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Determinants of labor market choices: age differentials and family circumstances

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ABSTRACT OF THE DISSERTATION

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by

Marina Kutyavina

Doctor of Philosophy in Economics

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Professor Julie Berry Cullen, Chair

My research explores the interactions between labor market choices, public programs, and family circumstances. In the following three chapters, I study the relationship between labor market conditions and job search behavior of workers of differing ages, the effect of children's events on parental retirement timing, as well as the impact of UI extensions on recipients' spouses.

Chapter 1. Age Differences in Job Search Effort: Evidence from the Great Recession

Abstract. This paper demonstrates substantial and systematic difference in job search intensity across age groups and over the course of the Great Recession. Using fine-grained data on search intensity from the 2003-2012 American Time Use Survey, I find that search effort is pro-cyclical for the older unemployed workers and weakly counter-cyclical for the younger age groups. This result is robust to controlling for workers' housing wealth, Unemployment Insurance benefits and duration, expected wages, as well as variety of workers' individual characteristics.

Job search intensity among unemployed workers is a crucial input into the labor market matching process, with the potential to significantly affect matching efficiency. Although standard job search models predict search intensity to be pro-cyclical, recent empirical studies have questioned this implication and demonstrated that aggregate search appears to be either acyclical (Shimer 2004) or counter-cyclical (Mukoyama, Patterson and Sahin 2014). While pro-cyclical search is expected to amplify the fluctuations in the labor market (Gomme and Lkhagvasuren 2013), counter-cyclical effort can plausibly diminish the variations in the job-finding probabilities. At the same time, research has highlighted substantial differences in labor market success across unemployed workers of different age groups, with workers over the age 50 experiencing significantly longer unemployment spells than younger workers.[1] Considering the rapidly aging population and policy interest

[1] Johnson and Mommaerts (2011), Johnson and Park (2011), and US Government Accountability Office Report (2012).

in prolonging careers to ensure sustainability of Social Security, struggles of the older workers in the labor market are a growing concern. Indeed, the re-employment gap between age groups has widened and become especially pronounced during the Great Recession as re-employment probabilities for older unemployed have declined more sharply than for the younger groups.[2]

In this paper, I study cyclical variation in job search intensity by age groups to determine whether differential changes in search effort could have contributed to the declining job-finding probabilities for the older workers or helped offset an even greater potential gap in re-employment. Empirically, I show that search effort is pro-cyclical among older workers and weakly counter-cyclical for younger age groups. I explore possible theoretical mechanisms and find that the standard framework of search intensity augmented with differential labor market characteristics of older and younger unemployed is consistent with the patterns observed in the data.

I use individual-level data on daily minutes of job search activities from the 2003-2012 waves of American Time Use Survey (ATUS), which is the most detailed empirical measure of search intensity available for the U.S.[3] In the main specifications, I focus on the short-term unemployed with inferred unemployment durations of 10 weeks or less in order to capture workers with the strongest ties to the labor market and abstract from issues

[2] Johnson and Butrica (2012) show that unemployed workers ages 25 to 34 were 13% less likely to become re-employed within 18 months during the Great Recession than they were in the pre-recession period, while older workers, ages 50 to 61, were 17% less likely to become re-employed during the Recession than under pre-recession conditions.

[3] Studies that use ATUS to study job search behavior include Krueger and Mueller (2010), Aguiar, Hurst, and Karabarbounis (2013a and 2013b), Mukoyama, Patterson and Sahin (2014), and DeLoach and Kurt (2013).

that arise due to changing search intensity over the course of a long unemployment spell.[4] However, following prior literature, I also examine search effort of workers with unemployment durations ranging from 0 to 135 weeks[5] and find roughly comparable patterns, although with smaller magnitudes.

The empirical findings reveal that during the recession, older unemployed workers (ages 50-61) decrease search effort by 43 minutes per day relative to the young unemployed (ages 18-30) and by 60 minutes relative to the prime age unemployed (ages 31-49). Since older workers search for jobs an average of 51 minutes per day in the pre-recession period, these changes in search intensity are large in magnitude. Furthermore, I demonstrate that the results critically depend on using a detailed measure of search intensity, such as the one that is available in ATUS. A more readily available measure that is often used in the literature, the sum of distinct job search methods that unemployed workers utilized in the previous month, does not approximate the time-intensity of the search process well.

The results are robust to controlling for workers' expected wages, housing wealth, Unemployment Insurance benefits, and a variety of individual characteristics. I also perform a number of tests for compositional change in the pool of unemployed workers over time, and find no evidence for significant changes.

This paper adds a novel dimension to the literature on the cyclical nature of job search intensity by highlighting the contrasting patterns in search effort across age groups

[4] Past studies that have found evidence of substantial changes in search intensity over the course of an unemployment spell include Krueger and Mueller (2011) as well as Krueger and Mueller (2010).
[5] 135 weeks is the maximum unemployment duration observed in my sample.

and over the business cycle, which has not been previously documented in the literature.[6] In addition, the findings draw attention to the importance of using a fine-grained measure of search intensity to adequately capture search effort across subgroups of the unemployed.

The rest of the paper is organized as follows. Section 1.1 provides a review of relevant literature. Section 1.2 lays out the theoretical framework. Section 1.3 describes the data and sample selection. Section 1.4 explains the methodology. Section 1.5 presents the main results and robustness checks, and Section 1.6 concludes.

1.1 Related Literature

A. Measures of Job Search Intensity

Numerous studies have examined aggregate search intensity, but have often been constrained to using a coarse measure of search effort. The most common proxy for search intensity is the total number of search methods that the respondents utilize over the course of a month. For instance, in the Current Population Survey (CPS), contacting employer directly, contacting an employment agency, or talking to friends about a job would each be classified as a separate job search method. For a worker who reports engaging in all three of these activities in the last month, search intensity would equal 3. These categories do not provide an accurate measure of how much time and effort workers put into job

[6] Although there are studies that examine cyclicality of job search (DeLoach and Kurt 2013; Mukoyama, Patterson, and Sahin 2013) as well as studies that touch on the age differential in search (Aguiar, Hurst, and Karabarbounis 2013b; Johnson and Mommaerts 2011; Krueger and Mueller 2012), to my knowledge this is the first study that analyzes whether age differences in search also vary across the business cycle. The existing studies on the age differential typically find either that the age differential in search is not significant (Johnson and Mommaerts 2011) or that the age profile has an inverse U-shape (Aguiar, Hurst, and Karabarbounis 2013b; Krueger and Mueller 2012). However, these studies are not designed for examination of changes in search by age groups and over business cycle because they either aggregate the data from UI-eligible and ineligible unemployed of all durations, focus only on pre-recession years, or pool data from years spanning the entire business cycle.

search, however they do provide a sense of comprehensiveness of the search process. Maestas and Li (2006) use data from the Health and Retirement Study and find that unemployed older workers who engage in more search strategies in year *t* are more likely to be employed in year *t+2*. However, perhaps due to the imprecise nature of the measures, past studies have been unable to detect any substantial variation in job search intensity across age groups.[7]

In an effort to address these data limitations, Krueger and Mueller (2010) turn to ATUS. Exploiting the more detailed information gathered on job search activities, the authors examine whether maximum Unemployment Insurance (UI) benefits affect search intensity. In their specifications, they include a quadratic control for age, but do not explore age differences further.

Following Krueger and Mueller, a growing number of recent studies use ATUS to analyze job search. For example, Aguiar, Hurst and Karabarbounis (2013a) employ ATUS to examine how the allocation of time between market work, home production, leisure, and other activities including job search evolve over the business cycle, with job search found to absorb only about 2 to 6 percent of foregone work hours. In another study, Aguiar, Hurst and Karabarbounis (2013b) find that time spent on search increases over the life-cycle and reaches a peak at ages 46 to 50, thought there is no attempt to differentiate by time period, UI eligibility or unemployment duration.

In an effort to extend ATUS timespan beyond its 2003 start date and increase the sample size, Mukoyama, Patterson and Sahin (2014) construct a measure of search effort

[7] Using four months of data from the 2010 CPS, Johnson and Mommaerts (2011) conclude that job search intensity does not vary much across age groups, although the authors note that unemployed workers ages 50 to 61 appear to use more search methods than unemployed of other age groups.

using information from both ATUS and Current Population Survey. First, the authors estimate daily search time on ATUS data using number of search methods together with worker demographic and labor market characteristics.[8] Then the authors use the estimated coefficients from ATUS to impute job search time for the CPS sample starting in 1994. The results from the estimated search time suggest that the aggregate effort is strongly counter-cyclical. However, in my sample, the correlation between daily search time and total number of search methods used over the last month is only 0.27. Furthermore, Figures A1.1 and A1.2 in the Appendix show that the relationship between methods and search time is different across time periods and by age groups. Given these complications, I use only the actual reported search time from ATUS, thus avoiding bias due to imperfect imputation at a cost of having a smaller sample size.

B. Job Search in Recession

A growing number of studies examine search efforts during the Great Recession. For instance, Krueger and Mueller (2011) collected panel data on self-reported job search intensity and psychological well-being of unemployed workers in New Jersey during 2009 and 2010. The authors obtain puzzling results showing that unemployed workers of all durations begin with about the same search intensity and experience similar declines in effort over a 24 week period.

Using an alternative approach, Marinescu (2012) estimates the effect of increases in UI benefit durations during the 2008 to 2011 period on aggregate job search effort, as inferred by the total number of job applications received on CareerBuilder.com. She finds

[8] Mukoyama, Patterson and Sahin use two-step approach, where they first estimate probability of observing non-zero search time and then estimate search time using data only from those unemployed workers who reported searching on the diary day.

that benefit extensions implemented during the latest recession have reduced job applications in a median state by 29 percent. The Career Builder data, however, do not have any information on demographic characteristics, geographical location, or the current employment status of the applicants. Kudlyak, Lkhagvasuren, and Sysuyev (2012) obtain data from a different online job search engine that does provide information on age, gender and education level of the applicants. However, since their data are available only for 2010 and 2011, they cannot address the question of changing job search efforts during the recession. Further, Green, de Hoyos, Li and Owen (2011) document that older job seekers in Great Britain are much less likely to use the Internet in the search process than younger workers, so these data sources are not likely to be representative for older workers.

The novel contribution of this paper is to explore age differences in search over the course of the business cycle. In a recent study of life-cycle profile of job search, Aguiar, Hurst and Karabarbounis (2013b) pool the data for years 2003 through 2011, and thus do not distinguish patterns in search intensity over the business cycle. Krueger and Mueller (2012) focus solely on the pre-recession years of 2003-2006 and 20-54 year olds and find that linear and a quadratic controls for age are not statistically significant. When the authors pool the results from 14 different countries using data from 1994 to 2006, they find that that the age profile for job search has an inverse U-shape, which is consistent with Aguiar, Hurst, and Karabarbounis (2013b). As the following analysis shows, it is critical to utilize both a precise measure of search intensity as well as a time period that extends over the business cycle in order to identify differences in the cyclicality of search effort by age.

1.2 Potential Drivers of the Differential Search Intensity

What factors can lead to differential cyclical patterns in search intensity by age groups? To explore possible mechanisms, I extend the generalized formulation of search intensity presented in DeLoach and Kurt (2013).[9] In a general equilibrium search-matching model, unemployed workers' choice of job search intensity can be expressed as:

$$S_{it} = f\left(c_{it}, E(w_{it}), g(b_{it},\phi_{it},W_{it}), \mu(s_{it}, \bar{s}_t, \theta_t) \mid S_i>0\right)$$

where S_{it} is the search effort for unemployed worker i at time t. As in the standard models, intensity of search is a function of three key components: cost of search, c_{it}, the difference between the expected present value of employment relative to unemployment, and the probability of obtaining a job given the search effort. The difference between the expected present value of being employed relative to unemployed is captured by expected wages upon re-employment, $E(w_{it})$, and the value of leisure, $g(b_{it},\phi_{it},W_{it})$. Specifically, g(.) is a function of unemployment compensation, b_{it}, the opportunity cost of working, ϕ_{it}, and the wealth of the worker, W_{it}. The probability of finding a job, $\mu(s_{it}, \bar{s}_t, \theta_t)$, depends on own search effort, s_{it}, the average search effort in the economy, $\bar{s}_t$, as well as a measure of labor market tightness, where $\theta = \frac{v}{u}$ is the ratio of vacancies to the unemployed. Within this framework, the differential experiences of the older and younger unemployed workers during the recession can potentially operate through all three of the search effort components.

A. Costs of Search Effort

[9] The detailed models of workers' job search decision can be found in Pissarides (2000); Maestas and Li (2006); Shimer (2004); Yashiv (2000).

The costs of search effort, c_{it}, could have changed differentially for the older and younger workers in the recession. For instance, the growing prevalence of negative employer perceptions[10] regarding older workers could have taken a toll on these workers' sense of self-esteem, making the search process more emotionally draining. The search costs for the younger age groups are more likely to have remained constant over the course of the recession. Although job search technology has been changing over time resulting in decreasing overall search costs, past studies have argued that such changes are gradual and unlikely to be a considerable driver of search effort changes over the business cycle (DeLoach and Kurt 2013). Thus, constant search costs for the younger age groups together with higher search costs for the older workers could have induced a wedge in search effort by age.

B. Relative Value of Employment and Unemployment

Prior research has found that older workers who became re-employed during the recession experience the largest declines in median monthly earnings as well as median hourly wages across all age groups (Johnson and Butrica 2012). Thus, the expected changes in wages, $E(w_{it})$, are likely to vary by age as well as over the business cycle. A larger relative decline in expected wages would diminish the relative value of employment and would cause search effort to decline.

Looking at the value of leisure, $g(b_{it},\phi_{it},w_{it})$, it is possible that the search intensity of younger and older workers was affected differentially by the Unemployment Insurance

[10] Heidkamp, Corre, and Van Horn (2010) examined a national survey data on individuals who lost their jobs during the latest downturn, and found that older unemployed workers cite age discrimination as the principal reason for their failures in the labor market. Similarly, focus group study conducted by the U.S. Government Accountability Office found that older workers see employer reluctance to hire them as the main re-employment obstacle (US GAO 2012).

(UI) extensions that were implemented during the last recession. Given that older workers are more prone to longer unemployment spells,[11] the prospect of receiving b_{it} for a longer time period might have decreased their search intensity more so than it affected search effort of the younger workers with shorter average unemployment durations.

The opportunity cost, ϕ_{it}, which includes the value of continuing education and home production, could have also changed differentially across age groups. For the younger workers, continuing education can be a more valuable option during the downturn than during normal economic times, thus leading to higher ϕ_{it}. In contrast, additional education might not be a viable option for the older workers considering their shorter timeline to recoup the costs of such education. Heidkamp, Corre, and Van Horn (2010) find that only 12% of older workers who became unemployed during the Great Recession took any education or training courses, compared to 20% of the younger workers. Nevertheless, it is plausible that the opportunity costs have increased for older workers during the downturn due to an increase in the value of home production. The number of children with grandparent caregivers has grown sharply since the start of the recession in 2007, suggesting that older workers were tapped to provide additional childcare services for their grandchildren (Livinston and Parker 2010). An increase in childcare raises the opportunity cost of older workers' leisure time, making unemployment relatively more attractive and reducing search effort.

[11] Using data that spans 1996 to 2007, Johnson and Mommaerts (2011) show that younger male workers between the ages of 25 and 34 are 39% more likely to find re-employment each month than the unemployed aged 50 to 61. Johnson and Butrica (2012) demonstrate that during 2004-2007 period, 89% of workers ages 25 to 34 found new jobs within 18 month of becoming unemployed, compared to only 78% of workers ages 50 to 61.

The remaining factor of $g(b_{it},\phi_{it},W_{it})$ that can create an age differential in search effort is wealth, W_{it}. Since wealth increases the value of being unemployed, wealthier workers are expected to exert lower effort to search for jobs. Studies have found that the youngest age groups were the most affected by wealth declines during the last recession, driven particularly by falling housing prices. For instance, McKernan et al. (2014) find individuals ages 44 to 79 in 2010 experienced 20-28 percent declines in wealth as a result of the recession, while those ages 35 to 43 experienced 47 percent wealth declines. Therefore, wealth effects would lead the younger workers to increase their search effort during the recession relatively more so than the older workers.

C. Job-Finding Probability

Older unemployed workers typically experience substantially lower job-finding probabilities than younger workers, and this re-employment gap between age groups has widened even further during the Great Recession. Johnson and Butrica (2012) show that unemployed workers ages 25 to 34 were 13% less likely to become re-employed within 18 months during the Great Recession than they were in the pre-recession period, while older workers, ages 50 to 61, were 17% less likely to become re-employed during the Recession than under pre-recession conditions.

The starting re-employment probabilities by age groups could differentially impact job search effort when the labor market conditions deteriorate. Mukoyama, Patterson, and Sahin (2013) show that theoretically, the marginal product of individual search effort, $\mu_{13}'(s_{it}, \bar{s}_t, \theta_t)$, could either be positive or negative. If $\mu_{13}'(s_{it}, \bar{s}_t, \theta_t)<0$, it would mean that the marginal product of individual search effort is larger when labor market conditions are worse. If $\mu_{13}'(s_{it}, \bar{s}_t, \theta_t)>0$, it would indicate that the marginal product of search is smaller

when labor market conditions deteriorate. Given the differential re-employment probabilities across age groups, it is likely that $\mu_{13}'(s_{it}, \bar{s}_t, \theta_t)$ could have a different sign for younger and older workers.

Shimer (2004) offers intuition on how deterioration in labor market conditions, θ_t , could differentially affect search effort of young and older unemployed workers resulting in opposite signs for $\mu_{13}'(s_{it}, \bar{s}_t, \theta_t)$ for the two age groups.[12] During normal economic times, young workers generally have high re-employment probabilities and are expected to exert little search effort as they are almost certain to receive an offer. For instance, when the probability of finding a job is 1, there is no reason to exert more than the absolute minimal effort, just enough to apply to exactly 1 position since each application is guaranteed to result in an offer. In contrast, older workers with lower re-employment probabilities are expected to exert higher effort in order to secure a job. During an economic downturn, it becomes harder to find a job for all types of workers. Now the younger workers with initially high-reemployment probabilities would need to exert more effort in order to continue securing at least one job offer, consistent with $\mu_{13}'(s_{it}, \bar{s}_t, \theta_t)<0$ for this group. For older workers with low starting re-employment probabilities, the standard effects of lower returns to search during recession would dominate, consistent with $\mu_{13}'(s_{it}, \bar{s}_t, \theta_t)>0$, and they are predicted to decrease search effort. [13] In the post-

[12] Shimer (2004) lays out a framework based on differential starting re-employment probabilities. Since young and older unemployed workers have different re-employment probabilities (Johnson and Butrica 2012), I am applying Shimer's analysis of workers with high initial re-employment probabilities to the younger workers and discussion on workers with low starting probabilities to the older workers.

[13] In particular, under low costs of search effort, Shimer derives the "eighty percent" rule, which explicitly defines the cut-off for high re-employment probability to be 80%, i.e. workers who have at least an 80% probability of finding a job within a search period will respond to downturns by increasing effort.

recession period, the search intensities across age groups are predicted to return to their pre-recession levels, following reversion to the pre-recession re-employment probabilities.

Therefore, all three components of search effort, including costs of search, relative value of employment and unemployment as well as job-finding probabilities could have changed differentially across age groups over the course of the Great Recession. An increase in direct search costs or the value of unemployment as well as having lower baseline re-employment probabilities are all predicted to decrease search intensity, and prior studies have highlighted that older workers are likely to experience these conditions during a downturn. For the younger workers, higher value of unemployment due to lower expected wages, growing educational opportunities and more generous UI benefits are predicted to decrease search intensity during the downturn. However, declining wealth as well as higher initial re-employment probabilities are expected to increase effort for this age group. Thus, whether or not search intensity is pro- or counter-cyclical for younger unemployed needs to be determined empirically.

In the following analysis, I first present results for the overall search intensity and then attempt to separate the effects of the above components on the search effort. Although I do not have data to capture search costs or complete opportunity costs of the search effort, I control for the changes in the relative value of unemployment by including predicted wages, generosity and duration of UI benefits, as well as a proxy for housing wealth. The age groups themselves reflect the differential baseline re-employment probabilities.

D. Compositional Change

In addition to the standard theoretical determinants of search intensity, it can be the case that the observed cyclical pattern in search effort across age groups is a result of a compositional change in the pool of the unemployed workers. For instance, more low-effort older workers as well as more high-effort younger workers could be entering unemployment during the recession relative to pre-recession period. However, I test and do not find evidence for significant compositional change as reported in the robustness section.

1.3 Data and Sample

A. American Time Use Survey

The main source of data in this paper is the 2003-2012 American Time Use Survey (ATUS), a nationally representative dataset which captures the time that individuals spend on various activities each day. ATUS respondents are randomly drawn from the final wave of the CPS, and the respondents' questionnaires from ATUS are linked to their 8th month CPS records. On average, ATUS interviews take place about 3 months following the last CPS interview,[14] and each selected CPS respondent appears in ATUS only once. Respondents are sent advance mailers stating that they will be interviewed for ATUS on a specified day and asked about their activities on the day preceding the interview, known as the diary day.

Together with demographic and labor force status information, ATUS provides detailed data on minutes spent on broad range of activities during a diary day, such as sleeping, eating, exercising, as well as working, searching for jobs, interviewing, and

[14] Within my sample, 14% of ATUS interviews take place 2 months and 70% take place 3 months following the CPS; 15% occur 4 months after, and less than 1% take place 5 months later.

engaging in other income-generating activities. Two separate measures of job search intensity can be constructed from ATUS: one measure that tabulates minutes spent on all search activities on a diary day, including contacting prospective employers, filling out job applications, updating resumes and interviewing,[15] and another measure that counts distinct search methods respondents used over the previous month. The latter measure of search intensity has been frequently used in the past studies as it is readily available in the CPS. Among the search methods, there are 9 active methods, such as contacting an employer directly or contacting a private employment agency, as well as 3 passive methods, such as looking at ads or attending training courses.[16] Past studies have typically used the total number of methods, both active and passive, as proxies for search intensity.[17]

Table 1.1 lists 12 distinct search methods together with additional examples of self-reported job search activities. The time spent on search activities on a diary day captures both active and passive methods and, therefore, reflects the same behavior as that conveyed by the conventional measure of search intensity. However, using the amount of time that the respondents engage in search on a given day provides a more intuitive measure of effort than counting search methods. For instance, in my sample, respondents who report using 3 search methods over the last month spend between 0 and 8 hours searching for a new job on a diary day, with an average search time of about 50 minutes.

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[15] Total minutes of job search activities are calculated as the sum of ATUS job search activities (t050481), job interviewing (t050403), waiting associated with job search or interview (t050303), security procedures related to job search/interviewing (t050405), and job search and interviewing not elsewhere classified (t050499). This definition follows prior ATUS studies of search effort (Mukoyama, Patterson and Sahin 2014).

[16] Active methods are defined as search strategies that can directly result in a job offer, without further effort by the applicant (U.S. Census Bureau (2006)).

[17] For instance, see Maestas and Li (2006), Johnson and Mommaerts (2011), and Shimer (2004).

The sample includes unemployed workers of ages 18 through 61. I exclude those over the age of 61 in order to abstract from issues related to early retirement. Furthermore, I exclude all full-time and part-time students.[18]

Since ATUS does not collect information on the exact duration of unemployment, I construct this measure following Krueger and Mueller (2010). In order to focus on the short-term unemployed and to include detailed data on the workers' most recent employment, I select only those unemployed who reported having a job with positive earnings in the 8th month of CPS.[19] Thus, all workers in my sample became unemployed in the period between the CPS and ATUS interviews, which is 3 months on average. I infer the unemployment durations by dividing the weeks elapsed between CPS and ATUS interviews in half. This estimation allows me to restrict my sample to unemployed with average durations of 10 weeks or less, although it is important to note that the actual durations in my sample can vary from 0 to 20 weeks.

There are several potential concerns with the quality of the ATUS data: the relatively low response rate of approximately 55 percent and the treatment of multitasking. First, the composition of respondents choosing to participate in ATUS may systematically vary over the business cycle and be related to job search intensity. To diminish this concern, I employ ATUS multi-year survey weights throughout the analysis which adjust for differential non-response rates across demographic groups.[20] Table A1.1 in the

[18] Full-time and part-time student status is identified at the time of the CPS interview when respondents are employed in order to avoid endogenous selection into schooling on search effort.
[19] I perform the analysis only on those individuals who report non-missing homeownership status and non-missing family income.
[20] Specifically, ATUS multi-year survey weights are designed to account for the differential response rates across demographic groups and days of the week as well as oversampling of certain demographic groups (US BLS 2013).

Appendix illustrates the differences in observable characteristics of workers ages 18 to 61 who were employed at the time of CPS interview, were selected for ATUS and participated in the time use survey (respondents) and those who failed to participate (non-respondents). On average, respondents are more likely to be older, female, have a college degree, own their living quarters, and have higher weekly earnings as well as family income.[21] Despite the level differences, however, the characteristics of respondents and non-respondents follow roughly similar trends.[22] For instance, both respondents and non-respondents across all age groups have substantially higher earnings during the recession than in the pre-recession period.[23] I further test whether the interactions of age groups with recession and post-recession periods affect the likelihood of an individual responding to ATUS while controlling for changes in observable characteristics over the business cycle and do not find significant results.[24]

The second concern with the quality of ATUS data is that, in cases of self-reported multi-tasking, ATUS records only the primary activity.[25] If younger age groups engage in distinct multi-tasking patterns when searching for jobs, the reported age differential in search could misrepresent differences in effort across age groups. However, in order for such concern to affect my analysis, the multi-tasking patterns would have to vary not only across age groups but also over the business cycle, which is less likely.

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[21] With the exception of difference in *Some College* attainment, all differences between respondents and non-respondents are statistically significant at 1 percent level; however, most of the differences are small in magnitude. The characteristics on which respondents and non-respondents differ by substantial amounts include age, fraction married, weekly earnings and average family income.
[22] See Tables A1.2-A1.4 in the Appendix.
[23] The rise in earnings for the respondents during the recession is statistically larger than the rise for the non-respondents among young and prime age workers; however, the magnitude of the difference is modest (Tables A1.2 and A1.3 in the Appendix).
[24] See Table A1.5 in the Appendix.
[25] Bureau of Labor Statistics (2013).

B. Labor Market and Housing Data

In order to isolate the effects of components of individual search effort and conduct sensitivity analysis, I bring in additional data for expected wages, generosity and duration of UI benefits, housing wealth, and labor market tightness.

To estimate expected wages for unemployed workers, I use data from the 2003-2012 Current Population Survey Merged Outgoing Rotation Groups. My CPS sample includes only full-time workers who are not in school and for whom data on weekly earnings and hours are available.[26] For each year in my sample, I run separate regressions of hourly wages on age and age squared, gender, marital status, dummies for education level and state of residence, allowing the estimated coefficients to vary across years.

The data on UI benefits are obtained from two sources. Maximum and minimum UI weekly benefit amounts across states and years come from the U.S. Department of Labor's Comparison of State UI Laws.[27] The maximum benefit amounts include allowances for dependents in 10 states that have this option. Within my sample, the maximum weekly UI benefit available to workers varies from $200 to $943, with an average of $403. Estimated UI duration data comes from Rothstein (2011).[28] Rothstein simulates the number of weeks of UI benefits expected for workers who become unemployed in each state and each week between January of 2002 and March of 2011,

[26] To obtain a consistent measure of hourly wages in CPS outgoing rotation groups' data, I follow CPS documentation and divide weekly earnings, earnwke, by the weekly hours, uhourse (http://www.nber.org/morg/docs/cpsx.pdf).
[27] Employment and Training Administration. 2003-2012. "Comparison of State Unemployment Insurance Laws." United States Department of Labor. http://workforcesecurity.doleta.gov/unemploy/statelaws.asp#Statelaw (accessed November 2, 2013).
[28] Rothstein, Jesse. 2011. "Unemployment Insurance and Job Search in the Great Recession." NBER Working Paper No. 17534. https://berkeley.app.box.com/rothstein-replication-uiflows (accessed October 16, 2013).

incorporating the UI extensions due to Emergency Unemployment Compensation (EUC) and Extended Benefits (EB) programs.[29] Because states employ diverse triggers to activate these extensions, the EB and EUC programs introduced substantial variation in weeks of eligibility available to recently unemployed workers across states and over time.

In order to determine the effect of changes in housing wealth on search intensity, I use two sources of data on housing prices. Since housing data at the state level are not available, I follow DeLoach and Kurt (2013) and construct a regional index from S&P/Case-Shiller housing market data. S&P/Case-Shiller offers monthly home price indices calculated from CoreLogic data and covering 20 major metropolitan areas (MSA). The regional index weights the MSA's by their population shares. The second measure is based on monthly data from Federal Housing Finance Agency (FHFA) and aggregated to the division level. In my sample, the two indices are highly correlated with each other, with the correlation coefficient equal to 0.75. This is not surprising as both sources employ repeat sales method, though the sample of homes is somewhat different. [30]

Data on labor market tightness are available at the regional monthly level. The number of vacancies is obtained from the 2003-2012 BLS Job Openings and Labor Turnover Survey (JOLTS), and the number of unemployed comes from the BLS Local Area Unemployment Statistics.[31] The measure of labor market tightness is then calculated as the regional vacancies divided by the regional unemployment.

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[29] In this paper, I am using the version of Rothstein's simulations that assumes that recipients do not expect Congress to re-authorize EUC after its scheduled expiration date.

[30] FHFA uses data from single-family properties whose mortgages have been purchased or secured by Fannie Mae or Freddie Mac. Case-Shiller uses CoreLogic housing data from multiple sources that capture about 75% of the U.S. residential housing stock value.

[31] Unfortunately, the vacancy data are not available by state and at the monthly level in the U.S.

1.4 Methodology

To study age differences in the cyclicality of job search intensity, I employ a difference-in-differences strategy. I define three age groups: young unemployed between the ages of 18 and 30, prime age between the ages of 31 and 49, and older unemployed between the ages of 50 and 61.[32] Furthermore, I define three distinct time periods: pre-recession (years 2003 to 2006), recession (years 2008 and 2009), and post-recession (years 2010 to 2012).[33] I exclude 2007 observations from my main specifications because it is an important transitional period considering that the liquidity crisis began to be felt in August while the Great Recession officially started in December of that year; however, the results are robust to including 2007 as part of either the pre-recession or recessionary period.[34]

I estimate the following specification:[35]

$$
\begin{aligned}
(1.1) \qquad Y_{ist} \;=\; & \beta_0 + \beta_1 Young_i + \beta_2\, Prime\ Age_i + \\
& + \beta_3 Recession_t + \beta_4 Post\ Recession_t + \\
& + \beta_5 Young_i * Recession_t + \beta_6 Young_i * Post\ Recession_t + \\
& + \beta_7\, Prime\ Age_i * Recession_t + \beta_8\, Prime\ Age_i * Post\ Recession_t \\
& + \boldsymbol{\Gamma}\, \mathbf{X}_i + \boldsymbol{\Omega}\, \mathbf{Z}_{ist} + \boldsymbol{\lambda}_t + \boldsymbol{\delta}_t + \boldsymbol{\mu}_s + \varepsilon_{ist}
\end{aligned}
$$

[32] Results are robust to varying age group brackets. See Section 1.5, part C.
[33] Results are robust to defining recession period to capture years 2008 through 2010 in order to account for the high unemployment rate that persisted into 2010. See Section 1.5, part C.
[34] As detailed in Appendix 1.B, I also test for pre-existing trends but do not find evidence for such trends.
[35] All regressions are estimated with OLS. Steward (2009) uses ATUS data to show that OLS produces unbiased estimates compared to Tobit specifications when data contain bunching at zero but reflect only a part of the period of interest (i.e. one particular diary day).

where Y_{ist} represents job search minutes of an unemployed worker *i*, in state *s*, on a diary day *t*. $Young_i$ and $Prime\ Age_i$ are indicators capturing the respective age groups, with the omitted category being the older workers. $Recession_t$ and $Post\ Recession_t$ capture the corresponding time periods, with the pre-recession years 2003 to 2006 being the omitted period. All specifications include month-by-year fixed effects, $\boldsymbol{\lambda}_t$, day of the week and holidays fixed effects, $\boldsymbol{\delta}_t$, and state fixed effects, $\boldsymbol{\mu}_s$, unless noted otherwise.

Vector $\mathbf{X}_i$ contains a broad set of respondent characteristics. Since unemployed workers who expect to be recalled to their previous employer are likely to spend significantly less time searching, an indicator for this status is included. Demographic controls include gender, education, marital status, race, immigrant status, number of household children under the age 18, and 12 indicators for prior industries of employment.

To absorb some of the components of job search effort, I also include a vector of additional controls in vector $\mathbf{Z}_{ist}$, which contains predicted hourly wages, maximum weekly UI benefits and expected benefit duration, as well as proxies for wealth.[36] Wealth proxies consist of the total family income[37] reported in the 8th month of CPS as well as the interactions between homeownership status[38] and the regional housing price indices.

The key coefficients of interest are on the interactions between age groups and time periods. These reflect the evolution of differences in average daily search effort between older and younger age groups across the business cycle. For instance, the coefficient β_5 on $Young_i*Recession_t$ indicates how many more or fewer minutes per day

[36] Unfortunately, ATUS does not solicit wealth data from the respondents.
[37] Data on total family income is aggregated into 16 categories, ranging from less than $5,000 per year to $150,000 or more, and is incorporated into the regression as a set of 15 indicators.
[38] The homeownership proxy is an indicator for whether the respondent or a family member owns the living quarters.

the younger unemployed spent on job search activities than the older unemployed during the recession as compared to the pre-recession period.

Given the above specification, the main threat to identification is omitted time-varying variables that are correlated with age, arising from changes in the composition of short-term unemployed by age groups and over time. For instance, it is possible that older workers who lose their jobs in recessions are systematically different on unobservable dimensions from older works who lose their jobs during normal economic conditions. I test and do not find evidence for compositional change as reported in the robustness section.

As an alternative methodology, I also estimate the relationship between labor market tightness and search effort by age groups. In this specification, labor market tightness is measured as the log of the regional vacancy-to-unemployment ratio, *Ln(VU)*, and the main coefficients of interest are on the interactions of age groups and the *Ln(VU)* ratio. The main drawback of using this methodology is the lack of state-level data on labor market tightness. Using regional data, as has been done in prior studies, results in a coarse measure of labor market conditions.

1.5 Results

A. Descriptive Statistics

Table 1.2 presents summary statistics on job search intensity by age groups for the short-term unemployed. Focusing on differences in baseline search intensities, Panel A highlights the importance of using time to measure search effort. Older unemployed workers spend almost twice the amount of time on job search as young and prime age workers. However, data on the average number of search methods used in the last month

imply that older workers have the lower search intensity than the prime age workers in the pre-recession period. Thus, the counts of search methods and actual time spent on job search activities present contrasting baseline patterns and reveal that the number of search methods does not approximate the time intensity of the job search process well. The discrepancy between the two measures is further highlighted by their low overall correlation of 0.27, which varies from 0.37 prior to the recession to 0.19 in the post-recession period.[39]

Panel C in Table 1.2 summarizes changes in search time between the pre-recession and recession periods for the three age groups. Younger unemployed have increased their daily search time by almost 50 percent (12.73 minutes), while prime age unemployed spent over 80 percent more time (27.58 minutes) on search in the recession. In contrast, older unemployed decreased their efforts by half (by 34.5 minutes). [40]

Panel D, which reflects the post-recession period, shows that the average daily search time for all age groups appears to be gradually reverting to the pre-recession levels. Figure 1.1 graphs the average daily job search minutes for workers of older and younger age groups. It appears that the search intensity of the older workers is pro-cyclical, while the search intensity of young and prime age workers is weakly counter-cyclical.

It is important to note that throughout the analysis I focus on the average daily job search intensity as a product of extensive and intensive margins: the probability of searching on a given day and the daily time spent on search once the search process is

[39] Figures A1.1-A1.3 in the Appendix demonstrate considerable variation in correlations between search time and methods by age groups and over time periods.
[40] Although summary statistics can be informative, most of the changes in search within age groups and over time are not statistically significant due to small sample constraints.

commenced. Comparisons of unconditional job search minutes and time conditional on non-zero search in Panels A-D reveal that the cyclical differences in average search by age groups are driven by the differences in the extensive margin. Conditional on non-zero search, daily search time of the older unemployed workers appears to have increased over the course of the business cycle, although this change is not statistically significant. Overall, the data suggest that the variation in average job search effort across age groups and over time is due to the older workers' lower relative frequency of searching.

B. Main Findings

Table 1.3 presents key regression results for the age differential in search intensity. In the first three columns, the dependent variable is the total minutes of job search activities on a diary day. Column (1) includes only age group and period dummies together with their interactions. Column (2) introduces the month-by-year indicators, major industry and diary day indicators as well as state fixed effects. Column (3) adds a vector of demographic controls.

The baseline specification in Column (3) shows that in the pre-recession period, older unemployed spent 47 and 35 minutes more on job search activities than young and prime age workers, respectively. However, during the recession, older workers decreased their effort by 43 and 60 minutes a day relative to these groups. All of these differences are statistically significant. In the post-recession period, the discrepancy in search intensities across age group declines in magnitude.

Column (4) compares the above findings that rely on time-intensive measure of search effort to a conventional effort measure: total number of search methods employed over the previous month. The results demonstrate a clear divergence between the two

measures as the age differential in search is no longer detected in the analysis of search methods. Thus, the time and the methods measures produce very different results regarding the age differences in job search effort.

Table 1.4 presents the analysis that conditions on several components of the search intensity. Column (1) reproduces the main results from Table 1.3 for comparison. Columns (2) through (7) include a variety of variables that attempt to control for the changes in the relative value of unemployment during the recession. Column (2) adds in family income which helps to proxy for the workers' wealth. Column (3) includes predicted hourly wages. Columns (4) and (5) add UI benefit generosity and duration, respectively. Because the data on expected UI duration is only available until 2011, the sample size is reduced from 1,281 to 1,063 observations. Columns (6) and (7) introduce interactions of homeownership status with the S&P Case-Shiller and the FHFA Division House Price Indices, respectively.

The findings reveal that the age differential in search effort remains unchanged after controlling for changes in the relative value of unemployment during the recession. As predicted by theory, higher expected wages are associated with higher search effort. Larger maximum weekly UI benefits and longer expected benefit durations are associated with lower search effort, though again these effects are small in magnitude and mostly insignificant. The lack of a substantial effect of benefit duration on search effort is consistent with Rothstein's (2011) finding that UI extensions had small impacts on job finding probabilities among unemployed workers, with most of the effect being concentrated among the long-term unemployed.

Looking at the effect of housing wealth, the coefficient for the homeownership proxy is negative but insignificant, while higher price indices are associated with higher search effort. Thus, larger housing wealth seems to increase rather than diminish job search effort for the short-term unemployed. In light of the prior studies, it might be surprising that the coefficients on the housing indices are positive. In their study of aggregate search intensity among unemployed workers of all durations, DeLoach and Kurt (2013) highlight the importance of wealth effects in determining whether search effort is pro- or counter-cyclical. The authors show that among all unemployed, search effort appears to be acyclical without including controls for the interactions of homeownership and the Case-Shiller index, yet pro-cyclical once the wealth effects are isolated. Furthermore, the authors find that the coefficients on the price index as well as its interaction with homeownership are negative and significant, indicating that higher housing wealth is associated with reduced search effort. The main difference between my analysis and theirs is the studied sample and the inclusion of month-by-year indicators. I focus on the short-term unemployed with durations of 10 weeks or less, while DeLoach and Kurt study search effort among unemployed with durations ranging up to 135 weeks. Moreover, I have an additional year of data and use 2003-2012 waves of ATUS, while the authors' data end in 2011. While I can reproduce DeLoach and Kurt's results in their original sample and using their specification, the inclusion of month-by-year indicators in my analysis changes the interpretation of the coefficient on the housing price index. Table A1.6 in the Appendix shows the results for search intensity that follows DeLoach and Kurt and compares their findings to my analysis of age differences using unemployed of all durations. Including month-by-year dummies changes the coefficient on Case-Shiller

Index from strongly negative in their specifications to positive and insignificant in my specifications. Month-by-year dummies leave mainly the regional variation in the housing prices. Therefore, the results in Table 1.4 for the short-term unemployed indicate that unemployed in regions with higher housing prices exert higher search effort.[41] Most importantly, the age differential in search effort remains the same in magnitude and significance after the wealth effects are accounted for, suggesting that the differential cannot be explained by the different wealth declines across age groups.

Finally, Column (8) in Table 1.4 highlights the importance of using a fine-grained measure of search intensity by comparing the findings to analysis where the dependent variable is total number of search methods used over the past month. As in Table 1.3, the analysis using search methods does not allow for the detection of the age differential in search.

Table 1.5 presents results from an alternative specification using the regional measure of labor market tightness. As can be seen from the table, the coefficient on *Ln(VU)* ratio is positive while the interactions $Young_i * Ln(VU)$ and $Prime\ Age_i * Ln(VU)$ are negative, although these findings are not statistically significant.[42] One possible reason why these results are similar in direction but less precise could be due to somewhat different definitions of a recession period. In my main specifications, I follow the official start and end dates of the recession determined by the Business Cycle Dating Committee of the National Bureau of Economic Research. The committee used payroll employment

[41] As discussed in Section 1.5, part C, my findings are also robust to including only the month indicators and clustering the standard errors at the month-by-year level as was done in DeLoach and Kurt (2013).
[42] Using a 3-month or a 6-month moving average of Ln(VU) to reduce noise in the monthly regional Ln(VU) data leads to similar findings, with insignificant coefficients on the interaction terms.

measure together with several domestic production measures to establish that recession began in December of 2007 and ended by July of 2009. Figure 1.2 shows one of the measures used in the official recession timing, total non-farm payroll, which reached its peak precisely in December of 2007. I treat 2007 as a transition period and exclude it from the main specifications, even though the results are robust to including 2007 as part of either the pre-recessionary or recession period; years 2008-2009 define the recession in the main analysis. In contrast to the payroll data, the regional Ln(VU) ratios reached their peaks in late 2006 to early 2007, over 6 months prior to the official start of the recession (Figure 1.2). Regional rather than state-level measure of vacancies together with measurement error in JOLTS data (Davis et al. 2008) could have also contributed to the finding of insignificant results in this specification.

C. Robustness Checks

The main concern with the above analysis is the possibility that the composition of short-term unemployed workers is changing differentially across age groups over time. In a recent study, Shimer (2012) shows that compositional change in the pool of unemployed workers over the business cycle appears to be small and cannot account for much of the fluctuation in job finding probabilities. Estimating whether observable characteristics vary between unemployed workers of different age groups across time periods, I draw the same conclusion (Appendix Tables A1.7-A1.10). Overall, the results show very few statistically significant divergent trends in the composition of young and older unemployed, and no statistically significant divergent trends for prime age and older unemployed workers. Given the lack of differential trends in observable characteristics, it

is plausible that the unobservable characteristics also remain similar across age groups and over time.

I administer several additional tests for compositional change and pre-existing trends.[43] As the main test for compositional change, I employ a two-stage approach where, in the first stage, I predict job search minutes using all controls, but excluding age, period indicators and month-by-year fixed effects. In the second stage, I regress the predicted daily job search minutes on age group dummies, the interactions of age groups and period dummies, and month-by-year fixed effects.[44] The results in Table 1.6 show that the coefficients on interaction terms are not statistically significant, suggesting that there is no significant compositional change between the pre-recession, recession, and post-recession periods.

Next, I include additional variables that could have presented omitted variable bias in the preferred specification. In Table 1.7, I control for having an employed spouse, the annual age-specific state-level unemployment rate, and variation in industry composition over time. Since job search effort is likely to depend on spousal labor force status, which in turn might systematically vary by age, it is important to control for this factor. The results indicate that having a working spouse does not affect individual search intensity. Furthermore, although the unemployment rate is endogenous to search effort, it is reassuring to see that it also does not affect the results. To control for the variation in

[43] Please see Appendix 1.B for a detailed description of additional testing.
[44] This approach provides one way to test for whether age groups in different periods in time had systematically different observable characteristics. If an interaction of the age group and specific time period in the second stage is significant, it would indicate that this particular group had significantly different observable characteristics because the observables determined the construction of predicted search time in the first stage.

industry composition over time, I predict state-level employment in each major industry using data from Bureau of Labor Statistics (BLS).[45] The predicted employment captures changes in job opportunities within each industry that could have affected search effort. Including this variable allows me to rule out the possibility that my results are driven by older unemployed workers being concentrated in industries which suffered the most during the recession.

Finally, the regressions in Table 1.8 allow the effects of expected wages, UI benefits, and wealth to vary by age groups. Column (1) reproduces key findings from Table 1.4. Columns (2) through (6) allow the effects of expected wages, maximum UI benefit, total weeks of UI eligibility, interaction of homeownership with Case-Shiller index as well as interaction of homeownership with FHFA division-level index, respectively, to vary by age. Column (7) allows the effects of all of the above controls to vary by age simultaneously. None of the interactions besides the age groups with time period dummies are statistically significant. Furthermore, the main coefficients of interest on the interaction of $Young_i$ and $Prime\ Age_i$ with $Recession_t$ remain very similar in magnitude and significance across these specifications.

In addition, I perform a number of sensitivity tests for my preferred specification.[46] First, I re-estimate the regressions with varying definitions for age categories. The results remain qualitatively similar whether I group all unemployed younger than 50 into one category or restrict my sample to either 20-61 or 25-60 year olds. Second, I use an alternative definition of recession. Since the unemployment rate remained high in 2010, I

[45] Please see Appendix 1.A for details on data construction.
[46] Results from all robustness checks are available upon request.

redefine the recessionary period as years 2008-2010. The results remain similar in both magnitude and significance to the main findings. Third, I repeat the analysis using only the sum of minutes spent on job search activities, but excluding the time spent on interviews and any waiting associated with the active search process. The results remain very similar in magnitude and significance. Fourth, to ensure that the results are reflecting the behavior of short-term unemployed, I restrict my analysis to respondents with inferred unemployment durations of 6 weeks or less, which is equivalent to actual durations of 0-12 weeks. The results remain very similar in magnitude, although no longer statistically significant due to small sample constraints. In addition, I estimate results for longer-term unemployed. Table A1.6 in the Appendix shows that when unemployed workers with durations ranging from 0 to 135 weeks are examined together, the age differential between older and prime age workers in search effort remains pronounced during the recession, although coefficients are smaller in magnitude and only the interaction of $Prime\ Age_i$* $Recession_t$ remains significant.[47]

1.6 Conclusion

This paper documents age differences in job search effort over the course of the Great Recession. The results show that between 2003 and 2006, older unemployed workers spent more time per day searching for jobs than did younger and prime age workers. However, during the recession, older unemployed workers decreased their search intensity by 43 minutes per day relative to younger workers and by 60 minutes relative to

[47] In particular, Table A1.6 shows that prime age unemployed increased their search intensity by 22 minutes per day relative to older unemployed during the recession (significant at 10 percent). The differential in intensity between young and older unemployed workers is no longer detected.

prime age workers. The patterns in search effort for the short-term unemployed reveal that search intensity is pro-cyclical among the older workers and weakly counter-cyclical among the younger age groups. Thus, it appears that older workers' search effort does not operate to potentially offset their declining re-employment probabilities during an economic downturn.

Furthermore, the paper highlights that contradictory conclusions would be drawn from two alternative measures of search intensity: daily minutes on job search activities and the number of distinct search methods utilized over the past month. The results indicate that the number of search methods does not provide an accurate approximation of the time intensity of the search process.

The findings of the age differential in search effort remain robust after controlling for changes in the value of employment relative to unemployment by including expected wages, UI benefit generosity and duration, as well as proxies for housing wealth. Numerous tests do not support a hypothesis that compositional change could explain the differential trends in search effort by age. Additional robustness checks confirm that the results are consistent across variety of specifications. Amidst growing concerns over the aging population and the difficulties faced by older workers in the labor market, it becomes increasingly important to recognize and further understand age differentials in job search.

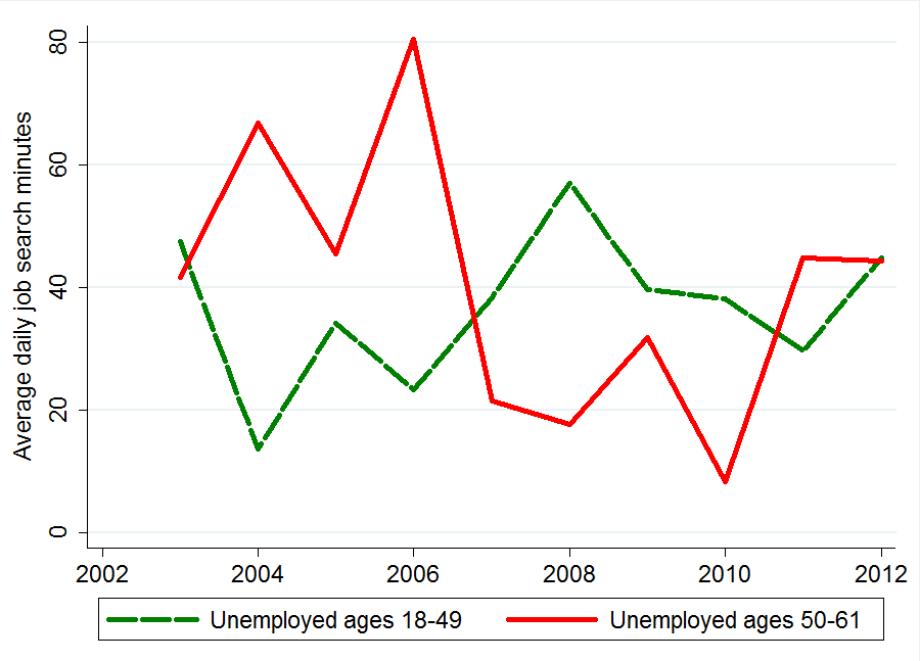

Figure 1.1: Job Search Intensity by Age Groups.

Notes: Average total daily job search minutes are weighted using ATUS multi-year survey weights. Young and prime age unemployed have similar search behaviors and are grouped together for illustrative purposes.

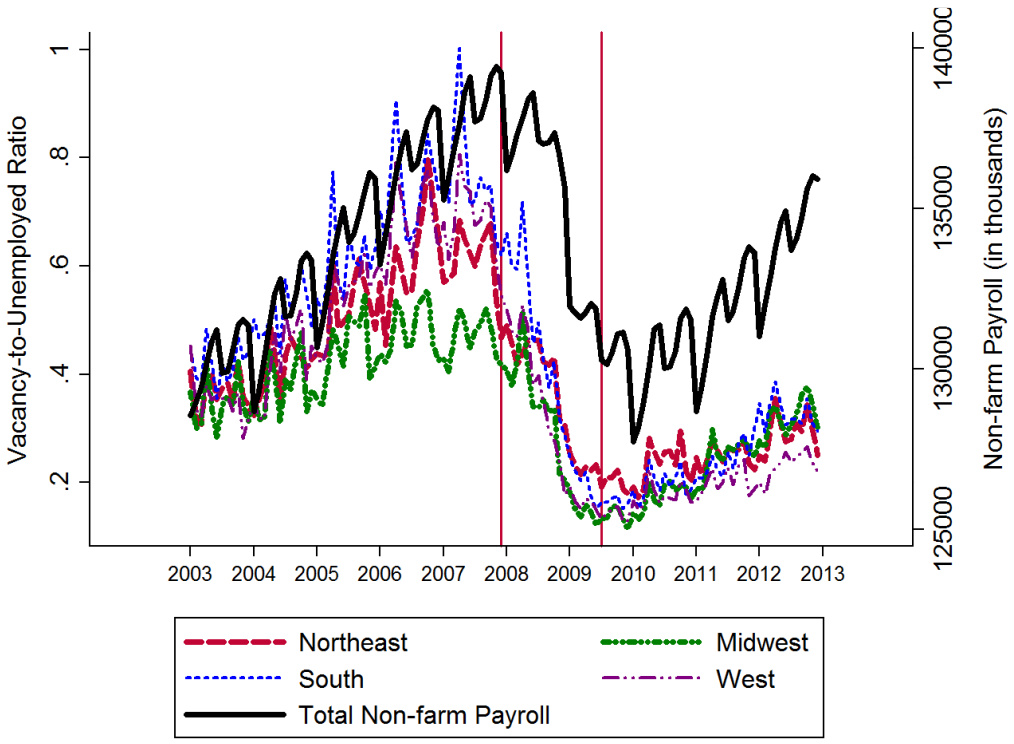

Figure 1.2: Regional Vacancy-Unemployment Ratios and Payroll.

Notes: Two vertical lines mark the official start and end dates of the Great Recession, December 2007 - June 2009, which are determined by the Business Cycle Dating Committee of the National Bureau of Economic Research.

Table 1.1: Examples of Job Search Activities and Search Methods.

All Job Search Activities

Panel A. Active Search Methods

1. Contacted employer directly/interview
   i.e. making phone calls to prospective employer
2. Contacted public employment agency
3. Contacted private employment agency
4. Contacted friends or relatives
5. Contacted school/university employment center
6. Sent out resumes/filled out applications
7. Checked union/professional registers
8. Placed or answered ads
9. Other active
   i.e. auditioning for acting role (non-volunteer),
   auditioning for band/symphony (non-volunteer)

Panel B. Passive Search Methods

1. Looked at ads
   i.e. reading ads on Internet
2. Attended job training programs/courses
3. Other passive
   i.e. researching an employer,
   writing/updating resume,
   asking former employers to provide references,
   picking up job applications

Notes: Examples of job search activities are from ATUS 2008 Activity Lexicon.

Table 1.2: Job Search Intensity Among Short-Term Unemployed, by Age Groups and Over Time

	Young (18-30)	Prime Age (31-49)	Older Workers (50-61)	Difference: Older – Young	Difference: Older – Prime Age
Panel A. Pre-Recession period, 2003-2006					
Average minutes of job search per day	24.05	32.67	60.85	36.79**	28.17*
Average minutes of job search on weekday, conditional on non-zero search	138.45	171.28	182.52	44.06	11.24
Average number of search methods (total)	1.57	1.81	1.58	0.01	-0.23
Average number of search methods (active)	1.25	1.45	1.32	0.07	-013
Panel B. Recession, 2008-2009					
Average minutes on job search per day	36.79	60.25	26.35	-10.45	-33.91
Average minutes on job search on weekday, conditional on non-zero search	142.63	218.65	197.50	54.87	-21.16
Average number of search methods (total)	2.04	2.08	1.49	-0.55**	-0.59**
Average number of search methods (active)	1.69	1.78	1.22	-0.47*	-0.56**
Panel C. Difference: Recession – Pre-Recession					
Average minutes of job search per day	12.73	27.58*	-34.50		
Average minutes of job search on weekday, conditional on non-zero search	4.18	35.47*	14.98		
Average number of search methods (total)	0.47**	0.27	-0.09		
Average number of search methods (active)	0.44**	0.33*	-0.1		
Panel D. Post-Recession period, 2010-2011					
Average minutes on job search per day	35.40	38.38	32.64	-2.76	-5.74
Average minutes on job search on weekday, conditional on non-zero search	164.19	181.34	193.59	29.41	12.25
Average number of search methods (total)	1.81	1.68	1.68	-0.13	0.00
Average number of search methods (active)	1.58	1.35	1.41	-0.17	0.06
No. of observations across periods	338	680	263		

Notes: ATUS survey weights are used in computation of all summary statistics. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 1.3: Cyclical Variations in Job Search Effort by Age Groups.

Dependent Variable:	Total Minutes of Job Search Activities on Diary Day			No. of Search Methods
	(1)	(2)	(3)	(4)
Young (18-30)	-36.79**	-36.50**	-46.75***	-0.20
	(17.00)	(15.42)	(15.25)	(0.26)
Prime Age (31-49)	-28.17	-30.71*	-34.93**	0.12
	(17.25)	(16.60)	(15.00)	(0.24)
Young * Recession	47.24*	47.29*	43.27*	0.31
	(27.64)	(24.20)	(22.10)	(0.27)
Prime Age * Recession	62.08**	61.71**	60.45**	0.29
	(28.59)	(28.89)	(24.08)	(0.33)
Young * Post Recession	39.55*	38.31*	32.22*	0.24
	(22.68)	(19.45)	(18.04)	(0.36)
Prime Age * Post Recession	33.92*	28.29	32.09*	-0.24
	(19.61)	(18.53)	(16.61)	(0.35)
Constant	60.85***	62.04**	67.63**	0.91*
	(15.78)	(24.62)	(30.33)	(0.50)
Observations	1,281	1,281	1,281	1,281
R-squared	0.01	0.23	0.32	0.41
Month-by-Year Indicators	--	X	X	X
Major Industry and Diary Day Indicators	--	X	X	X
State Fixed Effects	--	X	X	X
Demographic Controls	--	--	X	X

Notes: Observations are weighted using ATUS survey weights. Standard errors are clustered at the state-level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 1.4: Isolating Determinants of Search Intensity.

Dependent Variable:	Total Minutes of Job Search Activities on Diary Day							No. of Methods
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Young (18-30)	-46.75***	-47.33***	-25.82	-25.37	-28.73	-26.82	-23.86	0.11
	(15.25)	(15.25)	(18.02)	(17.81)	(21.82)	(18.75)	(19.59)	(0.37)
Prime Age (31-49)	-34.93**	-33.85**	-30.49**	-30.24**	-31.28**	-30.91**	-31.25**	0.11
	(15.00)	(13.62)	(14.01)	(13.93)	(14.50)	(14.49)	(14.70)	(0.25)
Young * Recession	43.27*	47.91**	48.04**	48.50**	49.49**	44.41**	45.88**	0.32
	(22.10)	(19.63)	(19.43)	(19.38)	(19.23)	(20.33)	(19.88)	(0.28)
Prime Age * Recession	60.45**	62.49***	65.11***	65.28***	66.57***	63.53***	65.66***	0.40
	(24.08)	(22.46)	(21.86)	(21.78)	(22.62)	(21.94)	(22.07)	(0.30)
Young * Post Recession	32.22*	33.94*	34.45*	35.54*	50.51**	31.94*	33.44*	0.20
	(18.04)	(18.04)	(17.98)	(17.99)	(21.34)	(18.30)	(18.48)	(0.36)
Prime Age * Post Recession	32.09*	32.29*	32.68*	33.19**	63.71***	30.88*	31.00*	-0.21
	(16.61)	(16.76)	(16.78)	(16.52)	(22.78)	(16.93)	(17.08)	(0.34)
Predicted Ln(wage)			70.38*	73.41*	59.16	71.44*	79.78**	1.21*
			(39.56)	(39.99)	(47.43)	(39.47)	(39.38)	(0.70)
Ln(max UI benefit)				-60.49	-76.84	-60.82	-109.84**	2.74***
				(69.73)	(72.02)	(61.16)	(51.35)	(0.96)
Total weeks of UI remaining					-0.24			
					(0.64)			
"Homeowner"						-97.94	-355.17	-2.28
						(173.61)	(296.40)	(3.38)
Ln(Case-Shiller Index)						134.38		
						(81.68)		
"Homeowner"* Ln(Case-Shiller)						17.24		
						(35.24)		
Ln(FHFA Division House Price Index)							128.52**	-0.39
							(62.15)	(0.73)
"Homeowner"* Ln(FHFA Index)							64.96	0.40
							(56.62)	(0.64)
Constant	67.63**	46.13	-133.98	184.30	307.36	-450.42	-197.42	-14.59**
	(30.33)	(36.35)	(99.17)	(386.47)	(436.49)	(536.82)	(398.21)	(5.92)
Observations	1,281	1,281	1,281	1,281	1,063	1,281	1,281	1,281
R-squared	0.32	0.34	0.34	0.34	0.34	0.35	0.35	0.44
Month-by-Year Indicators	X	X	X	X	X	X	X	X
Major Industry and Diary Day Indicators	X	X	X	X	X	X	X	X
State Fixed Effects	X	X	X	X	X	X	X	X
Demographic Controls	X	X	X	X	X	X	X	X
Family Income Categories	--	X	X	X	X	X	X	X

Notes: Observations are weighted using ATUS survey weights. Standard errors are clustered at the state-level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 1.5: Interactions with Vacancy-to-Unemployment Ratio.

Dependent Variable is Total Minutes of Job Search Activities on Diary Day	(1)	(2)	(3)
Ln(VU)	15.74	6.93	17.17
	(14.13)	(16.74)	(17.33)
Young (18-30)	-37.08	-6.38	-8.47
	(22.88)	(26.59)	(26.32)
Prime Age (31-49)	-26.46	-18.51	-20.40
	(22.78)	(23.02)	(22.78)
Young * Ln(VU)	-14.18	-10.67	-11.66
	(18.44)	(18.07)	(17.87)
Prime Age * Ln(VU)	-20.60	-19.15	-20.64
	(17.50)	(17.41)	(17.25)
Predicted Ln(wage)		78.15*	79.55*
		(41.91)	(41.61)
Ln(max UI benefit)		-87.53*	-55.70
		(48.41)	(45.02)
Ln(FHFA Division Index)		15.04	
		(42.36)	
"Homeowner"		-387.34*	-175.03
		(222.19)	(131.05)
"Homeowner"*Ln(FHFA Index)		70.25*	
		(42.01)	
Ln(Case-Shiller Index)			-18.37
			(35.29)
"Homeowner"*Ln(Case-Shiller)			31.70
			(26.04)
Constant	81.41*	233.29	232.20
	(47.26)	(260.25)	(258.56)
Observations	1,389	1,389	1,389
R-squared	0.20	0.23	0.23
Month Indicators	X	X	X
Major Industry; Family Income Categories and Diary Day Indicators	X	X	X
State Fixed Effects	X	X	X

Notes: Observations are weighted using ATUS survey weights. All regressions include 2007 observations. All columns include the same set of demographic controls as in Table 4. Standard errors are clustered at month-by-year level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 1.6: Testing for Compositional Change in the Pool of Short-Term Unemployed.

Dependent Variable is Predicted Minutes of Job Search Activities on Diary Day	(1)
Young (18-30)	-1.53
	(5.26)
Prime Age (31-49)	2.18
	(6.34)
Young * Recession	-4.66
	(11.20)
Prime Age * Recession	-8.61
	(11.33)
Young * Post Recession	10.42
	(7.54)
Prime Age * Post Recession	3.86
	(7.77)
Constant	40.27***
	(8.64)
Observations	1,281
R-squared	0.11
Month-by-Year Indicators	X

Notes: Predicted job search minutes are obtained by regressing job search minutes on all controls, except for age, period indicators and month*year fixed effects. Observations are weighted using ATUS survey weights. Standard errors are clustered at the state-level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. *Significant at the 10 percent level.

Table 1.7: Additional Controls.

Dependent Variable is Total Minutes of Job Search Activities on Diary Day	(1)	(2)	(3)
Young (18-30)	-27.46	-21.54	-28.54
	(19.18)	(21.94)	(19.25)
Prime Age (31-49)	-31.62**	-30.37**	-30.64**
	(14.76)	(14.06)	(14.75)
Young * Recession	44.42**	46.07*	45.19**
	(20.32)	(22.95)	(20.64)
Prime Age * Recession	63.85***	64.26***	63.79***
	(22.15)	(23.10)	(21.69)
Young * Post Recession	31.75*	34.19*	33.29*
	(18.20)	(18.74)	(18.66)
Prime Age * Post Recession	31.05*	31.24*	29.83*
	(16.83)	(17.41)	(17.54)
Predicted Ln(wage)	70.64*	72.83*	71.61*
	(39.26)	(38.31)	(42.09)
Ln(max UI benefit)	-62.59	-65.64	-67.84
	(62.44)	(55.95)	(59.45)
Ln(Case-Shiller Index)	134.02	132.59	140.87*
	(81.51)	(83.20)	(81.42)
"Homeowner"	-99.30	-98.12	-96.70
	(173.91)	(173.63)	(173.83)
"Homeowner"*Ln(Case-Shiller)	17.50	17.29	16.75
	(35.30)	(35.25)	(35.25)
Employed Spouse	4.60		
	(8.10)		
Unemployment rate by age group		-0.84	
		(2.45)	
Predicted Industry Employment			-131.67
			(97.27)
Constant	-438.20	-414.80	-451.10
	(540.77)	(536.86)	(532.67)
Observations	1,281	1,281	1,267
R-squared	0.35	0.35	0.35
Month-by-year Indicators	X	X	X
Major Industry; Family Income Categories and Diary Day Indicators	X	X	X
State Fixed Effects	X	X	X

Notes: Observations are weighted using ATUS survey weights. Standard errors are clustered at the state-level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. *Significant at the 10 percent level.

Table 1.8. Allowing Controls to Vary by Age Groups

Dependent Variable is Total Minutes of Job Search Activities on Diary Day	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Young (18-30)	-26.82	55.59	-331.53*	-29.37	-187.08	-203.61	-479.41
	(18.75)	(98.54)	(196.17)	(30.60)	(331.77)	(564.48)	(659.58)
Prime Age (31-49)	-30.91**	15.28	-274.64	-43.06**	-413.99	-641.60	-805.26
	(14.49)	(91.06)	(239.18)	(21.01)	(334.66)	(567.86)	(673.07)
Young * Recession	44.41**	46.78**	41.05*	45.49**	39.03*	39.68*	37.99*
	(20.33)	(20.96)	(21.00)	(20.81)	(20.78)	(20.12)	(21.83)
Prime Age * Recession	63.53***	64.90***	61.58***	57.62**	72.23***	66.57***	68.37***
	(21.94)	(22.94)	(22.78)	(21.57)	(22.67)	(23.08)	(24.16)
Young * Post Recession	31.94*	35.98*	26.87	48.43*	29.70	33.51	32.40
	(18.30)	(21.42)	(18.67)	(26.03)	(24.62)	(20.19)	(24.98)
Prime Age * Post Recession	30.88*	32.86*	27.64	48.94**	47.04**	42.55**	45.17**
	(16.93)	(19.13)	(17.42)	(23.07)	(19.18)	(16.57)	(20.68)
Young * Predicted Ln(wage)		-29.15					-29.42
		(36.02)					(38.69)
Prime Age*Predicted Ln(wage)		-15.87					-31.96
		(34.70)					(41.35)
Young*Ln(max UI)			51.29				52.87
			(33.60)				(32.49)
Prime Age*Ln(max UI)			41.10				31.84
			(40.60)				(39.83)
Young * Weeks UI				-0.01			
				(0.80)			
Prime Age * Weeks UI				0.56			
				(0.55)			
"Homeowner"*Young					119.00	-282.48	-200.56
					(415.62)	(800.39)	(797.44)
Young*Ln(Case-Shiller)					35.71		
					(66.97)		
"Homeowner*Young*Ln(C-S)					-31.34		
					(84.05)		
"Homeowner"*Prime Age					-15.64	-79.32	-55.77
					(391.91)	(731.44)	(735.82)
Prime Age*Ln(C-S)					74.35		
					(66.44)		
"Homeowner"*Prime*Ln(C-S)					4.50		
					(77.83)		
Young * Ln(FHFA Index)						37.20	45.85
						(108.29)	(116.09)
"Homeowner"*Young*Ln(FHFA)						46.82	31.47
						(152.40)	(152.34)
Prime Age * Ln(FHFA Index)						114.04	126.17
						(108.06)	(116.78)
"Homeowner"*Prime *Ln(FHFA)						16.51	12.51
						(138.21)	(139.26)
Observations	1,281	1,281	1,281	1,063	1,281	1,281	1,281
R-squared	0.35	0.35	0.35	0.35	0.36	0.36	0.36
Month-by-Year Indicators	X	X	X	X	X	X	X
Major Industry and Diary Day Indicators	X	X	X	X	X	X	X
State Fixed Effects	X	X	X	X	X	X	X
Family Income Categories	X	X	X	X	X	X	X

Notes: A subset of the coefficients is shown for brevity. Observations are weighted using ATUS survey weights. Standard errors are clustered at the state-level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. *Significant at the 10 percent level.

Appendix 1.A *Data Construction*

In this paper, I use 2003-2012 multi-year American Time Use Survey (ATUS) data, downloaded from Bureau of Labor Statistics (BLS) website.[48] I combine the following three files:

1) Activity summary file

2) ATUS-CPS file

3) Respondent file

Activity summary file contains information on total number of minutes the respondent spent on various activities on the diary day. ATUS-CPS file contains data from the 8th month CPS interview that immediately preceded ATUS. Respondent file contains detailed demographic and employment information collected at the time of ATUS interview.

Estimated UI eligibility data comes from Rothstein (2011).[49] Rothstein simulates the number of weeks of UI benefits expected for workers who become unemployed in each state and each week between January of 2002 and March of 2011, incorporating the UI extensions due to Emergency Unemployment Compensation (EUC) and Extended Benefits (EB) programs.[50]

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[48] Bureau of Labor Statistics. 2003-2012. "American Time Use Survey — Multi-Year Microdata Files." United States Department of Labor. http://www.bls.gov/tus/datafiles_0312.htm (last accessed January 6, 2014).

[49] Rothstein, Jesse. 2011. "Unemployment Insurance and Job Search in the Great Recession." NBER Working Paper No. 17534. https://berkeley.app.box.com/rothstein-replication-uiflows (accessed October 16, 2013).

[50] In this paper, I am using the version of Rothstein's simulations that assumes that recipients do not expect Congress to re-authorize EUC after its scheduled expiration date.

Annual unemployment rate by state and by age groups for the civilian non-institutional population comes from the BLS.[51] Official unemployment rate for individuals ages 55 to 64 is used as a proxy for unemployment rate for older workers, defined in the paper to be between ages of 50 and 61. Unemployment rate for 35 to 44-year-olds is used as a proxy for unemployment for prime age workers, ages 31 to 49. Finally, unemployment for 20 to 24-year-olds is used as a proxy for unemployment for young workers, ages 18 to 30. As an alternative measure of unemployment for young workers, I also utilize data on official unemployment rate for individuals between ages 25 and 34.

Maximum and minimum UI weekly benefit amounts across states and years comes from U.S. Department of Labor's *Comparison of State UI Laws*.[52] The maximum benefit amounts include allowances for dependents in 10 states that have this option.

Data used in construction of the control for variation in industry composition over time comes from the BLS "State and Area Employment, Hours, and Earnings"[53] as well as "Employment, Hours, and Earnings – National,"[54] not seasonally adjusted. I matched Super Sectors identified in BLS to 12 major industries identified in ATUS.[55] Several assumptions were made in the matching process. First, ATUS Wholesale and Retail

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[51] Bureau of Labor Statistics. 2003-2012. "States: Employment status of the civilian noninstitutional population by sex, race, Hispanic or Latino ethnicity, marital status, and detailed age, annual averages." United States Department of Labor. http://www.bls.gov/lau/. (accessed October 30, 2013).

[52] Employment and training Administration. 2003-2012. "Comparison of State Unemployment Insurance Laws." United States Department of Labor. http://workforcesecurity.doleta.gov/unemploy/statelaws.asp#Statelaw (accessed November 2, 2013).

[53] Bureau of Labor Statistics. 2003-2012. "State and Area Employment, Hours, and Earnings." United States Department of Labor. http://www.bls.gov/data/#employment (accessed October 30, 2013).

[54] Bureau of Labor Statistics. 2003-2012. "Employment, Hours, and Earnings – National." United States Department of Labor. http://www.bls.gov/data/#employment (accessed October 30, 2013).

[55] In total, ATUS identifies 14 major industries, including Armed Forces as well as Agriculture, forestry, fishing, and hunting. None of the unemployed in my sample report being in Armed Forces, and less than 2% of unemployed reported previous working in agriculture. I exclude both Armed Forces and Agriculture industries from the analysis.

industry was treated as equivalent to the sum of BLS Wholesale and BLS Retail industries. ATUS Transportation and Utilities industry was treated as equivalent to the sum of BLS Transportation and Warehousing industry and Utilities industry. Finally, ATUS Public Administration industry was treated as equivalent to BLS Government industry. Table A1.13 shows correspondence between BLS and ATUS industry classifications.

In order to control for potential variation in industry composition over time, I predict state-level employment in each major industry for years 2004-2012. In particular, I construct the predicted employment share of each industry in each state in the following manner:

$$\text{Predicted } E_{i,t,s} = [E_{i,2003,s} * (E_{i,t,n}/E_{i,2003,n})] / \sum_i [E_{i,2003,s} * (E_{i,t,n}/E_{i,2003,n})]$$

where $E_{i,2003,s}$ is employment in industry *i*, year 2003, state *s*. $E_{i,t,n}$ is national employment in industry *i* and year *t*, and $E_{i,2003,n}$ is national employment in industry *i* and year 2003.

Appendix 1.B *Additional Tests*

I administer two additional tests for compositional change. First, I explore whether older unemployed workers with specific characteristics were more likely to appear in the data during the Recession than other periods. In particular, I estimate a probit regression with a dependent variable capturing whether or not an observation comes from the recession period and control for all individual characteristics as well as their interactions with an indicator for ages 50 to 61 (Appendix Table A1.11). To appropriately test for joint significance of interaction terms in difference-in-difference model within a non-linear setting, I bootstrap the standard errors (Puhani 2012). Jointly, the interactions of older age

group and all the controls are not significant, implying that the characteristics of the older workers were not substantially different during the recession years.[56]

For an additional check, I estimate a probit model on the probability that a worker in my sample belongs in the older age group and all the controls together with their interactions with the $Recession_{ist}$ indicator (Appendix Table A1.12). If the characteristics of older workers were systematically different during the recession period than in other years, I would expect to find interactions of controls and the $Recession_{ist}$ indicator to be significant; however, Table A1.12 demonstrates that this set of interactions is not statistically significant.[57] Taken together, these findings are consistent with Shimer (2012) and do not provide evidence for a substantial compositional change in the pool of unemployed workers.

I test for pre-existing trends in job search behavior by age through including a linear time trend, interacting it with age groups and performing the analysis on the pre-recession period only. The interactions of the trend and age groups are not statistically significant either individually or jointly, indicating that the data do not exhibit pre-existing trends. Furthermore, I test for whether the year 2007 on its own or years 2006 and 2007 together are statistically different from other pre-recession years by examining the interactions of age groups with either the 2007 year dummy or a dummy for 2006/2007 years. The results show that the job search behavior by age groups is not statistically different in 2007 alone or in 2006/2007 from earlier pre-recession years.[58]

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[56] The joint set of interactions is only significant when including an additional set of 16 interactions of older age group with each of the 16 family income categories.
[57] The joint set of interactions is only significant when including an additional set of 16 interactions of Recession period with each of the 16 family income categories.
[58] Results are available upon request.

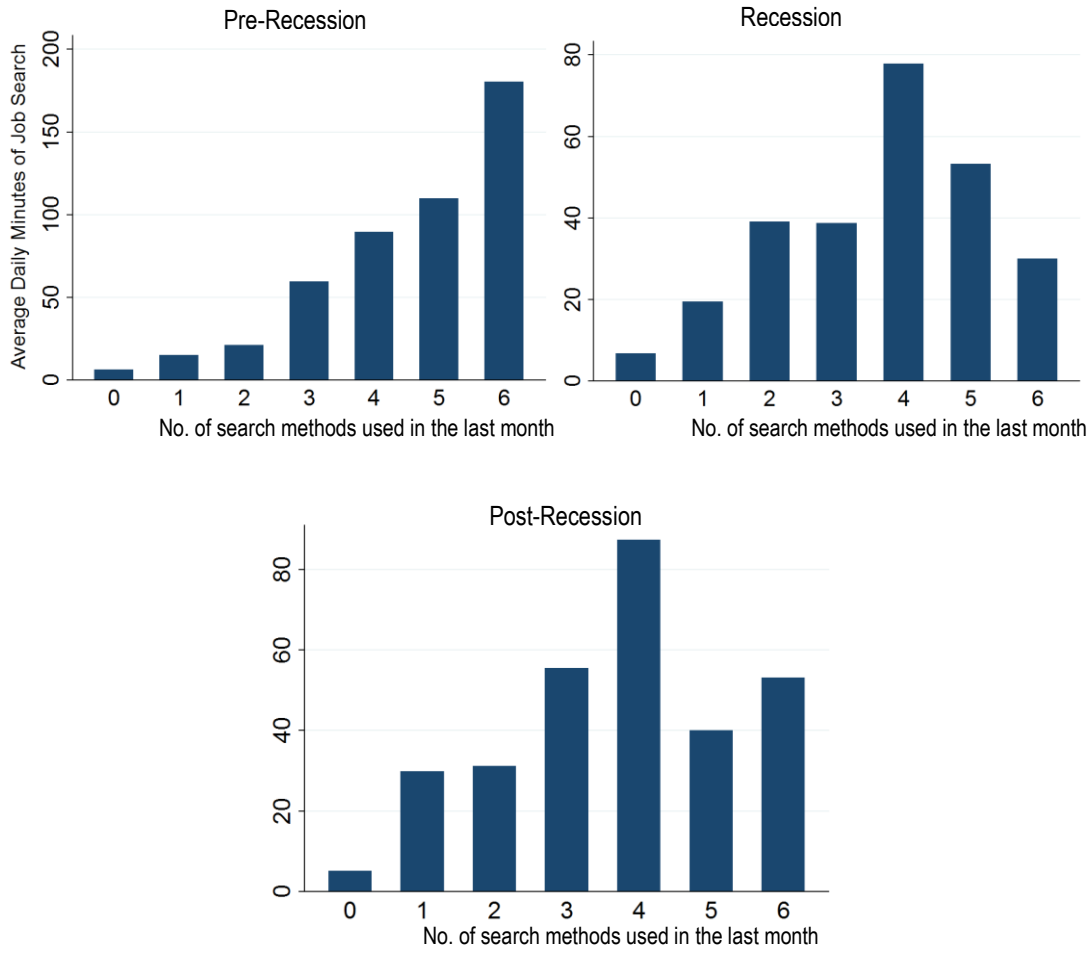

Figure A1.1: Correspondence Between Time and Methods Measures of Job Search Intensity Over the Business Cycle.

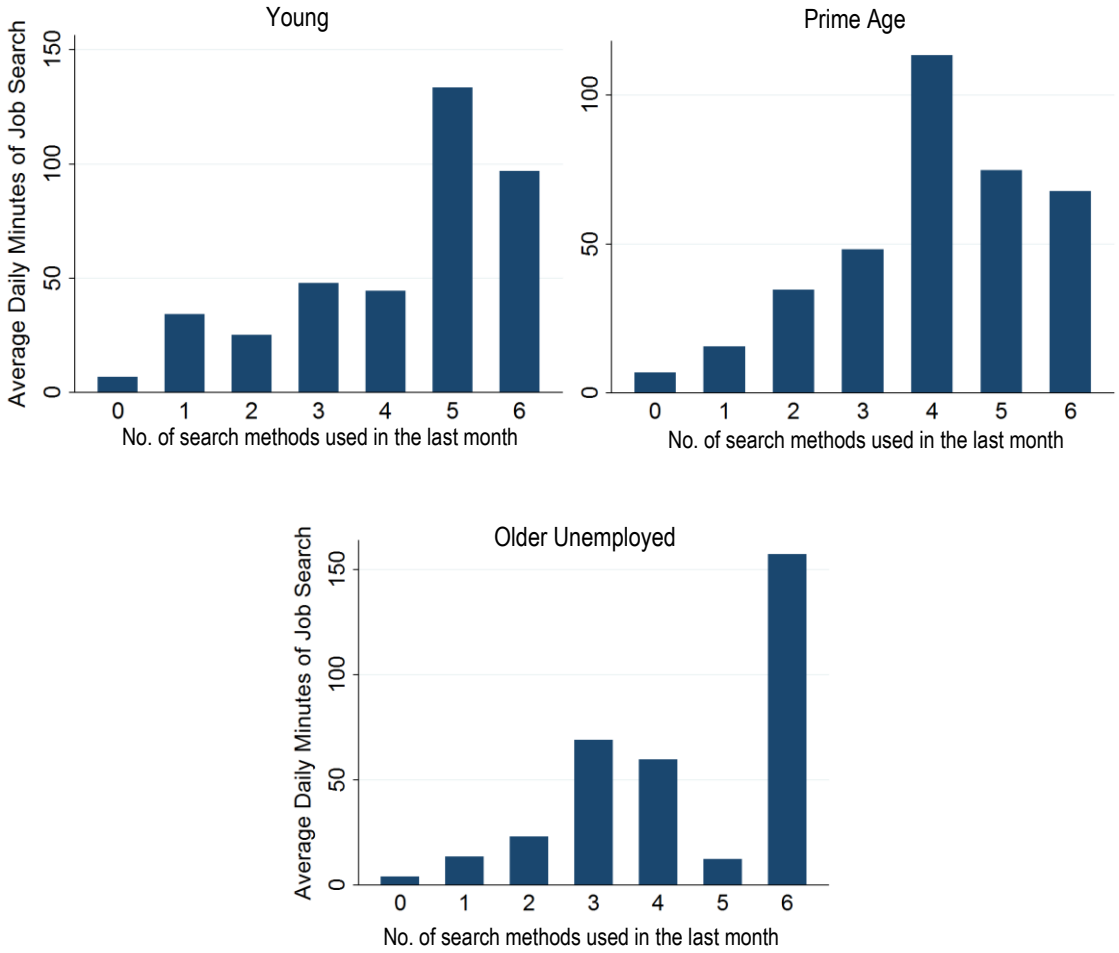

Figure A1.2: Correspondence Between Time and Methods Measures of Job Search Intensity by Age Groups.

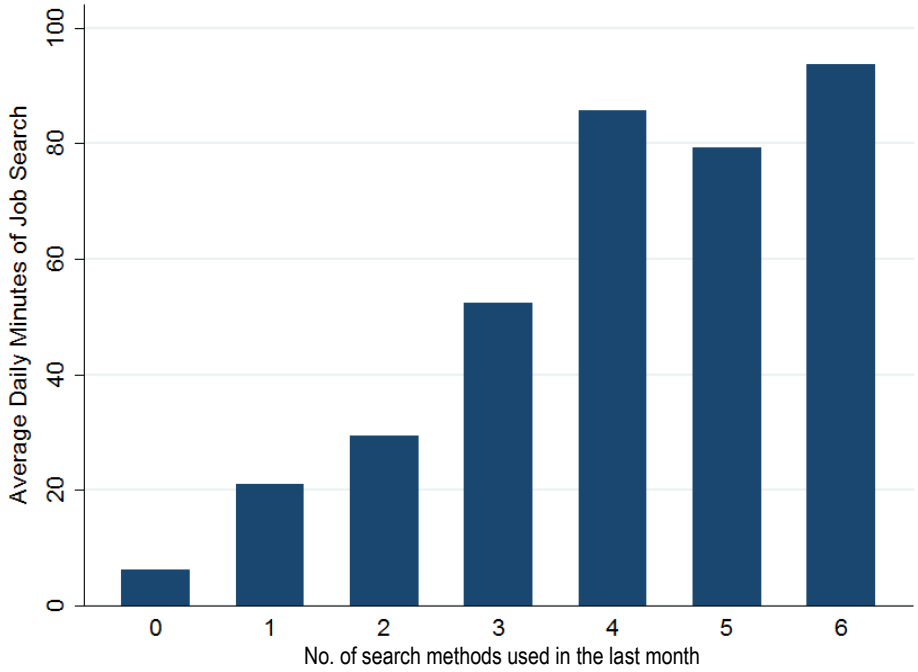

Figure A1.3: Average Correspondence Between Time and Methods Measures of Job Search Intensity.

Table A1.1: Differences Between ATUS Respondents and Non-respondents.

	Respondents	Non-respondents
Age	41.37	38.65
Young (18-30)	0.17	0.26
Prime Age (31-49)	0.57	0.55
Older (50-61)	0.25	0.18
Married	0.60	0.51
Widowed	0.02	0.01
Divorced or separated	0.17	0.19
Female	0.51	0.48
Black	0.12	0.17
Other Race	0.06	0.06
Hispanic	0.13	0.18
Immigrant	0.15	0.19
Some College	0.29	0.29
College Degree	0.39	0.27
Weekly earnings	847.67	731.37
"Homeownership"	0.74	0.60
No. of own children <18	1.18	1.20
Average family income	11.47	10.48
Observations:	74,940	70,493

Notes: Sample includes all workers age 18-61 who were employed at the time of CPS interview, were not part-time or full-time students, and were selected to participate in ATUS. All differences between Respondents and Non-Respondents are statistically significant at 1% level, except for difference in *Some College* attainment which is not significant. Average family income of 10 represents total annual income range of $35,000-39,999. Average family income of 11 represents total annual income range of $40,000-49,999.

Table A1.2: Testing for Differential Trends in Observable Characteristics Among Young Respondents and Non-Respondents.

	Young Respondents		Young Non-respondents		$(Resp_{rec} - Resp_{pre}) - (NonResp_{rec} - NonResp_{pre})$	t-stat
	Pre-Recession	Recession	Pre-Recession	Recession		
Married	0.42	0.39	0.32	0.31	-0.018	-1.22
Widowed	0.00	0.00	0.00	0.00	-0.002	-1.28
Divorced or separated	0.07	0.06	0.07	0.08	-0.01	-1.19
Female	0.53	0.52	0.49	0.51	-0.026*	-1.64
Black	0.12	0.13	0.18	0.19	0.001	0.09
Other Race	0.06	0.06	0.06	0.06	0.008	1.09
Hispanic	0.20	0.18	0.23	0.25	-0.034***	-2.66
Immigrant	0.16	0.15	0.17	0.17	-0.015	-1.26
Some College	0.31	0.32	0.30	0.31	-0.001	-0.10
College Degree	0.29	0.32	0.18	0.20	0.007	0.55
Weekly earnings	561.69	632.28	517.70	559.96	28.33**	2.22
Average family income	9.71	10.34	9.13	9.52	0.24*	1.91
"Homeownership"	0.52	0.50	0.41	0.40	-0.011	-0.73
No. of own children <18	1.34	1.37	1.38	1.42	-0.009	-0.20
Observations:	5717	2491	7979	3419		

Notes: Pre-Recession period includes 2003-2006; Recession includes 2008-2009. Average family income of 9 represents total annual income range of $30,000-34,999. Average family income of 10 represents total annual income range of $35,000-39,999. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A1.3: Testing for Differential Trends in Observable Characteristics Among Prime Age Respondents and Non-Respondents.

	Prime Age Respondents		Prime Age Non-respondents		$(Resp_{rec} - Resp_{pre}) - (NonResp_{rec} - NonResp_{pre})$	t-stat
	Pre-Recession	Recession	Pre-Recession	Recession		
Married	0.67	0.66	0.58	0.59	-0.015	-1.57
Widowed	0.01	0.01	0.01	0.01	-0.002	-0.97
Divorced or separated	0.17	0.17	0.21	0.20	0.007	0.96
Female	0.51	0.50	0.46	0.48	-0.022**	-2.31
Black	0.10	0.11	0.17	0.17	0.008	1.22
Other Race	0.06	0.06	0.06	0.07	-0.002	-0.41
Hispanic	0.12	0.14	0.16	0.18	0.002	0.32
Immigrant	0.15	0.18	0.19	0.21	0.007	0.89
Some College	0.29	0.28	0.29	0.29	-0.017**	-1.97
College Degree	0.39	0.44	0.27	0.30	0.024***	2.65
Weekly earnings	842.88	963.03	759.60	836.46	43.29***	3.55
Average family income	11.66	12.08	10.77	11.25	-0.0626	-0.85
"Homeownership"	0.79	0.76	0.67	0.65	0.002	0.22
No. of own children <18	1.58	1.65	1.54	1.61	-0.01	-0.42
Observations:	19,125	8,033	16,940	7,044		

Notes: Pre-Recession period includes 2003-2006; Recession includes 2008-2009. Average family income of 9 represents total annual income range of $30,000-34,999. Average family income of 10 represents total annual income range of $35,000-39,999. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A1.4: Testing for Differential Trends in Observable Characteristics Among Older Respondents and Non-Respondents.

	Older Respondents		Older Non-respondents		$(Resp_{rec} - Resp_{pre}) - (NonResp_{rec} - NonResp_{pre})$	t-stat
	Pre-Recession	Recession	Pre-Recession	Recession		
Married	0.61	0.57	0.57	0.52	0.008	0.50
Widowed	0.04	0.05	0.05	0.05	0.014**	2.07
Divorced or separated	0.25	0.24	0.28	0.31	-0.032**	-2.26
Female	0.52	0.52	0.46	0.48	-0.023	-1.47
Black	0.12	0.15	0.19	0.22	0.014	1.17
Other Race	0.04	0.03	0.05	0.05	-0.002	-0.31
Hispanic	0.08	0.11	0.11	0.13	0.001	0.12
Immigrant	0.11	0.12	0.16	0.18	-0.008	-0.68
Some College	0.28	0.29	0.27	0.28	-0.009	-0.65
College Degree	0.38	0.38	0.27	0.28	-0.006	-0.39
Weekly earnings	840.57	948.73	750.41	833.77	24.80	1.23
Average family income	11.52	11.89	10.87	11.23	0.003	0.03
"Homeownership"	0.85	0.82	0.76	0.72	0.007	0.53
No. of own children <18	0.38	0.45	0.43	0.51	-0.021	-0.67
Observations:	8045	3695	5202	2481		

Notes: Pre-Recession period includes 2003-2006; Recession includes 2008-2009. Average family income of 9 represents total annual income range of $30,000-34,999. Average family income of 10 represents total annual income range of $35,000-39,999. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A1.5: Testing for Differential Non-response by Age Groups and Over Time.

Dependent variable: Indicator for Respondent status	(1)	(2)	(3)	(4)	(5)	(6)
Young (18-30)	-0.33***	-0.33***	-0.33***	-0.34***	-0.34***	-0.33***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Prime Age (31-49)	-0.17***	-0.17***	-0.17***	-0.18***	-0.18***	-0.18***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Young * Recession	-0.03	-0.04	-0.04	-0.02	-0.02	-0.02
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)
Young * Post Recession	0.01	0.03	0.03	0.03	0.05	0.05
	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)
Prime Age * Recession	-0.03	-0.04	-0.04	-0.03	-0.03	-0.03
	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)
Prime Age * Post Recession	0.03	0.03	0.03	0.06*	0.07*	0.07
	(0.03)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)
Observations	71,463	60,275	60,275	71,463	60,275	60,275
Included Characteristics: married, widowed, divorced/separated, female, black, other race, Hispanic, immigrant, some college, college degree, weekly earnings, homeowner, no. of own children <18, and family income.	X	X	X	X	X	X
Month-by-Year Indicators		X	X		X	X
State Fixed Effects		X	X		X	X
Major Industry Indicators			X			X
Interactions of all characteristics and Recession as well as Post Recession				X	X	X
Chi-sq statistic for joint significance of Young*Recession, Young*Post Recession, Prime Age*Recession, Prime Age*Post Recession	2.540	3.045	2.883	5.335	4.730	4.611
Chi-sq p-value	0.637	0.550	0.578	0.255	0.316	0.330

Notes: Sample includes all workers age 18-61 who were employed at the time of CPS interview, were not part-time or full-time students, and were selected to participate in ATUS . *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A1.6: Job Search Behavior of Unemployed of All Durations, 0-135 Weeks.

Dependent Variable is the Total Minutes of Job Search Activities on Diary Day	Years 2003-2011			Years 2003-2012	
	(1)	(2)	(3)	(4)	(5)
Ln(VU)	2.54	13.40*			
	(4.52)	(7.46)			
Age	-2.06	-2.68			
	(2.64)	(2.67)			
Age^2	0.02	0.02			
	(0.03)	(0.03)			
Ln(max UI benefit)	-18.37	-12.31	6.53	-4.02	-19.72
	(31.37)	(31.13)	(28.69)	(29.44)	(24.69)
Predicted Ln(hourly wage)	111.85**	123.68**	26.31	9.53	9.37
	(52.37)	(52.83)	(23.80)	(17.34)	(16.76)
Ln(Case-Shiller Index)		-44.04**	26.33	31.64	
		(19.32)	(36.77)	(30.70)	
"Homeowner"		-45.52	-41.18	-113.27	-197.97
		(78.67)	(93.16)	(82.22)	(136.26)
"Homeowner"*Ln(Case-Shiller)		7.39	6.97	21.61	
		(15.61)	(18.52)	(16.48)	
Young (18-30)			-10.75	-16.41**	-15.97**
			(8.49)	(7.41)	(7.38)
Prime Age (31-49)			-9.34*	-8.72*	-8.70*
			(5.12)	(5.07)	(5.09)
Young * Recession			0.01	0.32	0.23
			(12.65)	(12.80)	(12.84)
Prime Age * Recession			21.58*	20.33*	20.75*
			(11.91)	(11.79)	(11.79)
Young * Post Recession			0.21	4.35	3.82
			(8.40)	(7.85)	(7.82)
Prime Age * Post Recession			10.94	8.69	8.60
			(9.13)	(9.05)	(8.99)
Ln(FHFA Division Index)					43.70
					(31.50)
"Homeowner"*Ln(FHFA Index)					36.53
					(26.00)
Constant	-106.95	80.00	-202.87	-129.26	-109.37
	(138.08)	(163.33)	(249.93)	(229.83)	(202.44)
Observations	4,426	4,426	4,063	4,532	4,532
R-squared	0.11	0.12	0.16	0.16	0.16
Month Indicators	X	X	--	--	--
State Fixed Effects	X	X	X	X	X
Month-by-Year Indicators	--	--	X	X	X

Notes: Observations are weighted using ATUS survey weights. All regressions include the demographic controls as well as dummies for 4 types of unemployed: those who expect recall, job leavers, new entrants and re-entrants. Columns (1) and (2) reproduce DeLoach and Kurt's (2013) results. Columns (3)-(5) present difference-in-difference analysis. Column (3) includes the same sample selection as in columns (1) and (2), with exclusion of 2007 observations. Columns (4) and (5) include additional year of data, 2012. Standard errors are clustered at month-by-year level in Columns (1)-(2) following DeLoach and Kurt, and by the state in Columns (3)-(5). *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A1.7: Testing for Differential Trends in Observable Characteristics Among Young and Older Unemployed Between Pre-Recession and Recession Periods.

	Young (18-30)		Older (50-61)		$(Old_{recession} - Old_{pre}) - (Young_{recession} - Young_{pre})$	t-stat
	Pre-Recession	Recession	Pre-Recession	Recession		
Married	0.34	0.18	0.71	0.58	-0.03	0.23
Widowed	0.00	0.00	0.02	0.04	0.02	0.64
Divorced or separated	0.05	0.02	0.20	0.24	0.07	0.92
Female	0.40	0.41	0.51	0.44	-0.08	-0.61
Black	0.09	0.21	0.15	0.16	-0.11	-1.22
Other Race	0.06	0.02	0.08	0.02	-0.02	-0.36
Hispanic	0.31	0.19	0.15	0.17	0.14	1.23
Immigrant	0.19	0.14	0.13	0.19	0.11	1.06
Some College	0.33	0.22	0.24	0.19	0.07	0.61
College Degree	0.12	0.12	0.32	0.24	-0.08	-0.72
Weekly earnings on previous job	413.95	424.04	776.25	775.30	-11.05	-0.07
"Homeownership"	0.64	0.39	0.82	0.72	0.14	1.14
Expect Recall	0.08	0.03	0.15	0.18	0.07	0.91
No. of children under age 18 in household	0.75	0.88	0.46	0.52	-0.06	-0.22
Average family income	9.68	10.13	10.47	10.62	-0.30	-0.30
Observations:	141	84	102	64		

Notes: Pre-Recession period includes 2003-2006; Recession includes 2008-2009. ATUS survey weights were used in calculation of all statistics. Average family income of 9 represents total annual income range of $30,000-34,999. Average family income of 10 represents total annual income range of $35,000-39,999. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A1.8: Testing for Differential Trends in Observable Characteristics Among Young and Older Unemployed Between Pre-Recession and Post-Recession Periods.

	Young (18-30)		Older (50-61)		$(Old_{post} - Old_{pre}) - (Young_{post} - Young_{pre})$	t-stat
	Pre-Recession	Post-Recession	Pre-Recession	Post-Recession		
Married	0.34	0.25	0.71	0.53	-0.09	-0.85
Widowed	0.00	0.00	0.02	0.02	-0.01	-0.35
Divorced or separated	0.05	0.04	0.20	0.30	0.11	1.31
Female	0.40	0.47	0.51	0.47	-0.11	-0.85
Black	0.09	0.17	0.15	0.24	0.01	0.13
Other Race	0.06	0.09	0.08	0.04	-0.07	-1.14
Hispanic	0.31	0.23	0.15	0.19	0.12	1.15
Immigrant	0.19	0.13	0.13	0.24	0.17*	1.78
Some College	0.33	0.13	0.24	0.27	.24**	2.23
College Degree	0.12	0.18	0.32	0.24	-0.13	-1.33
Weekly earnings on previous job	413.95	452.41	776.25	741.73	-72.98	-0.50
"Homeownership"	0.64	0.50	0.82	0.67	-0.01	-0.11
Expect Recall	0.08	0.09	0.15	0.12	-0.04	-0.54
No. of children under	0.75	0.88	0.46	0.45	-0.13	-0.55
Average family income	9.68	9.77	10.47	9.98	-0.58	-0.59
Observations:	141	113	102	97		

Notes: Pre-Recession period includes 2003-2006; Recession includes 2008-2009. ATUS survey weights were used in calculation of all statistics. Average family income of 9 represents total annual income range of $30,000-34,999. Average family income of 10 represents total annual income range of $35,000-39,999. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A1.9: Testing for Differential Trends in Observable Characteristics Among Prime Age and Older Unemployed Between Pre-Recession and Recession Periods.

	Prime Age (31-49)		Older (50-61)		$(Old_{recession} - Old_{pre}) - (PrimeAge_{recession} - PrimeAge_{pre})$	t-stat
	Pre-Recession	Recession	Pre-Recession	Recession		
Married	0.60	0.59	0.71	0.58	-0.12	-1.12
Widowed	0.01	0.01	0.02	0.04	0.02	0.77
Divorced or separated	0.16	0.20	0.20	0.24	-0.004	-0.04
Female	0.47	0.37	0.51	0.44	0.03	0.26
Black	0.18	0.20	0.15	0.16	-0.006	-0.08
Other Race	0.06	0.04	0.08	0.02	-0.04	-0.88
Hispanic	0.13	0.16	0.15	0.17	-0.01	-0.14
Immigrant	0.15	0.18	0.13	0.19	0.03	0.35
Some College	0.27	0.34	0.24	0.19	-0.12	-1.26
College Degree	0.21	0.16	0.32	0.24	-0.04	-0.38
Weekly earnings on previous job	624.22	709.69	776.25	775.30	-86.42	-0.55
"Homeownership"	0.63	0.64	0.82	0.72	-0.12	-1.18
Expect Recall	0.11	0.15	0.15	0.18	-0.01	-0.12
No. of children under age 18 in household	1.16	1.11	0.46	0.52	0.11	0.48
Average family income	9.69	10.79	10.47	10.62	-0.96	-1.18
Observations:	309	165	102	64		

Notes: Pre-Recession period includes 2003-2006; Recession includes 2008-2009. ATUS survey weights were used in calculation of all statistics. Average family income of 9 represents total annual income range of $30,000-34,999. Average family income of 10 represents total annual income range of $35,000-39,999. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A1.10: Testing for Differential Trends in Observable Characteristics Among Prime Age and Older Unemployed Between Pre-Recession and Post-Recession Periods.

	Prime Age (31-49)		Older (50-61)		$(Old_{post} - Old_{pre}) - (PrimeAge_{post} - PrimeAge_{pre})$	t-stat
	Pre-Recession	Post-Recession	Pre-Recession	Post-Recession		
Married	0.60	0.59	0.71	0.53	-0.16	-1.64
Widowed	0.01	0.01	0.02	0.02	-0.01	-0.31
Divorced or separated	0.16	0.20	0.20	0.30	0.06	0.62
Female	0.47	0.52	0.51	0.47	-0.09	-0.83
Black	0.18	0.19	0.15	0.24	0.08	1.03
Other Race	0.06	0.07	0.08	0.04	-0.05	-0.85
Hispanic	0.13	0.22	0.15	0.19	-0.05	-0.65
Immigrant	0.15	0.27	0.13	0.24	-0.01	-0.14
Some College	0.27	0.24	0.24	0.27	0.06	0.66
College Degree	0.21	0.21	0.32	0.24	-0.08	-0.92
Weekly earnings on previous job	624.22	646.69	776.25	741.72	-57.00	-0.39
"Homeownership"	0.63	0.56	0.82	0.67	-0.08	-0.85
Expect Recall	0.11	0.10	0.15	0.12	-0.02	-0.30
No. of children <18 in household	1.16	1.11	0.46	0.45	0.04	0.20
Average family income	9.69	9.67	10.47	9.98	-0.48	-0.61
Observations:	309	206	102	97		

Notes: Pre-Recession period includes 2003-2006; Recession includes 2008-2009. ATUS survey weights were used in calculation of all statistics. Average family income of 9 represents total annual income range of $30,000-34,999. Average family income of 10 represents total annual income range of $35,000-39,999. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A1.11: Testing for Changes in Characteristics of Older Unemployed Workers During the Recession.

Dependent Variable is Indicator for Recession Period	(1)	(2)	(3)
Older unemployed (50-61)	0.44	0.53	0.38
	(1.57)	(1.63)	(2.21)
Ln(weekly earnings)	0.11	0.11	0.11*
	(0.07)	(0.07)	(0.06)
"Homeowner"	-0.22**	-0.22**	-0.22**
	(0.10)	(0.10)	(0.11)
Expect recall	0.01	0.01	0.00
	(0.12)	(0.12)	(0.12)
Some college	0.17*	0.17*	0.18**
	(0.10)	(0.10)	(0.08)
College degree	-0.18	-0.18	-0.15
	(0.12)	(0.13)	(0.12)
Older * Ln(weekly earnings)	-0.02	-0.03	0.01
	(0.13)	(0.14)	(0.16)
Older * Homeowner	0.06	0.03	0.01
	(0.31)	(0.31)	(0.37)
Older * Expect recall	0.05	0.06	0.06
	(0.30)	(0.30)	(0.34)
Older * Some College	-0.18	-0.19	-0.26
	(0.23)	(0.23)	(0.25)
Older * College degree	-0.09	-0.11	-0.16
	(0.20)	(0.22)	(0.32)
Observations	1,281	1,281	1,272
Diary Day Indicators, 16 Family Income Categories, Major Industry Indicators, State Fixed Effects	X	X	X
Interactions of Older * (all demographic controls, prior earnings, and homeownership)	X		
Interactions of Older * (all demographic controls, prior earnings, homeownership, and family income)		X	
Interactions of Older * (all demographic controls, prior earnings, homeownership, and 16 separate family income indicators)			X
Chi-sq statistic for joint significance of interactions of Older with specified characteristics	13.70	13.73	443.6
Chi-sq p-value	0.472	0.546	0

Notes: All regressions include the full set of controls; a subset of coefficients is shown for brevity. Observations are weighted using ATUS survey weights. Standard errors are bootstrapped. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A1.12: Testing for Changes in Characteristics of Older Unemployed Workers.

Dependent Variable is Indicator for Older Age Group (50-61)	(1)	(2)	(3)
Ln(weekly earnings)	0.04	0.03	0.03
	(0.05)	(0.05)	(0.05)
"Homeowner"	0.47***	0.46***	0.48***
	(0.17)	(0.17)	(0.15)
Expect recall	0.28	0.28	0.29
	(0.24)	(0.24)	(0.21)
No. of household children <18	-0.57***	-0.57***	-0.57***
	(0.06)	(0.06)	(0.04)
Some college	0.04	0.04	0.04
	(0.13)	(0.13)	(0.13)
College degree	0.18	0.17	0.20
	(0.13)	(0.14)	(0.17)
Married	0.87***	0.87***	0.88***
	(0.14)	(0.14)	(0.14)
Recession * Ln(weekly earnings)	0.03	0.05	-0.04
	(0.03)	(0.05)	(0.16)
Recession * "Homeowner"	-0.12	-0.09	0.01
	(0.33)	(0.33)	(0.29)
Recession * Expect recall	-0.17	-0.17	-0.16
	(0.36)	(0.37)	(0.37)
Recession * No. of children	0.14	0.14	0.10
	(0.12)	(0.12)	(0.11)
Recession * Some college	-0.37*	-0.36*	-0.42**
	(0.20)	(0.21)	(0.21)
Recession * College degree	-0.00	0.03	0.03
	(0.20)	(0.21)	(0.29)
Recession * Married	-0.31	-0.28	-0.25
	(0.23)	(0.25)	(0.35)
Observations	1,281	1,281	1,275
Diary Day Indicators, 16 Family Income Categories, Major Industry Indicators, State Fixed Effects	X	X	X
Interactions of Recession * (all demographic controls, prior earnings, and homeownership)	X		
Interactions of Recession * (all demographic controls, prior earnings, homeownership, and family income)		X	
Interactions of Recession * (all demographic controls, prior earnings, homeownership, and 16 separate family income indicators)			X
Chi-sq statistic for joint significance of interactions of Recession with specified characteristics	13.18	14.52	1528
Chi-sq p-value	0.512	0.487	0

Notes: All regressions include the full set of controls; a subset of coefficients is shown for brevity. Observations are weighted using ATUS survey weights. Standard errors are bootstrapped. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A1.13: Matching BLS Super Sectors and Major Industries in ATUS.

NAICS Codes	BLS Super Sectors / Industries	ATUS Major Industry Code	ATUS Major Industries
21	Mining and logging (Mining industry)	2	Mining
23	Construction	3	Construction
31, 32, 33	Manufacturing	4	Manufacturing
42; 44, 45	Wholesale trade; Retail trade	5	Wholesale and retail trade
48, 49; 22	Transportation and warehousing; Utilities	6	Transportation and utilities
51	Information	7	Information
52, 53	Financial activities	8	Financial activities
54, 55, 56	Professional and business services	9	Professional and business services
61, 62	Education and health services	10	Educational and health services
71, 72	Leisure and hospitality	11	Leisure and hospitality
81	Other services	12	Other services
–	Government (Federal, state and local)	13	Public administration

Notes: ATUS Major Industries descriptions are from 2003-2012 ATUS codebook. http://www.bls.gov/tus/atuscpscodebk0312.pdf. (accessed October 30, 2013). NAICS codes are from BLS website. http://www.bls.gov/ces/cessuper.htm (last accessed October 30, 2013).

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Chapter 2. Family Circumstances, Retirement Expectations and Realizations: Evidence from the Health and Retirement Study

Abstract. In this paper, we quantify the impact of family circumstances on older workers' retirement expectations and the timing of labor force withdrawal. Using data from the 1992-2010 waves of the Health and Retirement Study, we identify a set of pivotal events in the lives of adult children, including marriage, loss or gain of employment and moving in or out of the parental home, and determine which events shift the expected timing of retirement. Our findings indicate that no event increases expectations of late retirement, and, in fact, a child's move out of the parental home significantly reduces expectations of retiring past age 65. We then examine whether the event that shifts expectations also affects whether the parents continue to engage in full-time work past 65. Evidence shows that having a child move out leads to lower subsequent financial transfers given to children and ultimately reduces the probability of full-time work after 65 by 10 percentage points. The magnitude of the effect from having a child move out is equivalent to the effect of an own health shock experienced during the pre-retirement years.

Considering the aging population and growing concerns over the long-term solvency of the Social Security program, understanding how prepared older workers are for retirement and to what extent their retirement expectations incorporate future uncertainty becomes increasingly important. The extensive literature on determinants of

retirement intentions and realizations has generally focused on the impacts of healthshocks and own financial incentives on the older workers. However, in the aftermath of the Great Recession, media reports and surveys by financial planning firms began to draw attention to the impacts of family circumstances on the retirement process. Economic setbacks experienced by adult children may require financial assistance and be a source of strain on parental retirement savings. If older workers have not fully budgeted for supporting their grown children, they may have to remain in the labor force longer than planned.[59] Although anecdotal evidence of parents postponing their retirement to pay for their children's education, assist through a period of unemployment or help with expenses associated with newborn grandchildren is plentiful, empirical evidence is scarce. In this study, we directly test whether the family circumstances of older workers are important determinants of retirement expectations and ultimate labor force exit.

The novel contribution of this paper is quantifying the impact of a broad set of events in adult children's lives on older worker's retirement expectations and realizations. Using rich family data from the 1992-2010 waves of the Health and Retirement Study (HRS), we identify a number of pivotal events for adult children, including marriage, widowhood or divorce, loss or gain of employment, as well as moving in or out of the parental home. Our study takes advantage of the vital data on retirement expectations and labor force status measured in each wave of HRS in order to move beyond the correlational analysis in the prior literature and determine causal impacts of family circumstances. Due

[59] As reported by Merrill Lynch, "the vast majority of people age 50+ have never budgeted and prepared for providing financial support to other family members (88%) […] even though they are highly likely to provide such support" (2013, p.8). As a result, 30% of pre-retirees age 50+ say they would remain in the labor force longer to support their family members.

to the nature of the survey questions, our measure of retirement expectations captures probabilities that older workers continue working full-time past ages 62 and 65, while the retirement realizations reflect whether or not individuals are in the labor force with a full-time job past ages 62 and 65.

Since retirement follows well-documented patterns with spikes in retirement hazards at ages when workers first become eligible for early and full social security benefits,[60] we focus on the years leading up to the Early Retirement Age (ERA) of 62 years. In particular, we define years 58-61 as the pre-retirement years because we expect unanticipated shocks occurring close to a possible retirement date to have the largest impact on retirement timing.

The analysis proceeds in two steps. First, we establish which events in adult children's lives shift retirement expectations for the older workers during their pre-retirement years. Second, we explore whether events that alter expectations also affect the actual retirement decisions. The results show that the vast majority of changes in children's lives do not impact retirement expectations. Only one event, child's move out of the parental home, is not fully anticipated and results in a significant decrease in late retirement expectations. In particular, child's move out of parental home reduces the self-reported probability of full-time work by 5 percentage points. Considering that own deterioration in health during pre-retirement years reduces the stated probability of full-time work by only 7 percentage points, the effect of child's move on retirement expectations is large in magnitude.

[60] See Diamond and Gruber (1999).

Tracing the impact of the unanticipated event on retirement realizations, we find that the child's move ultimately reduces the rate of full-time work past age 65 by 10 percentage points, significant at 5% level. The effect of child's move is equivalent in magnitude to own deterioration of health during pre-retirement years, indicating an important role for certain family circumstances on retirement timing. Our findings highlight the financial mechanism for the impact of the child's move as the move reduces subsequent financial support given to children by approximately $1,800 annually over a four year period. Furthermore, we explore the characteristics of children who move out and find that these children are about 25 years old on average and have higher incomes after the move. In fact, about one fifth of these adult children successfully purchase their own homes in the wave following the move. Although detailed analysis of children is limited by missing data and coarse measures of children's financial condition, the results are consistent with the hypothesis that children who move out do better financially than their parents have anticipated, thus enabling the parents to reduce their financial support and retire earlier than expected.

The rest of the paper is organized as follows. Section 2.1 provides a review of the relevant literature. Section 2.2 presents a simple theoretical framework. Section 2.3 describes the data and sample selection. Section 2.4 explains the methodology. Section 2.5 presents the main results and the robustness tests, and Section 2.6 concludes.

2.1 Related Literature

The prevalence of financial support provided by older parents to their adult children has been surging since the 1980's. Wightman, Patrick, Schoeni, and Schulenberg (2013) employ historical data from the national Monitoring the Future survey to track

patters over the period of 1977 to 2011. They show that the fraction of adult children in their early and mid-twenties receiving financial assistance from their parents has grown by over 20 percentage points. Only 47% of individuals ages 23-24 received assistance in 1982, while 68% received support in 2011.

The typical financial support given to children is sizable in magnitude, and studies have shown that parents provide even greater assistance to children in need. For instance, Leukhina and Santoro (2011) find that the average transfers given by parents over the age 50 to their non-coresident children are over $7,000 per year, and increase further when children experience a negative income shock, such as job loss. Similarly, Cox and Way (2011) demonstrate that becoming unemployed is associated with increased transfers from family and friends, and McGarry and Shoeni (1995) document that parents give more financial assistance to lower-income children. Moreover, Charles, Danziger, Li, and Schoeni (2014) find that consumption expenditures are significantly correlated across adult children and older parents' households, even after controlling for income correlations.[61] The authors' findings suggest a role for inter-vivo transfers in consumption smoothing and highlight the need to measure the effects of such transfers.

As the financial support to adult children becomes more widespread, it is important to understand the impact of this support on the parents, and, in particular, whether assisting children affects older workers' retirement expectations and the ultimate timing of labor force exit. The literature on retirement expectations has generally found older workers to

[61] Altonji, Hayashi, and Kotlikoff (1992) as well as Hayashi and Kotlikoff (1996) rejected full risk-sharing within families using earlier data on food consumption. Charles, Danziger, Li and Schoeni employed the same dataset as was used in the prior studies, PSID, but utilized the latest available records as well as a more comprehensive measure of consumption within extended families.

be competent at forming expectations, although workers do not use all information available to them at the time (Bernheim 1989). Benitez-Silva and Dwyer (2005) examine the rationality of retirement expectations using the 1992-2000 HRS data and find that the majority of individuals correctly plan for most uncertain events, with the exception of certain health shocks, health insurance needs, and new job transition. The authors conclude that the rational expectation hypothesis cannot be rejected in the HRS data.

While previous studies examined the effects of health and wealth shocks on retirement expectations (McGarry 2004), no studies to our knowledge have explored the extent to which important events in adult children's lives affect expectations. One study that considers the effect of some family circumstances on retirement expectations and realizations is done by Damman, Henkens, and Kalmijn (2011). Using panel data on Dutch workers, the authors establish that pre-retirement age men with younger children and with more financially dependent children are less likely to expect to retire early as well as less likely to follow through with early retirement. These correlations may reflect greater exposure to shocks to children's financial well-being.

The vast literature on retirement determinants has similarly focused on health and wealth factors affecting labor force exit. Hurd, Smith, and Zissimopoulos (2004) study self-reported survival probabilities and find modest effects of low survival probability on early retirement and Social Security benefit claiming. Looking at wealth factors, Coile and Gruber (2007) find that present discounted value of social security benefits and benefit accrual have significant effects on retirement timing, with higher future benefits increasing the probability of retirement. Similarly, Johnson, Penner, and Toohey (2008)

show that older workers' considerations of future financial expenses, in particular out-of-pocket health care costs, influence their choices of when to retire.

The effect of children's circumstances on retirement timing has received substantially less attention in the literature, and only recently have studies begun to fill the gap in our understanding of the role of the family. Using aggregate data from 22 European countries, Van Bavel and De Winter (2013) find that the birth of a grandchild is associated with higher probability of retirement for women, suggesting that the need to care for the newborn grandchildren affects the decision to exit the labor force. In the study most closely related to this paper, Szinovacz, DeViney, and Davey (2001) utilize data from the National Survey of Families and Household (NSFH) to examine whether family structure and obligations affect the timing of retirement. Although frequency of contact with children does not appear to be related to the retirement decision, the authors find that providing financial assistance to children is associated with a lower probability of labor force exit. However, due to small sample constraints, the authors aggregate male and female respondents between ages 55 and 75 in the analysis, thus restricting transfers to have the same effect irrespective of age or gender. More importantly, NSFH does not have data on retirement expectations or financial security of the workers which would affect both transfers and the retirement timing. In this paper, we exploit detailed HRS data on retirement expectations, financial and health factors as well as changes in family circumstances of male workers to identify a set of important events in adult children's lives, and then determine the extent to which these events impact retirement expectations and actual retirement timing.

2.2 Theoretical Framework

For workers approaching retirement, unexpected financial need experienced by adult children can present a considerable wealth shock. If parents are unable to fully finance higher transfers to children through lower consumption, they may respond by delaying retirement. Ideally, wealth shocks would then be defined as the difference between actual and expected financial support given to children in the pre-retirement years. Unfortunately, data on planned financial support to family members is not available in the HRS. Instead, we utilize data on expected retirement timing as a proxy for expected financial preparedness for retirement. We infer wealth shocks indirectly by examining which events shift retirement expectations. For example, if an event leads to an increase in the expectation of retiring after age 65, we conclude that this event is likely to be associated with either contemporary or subsequent transfers that were not expected and are large in magnitude, thus presenting a wealth shock. [62] Since leisure is a normal good, a negative wealth shock late in life can be expected to delay retirement while a positive shock is likely to expedite it.

Relying on the retirement expectations data to identify wealth shocks has several important limitations. First, children's events can impact retirement expectations and realizations through non-financial channels, leading to time transfers or altering the value of leisure in retirement. For instance, birth of grandchildren could cause older workers to spend more time baby-sitting as well as derive higher utility from being retired. Our data

[62] The relationship between unexpected events and resulting financial support is not necessarily simultaneous. In fact, data show that some unexpected events lead to a change in transfers occurring over the next 4 years. Furthermore, to the extent that certain children's events are anticipated, parents can adjust financial support in the years leading up to these events. Thus, it is difficult to quantify a wealth shock by measuring the relationship between the events and contemporaneous transfers.

do not allow us to separate the effect of non-financial and financial factors, and thus our events affect retirement expectations via both of these channels. As the non-financial and financial factors exert opposing forces on the decision to retire, with time demands encouraging early retirement, while the need to financially support family members encourages later retirement, our findings can be interpreted as the net effect of financial and non-financial considerations. Although it is difficult to measure the magnitude of the non-financial considerations, we find evidence for the role of the financial channel.

A second limitation of our analysis is that we cannot identify all of the unanticipated events in the lives of adult children. Older workers can respond to children's events either by changing consumption patterns or labor supply paths. Our approach only captures the events that shift the latter.

Once we identify children's events that shift parental retirement expectations, we investigate whether these events ultimately affect retirement realizations. If retirement expectations are accurate predictors of actual labor force exit, then all events that change expectations should also change retirement timing.

2.3 Data and Sample

In this project, we use panel data from the RAND version of the 1992-2010 Health and Retirement Study (HRS), which is a national biennial survey of individuals over the age 50. The features of HRS essential to our analysis are the data on older workers' retirement expectations and family circumstances measured in each wave as well as ultimate retirement realizations.

HRS includes two distinct measures of retirement expectations: planned retirement age and probabilities of working full-time past ages 62 and 65. In particular, question on

planned retirement age asks respondent the following: "Do you plan to stop working altogether or reduce work hours at a particular date or age, have you not given it much thought, or what?" The question on probabilities of working full-time asks, "Thinking about work generally and not just your present job, what do you think are the chances that you will be working full-time after you reach age 62 (65)?" Following Goda, Shoven, and Slavov (2011), we use probabilities of working full-time as our main measure of retirement expectations for several reasons. First, the question underlying planned retirement age is imprecise and could be interpreted to mean either full or partial retirement, while the probabilities questions are less subject to misinterpretation. Second, numerical answers for planned retirement age are only available for 34% of individuals in our sample, as 46% of respondents say that they will 'never' retire. In contrast, data on full-time work probabilities are available for 82% of our sample.

There are also several ways to define retirement in the HRS. Since our data on expectations relate to either partial or full retirement, we define retirement as the date when respondents first report employment status as being either partially or fully retired; however, our results are robust to alternative definitions. We use the RAND labor force status variable, which combines information from a number of labor force questions.

To identify pivotal events in adult children's lives, we rely on linked data on respondents' children. In particular, our dataset contains total number of living children and grandchildren as well as total number of children who are married, reside with the parent, and work full-time or part-time in each wave.[63] From this information, we

[63] HRS family data also include the total number of children in school as well as the total number of home-owning children. Unfortunately, data on children's schooling are only available for 37% of our sample due to missing records. We do not utilize data on the number of home-owning children in our

construct indicators for changes in children's circumstances based on changes in these totals between waves. For instance, if we observe that the number of resident children decreases from one wave to the next, we assign a value of 1 to our indicator variable for child's move out of a parental home.[64] Indicators for improvement or deterioration in own or spousal health are based on self-reports of health[65] and constructed analogously.

Due to the biennial survey design, some respondents are only observed at age 60 while others are only observed at age 61. Since our goal is to focus on workers approaching ERA of 62 years, we combine data from respondents observed at age 60 and 61 for sample size considerations. Furthermore, due to the structure of the data, children's events and health changes reported in year *t* refer to events that occurred within the two years prior to *t*. Thus, the events reported at ages 60/61 have occurred between ages 58/59 and 60/61. The age 58/59 is the baseline age in our sample at which we measure demographic and financial controls. Years between 58/59 and 60/61 (abbreviated as 58-61) are defined as the pre-retirement years since they are leading up to the ERA, when the first spike in the retirement hazard is observed.

We use data on the 1931-1941 birth cohorts because HRS enables us to track these individuals from their fifties and until age 69 and beyond. Following prior literature, we

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baseline analysis due to difficulties with interpretation. It is not clear whether a decrease in the number of home-owning children indicates higher or lower financial need, as loss of homeownership could imply children's financial ruin or signal decreased need due to elimination of mortgage payments. When included in the analysis, coefficients on indicators for loss or gain of homeownership among children are not statistically significant and do not change our baseline results.

[64] Although it is possible for our indicator variable to pick up cases where parents are the ones who are moving out of their children's homes, the data suggest that such cases are unlikely. About 87% of our respondents are homeowners at the baseline, and no respondents indicate that any of their children were on their home deed prior to the move.

[65] Health is evaluated on a 5 point scale: 5-Excellent, 4-Very good, 3-Good, 2-Fair, and 1-Poor.

focus our analysis on men.[66] Since we aim to measure children's events occurring as close as possible to the ERA, we restrict our attention to men who are observed at the ages of 58/59 and 60/61 in the survey. Our sample consists of married men[67] who are in the labor force at age 58/59, [68] have not been previously retired, and have at least one child.[69]

2.4 Methodology

Our analysis proceeds in two steps. First, we identify events in adult children's lives that appear to be unanticipated and shift parental retirement expectations during the ages of 58-61. Second, we determine whether the events that alter expectations also change the realized rates at which parents work full-time past age 62 and 65.

In the first step, we estimate the following baseline specification:

$$(2.1) \quad P(65)_{i,60/61} = \beta_0 + \beta_1 P(65)_{i,58/59} + \beta_2 P(62)_{i,58/59} + \boldsymbol{ChildenEvents_{i,60/61}\theta} + \\ + \boldsymbol{HealthChanges_{i,60/61}\Omega} + \mathbf{X^c_{i,58/59}\delta} + \mathbf{X^p_{i,58/59}\Gamma} + \boldsymbol{\lambda_t} + \varepsilon_{it}$$

where $P(65)_{i,60/61}$ is the self-reported probability of working full-time past age 65 measured at ages 60/61. A critical feature of our analysis is controlling for baseline retirement expectations, $P(65)_{i,58/59}$ and $P(62)_{i,58/59}$,[70] captured at ages 58/59, prior to the observed changes in children's circumstances.[71] $\mathbf{X^c_{i,58/59}}$ is a vector of children's characteristics

[66] Retirement drivers are likely to vary between genders. For instance, Van Bavel and De Winter (2013) show that births of grandchildren affect the retirement decisions of women but not men.
[67] Results are robust to including non-married men and controlling for baseline marital status at ages 58/59.
[68] Following Hurd, Smith and Zissimopoulos (2004) we define individuals to be in the labor force if they report working full-time, part-time or are unemployed.
[69] Either biological or step-children are included; however, only 10% of our sample report having step-children.
[70] We include both P(65) and P(62) to better capture baseline retirement expectations. However, the results are robust to excluding P(62).
[71] We regress P(65) reported at ages 60/61 on P(65) reported at the baseline rather than estimating a first difference model in order to avoid restricting the coefficient on baseline P(65) to equal 1. The results are

reported at ages 58/59, including total number of children and grandchildren, number of children who are working full-time and part-time, married, reside with the parent as well as the ages of the youngest and oldest child. $\mathbf{X^p_{i,58/59}}$ is a vector of parent's characteristics reported at ages 58/59, including labor force status, education, race,[72] indicators for good and poor health, self-reported expectation of living to age 75,[73] and a set of financial controls.[74] $\boldsymbol{\lambda_t}$ is a year fixed effect.

The key coefficients of interest are on the vector of $\boldsymbol{ChildenEvents_{i,60/61}}$ which contains the set of pivotal changes in children's lives, such as child's marriage or divorce/widowhood, loss or gain of employment,[75] birth of own children, as well as move in or out of the parental home. These events are reported at ages 60/61 and reflect changes over the last two years, since ages 58/59. Controlling for baseline retirement expectations, a statistically significant coefficient on a child's event indicator would signify this event to be at least partially unanticipated by workers at ages 58/59. For instance, a significant negative coefficient on child's move out of a parental home indicator would show that this event decreases the self-reported probability of working full-time in the future, thus

somewhat sensitive to running the analysis in differences, and the key coefficients become marginally insignificant, though are very similar in magnitude.

[72] Two labor force status indicators differentiate workers who have part-time jobs or are unemployed, with the omitted category being a full-time worker. We include indicators for whether respondent has completed some college or has a college degree. Race is reflected via indicators for black, other race, and Hispanic.

[73] We include the self-reported expectation of living to age 75 reported at ages 58/59 in our control set throughout the analysis since past studies have found mortality expectations to affect actual retirement timing (Hurd, Smith and Zissimopoulos 2004). Our results are robust to excluding this control.

[74] Financial controls include respondent's annual earnings, total household's financial wealth (including net value of checking and savings accounts, stocks, bonds, and other saving tools) and non-financial wealth (including the value of primary residence, vehicles, and businesses).

[75] Our data do not allow us to distinguish child's layoff from voluntary job leave as the loss of employment is constructed from changes in the number of employed children between waves.

revealing the event not to have been incorporated into workers' retirement expectations in the previous period.[76]

The vector $\boldsymbol{HealthChanges_{i,60/61}}$ includes indicators for improvement or deterioration in respondent and spouse's health occurring over the same period as the children's events.[77] A significant coefficient on these indicators would capture positive or negative health shocks and enable us to measure the impact of children's events against a well-studied retirement determinant.[78]

In the second step of the analysis, we determine whether the events that affect retirement expectations also impact retirement realizations by estimating the following probit model:

$$(2.2) \qquad FT(65)_i = \beta_0 + \beta_1 P(65)_{i,58/59} + \beta_2 P(62)_{i,58/59} + \boldsymbol{ChildrenEvents_{i,60/61}\theta} + \\ + \boldsymbol{HealthChanges_{i,60/61}\Omega} + \mathbf{X^c_{i,58/59}}\,\boldsymbol{\delta} + \mathbf{X^p_{i,58/59}}\,\boldsymbol{\Gamma} + \boldsymbol{\lambda_t} + \varepsilon_{it}$$

where $FT(65)_i$ is an indicator for working full-time in any wave past age 65. We include both expectations of working full-time past ages 62 and 65 as together they can convey a fuller picture of respondent's retirement expectations.[79] $\boldsymbol{ChildrenEvents_{i,60/61}}$ in this

[76] A statistically significant coefficient on any of the $\boldsymbol{ChildenEvents_{i,60/61}}$ does not necessarily mean that the event was completely unexpected. As noted by Benitez-Silva and Dwyer (2005), a significant coefficient could also indicate that the respondent knew the probabilities of the events prior to their occurrence, but did not know future realizations.

[77] Since parental health shocks themselves might affect certain children's events, particularly moving in and out of the parental home, and thus be considered endogenous, we repeat our analysis without these measures. All of our specifications are robust to excluding the vector of health changes.

[78] McGarry (2004) uses HRS data to show that self-reported health changes have large effects on retirement expectations, even relative to changes in financial variables.

[79] The results are robust to excluding $P(62)_{i,58/59}$.

specification include the events shown to be unanticipated in the previous step, although we also test for any impact of the events that do not shift retirement expectations.[80]

2.5 Results

A. Descriptive Statistics

Table 2.1 presents summary statistics for our sample of male workers approaching retirement. All workers' characteristics are measured at ages 58/59. As can be seen from Panel A, the vast majority of workers have full-time employment, with only 4% working part-time and less than 1% reporting unemployment.[81] About a quarter of the workers have college degrees or above and report earning an average of $58,000 per year. Mean household financial wealth, which includes the net value of checking and savings accounts, stocks, bonds and other saving tools, is approximately $126,000, while non-financial wealth, including the value of primary residence, vehicles, and businesses, is about $344,000. The majority of the older workers report being in excellent or very good health, with only 11% describing their health as poor.

Panel B illustrates characteristics of respondents' children. On average, workers in our sample have 3 children between the ages of 25.5 and 33.3. Two thirds are working full-time, and a small fraction hold part-time jobs. Slightly over half of the children are married. Across all children, there is a total of 4.5 own children. About 38% of fathers in our sample have at least one co-resident child.

[80] We find that events that do not shift retirement expectations also do not affect the probability of working full-time past age 65.

[81] Note that our sample is limited to individuals who are in the labor force at ages 58/59, defined as working full-time, part-time, or being classified as unemployed.

Workers' average retirement expectations and realizations are shown in Panel C. At ages 58/59, the average self-reported probability of working full-time past age 62 is 59%, and it remains about the same at ages 60/61, with the average probability being 58.3%. Similarly, the probability of working full-time past age 65 changes only slightly from 32.6% to 31% over the two years. Looking at retirement realizations, 37% of respondents ultimately work full-time past age 65. Thus, on the first glance, it appears that workers tend to retire later than anticipated during the pre-retirement years.

Table 2.2 presents statistics on the prevalence of children's events and health changes in our sample. The most common event is the birth of grandchildren, experienced by over 30% of the respondents. Child's marriage is the second most widespread event, taking place for almost 20% of pre-retirement parents, while only 8% experience child's divorce or widowhood. Child's gain of employment occurs for 19% of the respondents, while child's loss of employment is experienced by 14%. When it comes to co-residing, 6% of parents report having a child move into their home during the pre-retirement years, while almost 16% report having a previously co-resident child move out.[82] As a comparison, 25% of respondents experience own health deterioration, with most being only a one-point reduction on the 5 point scale. Thus, pivotal changes in children's circumstances are quite widespread for the pre-retirement age workers although somewhat less common than own or spousal health shocks. We omit child's divorce and a move into the parental home from the discussion as they are the least common events in our sample.[83]

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[82] Among the older workers with co-resident children at baseline, 41% have a child who moved out during the pre-retirement years.

[83] All children's events including divorce and moving into the parental home are included in the regressions unless stated otherwise. The coefficients on these two events are typically small in magnitude and not statistically significant in the main specifications.

B. Retirement Expectations

Table 2.3 shows the baseline specification from Equation (2.1). Columns 1-5 include one child's event at a time, while Column 6 presents the results with all children's events together. The findings indicate that having a child move out of a parental home during the pre-retirement years decreases older workers' expectations of working full-time past age 65 by 5 percentage points, significant at the 10% level. The remaining events in children's lives appear to be either anticipated, so as not to shift the retirement expectations, or mitigated by changes in parental consumption rather than in timing of labor force exit. For instance, children's marriage and birth of grandchildren are most likely to be well thought-out by the older workers.

As noted in prior literature, retirement expectations at 58/59 do not capture all information available to workers.[84] Column 6 in Table 2.3 demonstrates that individuals with college degrees systematically increase retirement expectations in the next period. Moreover, individuals with poor health at the baseline decrease retirement expectations in the next period even if they do not experience any interim changes in self-reported health. When older workers indeed face a negative health shock during the pre-retirement years, their retirement expectations decrease by 7 percentage points, significant at the 1% level. Table 2.4 presents the baseline results for the self-reported probability of working full-time past age 62. As can be seen from the table, none of the children's events consistently affect this probability.

C. Retirement Realizations

[84] See, for example, Bernheim (1989) and Benitez-Silva and Dwyer (2005).

Table 2.5 highlights our main findings on retirement realizations. Column 1 includes only the children's events reported at 60/61 and controls for children's characteristics and retirement expectations at ages 58/59. Column 2 adds the vector of health changes, full set of respondents' controls and year fixed effects reproducing specification from Equation (2.2), while Column 3 provides an additional robustness check by including restricted cubic splines for retirement expectations.

The results show that the only event that significantly impacts the realized rates of full-time work after age 65 is the child's move out of the parental home.[85] Specifically, having a child move out during the pre-retirement years reduces the likelihood of working full-time past age 65 by 10 percentage points, significant at 5% level. As a comparison, a negative health shock in the pre-retirement years reduces the probability of full-time work by only 8 percentage points.

Looking at the realization of full-time work past age 62 in Table 2.6, children's events do not appear to impact whether older workers remain in the labor force after ERA. These findings are consistent with the results on expectations, as none of the children's events significantly shifted expectations of working full-time past age 62.

The main concern with our interpretation of children's events as exogenous shocks which lead to changes in parental retirement timing is the possibility of reverse causality. For reverse causality to hold in the case of child's move out of a parental home, parents would need to abruptly change their expectations of working full-time after age 65 when they are themselves 58-61 years old and then ask their children to move out right away,

[85] Children's events that do not shift the self-reported probability of working full-time past age 65 also do not affect the ultimate retirement realization.

by age 61. Given that the children's events do not affect the more immediate realization of working full-time past age 62, it seems unlikely that the parents force their child to leave by age 61 in anticipation of stopping full-time work much later, at age 65.

D. Effects of Children's Events on Subsequent Financial Transfers

Considering that our hypothesized channel for the effect of children's events on retirement timing is via changes in financial support, we directly test for whether events affect the amount of assistance given to children between the ages of 60/61 and 64/65. To this end, we aggregate the total amount of financial transfers reported at ages 62/63 and 64/65.

Table 2.7 presents the results [86] where Column 1 includes the full set of children's events and controls described in Equation (2.1), and Column 2 includes additional controls for prior financial transfers as well as self-reported expectation of living to age 75, reported at 58/59.[87] The striking finding is that child's move reduces subsequent transfers by about $1,800 annually over a four year period, while none of the other events significantly impact future transfers. Thus, it appears that a child's move is indicative of an unanticipated reduction in financial need which ultimately enables older workers to retire earlier than expected.

E. Closer Look at the Children who are Moving Out

What distinguishes households with children moving out during the pre-retirement years from those with continuously co-residing children? Table 2.8 shows that among

[86] A subset of children's events is shown in Table 2.7 for brevity. None of the omitted coefficients on children's events are statistically significant.

[87] Self-reported probability of living to age 75 is reported on 0 to 100 scale. As the expected mortality is likely to affect financial support given to children and might potentially influence the timing of children's events, our preferred specifications include this probability.

respondents with co-resident children at baseline, respondents who experience a child's move and those who do not are very similar on demographic, health, and financial measures.[88] The main distinction appears to be that respondents with children who are moving out tend to have more children and more resident children at the baseline. Furthermore, more children in such households have full-time jobs and are married.

In order to better understand the characteristics of adult children who are moving out and explore possible reasons for the move, we bring in additional data from RAND version of HRS Respondent-Kid File for the years 1992-2010.[89] This dataset contains supplementary family information on the exact same individuals that are in our main sample. We utilize Respondent-Kid File to obtain detailed panel data on each of the respondents' children, including each child's age, household income, and co-residency status throughout the length of the survey period.[90]

Table 2.9 presents the characteristics of children who moved out of the parental home during their fathers' pre-retirement years. The average age of children who moved is 25 as reported at the 60/61 wave.[91] Figure 2.1 further highlights the substantial spread in the distribution of ages at the time of the move, with peaks at ages 23, 24, 25, 27 and 31.

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[88] Similar pattern holds when we compare all respondents on the basis of having a child move out as shown in Table 2.8b.

[89] RAND prepares two longitudinal versions of HRS Family data: one with respondent-kid observations and one containing summary measures on all of the respondent's children. The respondents in the two versions of the datasets are the exact same individuals. For our main analysis, we utilize the summary data on all of the respondent's children; however, the summary measures alone do not allow us to identify characteristics of the children who moved out of the parental home.

[90] The main limitation of using Respondent-Kid File in the analysis is the pervasiveness of missing records for many of the children's characteristics. For instance, data on children's income range is missing for over half of the children who moved out of parental home in our sample.

[91] All children's characteristics are measured at wave 60/61 unless stated otherwise.

One of the possible explanations for children moving out during their 20's is college graduation. However, as shown in Panel B, these children have completed only 13.8 years of schooling at the time of the move. The distribution of children's years of education in Figure 2.2 reveals that over a third of children had moved out while having only a high school education or less. Table 2.9, Panel B, further highlights that while 40% of children report attending school at the baseline wave, almost 20% continue to attend school after moving out of the parental home. These findings together with the wide distribution of ages at the time of the move suggest that that children's move is not predominantly a consequence of college graduation.

Summary statistics in Panels C and D of Table 2.9 provide some insight into the children's financial situation, although our analysis is limited by inconsistent measures of children's income across waves together with numerous missing records. In the wave prior to the move, the lowest bound for the children's annual household income is about $1,800.[92] However, in the wave following the move, the lowest bound for children's income increases to almost $15,000. In addition, 19% of children become homeowners in the wave following the move. Looking at the persistency of the child's moving, we find that only 23% of children who moved out during pre-retirement years returned to co-reside with the parent at any point after the 60/61 wave. Thus, these descriptive statistics appear to imply that children who moved out during the pre-retirement years are on stable

[92] RAND version of HRS Respondent-Kid File contains bracket measures of children's household income as well as minimum and maximum values of children's income. Unfortunately, only the minimum and maximum values are measured consistently across all waves. We utilize the minimum income values as there is less missing data than among the maximum values.

financial footing, which is consistent with our finding of parents providing lower financial support to such children.

We further test for whether a child's move out of the parental home is indeed unanticipated by older workers by regressing an indicator for this event on the full set of baseline controls available at ages 58/59. Results in Table 2.10 show that the two retirement expectations at 58/59 do not have any predictive power for the child moving out within the next two years either individually or jointly. In the full sample of workers, having more co-resident children at baseline mechanically predicts the subsequent move. Focusing on the sub-sample of the respondents with co-resident children, only several factors appear to predict the move. Specifically, having older children, providing more financial support at the baseline, and having lower total financial wealth all positively predict the child moving out of the parental home. Thus, it appears that the child's move during the pre-retirement years is not fully anticipated by the parents.

F. Spousal Labor Supply Adjustment

Although we focus our analysis on men, the unexpected events in children's lives are likely to trigger not only a labor supply response from men but also their spouses. We examine whether events also affect the likelihood that the spouse remains in the labor force immediately following the events as well as works full-time past ages 62 and 65. However, since women typically retire earlier than men and the average age of spousal retirement is 54 years in our data, our analysis of spousal adjustment is constrained by a small sample. At the baseline, 34% of spouses are already not in the labor force, and we observe only 80% of spouses past age 62 and 66% past age 65.

While none of the children's events significantly affect spousal expectations of own retirement,[93] several events appear to influence retirement realizations. Table 2.11 shows how children's events impact whether the spouse is in the labor force during the respondent's 60/61 wave (Columns 1-3), as well as whether or not the spouse is working full-time past age 62 (Column 4) or age 65 (Column 5). The results suggest that child's marriage decreases the likelihood of spouses working full-time past age 65 as well as reduces the probability of being in the labor force in the next wave for spouses who are working at the baseline. It is possible that a child's marriage is associated with somewhat improved financial security of the child, thus allowing the spouse to retire earlier while not significantly affecting the labor supply of the respondent.

In addition, birth of a grandchild significantly increases probability that the spouse is working in the wave following the birth as well as working full-time past ages 62 and 65. Although surprising,[94] this effect is coming entirely from a subgroup of spouses who are working at the baseline period. For spouses who are not working at the baseline, the birth of a grandchild seems to reduce probability of re-entering the labor force by the next wave; however, this estimate is not statistically significant. While we don't find evidence for births of grandchildren leading to direct financial transfers which would cause a

[93] Results on spousal retirement expectations are available upon request. Our finding of no effect on expectations is consistent with past studies which showed that retirement expectations for women are less reliable predictors of actual retirement age than men's expectations (Bernheim 1989).

[94] The finding that birth of a grandchild increases the probability of being in the labor force in the next wave for women contrasts with the results obtained by Van Bavel and De Winter (2013), who show that having grandchildren increases the probability of retirement for women in their sample of 22 European countries. However, Van Baven and De Winter look at both expected and unexpected births of grandchildren, while we control for women's baseline retirement expectations, making our results not comparable directly. Furthermore, Van Baven and De Winter examine whether having any grandchildren at all increases probability of retiring at ages 55 and 60, while our analysis focuses on birth of grandchildren in the last two years. In our sample, having grandkids at baseline is not a significant predictor of either being in the labor force in the next wave or working full-time past age 62 or 65.

retirement delay, it is possible that older workers are financially supporting their grandchildren with in-kind gifts. Furthermore, birth of grandchildren could also stimulate bequest motives which might lead spouses to remain in the labor force longer than expected. Overall, our findings suggest that there is some adjustment taking place on the spousal labor supply margin; however, our spousal analysis is constrained by small sample sizes.

G. Robustness Tests

Table 2.12 presents a set of robustness checks for our expectations regressions. Column 1 reproduces our baseline estimation from Table 2.3, Column 6. Column 2 includes controls for labor force and marital status at age 60/61. Column 3 and 4 demonstrate the sensitivity of our baseline results to reducing the set of controls. Column 5 introduces a more detailed measure of changes in self-reported health status by distinguishing a 1 point deterioration in health (on a 5 point scale) from a deterioration of 2+ points. Column 6 adds interactions of $P(65)_{58/59}$ with respondents' and children's controls measured at ages 58/59, while Column 7 employs restricted cubic splines for $P(62)_{58/59}$ and $P(65)_{58/59}$. The coefficient on child's move remains the same in magnitude across all specifications and similar in significance.

One important concern for our analysis is any selective attrition that occurs as a result of children's events. Tables A2.1 and A2.2 in the Appendix test whether children's events systematically predict having missing expectations data at ages 60/61. The results suggest that child's loss of employment does decrease the likelihood that we observe age 60/61 expectations data for the respondent, conditional on that respondent reporting

children's events at 60/61. However, the child's move out of a parental home does not appear to affect the likelihood of observing expectations data.

We further test whether children's events in the pre-retirement years affect whether or not we observe parental retirement realizations. Reassuringly, Table A2.3 demonstrates that none of the children's events appears to relate to whether or not we observe the respondents long enough to record their retirement timing. Table A2.4 examines whether children's events appear to relate to parental labor force status in the next wave and do not find any relationship. Table A2.5 looks at whether children's events affect a change in parental marital status. Although most events do not appear to affect changes in marital status, child's loss of employment does appear to have a small positive effect on parents no longer being married in the subsequent wave.

2.6 Conclusion

We find that most events in children's lives occurring near retirement do not appear to induce older workers to remain in the labor force longer than anticipated. Our results suggest that the majority of pivotal changes in children's circumstances appear to be either expected by the workers approaching retirement or mitigated via changes in consumption rather than labor force exit. Only the child's move out of the parental home significantly decreases expectations of late retirement. Furthermore, solely the child's move affects the subsequent amount of financial support given to children and ultimately reduces the likelihood of full-time work past age 65 by 10 percentage points. The magnitude of this effect is equivalent to the effect of own health shock experienced during the pre-retirement years, highlighting the importance of the family circumstances on labor market choices.

Acknowledgements. Chapter 2 is currently being prepared for submission for publication of the material. I would like to acknowledge my co-authors, Christopher R. Tamborini and Gayle L. Reznik at the Social Security Administration, who started this project with me.

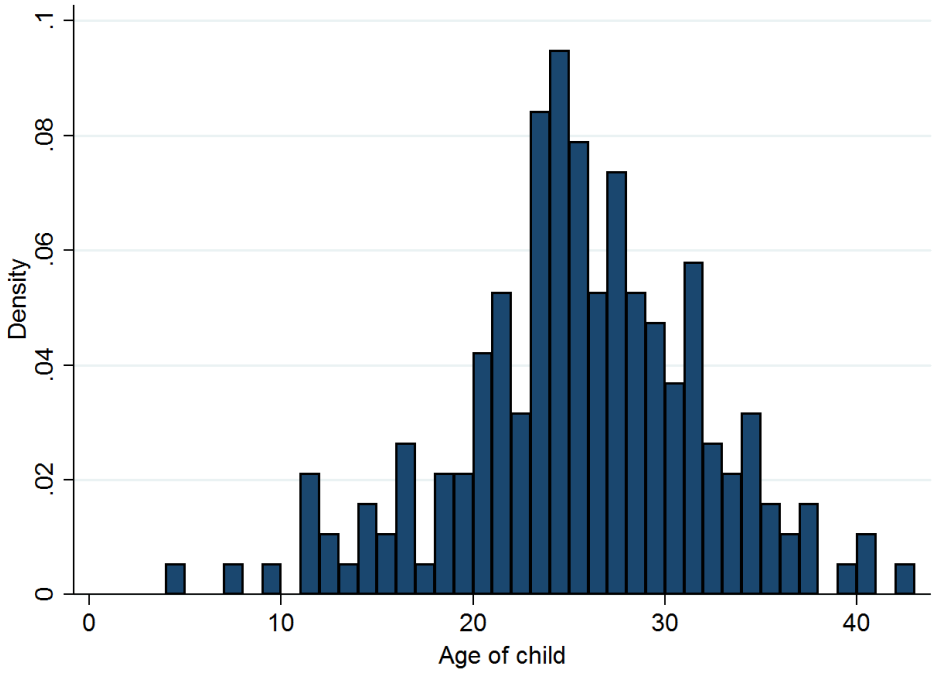

Figure 2.1: Age of Children Who Move Out of Parental Home During Pre-retirement Years.

Notes: Age of children is measured at 60/61 wave. Sample consists of all children who moved out of the parental home during their fathers' pre-retirement years.

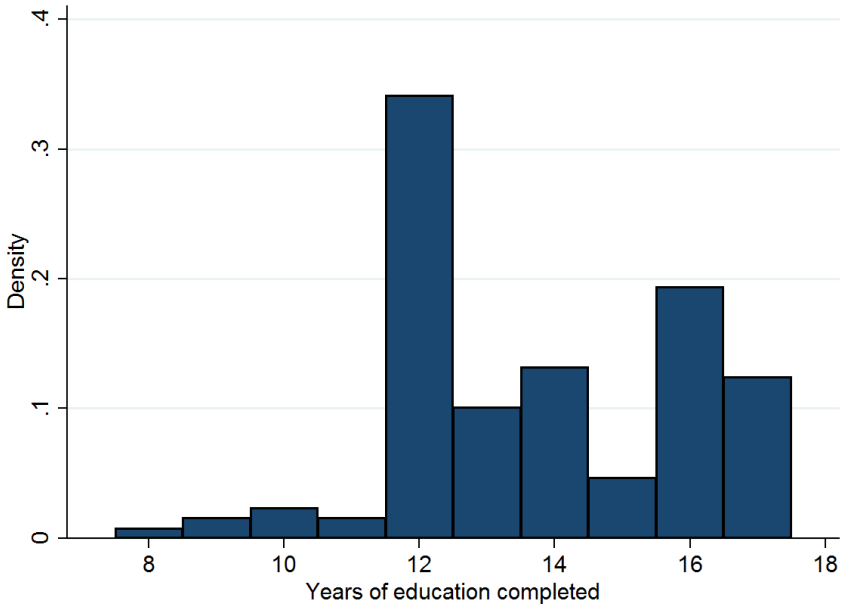

Figure 2.2: Years of Education Completed by Children at the Time of Moving Out.

Notes: Children's years of education completed are measured at 60/61 wave. Sample consists of all children who moved out of the parental home during their fathers' pre-retirement years.

Table 2.1: Summary Statistics, Main Sample.

Panel A: Respondent's characteristics at 58/59	
Work full-time at 58/59	95.3%
Work part-time at 58/59	4.1%
Unemployed at 58/59	0.6%
Some college	4.6%
College degree	27.7%
Black	9.3%
Other race	2.1%
Hispanic	6.9%
Respondent's annual earnings	$58,154
Respondent's total financial wealth	$126,462
Respondent's total wealth	$344,254
Respondent's health is excellent/very good	58.4%
Respondent's health is good	30.5%
Respondent's health is poor	11.1%
Respondent's self-reported probability of living to age 75 at 58/59	66.2%
Panel B: Characteristics of respondents' children at 58/59	
No. of children	3.4
Age of youngest child	25.5
Age of oldest child	33.3
No. of children working full-time	2.3
No. of children working part-time	0.3
No. of married children	1.8
No. of resident children	0.6
No. of grandchildren	4.5
Percent of respondents with co-resident child	38.3%
Panel C: Retirement Expectations and Realizations	
Average P(62) reported at 58/59	59.0%
Average P(62) reported at 60/61	58.3%
Average P(65) reported at 58/59	32.6%
Average P(65) reported at 60/61	31.0%
Actually work full-time past age 65	37.4%
Age retired (either partial or full retirement)	64.4
No. of observations	974

Notes: Age retired is based on comprehensive data from multiple questions in the HRS survey and represents the most accurate retirement status that can be inferred. Sample includes all men from 1932-1941 birth cohorts who are observed at ages 58/59 and 60/61, in the labor force at age 58/59 and have not been previously retired, as well as married with at least one child.

Table 2.2: Summary Statistics on Children's Events and Health Changes, Reported at 60/61 Wave.

	Percentage
Child's divorce/widowhood	8.2%
Child's marriage	19.9%
Birth of a grandchild	30.5%
Child found job	18.9%
Child lost job	13.6%
Child moved in with parents	6.1%
Child moved out of parental home	15.7%
Respondent's health improved	19.4%
Respondent's health worsened	24.8%
Respondent's health worsened by 1 point [on 5 point scale]	19.5%
Respondent's health worsened by 2+ points	5.3%
Spouse's health improved	18.7%
Spouse's health worsened	27.5%
Spouse's health worsened by 1 point	23.4%
Spouse's health worsened by 2+ points	4.1%
Observations	974

Notes: Sample includes all men from 1932-1941 birth cohorts who are observed at ages 58/59 and 60/61, in the labor force at age 58/59 and have not been previously retired, as well as married with at least one child.

Table 2.3: Baseline Specification - P65.

Dependent variable is P(65) reported at ages 60/61	(1)	(2)	(3)	(4)	(5)	(6)
P(65) reported at 58/59	0.57***	0.57***	0.56***	0.56***	0.56***	0.56***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
P(62) reported at 58/59	0.10***	0.10***	0.10***	0.10***	0.10***	0.10***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Child's marriage, 60/61	-1.25					-0.03
	(2.36)					(2.39)
Birth of grandchild, 60/61		-3.26				-3.46
		(2.12)				(2.15)
Child found job, 60/61			-4.15			-3.44
			(2.65)			(2.72)
Child lost/left job, 60/61				3.32		2.73
				(2.78)		(2.86)
Child moved out, 60/61					-5.70*	-5.39*
					(3.04)	(3.07)
Respondent's health improved, 60/61	3.10	3.12	3.08	3.21	3.06	3.11
	(2.59)	(2.59)	(2.59)	(2.60)	(2.58)	(2.61)
Respondent's health worsened, 60/61	-7.08***	-7.07***	-7.05***	-7.07***	-6.93***	-6.94***
	(2.20)	(2.19)	(2.19)	(2.19)	(2.19)	(2.19)
Spouse's health worsened, 60/61	-4.94**	-5.01**	-4.99**	-4.96**	-4.91**	-5.09**
	(2.00)	(2.00)	(2.00)	(2.00)	(2.00)	(1.99)
Spouse's health improved, 60/61	-2.20	-2.17	-1.98	-2.27	-2.30	-2.27
	(2.46)	(2.46)	(2.47)	(2.45)	(2.46)	(2.47)
No. of resident children, 58/59	0.71	0.64	0.93	0.81	2.18	2.04
	(1.50)	(1.49)	(1.49)	(1.49)	(1.70)	(1.71)
No. of grandchildren, 58/59	-0.14	-0.18	-0.14	-0.16	-0.13	-0.19
	(0.21)	(0.21)	(0.21)	(0.21)	(0.21)	(0.21)
No. of living children, 58/59	-1.14	-1.05	-0.58	-1.16	-1.20	-0.38
	(1.18)	(1.17)	(1.22)	(1.16)	(1.15)	(1.24)
College degree	5.12**	5.13**	5.18**	5.14**	5.16**	5.25**
	(2.29)	(2.29)	(2.29)	(2.30)	(2.29)	(2.30)
Health is good, 58/59	-6.12***	-6.08***	-5.83**	-6.18***	-6.12***	-5.97***
	(2.28)	(2.28)	(2.29)	(2.28)	(2.28)	(2.28)
Health is poor, 58/59	-10.48***	-10.46***	-10.10***	-10.35***	-10.52***	-10.08***
	(3.16)	(3.16)	(3.13)	(3.14)	(3.15)	(3.14)
Constant	10.78	10.51	10.72	10.48	10.80	10.92
	(8.02)	(8.00)	(8.01)	(8.01)	(7.97)	(7.86)
Observations	974	974	974	974	974	974
R-squared	0.44	0.45	0.45	0.44	0.45	0.45
Respondent's demographic; labor force; and financial controls; ages of youngest and oldest child at 58/59	X	X	X	X	X	X
Year FE	X	X	X	X	X	X

Notes: Dependent variable P(65) is the self-reported probability of working full-time past age 65, as measured at ages 60/61. Sample includes all men from 1932-1941 birth cohorts who are observed at ages 58/59 and 60/61, in the labor force at age 58/59 and have not been previously retired, as well as married with at least one child. Robust standard errors in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 2.4: Baseline Specification - P62.

Dependent variable is P(62) reported at ages 60/61	(1)	(2)	(3)	(4)	(5)	(6)
P(65) reported at 58/59	0.23***	0.24***	0.23***	0.23***	0.23***	0.23***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
P(62) reported at 58/59	0.47***	0.47***	0.47***	0.47***	0.46***	0.47***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Child's marriage, 60/61	1.73					2.71
	(2.97)					(3.02)
Birth of grandchild, 60/61		-1.92				-2.02
		(2.63)				(2.65)
Child found job, 60/61			-5.38*			-4.71
			(3.00)			(3.11)
Child lost/left job, 60/61				2.92		2.51
				(3.09)		(3.16)
Child moved out, 60/61					-3.86	-4.41
					(3.56)	(3.61)
Respondent's health improved, 60/61	3.56	3.55	3.50	3.63	3.52	3.65
	(3.09)	(3.10)	(3.09)	(3.10)	(3.09)	(3.09)
Respondent's health worsened, 60/61	-5.21*	-5.25*	-5.23*	-5.25*	-5.16*	-4.94*
	(2.71)	(2.70)	(2.71)	(2.70)	(2.70)	(2.71)
Spouse's health worsened, 60/61	-3.92	-3.99	-4.02	-3.97	-3.93	-4.06*
	(2.47)	(2.46)	(2.47)	(2.47)	(2.47)	(2.46)
Spouse's health improved, 60/61	-2.24	-2.32	-2.09	-2.42	-2.41	-2.12
	(3.06)	(3.06)	(3.07)	(3.05)	(3.07)	(3.07)
No. of resident children, 58/59	0.97	0.76	1.03	0.86	1.79	1.95
	(1.71)	(1.69)	(1.70)	(1.70)	(1.92)	(1.94)
No. of grandchildren, 58/59	0.03	0.00	0.03	0.01	0.03	0.01
	(0.25)	(0.25)	(0.25)	(0.25)	(0.25)	(0.25)
No. of living children, 58/59	-4.39***	-4.14***	-3.40**	-4.18***	-4.22***	-3.44**
	(1.41)	(1.38)	(1.43)	(1.37)	(1.37)	(1.42)
College degree	10.36***	10.38***	10.45***	10.39***	10.41***	10.43***
	(2.61)	(2.60)	(2.61)	(2.61)	(2.61)	(2.61)
Health is good, 58/59	-1.52	-1.56	-1.23	-1.65	-1.59	-1.14
	(2.58)	(2.57)	(2.58)	(2.58)	(2.57)	(2.60)
Health is poor, 58/59	-11.97***	-11.96***	-11.48***	-11.85***	-12.00***	-11.62***
	(4.07)	(4.07)	(4.08)	(4.07)	(4.08)	(4.10)
Constant	31.96***	32.27***	32.52***	32.23***	32.46***	33.30***
	(9.58)	(9.56)	(9.49)	(9.54)	(9.52)	(9.54)
Observations	974	974	974	974	974	974
R-squared	0.39	0.39	0.39	0.39	0.39	0.40
Respondent's demographic; labor force; and financial controls; ages of youngest and oldest child at 58/59	X	X	X	X	X	X
Year FE	X	X	X	X	X	X

Notes: Dependent variable P(62) is the self-reported probability of working full-time past age 62, as measured at ages 60/61. Sample includes all men from 1932-1941 birth cohorts who are observed at ages 58/59 and 60/61, in the labor force at age 58/59 and have not been previously retired, as well as married with at least one child. Robust standard errors in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 2.5: Retirement Realizations: Working Full-time Past Age 65.

Dependent variable is an indicator for working full-time at any wave past turning 65	(1)	(2)	(3)
P(65)/100 reported at 58/59	0.401***	0.395***	
	(0.045)	(0.045)	
P(62)/100 reported at 58/59	0.163***	0.146***	
	(0.047)	(0.046)	
Child's marriage, 60/61	-0.012	0.002	0.007
	(0.038)	(0.038)	(0.038)
Birth of grandchild, 60/61	-0.009	-0.038	-0.035
	(0.031)	(0.033)	(0.033)
Child found job, 60/61	0.023	0.038	0.045
	(0.040)	(0.042)	(0.042)
Child lost/left job, 60/61	0.028	0.006	0.005
	(0.043)	(0.042)	(0.042)
Child moved out, 60/61	-0.097**	-0.100**	-0.104**
	(0.048)	(0.048)	(0.047)
Respondent's health improved, 60/61		-0.000	0.002
		(0.038)	(0.038)
Respondent's health worsened, 60/61		-0.077**	-0.081**
		(0.034)	(0.034)
Spouse's health worsened, 60/61		-0.060*	-0.061*
		(0.033)	(0.033)
Spouse's health improved, 60/61		0.028	0.029
		(0.036)	(0.036)
No. of grandchildren, 58/59		0.007**	0.007**
		(0.003)	(0.003)
Expectation of living to age 75, 58/59		0.000	0.011
		(0.056)	(0.055)
College degree		0.023	0.017
		(0.034)	(0.034)
Hispanic		0.046	0.043
		(0.055)	(0.055)
Health is good, 58/59		-0.025	-0.021
		(0.033)	(0.033)
Health is poor, 58/59		-0.098*	-0.090*
		(0.055)	(0.054)
Observations	974	974	974
Children's characteristics 58/59	X	X	X
Respondent's demographic and labor force controls 58/59	--	X	X
Respondent's financial controls	--	X	X
Year FE	--	X	X
Restricted cubic spline for P65 and P62	--	--	X

Notes: Coefficients are the average marginal effects from the probit model. Robust standard errors in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 2.6: Retirement Realizations: Working Full-time Past Age 62.

Dependent variable is an indicator for working full-time at any wave past turning 62.	(1)	(2)	(3)
P(65)/100 reported at 58/59	0.26***	0.27***	
	(0.05)	(0.05)	
P(62)/100 reported at 58/59	0.32***	0.30***	
	(0.04)	(0.04)	
Child's marriage, 60/61	0.01	0.03	0.03
	(0.04)	(0.04)	(0.04)
Birth of grandchild, 60/61	-0.03	-0.05	-0.05
	(0.03)	(0.03)	(0.03)
Child found job, 60/61	-0.02	0.00	0.01
	(0.04)	(0.04)	(0.04)
Child lost/left job, 60/61	0.07	0.05	0.06
	(0.04)	(0.04)	(0.04)
Child moved out, 60/61	0.01	0.01	0.02
	(0.05)	(0.05)	(0.05)
Respondent's health improved, 60/61		0.08**	0.08**
		(0.04)	(0.04)
Respondent's health worsened, 60/61		-0.05	-0.05
		(0.04)	(0.03)
Spouse's health worsened, 60/61		-0.06*	-0.06*
		(0.03)	(0.03)
Spouse's health improved, 60/61		-0.03	-0.04
		(0.04)	(0.04)
No. of grandchildren, 58/59		0.00	0.00
		(0.00)	(0.00)
Expectation of living to age 75, 58/59		-0.10*	-0.09*
		(0.05)	(0.05)
College degree		0.09***	0.07**
		(0.03)	(0.03)
Hispanic		0.01	0.01
		(0.06)	(0.06)
Health is good, 58/59		-0.01	-0.02
		(0.03)	(0.03)
Health is poor, 58/59		-0.13**	-0.12**
		(0.05)	(0.05)
Observations	974	974	974
Children's characteristics 58/59	X	X	X
Respondent's demographic and labor force controls 58/59	--	X	X
Respondent's financial controls	--	X	X
Year FE	--	X	X
Restricted cubic spline for P65 and P62	--	--	X

Notes: Coefficients are the average marginal effects from the probit model. Robust standard errors in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 2.7: Relationship Between Children's Events and Subsequent Financial Transfers from Parents.

Dependent variable is annual financial transfers given to children between years of 60/61 and 64/65	(1)	(2)
Financial transfers to children reported at 58/59		0.08**
		(0.04)
Expectation of living to age 75, 58/59		-9.87*
		(5.22)
P(65) reported at 58/59	8.71	7.79
	(7.21)	(6.95)
P(62) reported at 58/59	-12.93*	-12.15*
	(6.67)	(6.55)
Birth of grandchild, 60/61	-562.37	-618.17
	(416.43)	(417.93)
Child found job, 60/61	134.49	54.63
	(656.09)	(661.74)
Child lost/left job, 60/61	-545.57	-439.59
	(421.39)	(407.90)
Child moved out, 60/61	-1,504.70*	-1,774.34**
	(855.26)	(888.25)
Respondent's health improved, 60/61	-90.65	-221.55
	(402.49)	(411.70)
Respondent's health worsened, 60/61	491.92	479.97
	(534.58)	(525.30)
Spouse's health worsened, 60/61	904.36	791.28
	(584.36)	(552.41)
Spouse's health improved, 60/61	536.60	353.49
	(445.82)	(442.69)
No. of resident children, 58/59	899.52*	842.54*
	(479.45)	(454.34)
College degree	1,732.27***	1,495.91***
	(579.37)	(521.00)
Health is poor, 58/59	-588.77	-480.99
	(503.07)	(490.68)
Age of youngest child	-48.01	-40.49
	(43.12)	(43.08)
Respondent’s annual earnings (in $100k), 58/59	-701.73	-713.94
	(458.66)	(443.57)
Respondent’s non-financial wealth (in $100k), 58/59	19.37	12.57
	(14.21)	(12.76)
Respondent’s financial wealth (in $100k), 58/59	899.46***	849.96***
	(174.93)	(183.32)
Constant	6,930.30***	5,689.19***
	(2,153.81)	(2,014.28)
Observations	692	692
R-squared	0.43	0.44
Children's characteristics 5859	X	X
Respondent's demographic labor force and financial characteristics	X	X
Year FE	X	X

Notes: Robust standard errors in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 2.8: Characteristics of Respondents With and Without Children Moving Out During Pre-Retirement Years Among Households With Resident Children at Baseline.

	No child moving out at 60/61	**Child moving out at 60/61**	**Difference (Child move out - No child move out)**
Children's characteristics at 58/59:			
No. of resident children	1.37	1.62	0.253***
No. of children	3.40	4.06	0.670***
Age of youngest child	21.43	21.37	-0.061
Age of oldest child	30.8	31.3	0.507
No. of children working full-time	1.96	2.28	0.524***
No. of children working part-time	0.50	0.45	-0.044
No. of married children	1.23	1.58	0.343**
No. of grandchildren	3.70	4.65	0.959*
Respondent's characteristics at 58/59:			
Some college	0.03	0.06	0.032
College degree	0.27	0.24	-0.026
Black	0.15	0.14	-0.017
Other race	0.04	0.03	-0.015
Hispanic	0.14	0.09	-0.045
Respondent's annual earnings	$59,260	$53,863	-5,397
Respondent's total financial wealth	$115,439	$77,395	-38,044
Respondent's total wealth	$279,201	$341,077	61,876
Respondent's health is good	0.34	0.32	-0.016
Respondent's health is poor	0.14	0.15	0.801

Notes: *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 2.8b: Characteristics of Respondents With and Without Children Moving Out During Pre-Retirement Years.

	No child moving out at 60/61	**Child moving out at 60/61**	**Difference (Child move out - No child move out)**
Children's characteristics at 58/59:			
No. of resident children	0.37	1.62	1.254***
No. of children	3.29	4.06	0.771***
Age of youngest child	26.24	21.37	-4.87)***
Age of oldest child	33.71	31.31	-2.400***
No. of children working full-time	2.29	2.48	0.189
No. of children working part-time	0.32	0.45	0.128**
No. of married children	1.83	1.58	-0.254**
No. of grandchildren	4.43	4.65	0.226
Respondent's characteristics at 58/59:			
Some college	0.04	0.06	0.015
College degree	0.28	0.24	-0.042
Black	0.08	0.14	-0.052*
Other race	0.02	0.03	0.005
Hispanic	0.06	0.09	0.027
Respondent's annual earnings	$58,954	$53,862	-5,092
Respondent's total financial wealth	$135,606	$77,394	-58,212***
Respondent's total wealth	$344,845	$341,077	-3,769
Respondent's health is good	0.30	0.32	0.018
Respondent's health is poor	0.10	0.15	0.047

Notes: *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 2.9: Characteristics of Children Who Moved Out During Parental Pre-Retirement Year.

Panel A. Demographics	
Age	25.1 (6.5)
Male	54%
Panel B. Education	
Years of Education, reported at 60/61 wave	13.8 (2.1)
Percent of children who report being in school at baseline wave	40.2%
Percent of children who report being in school at 60/61 wave	19.5%
Panel C. Income	
Minimum child's income estimate at baseline wave	$1,776 (5,590)
Minimum child's income estimate at 60/61 wave	$14,942 (15,285)
Panel D. Housing	
Percent of children who co-resided with parents in only one wave prior to the move out in wave 60/61	27.58%
Percent of children who returned to parental home at any point after 60/61 wave	23.16%
Percent of children who became homeowners in wave 60/61	19.41%
No. of children who moved out	190
No. of parents who had at least one child move out during pre-retirement years	151

Notes: Data comes from RAND version of HRS Respondent-Kid File for years 1992-2010. Standard deviations are shown in parenthesis. Data on children's education and schooling is missing for 43% of children at the baseline wave, and 33% of children at 60/61 wave. Data on children's minimum income is missing for 44% of children at baseline wave and 55% of children at 60/61 wave. Data on children's homeownership status at 60/61 wave is missing for 11% of children.

Table 2.10: Predictability of Child Moving Out at 60/61.

Dependent variable is an indicator for child moving out at 60/61	(1)	(2)	(3)	(4)
Financial transfers to children reported at 58/59 (in 10,000)		0.023***		0.047***
		(0.007)		(0.018)
P(65)/100 reported at 58/59	0.001	-0.008	-0.030	-0.054
	(0.037)	(0.038)	(0.101)	(0.101)
P(62)/100 reported at 58/59	-0.048	-0.045	-0.116	-0.109
	(0.033)	(0.033)	(0.096)	(0.095)
No. of children working full-time, 58/59	0.013	0.013	-0.028	-0.024
	(0.013)	(0.013)	(0.035)	(0.035)
No. of children working part-time, 58/59	0.011	0.012	-0.028	-0.024
	(0.019)	(0.019)	(0.047)	(0.046)
No. of married children, 58/59	0.003	0.004	0.033	0.033
	(0.012)	(0.012)	(0.034)	(0.034)
No. of resident children, 58/59	0.163***	0.157***	0.108**	0.105**
	(0.017)	(0.017)	(0.051)	(0.051)
No. of grandchildren, 58/59	0.001	0.001	-0.004	-0.004
	(0.003)	(0.003)	(0.008)	(0.008)
Expectation of living to age 75, 58/59	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.001)	(0.001)
Some college	0.053	0.055	0.158	0.167
	(0.044)	(0.043)	(0.135)	(0.138)
College degree	0.018	0.010	0.070	0.055
	(0.026)	(0.026)	(0.071)	(0.071)
Health is good, 58/59	-0.010	-0.009	-0.036	-0.033
	(0.023)	(0.023)	(0.064)	(0.064)
Health is poor, 58/59	-0.016	-0.015	0.002	0.003
	(0.035)	(0.034)	(0.095)	(0.094)
Age of youngest child	0.003	0.003	0.016***	0.015***
	(0.003)	(0.002)	(0.006)	(0.006)
Age of oldest child	-0.002	-0.002	-0.009	-0.009
	(0.003)	(0.003)	(0.006)	(0.006)
Respondent's annual earnings, in $100,000	-0.004	-0.015	-0.027	-0.061
	(0.020)	(0.022)	(0.062)	(0.061)
Respondent's total wealth, in $100,000	0.001	0.001	0.005*	0.005
	(0.001)	(0.001)	(0.003)	(0.003)
Respondent's total financial wealth, in $100,000	-0.007	-0.011*	-0.022	-0.030*
	(0.005)	(0.006)	(0.016)	(0.016)
Observations	807	807	300	300
Children's characteristics 5859	X	X	X	X
Respondent's demographic labor force and financial characteristics	X	X	X	X
Year FE	X	X	X	X
Chi-sq statistic for joint significance of P(65) and P(62)	3.525	3.849	3.260	3.872
Chi-sq p-value	0.172	0.146	0.196	0.144

Notes: Robust standard errors in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 2.11: Spousal Labor Supply Adjustment

Dependent Variable:	(1) Indicator for spouse being in LF at 60/61 wave	(2) Indicator for spouse being in LF at 60/61 wave	(3) Indicator for spouse being in LF at 60/61 wave	(4) Indicator for spouse working full-time past 62	(5) Indicator for spouse working full-time past 65
Subsample:	Full	Spouses in LF at baseline	Spouses not in LF at baseline	Full	Full
Spousal age when R is 58/59	-0.01**	-0.01**	-0.00	0.01	0.01**
	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)
Spousal P(65)/100 reported when R is 58/59	0.02	0.00		0.07	0.28***
	(0.07)	(0.08)		(0.09)	(0.08)
Spousal P(62)/100 reported when R is 58/59	0.16***	0.17***		0.20***	0.04
	(0.05)	(0.06)		(0.07)	(0.06)
Child's marriage, 60/61	-0.04	-0.07**	-0.15***	-0.07	-0.13***
	(0.03)	(0.03)	(0.05)	(0.05)	(0.05)
Birth of grandchild, 60/61	0.06**	0.07**	-0.05	0.08*	0.10***
	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)
Child found job, 60/61	0.01	0.03	-0.07	0.04	0.05
	(0.03)	(0.04)	(0.05)	(0.05)	(0.05)
Child lost/left job, 60/61	-0.02	-0.01	-0.05	0.02	0.05
	(0.03)	(0.04)	(0.05)	(0.05)	(0.06)
Child moved out, 60/61	0.05	0.05	0.06	-0.13**	-0.03
	(0.04)	(0.05)	(0.07)	(0.06)	(0.06)
No. of resident children, 58/59	0.01	0.02	-0.05	0.03	0.06**
	(0.02)	(0.02)	(0.04)	(0.03)	(0.03)
No. of grandchildren, 58/59	0.00	-0.00	0.01*	0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)
Spouse’s expectations of living to age 75, 58/59	-0.00	-0.00	0.00	-0.00**	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Spouse's health good	-0.07**	-0.06*	-0.07	-0.01	-0.00
	(0.03)	(0.03)	(0.05)	(0.04)	(0.04)
Spouse's health poor	-0.20***	-0.22***	0.02	0.06	0.03
	(0.05)	(0.05)	(0.07)	(0.08)	(0.08)
Respondent's health improved, 60/61	0.09***	0.08**	0.04	0.01	-0.05
	(0.03)	(0.04)	(0.05)	(0.04)	(0.05)
Respondent's health worsened, 60/61	-0.08***	-0.09***	-0.03	0.01	-0.01
	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)
Spouse's health worsened, r 60/61	-0.04	-0.07**	0.04	0.01	0.01
	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)
Spouse's health improved, r 60/61	0.07**	0.08**	0.03	-0.07	-0.05
	(0.03)	(0.04)	(0.04)	(0.05)	(0.05)
Observations	734	566	292	585	447
Spouse's demographic labor force and financial controls; ages of youngest and oldest child at 58/59; Year FE	X	X	X	X	X

Notes: Sample consists of spouses of the respondents from our main subsample. Wave 58/59 refers to the survey wave when the respondent (rather than his spouse) is age 58/59; Wave 60/61 refers to survey wave when the respondent is age 60/61. Robust standard errors in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 2.12: Robustness Checks.

Dependent variable is P(65) reported at ages 60/61	(1)	(2)	(3)	(4)	(5)	(6)	(7)
P(65) reported at 58/59	0.56***	0.56***	0.64***	0.57***	0.56***	0.55***	
	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)	(0.20)	
P(62) reported at 58/59	0.10***	0.08***		0.10***	0.10***	0.11***	
	(0.03)	(0.03)		(0.03)	(0.03)	(0.03)	
Child's marriage, 60/61	-0.03	0.38	0.26	0.00	0.19	0.04	-0.08
	(2.39)	(2.33)	(2.32)	(2.39)	(2.39)	(2.42)	(2.41)
Birth of grandchild, 60/61	-3.46	-3.03	-2.45	-3.12	-3.35	-4.65**	-3.54
	(2.15)	(2.15)	(2.00)	(2.13)	(2.15)	(2.13)	(2.16)
Child found job, 60/61	-3.44	-3.67	-3.49	-3.93	-3.22	-3.01	-3.32
	(2.72)	(2.74)	(2.50)	(2.71)	(2.71)	(2.70)	(2.74)
Child lost/left job, 60/61	2.73	3.10	2.26	2.64	2.75	3.01	2.70
	(2.86)	(2.87)	(2.83)	(2.86)	(2.86)	(2.91)	(2.89)
Child moved out, 60/61	-5.39*	-5.65*	-6.24**	-5.00	-5.17*	-5.22*	-5.35*
	(3.07)	(3.07)	(3.12)	(3.08)	(3.06)	(3.04)	(3.08)
Respondent's health improved, 60/61	3.11	2.64		2.75	3.34	3.42	3.07
	(2.61)	(2.64)		(2.60)	(2.61)	(2.63)	(2.61)
Respondent's health worsened by 1pt, 60/61					-5.00**		
					(2.34)		
Respondent's health worsened by 2+pts, 60/61					-14.58***		
					(4.11)		
Spouse's health worsened by 1pt, 60/61					-5.58***		
					(2.02)		
Spouse's health worsened by 2+pts, 60/61					-0.65		
					(4.97)		
Health is good, 58/59	-5.97***	-5.51**		-5.71**	-6.48***	-3.65	-6.00***
	(2.28)	(2.29)		(2.28)	(2.29)	(2.68)	(2.31)
Health is poor, 58/59	-10.08***	-8.94***		-9.67***	-10.56***	-8.68**	-10.21***
	(3.14)	(3.18)		(3.12)	(3.15)	(3.70)	(3.15)
Respondent's health worsened, 60/61	-6.94***	-6.52***		-6.98***		-6.36***	-6.96***
	(2.19)	(2.18)		(2.20)		(2.18)	(2.19)
Spouse's health worsened, 60/61	-5.09**	-4.25**		-5.10**		-4.82**	-5.10**
	(1.99)	(2.02)		(1.99)		(2.03)	(2.00)
Observations	974	974	974	974	974	974	974
R-squared	0.45	0.46	0.41	0.45	0.45	0.47	0.45
Children's characteristics at 58/59	X	X	X	X	X	X	X
Year FE; Respondent's demographic characteristics	X	X	--	X	X	X	X
Controls for LF and marital status at 60/61	--	X	--	--	--	--	--
Respondent's financial characteristics at 58/59	X	X	--	--	X	X	X
Interactions of P65 with R's and children's controls	--	--	--	--	--	X	--
Restricted cubic spline P62 and P65	--	--	--	--	--	--	X

Notes: Robust standard errors in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Appendix 2

Table A2.1: Testing for Selection in Missing P(65) Expectations Data at 60/61.

Dependent variable is an indicator for whether individual has non-missing P(65) data reported at 60/61	(1)	(2)	(3)	(4)
P(65) reported at 58/59		0.00	0.00	-0.00
		(0.00)	(0.00)	(0.00)
P(62) reported at 58/59		0.00	0.00	0.00
		(0.00)	(0.00)	(0.00)
Child's divorce/widowhood, 60/61	-0.00	0.00	-0.00	0.01
	(0.03)	(0.03)	(0.03)	(0.03)
Child's marriage, 60/61	-0.02	-0.00	-0.01	-0.00
	(0.02)	(0.02)	(0.02)	(0.02)
Birth of grandchild, 60/61	-0.03	-0.03	-0.03	-0.02
	(0.02)	(0.02)	(0.02)	(0.02)
Child found job, 60/61	-0.02	-0.03	-0.03	-0.04
	(0.02)	(0.03)	(0.03)	(0.02)
Child lost/left job, 60/61	-0.07***	-0.07***	-0.07***	-0.05**
	(0.03)	(0.03)	(0.03)	(0.02)
Child moved in with parents, 60/61	0.07	0.07	0.08*	0.06
	(0.04)	(0.04)	(0.05)	(0.04)
Child moved out, 60/61	0.01	0.01	0.01	0.03
	(0.03)	(0.03)	(0.03)	(0.03)
Respondent's health improved, 60/61	-0.08***	-0.07***	-0.07***	-0.06***
	(0.02)	(0.02)	(0.02)	(0.02)
Respondent's health worsened, 60/61	-0.10***	-0.09***	-0.09***	-0.06***
	(0.02)	(0.02)	(0.02)	(0.02)
Spouse's health worsened, 60/61	-0.01	-0.00	-0.00	0.01
	(0.02)	(0.02)	(0.02)	(0.02)
Spouse's health improved, 60/61	-0.05**	-0.05**	-0.05**	-0.04**
	(0.02)	(0.02)	(0.02)	(0.02)
No. of children working full-time, 58/59		-0.00	-0.00	-0.01
		(0.01)	(0.01)	(0.01)
No. of children working part-time, 58/59		-0.01	-0.01	-0.01
		(0.02)	(0.02)	(0.02)
Observations	1,288	1,286	1,286	1,276
Respondent's demographic controls	--	X	X	X
Year FE	--	X	X	X
Respondent's financial controls	--	--	X	X
Age of youngest/oldest child	--	--	X	X
LF and marital status controls at 60/61	--	--	--	X

Notes: Robust standard errors in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level

Table A2.2: Testing for Selection in Missing P(62) Expectations Data at 60/61.

Dependent variable is an indicator for whether individual has non-missing P(62) data reported at 60/61	(1)	(2)	(3)	(4)
P(65) reported at 58/59		0.00	0.00	0.00
		(0.00)	(0.00)	(0.00)
P(62) reported at 58/59		0.00	0.00	0.00
		(0.00)	(0.00)	(0.00)
Child's divorce/widowhood, 60/61	-0.01	-0.01	-0.01	0.00
	(0.03)	(0.03)	(0.03)	(0.03)
Child's marriage, 60/61	-0.02	-0.00	-0.00	0.01
	(0.02)	(0.02)	(0.02)	(0.02)
Birth of grandchild, 60/61	-0.03	-0.03	-0.03	-0.02
	(0.02)	(0.02)	(0.02)	(0.02)
Child found job, 60/61	-0.04	-0.04	-0.04	-0.05**
	(0.02)	(0.03)	(0.03)	(0.02)
Child lost/left job, 60/61	-0.07***	-0.07***	-0.07***	-0.05*
	(0.03)	(0.03)	(0.03)	(0.02)
Child moved in with parents, 60/61	0.09*	0.09*	0.10**	0.07
	(0.05)	(0.05)	(0.05)	(0.04)
Child moved out, 60/61	0.02	0.02	0.02	0.03
	(0.03)	(0.03)	(0.03)	(0.03)
Respondent's health improved, 60/61	-0.07***	-0.06***	-0.07***	-0.05**
	(0.02)	(0.02)	(0.02)	(0.02)
Respondent's health worsened, 60/61	-0.10***	-0.09***	-0.09***	-0.06***
	(0.02)	(0.02)	(0.02)	(0.02)
Spouse's health worsened, 60/61	0.00	0.01	0.01	0.01
	(0.02)	(0.02)	(0.02)	(0.02)
Spouse's health improved, 60/61	-0.06**	-0.06**	-0.06**	-0.04**
	(0.02)	(0.02)	(0.02)	(0.02)
No. of children working full-time, 58/59		-0.01	-0.01	-0.01
		(0.01)	(0.01)	(0.01)
Observations	1,288	1,286	1,286	1,276
Respondent's demographic controls	--	X	X	X
Year FE	--	X	X	X
Respondent's financial controls	--	--	X	X
Age of youngest/oldest child	--	--	X	X
LF and marital status controls at 60/61	--	--	--	X

Notes: Robust standard errors in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A2.3: Testing for Selection in Observed Retirement Realizations.

Dependent variable is an indicator for whether individual has non-missing retirement realization data	(1)	(2)	(3)	(4)
P(65) reported at 58/59		0.00	0.00	0.00
		(0.00)	(0.00)	(0.00)
P(62) reported at 58/59		0.00	0.00	0.00
		(0.00)	(0.00)	(0.00)
Child's divorce/widowhood, 60/61	-0.02	-0.01	-0.02	-0.02
	(0.03)	(0.03)	(0.03)	(0.03)
Child's marriage, 60/61	-0.01	-0.02	-0.02	-0.02
	(0.02)	(0.02)	(0.02)	(0.02)
Birth of grandchild, 60/61	-0.01	0.01	0.01	0.01
	(0.02)	(0.02)	(0.02)	(0.02)
Child found job, 60/61	-0.03	-0.02	-0.02	-0.02
	(0.02)	(0.02)	(0.02)	(0.02)
Child lost/left job, 60/61	0.00	-0.00	-0.00	0.01
	(0.02)	(0.02)	(0.02)	(0.03)
Child moved in with parents, 60/61	-0.02	-0.03	-0.02	-0.01
	(0.03)	(0.03)	(0.03)	(0.03)
Child moved out, 60/61	0.03	0.04	0.03	0.03
	(0.02)	(0.03)	(0.03)	(0.03)
Respondent's health improved, 60/61	-0.04*	-0.02	-0.02	-0.02
	(0.02)	(0.02)	(0.02)	(0.02)
Respondent's health worsened, 60/61	-0.03	-0.05**	-0.05***	-0.05**
	(0.02)	(0.02)	(0.02)	(0.02)
Spouse's health worsened, 60/61	-0.01	-0.00	-0.01	-0.01
	(0.02)	(0.02)	(0.02)	(0.02)
Observations	1,288	1,274	1,274	1,265
Respondent's demographic controls	--	X	X	X
Year FE	--	X	X	X
Respondent's financial controls	--	--	X	X
Age of youngest/oldest child	--	--	X	X
LF and marital status controls at 60/61	--	--	--	X

Notes: Robust standard errors in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A2.4: Testing for Whether Children's Events Predict Labor Force Exit at 60/61.

Dependent variable is an indicator equal to 1 if respondent is no longer in the labor force at 60/61	(1)
P(65)/100 reported at 58/59	-0.08**
	(0.04)
P(62)/100 reported at 58/59	-0.20***
	(0.03)
Child's divorce/widowhood, 60/61	0.03
	(0.03)
Child's marriage, 60/61	0.02
	(0.02)
Birth of grandchild, 60/61	0.02
	(0.02)
Child found job, 60/61	-0.02
	(0.03)
Child lost/left job, 60/61	-0.01
	(0.03)
Child moved in with parents, 60/61	-0.03
	(0.04)
Child moved out, 60/61	0.01
	(0.03)
Respondent's health improved, 60/61	-0.01
	(0.02)
Respondent's health worsened, 60/61	0.07***
	(0.02)
Spouse's health worsened, 60/61	0.03
	(0.02)
Spouse's health improved, 60/61	-0.00
	(0.02)
No. of children working full-time, 58/59	-0.00
	(0.01)
College degree	0.00
	(0.02)
Observations	1,286
Respondent's demographic controls	X
Respondent's financial controls	X
Age of youngest/oldest child	X
Year FE	X

Notes: Robust standard errors in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A2.5: Testing for Whether Children's Events Predict Not Being Married at 60/61.

Dependent variable is an indicator equal to 1 if respondent is no longer married at age 60/61	(1)
P(65)/100, 58/59	0.02*
	(0.01)
P(62)/100, 58/59	-0.01
	(0.01)
Child's divorce/widowhood, 60/61	0.01
	(0.01)
Child's marriage, 60/61	0.00
	(0.01)
Birth of grandchild, 60/61	0.01
	(0.01)
Child found job, 60/61	-0.00
	(0.01)
Child lost/left job, 60/61	0.01
	(0.01)
Child moved in with parents, 60/61	0.03
	(0.03)
Child moved out, 60/61	0.01
	(0.02)
Respondent's health improved, 60/61	-0.00
	(0.01)
Respondent's health worsened, 60/61	0.01
	(0.01)
Spouse's health worsened, 60/61	-0.04***
	(0.01)
Spouse's health improved, 60/61	-0.03***
	(0.01)
No. of children working full-time, 58/59	-0.00
	(0.00)
No. of children working part-time, 58/59	-0.00
	(0.01)
Health is poor, 58/59	-0.02**
	(0.01)
Observations	1,286
R-squared	0.06
Respondent's demographic controls	X
Respondent's financial controls	X
Age of youngest/oldest child	X
Year FE	X

Notes: Robust standard errors in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

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Chapter 3. Effect of Unemployment Insurance Extensions on Spousal Labor Supply

Abstract. This paper examines whether the UI extensions implemented during the Great Recession have displaced spousal labor supply. Using the 2008 panel of the Survey of Income and Program Participation matched with simulated UI benefits data, I do not find a negative impact of the extensions on the extensive margin. Furthermore, the results show that the UI extensions had a significant positive effect on the intensive margin, leading to a substantial increase in spousal work hours.

In the midst of the Great Recession, the Unemployment Insurance (UI) benefits provided to unemployed workers were extended to unprecedented lengths, igniting much policy debate. The resulting discussions highlighted the key trade-offs involved with the extended benefit provision. On one hand, the additional UI benefits could stimulate the economy by providing liquidity-constrained unemployed with cash, thus raising aggregate demand and ultimately reducing unemployment. On the other hand, making UI benefits available for a longer time period could exacerbate the moral hazard problem and reduce recipients' job search effort, resulting in higher overall unemployment.

Given these conflicting possibilities, numerous empirical studies investigate the effect of UI extensions on recipients and find limited impacts. Overall, the literature shows the extensions have a small negative effect on recipients' job-finding probabilities,

contributing only about 0.2 percentage points to the unemployment rate which stood at 8.9% in 2011.[95]

However, as a public insurance program, UI extensions could interact with and potentially displace private insurance mechanisms available to unemployed workers. One such private insurance mechanism is labor supply of family members, particularly spouses. When workers lose their jobs, their spouses could help offset the loss of income by either entering the labor force if they are initially non-participating or increasing their existing work hours. Past research has demonstrated that the presence of UI lowers spousal hours by up to 30% (Cullen and Gruber, 2000). Therefore, it is plausible that the longer duration of UI could have had an analogous effect; however, it has not yet been examined in the literature.

In this paper, I study the impact of UI extensions on spousal labor supply. Exploiting the timing of the extensions' rollout, I identify the causal effect on whether the spouses are employed as well as their average work hours. Similar to Rothstein, my identification strategy relies on variation in extended UI availability that remains after accounting for the labor demand conditions.

I use panel data from the 2008 Survey of Income and Program Participation (SIPP), which contains detailed economic and demographic data on all household members. The analysis sample includes male and female SIPP respondents ages 18 to 65 who experience an unemployment spell and whose labor market histories make them likely to be eligible for UI. Based on the start date of the unemployment spell and the state

[95] Rothstein (2011), Farber and Valletta (2013), and Figura and Barnichon (2014).

of residence, I match SIPP respondents with simulated UI benefits data from Rothstein (2011). Rothstein's data reflects the timed roll-out of the four tiers of the Emergency Unemployment Compensation (EUC) as well as activation of the Extended Benefits (EB) program, which together comprise the extended UI benefits. For each unemployment spell, I determine the total weeks of EUC and EB that workers can expect at the start of their spells as well as whether the benefits were further extended as the spells progressed. My spousal outcomes are measured over three time periods: the first 3 and 6 months following the start of the spell as well as the entire duration of the spell.

The results show that the UI extensions do not decrease spousal labor supply as I find no impact on the extensive margin. Moreover, my findings highlight that the extensions had a positive and significant effect on the intensive margin, resulting in higher spousal work hours. In light of prior evidence on UI crowd-out of spousal labor supply, it is surprising that longer benefit durations do not have the same negative impact. I explore two plausible explanations for the observed pattern and find evidence consistent with spouses finding it optimal to switch primary earner responsibilities when higher-earning respondents become eligible for longer UI.

The rest of the paper is organized as follows. Section 3.1 provides a review of relevant literature. Section 3.2 outlines the structure of the UI extensions. Section 3.3 describes the data and sample selection. Section 3.4 explains the methodology. Section 3.5 presents the results, and Section 3.6 concludes.

3.1 Related Literature

A. Spousal labor supply during partner's unemployment

The large literature on the labor supply changes of spouses in response to their partners' unemployment has focused on measuring the "added worker effect" (AWE), which is the propensity of wives to enter the labor force after their husbands lose their jobs. Numerous studies on international data have documented a substantial AWE.[96] For instance, Fernandes and de Felicio (2005) use 1985-1999 data from Brazil to show that the husband's unemployment increases the likelihood that nonparticipating wives enter the labor force by 35%. Using 2005-2010 data from Turkey, Karaoglan and Okten (2015) find a smaller, but still significant AWE of 4-8%. Parker and Skoufias (2004) employ 1994-95 and 1998-99 data from Mexico and find a greater AWE during the 1994 Peso Crisis than the later period of improved economic conditions.[97]

While earlier studies using the U.S. data found mixed evidence for AWE,[98] later work provides support for this effect. Juhn and Potter (2007) use the 2004-2005 Current Population Survey to estimate that non-participating wives are 8 percentage points more likely to enter the labor force when their husbands lose their jobs. Comparing this result to the earlier period of 1968-1973, the authors find that the response doubled in magnitude over time. However, because the overall share of households with non-participating wives has declined, the authors argue that the AWE became less economically important.

[96] There are some exceptions that do not find evidence for AWE. For instance, Eliason (2011) uses data from 1987 plant closures in Sweden to show that wives' annual earnings did not increase after their husbands were laid off from their jobs.

[97] Similarly, Kohara (2010) finds evidence for substantial AWE in Japanese data from 1993 to 2004, showing that working wives increase their hours following their husbands' unemployment spells while non-working wives become more likely to enter the labor market. Using 1993-2006 data from Taiwan, Huang, Luh, and Huang (2012) find a larger effect in families where wives have more than 9 years of schooling

[98] For instance, Lundberg (1985) finds evidence for small but significant AWE in the data from Seattle and Denver, while Maloney (1991) and Spletzer (1997) do not find statistically significant AWE in the PSID and CPS data, respectively.

Nevertheless, since spousal labor supply can adjust not only on the extensive, but also on the intensive margin, it can be informative to expand the inquiry into the spousal labor supply adjustments beyond the AWE.

B. Public insurance crowd-out of spousal labor supply

Since spousal labor supply during partner's unemployment can function as private insurance against income loss, it is important to understand how it interacts with public insurance programs. Several studies have documented significant crowd-out of spousal labor supply by disability and sickness insurance programs. For instance, Chen (2012) shows that Disability Insurance reduces spousal labor force participation by 6%. Olsson and Thoursie (2011) find that Swedish sickness insurance similarly reduces spousal labor supply.

Focusing on the most prominent public program to combat income loss, Unemployment Insurance, Cullen and Gruber (2000) demonstrate that UI benefits significantly crowd out spousal labor supply. Using 1983-1993 data from the Survey of Income and Program Participation, the authors show that for each dollar of UI, wives earn up to 73 cents less. Furthermore, Cullen and Gruber estimate that in the absence of UI, spouses would work 30% more hours. Given this relationship between the UI and spousal labor force adjustment, it is reasonable to expect the notable changes to the UI program to affect not only the benefit recipients, but also their spouses.

C. UI extensions and implications for the spousal labor supply

Following the unprecedented expansion of UI benefits during the Great Recession, numerous studies have evaluated the impact of longer benefit duration on recipients' job finding prospects. The majority of studies find significant but small negative impacts.

Exploiting the haphazard rollout of the Emergency Unemployment Compensation (EUC) and Extended Benefits (EB) programs, Rothstein (2011) shows that the UI extensions increased the overall unemployment rate by only about 0.2 percentage points. More than half of this effect comes from a decline in non-participation following unemployment rather than a decline in job finding probabilities, suggesting a limited role for moral hazard from prolonged benefit receipt. Using similar data and identification strategies, Farber and Valletta (2013) reach the same conclusion of a significant but small impact of UI extensions on the unemployment rate. Figura and Barnichon (2014) broaden the scope of the analysis by including 35 years of data from Current Population Survey (CPS), starting in 1976. In line with prior estimates, the authors find that the UI extensions increased the unemployment rate by 0.3 percentage points during the Great Recession and the effect of extensions was even smaller in the past recessions. At the same time, however, Figura and Barnichon show that the extensions had a sizable and significant impact on job finding probabilities of unemployed workers who are approaching or already reached exhaustion of regular benefits, reducing transitions to employment by 16-17 percent. Thus, UI extensions appear to have a small negative impact on job finding probabilities of recently unemployed workers and a larger effect on re-employment rates for workers receiving or about to receive the extensions. [99]

[99] A number of recent studies do find a large negative impact of UI extensions on the U.S. labor market; however, many involve extrapolations from pre-recession periods. Fugita (2011) estimates counterfactual exit hazards for the recession period using the 2004-2007 hazards and finds that the extensions have increased the unemployment rate for men by 1.2 percentage points. Hagedorn, Karahan, Manovskii and Mitman (2013) analyze neighboring counties with different UI policies and find that the benefit extensions have increased the unemployment rate in 2011 by 2.5 percentage points.

Despite the multitude of studies on the extensions' effects on the recipients, no study to my knowledge has examined the impact on the recipients' spouses. Considering the demonstrated crowd-out between UI benefit generosity and spousal labor supply, it is possible that lengthening the duration could have a similar effect. In this paper, I exploit the timing of the roll-out of the UI extensions to determine the causal impact on spousal labor force participation and work hours.

3.2 Structure of the Unemployment Insurance Extensions

Under normal economic conditions, states typically provide 26 weeks[100] of regular UI benefits to eligible unemployed workers.[101] However, during recessionary periods, the federal government often implements additional benefit programs which extend the duration of the UI availability. Between July 2008 and January 2014, Congress has passed and repeatedly re-authorized the Emergency Unemployment Compensation program of 2008 (EUC), which provides up to 53 weeks of additional benefits in four tiers. At the start, EUC provided 13 weeks of additional benefits to anyone who exhausted their regular benefits before March 28, 2009. In November 2008, EUC Tier I was extended to 20 weeks, and Tier II was introduced, providing another 13 weeks of benefits available in states with

[100] Some states provide fewer than 26 weeks of regular benefits based on prior work history. For instance, Alaska provides 16-26 weeks of benefits depending on the amount and distribution of wages paid in the base period (http://www.labor.state.ak.us/esd_unemployment_insurance/uihandbook.pdf).

[101] To be eligible for UI, workers must become unemployed through no fault of their own and meet other state-specific monetary and non-monetary eligibility requirements. Non-monetary requirements include physical ability and availability to work as well as active job search. Monetary requirements include minimum wages earned or time worked during the base period (usually the first 4 out of the last 5 quarters prior to the start of unemployment). For instance, in California, unemployed workers must have earned at least $1,300 in the highest quarter of the base period or $900 in the highest quarter and have total base period earnings 1.25 times the high quarter earnings (http://www.edd.ca.gov/pdf_pub_ctr/de8714ab.pdf). In New York, the unemployed must have worked for at least 2 quarters in the base period, earned at least $1,900 in wages in the highest quarter, and received total wages in the base period of 1.5 times the high quarter wages (https://www.labor.ny.gov/ui/claimantinfo/beforeyouapplyfaq.shtm#0)

unemployment rates above 6%. Subsequent expansion in November of 2009 prolonged Tier II benefits to 14 weeks and removed unemployment rate requirement, added 13 more weeks of benefits as Tier III for states with unemployment rates of at least 6%, and created Tier IV with 6 supplemental weeks available if state unemployment rates surpassed 8.5% (Fujita 2010).

Despite the repeated re-authorizations, the EUC program was allowed to expire on three separate occasions in 2010, and each ultimate extension was highly controversial in Congress. According to Rothstein (2011), it would have been unrealistic for the unemployed workers to believe that the EUC program would be successfully and timely extended. Without anticipating future extensions, the newly unemployed could have qualified for EUC only in the 3rd quarter of 2008, 2nd quarter of 2009 and December 2010-April 2011 (Rothstein 2011).

In addition to the EUC program, unemployed workers who exhaust regular and emergency benefits in their state are eligible for an additional 13-20 weeks of UI support provided via the Federal-State Extended Benefits (EB) program. The EB program was established in 1970 to lengthen the duration of UI during periods of high unemployment. Because typically federal and state governments share the financing of the EB, states have adopted a variety of EB triggers based on their willingness to pay out these benefits. The minimum trigger insures that all states pay EB if the insured unemployment rate (IUR) for the last 13 weeks is 5% or higher and is 120% of the rate in the same 13-week period in the last 2 years. Other states have adopted triggers that start EB payments if the IUR for the last 13 weeks was at least 6%, regardless of the IUR in past years. An alternative trigger switches on if the average total unemployment rate (TUR) for the last 3 months is

6.5% or higher and is 110% of the rate for the same 3-month period in either of the last 2 years.[102] After the American Recovery and Reinvestment Act (ARRA) passed in February 2009 authorized 100% federal financing of the EB benefits, many states have adopted more generous triggers.

Due to the many activations and discontinuations of EUC and EB programs, newly unemployed workers experienced substantial variation in the total potential weeks of UI benefits available to them during and following the Great Recession. Figure 3.1 shows the estimated total weeks of UI eligibility that unemployed workers could expect at the start of their spells between 2008 and 2011. While a little over a third of unemployed were not eligible for any extensions at the very start of their spells, 41% were eligible for 20 additional weeks, and 3% were eligible for up to 54 additional weeks. Furthermore, within 6 months after losing their jobs, 87% of workers in my sample became eligible for additional weeks of benefits, topping off what they could expect at the beginning of their spells.

Despite the media publicity that surrounded the UI extensions during the last recession, it is important to note that obtaining the information on the total potential duration of UI benefits required some additional effort on behalf of the unemployed. Since EUC and EB are separate programs from the regular benefits, the initial letters of eligibility award that unemployed workers receive after filling for UI do not explicitly state the number of EUC or EB weeks that the workers will be granted in addition to the regular benefits. The notice of EUC and EB eligibility is only mailed to the UI recipients

[102] See http://oui.doleta.gov/unemploy/pdf/partnership.pdf for more details.

close to the date of regular benefit exhaustion.[103] However, it is possible that workers could have obtained this information by contacting the unemployment office in their state, researching the extended UI, or by accessing online tools such as Unemployment Benefit Estimation Tool, introduced by the Department of Labor in October 2009. The Benefit Estimation Tool enabled workers to find out exactly how many weeks of extended UI benefits they can expect to receive by inputting their state and claim start date along with information on their weekly UI payments and maximum benefit entitlement.[104] Given the importance of knowing the duration of UI for the unemployed workers, it is reasonable to assume that most workers have accessed the information on their potential benefit duration. Since I do not have data to control for workers' knowledge of their total weeks of UI eligibility, the analysis in this paper captures the effect of extensions availability on spousal labor supply.

3.3 Data and Sample Selection

To study the effects of UI extensions on the recipients' spouses, I combine data from several sources. The panel data on individual labor supply and demographic information comes from the first 15 waves of 2008 Survey of Income and Program Participation (SIPP).[105] SIPP is a nationally representative dataset which surveys the same households every 4 months for the duration of the panel. During each interview, sampled

[103] In particular, the notice of eligibility in Tier I EUC program is only mailed to the UI recipients at the exhaustion of the regular benefits. Then, the notice of eligibility in each subsequent EUC tier is mailed one-at-a-time at the end of each tier. Finally, only once all the regular and the EUC benefits are exhausted do the unemployed receive their notice of eligibility for the EB program.

[104] Unemployment Benefit Estimation Tool was designed to enable mortgage companies and housing counselors to project homeowner's unemployment insurance income in order to modify their loans. See http://workforcesecurity.doleta.gov/unemploy/ben_entitle.asp.

[105] I use CEPR SIPP Uniform Extracts for the 2008 panel, supplemented with data from waves 12 through 15. For details, see http://ceprdata.org/sipp-uniform-data-extracts/.

households are asked about the prior 4 months, resulting in monthly data on all household members over the age 16. SIPP collects detailed information on labor supply of the household members, including hours and earnings on up to two jobs, demographic information, as well as data on a variety of social insurance and welfare payments received.

The data on weeks of extended UI available to newly unemployed workers are obtained from Rothstein (2011) and cover the period between the start of the SIPP panel in May 2008 and March 2011.[106] Rothstein incorporates data from both EUC and EB programs to simulate the number of benefit weeks that newly unemployed workers can expect at the start of their spell as well as the number of additional weeks of extended UI they can receive as their spell progresses.[107] Since Rothstein's data end in 2011, my analysis only captures the period when extended UI were being rolled out but before they were curtailed. However, Farber, Rothstein and Valletta (2015) show that there is no difference in the impact of UI extensions on job-finding rates between 2008-2011 and the later years of 2012-2014 when the extensions were phased out.

I bring in several measures of local labor market conditions. Since the benefit extensions are based on state-level monthly unemployment rates, I use data on monthly unemployment by state obtained from the Bureau of Labor Statistics.[108] To capture the labor demand faced by spouses, I calculate two alternative measures based on data from

[106] Rothstein (2011) provides data on simulated weeks of UI starting in January 2002; however, the SIPP panel begins in May 2008.
[107] I use the version of Rothstein's simulations that assumes that recipients are eligible for full benefits and do not expect Congress to re-authorize EUC after its scheduled expiration date.
[108] State-level monthly unemployment data were downloaded from http://www.bls.gov/lau/data.htm (accessed on September 20, 2013).

Current Population Survey Merged Outgoing Rotation Groups.[109] The first measure of unemployment is calculated by gender and education level of the spouse for each state and month.[110] The second measure is calculated by gender and major industry of the spouse for each state and year.[111] As a robustness check, I calculate predicted wages for spouses using CPS Outgoing Rotation data on married individuals who are not full-time students.[112]

In order to control for variation in levels of UI benefit generosity, I include data on maximum weekly UI benefit amounts by state and year from the U.S. Department of Labor's Comparison of State UI Laws.[113] The maximum benefit amounts include allowances for dependents in 10 states that have this option.

My data contain information on individuals ages 18 to 65 who become unemployed, referred to as respondents, and their respective spouses.[114] Since 47% of SIPP households with positive incomes have dual earners and 21% report the wife being the sole earner, my sample includes unemployed wives as well as unemployed

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[109] CPS Outgoing interview file was downloaded from http://www.nber.org/data/morg.html (accessed on March 13, 2015).

[110] Education level is captured by three groups: high school degree or less, some college, and college degree. Unemployment rate calculations include only those individuals who are not full-time students.

[111] Major industry for spouses captures the industry that the spouse was reporting in the month immediately prior respondent's unemployment spell. If that data is missing, I use the following information in respective order until non-missing industry records are located: industry 2 months prior to respondent's spell, industry 3 months prior, or industry reported any time prior to respondent's spell.

[112] Specifically, I regress ln(wages) on individual's age and age^2, indicators for black and other races, some college and college degree dummies, along with indicators for state and calendar month. I run a separate prediction regression by gender and for each calendar year in my sample.

[113] Employment and Training Administration. 2003-2012. "Comparison of State Unemployment Insurance Laws." United States Department of Labor. http://workforcesecurity.doleta.gov/unemploy/statelaws.asp#Statelaw (accessed November 2, 2013).

[114] Following Cullen and Gruber (2000), I include only the couples that remain married throughout the unemployment spell in the analysis, abstracting from the potential effects of UI extensions on divorce rates.

husbands.[115] I focus only on those respondents who were employed for 3 consecutive months prior to the start of their unemployment spell and had positive earnings[116] in order to capture the group of unemployed workers most likely to be eligible for UI.[117] Moreover, I exclude respondents whose last job was temporary as well as all respondents whose reason for unemployment would disqualify them from UI receipt. In particular, I exclude those who report leaving their job due to retirement or old age, childcare problems, other family/personal obligations, own illness, school/training, unsatisfactory work arrangements, being discharged/fired, or quitting for any other reason. Finally, I exclude data from 8 states for which I only have 3 observations or less: Vermont, North and South Dakota, Rhode Island, DC, West Virginia, Montana and Alaska.

I define the unemployment spell as a jobless period when respondent is classified as being "on layoff or looking for work" for at least some part of the spell, starting with the first full month without a job and ending with the first full month of employment. The spousal labor supply variables are then measured from the start of the respondent's spell. I examine spousal outcomes in three different time frames: the first 3 months and first 6 months since the start of the spell as well as the entire duration of the respondent's spell.[118] The fixed 3- and 6-month windows are independent of whether or not the respondent finds

[115] These calculations are based on the first month of the 2008 SIPP panel. Specifically, 87% of married couples report positive monthly earnings in the first month of the panel. Among these, 47% report dual earnings from both husband and wife, 32% report the husband being the sole earner, and 21% report the wife being the sole earner. For the dual earning households, 42% report husband having earnings that are at least $1,000 per month higher than the wife's; 38% have earnings for both spouses within a $1,000 of each other's, and 20% have wives making at least $1,000 more per month than husbands.

[116] I restrict the analysis only to respondents with calculated hourly wages of above $1 and below $300, with reported weekly hours of 126 or less.

[117] I also exclude observations that are missing data on spousal hours and/or labor force status in the month prior to the start of the respondent's unemployment spell.

[118] Looking at spousal labor supply for the duration of the respondent's spell follows Cullen and Gruber (2000).

re-employment during that time, which allows me to avoid scaling spousal labor supply variables by the endogenous spell duration.

3.4 Methodology

I employ the timing of the roll-out of EUC and EB programs during the Great Recession to identify the causal effect of UI extensions on spousal labor supply. I follow Rothstein's (2011) approach in isolating the effect of extensions: once I account for local labor demand conditions, the remaining variation in weeks of extended UI comes from the haphazard roll-out of EUC, repeated expiration and renewal of EUC, as well as states' decisions about whether or not to participate in the EB program.

I estimate regressions of the form:

$$
\begin{aligned}
(3.1) \qquad Y_{ist} \;=\; & \beta_0 + \beta_1\, Extended\ UI\ at\ start_{ist} + \beta_2\, Subsequent\ Extensions_{ist} + \\
& + P_u(UnempRate) + P_c(Spousal\ UnempRate_{ist}) + \\
& + \beta_3\, Spousal\ Wage\ Prior_{ist} + \beta_4\, Spouse\ LF\ Prior_{ist} + \\
& + \boldsymbol{\Gamma}\, \mathbf{X}_{ist} + \boldsymbol{\Omega}\, \mathbf{Z}_{ist} + \boldsymbol{\lambda}_t + \boldsymbol{\mu}_s + \varepsilon_{ist}
\end{aligned}
$$

where Y_{ist} is one of several spousal labor supply measures for unemployed worker *i*, in state *s*, on date *t*. All dependent variables are measured over three periods: the first 3 months and first 6 months after the start of the respondent's spell as well as over the entire duration of the spell. The set includes an indicator for whether or not the spouse is working during the period, the share of the period that the spouse is employed, and average weekly hours for the spouse.

The key regressor of interest is $Extended\ UI\ at\ start_{ist}$, which captures whether the newly unemployed worker is eligible for EUC and/or EB benefits based on the programs

in effect at the beginning of the spell. *Subsequent Extensions*$_{ist}$ reflects whether any additional EUC/EB weeks of benefits become available within 3 or 6 months of the unemployment start date.[119] For instance, if the expiration of EUC is more than 6 months away when workers initially lose their jobs, they will be eligible to receive at least the Tier 1 benefits, which will be picked up by the *Extended UI at start*$_{ist}$ variable. However, if the EUC program was extended after several months following the start of the spell, workers can then expect to receive UI for even longer, which would be captured by *Subsequent Extensions*$_{ist}$ variable.

In order to isolate the effect of extensions from the impact of local labor market conditions, I control for labor demand with several measures. P_u(*UnempRate*) is a cubic polynomial in the overall state-level monthly unemployment rate. P_c(*Spousal UnempRate*$_{ist}$) is a cubic polynomial in calculated unemployment rate for spouses either by gender, education, state and month, or by gender, major industry, state and year. Furthermore, I include spouses' wages and labor force status in the month prior to respondent's spell since their ability to respond is likely to vary based on the initial conditions.

$\mathbf{X}_{ist}$ is a vector of respondent's demographic and labor force characteristics, including age and age^2, some college and college degree indicators, dummies for black and other ethnicity, as well as a 13-piece spline in average earnings in the quarter prior to start of unemployment spell. $\mathbf{Z}_{ist}$ is a vector of spousal demographic characteristics, as

[119] When the dependent variable is measured over the first 3 months, *Subsequent Extensions* variable reflects whether any additional weeks of benefits became available within 3 months following start date of the spell. When the dependent variable is measured over the first 6 months or the entire spell duration, *Subsequent Extensions* captures whether any additional benefit weeks became available within 6 months after the start.

well as number of children under the age of 18 in the household. $\boldsymbol{\lambda}_t$ are the month-by-year fixed effects, and $\boldsymbol{\mu}_s$ are state fixed effects. All regressions are weighted using the SIPP person-level weight. Errors are clustered at the state level.

3.5 Results

A. Descriptive Statistics

Table 3.1 provides summary statistics on the respondents and spouses in my sample. In total, I have data on 1,420 individuals and their 1,513 unemployment spells.[120] Out of these spells, 565 are experienced by women and 948 are experienced by men. The average age for the respondents is 43 years. A third of the respondents have some college education, while almost a quarter have a college degree. The average monthly earnings for the respondents in the quarter prior to their unemployment spell is about $3,200. The breakdown of the summary statistics by respondent's gender in Columns (2) and (3) highlight that the monthly earnings for male respondents are over $1,000 higher than the monthly earnings for female respondents.

Table 3.1 further shows that on average, the respondents are eligible for about 42 weeks of total UI benefits, indicating that the newly unemployed workers can expect to collect 16 weeks of extended benefits. Moreover, Figure 3.1 demonstrates substantial variation in the potential weeks of UI that the workers can expect to be eligible for at the start of their spell, ranging from 0 additional weeks to 54.

Table 3.2 summarizes the reasons for unemployment reported by the respondents in my sample. As can be seen from the table, the majority of individuals report being on

[120] Some respondents experience more than one qualifying spell during the study period.

layoff, and 12% report losing their job because their employer sold the business. Although almost a third of the spells are missing data on unemployment reason, respondents report positive UI income in 23% of these spells which implies that a large number of them are UI-eligible.

Focusing on the characteristics of unemployment spells, Table 3.3 shows that the average spell duration in my sample is 13 months for female respondents and 10 months for male respondents.[121] Among men, 88% worked full-time prior to the start of their spell, while 71% of women had prior full-time employment.

Looking at the spouses, Table 3.3 shows that 23% of spouses were not in the labor force in the month prior to the start of the respondent's spell. Among the spouses with non-missing hours data, 12% worked part-time and 66% worked full-time prior to respondent's spell, earning an average of $2,600 per month.

B. Main Findings

Tables 3.4 through 3.6 present the main results on the spousal labor supply variables: whether the spouse is working, share of the period that the spouse is working, and the average hours during the period. In the tables, the first three columns utilize the weeks of extended UI benefits available to the unemployed workers, while the last three columns rely on the indicators for having extended UI. All columns include the full set of controls described above unless otherwise noted.

Table 3.4 shows that neither the total weeks of extended UI available to the respondent at the start of the spell nor the indicator for having any weeks of extended UI

[121] Since my definition of an unemployment spell excludes spells shorter than one month, the average duration in my sample is longer than the national average during the same time period.

affect whether or not spouse works. Although most coefficients on the extended UI variables are positive, they are small in magnitude and not statistically significant. These findings suggest that extended UI does not significantly affect the extensive margin of spousal labor supply.

Looking at the share of months that the spouse is working, Table 3.5 highlights that the estimated coefficient on the indicator for extended UI available to newly unemployed is positive and statistically significant over the 6 month period and over the entire spell. In particular, the estimate of 0.058 indicates that having extended UI available at the start of the spell increases spousal labor supply by 1.5 weeks over the subsequent 6 month period, significant at the 5 percent level. Moreover, it is the initial extended UI eligibility, rather than additional extensions that take place later, that have an effect on the share of the 6 month period that the spouse is working. The coefficient on extra UI weeks that were added during the first 6 months is smaller in magnitude and not statistically significant.

Table 3.6 demonstrates that extended UI has a large, positive and significant effect on the intensive margin of spousal labor supply. The coefficients on the weeks and indicators for extended UI available at the start of the spell are positive and significant in all periods. In particular, results for the 6 month window in Columns (2) and (5) show that each additional week of extended UI available to newly unemployed increases spousal weekly hours by 0.5 hours on average, while having any extended UI at start increases work by 5.5 hours on average, significant at the 1 percent level.[122]

[122] In Tables 3.4-3.6, *Weeks of EUC+EB* variable is rescaled by 100 in order to display non-zero coefficients.

Overall, the results of no effect on the extensive margin and a positive effect on the intensive margin of spousal labor supply are surprising in light of the prior studies on the UI crowd-out. In particular, if longer UI durations have the same impact on spousal labor supply as do higher benefit amounts, we would expect to see a negative effect of the extensions on both extensive and intensive margins as was found by Cullen and Gruber (2000). I discuss two potential explanations for this paper's findings.

One possible explanation for the UI extensions having a strong positive impact on spousal work hours could be that the extended benefits are correlated with forecasts of economic conditions in the near future. For instance, if longer UI benefits become available when contemporary forecasts of economic conditions deteriorate, spouses could be increasing their hours in response to higher prospects of losing employment in the near future as well as prospects of respondents unable to find a job for a longer period. To test for this possibility, I include state-by-year dummies to absorb state-level forecasts of unemployment rates in the near term. Table 3.7 compares the findings on average spousal hours with and without state-by-year dummies. Columns (2), (4), and (6) demonstrate that these additional controls do not change the main results, suggesting that the forecasting explanation is not the main determinant of the observed pattern.

Another plausible reason for the observed results is that spouses might find it optimal to switch primary earner responsibilities when the initial primary earner becomes unemployed. Since longer UI benefit durations change the household budget constraint, the spouses might find it optimal to increase their work hours if there is opportunity to do so, while the respondents remain unemployed and collect UI for a longer period. To address this explanation, I examine whether spousal response varies by whether or not the

spouse is the primary earner in the household in the month prior to the start of the respondent's spell. I define primary earner to be the household member with strictly higher reported earnings. Table 3.8 presents the results for average spousal hours on the two subsets of the data: Columns (1)-(3) are estimated on a subsample where the spouse is not the primary earner, and Columns (4)-(6) are estimated on a subsample where the spouse is the primary earner. The results show that spouses who are not the primary earners significantly increase their work by over 7 hours per week on average, while spouses who are already primary earners increase their hours by 2-3 hours and this increase is not statistically significant. Thus, these findings are consistent with the explanation of spouses switching primary earner responsibilities. In Table 3.8b, I split the sample by whether or not the spouse is working 40+ hours prior to the respondent's spell. The coefficients across these two subgroups are similar in magnitude, although only the coefficients on the full-time spouses is statistically significant. This indicates that the spouses who are already working full-time are increasing their hours further in response to longer potential UI receipt.

C. Robustness Checks

Table 3.9 shows the sensitivity of the main results on spousal hours over the 6 month period to gradually adding control variables. In particular, Column (1) contains only the indicators for extended UI and subsequent extensions as well as gender of the respondent. Column (2) includes state indicators and month-by-year fixed effects. Column (3) adds in a cubic polynomial in the monthly state unemployment rate. Column (4) contributes the control for whether or not the spouse is in the labor force in the month

prior to r's spell. Column (5) includes the full set of controls, reproducing Column 5 in Table 3.6.

Table 3.9b presents adds alternative controls. Column (1) reproduces the main results on spousal hours over the 6 month period for comparison. Column (2) replaces actual spouse's wage with predicted log of spouse's wage by state, education, and month-year. Column (3) utilizes a cubic in calculated unemployment rate based on spousal major industry rather than education level. Column (4) shows the sensitivity of main results to excluding indicator for prior spousal labor force status. Finally, Column (5) introduces controls for spouse working part-time and full-time in place of the labor force indicator. Overall, the results appear to be robust across specifications.

Considering that the unemployed do not begin collecting extended UI benefits until 6 months after the start of the spell, spousal response to the extensions could be delayed. Table 3.10 presents the results on spousal average weekly hours during the 6-12 month and 6-24 month windows after the start of the respondent's spell. Due to the fact that some spells occur too close to the end of the SIPP panel to measure effects after 6 months together with pervasiveness of missing data on the spouses, my sample size in these estimations is reduced. The findings show that extended UI do not have a statistically significant impact on spousal hours in the 6-12 or 6-24 month windows.

Finally, Tables 3.11 and 3.11b present the results on spousal hours by gender of the respondent. Table 3.11 shows that extended UI available at the start of the spell has a large and positive impact on average hours for male spouses, statistically significant across all periods. Looking at female spouses in Table 3.11b, the results show positive coefficients on the UI extensions in all periods, but they are not statistically significant.

Thus, it appears that male spouses increase their hours more than female spouses in response to respondent's unemployment spell.

3.6 Conclusion

This paper contributes to the literature on the UI extensions by examining the impact of extensions on recipients' spouses. Using the timing of the extensions' roll-out, I identify the causal effect of extensions on whether or not the spouse is employed as well as on their average work hours. My findings show that UI extensions do not affect spousal labor supply on the extensive margin and have a positive impact on the intensive margin, resulting in higher work hours. The results remain robust after taking into account potential correlation between extended UI and forecasts of future economic conditions. Overall, the findings appear to be consistent with spouses switching primary earner responsibilities when the initial primary earner becomes unemployed.

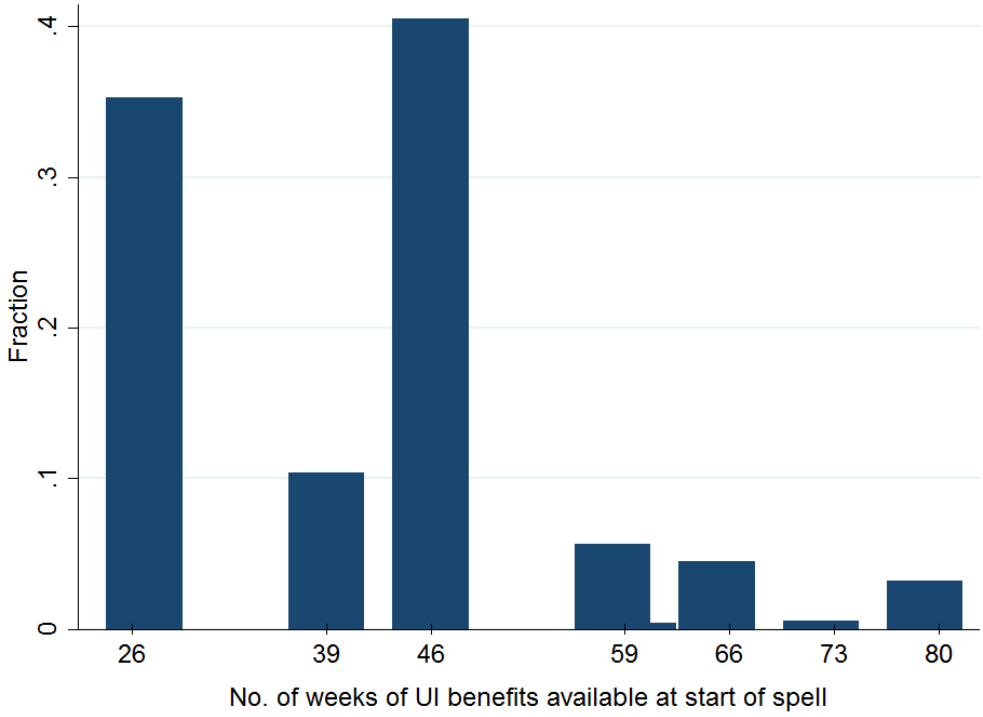

Figure 3.1: Potential Weeks of UI Benefits Available at the Start of Unemployment Spell.

Table 3.1: Summary Statistics.

	Average (1)	Women (2)	Men (3)
Respondent's age	42.96	42.31	43.34
	(0.30)	(0.50)	(0.38)
Respondent with some college	0.33	0.35	0.32
	(0.01)	(0.02)	(0.02)
Respondent with college degree	0.23	0.26	0.21
	(0.01)	(0.02)	(0.01)
Respondent black	0.10	0.13	0.09
	(0.01)	(0.02)	(0.01)
Respondent other	0.33	0.29	0.34
	(0.01)	(0.02)	(0.02)
No. of children <18 in family	1.18	1.08	1.24
	(0.04)	(0.06)	(0.05)
Respondent's average monthly earnings in quarter prior to unemployment	3,169.32	2,478.39	3,575.07
	(66.61)	(88.95)	(89.28)
Respondent's average weekly hours in quarter prior to unemployment	41.06	37.46	43.18
	(0.36)	(0.55)	(0.46)
No. of weeks of UI benefits available at start of spell	41.60	42.08	41.32
	(0.38)	(0.65)	(0.47)
Spouse's age	42.53	44.88	41.15
	(0.30)	(0.51)	(0.37)
Spouse with some college	0.34	0.34	0.34
	(0.01)	(0.02)	(0.02)
Spouse with college degree	0.25	0.22	0.27
	(0.01)	(0.02)	(0.02)
Spouse black	0.10	0.13	0.08
	(0.01)	(0.02)	(0.01)
Spouse other	0.31	0.28	0.32
	(0.01)	(0.02)	(0.02)
Predicted spouse's wage by state/education/month-year	17.79	20.49	16.21
	(0.15)	(0.27)	(0.15)
Calculated spouse's unemployment rate by state/month/gender/education	8.42	9.64	7.70
	(0.14)	(0.24)	(0.17)
Calculated spouse's unemployment rate by state/year/gender/major industry	8.01	8.72	7.59
	(0.11)	(0.21)	(0.13)
Average unemployment rate by state/month-year	9.07	9.09	9.07
	(0.06)	(0.09)	(0.07)
Observations	1513	565	948

Notes: Standard errors in parentheses.

Table 3.2: Reasons for Unemployment.

	Women (1)	Men (2)
On layoff	0.52	0.56
	(0.02)	(0.02)
Slack work or business conditions	0.02	0.02
	(0.01)	(0.01)
Employer bankrupt	0.02	0.01
	(0.01)	(0.00)
Employer sold business	0.12	0.12
	(0.01)	(0.01)
Missing	0.31	0.28
	(0.02)	(0.02)
Observations	565	948

Notes: Standard errors in parentheses.

Table 3.3: Characteristics of Unemployment Spells.

	Average (1)	Women (2)	Men (3)
Duration of unemployment spell (months)	11.06	13.00	9.98
	(0.34)	(0.58)	(0.41)
Respondent's average monthly earnings in quarter prior to unemployment	3,234.96	2,495.53	3,649.47
	(70.66)	(93.24)	(94.06)
Respondent's average weekly hours in quarter prior to unemployment	41.23	37.52	43.31
	(0.38)	(0.58)	(0.48)
Fraction of respondents working part-time prior to start of spell	0.18	0.29	0.12
	(0.01)	(0.02)	(0.01)
Fraction of respondents working full-time prior to start of spell	0.82	0.71	0.88
	(0.01)	(0.02)	(0.01)
Average weekly spousal hours in 3 months prior to start of r's spell	31.12	38.62	26.91
	(0.56)	(0.83)	(0.70)
Average weekly spousal hours in the month prior to start of r's spell	31.15	38.41	27.08
	(0.57)	(0.85)	(0.71)
Fraction of spouses NILF prior to r's spell	0.23	0.12	0.29
	(0.01)	(0.02)	(0.02)
Spouse working part-time prior to r's spell	0.12	0.06	0.14
	(0.01)	(0.01)	(0.01)
Spouse working full-time prior to r's spell	0.66	0.82	0.57
	(0.01)	(0.02)	(0.02)
Spousal earnings in the month prior to start of r's spell	2,633.01	3,521.08	2,135.19
	(79.67)	(152.12)	(86.09)
Spousal wage on main job in month prior to r's spell	15.83	20.22	13.36
	(0.47)	(0.93)	(0.50)
Observations	1513	565	948

Notes: Standard errors in parentheses.

Table 3.4: Whether Spouse Works During Spell.

Dependent variable is indicator for whether spouse works anytime during period	3 months	6 months	Spell	3 months	6 months	Spell
	(1)	(2)	(3)	(4)	(5)	(6)
Weeks of EUC+EB benefits available at start of spell/100	0.103	-0.008	0.247			
	(0.19)	(0.19)	(0.20)			
(Weeks of EUC+EB)^2	0.023	0.769**	0.022			
	(0.50)	(0.39)	(0.47)			
Additional EEB weeks added during first 3 months of spell/100	0.180					
	(0.21)					
(Additional EEB weeks added during first 3 months of spell)^2	-0.435					
	(0.42)					
Additional EEB weeks added during first 6 months of spell*100		0.252	0.255			
		(0.25)	(0.23)			
(Additional EEB weeks added during first 6 months of spell)^2		-0.423	-0.204			
		(0.30)	(0.28)			
Indicator for positive weeks of EUC or EB available				0.023	0.035	0.028
				(0.03)	(0.02)	(0.02)
Whether additional EEB weeks were added during first 3 months of spell				-0.001		
				(0.02)		
Whether additional EEB weeks were added during first 6 months of spell					-0.019	0.026
					(0.03)	(0.04)
Female	-0.010	0.008	-0.001	-0.010	0.009	-0.000
	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)
Indicator for spouse being in LF in month prior to r's spell	0.333***	0.275***	0.266***	0.335***	0.278***	0.266***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Spousal wage on main job in month prior to r's spell	0.008***	0.008***	0.009***	0.008***	0.008***	0.009***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	1,513	1,513	1,513	1,513	1,513	1,513
Month-by-Year Indicators	X	X	X	X	X	X
State Fixed Effects	X	X	X	X	X	X
Chi-sq statistic for joint significance of Weeks of EUC+EB and Weeks^2	0.628	5.649	2.633			
Chi-sq p-value	0.730	0.0593	0.268			

Notes: Coefficients are the average marginal effects from the probit model. Subset of coefficients is shown for brevity; all regressions include respondent's average earnings in 3 months prior to the spell in place of 13-piece spline in earnings. All other controls described in Section 3.4 are present, including a cubic polynomial in monthly state unemployment rate and a cubic polynomial in calculated unemployment rate for spouses based on education level. All regressions are weighted using person-level weights, wpfinwgt. Errors are clustered at the state level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 3.5: Share of Months Spouse is Working.

Dependent variable is share of months spouse is working during each period	3 months	6 months	Spell	3 months	6 months	Spell
	(1)	(2)	(3)	(4)	(5)	(6)
Weeks of EUC+EB benefits available at start of spell/100	0.208	0.292	0.117			
	(0.24)	(0.26)	(0.26)			
(Weeks of EUC+EB)^2	-0.142	-0.200	-0.044			
	(0.61)	(0.52)	(0.57)			
Additional EEB weeks added during first 3 months of spell/100	0.177					
	(0.22)					
(Additional EEB weeks added during first 3 months of spell)^2	-0.414					
	(0.46)					
Additional EEB weeks added during first 6 months of spell*100		0.177	0.148			
		(0.37)	(0.33)			
(Additional EEB weeks added during first 6 months of spell)^2		-0.310	-0.357			
		(0.46)	(0.43)			
Indicator for positive weeks of EUC or EB available				0.041	0.058**	0.042*
				(0.03)	(0.02)	(0.02)
Whether additional EEB weeks were added during first 3 months of spell				0.003		
				(0.03)		
Whether additional EEB weeks were added during first 6 months of spell					0.022	0.027
					(0.05)	(0.05)
Female	-0.001	0.009	-0.009	-0.001	0.009	-0.009
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Indicator for spouse being in LF in month prior to r's spell	0.728***	0.710***	0.690***	0.728***	0.710***	0.690***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Spousal wage on main job in month prior to r's spell	0.004***	0.004**	0.004**	0.004***	0.004**	0.004**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	1,513	1,513	1,513	1,513	1,513	1,513
R-squared	0.59	0.59	0.57	0.59	0.59	0.57
Month-by-Year Indicators	X	X	X	X	X	X
State Fixed Effects	X	X	X	X	X	X
Spline in R's Average Earnings Prior to Spell	X	X	X	X	X	X
F statistic for joint significance of Weeks of EUC+EB and Weeks^2	0.566	0.669	0.133			
F p-value	0.572	0.518	0.876			

Notes: Subset of coefficients is shown for brevity; all regressions include the full set of controls described in Section 3.4, including a cubic polynomial in monthly state unemployment rate and a cubic polynomial in calculated unemployment rate for spouses based on education level. All regressions are weighted using person-level weights, wpfinwgt. Errors are clustered at the state level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 3.6: Spousal Average Weekly Hours.

Dependent variable is average weekly hours for spouse during each period	3 months	6 months	Spell	3 months	6 months	Spell
	(1)	(2)	(3)	(4)	(5)	(6)
Weeks of EUC+EB benefits available at start of spell/100	38.812***	50.163***	46.080***			
	(11.27)	(15.11)	(16.88)			
(Weeks of EUC+EB)^2	-62.631**	-62.170**	-62.091*			
	(25.94)	(30.37)	(33.88)			
Additional EEB weeks added during first 3 months of spell/100	7.220					
	(9.80)					
(Additional EEB weeks added during first 3 months of spell)^2	-13.005					
	(21.49)					
Additional EEB weeks added during first 6 months of spell*100		10.788	6.842			
		(15.44)	(15.53)			
(Additional EEB weeks added during first 6 months of spell)^2		0.179	2.912			
		(22.00)	(22.37)			
Indicator for positive weeks of EUC or EB available				5.239***	5.494***	5.304***
				(1.59)	(1.57)	(1.65)
Whether additional EEB weeks were added during first 3 months of spell				0.708		
				(1.11)		
Whether additional EEB weeks were added during first 6 months of spell					1.199	1.467
					(2.33)	(2.56)
Female	4.107***	4.112***	3.985***	4.127***	4.140***	4.021***
	(1.37)	(1.02)	(1.10)	(1.36)	(1.03)	(1.12)
Indicator for spouse being in LF in month prior to r's spell	28.922***	28.360***	27.349***	28.882***	28.338***	27.310***
	(1.59)	(1.59)	(1.73)	(1.59)	(1.57)	(1.72)
Spousal wage on main job in month prior to r's spell	0.184**	0.183**	0.191**	0.184**	0.183**	0.191**
	(0.07)	(0.07)	(0.08)	(0.07)	(0.07)	(0.08)
Observations	1,513	1,513	1,513	1,513	1,513	1,513
R-squared	0.53	0.55	0.53	0.53	0.55	0.53
Month-by-Year Indicators	X	X	X	X	X	X
State Fixed Effects	X	X	X	X	X	X
Spline in R's Average Earnings Prior to Spell	X	X	X	X	X	X
F statistic for joint significance of Weeks of EUC+EB and Weeks^2	5.965	5.583	3.783			
F p-value	0.00532	0.00717	0.0311			

Notes: Subset of coefficients is shown for brevity; all regressions include the full set of controls described in Section 3.4, including a cubic polynomial in monthly state unemployment rate and a cubic polynomial in calculated unemployment rate for spouses based on education level. All regressions are weighted using person-level weights, wpfinwgt. Errors are clustered at the state level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 3.7: Adding State-by-year Controls.

Dependent variable is average weekly hours for spouse during each period	3 months	3 months	6 months	6 months	Spell	Spell
	(1)	(2)	(3)	(4)	(5)	(6)
Indicator for positive weeks of EUC or EB available	5.239***	5.406**	5.494***	5.831***	5.304***	5.592***
	(1.59)	(2.11)	(1.57)	(2.03)	(1.65)	(2.02)
Whether additional EEB weeks were added during first 3 months of spell	0.708	0.847				
	(1.11)	(1.18)				
Whether additional EEB weeks were added during first 6 months of spell			1.199	0.306	1.467	0.856
			(2.33)	(2.43)	(2.56)	(2.53)
Female	4.127***	4.116**	4.140***	4.279***	4.021***	4.017***
	(1.36)	(1.53)	(1.03)	(1.15)	(1.12)	(1.23)
Indicator for spouse being in LF in month prior to r's spell	28.882***	29.010***	28.338***	28.461***	27.310***	27.327***
	(1.59)	(1.65)	(1.57)	(1.59)	(1.72)	(1.78)
Spousal wage on main job in month prior to r's spell	0.184**	0.187**	0.183**	0.185**	0.191**	0.190**
	(0.07)	(0.08)	(0.07)	(0.08)	(0.08)	(0.08)
Observations	1,513	1,513	1,513	1,513	1,513	1,513
R-squared	0.53	0.57	0.55	0.58	0.53	0.57
Month-by-Year Indicators	X	X	X	X	X	X
State Fixed Effects	X	X	X	X	X	X
Spline in R's Average Earnings Prior to Spell	X	X	X	X	X	X
State-by-Year Indicators	--	X	--	X	--	X

Notes: Subset of coefficients is shown for brevity; all regressions include the full set of controls described in Section 3.4, including a cubic polynomial in monthly state unemployment rate and a cubic polynomial in calculated unemployment rate for spouses based on education level. All regressions are weighted using person-level weights, wpfinwgt. Errors are clustered at the state level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 3.8: Spousal Average Weekly Hours by Primary Earner Status.

Dependent variable is average weekly hours for spouse during each period	Spouse not primary earner			Spouse is primary earner		
	3 months	6 months	Spell	3 months	6 months	Spell
	(1)	(2)	(3)	(4)	(5)	(6)
Indicator for positive weeks of EUC or EB available	7.421***	7.882***	7.935***	2.477	2.901	2.232
	(2.23)	(2.46)	(2.25)	(2.06)	(1.80)	(2.17)
Whether additional EEB weeks were added during first 3 months of spell	3.109*			-3.168		
	(1.55)			(2.06)		
Whether additional EEB weeks were added during first 6 months of spell		3.662	4.655		-2.647	-2.985
		(2.56)	(2.94)		(2.62)	(2.48)
Female	1.233	1.238	1.949	2.806*	3.531***	2.213
	(2.36)	(1.96)	(2.05)	(1.45)	(1.07)	(1.50)
Indicator for spouse being in LF in month prior to r's spell	19.271***	19.321***	18.650***			
	(1.64)	(1.50)	(1.64)			
Spousal wage on main job in month prior to r's spell	0.748***	0.709***	0.717***	-0.091***	-0.090***	-0.071**
	(0.10)	(0.08)	(0.10)	(0.03)	(0.03)	(0.03)
Observations	908	908	908	588	588	588
R-squared	0.57	0.59	0.57	0.27	0.28	0.27
Month-by-Year Indicators	X	X	X	X	X	X
State Fixed Effects	X	X	X	X	X	X
Spline in R's Average Earnings Prior to Spell	X	X	X	X	X	X

Notes: Columns (1)-(3) are estimated on subsample of respondents where spouse is not the primary earner (i.e. has higher earnings in the month prior to start of the spell). Columns (4)-(6) are estimated on subsample where spouse is the primary earner. Subset of coefficients is shown for brevity; all regressions include the full set of controls described in Section 3.4, including a cubic polynomial in monthly state unemployment rate and a cubic polynomial in calculated unemployment rate for spouses based on education level. All regressions are weighted using person-level weights, wpfinwgt. Errors are clustered at the state level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 3.8b: Spousal Average Weekly Hours by Full-time Status.

Dependent variable is average weekly hours for spouse during each period	Spouse works less than 40 hrs			Spouse works 40+ hrs		
	3 months	6 months	Spell	3 months	6 months	Spell
	(1)	(2)	(3)	(4)	(5)	(6)
Indicator for positive weeks of EUC or EB available	4.164	4.111	4.481	4.759**	4.946***	4.662**
	(3.27)	(3.42)	(3.33)	(1.97)	(1.77)	(2.09)
Whether additional EEB weeks were added during first 3 months of spell	-0.133			-0.212		
	(1.55)			(1.62)		
Whether additional EEB weeks were added during first 6 months of spell		-1.003	0.337		-1.129	-2.078
		(2.52)	(2.63)		(2.73)	(2.94)
Female	-0.123	0.626	1.746	3.222*	3.358***	2.431*
	(2.81)	(2.68)	(3.05)	(1.63)	(1.20)	(1.35)
Spousal wage on main job in month prior to r's spell	0.580**	0.564**	0.545**	-0.042	-0.030	-0.013
	(0.24)	(0.24)	(0.24)	(0.03)	(0.03)	(0.03)
Observations	644	644	644	835	835	835
R-squared	0.36	0.35	0.34	0.23	0.23	0.24
Month-by-Year Indicators	X	X	X	X	X	X
State Fixed Effects	X	X	X	X	X	X
Spline in R's Average Earnings Prior to Spell	X	X	X	X	X	X

Notes: Columns (1)-(3) are estimated on subsample of respondents where spouse works less than 40 hours prior to respondent's spell. Columns (4)-(6) are estimated on subsample where spouse works 40 hours or more prior to respondent's spell. Subset of coefficients is shown for brevity; all regressions include the full set of controls described in Section 3.4, including a cubic polynomial in monthly state unemployment rate and a cubic polynomial in calculated unemployment rate for spouses based on education level. All regressions are weighted using person-level weights, wpfinwgt. Errors are clustered at the state level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 3.9: Robustness Checks.

Dependent variable is average weekly spousal hours over 6 month period	(1)	(2)	(3)	(4)	(5)
Indicator for positive weeks of EUC or EB available	-0.660	2.257	2.417	4.526***	5.494***
	(1.30)	(2.04)	(1.98)	(1.59)	(1.57)
Whether additional EEB weeks were added during first 6 months of spell	1.352	1.156	1.132	0.025	1.199
	(2.11)	(3.14)	(3.15)	(2.31)	(2.33)
Indicator for spouse being in LF in month prior to r's spell				33.121***	28.338***
				(0.91)	(1.57)
Female	9.326***	9.617***	9.563***	4.300***	4.140***
	(1.22)	(1.20)	(1.21)	(0.80)	(1.03)
Spousal wage on main job in month prior to r's spell					0.183**
					(0.07)
Observations	1,513	1,513	1,513	1,513	1,513
R-squared	0.05	0.11	0.11	0.50	0.55
Month-by-Year Indicators	--	X	X	X	X
State Fixed Effects	--	X	X	X	X
Cubic in monthly state unemployment rate	--	--	X	X	X
Spline in R's Average Earnings Prior to Spell	--	--	--	--	X

Notes: Subset of coefficients is shown for brevity. All regressions are weighted using person-level weights, wpfinwgt. Errors are clustered at the state level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 3.9b: Alternative Controls.

Dependent variable is average weekly spousal hours during 6 months since start of unemployment spell	(1)	(2)	(3)	(4)	(5)
Indicator for positive weeks of EUC or EB available	5.494***	5.186***	5.314***	4.765**	4.210**
	(1.57)	(1.54)	(1.56)	(1.98)	(1.74)
Whether additional EEB weeks were added during first 6 months of spell	1.199	1.145	1.066	2.491	0.161
	(2.33)	(2.23)	(2.33)	(2.89)	(1.90)
Female	4.140***	2.343	4.814***	6.699***	3.802***
	(1.03)	(2.94)	(1.10)	(1.81)	(1.30)
Indicator for spouse being in LF in month prior to r's spell	28.338***	31.305***	27.748***		
	(1.57)	(0.98)	(1.55)		
Spousal wage on main job in month prior to r's spell	0.183**		0.182**	0.490***	-0.002
	(0.07)		(0.08)	(0.11)	(0.03)
Predicted Ln(Spouse's wage by state/education/month-year)		10.801			
		(9.51)			
Spouse working part-time prior to r's spell					20.137***
					(1.40)
Spouse working full-time prior to r's spell					36.348***
					(1.22)
Observations	1,513	1,513	1,513	1,513	1,479
R-squared	0.55	0.54	0.55	0.34	0.71
Month-by-Year Indicators	X	X	X	X	X
State Fixed Effects	X	X	X	X	X
Spline in R's Average Earnings Prior to Spell	X	X	X	X	X
Unemployment Rate by Major Industry	--	--	X	--	--

Notes: Subset of coefficients is shown for brevity. All regressions are weighted using person-level weights, wpfinwgt. Errors are clustered at the state level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 3.10: Spousal Average Weekly Hours Over Longer Periods.

Dependent variable is average weekly hours for spouse during each period	6-12 months	6-24 months	6-12 months	6-24 months
	(1)	(2)	(3)	(4)
Weeks of EUC+EB benefits available at start of spell/100	-9.409	-3.562		
	(19.33)	(18.63)		
(Weeks of EUC+EB)^2	16.465	-9.405		
	(33.91)	(29.97)		
Additional EEB weeks added over 12 month period	-0.712	-15.534		
	(20.62)	(17.71)		
(Additional EEB weeks added over 12 month period)^2	-20.867	-4.720		
	(20.31)	(20.49)		
Indicator for positive weeks of EUC or EB available			2.537	2.923
			(1.77)	(1.92)
Whether additional EEB weeks were added over 12 month period			-1.379	-0.924
			(3.00)	(2.27)
Female	3.031**	4.352***	2.984**	4.346***
	(1.33)	(1.08)	(1.34)	(1.11)
Indicator for spouse being in LF in month prior to r's spell	26.955***	25.158***	27.055***	25.209***
	(1.55)	(1.31)	(1.51)	(1.28)
Spousal wage on main job in month prior to r's spell	0.145*	0.148***	0.145*	0.148***
	(0.08)	(0.05)	(0.07)	(0.05)
Observations	1,138	1,173	1,138	1,173
R-squared	0.49	0.53	0.49	0.53
Month-by-Year Indicators	X	X	X	X
State Fixed Effects	X	X	X	X
Spline in R's Average Earnings Prior to Spell	X	X	X	X
F statistic for joint significance of Weeks of EUC+EB and Weeks^2	0.143	0.188		
F p-value	0.867	0.829		

Notes: Subset of coefficients is shown for brevity. All regressions are weighted using person-level weights, wpfinwgt. Errors are clustered at the state level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 3.11: Spousal Average Weekly Hours - Male Spouses.

Dependent variable is average weekly hours for spouse during each period	3 months	6 months	Spell	3 months	6 months	Spell
	(1)	(2)	(3)	(4)	(5)	(6)
Weeks of EUC+EB benefits available at start of spell/100	55.900**	81.256***	74.762***			
	(27.09)	(21.91)	(26.08)			
(Weeks of EUC+EB)^2	-64.806	-85.608**	-92.753*			
	(49.29)	(40.83)	(47.15)			
Additional EEB weeks added during first 3 months of spell/100	7.127					
	(31.05)					
(Additional EEB weeks added during first 3 months of spell)^2	-2.804					
	(50.45)					
Additional EEB weeks added during first 6 months of spell*100		1.266	1.224			
		(23.19)	(24.45)			
(Additional EEB weeks added during first 6 months of spell)^2		28.037	20.719			
		(33.97)	(34.53)			
Indicator for positive weeks of EUC or EB available				7.096**	7.899***	8.488***
				(3.21)	(2.65)	(2.68)
Whether additional EEB weeks were added during first 3 months of spell				-1.315		
				(2.96)		
Whether additional EEB weeks were added during first 6 months of spell					-4.320	-2.327
					(3.11)	(3.73)
Indicator for spouse being in LF in month prior to r's spell	32.146***	31.741***	27.781***	32.120***	32.087***	28.081***
	(2.81)	(2.64)	(2.82)	(2.92)	(2.72)	(2.93)
Spousal wage on main job in month prior to r's spell	0.048	0.053	0.056	0.049	0.053	0.057
	(0.08)	(0.07)	(0.09)	(0.07)	(0.07)	(0.09)
Observations	565	565	565	565	565	565
R-squared	0.48	0.51	0.48	0.48	0.51	0.48
Month-by-Year Indicators	X	X	X	X	X	X
State Fixed Effects	X	X	X	X	X	X
Spline in R's Average Earnings Prior to Spell	X	X	X	X	X	X
F statistic for joint significance of Weeks of EUC+EB and Weeks^2	2.15	5.58	3.78			
F p-value	0.1293	0.0072	0.0311			

Notes: Sample includes female respondents with male spouses only. Subset of coefficients is shown for brevity; all regressions include the full set of controls described in the Methodology Section, including a cubic polynomial in monthly state unemployment rate and a cubic polynomial in calculated unemployment rate for spouses based on education level. All regressions are weighted using person-level weights, wpfinwgt. Errors are clustered at the state level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 3.11b: Spousal Average Weekly Hours - Female Spouses.

Dependent variable is average weekly hours for spouse during each period	3 months	6 months	Spell	3 months	6 months	Spell
	(1)	(2)	(3)	(4)	(5)	(6)
Weeks of EUC+EB benefits available at start of spell/100	22.048*	27.537	25.726			
	(12.95)	(20.58)	(24.17)			
(Weeks of EUC+EB)^2	-42.180	-27.978	-29.794			
	(25.53)	(32.92)	(37.21)			
Additional EEB weeks added during first 3 months of spell/100	14.955					
	(14.11)					
(Additional EEB weeks added during first 3 months of spell)^2	-33.268					
	(27.21)					
Additional EEB weeks added during first 6 months of spell*100		23.780	19.051			
		(17.65)	(18.31)			
(Additional EEB weeks added during first 6 months of spell)^2		-24.031	-19.366			
		(22.55)	(21.88)			
Indicator for positive weeks of EUC or EB available				3.696	3.356	3.073
				(2.22)	(2.43)	(2.47)
Whether additional EEB weeks were added during first 3 months of spell				2.045		
				(1.61)		
Whether additional EEB weeks were added during first 6 months of spell					3.998	3.851
					(2.44)	(2.47)
Indicator for spouse being in LF in month prior to r's spell	24.999***	24.795***	24.110***	24.998***	24.775***	24.080***
	(2.01)	(2.02)	(2.04)	(2.03)	(1.99)	(2.02)
Spousal wage on main job in month prior to r's spell	0.358***	0.346***	0.350***	0.357***	0.346***	0.350***
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
Observations	948	948	948	948	948	948
R-squared	0.61	0.61	0.60	0.61	0.61	0.60
Month-by-Year Indicators	X	X	X	X	X	X
State Fixed Effects	X	X	X	X	X	X
Spline in R's Average Earnings Prior to Spell	X	X	X	X	X	X
F statistic for joint significance of Weeks of EUC+EB and Weeks^2	1.62	0.92	0.57			
F p-value	0.2098	0.4073	0.5679			

Notes: Sample includes male respondents with female spouses only. Subset of coefficients is shown for brevity; all regressions include the full set of controls described in Section 3.4, including a cubic polynomial in monthly state unemployment rate and a cubic polynomial in calculated unemployment rate for spouses based on education level. All regressions are weighted using person-level weights, wpfinwgt. Errors are clustered at the state level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

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