	1,646	2,589
Job Losers:			
& Less than State Maximum Weeks[a]	677	1,340	2,017
& Four obs. in Base Period	362	698	1,060
& Excluding Bad Matches	347	666	1,013
& Monetarily Eligible	298	571	869
& Have Weeks Remaining	291	550	841
Percentage of Ineligible Job Losers[b]	16.14%	17.42%	16.98%
& WBA> Min WBA & RR<100%	285	538	823
Eligible:			
Final Sample Size	285	538	823
Average Replacement Rate	46.10%	49.19%	48.12%
Percent Receiving Max WBA	33.33%	31.60%	32.20%
Number qualifying using ABP	13	26	39
Average Spell Duration (weeks)	9.62	14.65	12.90
Max Duration (weeks)	44	61	61

a: including all extended and emergency benefits

a: the difference between Job Losers and Less than State Maximum Weeks also includes a small number of individuals that worked part-time during their base period and live in states that don't pay benefits to individuals seeking part-time employment

b: Have Weeks Remaining / Four obs. in Base Period

Table 2.3: Summary Statistics for ATUS Respondents Aged 20-65

	2003-2007		2008-2013		2003-2013	
Specification	Mean	JL-Mean[a]	Mean	JL-Mean[a]	Mean	JL-Mean[a]
Job Search (minutes per day)	57.99	48.94	61.57	60.14	60.45	56.49
Replacement Rate	47.41		50.14		49.28	
log real Predicted Wage	2.92	2.84	2.82	2.76	2.85	2.79
Dispersion Parameter	0.49	0.49	0.49	0.49	0.49	0.49
Age	38.93	36.9	41.68	39.6	40.82	38.72
Some College	0.34	0.3	0.31	0.28	0.32	0.29
College Degree	0.22	0.19	0.26	0.21	0.25	0.21
Female	0.37	0.43	0.44	0.43	0.42	0.43
Female*Partner	0.24	0.24	0.24	0.21	0.24	0.22
Female*Children	0.22	0.22	0.17	0.19	0.19	0.2
Partner	0.58	0.53	0.6	0.53	0.59	0.53
Children	0.49	0.44	0.42	0.43	0.44	0.43
Weekend	0.26	0.25	0.27	0.29	0.27	0.28
State Unemployment Rate	5.25	5.28	8.73	8.89	7.64	7.71
Home Owner	0.76	0.59	0.7	0.58	0.71	0.58
log Case-Shiller	5.34	5.36	5.05	5.04	5.14	5.15
Home Owner x Case-Shiller	4.03	3.17	3.52	2.93	3.68	3.01
log Real-S&P500	7.26	7.27	7.13	7.14	7.17	7.18
Potential Weeks of Benefits	16.73		46.63		37.28	
N	285	677	538	1340	823	2017

a: Mean of all Job Losers in ATUS aged 20-65 with unemployment durations less than the state maximum potential weeks of benefits

Table 2.4: The Determinants of Job Search for UI Eligible Individuals
Measured in Minutes per day Searching for a Job

	2003-2007		2008-2013		2003-2013	
Specification	OLS	IV[a]	OLS	IV[a]	OLS	IV[a]
Replacement Rate[a]	-2.65**	-7.04*	-0.72	-0.00	-1.24*	-1.43
	(1.19)	(3.95)	(0.75)	(2.20)	(0.65)	(2.13)
log Real Predicted Wage[b]	131.76	193.50	-76.48	-91.41	-25.66	-21.95
	(130.64)	(160.46)	(84.81)	(81.49)	(72.10)	(78.17)
Dispersion Parameter[b]	-238.77	-438.13	109.31	183.98	84.66	67.84
	(380.96)	(399.72)	(204.19)	(275.52)	(163.51)	(230.17)
Age	-7.65	-12.84	14.74**	15.74**	8.37	8.09
	(9.97)	(12.69)	(6.75)	(7.21)	(5.28)	(6.50)
Age Squared	0.08	0.12	-0.16*	-0.17**	-0.09	-0.09
	(0.12)	(0.14)	(0.08)	(0.08)	(0.06)	(0.07)
Some College	-10.59	-30.24	38.06**	43.12**	25.80	24.58
	(32.17)	(43.93)	(18.08)	(20.24)	(16.85)	(21.09)
College Degree	-29.60	-108.68	90.76*	106.39*	61.97	57.91
	(71.26)	(115.04)	(51.03)	(55.05)	(43.23)	(56.31)
Female	61.52	79.16*	-35.19	-39.84*	-14.25	-13.18
	(44.58)	(46.11)	(27.18)	(23.11)	(25.33)	(22.69)
Female*Partner	-40.67	-16.77	-50.48*	-52.11*	-42.32**	-41.73**
	(29.69)	(37.10)	(26.33)	(26.62)	(17.98)	(19.45)
Female*Children	-4.44	-9.52	28.75	28.44	17.08	17.15
	(34.31)	(34.83)	(26.22)	(25.68)	(22.38)	(21.96)
Partner	6.20	-14.87	11.58	14.21	5.07	4.36
	(21.76)	(23.10)	(20.76)	(21.57)	(14.08)	(15.46)
Children	23.06	32.18	-22.43	-23.25	-5.93	-5.70
	(28.58)	(29.38)	(17.81)	(17.23)	(16.47)	(16.04)
Weekend	-60.90***	-65.90***	-58.44***	-56.89***	-62.94***	-63.32***
	(14.30)	(13.42)	(8.86)	(10.97)	(7.57)	(9.17)
Constant	110.73	370.73	-35.20	-115.97	3.54	17.17
	(218.45)	(315.88)	(115.92)	(243.71)	(103.90)	(195.65)
Year and Month Fixed Effects	X	X	X	X	X	X
N	285	285	538	538	823	823
F-Statistic for Instrument[c]		12.06		45.80		60.20
R-squared	0.2410	0.1334	0.2046	0.2009	0.1836	0.1833

Note: * ** *** indicate coefficient is statistically different from zero at the 90%, 95%, and 99% confidence level
Regressions are run with robust clustered standard errors at the state level.
For the Replacement and Unemployment Rates: 1=1%.

a The instrument for Replacement Rate is created through running the entire 2003-2013 sample though the simulation program biannually for each state-year cell and taking the average replacement rate for the entire sample.

b Predicted Wage and Dispersion Parameter are generated out of sample using CPS data from 2004-2005.

c F-Statistics are for the significance of the instrument excluded from the structural model.

Table 2.5: The Determinants of Job Search for UI Eligible Individuals with Macroeconomic Controls
Measured in Minutes per day Searching for a Job

	2003-2007		2008-2013		2003-2013	
Specification	OLS	IV[a]	OLS	IV[a]	OLS	IV[a]
Replacement Rate[a]	-2.69**	-7.80**	-0.65	-0.19	-1.25*	-1.60
	(1.09)	(3.87)	(0.74)	(2.17)	(0.63)	(2.13)
log real Predicted Wage[b]	112.18	180.85	-73.88	-81.39	-17.71	-12.17
	(126.21)	(164.41)	(88.36)	(80.43)	(73.33)	(73.94)
Dispersion Parameter[b]	-416.12	-663.52	101.18	148.16	60.47	29.81
	(403.20)	(441.19)	(211.91)	(285.95)	(166.65)	(237.16)
Age	-7.45	-13.71	14.56**	15.11**	7.66	7.21
	(9.75)	(13.32)	(7.03)	(7.09)	(5.71)	(6.53)
Age Squared	0.08	0.14	-0.16*	-0.16*	-0.08	-0.08
	(0.11)	(0.15)	(0.08)	(0.08)	(0.06)	(0.07)
Some College	-5.10	-27.57	40.72**	43.51**	26.70	24.80
	(27.86)	(42.70)	(19.19)	(18.68)	(17.48)	(20.22)
College Degree	-13.82	-104.39	90.69	99.39*	59.20	52.66
	(68.77)	(118.29)	(55.90)	(54.08)	(44.67)	(52.73)
Female	39.15	57.09	-35.68	-38.32	-13.33	-11.69
	(41.66)	(43.73)	(30.20)	(25.37)	(26.34)	(22.89)
Female*Partner	-21.04	8.66	-50.16*	-51.22**	-40.84**	-39.71**
	(28.06)	(38.33)	(25.59)	(25.73)	(17.25)	(19.39)
Female*Children	2.12	-5.05	28.48	28.30	15.92	16.05
	(32.00)	(30.28)	(26.44)	(25.55)	(21.36)	(20.85)
Partner	-2.68	-26.22	12.24	13.67	6.70	5.51
	(23.88)	(27.36)	(21.39)	(21.28)	(13.83)	(15.11)
Children	26.02	36.96	-20.26	-20.65	-4.31	-3.95
	(27.84)	(29.09)	(18.06)	(17.41)	(16.32)	(15.88)
Weekend	-58.11***	-63.92***	-56.41***	-55.35***	-61.91***	-62.58**
	(14.25)	(13.07)	(8.96)	(10.75)	(8.10)	(9.46)
State Unemployment Rate	7.48	10.79	-0.80	-0.77	-1.25	-1.24
	(10.54)	(13.40)	(3.66)	(3.41)	(3.59)	(3.54)
Home Owner	-596.81	-833.32	132.03	162.42	111.23	104.96
	(812.86)	(913.64)	(935.22)	(881.88)	(230.59)	(229.68)
log Case-Shiller	-476.11	-459.99	156.18	165.08	-49.75	-50.59
	(560.26)	(547.96)	(344.82)	(324.25)	(243.10)	(235.35)
Home Owner x Case-Shiller	104.30	147.48	-27.87	-33.66	-24.72	-23.65
	(151.99)	(171.06)	(185.70)	(175.06)	(44.61)	(44.18)
log Real-S&P500	-66.59	-24.81	53.34	60.37	60.37	55.51
	(284.29)	(289.89)	(67.87)	(72.83)	(69.89)	(76.75)
Expected Weeks Remaining	0.64	-0.31	-0.02	-0.03	-0.04	-0.03
	(1.09)	(1.33)	(0.34)	(0.32)	(0.34)	(0.32)
Constant	3170.05*	3122.40*	-1209.92	-1375.61	-142.82	-77.08
	(1813.92)	(1613.62)	(1465.23)	(1394.84)	(1221.55)	(1274.52)
Year and Month Fixed Effects	X	X	X	X	X	X
N	285	285	538	538	823	823
F-Statistic for Instrument[c]		22.66		53.58		67.24
R-squared	0.2701	0.1272	0.2095	0.2080	0.1885	0.1876

Note: * ** *** indicate coefficient is statistically different from zero at the 90%, 95%, and 99% confidence level
Regressions are run with robust clustered standard errors at the state level.
For the Replacement and Unemployment Rates: 1=1%.
a The instrument for Replacement Rate is created through running the entire 2003-2013 sample though the simulation program biannually for each state-year cell and taking the average replacement rate for the entire sample.
b Predicted Wage and Dispersion Parameter are generated out of sample using CPS data from 2004-2005.
c F-Statistics are for the significance of the instrument excluded from the structural model.

Table 2.6: Robustness Checks for Coefficient Estimates of Replacement Rate for Various Specifications

	2003-2007		2008-2013		2003-2013	
Specification	OLS	IV[a]	OLS	IV[a]	OLS	IV[a]
Baseline Model:						
(1) Age 25-55	-2.44*	-4.53	-0.46	0.53	-1.10*	-0.47
	(1.25)	(3.55)	(0.67)	(2.06)	(0.60)	(1.97)
(2) No Employed Partner	-2.13	-12.83***	-1.16	-1.44	-1.66**	-3.71
	(1.82)	(4.24)	(0.99)	(2.02)	(0.80)	(2.41)
(3) Age 25-55 & No Employed Partner	-2.11	-8.23**	0.03	-0.11	-1.16	-1.83
	(1.91)	(3.21)	(0.81)	(2.04)	(0.72)	(2.00)
(4) Including ln(Real WBA)	-2.61**	-6.53*	-0.75	-0.10	-1.28*	-1.34
	(1.24)	(3.46)	(0.85)	(1.81)	(0.73)	(1.81)
(5) Excluding 2009-2010			-0.64	-4.08	-1.56**	-5.60***
			(1.00)	(3.00)	(0.66)	(2.08)
Baseline Model with Macro Controls:						
(1) Age 25-55	-2.49**	-4.83	-0.28	0.34	-1.07*	-0.63
	(1.16)	(3.72)	(0.65)	(2.12)	(0.59)	(2.01)
(2) No Employed Partner	-2.45	-15.07***	-1.20	-0.36	-1.72**	-3.27
	(1.76)	(4.85)	(0.94)	(1.89)	(0.78)	(2.43)
(3) Age 25-55 & No Employed Partner	-2.60	-10.10***	0.08	0.34	-1.21	-1.32
	(1.85)	(3.89)	(0.86)	(1.81)	(0.76)	(1.93)
(4) Including ln(Real WBA)	-2.56**	-7.30**	-0.68	-0.22	-1.31*	-1.47
	(1.15)	(3.33)	(0.86)	(1.79)	(0.72)	(1.82)
(5) Excluding 2009-2010			-0.65	-4.26	-1.72***	-5.84***
			(0.98)	(2.89)	(0.61)	(1.93)
N	285	285	538	538	823	823

Note: * ** *** indicate coefficient is statistically different from zero at the 90%, 95%, and 99% confidence level
Regressions are run with robust clustered standard errors at the state level.
For the Replacement Rate: 1=1%.
a The instrument for Replacement Rate is created through running the entire 2003-2013 sample though the simulation program biannually for each state-year cell and taking the average replacement rate for the entire sample.
N is for full sample

3 Unemployment Insurance Modernizations and Unemployment Duration

3.1 Introduction

There is a large literature in economics that examines how unemployment insurance (UI) generosity affects spell duration, with much of this literature finding that a 10 percent increase in benefit amounts increases spell duration by 3-8%. To identify the effect that UI generosity has on spell duration, most papers focus on a group of unemployed workers that are viewed as homogeneous after controlling for demographics and examine how variations in UI generosity affect spell duration. However, one concern with this is that the pool of eligible UI recipients has become increasingly diverse over the last decade based on the cause of unemployment with individuals with limited earnings histories, part-time workers, and voluntary job leavers becoming a larger percentage of UI recipients. The changes have largely been driven by several states modernizing their UI systems to expand coverage to many groups that have historically been excluded from receiving UI including expanding benefits to individuals with limited earnings histories, unemployed part-time workers, voluntary job leavers with compelling reasons, and increased benefit amounts for individuals with children.

These policies were core components of UI modernization incentive payments made as part of the American Recovery and Reinvestment Act of 2009 (ARRA) and have been key components of the Obama Administration's plans to overhaul state UI systems. After the modernizations, 39 states offered more favorable earnings tests to individuals with limited earnings histories, 28 states offered benefits to part-time workers, 24 states offered benefits to voluntary job leavers with compelling reasons, while 14 states have

expanded benefit amounts for individuals with children. However, there is little empirical evidence about what effects these modernizations have had on recipiency and duration.

I focus this analysis on four types of modernizations. The first is a modernization that affects the windows of where UI earnings test are calculated which are typically called base periods. Traditional base periods use past earnings consisting of the earliest 4 of the last 5 completed calendar quarters preceding the filing of a UI claim to test for monetary eligibility. These exclude the last completed quarter before the filing of a claim. However in recent years, several states have implemented alternative base periods which use the last 4 completed quarters of earnings if an individual does not qualify using a traditional base period.

The second is a nonmonetary condition that often excludes part-time workers from receiving UI. More formally, the condition requires that UI recipients be available for and actively seek full-time employment.[31] While this condition does not disqualify part-time workers who are part-time for economic reasons, it can disqualify individuals that are part-time due to caring for children or other family members, part-time secondary-wage earners for tax purposes or to gain health insurance coverage, and individuals that prefer part-time employment. Hence, this condition could be difficult for the set of part-time workers who are part-time because they have constraints outside of the labor force that prevent them from working full-time as well as individuals who desire part-time employment.

[31] This should not be confused with underemployed workers who receive UI. For more about underemployed workers who receive UI, see McCall (1996).

Third, I examine provisions that exclude voluntary job leavers from receiving UI even if they are monetarily eligible. This is a common textbook exclusion from UI eligibility. However, essentially all states offer monetarily eligible voluntary job leavers unemployment benefits if the state considers the reason for leaving the job to be compelling, although what is a compelling reason varies significantly across states. The modernization I focus on does not disqualify individuals who voluntarily exited the labor force due to providing care for ill family members, were victims of sexual assault or domestic violence, or who became unemployed due to moving with a spouse who had relocated for employment purposes. However, these individuals must still pass UI earnings test to qualify for benefits. Fourth, I examine dependent allowances which are additional UI payments made to monetarily eligible individuals with children and sometimes spouses.

There are several reasons to believe that UI heterogeneity through the treatment of unemployed workers with limited earnings histories, part-time workers, voluntary job leavers that left for compelling reasons, and expanding benefit amounts for individuals with children could have differential effects on unemployment duration. First, alternative base periods expand coverage to individuals with shorter earnings histories. These individuals could include new and reentrants to the labor force with short employment durations before a spell and individuals that have suffered a past unemployment spell but regained employment before a subsequent spell, which could lead to increased spell duration. Second, part-time workers who become unemployed could have shorter unemployment durations than similar full-time workers, although there is little empirical evidence on the sign or magnitude of this difference. Third, eligible voluntary job leavers

could have significantly longer spell durations as the decision to become voluntarily unemployed is likely endogenous, where eligibility likely increases this probability. Fourth, dependent allowances which range from a minimum of $5 per week in Pennsylvania (with 1 qualifying dependent) up to $300 per week in Massachusetts (with 12 qualifying dependents; $25 per dependent) raise recipients' replacement rates, which could potentially increase the spell length of dependent allowance recipients. The purpose of this essay is to examine how these policies affect UI recipiency and spell duration.

Using the Survey of Income and Program Participation from 1997-2012, I use a multi-period difference in difference estimator to examine how these policies have affected UI recipiency and spell duration. My findings suggest that the UI modernizations that were part of ARRA led to large increases in UI recipiency. These were primarily driven by increases in recipiency from alternative base periods, expanding benefits to part-time workers, and higher take-up rates due to dependent allowances, while expanding benefits to voluntary job leavers led to smaller increases in recipiency. Moreover, I find that part-time unemployed workers and voluntary job leavers have spell durations that are around 6 weeks less than traditional claimants, while individuals with limited earnings histories and individuals that received additional payments for having children had similar spell durations to traditional claimants.

3.2 Literature Review

Unemployment insurance is the largest safety-net program for working age individuals. The program is operated jointly between the federal and state governments. At the height of the labor market decline following the Great Recession in 2010, the

program paid out over 12 million weekly claims with total joint expenditures of over 200 billion dollars during the year. The program often plays a critical role in helping workers smooth consumption during times of unemployment.

Since its inception in the United States in the late 1930s, there has always been a great deal of concern that UI produces a "moral hazard" effect where leisure is subsidized through UI and this "moral hazard" effect is often assumed to be increasing in UI generosity. As predicted by UI search models such as Mortensen (1977) and Moffitt and Nicholson (1982), UI lowers search intensity and raises reservation wages of recipients in both the replacement rate and duration of potential benefits. There is a large empirical literature that examines the effects of increased benefit amounts on spell duration. For example Moffitt (1985), Solon (1985), Meyer (1990), and others have found that a 10% increase in benefit levels increases spell duration by an average of between 3-8%.

There is also a large literature that examines how increases in potential weeks of benefits affect spell duration. For example, Moffitt (1985), Solon (1985), Katz and Meyer (1990), Card and Levine (2000), and others have found that a one week increase in potential benefits increases spell duration by between .08-.30 weeks. Moreover, several recent papers examine how potential weeks of benefits affected spell duration during the Great Recession as potential weeks of benefits reached up to 99 weeks for certain individuals. Farber and Valletta (2015) and Rothstein (2011) find a small but statistically significant increase in unemployment caused by the large increase in potential weeks of benefits, although their findings appear to be coming from decreases in the labor force exit rate rather than reductions in the job finding rate. While estimates vary widely, most research suggests that more generous unemployment benefits in terms

of benefit amounts and potential weeks of benefits increase spell duration although the size of this effect might vary throughout the business cycle.

Most of the papers that examine the moral hazard cost of UI focus on a pool of individuals that are initially eligible for UI and examine how more generous benefits affect these individuals' spell duration. However, this essay differs from these papers in that it focuses on how states determine who is initially eligible for UI and monetary payments to recipients with dependents to determine if this heterogeneity in worker type is affecting recipiency and spell duration.

There is a small literature that examines the effects on UI recipiency and cost of providing benefits to unemployed workers with limited earnings histories, part-time workers, voluntary job leavers, and paying dependent allowances. Vroman (1995) using administrative data examines six states (Maine, Massachusetts, Ohio, Rhode Island, Vermont, and Washington) which had enacted alternative base periods by the early 1990s. He finds that for these states between 6-8 percent of claims would have been ineligible under a traditional base period.

O'Leary (2011) uses administrative data from Kentucky, a state which has none of the policies examined in this essay to simulate how these policies affect UI cost and recipiency for each of the policies examined in this essay. O'Leary finds that implementing an alternative base period increases recipiency by 2.8 percentage-points, while finding that paying benefits to part-time workers, paying benefits to voluntary job leavers with compelling reasons, and paying dependent allowances would increase average UI total costs between 1.2%-6.3% per policy. However, one limitation of using administrative data is that individual and Department of Labor prescreening might

prevent individuals who are ineligible or likely to be ineligible from applying which is unobserved in administrative data.[32]

There have also been studies that rely on survey data to examine the effects of these policies on recipiency, although most of this research has focused on alternative base periods. Boushey, Stettner, and Wenger (2005) use the Survey of Income and Program Participation panels for 1993, 1996, and 2001 to estimate how a nationwide implementation of alternative base periods would increase UI recipiency. They examine unemployed workers between the ages of 16 and 65 and find that a nationwide implementation of alternative base periods would increase recipiency rates by approximately 6 percentage-points. Shaefer and Gould-Werth (2013) examine the effects of alternative base periods on UI recipiency. Using the March CPS, Shaefer and Gould-Werth examine the probability of individuals receiving UI after alternative base periods were implemented. They find that alternative base periods increase UI recipiency among part-time workers with less than a high school degree by 2.8 percentage-points and have smaller effects for more educated workers. This essay expands the current literature through being the first paper to examine how all four of these ARRA policies affect recipiency. I then examine how these policies affect unemployment duration, which has not been previously examined in the literature.

[32] O'Leary (2011) notes that 654,838 of the 720,913 Kentucky applicants in his sample from 2006-2009 were monetarily eligible for UI implying 90.8% of applicants were monetarily eligible. However, over the last decade, many states have added calculators online that estimate eligibility and benefit amounts, which likely reduce the probability of ineligible individuals from applying.

3.3 UI Eligibility and Modernizations

To qualify for UI in each state there are both monetary and non-monetary conditions. Monetary conditions require that recipients have a certain amount of earnings during an individual's base period to qualify for UI. These earnings are then used to determine the benefit level that the individual will receive which is capped at some maximum benefit that varies by state. Moreover, all states have non-monetary conditions that can exclude voluntary job leavers, individuals not available for full-time employment, individuals fired for cause, and individuals that are eligible for UI but that are not actively seeking employment, among other requirements. In many states base period wages also determine weeks of benefits which typically range from 10-26 weeks.

However since 1970, many states have implemented automatic trigger programs that typically extend potential benefit weeks for an additional 13-20 weeks when unemployment in the state crosses a certain threshold. Moreover during recessionary periods in the United States, Congress typically passes bills providing emergency unemployment compensation which extends potential weeks of benefits for individuals in all states or states that meet certain economic conditions. Combined state, extended, and emergency benefits led some UI recipients to receive unemployment benefits for as many as 99 weeks during the Great Recession. Minimum earnings to qualify for UI, maximum weeks of state benefits, and the minimum and maximum weekly benefit amounts for 2012 are displayed in Table 3.1.

One consideration for states when determining UI generosity is that states typically bear the full cost of state benefits. Extended benefit cost are typically split between the state and federal government while emergency benefits are fully financed by

the federal government. However during the Great Recession, extended benefits were also fully financed by the federal government. Given that states fully bear the costs of providing state benefits, there is a monetary incentive to restrict benefits to unemployed individuals. This can be seen by the fact that at any given time most unemployed individuals generally don't receive unemployment benefits. As noted by Blank and Card (1991), only about 30 percent of unemployed individuals receive unemployment benefits at a given time although this percentage has increased in recent years largely due to extended and emergency unemployment benefits during the Great Recession. Moreover, Blank and Card estimate take-up rates among eligibles of around 70 percent.

The overall UI recipiency rate peaked in early 2010 at around 80 percent, but had fallen to around 45 percent by the end of 2012 (see Figure 3.1 where recipiency is the ratio of total claims to unemployed). There are four main reasons that most unemployed individuals don't receive unemployment benefits. These reasons are not satisfying monetary requirements, not satisfying non-monetary requirements, exceeding the maximum weeks of benefits, and not taking up benefits. However, in recent years, several states have modernized their UI programs to increase the likelihood that individuals will meet UI programs' monetary and non-monetary requirements to qualify for benefits. I discuss these modernizations below.

Since the early 2000s, there have been a large number of states that have implemented policies to increase monetary and non-monetary eligibility, with much of the changes coming from provisions in ARRA which started offering states incentive funds in February of 2009. While ARRA got much attention for expanding emergency unemployment benefits, it also included significant provisions that offered states

incentive payments to modify their laws to increase eligibility and generosity of their UI programs, or if such laws already existed to show that they were compliant with UI modernization standards.

ARRA offered states a total of up to $7 billion to modernize their UI programs through increasing program eligibility and generosity.[33] Of this amount, one-third of funding was offered to states that offer alternative base periods which allow workers to count more recent earnings if they don't qualify for benefits using a traditional base period (or if the state's base period includes the most recent completed quarter of earnings). Contingent on being eligible for the initial one-third of funding through having an alternative base period, states could receive the remaining two-thirds of ARRA funding offered to them through having or implementing any two of the following four UI modernizations:

- Remove state laws requiring available for and actively seeking full-time work requirements because an individual is seeking only part-time work, except where a majority of the weeks of work in the individual's base period do not include part-time work.

- Provide 26 weeks of unemployment compensation to individuals who are unemployed and have exhausted all rights to regular UI payments, and are enrolled and making satisfactory progress in an approved training program.

- Provide unemployed individuals $15 or more in additional weekly benefits for each dependent of an unemployed individual up to at least $50 per week or 50% of the individual's weekly benefit amount, whichever is less.

[33] The maximum incentive payment allowable to any state was based off of the ratio of that state's taxable wages to the total taxable wages for all states from the preceding calendar year. Hence, larger states were typically offered more money to modernize their UI programs relative to smaller states.

- Extend benefits to individuals who voluntarily exited the labor force due to providing care for ill family members, victims of sexual assault or domestic violence, or who became unemployed due to moving with a spouse who relocated for employment purposes.

ARRA led eighteen states to implement alternative base periods and 2 states made minor fixes to comply with the law from 2009-2011, which brought the total number meeting the UI modernization standards to 39 states which are displayed in Figure 3.2. Eight states removed available for and actively seeking full-time work requirements for individuals whose base period histories were primarily part-time while six states made minor fixes to their laws to meet ARRA's requirements bringing the total number of states to offer benefits to part-time workers to 29 states which are displayed in Figure 3.3. Fifteen states expanded coverage to voluntary job leavers who exited the labor force due to providing care for ill family members, were victims of sexual assault or domestic violence, or who became unemployed due to moving with a spouse who has relocated for employment purposes, while five states modified their existing laws to comply with ARRA. After the modernizations, 24 states did not disqualify such individuals with compelling reasons which are displayed in Figure 3.4. Tennessee was the only state that enacted a dependent allowance while Illinois and Rhode Island altered their laws to become compliant with ARRA bringing the total number of states offering dependent allowances to 14 states which are displayed in Figure 3.5, although generosity and ARRA compliance vary widely.

In all, 39 states received ARRA funds between 2009 and 2011. After the modernizations, 39 states offered more favorable earnings tests to individuals with limited earnings histories, 28 states offered benefits to part-time workers, 24 states

offered benefits to voluntary job leavers with compelling reasons, while 14 states have expanded benefit amounts for individuals with children. ARRA modernizations undertaken by states are displayed in Table 3.2.

One consideration with this analysis is how to treat states who fixed their laws to become ARRA compliant (see Figure 3.2 - Figure 3.5), where a state might have had the ARRA policy in place prior to ARRA but the wording of the state's policy might not have been ARRA compliant. For determining how to treat these states who "fixed" their policies, I rely on the Employment and Training Administration's "Comparison of State Unemployment Insurance Laws" from 2001-2012 and state sources prior to 2001 which is the first year that the handbooks are available. If the state was classified as meeting the ARRA requirement, then I classify the state as having the policy for the analysis.

3.4 Models

To analyze how the modernizations affected recipiency and spell duration, I use generalized difference in difference models to capture the variation in timing of when states adopted the ARRA policies (see Bertrand, Duflo, and Mullainathan (2004) and Hansen (2007) for a description of the generalized models). The models contain both state and period fixed effects (a fixed effect for each unique month and year combination), to isolate the effects of the ARRA policy variables that have variation across both state and time.

3.4.1 ARRA and Expanding UI Coverage

To examine how UI heterogeneity affects recipiency, I first examine how each modernization increases the likelihood of recipiency. To examine this, I estimate generalized difference in difference logit models of the form:

$$(3.1) \quad UI_{ist}^{*} = \alpha_0 + ARRA_{st}\ \lambda + \alpha_2 UR_{st} + X_{ist}\,\varphi + \delta_t + \theta_s + e_{ist},\ UI_{ist} = 1[UI_{ist}^{*} > 0]$$

where UI_{ist}^{*} is a latent variable whose value is determined by the given equation, UI_{ist} is a binary variable that takes on the value of 1 if the respondent reported receiving UI. $ARRA_{st}$ is a vector for the ARRA policies examined in the essay. It denotes whether state s had expanded UI coverage to individuals with limited earnings histories, part-time workers, voluntary job leavers with compelling reasons, or increased benefit amounts for individuals with children before the spell start date at time t. The ARRA variables take on a value of 1 if the state had an alternative base period or extended benefits to part-time workers by the spell start date, for compelling family reasons a value of 0, 1/3, 2/3, and 1 representing the percentage of the three policies considered compelling family reasons in ARRA the state had implemented at the time of the spell, and a value of 1 if the state paid dependent allowances at the time of the spell, respectively. X_{ist} controls for age, age squared, education, married, number of children, the interaction between married and number of children, and race. δ_t and θ_s are period and state fixed effects, respectively. UR_{st} is the state unemployment rate for period t. Standard errors are block-bootstrapped at the state level.[34]

[34] See Bertrand, Duflo, and Mullainathan (2004).

3.4.2 ARRA and Spell Duration

It is likely that the UI modernizations as part of ARRA led to differential effects on spell duration based on the type of expanded eligibility. For example, voluntary job leavers' spell duration might respond differently to UI eligibility relative to individuals that did not voluntarily select into unemployment. To examine how UI heterogeneity affects spell duration, I estimate generalized difference in difference models of the form:

$$(3.2) \quad DUR_{ist} = \alpha_0 + ARRA_{ist}\ \lambda\ + \alpha_1\ RR_{ist} + RR_{ist}\ x\ ARRA_{ist}\ \psi + \alpha_2 UR_{st} + X_{ist}\ \varphi + \delta_t + \theta_s + e_{ist}$$

DUR_{ist} is the spell duration of individual i measured in weeks.[35] For the analysis, I examine spell duration over the first 52 weeks of unemployment and exclude left censored observations from the analysis. $ARRA_{ist}$ is the main explanatory variable. It denotes whether respondent i qualified using an alternative base period, was a part-time worker who was eligible for benefits, was a voluntary job leaver with compelling reasons, or if the individual received a dependent allowance.

RR_{ist} is individual i's replacement rate measured as the ratio of the weekly benefit amount (including dependent allowances) from the benefit calculator to the observed average weekly wage during the respondent's base period. $RR_{ist}\ x\ ARRA_{ist}$ is a vector for the interaction terms between the replacement rate and the ARRA policy variables. X_{ist} controls for the log of the respondent's average weekly wage during the base period in real terms using CPI-U-RS, age, age squared, education, married, number of children,

[35] The fixed effects in these models makes duration models difficult to estimate. For another example of a paper using difference in difference analysis to examine spell duration see Meyer, Viscusi, and Durbin (1995).

the interaction between married and number of children, and race. δ_t and θ_s are period and state fixed effects, respectively. UR_{st} is the state unemployment rate for period t. Standard errors are block-bootstrapped at the state level.

3.5 Data

To analyze how heterogeneity in state insurance programs affects recipiency and unemployment duration, I use data from the Survey of Income and Program Participation (SIPP) between 1996 and 2012. The data is composed of the 1996, 2001, 2004, and 2008 panels of the SIPP. The SIPP is produced by the Census Bureau to provide comprehensive information on wealth, participation in transfer programs, and employment. Households participating in the survey are contacted every four months for periods lasting between two and four years. Each panel is split into four groups with each group being interviewed in a separate month. Combined each of these group's observations over a 4-month period creates what is commonly referred to as a wave. In each wave, respondents are asked to provide information about the four months since their previous interview.

Furthermore, respondents are asked to provide their employment status for each week of each month. Among other things, the SIPP provides longitudinal data on weekly labor force status, the availability of asset data, large sample sizes of individuals followed over multiple years, and data on UI receipt. The survey also asks respondents their reason for unemployment. This includes a brief description of the reason the individual's job ended for the 1984-1993 SIPP panels. However, starting in the 1996 panel and thereafter the SIPP includes a detailed question about the primary reason that a job

ended.[36]

Since reported benefit amounts are often quite noisy, I run each respondent's base period earnings through a benefit calculator to determine if the individual is monetarily eligible to receive UI. The benefit calculator is created using data from The Employment and Training Administration's "Significant Provisions of State Unemployment Insurance Laws" for each year from 1997-2012. If an individual has sufficient earnings to qualify for UI then the program also calculates the individual's weekly benefit amount including any dependent allowances when applicable. A further discussion of the benefit calculator is provided in the data appendix.

For estimates of how the ARRA policies affect recipiency, I use a sample of 18,373 unemployed SIPP respondents between the years 1997-2012.[37] The sample is composed of unemployed respondents, where base period earnings were observed regardless of UI eligibility, and that had spells lasting over a week. Summary statistics using official SIPP weights are reported in the first column of Table 3.3. Females make up 44% of respondents in the sample and 37% of the sample is married. Most of the sample has a high school degree as the highest level of education with 16% of the sample reported having less than a high school degree, 68% reported having a high school degree and no college degree, and 16% reported having a college degree or higher. For the policy variables, 37% of respondents lived in states where alternative base periods were

[36] More specifically, the question lets individuals report the reason the job ended as layoff, retired, childcare problems, family or personal obligations, own illness, own injury, school or training, discharged or fired, employer went bankrupt, employer sold business, job was temporary and ended, quit to take another job, slack work or business conditions, unsatisfactory work arrangements, or quit for some other reason.

[37] Given that a base period spans that first five quarters of a respondent's observation window and that SIPP panels bring in new respondents every 2-4 years, I observe no spells that start in 1996, 2001, 2004, or 2008.

available, 37% lived in states where individuals seeking part-time work were eligible for benefits, 57% of the ARRA compelling family reasons were available, and 26% lived in states that payed dependent allowances.

To examine how UI affects unemployment duration, I use the SIPP from the years 1997-2012 and restrict the sample to individuals that reported receiving UI during a spell lasting at least one week who did not have imputed earnings during their base period. The sample is composed of 4,500 unemployed respondents meeting these requirements, given that around 28% of the previous sample reported receiving UI and around 13% of these individuals had imputed earnings during their base period. Of this sample, 3,777 were traditional claims that were not directly affected by the ARRA policies covered in this essay, 52 individuals qualified using alternative base periods, 39 individuals qualified using part-time worker provisions, 26 qualified using compelling family reason provisions, and 628 received dependent allowances.[38] Summary statistics using official SIPP weights are reported in Table 3.3. Females make up 44% of unemployed respondents in the sample and 52% of the sample is married. Most of the sample has a high school degree as the highest level of education with 12% of the sample having less than a high school degree, 67% having a high school degree and no college degree, and 21% having a college degree or higher.

One potential concern is that "seam effects" where month-to-month changes in responses tend to be larger for seam months than for adjacent non-seam months could be affecting my results. Seam effects can occur in the SIPP when individuals are reporting their weekly employment status over the past four months which could lead to artificial

[38] These add up to 4,522 as 22 of the unemployed UI recipients who became eligible for UI under the ARRA provisions covered in ARRA also qualified for dependent allowances.

spikes in hazards at the fourth and eighth months. To test if seam effects are driving the results, I follow Grogger (2004) and Ham and Shore-Sheppard (2005) and re-estimate the results dropping months that don't correspond to the last reference period. Doing this produces similar results to my baseline estimates but with larger standard errors given the reduction in sample size.

3.6.1 Unemployment Modernizations and Recipiency

The results are displayed in Table 3.4. The marginal effects of implementing an alternative base period, extending benefits to unemployed part-time workers, extending benefits to voluntary job leavers with compelling family reasons, or paying dependent allowances are displayed in Specifications 1-4, respectively. The results suggest that recipiency increases by 3 percentage-points from implementing alternative base periods, by 2.2 percentage-points from extending benefits to part-time workers, by 1.3 percentage-points for extending benefits to voluntary job leavers with compelling family reasons, and by 5.6 percentage-points from paying dependent allowances. Given that 28% of the sample receives UI, this suggest that recipiency increases by 10.7% through implementing alternative base periods, by 7.9% through extending benefits to part-time workers, by 4.3% through extending benefits to voluntary job leavers with compelling family reasons, and by around 20% through paying dependent allowances. However, one potential concern with stratifying the models by type of policy implemented is that multiple policies might become effective at the same time (or around the same time) or workers might qualify for more than one of the policies. This could lead to the marginal effects on the policy variables overstating the effect of each individual policy.

To address this concern, Specification 5 includes estimates controlling for each of the four policies simultaneously. The results suggest that recipiency is increased by 2.3 percentage-points from implementing alternative base periods, by 1.5 percentage-points from extending benefits to part-time workers, by 0.9 percentage-points from adopting all three of the ARRA compelling family reasons provisions, and by 3.9 percentage-points from paying dependent allowances. The standard errors are larger when all of the policy variables are included in the model which is likely due to multicollinearity, although the marginal effect on alternative base period is statistically significant and the marginal effect on dependent credit is nearly statistically significant with a p-value of 1.59.

The marginal effects suggest that alternative base periods, expanding benefits to part-time workers, and paying dependent allowances lead to large increases in recipiency while expanding benefits to voluntary job leavers appears to have a small effect on recipiency. Given that only 28% of unemployed individuals in the sample reported receiving UI, these effects are quite large with the estimates from Specification 5 suggesting that implementing all four of these policies increases recipiency by around 22.2%.[39] The estimates are around four times the size of Shaefer and Gould-Werth (2013) estimates of implementing both an alternative base period and extending benefits to unemployed part-time workers effect on increasing recipiency by around 1 percentage-point combined. The estimates are in line with O'Leary (2011) estimate for implementing an alternative base period and around half of Vroman (1995) estimate.

[39] Given that around 40% of unemployed individuals received UI over this period and as noted by Meyer, Mok, and Sullivan (2009), reporting rates in the SIPP for UI receipt were 74.7% for the years 1987-2007, this number seems reasonable.

Another question of interest to policymakers is the demographic backgrounds of who these policies increase eligibility for. To examine this, I interact my education group variables with each of the policy variables.[40] The results are displayed in Table 3.5. The results suggest that extending benefits to individuals with limited earnings histories through implementing alternative base periods increases recipiency for individuals with a high school degree or higher by 2 to 3 percentage-points. However, this result is primarily concentrated on individuals with a high school degree or higher. Providing benefits to unemployed part-time workers increases recipiency by around 2 percentage-points for high school degree holders with no college degree and by around 3 percentage-points for college degree holders. However, expanding benefits to voluntary job leavers increases recipiency by around 4 percentage-points for individuals with less than a high school degree, although the marginal effects are not statistically significant. Paying dependent allowances increases recipiency by 3 to 4 percentage-points for individuals with a college degree, by 2 to 3 percentage-points for those with a high school degree, and has no effect on recipiency for individuals with less than a high school degree.

3.6.2 Unemployment Modernizations and Spell Duration

The baseline estimates are reported in Table 3.6. For Specifications 1-4, each of the ARRA policy variables are run separately with the 3,777 traditional claimants that qualified not using the ARRA policies. The results suggest that qualifying for UI with an alternative base period leads to slightly longer unemployment durations, although the results are not statistically significant. Using the average replacement rate of 98% for

[40] Given that the SIPP is a relatively short panel lasting 2-4 years, it is difficult to estimate life-time earnings and instead I use education to proxy for this.

individuals that qualified for UI using an alternative base period, the results suggest that individuals that qualify for UI using an alternative base period have average spell durations of around two weeks longer than traditional claimants. Part-time workers who received benefits have average spell durations that are six weeks less than traditional claimants, although the results are not statistically significant. Voluntary job leavers have shorter unemployment spells than traditional claimants, with an average spell duration of around 6 fewer weeks evaluated at the mean replacement rate for these individuals. Moreover, the results suggest that dependent allowances have no effect on spell duration.

It should be noted that higher replacement rates were not associated with longer spell durations in the models. While this might seem troubling, much of the variation in the ARRA policies is coming in the 2009-2012 period, where UI generosity payments have been shown to have no effect on spell duration (see Farber and Valletta (2015) and Rothstein (2011)). Hence as economic conditions normalize, it is possible that differential effects could occur.

Another potential concern with these estimates is that wages (which determine replacement rates) could be correlated with unemployment duration. For example, more generous replacement rates might be correlated with selection into unemployment and potentially longer spells. To address this concern, I use a two-step method used by Chetty (2008) where in the first stage I predict respondents' base period wages. To do this, I use a log wage equation of the form:

$$\ln(w_{ist-1}) = \alpha + Z_{ist}\,\psi + \lambda\, UR_{st} + \theta_t + u_{ist} \tag{3.3}$$

where Z_{ist} includes controls for age, age squared, education group, gender, industry, occupation, marital status, $UR_{st}\ is$ the state unemployment rate at time t, θ_t are year

fixed effects, and u_{ist} is the robust error term. I then recover the predicted wage in levels and run it through my benefit calculator.

The results using the predicted replacement rate are displayed in Table 3.7. The sample sizes are slightly smaller as I was unable to predict wages for 80 of the individuals as they had either missing industry or occupation codes. Qualifying for UI using an alternative base period is associated with a 3 week increase in spell duration, which is not statistically significant. Qualifying as a part-time worker is associated with a 9 week decrease in spell duration which is offset by .032 weeks for each percentage-point increase in the replacement rate. Evaluated at the mean replacement rate for part-time unemployed workers of 62%, the estimates suggest that they would have spell durations that are around 7 weeks less than traditional claimants. For voluntary job leavers, the results suggest that they have spell durations around six weeks less than traditional claimants evaluated at their mean replacement rate of 60%. Moreover, the results suggest that dependent allowances have no effect on spell duration.

My findings suggest that individuals that qualify for UI that are part-time unemployed workers and voluntary job leavers have unemployment spell durations that are shorter than traditional claimants. Individuals that qualify for UI using an alternative base period and individuals that receive dependent allowances have similar unemployment durations to traditional claimants evaluated at the mean replacement rate.

3.6.3 Policy Costs

One particular question of interest to policymakers is the costs associated with implementing the ARRA policies. The cost of the policies are dependent upon the

increases in recipiency stemming from the policy, the weekly benefit amount paid to these individuals, and their spell duration. This can lead to significant variations in the cost of implementing each of the ARRA policies.

For alternative base periods, the average benefit amount is $186.6 compared to $312.2 for traditional claimants, which is displayed in Table 3.3. Since dependent allowances increase recipiency by around 2.3 percentage-points with 28% of the unemployed sample reporting receiving UI, total claims increase by 8.2% through implementing alternative base periods. Since alternative base period recipients have similar spell durations to traditional claimants, implementing an alternative base period increases total UI expenditure by 4.9% on average.

For expanding benefits to unemployed part-time workers, their average benefit amount is $221.7 compared to $312.2 for traditional claimants. Since paying benefits to unemployed part-time workers increases recipiency by around 1.5 percentage-points with 28% of the unemployed sample reporting receiving UI, total claims increase by 5.4% through paying benefits to unemployed part-time workers. Since unemployed part-time workers have spell durations that are around six weeks less than traditional claimants, paying benefits to unemployed part-time workers increases total UI expenditure by 2.9% on average.

For expanding benefits to voluntary job leavers with compelling reasons, their average benefit amount is $297 compared to $312.2 for traditional claimants. Since paying benefits to voluntary job leavers increases recipiency by around .9 percentage-points with 28% of the unemployed sample reporting receiving UI, total claims increase by 3.2% through paying benefits to voluntary job leavers with compelling reasons. Since

voluntary job leavers have spell durations that are around six weeks less than traditional claimants, paying benefits to voluntary job leavers increases total UI expenditure by 3.2% on average.

For dependent allowances, I use my benefit calculator to determine the amount of the dependent allowance and use this to determine how much these increase benefit amounts. For dependent allowance recipients, the average weekly benefit amount for these individuals was $344.5 in 2012 dollars. Of this amount, $34.8 represents dependent allowances, which increases benefits amounts by around 11.2% on average. Since dependent allowances increase recipiency by around 4 percentage-points with 28% of the unemployed sample reporting receiving UI, total claims increase by 13.9% with dependent allowances. Since these claims are on average 11.2% more expensive than traditional claims and dependent allowances have no effect on spell duration, my estimates suggest that dependent allowances increase the cost of UI by around 15.4% on average.

The cost estimates for alternative base periods, paying benefits to unemployed part-time workers, and expanding benefits to voluntary job leavers with compelling family reasons are in line with O'Leary (2011) estimates of increasing cost by 1.5-5%. However, the estimates for the cost of dependent allowances are over twice the size of O'Leary (2011) estimate of 6.3% which is driven by the high take-up rate of this group, which is not observable in the Kentucky administrative data that O'Leary (2011) uses. The high costs associated with paying dependent allowances are likely why they are the least prevalent of the policies examined in this essay and why Tennessee was the only state to adopt dependent allowances under ARRA.

3.7 Conclusion

This essay examines how expanding UI benefits to individuals with limited earnings histories, part-time unemployed workers, voluntary job leavers with compelling reasons, and paying dependent allowances affect UI recipiency and spell duration. Using the SIPP from 1997-2012, I examine how these policies affect recipiency and unemployment duration. I find large increases in recipiency from implementing alternative base periods, expanding benefits to part-time workers, and higher take-up rates due to dependent allowances, while expanding benefits to voluntary job leavers leads to smaller increases in recipiency. Moreover, part-time unemployed workers and voluntary job leavers have average unemployment spell durations that are around 6 weeks less than traditional claimants. I find no evidence that individuals that qualify for UI using an alternative base period or dependent allowance recipients have spell durations that vary from traditional claimants.

Overall, my findings suggest that the UI modernizations that were part of ARRA led to large increases in UI recipiency. These increases have led to a large number of individuals to receive UI benefits who would have historically been ineligible from receiving benefits. The results suggest that expanding benefits to individuals with limited earnings histories increases program costs by around 5%, expanding benefits to unemployed part-time workers and voluntary job leavers with compelling reasons increases total cost by around 3% for each policy, and increased benefit amounts for individuals with children increases cost by around 15% which is largely driven by higher take-up rates due to the dependent allowance payments. These results should be helpful for policymakers considering implementing these policies.

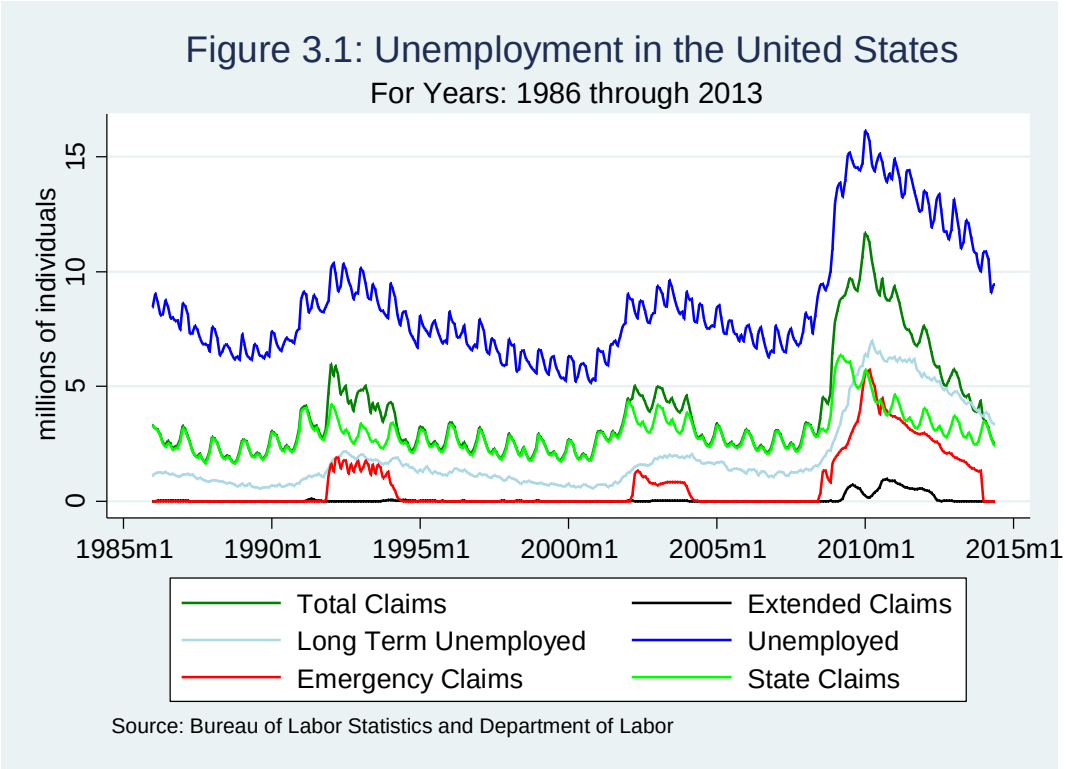


Figure 3.1: Unemployment in the United States
For Years: 1986 through 2013
millions of individuals
0
5
10
15
1985m1
1990m1
1995m1
2000m1
2005m1
2010m1
2015m1
Total Claims
Extended Claims
Long Term Unemployed
Unemployed
Emergency Claims
State Claims
Source: Bureau of Labor Statistics and Department of Labor

Figure 3.2: Alternative Base Periods

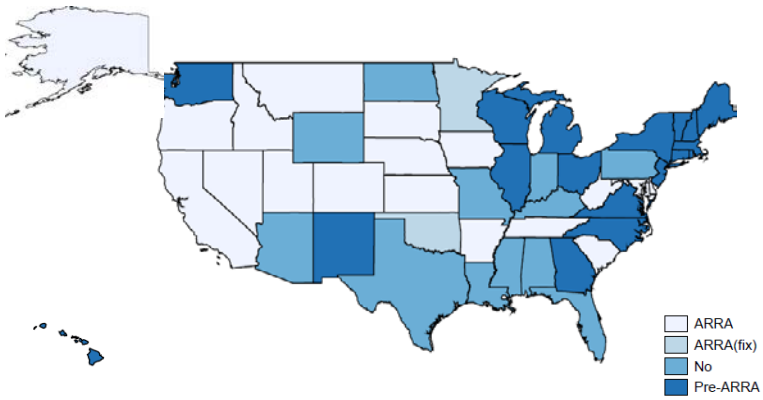


Figure 3.3: Benefits for Part-Time Workers

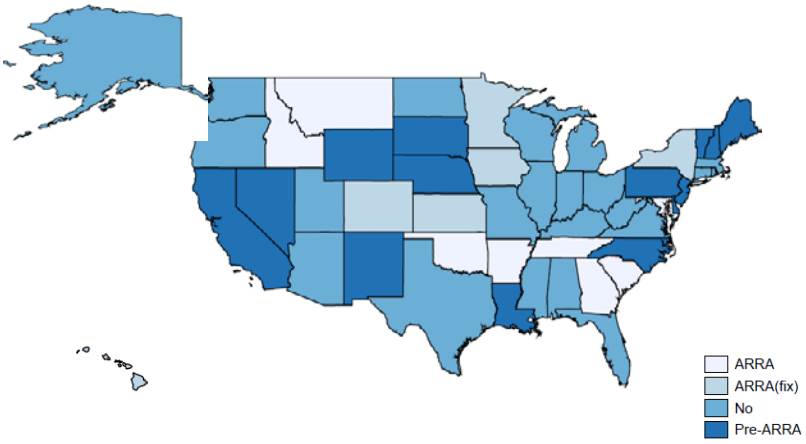
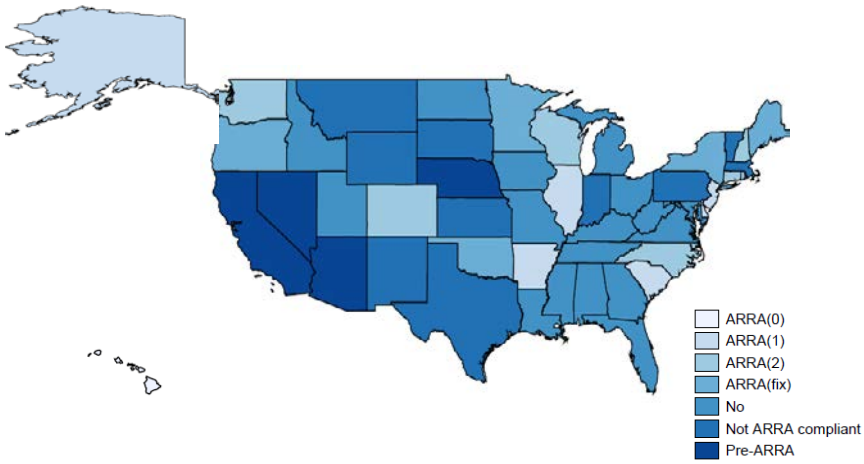


Figure 3.4: Benefits for Voluntary Job Leavers with Compelling Reasons



ARRA( ) is number of the three compelling reasons in place before ARRA

Figure 3.5: Dependent Allowances

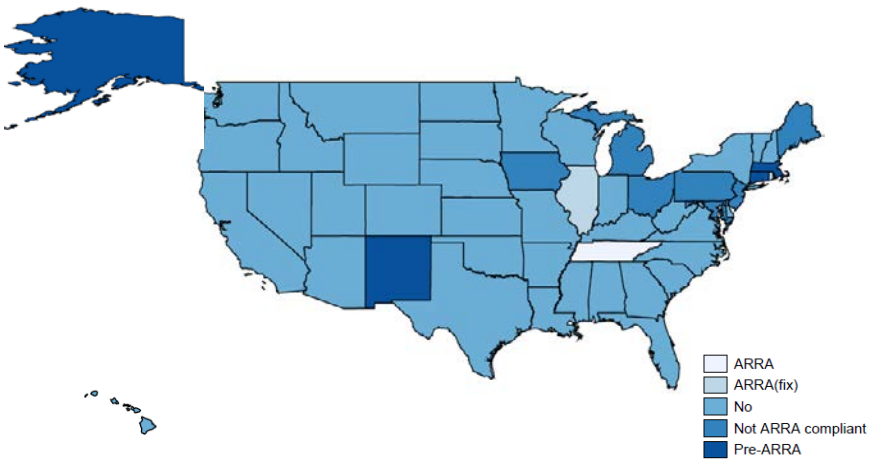


Figure 3.6: Traditional Base Period

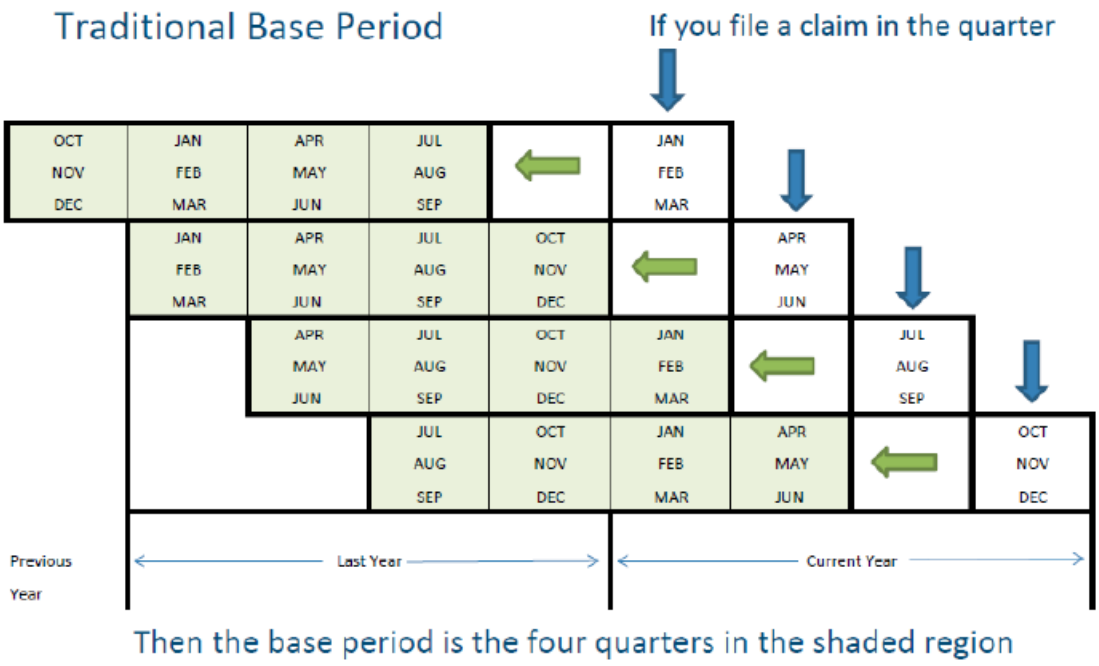


Figure 3.7: Alternative Base Period

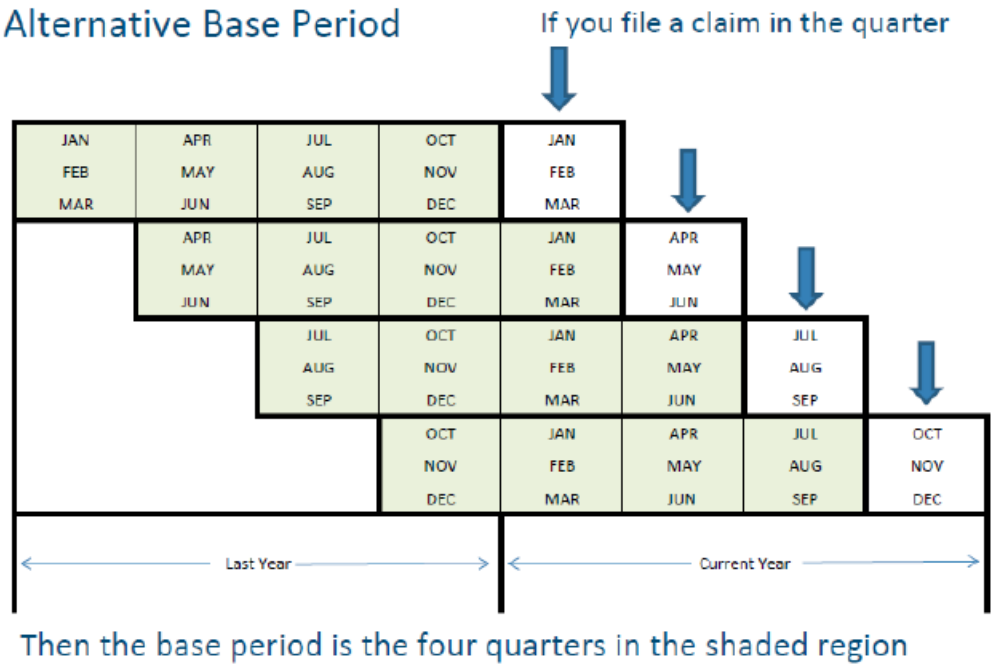


Table 3.1: Wages to Qualify and Benefit Amounts for 2012

States	Wages to Qualify	Max Weeks	Min. Weekly Benefit	W/ Dep*	Max. Weekly Benefit	W/Dep*
Alabama	2314	26	45		265	
Alaska	2500	26	56	128	370	442
Arizona	2250	26	119		240	
Arkansas	2870	25	81		451	
California	1125	26	40		450	
Colorado	2500	26	25		466	513
Connecticut	600	26	15	30	573	648
Delaware	720	26	20		330	
District of Columbia	1950	26	50		359	
Florida	3400	23	32		275	
Georgia	1760	20	44		330	
Hawaii	130	26	5		523	
Idaho	2340	26	72		343	
Illinois	1600	25	51	77	403	549
Indiana	4200	26	37		390	
Iowa	1990	26	59	71	396	486
Kansas	3330	26	114		456	
Kentucky	2944	26	39		415	
Louisiana	1200	26	10		247	
Maine	4148	26	65	97	372	558
Maryland	900	26	50	90	430	
Massachusetts	3500	30	33	49	653	979
Michigan	4307	20	117	147	362	
Minnesota	1250	26	38		385	597
Mississippi	1200	26	30		235	
Missouri	2250	20	35		320	
Montana	2363	28	127		446	
Nebraska	3868	26	70		354	
Nevada	600	26	16		396	
New Hampshire	2800	26	32		427	
New Jersey	2900	26	87	100	611	
New Mexico	1799	26	74	111	397	447
New York	2400	26	64		405	
North Carolina	4706	26	45		522	
North Dakota	2795	26	43		516	
Ohio	4400	26	111		400	539
Oklahoma	1500	26	16		368	
Oregon	1000	26	122		524	
Pennsylvania	1320	26	35	43	573	581
Rhode Island	2960	26	43	93	566	707
South Carolina	4455	20	42		326	
South Dakota	1288	26	28		333	
Tennessee	1560	26	30	80	275	325
Texas	2257	26	61		426	
Utah	3200	26	25		467	
Vermont	3085	26	69		425	
Virginia	2700	26	60		378	
Washington	6147.2**	26	143		604	
West Virginia	2200	26	24		424	
Wisconsin	1890	26	54		363	
Wyoming	3100	26	33		459	

Notes: * maximum benefit with dependents

** based on state's requirement that workers work 680 hours in their base period to qualify times the state minimum wage

Table 3.2: Policies Enacted

State	ARRA Year Enacted	Has Alternative Base Period	Offers Part-Time Workers Benefits	Compelling Family Reason*	Dependent Allowance	Training
Alabama		No	No	No	No	No
Alaska	2009/2010	ARRA	No	ARRA(1)	Pre-ARRA	No
Arizona		No	No	Pre-ARRA	No	No
Arkansas	2009	ARRA	ARRA	ARRA(1)	No	No
California	2009	ARRA	Pre-ARRA	Pre-ARRA	No	Pre-ARRA
Colorado	2009	ARRA	ARRA (fix)	ARRA (2)	No	No
Connecticut	2009	Pre-ARRA	No	ARRA(2)	Pre-ARRA	No
Delaware	2009	ARRA	Pre-ARRA	ARRA(1)	No	No
District of Columbia	2010	Pre-ARRA	Pre-ARRA	ARRA(1)	No	ARRA
Florida		No	No	No	No	No
Georgia	2009	Pre-ARRA	ARRA	No	No	ARRA
Hawaii	2009	Pre-ARRA	ARRA (fix)	ARRA(0)	No	No
Idaho	2009	ARRA	ARRA	No	No	ARRA
Illinois	2009	Pre-ARRA	No	ARRA(1)	ARRA (fix)	No
Indiana		No	No	Not ARRA compliant	No	No
Iowa	2009	ARRA	ARRA (fix)	No	Not ARRA compliant	ARRA
Kansas	2009	ARRA	ARRA (fix)	Not ARRA compliant	No	ARRA
Kentucky		No	No	No	No	No
Louisiana		No	Pre-ARRA	No	No	No
Maine	2009	Pre-ARRA	Pre-ARRA	ARRA (fix)	Not ARRA compliant	ARRA(fix)
Maryland	2009/2010	ARRA	ARRA	No	Not ARRA compliant	ARRA
Massachusetts	2009	Pre-ARRA	No	Not ARRA compliant	Pre-ARRA	ARRA(fix)
Michigan		Pre-ARRA	No	No	Not ARRA compliant	No
Minnesota	2009	ARRA (fix)	ARRA (fix)	ARRA (fix)	No	No
Mississippi		No	No	No	No	No
Missouri		No	No	No	No	No
Montana	2009	ARRA	ARRA	Not ARRA compliant	No	ARRA
Nebraska	2010	ARRA	Pre-ARRA	Pre-ARRA	No	ARRA
Nevada	2009	ARRA	Pre-ARRA	Pre-ARRA	No	No
New Hampshire	2009	Pre-ARRA	Pre-ARRA	ARRA (2)	No	No
New Jersey	2009	Pre-ARRA	Pre-ARRA	ARRA(1)	Not ARRA compliant	ARRA(fix)
New Mexico		Pre-ARRA	Pre-ARRA	Not ARRA compliant	Pre-ARRA	No
New York	2009	Pre-ARRA	ARRA (fix)	ARRA (fix)	No	No
North Carolina	2009	Pre-ARRA	Pre-ARRA	ARRA(2)	No	No
North Dakota		No	No	No	No	No
Ohio		Pre-ARRA	No	No	Not ARRA compliant	No
Oklahoma	2009	ARRA (fix)	ARRA	ARRA (fix)	No	No
Oregon	2009	ARRA	No	ARRA (fix)	No	ARRA(fix)
Pennsylvania		No	Pre-ARRA	Not ARRA compliant	Not ARRA compliant	No
Rhode Island	2010	Pre-ARRA	No	ARRA(2)	ARRA (fix)	No
South Carolina	2010	ARRA	ARRA	ARRA (1)	No	No
South Dakota	2009/2010	ARRA	Pre-ARRA	Not ARRA compliant	No	ARRA
Tennessee	2009	ARRA	ARRA	No	ARRA	No
Texas		No	No	Not ARRA compliant	No	No
Utah	2010	ARRA	No	No	No	No
Vermont	2009	Pre-ARRA	Pre-ARRA	Not ARRA compliant	No	ARRA
Virginia		Pre-ARRA	No	No	No	No
Washington	2009/2011	Pre-ARRA	No	ARRA(2)	No	Pre-ARRA
West Virginia	2009	ARRA	No	No	No	No
Wisconsin	2009	Pre-ARRA	No	ARRA(2)	No	ARRA
Wyoming		No	Pre-ARRA	Not ARRA compliant	No	No
Total	NA	39	29	NA	NA	15

Sources: ARRA Application forms, US Department of Labor

* ARRA(number of policies pre ARRA) compliant; fix are language changes were required

Table 3.3: Summary Statistics by Unemployment Type

Means- By Type of Claim[b]	Unemployed	Rec. UI	Traditinal Claims	Alternative BP	Part-Time Benefits	Voluntary Job Leaver	Rec. Dep. Allowance
Real Weekly Benefit Amt. (2012)		314.6	312.2	186.6	221.7	297.0	344.5
		(124.7)	(135.5)	(133.5)	(149.6)	(102.6)	(151.7)
Weeks Unemployed	18.21	25.33	25.41	27.60	18.19	22.17	25.33
	(19.81)	(19.33)	(19.30)	(18.91)	(18.68)	(18.37)	(19.47)
Replacement Rate		58.62	58.20	97.71	61.80	60.48	57.81
		(30.27)	(30.54)	(36.21)	(40.88)	(30.00)	(24.42)
Real Weekly Wage (2012)	429.2	658.2	664.9	134.7	517.9	516.3	667.0
	(507.4)	(597.7)	(598.2)	(104.9)	(790.3)	(287.0)	(589.8)
Age	34.21	41.08	41.39	40.28	39.91	35.79	39.37
	(12.03)	(10.50)	(10.65)	(9.867)	(9.757)	(9.155)	(9.603)
Female	0.440	0.442	0.437	0.314	0.889	0.516	0.459
	(0.496)	(0.497)	(0.496)	(0.468)	(0.319)	(0.510)	(0.499)
Married	0.374	0.529	0.512	0.399	0.592	0.523	0.633
	(0.484)	(0.499)	(0.500)	(0.494)	(0.498)	(0.509)	(0.482)
Other	0.0662	0.0647	0.0669	0.0594	0.0680	0.0276	0.0521
	(0.249)	(0.246)	(0.250)	(0.239)	(0.255)	(0.167)	(0.222)
Black	0.157	0.127	0.127	0.0341	0.0748	0.186	0.134
	(0.364)	(0.333)	(0.333)	(0.183)	(0.266)	(0.397)	(0.341)
Number of Children	0.844	0.828	0.727	0.563	1.278	1.173	1.448
	(1.153)	(1.136)	(1.112)	(0.860)	(1.133)	(1.088)	(1.095)
Married X Number of Children	0.465	0.600	0.530	0.259	0.743	0.662	1.051
	(0.982)	(1.053)	(1.023)	(0.660)	(1.002)	(0.911)	(1.156)
Less than High School[a]	0.158	0.124	0.126	0.151	0.0833	0.0372	0.108
	(0.365)	(0.329)	(0.332)	(0.362)	(0.280)	(0.193)	(0.310)
High School Degree[a]	0.678	0.659	0.653	0.657	0.772	0.859	0.685
	(0.467)	(0.474)	(0.476)	(0.480)	(0.425)	(0.355)	(0.465)
State Unemployment Rate	6.417	6.842	6.845	7.865	7.204	6.325	6.740
	(2.339)	(2.387)	(2.399)	(2.186)	(2.685)	(2.131)	(2.300)
N	18,373	4,500	3,777	52	39	26	628

Regressions are run with bootstrapped standard errors at the state level.

a Represents highest degree earned. Reference group is college degree graduates.

b Means are weighted using official SIPP weights.

Table 3.4: The Effect of UI Modernizations on Recipiency

Reported UI Recipiency	(1)	(2)	(3)	(4)	(5)
State has Alternative Base Period	0.030***				0.023**
	(0.01)				(0.01)
Part-Time Workers Eligible		0.022**			0.015
		(0.01)			(0.01)
% of ARRA Compelling Reasons			0.013		0.009
			(0.02)		(0.02)
State Pays Dependent Allowance				0.056***	0.039
				(0.02)	(0.02)
Age	0.040***	0.040***	0.040***	0.040***	0.040***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Age Squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Female	-0.003	-0.003	-0.003	-0.003	-0.003
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Married	0.051***	0.051***	0.051***	0.051***	0.052***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Other	-0.033***	-0.032**	-0.032**	-0.032**	-0.033***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Black	-0.022	-0.022	-0.022	-0.022	-0.022
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Number of Children	0.001	0.001	0.001	0.001	0.001
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Married X Number of Children	-0.010	-0.010	-0.010	-0.010	-0.010
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Less than High School[a]	-0.069***	-0.070***	-0.070***	-0.070***	-0.070***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
High School Degree[a]	-0.006	-0.006	-0.006	-0.006	-0.006
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
State Unemployment Rate	0.006	0.006	0.006	0.005	0.006
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
State and Period Fixed Effects	Yes	Yes	Yes	Yes	Yes
N	18,373	18,373	18,373	18,373	18,373

Note: * ** *** indicate marginal effect is statistically different from zero at the 90%, 95%, and 99% confidence level
Regressions are run with bootstrapped standard errors at the state level.
a Represents highest degree earned. Reference group is college degree graduates.

Table 3.5: The Effect of UI Modernizations on Recipiency by Education

Reported UI Recipiency	(1)	(2)	(3)	(4)	(5)
(ABP)	0.029*				0.022
	(0.01)				(0.01)
ABP X Less than High School	-0.027				-0.018
	(0.02)				(0.02)
ABP X High School Degree	-0.009				-0.008
	(0.02)				(0.02)
Part-Time Workers Eligible (PTW)		0.031*			0.028
		(0.02)			(0.02)
PTW X Less than High School		-0.017			-0.023
		(0.03)			(0.03)
PTW X High School Degree		-0.003			-0.005
		(0.02)			(0.02)
Voluntary Job Leavers Eligible (VJL)			-0.001		-0.007
			(0.02)		(0.02)
VJL X Less than High School			0.044		0.044
			(0.03)		(0.03)
VJL X High School Degree			0.015		0.016
			(0.02)		(0.02)
State Pays Dependent Allowance (DA)				0.042**	0.028
				(0.02)	(0.02)
DA X Less than High School				-0.042	-0.039
				(0.03)	(0.03)
DA X High School Degree				-0.009	-0.008
				(0.02)	(0.02)
Age	0.042***	0.042***	0.042***	0.042***	0.042***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Age Squared	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Female	-0.003	-0.003	-0.003	-0.003	-0.003
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Married	0.053***	0.053***	0.053***	0.053***	0.053***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Other	-0.034**	-0.034**	-0.033**	-0.034**	-0.034**
	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)
Black	-0.019	-0.019	-0.019	-0.019	-0.019
	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)
Number of Children	0.006	0.006	0.006	0.006	0.006
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Married X Number of Children	-0.014*	-0.014*	-0.015*	-0.015*	-0.015*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Less than High School[a]	-0.081***	-0.085***	-0.118***	-0.081***	-0.093***
	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
High School Degree[a]	-0.006	-0.009	-0.019	-0.007	-0.012
	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
State Unemployment Rate	0.008	0.008	0.007	0.007	0.007
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
State and Period Fixed Effects	Yes	Yes	Yes	Yes	Yes
N	18,373	18,373	18,373	18,373	18,373

Note: * ** *** indicate marginal effect is statistically different from zero at the 90%, 95%, and 99% confidence level
Regressions are run with bootstrapped standard errors at the state level.
a Represents highest degree earned. Reference group is college degree graduates.

Table 3.6: The Effect of UI Modernizations on Unemployment Duration

Unemployment Duration	(1)	(2)	(3)	(4)	(5)
Qualified using ABP	4.964				5.808
	(5.77)				(5.49)
Qualified using ABP X RR	-0.027				-0.032
	(0.04)				(0.04)
Eligible Part-Time Workers		-3.816			-3.665
		(5.06)			(5.09)
Eligible Part-Time Workers X RR		-0.040			-0.047
		(0.07)			(0.07)
Eligible Voluntary Job Leavers			-11.90***		-10.54**
			(4.21)		(4.23)
Eligible Voluntary Job Leavers X RR			0.111*		0.099
			(0.06)		(0.06)
Received Dependent Allowance				-0.384	-0.251
				(1.73)	(1.69)
Received Dependent Allowance X RR				0.007	0.005
				(0.03)	(0.03)
Replacement Rate	0.000	-0.001	-0.000	0.001	0.000
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
log Real Weekly Wage	0.492	0.466	0.511	0.451	0.441
	(0.34)	(0.35)	(0.34)	(0.32)	(0.33)
Age	-0.094	-0.032	-0.038	-0.041	-0.043
	(0.22)	(0.22)	(0.22)	(0.19)	(0.19)
Age Squared	0.002	0.001	0.001	0.001	0.001
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Female	-0.142	-0.141	-0.162	0.133	0.185
	(0.62)	(0.59)	(0.61)	(0.58)	(0.61)
Married	-1.855*	-1.816*	-1.916*	-1.689*	-1.566
	(0.96)	(0.97)	(0.98)	(0.96)	(0.94)
Hispanic/Other	1.890	1.748	1.593	2.065	2.418*
	(1.26)	(1.06)	(1.12)	(1.30)	(1.33)
Black	1.661*	1.707*	1.656*	1.708*	1.695*
	(0.94)	(0.97)	(0.95)	(0.87)	(0.88)
Number of Children	0.703	0.800	0.707	0.795	1.037*
	(0.61)	(0.66)	(0.63)	(0.55)	(0.58)
Married X Number of Children	-0.190	-0.323	-0.231	-0.170	-0.424
	(0.66)	(0.74)	(0.69)	(0.61)	(0.64)
Less than High School[a]	2.630*	2.767*	2.783**	2.705**	2.601*
	(1.42)	(1.39)	(1.37)	(1.32)	(1.33)
High School Degree[a]	0.751	0.931	0.930	0.741	0.751
	(0.72)	(0.74)	(0.73)	(0.66)	(0.63)
State Unemployment Rate	0.846*	0.950*	0.933**	0.755*	0.770*
	(0.47)	(0.48)	(0.46)	(0.43)	(0.43)
State and Period Fixed Effects	Yes	Yes	Yes	Yes	Yes
N[b]	3,829	3,816	3,803	4,405	4,500

Note: * ** *** indicate coefficient is statistically different from zero at the 90%, 95%, and 99% confidence level
Regressions are run with bootstrapped standard errors at the state level.
For the Replacement and Unemployment Rates: 1=1%.
a Represents highest degree earned. Reference group is college degree graduates.
b All regressions include 3,777 traditional claimants who qualified for UI without using ARRA policies.

Table 3.7: The Effect of UI Modernizations on Unemployment Duration using Predicted Replacement Rate

Unemployment Duration	(1)	(2)	(3)	(4)	(5)
Predicted Replacement Rate (PRR)	0.000	0.000	0.000	0.000	0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Qualified using ABP	3.655				4.499
	(4.73)				(4.36)
Qualified using ABP X PRR	-0.005*				-0.006
	(0.00)				(0.00)
Eligible Part-Time Workers		-8.852***			-8.948***
		(2.41)			(2.51)
Eligible Part-Time Workers X PRR		0.032			0.029
		(0.02)			(0.03)
Eligible Voluntary Job Leavers			-8.827*		-6.014
			(4.59)		(4.45)
Eligible Voluntary Job Leavers X PRR			0.045		0.026
			(0.06)		(0.06)
Received Dependent Allowance				0.451	0.292
				(1.15)	(1.16)
Received Dependent Allowance X PRR				-0.002	0.001
				(0.00)	(0.00)
log Real Weekly Wage	0.341	0.340	0.348	0.145	0.208
	(0.40)	(0.40)	(0.40)	(0.39)	(0.40)
Age	-0.296	-0.241	-0.245	-0.226	-0.239
	(0.22)	(0.22)	(0.22)	(0.18)	(0.18)
Age Squared	0.004	0.003	0.004	0.003	0.004
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Female	-0.001	-0.024	-0.058	0.163	0.224
	(0.62)	(0.60)	(0.62)	(0.59)	(0.60)
Married	-2.038**	-2.091**	-2.125**	-1.802*	-1.701*
	(0.97)	(0.95)	(0.98)	(0.96)	(0.95)
Hispanic/Other	2.098*	1.927*	1.873*	2.281*	2.494*
	(1.22)	(1.11)	(1.11)	(1.30)	(1.35)
Black	1.140	1.129	1.090	1.282	1.321
	(1.03)	(1.04)	(1.04)	(0.94)	(0.97)
Number of Children	0.618	0.631	0.642	0.754	0.922
	(0.67)	(0.68)	(0.68)	(0.60)	(0.60)
Married X Number of Children	-0.039	-0.070	-0.106	-0.071	-0.259
	(0.69)	(0.73)	(0.72)	(0.64)	(0.65)
Less than High School[a]	2.928*	2.875*	2.979**	2.692*	2.638*
	(1.46)	(1.44)	(1.44)	(1.40)	(1.36)
High School Degree[a]	0.884	1.002	0.979	0.758	0.846
	(0.77)	(0.77)	(0.77)	(0.71)	(0.68)
State Unemployment Rate	0.859*	0.979**	0.937*	0.788*	0.797*
	(0.48)	(0.48)	(0.47)	(0.43)	(0.42)
State and Period Fixed Effects	Yes	Yes	Yes	Yes	Yes
N[b]	3,756	3,744	3,734	4,332	4,420

Note: * ** *** indicate coefficient is statistically different from zero at the 90%, 95%, and 99% confidence level
Regressions are run with bootstrapped standard errors at the state level.
For the Replacement and Unemployment Rates:1=1%.
a Represents highest degree earned. Reference group is college degree graduates.
b All regressions include 3,708 traditional claimants who qualified for UI without using ARRA policies.

4 Liquidity Constraints and the Consumption Smoothing Benefits of Unemployment Insurance

4.1 Introduction

Unemployment insurance (UI) has been one of the most studied safety-net programs in economics. As noted by Card (2011), over one thousand articles with "unemployment" in their title were published in economics journals between 1980-2005. Many of these papers in the microeconomics literature have examined how variations in benefit amounts or weeks of benefits affect spell duration (i.e., the potential consequences of UI). However, an important question that has received much less attention is whether UI does a good job in helping its recipients smooth consumption, which is seemingly the program's goal. While a few papers have attempted to answer this question (Gruber (1997), Browning and Crossley (2001), Bloemen and Stancanelli (2005), and East and Kuka (2015)), evidence for the United States has remained scarce as historically it has been difficult to find high quality data on both consumption and UI generosity.

It has been shown that unemployment leads to large declines in average household income (see Kawano and LaLumia (2015) and Stephens (2001)). However, household consumption appears to be significantly more smoothed than income, even with respect to highly persistent income shocks.[41] The divergence from the decline in household income relative to the decline in consumption is largely driven by households' ability to smooth consumption through other means such as savings, borrowing, spousal

[41] See Blundell, Pistaferri, and Saporta-Eksten (2014), Saporta-Eksten (2014), and Stephens (2001).

income, the progressive nature of the tax code, UI, and other safety-net programs. Given all the ways that households can smooth consumption, there is some question about the degree that UI smoothes consumption.

However, the degree that UI smooths consumption is of interest to researchers and policymakers for three main reasons. First, governments spend large amounts of money on unemployment insurance. To this point, total cumulative government spending on UI in the United States exceeded half a trillion dollars from 2007-2012. Moreover, moral hazard costs associated with UI would add to these costs. Second, UI is often touted to produce a Keynesian stimulus effect where most people who receive UI spend the dollars that they receive quickly which helps to increase aggregate demand and ultimately employment. Such an effect only happens if UI affects consumption. Third, the degree that UI smooths consumption is one of the three key parameters need to identify optimal UI benefits (see Bailey (1978) and Chetty (2006) who generalizes Bailey's work), which has been an area of growing interest in recent years.

Much of the empirical evidence for the United States has come from the Panel Study of Income Dynamics (PSID), which has been collecting data on food consumption since 1968. Gruber (1997) was the first paper to use the PSID to examine the consumption smoothing benefits of UI.[42] Using the PSID from 1968-1987, he examined how UI generosity affects changes in consumption for individuals transitioning from employment to unemployment. Gruber uses food consumption as a proxy for total consumption, given that more broad measures of consumption are not continuously

[42] For early papers examining the consumption smoothing benefits of UI using the Consumer Expenditure Survey see Hamermesh (1982).

available for the 1968-1987 period. Gruber finds that each 10 percentage-point increase in the replacement rate (the ratio of the weekly UI benefit amount to the weekly wage prior to unemployment) reduces the drop in consumption by 2.8%. Other papers have also extended Gruber's analysis using food consumption and found similar effects for the years 1968-1987 but have found more diminished effects for recent years (see Kroft and Notowidigdo (2015) and East and Kuka (2015))[43].

Liquidity likely plays an important role in determining the consumption smoothing benefits of UI and has largely been ignored in the U.S. literature due to the PSID not collecting measures of wealth prior to 1984 and not continuously collecting wealth data every wave until 1999. Much of the Canadian and European literature suggests that the consumption smoothing benefits of UI are limited to those without liquid assets at the start of the spell (see Browning and Crossley (2001) and Bloemen and Stancanelli (2005)). Moreover, spousal labor income likely affects the degree that UI smoothes consumption. Households with a working spouse likely receive a lower degree of consumption smoothing benefits from UI than those without a working spouse as these households experience smaller percentage declines in household income due to unemployment. However, this has rarely been considered in the U.S. literature. Given this, past estimates of the consumption smoothing benefits of UI for the U.S. might overstate the degree that UI smoothes consumption for households with other means of

[43] East and Kuka primarily focus their analysis using food consumption but also consider broader measures of consumption as a robustness check when analyzing how the consumption smoothing benefits of UI have changed over time.

smoothing consumption and understate the degree that UI smoothes consumption for households without other means of smoothing consumption.

To determine if UI smoothes consumption and how this varies by wealth and spousal income, I use food consumption data from the PSID for the years 1968-2012. Since total consumption might not respond the same way as food consumption to changes in UI generosity, I also include specifications using imputed total consumption following Attanasio and Pistaferri (2014), which uses more comprehensive measures of consumption introduced in the PSID starting in 1999 to estimate total consumption. To generate total consumption, the method uses relative prices and taste shifters (through demographic variables) to estimate the portion of consumption that is unobserved prior to 1999. This is then aggregated with reported food consumption to generate a measure of total consumption. I then impute wealth using a method similar to Zeldes (1989) where I use questions on interest, dividend, and rent income to impute wealth for years that wealth data is not reported in the PSID.

Overall, my findings are twofold. First, the consumption smoothing benefits of UI that past studies have found are primarily concentrated on the 27% of households with zero-liquid assets at the spell start date that do not have an employed spouse. Second, I find that the consumption smoothing benefits of UI have remained fairly constant over time using both food consumption and imputed total consumption and that more generous UI benefits help to smooth consumption for households that do not have other means of smoothing consumption.

4.2 Unemployment Insurance and Consumption

One of the fundamental questions in the Unemployment Insurance (UI) literature is the degree to which UI smoothes consumption. As noted by Kawano and LaLumia (2015) using tax return data from 1999-2009, annual wage income during unemployment spells declines on average by 30% of pre-unemployment individual earnings and 16% of pre-unemployment household level earnings. However, as noted by Krueger and Meyer (2002), UI typically only replaces around 50% of pre-tax earnings prior to unemployment, although households often have additional means of smoothing consumption. These could include savings, access to credit markets, spousal labor supply, access to other transfer programs, and tax savings from lost income that could additionally help households to smooth consumption during an unemployment spell. Given this, households generally need less than full unemployment insurance coverage to fully smooth consumption.

While household income tends to decline by around 15% during an unemployment spell, consumption tends to decline significantly less. Stephens (2001) using the PSID finds that wage earnings of displaced household heads fall on average by 25% from the prior year, household income falls by 13%, while food consumption falls by only 5%. Saporta-Eksten (2014), using more recent PSID data, finds that total household consumption falls by around 8% following a transition into unemployment. The divergence from the decline in individual and household wages relative to the decline in consumption is largely driven by households' ability to smooth consumption through other means.

One of the most fundamental ways that households could smooth consumption during an unemployment spell is through having access to UI. UI is a joint program between the federal and state governments that came about in response to the high levels of unemployment seen during the Great Depression. UI was first introduced in Wisconsin in 1932 and expanded to the national level through the Social Security Act of 1935. To qualify for UI, there are both monetary and non-monetary requirements for eligibility that vary by the state where the wages were earned and the year. Monetary conditions require that recipients have a certain amount of earnings during an individual's base period to qualify for UI, which is composed of the first four of the last five calendar quarters before the filing of a claim. Base period earnings are then used to determine the benefit level that individuals receive which is capped at some maximum benefit that varies by state. Moreover, all states have non-monetary conditions that can exclude voluntary job leavers, individuals not available for full-time employment, individuals fired for cause, and individuals that are eligible for UI but not actively seeking employment, among other requirements.

UI generosity and eligibility can vary significantly by state. Weekly benefit amounts are primarily determined by the state where the individual worked, base period earnings, the distribution of earnings, and family structure. To outline this variation, average and maximum benefit amounts are displayed in Table 4.1 for 2013. The maximum weekly benefit amount ranges from $235 per week in Mississippi up to $1,011 in Massachusetts ($674 max for singles). The average weekly benefit amount in the U.S. for 2013 was $296.20. During normal economic conditions most individuals qualify for 26 weeks of potential benefits although it is possible to qualify for more or less than 26

weeks.[44] However, during adverse economic conditions, it is often possible to qualify for significantly more than 26 weeks of benefits through extended and emergency benefit payments. This led some individuals to be eligible for as many as 99 weeks of potential benefits during the Great Recession (see Farber and Valletta (2015) and Rothstein (2011)).

Another way that households can smooth consumption during an unemployment spell is through savings. Cash on hand, retirement accounts, and other types of liquid assets can be used to smooth consumption. However, as noted by Chetty (2008) nearly half of all job losers report having zero-liquid wealth at the start of a spell implying that liquid assets might not be able to smooth consumption for most individuals. Others have stressed the importance of home equity as a means of smoothing consumption (Hurst and Stafford (2004) and Ziliak (1998)).[45] Another possibility is that households could borrow using unsecured debt. Sullivan (2009) finds that the use of unsecured debt during unemployment is a common means of smoothing consumption for low-asset households during unemployment although neither the poorest nor wealthiest households tend to smooth consumption using this market.

Transfer programs and the structure of the tax system also serve as a means of smoothing consumption. Programs such as the Supplemental Nutrition Assistance Program (SNAP) can be used by low income households during an unemployment spell.

[44] At the start of 2013, Arkansas, Florida, Georgia, Michigan, Missouri, and South Carolina had maximum potential weeks of benefits between 20-25 weeks while Montana and Massachusetts offered maximums between 28-30 weeks.

[45] Hurst and Stafford (2004) note that it might be difficult for individuals to access home equity during an unemployment spell due to lending requirements.

Moreover, given SNAP's benefit reduction rate of 30%, households already receiving SNAP might be able to qualify for more generous benefits. Programs such as Temporary Assistance for Needy Families (TANF) and the Earned Income Tax Credit (EITC) might further help individuals with children smooth consumption during unemployment.[46] Moreover, the tax code offers further protection to individuals from negative income shocks. The progressive nature of the tax code means that reductions in earnings caused by unemployment will lead to larger changes in gross income than in net income, partly mitigating the decline in gross earnings (see Mankiw and Kimball (1992), Auerbach and Feenberg (2000), and Kniesner and Ziliak (2002)). Moreover, unemployed individuals do not have to pay FICA taxes further mitigating their loss of income. Hence, transfer programs and the tax code can help consumers smooth consumption when income losses occur due to unemployment.

Given all the possible ways that households can smooth consumption, there is some question about the degree that UI smoothes consumption. Historically, the degree to which UI smoothes consumption has been challenging to estimate given that few datasets provide comprehensive data on consumption. To this point, the only dataset that contains comprehensive data on consumption dating back to the 1980s is the Consumer Expenditure Survey (CE). However, the CE is a relatively short panel with households being interviewed for only 5 quarters and asks few questions regarding past earnings and employment which limits its usefulness in studying the consumption smoothing benefits

[46] Depending on an individual's earnings and number of children, reductions in earnings from unemployment could either increase or reduce the EITC benefit. It is also possible to qualify for the EITC without children although the income limit for this is $14,820 for single individuals and heads of household and $20,330 for married couples in 2015 with a $503 maximum benefit, which is significantly smaller than the maximum benefit for individuals with children which ranges from $3,359 with one child to $6,242 with 3 or more children. For a further discussion of UI and the EITC, see LaLumia (2013).

of UI. Another, more popular option in the literature has been to use longitudinal data from the PSID. The PSID contains comprehensive data on earnings as well as food consumption and housing expenditure since the late 1960s and introduced more comprehensive consumption measures starting in 1999 that account for 72% of expenditure as captured in the CE (Charles, Danziger, Li, and Schoeni (2007)).

The first paper to examine the consumption smoothing benefits of UI using the PSID was Gruber (1997). Gruber uses the PSID from 1968-1987 to examine how unemployment insurance smoothes consumption for individuals that were employed at the time of the survey in year t-1 and unemployed at the time of the survey in year t. For the analysis, Gruber uses food consumption (including SNAP benefits) as a proxy for total consumption. To determine benefit amounts and monetary eligibility, Gruber uses wage earnings from the calendar year preceding the t-1 observation (before the employed year) and runs these earnings through a benefit calculator that determines UI eligibility and benefit amounts. He finds that in the absence of UI, food consumption falls on average by approximately 22% while each 10 percentage-point increase in the replacement rate reduces the drop in consumption by 2.8%.

Recent research has also extended Gruber's work using the PSID. Kroft and Notowidigdo (2015) use the same dataset as Gruber (1997) to determine if the consumption smoothing benefits of UI vary throughout the business cycle.[47] Kroft and Notowidigdo expand Gruber's model through interacting the replacement rate with the

[47] Kroft and Notowidigdo (2015) primarily analyze the effects of how replacement rates affect unemployment durations throughout the business cycle using the Survey of Income and Program Participation, although they also consider the consumption smoothing effects as well.

state unemployment rate. They find that the degree that UI smoothes consumption does not appear to vary throughout the business cycle.

East and Kuka (2015) extend Gruber's analysis to the 1968-2011 period. They use food consumption as a proxy for total consumption while also considering more comprehensive measures of consumption and use a model similar to Gruber's model to extend his results. East and Kuka find that for their entire sample period from 1968-2011, that a 10 percentage-point increase in the replacement rate reduces the decline in consumption by 1.36% using their preferred specification and 1% using Gruber's specification with the latter not being statistically significant. They then incorporate linear time trends and period fixed effects interacted with the replacement rate to argue that the consumption smoothing benefits of UI largely declined in the 1990s. East and Kuka attribute this finding to reductions in UI generosity in the years following Gruber's analysis and having fewer unemployed individuals in the labor force which might lead to less generous UI benefits.

Others have used Canadian and European data to examine the consumption smoothing benefits of UI. Browning and Crossley (2001) find that a 10% decrease in the replacement rate reduces total expenditure by 0.8% among Canadians. Moreover, they find that variations in the replacement rate only affect the third of their sample that reported holding zero assets at the time of the job loss. Bloemen and Stancanelli (2005) examine the consumption smoothing benefits of UI for food expenditure in Great Britain for the years 1983-1984. Bloemen and Stancanelli find evidence that UI helps to smooth food consumption for households with zero financial wealth at the start of the unemployment spell.

Two fundamental questions have arisen in this literature following Gruber (1997). First, does UI smooth consumption for the general population of UI eligible individuals or are its consumption smoothing benefits limited to individuals that do not have other means of smoothing consumption such as having cash on hand at the start of the spell. Providing evidence from outside the U.S., Browning and Crossley (2001) and Bloemen and Stancanelli (2005) both find that the consumption smoothing benefits of UI are limited to individuals without liquid assets at the start of the spell. However, answering this question using the PSID has historically been difficult as comprehensive measures of wealth were not asked prior to 1984 and were not asked every survey year until 1999. This has led several authors such as Gruber (1997), Kroft and Notowidigdo (2015), and East and Kuka (2015) to not address if the consumption smoothing benefits that they observe extend to all UI eligible individuals or just individuals that have zero liquid assets at the start of the spell.

Second, total consumption might not respond the same way that food consumption does to changes in UI generosity. Given that food consumption is only a small percentage of total consumption ranging from 10-15% of personal consumption over the 1968-2012 period (see Figure 4.1) and food is typically income inelastic, changes in food consumption could largely diverge from changes in total consumption during an unemployment spell. Moreover, several stabilization programs are in place to stabilize food consumption such as SNAP, which could further cause changes in food consumption and total consumption to diverge. Hence, it is also important to consider broader measures of consumption for determining the consumption smoothing benefits of UI.

Browning and Crossley (2001) use a comprehensive measure of consumption to find that a 10 percentage-point increase in the replacement rate reduces the decline in consumption by only around 0.8% which is much smaller than Gruber's estimate of 2.8% using food consumption. However, Browning and Crossley are using data from Canada where there is a national UI system that is fundamentally different from the U.S. system (as are other government transfer programs). Given this, there is little empirical evidence regarding whether UI smoothes consumption for all of its recipients or just those who have no other means of smoothing consumption and the degree that UI smoothes consumption using more comprehensive measures of consumption. This essay helps to bridge this gap through using more comprehensive measures of consumption and wealth while accounting for spousal labor income to determine if UI smoothes consumption for the entire population of eligible unemployed individuals and the degree that UI smoothes consumption.

4.3 Model

To determine the degree that UI smoothes consumption, I use a log-linearized Consumption Euler Equation under the assumption of constant relative risk aversion (see Hall (1978)). The model takes the form:

$$\Delta C_{ist} = \alpha + \beta\, RR_{ist} + X_{ist}\,\psi + \lambda\, UR_{st} + \theta_s + d_t + \varepsilon_{ist} \tag{4.1}$$

Where C_{ist} is the log of household consumption, RR_{ist} is the respondent's after tax replacement rate, X_{ist} is a vector of control variables including categorical controls for age (age groups 25-37, 38-49, and 50-61), categorical controls for education (high school dropout, high school degree, college dropout or associates degree, and bachelor's degree

or higher), gender, marital status, family size, number of children, and the after-tax real weekly wage, UR_{st} is the state unemployment rate, $\theta_s \; and \; d_t$ are state and year fixed effects respectively, ε_{ist} is the error term and is clustered at the state level. [48]

4.3.1 Imputed Total Consumption Following Attanasio and Pistaferri (2014)

While much of the literature has used food consumption as a proxy for total consumption, it is likely that food consumption is less sensitive to changes in income than total consumption. Given that the PSID has consistently collected certain types of consumption data (such as food) and started collecting more comprehensive consumption data in 1999, one possibility is to use the more recent data to impute types of consumption that were not observed prior to 1999. To do this, I use a method similar to Attanasio and Pistaferri (2014).[49] To generate the measure, I use the 1999-2013 waves of the PSID (for calendar years 1998-2012) where more comprehensive measures of consumption are available to estimate the equation:

$$(4.2) \quad \ln n_{it} = Z_{it} \; \beta + \; p_t \;\; \varphi + g(f_{it}; \theta) + \; e_{it}$$

where n_{it} is net consumption (defined below), Z_{it} are socioeconomic controls, p_t are prices, f_{it} includes components of consumption that have been consistently collected during each PSID interview (i.e. food at home, food away from home, and SNAP

[48] From 1980 forward I use state unemployment rates from the BLS. Prior to this, I use state unemployment rates from Moffitt's Welfare Benefits Data Base which is available at http://www.econ2.jhu.edu/people/moffitt/datasets.html.

[49] The idea of imputing consumption builds off of Skinner (1987) who imputed total consumption in the PSID. To impute consumption, Skinner used estimated coefficients from the CE which he calculated through regressing total consumption on a set of consumption series that are available in both surveys (ex. food, utilities, vehicles, etc.). For other examples of papers that impute total consumption in the PSID, see Blundell, Pistaferri, and Preston (2008), Bronchetti (2012), Fisher and Johnson (2006), and Ziliak (1998).

benefits), g(.) is a cubic function, and e_{it} is the error term. The net consumption measure n_{it} is the sum of housing costs (homeowners insurance, electricity, heating, water, and other utility cost), transportation costs (car insurance, car repairs, gasoline, parking, bus fares, taxi fares, and other transportation costs), expenditure on children (childcare, school tuition, and other school related expenses), health-related expenses (health insurance premiums and out-of-pocket healthcare expenses), and rent.

Rent is calculated as annual rent expenditures for renters and for homeowners is calculated as 6% of the self-reported home value. I then estimate Equation 4.2 on a sample of 34,445 person-year observations (employed and unemployed) from 1998-2012.[50] The constructed measure of imputed total consumption is then given by:

$$(4.3) \qquad \hat{C}_{it} = f_{it} + exp\{Z_{it}\,\hat{\beta} + p_t\,\hat{\varphi} + g(f_{it};\hat{\theta})\}$$

which I then convert into real terms using CPI.

4.3.2 Liquidity and Spousal Labor Supply

While the PSID has historically asked limited questions about wealth prior to 1999, the PSID has always asked detailed questions regarding earnings and occasionally collected wealth data prior to 1999 and continuously each survey thereafter. Given that wealth is not continuously asked prior to 1999, Zeldes (1989), Runkle (1991), and Ziliak (1998) use questions on interest, dividend, and rent income to estimate liquid assets.

To determine if individuals have liquid assets, I follow an approach similar to Zeldes (1989). Prior to 1992, the PSID asks a question about joint interest, dividend, and

[50] I also explore using only unemployed individuals which produces similar estimates, although they are noisier.

rent income, which I use to determine if individuals have liquid assets. Beginning in reference year 1992, the PSID asks individual questions about interest, dividend, and rent income. For unemployment spells starting in 1992 or later, I use the questions on interest and dividend income to determine if individuals have liquid assets and exclude the rent income measure.

To determine if UI benefits only smooth consumption for individuals without liquid assets at the start of the unemployment spell, I use Zeldes's measure of liquid assets to determine if individuals have liquid assets during their base period. However, one limitation of this method is that I might not observe assets where little or no interest was earned which appears to be a problem after the Great Recession. To address this problem, I use reported liquid assets when observed (for base periods in 1984, 1994, 1999-2013) and Zeldes's method for base periods where this is not observed. Approximately half of households have liquid assets at the start of the spell using this method, which is similar to Chetty (2008) estimate of around 50% using panels in the Survey of Income and Program Participation from 1985-2000.[51] To determine if the consumption smoothing benefits of UI are limited to individuals with no liquid assets at the start of the spell, I then estimate models of the form:

$$\Delta C_{ist} = \alpha + \beta_1 RR_{ist} + \beta_2 NLA_{ist} + \beta_3 RR_{ist} \, x \, NLA_{ist} + X_{ist}\psi + \lambda \, UR_{st} + \theta_s + d_t + \varepsilon_{ist} \quad (4.4)$$

for both food and imputed total consumption. NLA_{ist} is an indicator for whether an individual has no liquid assets. I then interact this variable with the after tax replacement rate. In certain specifications, I also stratify the sample based on whether the household

[51] Using Zeldes method throughout the entire period does not meaningfully change my main findings, although it does reduce the number of individuals that I observe with liquid assets in the 2000s.

has a working spouse.[52] For the analysis, I define a working spouse as a spouse who was employed in the year of the respondent's base period and also had employment in the year the respondent was unemployed.[53] All other variables maintain their prior definitions from Equation 4.1.

4.4 Data

To examine how UI smoothes consumption during unemployment spells, I use data from the PSID for the survey years 1968-2013 to analyze unemployment spells from 1968-2012.[54] The PSID is the world's longest running longitudinal household survey. Since 1968, the PSID has been following households in the original 1968 sample as well as households of descendants of the original 1968 sample. The PSID followed households annually from 1968-1997 and biennially thereafter. In all, the PSID has produced an unbalanced panel of 75,253 individuals between the years 1968-2013.

Most questions in the PSID are asked retrospectively for the previous calendar year. This includes questions such as earnings last year, weeks of employment and unemployment, and participation in transfer programs and benefit amounts. The PSID also asks some questions that are specific to the time of the survey such as demographic variables and labor force status. A benefit of this design is that it allows researchers to

[52] In these specifications, I exclude controls for gender and marital status as I focus my analysis on household heads whom the PSID defines as the male for a married couple given its origins from the late 1960s.
[53] I require employment in both years for the spouse as I do not know the time of employment for the spouse. Only requiring that the spouse be employed during the year the respondent was unemployed is problematic as the employment could come after the respondent was already reemployed.
[54] Since I am using the recall questions on employment status and only observe base period earnings in the year 1967 for individuals unemployed in 1968, my sample consists of individuals with unemployment spells from 1968-2012.

examine labor force transitions using either employment status from the previous year or from the time of the survey.

For my analysis, I use the retrospective questions on employment because the timing of these questions correspond to the timing of the questions that I use to generate a more comprehensive measure of consumption and wealth. I focus the analysis on prime age heads of households between the ages of 25 and 61 that reported at least 26 weeks of employment in year t-1 (with no weeks unemployed) and reported being unemployed in year t.[55] I also exclude individuals that report being self-employed in year t-1 as this would often exclude them from being eligible for UI. Individuals that are on layoff are also excluded from the analysis when possible since they might face different incentives and be more likely to anticipate the job loss relative to other UI eligible individuals (see Feldstein (1976), Feldstein (1978), and Topel (1983)). Beginning in survey year 1976, the PSID distinguishes between individuals on temporary layoff and other types of unemployment, although this question is only asked at the time of the survey. From 1976-1996, I exclude individuals that reported in survey year t-1 that they were on layoff at the time of the survey.[56] Starting in survey year 2003, it is possible to identify individuals that were laidoff in the previous year and I exclude these individuals from the analysis.

Similar to Gruber (1997), I exclude observations where any component of food consumption is imputed or where the change in food consumption from the employed to the unemployed state is greater than threefold (in absolute value). However, unlike

[55] This is a slightly stronger requirement than Gruber (1997) imposes.
[56] For example, if a respondent was on layoff at the time of the survey in 1990 and reported in survey year 1991 being unemployed in 1990, I would exclude this observation from the analysis.

Gruber, I include only observations from the PSID main sample (The Survey Research Sample) and exclude observations from the Survey of Economic Opportunity (SEO) which is an oversample of low-income households following Attanasio and Pistaferri (2014) and Zeldes (1989).[57] I also exclude observations where family size changes from the employed to unemployed state as this could lead to large changes in consumption that are not related to UI.

Individuals meeting the criteria stated above are then run through a benefit calculator that determines monetary eligibility for UI. To determine monetary eligibility, I use earnings from the prior year's survey, where the individual was employed at least 26 weeks and never unemployed. The benefit calculator is created using data from The Employment and Training Administration's "Significant Provisions of State Unemployment Insurance Laws" for each year from 1968-2012. If an individual has sufficient earnings to qualify for UI then the program also calculates the individual's weekly benefit amount including any dependent allowances when applicable.[58] Average replacement rates by state for 2012 are displayed in Figure 4.2.[59]

[57] This leads Gruber's sample to be lower income and predominantly minority (51.3% of Gruber's sample identifies as being black or being of another minority race), although Gruber does control for both income and race to partially account for this.

[58] Dependent allowances are additional monetary payments made by states to eligible UI recipients who have qualifying dependents. The states that pay dependent allowances at some point during the sample period are Alaska, District of Columbia, Illinois, Iowa, Maine, Maryland, Massachusetts, Michigan, New Jersey, New Mexico, Ohio, Pennsylvania, Rhode Island, and Tennessee. Dependent allowances can range from a minimum of $5 per week in Pennsylvania (with one qualifying dependent) up to $300 per week in Massachusetts (with twelve qualifying dependents; $25 per dependent).

[59] To generate these figures, I create simulated replacement rates following Gruber (1997) where I run my full sample through the benefit calculator for every state-year cell using real earnings adjusted using CPI and calculate the mean replacement rate for each state-year cell. The rates can be viewed as a measure of relative generosity of UI benefits across states.

There are three main advantages of using simulated eligibility and benefits rather than reported benefits. First, UI take-up is endogenous. As noted by Blank and Card (1991) take-up rates among eligibles are typically around 67%. If take-up is correlated with consumption then using actual benefits received would lead to a biased coefficient estimate for the replacement rate. Second, UI receipt is often unreported and misreported in survey data. As noted by Meyer, Mok, and Sullivan (2009), UI receipt is often unreported with average yearly reporting rates of 73.8% in the PSID. Third, policymakers determine eligibility rather than take-up. Hence simulation based methods can help to address these concerns.

However, one potential concern is that wages could be correlated with an individual's ability to smooth consumption. For example, more generous replacement rates might be correlated with selection into unemployment. To address these concerns, I use a two-step method used by Chetty (2008) where in the first stage I predict respondents' base period wages. To do this, I use a log wage equation of the form:

$$\ln(w_{ist-1}) = \alpha + Z_{ist}\,\pi + \theta_t + u_{ist} \tag{4.5}$$

where Z_{ist} includes controls for age, age squared, education group, gender, major industry code, marital status, and the state unemployment rate, θ_t are year fixed effects, and u_{ist} is the robust error term. I then recover the predicted wage in levels and run it through my benefit calculator.

For the analysis, I use the after-tax real wage and replacement rate. Tax rates are calculated using TAXSIM.[60] Given that I am using data from 1968-2013, it is important

[60] I calculate tax rates using the federal marginal tax rate and FICA taxes from TAXSIM. I exclude state taxes since TAXSIM does not calculate state tax rates prior to 1977.

to account for how UI is treated for tax purposes. Prior to 1979, UI benefits were not treated as taxable income in the United States. Starting in 1979, high-income earners' benefits became taxable and this was extended to mid-income earners in 1982.[61] Following the passage of The Tax Reform Act of 1986, UI benefits were treated as ordinary income (excluding FICA taxes) starting in 1987. The implementation of taxing benefits has significantly reduced their value over time, ceteris paribus.

Food consumption is then constructed as total money spent on food at home and away from home. Purchases using food stamps are then added into this measure. While questions about wages, income, and consumption are asked about the previous calendar year, there is some ambiguity regarding the timing of the food consumption questions. The ambiguity comes from the PSID asking respondents how much money they spend on food during a typical week. This has led some researchers to assume the respondents report food expenditure for the first three months of the year given that surveys are typically conducted in March (Zeldes (1989), Gruber (1997), and East and Kuka (2015)) while others have assumed that it refers to the previous calendar year (Hall and Mishkin (1982), Dynarski and Shefrin (1987), and Blundell, Pistaferri, and Preston (2008)). For the analysis, I assume that the food consumption question references the previous calendar year.

After excluding individuals with insufficient base period earnings, there are 2,236 individuals for the years 1968–2012. Summary statistics are displayed in Table 4.2. Real food expenditure chained in 2013 dollars was $9,321 for the 1968-2012 period and declined throughout the period which is consistent with Figure 4.1. After-tax

[61] For a further discussion of the tax treatment of UI benefits prior to The Tax Reform Act of 1986, see Solon (1985).

replacement rates averaged 49.9% for the 1968-1986 period and 49.4% for the entire sample period. This is smaller than Gruber (1997) and East and Kuka (2015) average replacement rate of 57% for the 1968-1986 period although they include the SEO oversample of low-income individuals who typically have larger replacement rates. The average age of individuals in the sample is 39 years for the 1968-2012 period given that I am focusing on prime age workers between the ages of 25-61 at the time of the spell. Females make-up 13.7% of the sample for the 1968-1986 period and their share rises to 17.3% for the 1998-2012 period.[62] Marriage rates averaged 77.4% for the 1968-1986 period and declined in more recent years to average 69.4% throughout the 1968-2012 period. In terms of racial composition, the sample is 87.3% white, 9.7% black, while 3% are from other races. Mean education throughout the 1968-2012 period is 12.58 years which increases over time.

4.5 Baseline Estimates

The baseline estimates for Equation 4.1 using the actual replacement rate are displayed in Table 4.3. The first specification estimates Gruber (1997) model using my data for the 1968-1986 period. The results suggest that a 10 percentage-point increase in the replacement rate reduces the decline in consumption by 3.08% which is slightly larger than Gruber's estimate of 2.80%. The result is similar to my preferred specification for the same period which includes categorical controls for age and education. For my

[62] There are three main reasons why females compose only 17% of the sample. First, female labor force participation rates were much lower in the earlier years of the sample. Second, I am limiting my analysis to heads of households which the PSID defines as the male for a married couple. Third, UI eligibility is lower for females than males (conditional upon unemployment) due to females being less likely to have sufficient base period earnings to qualify for UI.

preferred specification, the results suggest that a 10 percentage-point increase in the replacement rate reduces the decline in food consumption by 3.11% for the 1968-1986 period, 2.07% for the 1968-1996 period, and 2.45% for the entire sample period from 1968-2012.

In contrast to East and Kuka (2015) finding that UI no longer helps recipients smooth consumption, the results suggest that UI helps to smooth consumption for my sample of prime age individuals for the entire sample period. While I am interpreting the timing of the food consumption question differently from Gruber (1997) and East and Kuka (2015) and using the recall questions on employment rather than the employment status at the time of the survey, sample heterogeneity might be driving these differences where I am focusing on prime age workers between the ages of 25-61 with at least 26 weeks of employment during their base period with sufficient earnings to qualify for UI and were not self-employed during their base period which would generally exclude them from receiving UI. Gruber (1997) and East and Kuka (2015) appear to include household heads of all ages and are not excluding self-employed individuals. When I drop these restrictions, my results become fairly similar to East and Kuka's for the entire sample period.

4.5.1 Wealth and Spousal Labor Supply

The degree that UI smoothes consumption likely depends on whether households have other means of smoothing consumption. Two of the primary ways that households can smooth consumption is through having liquid assets and through having an employed spouse. The latter captures that respondents with employed spouses see smaller

percentage declines in household income and the idea that these households should be able to borrow against the spouse's labor income. Table 4.4 displays the estimates from Equation 4.4 which adds a control for having zero-liquid assets at the spell start date into the model as well as an interaction between having zero-liquid assets and the after-tax replacement rate for the 1968-2012 period and the 1968-1996 period. The table also reports estimates stratified by whether the recipient had a working spouse using both the actual and predicted replacement rates. The results suggest that UI offers large consumption smoothing benefits for the 27% of households that do not have liquid assets and have no working spouse. For the full sample using the actual replacement rate for the 1968-2012 period, a 10 percentage-point increase in the replacement rate reduces the decline in consumption by 1.55% for those with liquid assets at the spell start date and 3.16% for those with zero liquid assets (evaluated at the mean).

However examining the stratified sample for the 1968-2012 period, the results suggest that this is largely driven by the 27% of households that do not have liquid assets and have no working spouse. For the stratified sample of households without a working spouse, a 10 percentage-point increase in the respondent's replacement rate reduces the decline in household consumption by 1.08% for those with liquid assets at the spell start date and 4.92% for those with zero liquid assets. Moreover, for these households, having zero liquid assets at the spell start date is associated with a 21% decline in consumption, ceteris paribus. For households with a working spouse, a 10 percentage-point increase in the respondent's replacement rate reduces the decline in household consumption by 1.67% for those with liquid assets at the spell start date and .75% for those with zero liquid assets, with neither coefficient being statistically significant. For these households,

having zero liquid assets at the spell start date is associated with a 2.1% decline in consumption, ceteris paribus, which is significantly smaller than the 21% decline for households without a working spouse.

Using the predicted replacement rate in place of the actual replacement rate produces similar results. The results suggest that the consumption smoothing benefits of UI are concentrated on the set of households with zero liquid assets at the spell start date that do not have a working spouse. For households without a working spouse, a 10 percentage-point increase in the respondent's replacement rate reduces the decline in household consumption by -1.02% for those with liquid assets at the spell start date which is not statistically significant and 3.45% for those with zero liquid assets. For households with a working spouse and no liquid assets, a 10 percentage-point increase in the respondent's replacement rate is associated with no change in household consumption using the predicted replacement rate.

4.5.2 Wealth, Spousal Labor Supply, and Imputed Total Consumption

Given that total consumption might not respond in the same way that food consumption does to changes in UI, I impute total consumption using a procedure based on Attanasio and Pistaferri (2014). Table 4.5 displays the estimates from Equation 4.4 using imputed total consumption for both the actual replacement rate and the predicted replacement rate. Using the actual replacement rate, the results vary relative to the estimates in Table 4.4 in that the estimates suggest that UI offers more consumption smoothing benefits to the eligible population of households as a whole and not just households with zero liquid assets at the spell start date. For the full sample using the

observed wage and imputed total consumption, a 10 percentage-point increase in the respondent's replacement rate reduces the decline in household consumption by 1.54% for those with liquid assets at the spell start date and 1.71% for those with zero liquid assets (evaluated at the mean). For households with no working spouse, a 10 percentage-point increase in the respondent's replacement rate reduces the decline in household consumption by 1.33% for those with liquid assets at the spell start date and 2.09% for those with zero liquid assets.

Using the predicted replacement rate, the results suggest that the consumption smoothing benefits of UI are concentrated on the set of households without liquid assets that do not have a working spouse, which is similar to the results using food consumption. For households without a working spouse, a 10 percentage-point increase in the respondent's replacement rate reduces the decline in household consumption by -.4% for those with liquid assets at the spell start date which is not statistically significant and 1.51% for those with zero liquid assets which is statistically significant.

The consumption smoothing benefits for households without other means of smoothing consumption are smaller using imputed total consumption rather than food consumption. For these households, a 10 percentage-point increase in the respondent's replacement rate reduces the decline in household consumption by between 3.5-4.9% using food consumption and 1.5-2.1% using imputed total consumption. The difference could be explained by households putting their first dollars towards food, which is consistent with food expenditure typically having an income elasticity of demand of around .6 which is lower than the income elasticity of demand of most other goods. This is consistent with Dynarski and Gruber's (1997) finding that food consumption is less

responsive than total consumption during transitions from employment to unemployment using the CE. However, both my measures of consumption suggest that UI helps households smooth consumption for households that do not have other means of smoothing consumption.

4.5.3 Declines over Time?

The past literature that has examined the consumption smoothing benefits of UI has found large consumption smoothing effects in the years through the late 1980s. East and Kuka (2015), extend Gruber's analysis and find large declines in the consumption smoothing benefits of UI in the 1990s that causes all but one of their nine such specifications to show that UI has no statistically significant consumption smoothing effect for the 1968-2011 period. They then decompose this effect by interacting decade fixed effects with the replacement rate to determine when the declines that they observe in the consumption smoothing benefits of UI occur. East and Kuka observe extremely large declines in the consumption smoothing benefits of UI in the 1990s.

However, I find large consumption smoothing benefits from UI that are statistically significant using models that include and exclude liquidity for the 1968-2012 period. To test if the consumption smoothing benefits of UI declined in the 1990s, I estimate Equation 4.1 and Equation 4.4 while including interaction terms for the decade interacted with the actual replacement rate which is similar to East and Kuka (2015) using food consumption for my entire sample and for a stratified sample based on having an employed spouse.[63]

[63] I also do this using imputed total consumption (available upon request) and obtain similar results to the estimates using food consumption where the time period interaction terms are statistically insignificant.

The results are displayed in Table 4.6. Few of the coefficients on replacement rate interacted with the time periods are statistically significant and I find no evidence of large declines in the 1990s after The Tax Reform Act of 1986 made UI benefits fully taxable. Moreover, each of the six F-Tests fail to reject that the coefficients on replacement rate interacted with the time periods are jointly equal to zero. Overall, I find little evidence that the consumption smoothing benefits of UI declined in the 1990s.

4.6 Conclusion

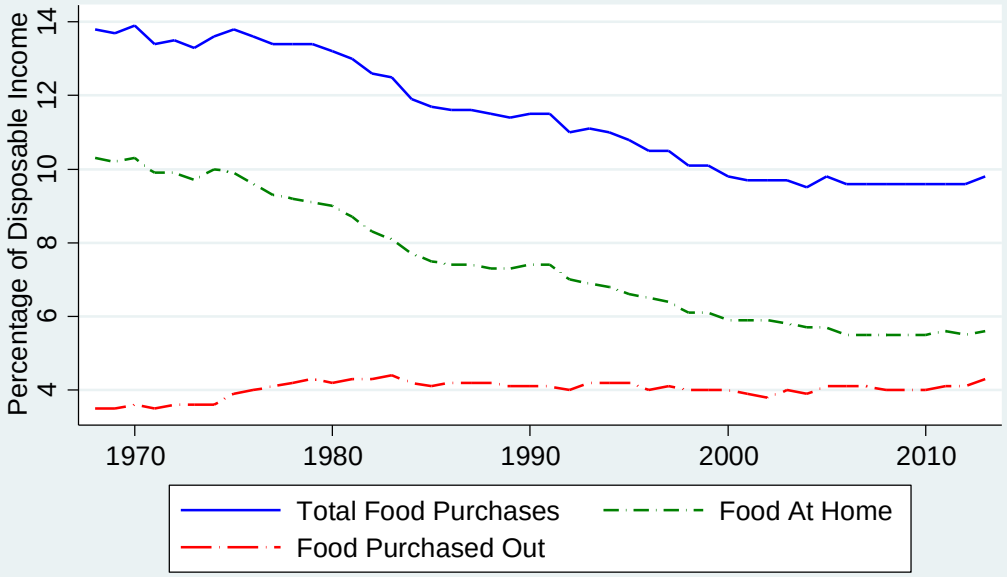
This essay examines how liquidity and spousal income affect the consumption smoothing benefits of UI. Using food consumption and imputed total consumption, I use the PSID from 1968-2012 to show that the consumption smoothing benefits of UI are primarily concentrated on the set of households with zero-liquid assets at the spell start date that do not have a wage earning spouse. For these 27% of households, a 10 percentage-point increase in the respondent's replacement rate reduces the decline in household consumption by between 3.5-4.9% using food consumption and 1.5-2.1% using imputed total consumption. However, for households with liquid assets or an employed spouse, UI offers much smaller consumption smoothing benefits and offers no consumption smoothing benefits for the 24% of households with liquid assets and an employed spouse. Moreover, I find no evidence that the consumption smoothing benefits of UI have declined over time.

The results suggest that UI offers large consumption smoothing benefits for liquidity constrained recipients, which is presumably the group that policymakers care about most. Moreover, the results are important for estimating optimal unemployment

benefits using the Baily-Chetty formula where the decline in consumption as a function of UI benefits is one of the three key parameters in determining optimal benefit amounts (see Baily (1978) and Chetty (2006)). The results suggest that liquidity constrained UI recipients have higher optimal replacement rates than less liquidity constrained recipients, ceteris paribus, which is something that policymakers could consider when designing benefit schedules.

Figure 4.1: Food Expenditure in the United States

As a Percentage of Disposable Income: 1968-2013



Note: food purchases include those made with both SNAP and WIC
Source: USDA Economic Research Service

Figure 4.2: Average Simulated Replacement Rate: by State for 2012

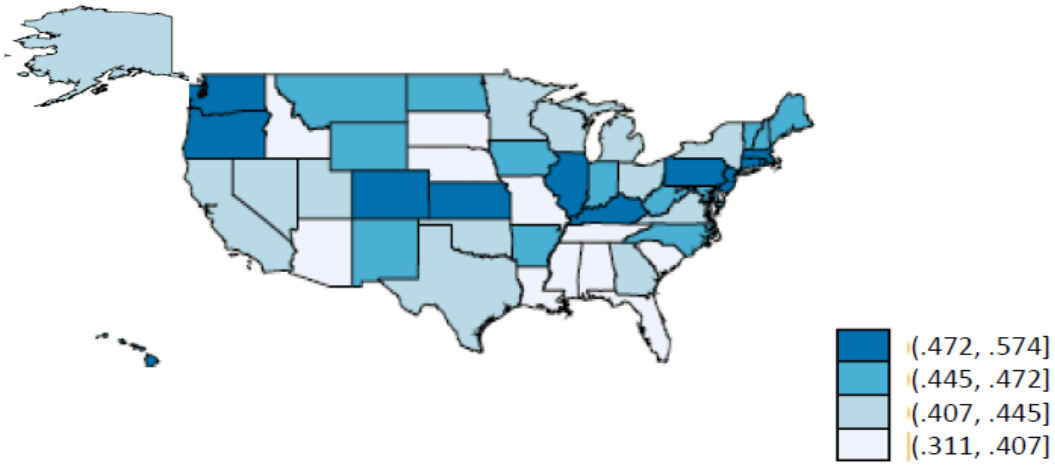


Table 4.1 - UI Benefits in Dollars and Weeks by State for 2013[a]

State	Min-WBA	Max-WBA	Average WBA	Average Weekly Wage	Min-Weeks	Max-Weeks
Alabama	45	265	207	794	15	26
Alaska	56	370	250	965	16	26
Arizona	122	240	221	866	12	26
Arkansas	81	451	289	736	9	25
California	40	450	301	1,083	14	26
Colorado	25	466	356	978	13	26
Connecticut	15	591	345	1,230	26	26
Delaware	20	330	245	1,002	24	26
D.C.	50	359	299	1,523	19	26
Florida	32	275	231	822	12	23
Georgia	44	330	267	909	6	20
Hawaii	5	534	424	781	26	26
Idaho	72	357	264	693	10	26
Illinois	51	413	324	1,016	26	26
Indiana	37	390	243	799	8	26
Iowa	59	396	337	780	7	26
Kansas	114	456	341	791	10	26
Kentucky	39	415	292	773	15	26
Louisiana	10	247	207	849	26	26
Maine	65	372	285	718	22	26
Maryland	50	430	329	996	26	26
Massachusetts	33	674	424	1,197	10	30
Michigan	117	362	293	899	14	20
Minnesota	24	393	376	970	11	26
Mississippi	30	235	194	683	13	26
Missouri	35	320	242	824	8	20
Montana	127	446	290	695	8	28
Nebraska	70	362	276	746	12	26
Nevada	16	402	308	822	12	26
New Hampshire	32	427	287	941	26	26
New Jersey	87	624	398	1,141	1	26
New Mexico	76	407	303	750	16	26
New York	64	405	308	1,276	26	26
North Carolina	46	535	290	833	13	26
North Dakota	43	516	396	947	12	26
Ohio	115	413	318	847	20	26
Oklahoma	16	386	293	809	18	26
Oregon	122	524	316	843	3	26
Pennsylvania	70	573	360	934	18	26
Rhode Island	45	566	351	870	15	26
South Carolina	42	326	248	747	13	20
South Dakota	28	333	276	680	15	26
Tennessee	30	275	235	843	13	26
Texas	62	440	341	999	10	26
Utah	26	479	345	794	10	26
Vermont	69	425	313	780	21	26
Virginia	54	378	295	990	12	26
Washington	143	604	387	1,012	1	26
West Virginia	24	424	275	748	26	26
Wisconsin	54	363	276	803	14	26
Wyoming	33	459	359	859	11	26

a. Minimum and maximum values for benefits and potential weeks of benefits are as of January 1, 2013.

Table 4.2: Summary Statistics for UI Eligible Individuals

	Subsample Periods		All Years
Period	1968-1986	1968-1996	1968-2012
Real Food Expenditure[a]	$10,096	$9,901	$9,321
Imputed Consumption[a]	$35,327	$34,499	$33,057
After-Tax Replacement Rate	0.499	0.492	0.494
After-Tax Real Weekly Wage[a]	$717	$705	$708
Age	38.2	38.3	38.8
Female	13.7%	15.1%	17.3%
Married	77.5%	74.0%	69.4%
White	88.4%	88.5%	87.3%
Black	8.9%	8.8%	9.7%
Other	2.6%	2.8%	3.0%
Years of Education	11.8	12.2	12.6
Family Size	3.2	3.1	2.9
Number of Children	1.2	1.2	1.1
State Unemployment Rate	0.069	0.067	0.066
Δ Log Food Consumption	-0.026	-0.026	-0.029
Δ Log Imputed Consumption	-0.055	-0.054	-0.057
Has Liquid Assets	38.3%	41.6%	51.4%
Has Employed Spouse	45.8%	47.1%	45.7%
Renter	32.0%	35.0%	36.9%
N	1,141	1,588	2,236

Notes: a: All dollar values are chained in 2013 dollars using CPI. The sample includes UI eligible PSID respondents age 25-61 that were employed at least 26 weeks in survey year t-1 and unemployed in survey year t. The sample excludes respondents who were self-employed during their base period, those on layoff, observations where the change in food consumption from the employed to unemployed state is greater than threefold (in absolute value), SEO observations, and observations where family size changes between the employed and unemployed state.

Table 4.3: Baseline Results- The Effect of UI on Food Consumption

Specification	Gruber Model	Baseline Model		
Years	1968-1986	1968-1986	1968-1996	1968-2012
After-Tax Replacement Rate	0.308***	0.311***	0.207***	0.245***
	(0.10)	(0.10)	(0.07)	(0.07)
Baseline Controls	Yes	Yes	Yes	Yes
State and Year Fixed Effects	Yes	Yes	Yes	Yes
Drop in Consumption without UI	18.2%	18.2%	12.8%	15.3%
N	1,143	1,143	1,588	2,236

Notes: The sample includes UI eligible PSID respondents age 25-61 that were employed at least 26 weeks in survey year t-1 and unemployed in survey year t. The sample excludes respondents who were self-employed during their base period, those on layoff, observations where the change in food consumption from the employed to unemployed state is greater than threefold (in absolute value), SEO observations, and observations where family size changes between the employed and unemployed state. Regressions are run with robust clustered standard errors at the state level. For the Replacement and Unemployment Rates: .01=1%. * ** *** indicate coefficient is statistically different from zero at the 90%, 95%, and 99% confidence level, respectively.

Table 4.4: The Effect of UI on Food Consumption with Liquidity

	Replacement Rate			Predicted Replacement Rate		
Sample	Full Sample	No Working Spouse	Working Spouse	Full Sample	No Working Spouse	Working Spouse
1968-2012						
After-Tax Replacement Rate (RR)	0.155*	0.108	0.167	-0.084	-0.102	-0.032
	(0.09)	(0.13)	(0.13)	(0.12)	(0.19)	(0.15)
No Liquid Assets x RR	0.161*	0.384***	-0.092	0.274**	0.447***	0.033
	(0.09)	(0.14)	(0.14)	(0.12)	(0.14)	(0.18)
No Liquid Assets	-0.098*	-0.208**	0.021	-0.156**	-0.250***	-0.039
	(0.05)	(0.08)	(0.07)	(0.06)	(0.08)	(0.10)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Percent with No Liquid Assets	48.6%	49.0%	47.3%	48.6%	49.0%	47.3%
Consumption Decline: RR=0 with Assets	9.95%	8.17%	9.61%	-1.23%	-1.76%	-0.56%
Consumption Decline: RR=0 without Assets	18.46%	25.64%	7.71%	12.23%	19.08%	-3.93%
P-Value: RR + No Liquid Assets x RR =0	0.0002	0.0005	0.4694	0.0465	0.0249	0.9916
N	2,236	1,215	1,021	2,236	1,215	1,021
1968-1996						
After-Tax Replacement Rate (RR)	0.022	-0.052	0.206	-0.037	-0.118	0.146
	(0.10)	(0.14)	(0.18)	(0.13)	(0.19)	(0.19)
No Liquid Assets x RR	0.284***	0.537***	-0.065	0.308**	0.488**	0.028
	(0.10)	(0.14)	(0.17)	(0.15)	(0.19)	(0.22)
No Liquid Assets	-0.165***	-0.291***	-0.010	-0.183**	-0.286***	-0.054
	(0.05)	(0.08)	(0.08)	(0.07)	(0.10)	(0.11)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Percent with No Liquid Assets	58.1%	58.4%	57.8%	58.1%	58.4%	57.8%
Consumption Decline: RR=0 with Assets	3.46%	0.46%	10.47%	0.54%	-3.37%	8.25%
Consumption Decline: RR=0 without Assets	18.07%	25.68%	11.14%	16.4%	20.48%	12.79%
P-Value: RR + No Liquid Assets x RR =0	0.0005	0.0015	0.2154	0.0157	0.0341	0.3591
N	1,588	840	748	1,588	840	748

Notes: The sample includes UI eligible PSID respondents age 25-61 that were employed at least 26 weeks in survey year t-1 and unemployed in survey year t. The sample excludes respondents who were self-employed during their base period, those on layoff, observations where the change in food consumption from the employed to unemployed state is greater than threefold (in absolute value), SEO observations, and observations where family size changes between the employed and unemployed state. Regressions are run with robust clustered standard errors at the state level. For the Replacement and Unemployment Rates: .01=1%. * ** *** indicate coefficient is statistically different from zero at the 90%, 95%, and 99% confidence level, respectively.

Table 4.5: The Effect of UI on Imputed Total Consumption with Liquidity

	Replacement Rate			Predicted Replacement Rate		
Sample	Full Sample	No Working Spouse	Working Spouse	Full Sample	No Working Spouse	Working Spouse
After-Tax Replacement Rate (RR)	0.154***	0.133*	0.160	0.001	-0.040	0.092
	(0.05)	(0.07)	(0.10)	(0.08)	(0.11)	(0.11)
No Liquid Assets x RR	0.017	0.076	-0.055	0.084	0.191**	-0.094
	(0.06)	(0.07)	(0.10)	(0.06)	(0.08)	(0.11)
No Liquid Assets	-0.026	-0.056	0.009	-0.058	-0.118***	0.030
	(0.03)	(0.04)	(0.05)	(0.04)	(0.04)	(0.06)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Percent with No Liquid Assets	48.6%	49.0%	47.3%	48.6%	49.0%	47.3%
Consumption Decline: RR=0 with Assets	12.37%	13.30%	11.73%	5.45%	5.23%	8.94%
Consumption Decline: RR=0 without Assets	14.32%	16.71%	11.30%	9.97%	14.23%	5.79%
N	2,236	1,215	1,021	2,236	1,215	1,021
P-Value: RR + No Liquid Assets x RR =0	0.0022	0.0017	0.1653	0.1113	0.0706	0.9844

Notes: The sample includes UI eligible PSID respondents age 25-61 that were employed at least 26 weeks in survey year t-1 and unemployed in survey year t. The sample excludes respondents who were self-employed during their base period, those on layoff, observations where the change in food consumption from the employed to unemployed state is greater than threefold (in absolute value), SEO observations, and observations where family size changes between the employed and unemployed state. Regressions are run with robust clustered standard errors at the state level. For the Replacement and Unemployment Rates: .01=1%. * ** *** indicate coefficient is statistically different from zero at the 90%, 95%, and 99% confidence level, respectively.

Table 4.6: The Consumption Smoothing Effects of Unemployment Insurance Over Time: 1968-2012

Sample	Full Sample		No Working Spouse		Working Spouse	
After Tax Replacement Rate (RR)	0.201**	0.020	0.263*	-0.141	0.010	0.092
	(0.09)	(0.13)	(0.15)	(0.16)	(0.14)	(0.20)
No Liquid Assets x RR		0.254**		0.572***		-0.110
		(0.12)		(0.14)		(0.20)
No Liquid Assets		-0.132**		-0.272***		0.013
		(0.05)		(0.08)		(0.08)
RR x 1977-1986 Period	0.050	0.079	0.060	0.169	0.140	0.078
	(0.11)	(0.14)	(0.17)	(0.22)	(0.17)	(0.19)
RR x 1990-1996 Period	-0.021	0.119	0.045	0.236	0.026	0.078
	(0.14)	(0.15)	(0.28)	(0.30)	(0.21)	(0.25)
RR x 1998-2012 Period	0.232*	0.350*	0.251	0.557*	0.232	0.114
	(0.14)	(0.19)	(0.25)	(0.28)	(0.22)	(0.28)
No Liquid Assets x RR x 1977-1986 Period		-0.006		-0.076		0.073
		(0.09)		(0.13)		(0.13)
No Liquid Assets x RR x 1990-1996 Period		-0.087		-0.060		-0.067
		(0.09)		(0.12)		(0.18)
No Liquid Assets x RR x 1998-2012 Period		-0.006		-0.086		0.146
		(0.10)		(0.14)		(0.17)
1977-1986 Period	0.062	0.133	0.179	0.143	0.128	0.141
	(0.09)	(0.09)	(0.13)	(0.13)	(0.19)	(0.19)
1990-1996 Period	0.180	0.141	0.014	-0.064	-0.034	-0.041
	(0.11)	(0.11)	(0.15)	(0.16)	(0.18)	(0.17)
1998-2012 Period	-0.105	-0.167*	-0.019	-0.156	-0.060	-0.031
	(0.09)	(0.09)	(0.15)	(0.15)	(0.17)	(0.16)
P-Value: All Interactions with RR jointly =0	0.2435	0.2668	0.4690	0.3445	0.4989	0.5799
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
N	2,236	2,236	1,215	1,215	1,021	1,021

Notes: The sample includes UI eligible PSID respondents age 25-61 that were employed at least 26 weeks in survey year t-1 and unemployed in survey year t. The sample excludes respondents who were self-employed during their base period, those on layoff, observations where the change in food consumption from the employed to unemployed state is greater than threefold (in absolute value), SEO observations, and observations where family size changes between the employed and unemployed state. Regressions are run with robust clustered standard errors at the state level. For the Replacement and Unemployment Rates: .01=1%. * ** *** indicate coefficient is statistically different from zero at the 90%, 95%, and 99% confidence level, respectively.

ARRA Policy Appendix

Alternative Base Periods

Traditionally most states have used earnings test that consist of the first four of the last five completed calendar quarters before the claim filing date which excludes an individual's three to six most recent months of earnings (see Figure 3.6). Traditionally many states excluded the most recent quarter of earnings over concerns that this quarter might not accurately represent workers earnings. However, 38 states and the District of Columbia now recalculate monetary eligibility for individuals that don't qualify for UI under traditional base periods using an alternative base period that consists of the four most recent completed calendar quarters preceding the filing of the claim (see Figure 3.7). This represents a historical change for many states as only 6 states had alternative base periods in 1995: Maine, Massachusetts, Ohio, Rhode Island, Vermont, and Washington (Vroman, 1995). However several states have added alternative base periods since this time. Today, 38 states and Washington DC have implemented alternative base periods.

Dependent Allowances

Dependent Allowances are monetary payments made by states to eligible UI recipients who have qualifying dependents. Currently 14 states offer dependent allowances which range from a minimum of $5 per week in Pennsylvania (with 1 qualifying dependent) up to $300 per week in Massachusetts (with 12 qualifying dependents; $25 per dependent). These are paid for dependents which include unmarred biological children under the age of 18 and in some states spouses, older children, parents, as well as other qualifying dependents as defined by state laws. Dependent Allowances are interesting because they raise UI recipients' replacement rates which could potentially increase the spell length of dependent allowance recipients and could lead to a substitution towards more household production given the family demographics of this group. Dependent Allowances have a long history as a component of several state unemployment systems. By 1951, ten states and the District of Columbia paid dependent allowances (Halsey). These states are Alaska, Arizona, Connecticut, Maryland, Massachusetts, Michigan, Nevada, North Dakota, Ohio, Wyoming, as well as the District of Columbia. Today, Arizona, Nevada, North Dakota, Wyoming, and the District of Columbia no longer offer dependent allowances, while Illinois, Iowa, Maine, New Jersey, Pennsylvania, Rhode Island, and Tennessee have implemented dependent allowances.

Part-Time Workers

Finally, many states require unemployed individuals to be available for and actively seek full-time employment to qualify and remain on UI. To see the magnitude of this consider Wisconsin which, like many other state, asks unemployed individuals the question about the week that they are trying to claim benefits:

> ***Were you able to work full-time and available for full-time work?***
> *Answer "YES" if you could have and would have worked full-time if work had been available for you.*
> *Answer "NO" if you could not work full-time because you were physically unable to work or you were unavailable for work. For example, you could not accept work with an employer (including your regular employer) because you were sick or injured, on vacation, didn't have a way to get to work, didn't have childcare arrangements, etc.* -- January 2013

Answering no to the above question will often result in a denial by a state to pay an unemployment claim. Such clauses often mean that many part-time workers have to be able to work full-time hours to be eligible for UI, even though the reason that many of these workers are part-time is because they cannot work full-time hours or chose not to. Twenty eight states and the District of Columbia currently exclude available for and seeking full-time work requirements for individuals with a history of part-time employment.

Voluntary Job Leavers

Essentially all states have provisions that allow for voluntary job leavers to receive unemployment benefits for compelling reasons. The major variance among states is what is considered a compelling reason. Compelling reasons can include providing care for ill family members, victims of sexual assault or domestic violence, or who became unemployed due to moving with a spouse who has relocated for employment purposes, as well as other reasons depending on the state. As can be seen in Table 3.2, many states accepted UI modernization funds to expand coverage to individuals with compelling family reasons. After the modernizations, 24 states offered benefits to voluntary job leavers with compelling reasons for the reasons outlined above.

Benefit Calculator Appendix

The benefit calculator is created using data from The Employment and Training Administration's "Significant Provisions of State Unemployment Insurance Laws" for each year from 1997-2012. The data provides each state's eligibility requirements and the algorithms to determine benefit amounts. The eligibility requirements typically require that recipients have a certain amount of earnings to qualify for UI (see Table 3.1 for 2012) that often must occur during multiple quarters during the respondent's base period. For benefit amounts, I use the data to determine base period earnings which are then used to determine each respondent's benefit amount. Benefit amounts are capped at some maximum and minimum level which are displayed in Table 3.1 for 2012.

To determine UI eligibility, I first determine the dates of each unemployed respondent's base period using their spell start date. The SIPP provides monthly earnings for each respondent and monthly earnings from wages during the base period are used to determine UI eligibility and benefit amounts. Replacement rates are then calculated as the ratio of the weekly benefit amount to the average weekly wage during the respondent's base period.

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Lewis H. Warren

Vita

Education:

University of Kentucky
M.S. Economics, 2012

Miami University
M.A. Economics, 2009

The University of Georgia
B.B.A. Economics, 2007

Current Working Papers:

Reassessing the Effects of Unemployment Insurance Generosity on Search Intensity: New Evidence from Earnings Histories

Liquidity Constraints and the Consumption Smoothing Benefits of Unemployment Insurance

Research Experience:

University of Kentucky Center for Poverty Research
Graduate Research Fellow, 2013-2015
University of Kentucky Center for Business and Economic Research
Graduate Research Fellow, 2013

Teaching Experience:

University of Kentucky, Instructor
Principles of Macroeconomics, 4 Sections (2012, 2015)
Principles of Microeconomics, 3 Sections (2015, 2016)

Graduate Assistant
University of Kentucky, 2011-
2012 Miami University 2008-2009

Grants and Fellowships:

Luckett Fellowship, 2014-2015
Gatton Fellowship, 2013-2014
Gatton Fellowship, 2012-2013
Steckler Fellowship, 2011-2012

Conference and Workshop Presentations:

- **SOLE Session at Midwest Economic Association** (Evanston): April 1, 2016
- **Southern Economic Association** Annual Meeting (New Orleans): November 23, 2015
- **Association for Public Policy Analysis and Management** Annual Meeting (Miami): November 14, 2015
- **Western Kentucky University** Department Workshop (Bowling Green): October 30, 2015
- **Kentucky Economic Association** Annual Meeting (Frankfort): October 23, 2015
- **University of Kentucky** Department Workshop (Lexington): October 12, 2015
- **SOLE Session at Midwest Economic Association** (Minneapolis): March 27, 2015
- **Southern Economic Association** Annual Meeting (Atlanta): November 24, 2014
- **Kentucky Economic Association** Annual Meeting (Frankfort): October 24, 2014
- **Survey of Income and Program Participation Workshop** (Ann Arbor): June 23-27, 2014
- **University of Kentucky** Department Workshop (Lexington): April 15, 2013