The Impact of Unemployment Benefits Extensions on Disability Insurance Application and Allowance Rates

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Abstract:

Both unemployment insurance (UI) extensions and the availability of disability benefits have disincentive effects on job search. But UI extensions can reduce the efficiency cost of disability benefits if UI recipients delay disability application until they exhaust their unemployment benefits. This paper investigates whether UI extension and exhaustion affect the timing of disability application and the composition of the applicant pool. Jobless individuals are significantly less likely to apply for disability benefits during the months their UI benefits are extended, and significantly more likely to apply to SSDI or SSI the month that the UI extension ends. These delays appear to be from healthier potential applicants: allowance rates increase in states that have recently implemented a UI extension, provided that benefits were extended at the federal level and not because of weak local labor market conditions. These results suggest that the benefits of UI extensions may be understated – permanent disability benefits are replaced by temporary unemployment benefits, while the probability of potential disability applicants finding a job is likely higher when receiving UI.

Introduction

The Great Recession of 2007-2009 has resulted in the highest national unemployment rate in nearly 30 years, increasing from 4.7 percent to a peak of 10.1 percent. Perhaps of more concern is that those who find themselves unemployed remain without a job longer than ever before. Whereas the Bureau of Labor Statistics' median unemployment duration measure, which dates to 1967, had never before exceeded 12.3 weeks, the median spell remains above 20 weeks nearly four years after the financial crisis began.

In response, the federal government has extended unemployment insurance (UI) benefits up to 99 weeks, roughly 17 months longer than normal durations. In making the decision to extend benefits, policymakers must balance the need to stimulate aggregate demand and the desire to help the victims of a weak macroeconomy with the disincentive effect of additional UI benefits. The economics literature has consistently found that the job finding rate increases significantly near the end of UI benefit duration (Moffitt 1985; Meyer 1990; Katz and Meyer 1990), suggesting that search effort has a strong influence on the probability of an unemployed worker finding a new job.

Meanwhile, the burgeoning rolls of public disability insurance programs, even before the crisis, have increased the call for disability reform (Autor and Duggan 2010), and record growth with the onset of the recession has only strengthened this effort. Social Security Disability Insurance (SSDI) applications reached an all-time high – 2.82 million, nearly 32 percent higher than the number received in 2006 (Annual Statistical Supplement 2011). Preliminary data from the monthly workload reports of Social Security Administration (SSA) state agencies, used in the state-level analysis in this paper, indicate that applications have kept rising. Including both SSDI and the Supplemental Security Income (SSI) program for low-income families, the average month saw 263,400 applications in 2010 and 264,700 applications the first five months of 2011, versus 254,500 in 2009 using the same data. Though the purpose of public disability programs is to provide income to the long-term disabled and those with terminal conditions, numerous studies have found a positive correlation between the macroeconomy and disability applications (see Autor and Duggan 2006 and Bound and Burkhauser 1999 for literature reviews).

The extension of UI benefits, however, can ameliorate concerns about disability insurance being used as supplemental unemployment insurance. Potential disability applicants may delay their application until they exhausted their extended UI benefits. In the meantime, costs are transferred from the SSDI Trust Fund, scheduled to be exhausted in 2018 (Social Security Trustees Report 2011), to general revenue, which is more fungible. In addition, some delayed applicants might find jobs, reducing the long-term costs of the disability programs.

This paper investigates whether the availability of unemployment insurance, in general, and extended UI benefits, in particular, delay disability applications and change the composition of the pool of remaining applicants. The study first estimates whether the implementation of a UI extension affects the proportion of a state's workers who apply to the SSDI and SSI programs and the (lagged) success rate for these applications. The study then uses the variation in the total UI duration provided by these extensions to estimate whether UI extension and exhaustion affect individual workers' hazard to SSDI or SSI application, using the Survey of Income and Program Participation (SIPP) Gold Standard File, which links job loss data from a household survey to disability application and earnings information from the SSA's administrative records.

The results indicate that jobless individuals are significantly less likely to apply for disability benefits during the months their UI benefits are extended, and significantly more likely to apply to SSDI or SSI the month that the UI extension ends. Workers whose UI benefits are never extended are also more likely to apply in the month their UI benefits expire, but the effect is smaller and less significant, suggesting that extended individuals have pent-up demand for disability application during the months when they would not otherwise receive benefits. State-level analysis suggests that relatively healthier applicants are most likely to delay application during the first months of a UI extension, thereby increasing the allowance rate observed after the applications wind their way through the determination process.

These results are consistent with growing evidence that the definition of a work-limiting disability, far from an objective, context-free state, depends on the availability (Autor and Duggan 2003) and generosity (Lindner 2011) of alternative sources of income available to potential disability beneficiaries. In addition, these results emphasize the importance of disability application as an exit pathway from unemployment.

The next section discusses the existing literature on the relationship between job search and both unemployment insurance and disability insurance. Section 3 describes the details of unemployment insurance and public disability programs. Section 4 sketches a conceptual model for how UI eligibility and exhaustion may affect disability application. Section 5 describes the data. Section 6 outlines the empirical models for both the state- and individual-level regressions, and Section 7 discusses the results. Section 8 concludes.

Previous Literature

The idea that job finding rates increase substantially near the end of an individual's unemployment benefit eligibility is well-established both in theoretical models (Mortensen 1977 and Moffitt and Nicholson 1982) and empirical studies. Moffitt (1985) was the first study to use duration model analysis to examine the distribution of unemployment spells, finding spikes at 26 and 39 weeks, consistent with two standard UI benefit durations. Meyer (1990) and Katz and Meyer (1990) find more direct evidence that UI exit rates are highly correlated with benefit duration, and that UI extensions lead some workers to delay their return to work.

Still, most empirical estimates of the effect of UI extensions on the length of unemployment spells find only moderate positive relationships. The estimated effect of a one-week increase in the duration of UI benefits ranges from 0.08 (Card and Levine 2000) to 0.20 (Katz and Meyer 1990).[1] Elsby, Hobijn, and Sahin (2010) suggest that estimates on the lower end are more appropriate for more recent extensions, as workers in the recessions of the 1970's and 1980's were more likely to be recalled after temporary lay-off than the modern-day unemployed. They also suggest that estimates of the disincentive effect of UI on job search may be overestimated, as UI is extended most often in slack local labor market conditions, so durations may be longer around the time of UI extensions not because of UI but because of the inability for the jobless to find work.[2] Indeed, Card and Levine (2000), which uses an exogenous UI extension in New Jersey during the mid-1990's expansion, estimate the smallest response to UI duration.It is also well-established that increases in the unemployment rate are associated with increases in disability applications (Stapleton et al. 1998; Rupp and Scott 1998; Black, Daniel, and Sanders 2002; Autor and Duggan 2003). On a micro level, a few papers have used a Moffitt-Meyer-style duration model to estimate the effect of unemployment insurance on the probability of applying for disability insurance, but only with data from outside the United

[1] These estimates focus on the average duration of nonemployment, but more heterogeneous impacts are possible. Gritz and MaCurdy (1997) find very little response in the median nonemployment duration to UI extensions, but longer spells of nonemployment get even longer when UI benefits are extended.

[2] Jurajda and Tannery (2003) find a larger spike in job finding rates in Philadelphia, which survived the 1980's recession relatively intact, than in Pittsburgh, where unemployment rates soared. However, they find little statistically significant difference between the job-finding hazard among workers in the two cities once they account for the interaction of unemployment rate with remaining UI duration.

States; Roed and Zhang (2005) and Henningsen (2007) use Norwegian data, Larsson (2006) uses Swedish data, and Pellizzari (2006) samples households in six European countries. These papers all find a significant increase in the hazard to disability insurance application or receipt in the months approaching UI exhaustion.

For U.S. data, only Lindner (2011) examines the association between applying for SSDI and SSI and the generosity of UI benefits on a micro-level. He similarly estimates a hazard model of disability application and also uses SIPP data linked to SSA administrative records, but his focus is on estimating an elasticity of DI application with respect to the UI monthly benefit amount. Because of this different focus, Lindner includes measures of the maximum spell duration in the individual's state and whether the benefits were ever extended instead of more direct controls for the UI duration facing the specific individual. Lindner also limits his analysis to the individual decision to apply for DI and to take up UI, without considering the effect of UI policy on the composition, and eventual success, of DI applicants. He finds that higher UI benefits significantly reduce the hazard into the DI program, but he can discern no coherent pattern in the elasticity of DI application with respect to UI generosity by the ordinal month of the jobless spell.

Other studies have focused on the composition of the applicant pool and their eventual success in obtaining disability benefits. Strand (2002), in a comprehensive analysis of the determinants of SSDI and SSI initial allowance rates, finds that a 1-percentage-point increase in the state unemployment rate is associated with a 1.3- to 1.9-percentage-point decline in the allowance rate. Rupp and Stapleton (1995) find a negative correlation between the initial allowance rate and the unemployment rate lagged by one and two years, but not the current unemployment rate, as expected. Autor and Duggan (2003) model the decision to apply for disability benefits "conditionally," where the individual chooses to apply only in the event of a job loss, which motivates their finding that selection bias has helped lower the observed unemployment rate as more high school dropouts shift to the disability rolls. This paper estimates whether conditional applicants are further induced by unemployment insurance eligibility changes within their jobless spell, conditional on local labor market conditions.

This paper is the first to focus on the effect of UI extensions on disability applications and the applicant pool. It contributes to the literature that estimates the effect of UI duration and extension on exit from unemployment by exploring the importance of an additional exit pathway.

It provides another estimate of the effect of macroeconomic conditions on both the state-level application rate and the individual decision to apply for disability. Finally, this paper extends the literature on how macroeconomic conditions affect the SSDI and SSI allowance rates both at the state-level and by individuals' eventual success in obtaining disability benefits.

Institutional Background

Unemployment Insurance. Most workers who lose their job involuntarily without cause, and voluntary quit in some states depending on the reason, are eligible for unemployment benefits. The system is financed mostly through taxes on employers that are experience-rated, where employers who have a history of former employees collecting benefits often are taxed at a higher rate. Though the federal government has criteria that need to be satisfied for a state to be eligible for federally-financed administrative costs, the parameters of the unemployment system vary greatly by state, including the payroll tax level and experiencing rating, the weekly benefit formula, the formula for determining the duration of benefits, and the automatic triggers for extended benefits. The Department of Labor's Employment and Training Administration collects these details in the "Comparison of State Unemployment Insurance Laws" annual report.

Unemployed workers' eligibility depends on their accumulated earnings exceeding a proscribed level during the base period, which for most states is the first four of the last five completed calendar quarters. The weekly benefit amount is then a certain percentage, usually between 1/24 and 1/26, of the worker's earnings in the highest-earning quarter (27 states) or the average of their best two quarters (11 states) during the base period. As there are 13 weeks in a quarter, the replacement rate, or the ratio of the weekly benefit amount to the pre-job loss weekly wage, is roughly 50 percent, though because most states cap the weekly benefit amount at a fraction (most often two-thirds) of the state's average weekly wage, the replacement rate is less than half for higher wage workers. Twelve states then add a small stipend for each dependent child, up to a maximum. The weekly benefit levels vary greatly between the states; Massachusetts has the highest maximum benefit ($625 in 2011) and Washington the highest minimum benefit ($135), while Mississippi has by far the lowest maximum benefit ($235, with a minimum of $30 per week).

The duration of benefits is either set at a fixed level for all UI recipients (nine states), or depends on the total amount of benefits unemployed workers can receive during their eligibility period. This “maximum entitlement” is the lesser of 26 (or 30 in Massachusetts) times the weekly benefit amount or a fraction, usually one-third (16 states), of total base period earnings. The benefit duration is then the maximum entitlement divided by the weekly benefit amount. For most people, this calculation results in 26 (or 30) weeks exactly, but for individuals whose base period earnings are concentrated in just one or two calendar quarters, durations may be shorter.[3]

There are two ways in which UI benefits may be extended. One is through federal emergency legislation, including laws passed in 1991, 2002, and 2008 that extended benefits nationwide, with the federal government picking up the tab. The Emergency Unemployment Compensation Act of 1991 added initially 13 weeks of benefits, and later 26 weeks, to normal durations for all states, though states could qualify for longer extensions (20 weeks initially, and later 33 weeks) if the unemployment rate was sufficiently high. The Temporary Extended Unemployment Compensation Act of 2002 added 50 percent to normal durations (up to 13 weeks), while making automatic state triggers easier to hit, with the federal government financing the difference. Finally, the Emergency Unemployment Compensation Program of 2008 initially added 20 weeks, plus an additional 13 weeks if the state unemployment rate was sufficiently high; after October 2009, all states received 34 weeks (Tiers 1 and 2), plus another 13 (Tier 3) to 19 weeks (Tier 4) if the state unemployment rate exceeded certain levels.

The other way is through the Extended Benefits program. This program is triggered by high and rising unemployment rates, based on standards imposed by federal law. All states must extend UI durations by 13 weeks during these periods, but states may opt for additional triggers, which provide an additional 13 to 33 weeks.[4] When benefits are extended automatically, the

[3] Alaska, Idaho, Montana, North Carolina, and North Dakota use a sliding scale based on the ratio of base period earnings to the highest quarter’s earnings to calculate duration. For example, Montana has a maximum duration of 28 weeks, longer than all but one other state, but workers must have a ratio of 3.5 or better, essentially ruling out any worker with volatile quarterly earnings or short recent work history. In addition, New Jersey and Pennsylvania base duration on the number of accumulated “credit weeks,” weeks where earnings exceeded a small threshold.

[4] The mandatory extension is 13 weeks when the 13-week rolling average of the insured unemployment rate is at least 5 percent and is 120 percent of the average insured unemployment rate over the same period each of the previous two years. (The insured unemployment rate, or IUR, is the number of individuals receiving UI benefits after the first week divided by the number of workers eligible for or already receiving UI.) The first optional level adds 13 weeks if the IUR is averages at least 6 percent for 13 weeks, regardless of past rates; 39 states participate in this program. The second optional level adds another 13 weeks if the three-month rolling average of the more familiar total unemployment rate is at least 6.5 percent and is 110 percent of the rolling average in either of the previous two years, or 20 weeks if the unemployment rate is 8 percent with the same comparison to previous years; 11 states participated in this level in 2009, but that increased to 38 states in 2010.

federal government pays for half of the added cost. In most cases, a federal emergency extension supersedes the automatic Extended Benefits program.

The adjustment in the duration formula for workers with highly concentrated earnings over their base period; the longer durations in Massachusetts (30 weeks for 1989 to present), Montana (28 weeks for 2004 to present), and Washington (30 weeks for 1989 to 2004); automatically-triggered Extended Benefits; and federal emergency extensions provide variation in UI duration. Figure 1 plots the histogram of durations in the regression sample from the SIPP Gold Standard File, separately by those whose benefits were never extended during their jobless spell, those whose benefits were already longer than normal but were not extended further, and those whose durations were extended during their time between job loss and disability application (or censoring). Not surprisingly, the majority of jobless individuals are eligible for 26 weeks of unemployment benefits, but more than 60 percent of the sample is eligible for a different number of weeks, including 32 percent of those unaffected by a UI extension.

Disability Insurance. The SSA administers two programs that provide disability benefits to qualified workers. Workers with work-limiting health conditions and a sufficient amount of total and recent working experience may qualify for SSDI. Those with lower incomes may qualify for SSI. Many work-limited low-income individuals apply to both programs concurrently.

An individual is SSDI-insured if he or she has accumulated a sufficient number of "work credits," both over his or her career and over the last 10 years. A worker earns one work credit for every $1120 earned in 2011, up to four credits a year (which are meant to represent the number of calendar quarters worked, but without necessitating quarterly reporting). Individuals need to earn two credits per year since the year they turned 21, with 20 of those credits (for those age 31 and older) coming in the last 10 years.

The Disability Determination Service in the applicant's state uses information from medical providers to decide whether the individual's medical condition is sufficiently severe and on the List of Impairments, whether the applicant can do the same work he or she did before, and whether he or she can do any other type of work. Approximately 37 percent of applications are allowed at the initial determination, according to the data used in the state-level regression, but some states have consistently higher or lower allowance rates across years, even accounting for observable differences between the states (Strand 2002).

The SSDI benefit is calculated from the same Primary Insurance Amount (PIA) formula as Social Security old-age retirement benefits. The PIA is a graduated percentage of a worker's Average Indexed Monthly Earnings, the average earnings over the individual's working years (excluding up to the five lowest-earning years), adjusted for the growth of overall wages in each year.

Few applicants leave SSDI before their Full Retirement Age (FRA), when their benefits are rolled into the old-age retirement program. About 7.6 percent of exits could be attributed to SSDI recipients being found no longer medically eligible in a Continuing Disability Review (Annual Statistical Supplement 2011). In addition, recipients who earn more than the Substantial Gainful Activity level ($1000 per month in 2010) are eventually removed from the SSDI rolls, but only after exhausting a nine-month trial period.

Working-age individuals are eligible for SSI only if their income and wealth fall below eligibility thresholds and they satisfy a similar disability screening to SSDI. Countable income, which includes one's own and one's spouse's income but excludes $20 per month of non-labor income and, for workers, $65 per month plus half of labor earnings beyond this level, must be below the federal SSI benefit level. In addition, non-housing wealth (excluding automobiles, life insurance, burial plots, and burial funds) must be below $2000. The individual can then receive the difference between the monthly benefit level of $674 and the recipient's countable income.

There are no restrictions on SSDI or SSI applicants receiving unemployment benefits, so individuals may apply for both unemployment and disability benefits at the same time. In fact, UI benefits can help to bridge the gap between SSDI application and the first receipt of benefits. In most states, disability recipients are excluded from UI benefits because they are no longer able and available to work, but nine states exempt those who are unavailable because of illness or disability provided they do not refuse suitable work offers.

Conceptual Framework

This study provides a simple model of the decision by utility-maximizing individuals who have recently experienced a job loss to either apply for disability insurance or search for a job (and thereby receive UI benefits, if the current time is before UI exhaustion).[5] The individuals' utility in month t, V_t, is simply the larger of the utility from disability application, V_t^d, and the utility from job search, V_t^s.

The utility from job search depends on the unemployment benefits, b, which are received when the current time t is before the exhaustion point L; the probability of finding a job, p; the discount factor β; the wage offer w, which is always accepted and earned in every period until infinity with no risk of further job loss; and the continuation value V_{t+1}:

$$V_t^s = U\left[bI(t < L) + \beta p \frac{w}{1-\beta} + \beta(1-p)V_{t+1}\right]$$

where I() is an indicator function equal to one if t<L and zero otherwise.

Disability applications are allowed with probability q, but only after J months of review; I assume that J is known to the applicants throughout. The model assumes that disability applications have utility cost a. The model also assumes that applicants stop searching after they decide to apply, so they cannot earn unemployment benefits during their wait between application and determination, nor will they receive job offers. Finally, the model assumes that allowed disability determinations are never reviewed, so successful applicants receive disability benefits d permanently. The utility from disability application is:

$$V_t^d = U\left[\beta^J q \frac{d}{1-\beta} + \beta^J(1-q)V_{t+1}\right] - a$$

In the simplest model, p and q are time-invariant; that is, the job finding rate and the success rate of disability application do not depend on the amount of time the individual has been unemployed. In that model, some individuals would apply for disability benefits immediately after job loss, as $V_0^d > V_0^s$. Others would never apply for disability, as $V_t^s > V_t^d$ even when unemployment benefits are not available (t≥L).

[5] This model is in some ways a simplification of the model in Lindner (2011), ignoring search effort and the possibility of receiving UI benefits during the wait for disability application and adding the assumption that wait time J is known.

As all parameters are time-invariant other than $bI(t < L)$, the only marginal applicants are those whose decision depends on the presence or absence of unemployment benefits. Some individuals will opt to search when unemployment benefits are available (t<L), but prefer application after UI exhaustion (t≥L), so $V^s_{t<L} > V^d_t > V^s_{t\geq L}$. In this simple model of time-invariant probabilities, individuals only will apply for disability benefits in the first period and at L, as all parameters are otherwise equal within the two time periods (t<L and t≥L). When UI benefits are extended, so that L is increased to L', the applicants in the initial period (with $V^d_0 > V^s_0$) and those who never apply (with $V^s_t > V^d_t$) are unaffected, but the marginal applicants will delay application until exactly L'.

A more interesting model is one that allows for p and q to vary over time.[6] The assumption is that p'(t)<0, as the longer one is unemployed, the more difficult it is to find a job, and that q'(t)>0, as the longer one is unemployed, the easier it is to convince the Disability Determination Service that one is unable to work.[7] In this model, the passage of an additional month reduces V^s_t and increases V^d_t. Like the time-invariant model, there will be concentrations of applications at both month 0 and month L, but unlike the simpler model, individuals will apply for disability in other months as well. Furthermore, when benefits are extended and L is increased to L', individuals who have not yet applied will delay their applications; the local maximum at L moves to L', but a few others will apply in between.[8]

Data

The Survey of Income and Program Participation (SIPP) is a nationally-representative longitudinal survey of households conducted by the U.S. Census Bureau. Every four months over a two- to four-year period, respondents are asked a battery of questions on their labor market participation, sources of income, employment relationships, demographics and family structure, health insurance status, wealth, and public program participation during each month

[6] The qualitative result is similar if only one of the probabilities varies with time.
[7] Though the literature (e.g., Ruhm 2000) often finds a positive effect of recessions on health, others find that individual job loss results in increased incidence of disability (Gallo, Brand et al. 2009). The first derivative of q with respect to time may also be positive if the negative effect of job loss on health gets worse as the jobless spell continues.
[8] Interestingly, this model seems to imply that fewer individuals will apply at new UI exhaustion month, L', than would have at L had benefits not been extended, because some individuals will apply in the interim as their p decreases and q increases. The empirical results find the opposite. The researcher will explore the implications of this contrast, and work through the model more formally, in the next draft of this paper.

between interviews. New panels began annually between 1990 and 1993, plus 1996, 2001, 2004, and 2008.

The SIPP Gold Standard File (GSF) matches all but the latter panel to disability application data originally from the SSA's 831 File and earnings data originally from both the SSA's Summary Earnings Record (SER) and the IRS' Detailed Earnings Record (DER).[9] Approximately 88 percent of SIPP respondents over age 15 provided valid Social Security numbers and were thus successfully matched (Abowd, Stinson, and Benedetto 2006).

The sample for the individual-level regressions includes workers ages 25 to 64 who are observed losing a job during their time in the SIPP panel. An individual has lost a job in month t if he or she worked all weeks in month t-1, less than the full number of weeks in month t, and no weeks in month t+1.[10] The sample excludes individuals with missing work status information at any point, as well as anyone whose state of residence is missing or unidentifiable.[11] The sample also excludes individuals who have insufficient earnings to receive UI, and those who are eligible for neither SSDI nor SSI. The resulting sample yields approximately 29,000 working-age adults who lost at least one job during their SIPP sampling window from 1990 to 2006. Table 1 details the process of refining the sample from the full SIPP. Table A1 provides summary statistics.

The 831 File includes the date of application, the filing type (SSDI, SSI, or concurrent), and the result of the initial determination for up to six disability applications for each individual through the end of calendar year 2007.[12] The sample excludes unsuccessful disability applications prior to the job loss (though previously failed applicants remain in the sample, and may apply again), and drop individuals from the sample if they apply in the same month as the job loss. The sample also excludes disability applications more than 48 months after the job loss,

[9] The 2008 SIPP panel will be matched to the SSA and IRS datasets, including the 2008 calendar year disability activity, in fall 2011.

[10] Individuals may have more than one jobless spell. The individual's spell is right-censored if he or she finds a new job, but a subsequent job loss would put him or her back in the sample a second time. Most individuals have only one spell during the SIPP – the sample includes 33,385 spells for 28,728 unique persons.

[11] Prior to the 2004 panel, several states were combined to prevent identification. In the 1990 through 1993 panels, the following states were grouped together: Maine and Vermont; Iowa, North Dakota, and South Dakota; and Alaska, Idaho, Montana, and Wyoming. In the 1996 and 2001 panels, Vermont was grouped with Maine, and Wyoming was grouped with North Dakota and South Dakota.

[12] The current GSF includes the first, second, and most recent application to both SSDI and SSI. Most people who apply to each program at some point in their history apply to both programs concurrently, so the number of applications per person is usually no more than three. An application is considered concurrent if the individual has SSDI and SSI applications in the same calendar month.

as they likely have little to do with health conditions at the time of separation; for non-applicants, the sample censors monthly observations at 48 months as well.

SSDI eligibility and the level of monthly benefits are calculated using the individual's earnings history from the SER.[13] The explanatory variables also include the individual's earnings previous to a job loss and his or her spouse's earnings in the year of the job loss from the DER; unlike the SER, the DER includes uncapped and non-FICA earnings. Both the benefits level and the earnings variables are adjusted for inflation using the Consumer Price Index from the Bureau of Labor Statistics.

I collect each state's unemployment insurance parameters from two reports produced annually by the Employment and Training Administration in the Department of Labor: the "Significant Provisions of State UI Laws" and the "Comparison of State Unemployment Insurance Laws."[14] These reports include the formulas for the weekly benefit amount and the duration of unemployment. Because the UI benefit formulas depend on quarterly earnings, I impute earnings for each of the last six quarters by distributing one's annual earnings from the administrative data between the calendar quarters according to the percent of one's total income earned that quarter, or evenly (annual earnings divided by four) for individuals who have not been in the SIPP for a full 18 months prior to the job loss. Though all but a few states have a maximum UI duration of 26 weeks, individual workers may have shorter durations if their earnings were concentrated in one or two quarters.[15] The Comparison of State Unemployment Laws report also includes information on the unemployment rate thresholds each state uses in the federal-state Extended Benefits program, as well as the dates of the three emergency UI extensions passed by the U.S. Congress since 1990.[16]

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[13] SSDI monthly benefits are equal to the Primary Insurance Amount (PIA). The PIA is calculated from a progressive formula based on one's Average Indexed Monthly Earnings, which takes into account inflation-adjusted earnings over one's highest-earning years. The PIA formula can be found in Section 7 of the Social Security Handbook (http://www.ssa.gov/OP_Home/handbook/ssa-hbk.htm). The SSI benefit is not included in the current analysis, but will be added in the next draft.

[14] Both reports are available on the DOL website (http://www.ows.doleta.gov/unemploy/statelaws.asp). The author would like to thank Daniel Hays, Patricia Martens, and Julie Balster from the ETA for their assistance in obtaining pre-2002 editions of the Comparison report.

[15] In the current draft, I do not include an indicator for whether the individual reports receiving unemployment benefits; implicitly assuming that take-up is random with respect to the other covariates. Lindner (2011) finds that many seemingly-eligible individuals do not opt to receive UI benefits, and differential take-up affects the estimates of the effect of UI benefit generosity on disability application. In the next draft I will use information in the public-use SIPP to better control for differential UI take-up.

[16] Information on the 1991-1994 Emergency Unemployment Compensation is from Corson, Needels, and Nicholson (1999), Table A.2.

The state unemployment rate is from the Local Area Unemployment Statistics of the Bureau of Labor Statistics. The insured unemployment rate, the number of individuals receiving UI benefits after the first week ("continuing claims") divided by the number of workers eligible for or already receiving UI, is from the Department of Labor's Unemployment Insurance Weekly Claims data.

Monthly state-level disability activity is available from the Social Security Administration State Agency Monthly Workload Data from October 2000 to May 2011. A state's monthly application rate is the number of initial receipts divided by the estimated age 18 to 64 population for that state in the given month, multiplied by 12 to annualize the rate.[17] The initial allowance rate is the number of allowances divided by the number of determinations in that state for that month.

Empirical Models

The analysis proceeds in two parts: state-level regressions of the effect of unemployment benefit extensions on SSDI and/or SSI application and initial allowance rates, and individual-level regressions of the effect of extensions specifically and unemployment benefit duration more generally on the timing of disability application.

State-level analysis. The first state-level specification estimates the immediate effect of a new UI extension in state s in month t, New_{st}, on the application rate, App_{st}:

$$App_{st} = \alpha_0 + \alpha_1 New_{st} + \theta_1 U_{st} + \theta_2 U_{s,t-6} + \pi_1 t + \pi_2 t^2 + m_t + \xi_s + \varepsilon_{st} \quad (1)$$

U_{st}, the contemporaneous state unemployment rate, accounts for the well-established relationship between macroeconomic conditions and disability applications. $U_{s,t-6}$, the unemployment rate lagged six months, accounts for the proportion of the state's population that, under most circumstances, is exhausting their unemployment benefits in month t. There are too few calendar years in which new UI extensions were implemented to include year fixed effects;

[17] The estimated age 18 to 64 population for 2000 to 2009 is from the U.S. Census Bureau's Population Estimates Program. To get the 2010 and 2011 estimated working-age state populations, which are not yet available from the Census, the state's 2009 population is regressed on the population in each year from 2000-2008, then used the results to predict 2010 using 2001-2009 and 2011 using 2002-2010.

instead, the model includes linear and quadratic time trends – t and t^2, respectively – to account for the secular upward trend in applications. The calendar month fixed effect, m_t, accounts for seasonal patterns, and the state fixed effect, ξ_s, controls for time-invariant differences across states in the inclination to apply for disability.[18]

According to a report from the Office of the Inspector General (2008), the disability determination process averages 131 days from the time of application to the initial determination. In the analogous estimation for the initial allowance rate, therefore, the model includes a lag of the new extension indicator and the unemployment rates by four months:

$$Allow_{st} = \alpha_0 + \alpha_1 New_{s,t-4} + \theta_1 U_{s,t-4} + \theta_2 U_{s,t-10} + \pi_1 t + \pi_2 t^2 + m_t + \xi_s + \varepsilon_{st} \tag{2}$$

The coefficient α_1 should be negative for application rate – at a given unemployment rate, a state that extends benefits should see fewer disability applications than a state that doesn't – and positive for allowance rate – healthier would-be applicants will delay their application and continue their job search during the extension, so the remaining applicants are less healthy, and more likely to be approved, on average.

The effect of a new UI extension should last longer than just the first month; jobless workers given a 13-week extension will likely delay their disability application for most, if not all, of those 13 weeks, so the application rate should remain at the new lower level for at least that long. After 13 weeks, those who would have exhausted their benefits absent the extension will finally come off the UI rolls, and the application rate will start to slowly increase. As the weeks go on, more and more UI recipients will exhaust their benefits, and the application rate will likely be restored to near its normal level even before the extension actually expires. Finally, when the UI extension ends, a few more workers will retain extended benefits for an additional 13 weeks, so the disability application rate should be slightly below normal until 13

[18] Munnell, Coe, and Webb (2011) find that state fixed effects explain a significant portion of cross-state differences in disability application rates. This study's results are similar, though the standard errors are somewhat smaller, when the model includes the set of state characteristics used in that study, both in lieu of state fixed effects and in addition to. This study include onlys the state fixed effects, because their state characteristics are only annual data, and is unavailable for 2010 and 2011; the addition of the latter 17 months are important because those months provide additional observations of states that are phasing out extended UI benefits.

weeks after the extension expires.[19] At each stage, the healthiest potential disability applicants are most likely to delay applications, so allowance rates should move inversely with the predicted change in application rates.

Furthermore, the length of the extension differs across states. The regressions in (1) and (2) ignore this variation, which helps to identify the effect of the extension separately from the weak labor market conditions that brought about the extension in the first place.

To take advantage of the variation in UI extensions and account for the duration of the effects of the extension on disability activity, the model replaces New_{st} with three mutually exclusive indicator variables: $First_{st}$, which equals one if the current month is one of the first N months in an N-month extension; $Ongoing_{st}$, which equals one if the current month is after the first N months, but the extension is still active; and $PhaseOut_{st}$, which equals one if the current month is within the first N months after the extension expires. The regression model is then:

$$\begin{aligned} App_{st} = \beta_0 + \ & \beta_1 First_{st} + \ \beta_2 Ongoing_{st} + \ \beta_1 PhaseOut_{st} \\ & + \ \theta_1 U_{st} + \theta_2 U_{s,t-6} + \pi_1 t + \pi_2 t^2 + m_t + \xi_s + \upsilon_{st} \end{aligned} \tag{3}$$

$$\begin{aligned} Allow_{st} = \beta_0 + \ & \beta_1 First_{s,t-4} + \ \beta_2 Ongoing_{s,t-4} \\ & + \ \beta_1 PhaseOut_{s,t-4} + \ \theta_1 U_{s,t-4} + \theta_2 U_{s,t-10} + \pi_1 t \\ & + \pi_2 t^2 + m_t + \xi_s + \upsilon_{st} \end{aligned} \tag{4}$$

The discussion above suggests that β_1, β_2, and β_3 are all negative in (3) and positive in (4), but $|\beta_1| > |\beta_2| > |\beta_3|$, so that only β_1 may be significantly different from the omitted condition of no recent extension.

Another concern with measuring the effect of extensions on disability activity is that extensions are not randomly assigned to states over time. Extensions are adopted because the national unemployment rate is rising, inducing Congress to pass emergency legislation that sends funds to the states for additional benefits, or because state labor market conditions deteriorate enough to trigger automatic increases in benefit duration. It is difficult to separate the effects of new extensions from the worsening economic conditions that trigger them.

[19] To the extent that potential disability applicants may not respond immediately to changes in UI duration, the model in (3) and (4) will do a better job of picking up the effects of a delayed response than (1) and (2), because short lags are built in to the categorical variables.

Fortunately for the researcher, not all states suffer equally in a recession, so when UI is extended nationwide, jobless workers in some states will benefit from longer UI durations despite the local labor market being relatively healthy. Whereas work-limited adults in states with poor economic conditions may apply for disability even with the option of further weeks of UI benefits because medium-term job prospects are weak, jobless individuals in states with more exogenous UI duration increases have a clear incentive to delay disability application at least until their UI eligibility is exhausted.

The model tests whether the effect of UI extensions on disability activity differs by the exogeneity of the extension by interacting each of the UI extension indicators in models (1) through (4) with two additional, mutually exclusive (and exhaustive for months that have a recent extension) variables. The indicator variable $Endo_{st}$ equals one if the extension comes about because of an automatic trigger in the federal-state Extended Benefits program, or if the (total) state unemployment rate is at least 1 percentage point higher than it was six months prior. Exo_{st}, conversely, equals one when the extension arises only because of national emergency legislation *and* the state unemployment rate has risen less than 1 percentage point in the last six months. Almost exactly half (52 of the 106 state-months with new UI extensions) of the extensions between 2000 and 2011 have been exogenous by this definition. The new versions of models (1) and (2) replace New_{st} with $New_{st} * Endo_{st}$ and $New_{st} * Exo_{st}$; similarly, there are six indicator variables that summarize the state of the UI extension and the nature of that extension in models (3) and (4). The discussion suggests that the coefficient on New_{st} in model (1) and $First_{st}$ in model (3) will be most negative, and the difference between these months and those without recent extensions most statistically significant, for states with exogenous extensions; the prediction for the allowance rates is the same, except with the sign of the coefficients flipped.

Individual-level analysis. The question that this study investigates with the individual data differs slightly: do jobless workers time their disability application to coincide with the exhaustion of their UI benefits? UI extensions provide additional variation in UI benefit duration, but are interesting in their own right; that is, the study also investigate the individual-level analogue to the state-level analysis – whether UI extensions induce jobless workers to delay disability claims, and whether the composition of applicants changes when UI benefits are extended.

The individual-level regression is an accelerated failure time (AFT) model where the dependent variable is the natural log of the number of months, T, between when individual i living in state s loses his or her job and he or she applies for disability:[20]

$$\ln T = \gamma_0 + \gamma_1 UINext_{ist} + \gamma_2 UINow_{ist} + \gamma_3 UILast_{ist} + \gamma_4 New_{st} + \gamma_5 OnExt_{ist} + \gamma_6 InitExp_{ist} + \lambda_1 U_{st} + \lambda_2 U_{st_0} + X_{ist}\zeta + \nu_{ist} \tag{5}$$

$UINext_{ist}$, $UINow_{ist}$, and $UILast_{ist}$ are indicator variables equal to one if i's unemployment benefits expire next month (t+1), in the current month (t), or last month (t-1). A statistically significant negative coefficient on any of these variables, especially $UINow_{ist}$, suggests that UI expiration induces jobless workers to apply for disability.[21]

New_{st} has a similar definition to the state-level analysis – equal to one when benefits are extended in the individual's state s – but a different interpretation. Because the individual is not necessarily at the end of his or her UI duration, this variable captures the effect of an announcement of longer UI benefits on the decision to apply. The estimated coefficient should be positive, as longer durations in the near future will likely be associated with delayed application.

$OnExt_{ist}$, which captures the effect of a currently active extension, is equal to one if the individual would not receive UI benefits in the current month were it not for a UI extension. The coefficient should be positive, as individuals who remain on UI benefits will likely delay their disability applications until they exhaust their extended benefits.

$InitExp_{ist}$ is equal to one if the individual was scheduled to exhaust his or her UI benefits in the current month according to his or her UI eligibility at the time of job loss. This variable captures two effects, both of which are expected to encourage application (i.e., negative coefficient). First, the individual may plan at the outset to apply for disability at the conclusion

[20] Spells are censored when the individual finds a new job, at 48 months after the job loss, or at the end of calendar year 2007 (when the current version of the SSA data that is linked to the SIPP ends), whichever is earlier.
[21] Duration models are often specified as hazard models. A positive coefficient in a hazard model indicates that the relevant variable increases the probability that the individual "fails" (in this case, files for disability). In AFT models, the expected signs are flipped: a negative coefficient indicates that the duration time is shortened, i.e., the applicant is more likely to file, and file sooner, as the relevant variable increases.

of his or her UI benefit eligibility, and those plans aren't easily adjusted.[22] Second, the individual may be unaware or indifferent toward increases in his or her UI duration. For UI recipients whose benefits are not extended, $InitExp_{ist}$ and $UINow_{ist}$ will both be equal to one, so I test the joint significance of these two variables.[23]

U_{st} and U_{st_0} control for the state unemployment rate currently and at the time of job loss, respectively; both should have a negative effect on the time to disability application.

X_{ist} is a vector of individual characteristics that may influence the decision to apply for disability. These include the log of real potential UI benefits, calculated from state parameters using imputed quarterly earnings, and the log of real potential SSDI benefits, calculated using the PIA formula. X_{ist} also includes the log of the individual's real annual earnings in the year prior to the job loss, the log of his or her spouse's real earnings (if married) in the current year, and an indicator for whether the individual is uninsured in the current month. Importantly, X_{ist} includes an indicator of whether the individual reports either a work-limiting condition or receipt of sick pay, workers' compensation, or veterans' benefits during his or her time in the SIPP; interestingly, many applicants do not have a value of one for this variable, so regression results are reported separately for those who do and do not satisfy one of these conditions. Finally, X_{ist} includes age at the time of separation and its square, gender, race, education, marital status, number of children, an indicator for foreign born, and the quintile of total wealth among the sample.

The AFT model is fully parameterized, which imposes a strong assumption about the distribution of the error term ν_{ist}. In order to remain as flexible as possible about the shape of the distribution, the study estimates a generalized gamma model, which nests some of the more common parameterizations of hazard models, including exponential, Weibull, and log-normal (Box-Steffensmeier and Jones 2004; Cameron and Trivedi 2005). Ultimately, the estimated auxiliary parameters reject these specifications in favor of the gamma function, and log-likelihood ratio, Akaike information criterion, and Bayesian information criterion tests favor the

[22] Meyer (1990) and Katz and Meyer (1990) find that many workers are subject to recall from temporary layoffs, which are often exactly as long as the worker is eligible for unemployment benefits. Disability application is not part of those studies, but workers who are on temporary layoff but *not* recalled may opt to apply to SSDI in that month, the equivalent of workers who do not have the same recall expectation applying for SSDI in the first month of the jobless spell, a common occurrence.

[23] The inclusion of both $InitExp_{ist}$ and $UINow_{ist}$ allows for flexibility in regard to the degree to which UI extensions are anticipated; this model is closest to the one that Rogers (1998) considers "rational foresight," her preferred model.

gamma specification. These tests also favor the parameterized gamma function over semi-parametric models like the Cox proportional hazards model and generalized linear models with splines for time since job loss and time before and after UI exhaustion. Most results, notably including the estimated effect of UI exhaustion on the timing of application, are consistent across these specifications.

In addition to separate estimation of the "disabled" and "non-disabled," loosely defined, the model is estimated separately by whether or not the application was ultimately successful at the initial determination. The model also considers two other failure variables: applying for SSDI and applying for SSI (both include concurrent applications). In both of these cases, the sample is restricted to those who are eligible for the respective program, and right-censor anyone when he or she loses eligibility for that program, as would be the case for SSDI when someone in a long non-employment spell no longer satisfies the requirement of having worked a certain number of recent quarters.

The advantage of using the individual data over the state-level analysis in measuring the impact of UI extensions on disability activity is twofold. First, rather than using the unemployment rate lagged six months to proxy for the demand for disability benefits among individuals who are probably coming off of UI, the model directly controls for the month in which each individual exhausts his or her UI benefits. Second, instead of assuming that all disability determinations are made exactly four months after application, the data includes the actual result from each individual application, and can test whether ultimately successful applicants respond differently to UI extensions than unsuccessful applicants. On the other hand, the state-level data is more up-to-date and therefore includes the current recession and recovery, unlike the individual-level data; the 2007-2011 period is especially interesting given the length of the UI extensions and the unprecedented growth in disability applications.

Results

State-level analysis. Table 2 reports the unconditional means of application and allowance rates for each disability program, separately by the time period after unemployment benefits were extended. As predicted, application (allowance) rates are lowest (highest) in months where the state had no recent extension, and generally higher (lower) when extensions are in effect, indicating that application rates increase, and allowance rates decrease, in periods of higher unemployment.[24] Application rates are highest, and allowance rates lowest, when UI extensions have been in place long enough that some individuals have exhausted even the extended benefits, but the labor market is weak enough that the federal or state government continues to lengthen UI duration. During the phase-out, when the labor market has improved enough to eliminate the extension but some individuals remain eligible, application (allowance) rates remain above (below) their pre-extension levels.

Attempting to untangle the competing, and often coinciding, effects of increases in the unemployment rate and increases in UI benefit duration, Table 3 reports the unconditional means separately by the nature of the UI extension. The pattern is quite different for endogenous and exogenous states, however. The application rate in the first months of an endogenous UI extension (1.63 percent) is much higher than when there are no extensions (1.37 percent), and subsequently falls as the extension continues (1.61 percent) and then phases out (1.51 percent). This pattern, the exact opposite of what the conceptual model predicts, suggests that potential applicants respond more to the increase in the unemployment rate for these states than the increased availability of UI benefits. States with UI benefits that were extended exogenously better fit the predicted pattern – though application rates increased with the introduction of extended UI benefits (1.44 percent), the increase was modest and likely due to the increase in the unemployment rate nationally, while application rates increased in subsequent months as predicted (1.56 percent).

Meanwhile, allowance rates should follow the opposite pattern – an increase when UI benefits are extended, as healthier potential applicants delay filing until UI benefits expire, at which point the allowance rate should decrease. In states where UI benefits were extended due to a poor economy, allowance rates fell, suggesting that extended benefits did little to stem the tide of the marginally disabled unemployed applying for disability due to poor employment prospects. States where UI benefits were extended exogenously, however, better fit the prediction – those who still applied for disability even with the increased availability of UI benefits were more likely to be approved, and this allowance rate approached pre-extension levels as potential applicants exhausted their UI eligibility.

[24] The extension categories are lagged four months in the initial allowance rate panel of Tables 2 and 3, to account for the typical lag between application and initial determination.

Table 4 reports the results for regressions of state application and allowance rates in a given month on an indicator for whether there was a new UI extension that month. As expected, as the state unemployment rate increases, more people apply for SSDI and SSI. The SSDI application rate is also positively correlated with the unemployment rate six months prior, suggesting that those with work-limiting conditions wait until their UI eligibility is exhausted to apply for SSDI. SSI applicants, though, may be less willing to wait for UI exhaustion; the lagged unemployment rate is statistically insignificant, but the magnitude of the correlation with the contemporaneous unemployment rate is larger than with SSDI. Allowance rates fall when the state unemployment rate rises, with lags of both four months (which for most applicants summarizes the condition of the labor market at the time of application) and 10 months (to allow for six months of UI eligibility and four months for disability application processing time). The estimated correlations of state unemployment rate with applications rate (positive) and allowance rate (negative) are consistent across nearly all specifications estimated in Tables 4 through 7.

Surprisingly, the overall application rate is higher in months where a UI extension is introduced, even controlling for the strength of the local labor market. The application rate increases by a statistically significant 0.05 percentage points, or about 4 percent of the mean monthly annualized application rate, relative to months with the same unemployment rates currently and six months prior, but no new UI extension. This finding contrasts with the conceptual model's prediction of a strong negative correlation between UI extensions and disability applications. The positive relationship is due primarily to a statistically significant increase in SSI applications; a less surprising result: more potential applicants will fall below the SSI income eligibility threshold when the local economy is weak enough to induce a UI extension. SSDI applications, in contrast, do not appear to respond to UI extensions.

The effect of new extensions on the allowance rate is also contrary to the predicted direction, but is statistically insignificant at conventional levels. A new UI extension results in a 0.46 percent decline in the initial allowance rate for all disability programs in a state four months later, but this effect is small relative to the mean allowance rate of 38 percent; moreover, the standard error is large relative to the estimate.

For application rate, the results are similar when, instead of an indicator for the month of a new extension, months are categorized with respect to the time after extension (Table 5). During the first N months of an N-month UI extension, when all of the recently unemployed are eligible for extended benefits, the application rate is expected to fall, but in fact rises by a statistically significant 0.07 percentage points, or about 5 percent of the mean application rate. The application rate continues to increase as the longest-tenured UI recipients exhaust their extended eligibility, and remains high as extended benefits phase out. Most of the increase in overall applications in the first months after extension is due to SSI, but SSDI applications increase by a statistically significant margin for all but the first N months.

Whereas the estimated impact of a new UI extension on a state's initial allowance rate four months later is negative when looking just at the month of the extension, the allowance rate increases for the first N months of the N-month extension (with a four-month lag to account for processing time), as predicted. The state's allowance rate increases by 0.5 percentage points for all programs, which is statistically different from zero at the 90 percent confidence level. The effect is larger (though not significantly so) and more statistically significant for the state's SSDI allowance rate, while SSI allowance rate matches the overall allowance rate in magnitude and significance. In later months, the allowance rate increases further, contrary to the prediction, though the differences in the coefficients by category are not statistically significant.

Tables 6 and 7 repeat the analysis from Tables 4 and 5, respectively, separating endogenous and exogenous UI extensions. The estimated impact of new extensions on the application rate is positive in Table 4, but because many extensions occur at the same time that the unemployment rate is rapidly increasing, this positive coefficient may be due to the inability to separate the extension itself from its underlying impetus. The results in Table 6 provide evidence in this direction: the application rate increases by a statistically-significant 0.15 percentage points, greater than 10 percent over the mean application rate, when UI benefits are extended endogenously, but *decreases* (though the estimate is statistically significant only for SSDI) for exogenous UI extensions. For both SSDI and SSI, allowance rates significantly decrease with endogenous UI extensions and significantly increase with exogenous UI extensions.

When considering the full timeline of the UI extension and not just its month of implementation, though, the estimated effects of endogenous and exogenous extensions on application and allowance rates are more similar (Table 7). The application rate increases in the first N months of an N-month extension, irrespective of the nature of the extension; this effect is stronger and more statistically significant for SSI, though the impact of an endogenous extension on the SSDI application rate is positive and statistically significant at the 90 percent level, and positive and insignificant for exogenous extensions. The estimates for the ongoing and phase-out periods of the both types of extensions match in magnitude and significance. For allowance rates, though, the estimates are clearly different: exogenous extensions significantly increase applicants' success rate throughout the duration of the extension, as expected, while endogenous extensions have no discernable effect.

In summary, state-level estimates indicate that SSDI and SSI applications increase at the onset of most UI extensions, in large part because UI benefits are extended during times of rising unemployment. Focusing on those states with stable unemployment rates where benefits were extended at the federal level, the SSDI application rate remained stable or fell slightly. The composition of applicants, however, changes when UI is extended as predicted: in states with exogenous UI extensions, the pool of remaining applicants is more likely to be approved for disability benefits at the initial determination. Healthier potential applicants, therefore, are less likely to apply when an alternative source of income, unemployment insurance, is available. Though some of the estimates are only weakly significant, these findings together indicate that UI extensions induce unemployed workers with more mild work-limiting health conditions to delay application to public disability programs.

Individual-level Analysis. Figure 2 and Table 8 both provide evidence that individuals consider their remaining unemployment insurance benefits in the timing of their disability application. Figure 2 plots the survivor function, the proportion of the sample that has not yet applied for either SSDI or SSI after each period, separately by whether the individual's benefits were extended during their jobless spell. Many individuals who eventually apply for disability benefits do so in the first three months after losing a job; the survivor function is steepest between the first two points for both those who never have benefits extended and those who have a longer-than-normal duration at the outset of their jobless spell, but are not further extended. After the first three months, the survivor function falls at a relatively constant rate. The survivor function is quite different for those whose benefits are extended (or extended further, if they are already longer than normal at the time of job loss) during their jobless spell: the survivor function is rather flat for the first months, and gets steeper over time. The increasing steepness in the unconditional survivor function is remarkable in light of the fact that benefits are extended typically in poor economic conditions; as seen in the state results, jobless individuals in slack labor markets should be inclined to apply for disability benefits faster, not slower.

Table 8 measures whether the timing of disability application coincides with the timing of UI exhaustion more directly. Each cell in Table 8 is the number of applications in the months before and after UI exhaustion, standardized to reflect that the periods are not of equal length.[25] The number of disability applications ticks up in the month that UI is exhausted, particularly for individuals whose benefits are extended during their jobless spell, probably reflecting pent-up demand from the months during the extension. This is less the case for individuals whose benefits are never extended, though this table does not take into account survivor bias; that is, because individuals drop out of the analysis after they've applied for disability, each successive period includes fewer potential applicants "at risk," so increases in later periods are that much more meaningful.

Concerns about survivor bias and confounding macroeconomic factors motivate the accelerated failure time (AFT) model, presented in Table 9. "Failure" is an application to either SSDI or SSI within the first 48 months after one's job loss. In addition to the coefficient and standard error, each variable's marginal effect are also reported, defined as the change in the predicted hazard rate from a small change in the variable (for a continuous variable) or the difference between values of 1 and 0 (for a binary variable), divided by the mean predicted hazard rate using the actual data.

The estimates in column 1 for the full sample show the importance of unemployment insurance extensions on the timing of disability applications. In the months where the UI recipient is receiving unemployment benefits only because of an extension, the probability that the recipient applies for disability falls by 45 percent. Furthermore, the individual is 91 percent more likely to apply for disability benefits in the month when his or her unemployment insurance ends after an extension (i.e., $UINow_{ist}$ = 1 but $InitExp_{ist}$ = 0). Both estimates are statistically significant at the 99-percent confidence level.

When benefits are not extended, however, the evidence that individuals apply for disability as soon as their unemployment benefits run out is weaker. A test of the joint

[25] For example, the average individual in the sample spends 5.33 months in the first period, greater than two months until UI is exhausted, though this varies from three-and-a-half months for people whose UI is never extended, to more than nine months for those whose benefits are extended during the jobless spell. The number of applications in the period is divided by the average number of months in that period (by extension category) to get the entries in Table 7.

significance of $UINow_{ist}$ and $InitExp_{ist}$ fails to reject the null hypothesis at the 90-percent confidence level.[26] Even if the estimate was more precise, the magnitude of the effect – a 46-percent (91 percent less 45 percent) increase in the probability of applying in the final UI month – is half as large as the effect for individuals facing extensions, perhaps indicating the importance of pent-up demand for DI benefits during extension months.

A higher current unemployment rate significantly reduces the failure time, as expected, but the positive and statistically significant coefficient on the unemployment rate at the time of job loss is surprising; the marginal effects, however, suggest the opposite effect on the hazard rate for each variable, so the overall effect of local labor market conditions is unclear. Another perhaps surprising result, that the addition of a new UI extension significantly increases the probability of applying for DI, can be partly explained by the fact that extensions are triggered by poor job prospects for the unemployed, as seen in the state-level results.

The other estimated effects are generally in the predicted direction. The disabled, broadly defined, are nearly 2.5 times more likely to apply for SSDI or SSI. The higher their earnings prior to job loss, the longer UI recipients are likely to wait to apply for disability. Blacks, the uninsured, and those with less than a high school education have shorter failure times, while the foreign-born and individuals with greater wealth wait longer to apply (see Appendix Table 2 for the full results). The value of the SSDI benefit and spouse's total earnings are positively associated with the failure time, surprisingly, but also positively associated with the hazard rate, as expected. The value of the potential UI benefit has no discernible effect on UI duration, which contradicts Lindner (2011), among others.

Columns 2 and 3 on Table 9 present the AFT results separately by whether the individual reports being "disabled," which includes reporting a work-limiting or work-preventing disability or receipt of sick pay, workers' compensation, or veterans' benefits. While both the disabled and the non-disabled, using these definitions, delay application during UI extensions, the magnitude of the effect of UI exhaustion is twice as large for the non-disabled. The only other variable that

[26] The coefficient on the indicator variable marking the month of initial expiration is almost exactly identical to the coefficient on the indicator for months where the individual is taking advantage of the UI extension. The former coefficient represents the change in the failure time (and the marginal effect represents the change in the hazard rate) when the current month is not also the month of UI exhaustion, i.e., when benefits have been extended since the jobless spell began. As the "on extension" variable is constructed to be equal to zero in the month of initial expiration, the coefficients should be roughly equal. (The fact that they are exactly the same to at least the third digit after the decimal is surprising; in the other four columns of Table 8, however, the magnitudes are close, but not identical.)

indicates that the non-disabled are more likely than the disabled to be motivated by UI concerns is the indicator for currently uninsured; whereas the self-reported disabled apply for disability without regard for their health insurance status, being uninsured increases the probability of applying in a given month by 58 percent for those who do not report work-limiting conditions and do not receive public benefits that are similar to disability insurance.

The estimates in column 1 allow for the jobless individual to apply for either SSDI or SSI (or both concurrently), but the estimated effect of UI benefits on disability application appears to be due mostly to SSDI. Each result described above holds when the failure event is SSDI application (column 4), and the sample excludes any individuals who are eligible for only SSI. Application to SSI (column 5) appears to be less responsive to UI incentives, though SSI applications are influenced by the current unemployment rate and whether the potential applicant is disabled (according to self reports) or currently uninsured.

Though the interpretation is not as easy as the state-level regressions of allowance rate on controls for the timing of UI extensions, comparing individual-level estimates for applications that are allowed and not allowed at the initial determination provide some evidence about the effect of UI extensions on the composition of disability applications.[27] The results in the two columns of Table 10 match closely: both ultimately successful and unsuccessful applicants delay filing until they exhaust extended UI benefits. There are subtle differences that suggest that healthier potential applicants are more likely to delay application, but the results are, on the whole, not significantly different from each other. In jobless spells where UI is not extended, the null hypothesis of no increase in the probability of applying for disability in the last month of UI eligibility is rejected at conventional two-sided significance levels only for unsuccessful applications, but the magnitude of the net marginal effect ($\gamma_2 + \gamma_6$) is not much greater than for accepted applications. The announcement of new extensions is associated with more successful applications, but no change in rejected applications; it is possible that the incentive to delay application for an imminent UI extension balances with the incentive to apply immediately in a weak labor market for healthier applicants, but unhealthier applicants are affected only by the macroeconomic effect. Finally, lacking health insurance increases the probability of applying

[27] Due to convergence problems, the regressions in Table 10 assume a Weibull distribution. The auxiliary parameters reported in Table 9 make clear that the Weibull is dominated by the gamma distribution; the Weibull is a special case of the generalized gamma when the kappa parameter is equal to one, but the estimated kappa parameter is below zero (and because it is significantly different from zero as well, the log-normal specification is also rejected). However, the coefficient estimates are very similar irrespective of the distributional assumption.

unsuccessfully by a statistically significant 59 percent, but has no effect on applying unsuccessfully.

Conclusion

As of July 3, 2011, almost exactly three years after unemployment insurance durations were extended by 20 to 33 weeks nationwide, the Emergency Unemployment Compensation Act of 2008 is still in effect. Residents of every state are still eligible for 34 weeks of UI benefits on top of their normal, state-funded UI duration; all but five states are eligible for an additional 13 weeks; and the unemployed in 25 states (including DC) are still eligible for Tier Four benefits totaling 99 weeks. Though many workers who lost their job at the onset of the Great Recession have long since exhausted even these lengthy UI durations, policymakers probably want to know whether other already-overburdened public programs, such as SSDI and SSI, need to fear further strain from yet more displaced and desperate working-age adults.

The results of this study suggest that jobless individuals, in particular those whose work-limiting conditions are more marginal, delay applying to SSDI or SSI until after they have exhausted their unemployment benefits. UI extensions push out these exhaustion dates; this study finds evidence at both the state- and individual-level that the unemployed respond in-kind. Jobless individuals are significantly less likely to apply for SSDI (and SSI, though the estimated effect is quite noisy) while they benefit from extra months of UI. This study also observes that in states where UI has been extended at least somewhat exogenously – that is, not because of worsening labor market conditions locally – allowance rates in subsequent months rise, indicating that only the unhealthiest potential applicants continue to seek SSDI benefits.

Public disability insurance programs are structured as long-term programs – applicants are required to demonstrate that their disabling conditions limit their ability to work permanently or over the long-term, and few beneficiaries leave the program except through reaching the FRA or death. Demand for these programs, then, should not respond to short run business cycle fluctuations. One interpretation of the findings of this paper is that disability insurance is being used, at least in part, as supplement unemployment insurance, a departure from its intended purpose made all the more expensive because any less-than-deserving recipient is more or less a permanent mistake.

On the other hand, it is less clear whether the individuals who apply for disability benefits as soon as they exhaust their UI benefits would have applied sooner if UI had not been available. Unemployment benefits are comparable to SSDI benefits – $233 per week for UI versus $972 per month for SSDI, based on this study's calculations of potential benefits for jobless individuals in the SIPP. The upside to unemployment benefits is that the income is received with almost 100 percent certainty, whereas disability applicants are far more likely to be rejected, and even successful applicants must wait for the decision. In addition, SSDI requires a five-month waiting period between the onset of disability and the first payment of benefits, so the availability of UI pays recently-employed disability applicants in the interim. Both programs require non-trivial effort, but the Social Security interviews and acquiring medical clearance from doctors probably outweigh calling in to UI's automated phone system once a week to confirm that the recipient is still searching for a job. Considering all of these factors, perhaps the bigger concern is that the individuals who are induced to apply due to UI expiration do not apply even sooner. This is especially true for those who delay application during the UI extension – whereas they have a stronger case for being unable to work after six months of joblessness compared to immediately after job loss, the marginal increase in the allowance rate from an additional three to six months is likely small.

A beneficiary of the delayed disability application is the SSDI Trust Fund, for which solvency is a growing concern. Except for inter-governmental transfers – emergency legislation are fully funded by the federal government, while states pick up half the tab in the automatically-triggered Extended Benefits program – the costs of disability and unemployment benefits are largely a wash, so the taxpayer is relatively unaffected. Essentially, delayed disability application transfers funds from general revenue at the federal and state level to the SSDI Trust Fund, the same transfer that will occur more explicitly, absent substantial reform, if the Trust Fund is exhausted in 2018 as currently projected (Social Security Trustees Report, 2011).

Debates over the merits of UI benefit extensions focus on the costs of the program, both the dollar value of extra benefits distributed to those eligible and the efficiency cost of job search disincentives, and the direct benefits to UI recipients without alternative income sources. This paper suggests that these debates miss an important indirect benefit of UI extensions: reduced costs for disability benefits. Moreover, UI extensions replace permanent disability benefits with temporary unemployment benefits, while providing recipients with more incentive to find a job than they would have while receiving disability benefits, which hopefully defrays even more of the long-run cost. Ignoring these indirect benefits has likely led to fewer, shorter, and more controversial UI extensions than a more complete accounting would suggest.

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Figure 1. Unemployment Insurance Duration

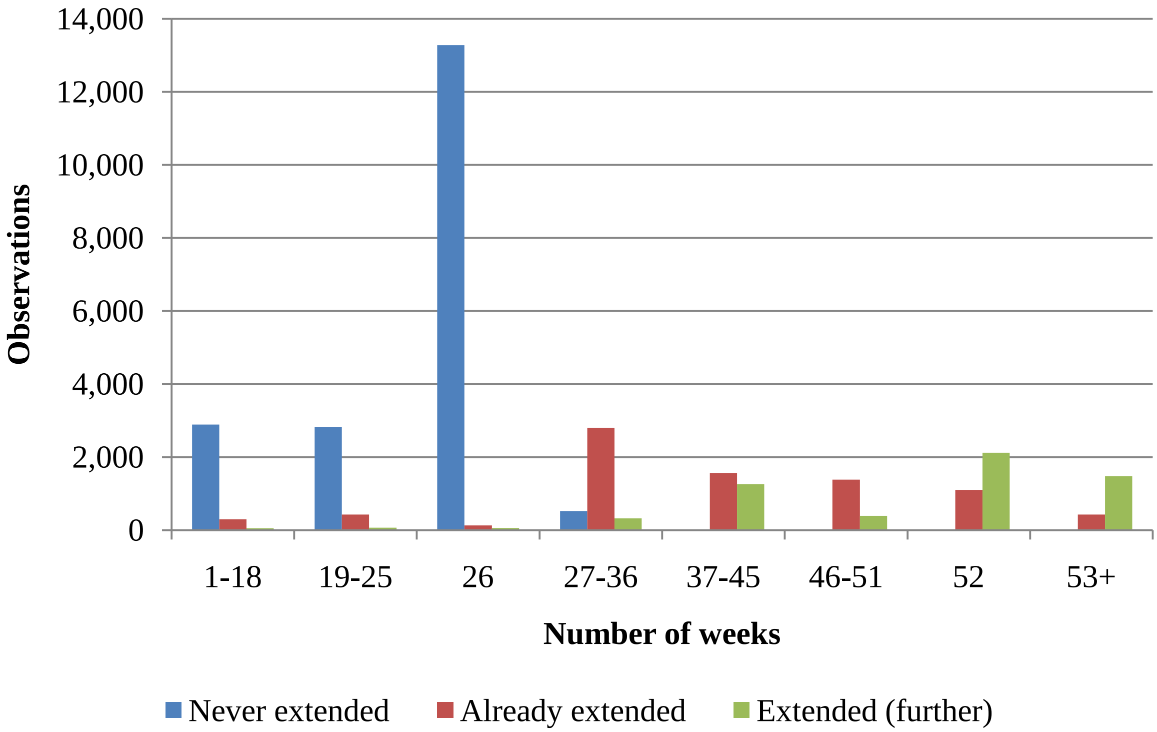

Figure 2. Survivor Functions from Time of Job Loss, by whether Benefits are Extended

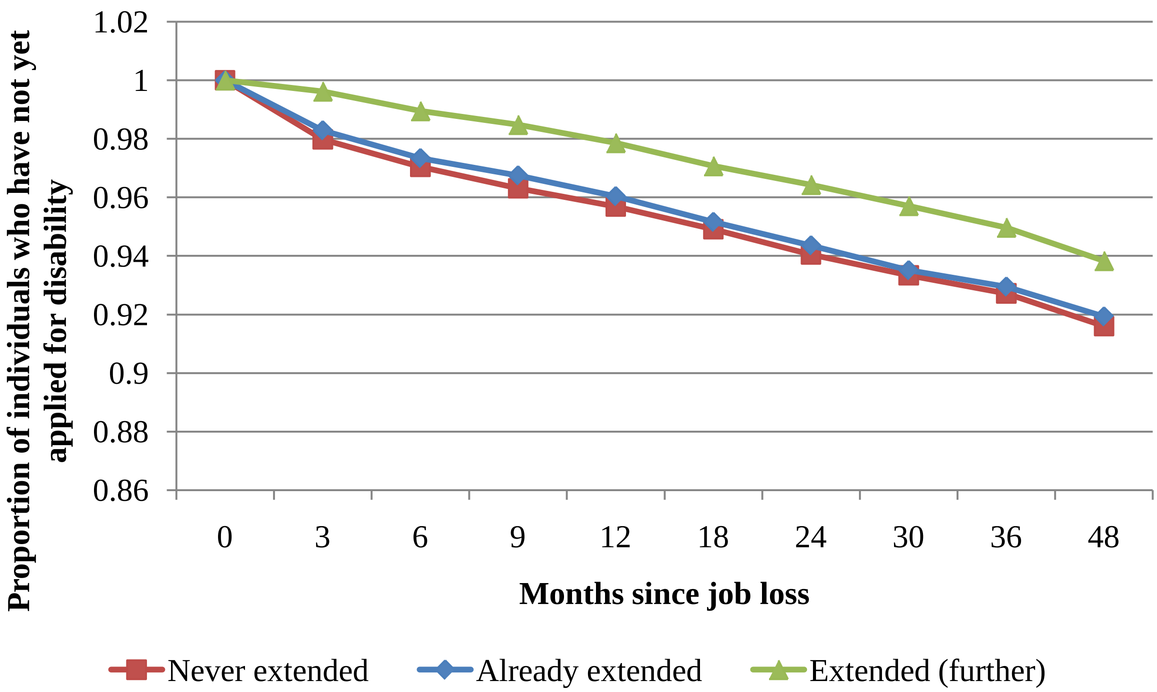

Table 1. Refining the Sample

Total sample in 1990-2004 SIPP panels	588722
Age 25 to 64	306864
Non-missing work status	243414
Experienced a job loss during SIPP	53849
Matched successfully to SSA	41239
Living in identifiable state	37313
Filing date not the same as job loss date	37177
Eligible for UI	34306
Eligible for SSDI and/or SSI	28728

Table 2. Mean Application and Initial Allowance Rates by UI Extension Timing

			Extension		
	All Periods	No Recent Extension	First Months	Ongoing	Phase-Out
Application rate					
All programs	1.46	1.37	1.52	1.58	1.52
	(0.52)	(0.48)	(0.52)	(0.55)	(0.53)
SSDI (including concurrent)	0.90	0.84	0.90	0.97	0.96
	(0.30)	(0.27)	(0.28)	(0.31)	(0.30)
SSDI Only	0.90	0.84	0.90	0.97	0.96
	(0.30)	(0.27)	(0.28)	(0.31)	(0.30)
SSI (including concurrent)	1.01	0.94	1.07	1.08	1.04
	(0.41)	(0.38)	(0.42)	(0.43)	(0.42)
SSI Only	0.57	0.53	0.62	0.61	0.57
	(0.26)	(0.24)	(0.28)	(0.27)	(0.26)
Initial allowance rate					
All programs	37.91	38.21	38.32	37.35	37.89
	(7.66)	(7.98)	(7.02)	(7.20)	(8.00)
SSDI (including concurrent)	37.62	37.95	38.29	37.01	37.17
	(7.96)	(8.36)	(7.19)	(7.37)	(8.34)
SSDI Only	47.11	47.33	48.24	46.60	46.40
	(8.30)	(8.59)	(7.84)	(7.88)	(8.43)
SSI (including concurrent)	33.43	33.77	33.71	32.80	33.79
	(7.64)	(7.94)	(7.04)	(7.19)	(8.03)
SSI Only	38.62	38.88	38.53	38.17	39.34
	(8.23)	(8.36)	(7.77)	(8.05)	(8.50)
N	6477	3572	439	2242	224

Note: Application rate is the ratio of applications received from that state in that month to the state population age 18 to 64, multiplied by 1200. For an extension of N months, the "first months" are the first N months, "ongoing" represents the remaining months before newly exhausted UI recipients can receive the extension, and "phase-out" represents the N months after the extension ends. For the initial allowance rate panel, extension periods are lagged four months to account for processing time. Standard deviations in parentheses.

Table 3. Mean Application and Initial Allowance Rates by UI Extension Timing and Nature of Extension

	Endogenous Extension			Exogenous Extension		
	First Months	Ongoing	Phase-Out	First Months	Ongoing	Phase-Out
Application rate						
All programs	1.63	1.61	1.51	1.44	1.56	1.56
	(0.54)	(0.58)	(0.55)	(0.49)	(0.53)	(0.47)
SSDI (including concurrent)	0.94	0.96	0.97	0.87	0.97	0.93
	(0.30)	(0.33)	(0.32)	(0.26)	(0.30)	(0.25)
SSDI Only	0.94	0.96	0.97	0.87	0.97	0.93
	(0.30)	(0.33)	(0.32)	(0.26)	(0.30)	(0.25)
SSI (including concurrent)	1.15	1.11	1.01	1.00	1.07	1.11
	(0.43)	(0.45)	(0.42)	(0.41)	(0.42)	(0.40)
SSI Only	0.69	0.64	0.54	0.56	0.59	0.63
	(0.27)	(0.28)	(0.25)	(0.28)	(0.27)	(0.27)
Initial allowance rate						
All programs	36.49	35.83	37.22	39.74	38.55	39.59
	(6.60)	(7.26)	(7.50)	(7.01)	(6.92)	(9.01)
SSDI (including concurrent)	36.35	35.40	36.58	39.79	38.29	38.66
	(6.61)	(7.58)	(8.00)	(7.27)	(6.95)	(9.05)
SSDI Only	45.30	44.33	45.95	50.50	48.40	47.56
	(7.12)	(7.94)	(7.97)	(7.63)	(7.35)	(9.46)
SSI (including concurrent)	32.27	31.56	32.83	34.82	33.79	36.25
	(6.58)	(7.10)	(7.48)	(7.19)	(7.10)	(8.91)
SSI Only	36.79	36.85	38.70	39.88	39.20	40.97
	(7.44)	(7.81)	(7.86)	(7.77)	(8.09)	(9.84)
N	191	990	161	248	1252	63

Note: Application rate is the ratio of applications received from that state in that month to the state population age 18 to 64, multiplied by 1200. For an extension of N months, the "first months" are the first N months, "ongoing" represents the remaining months before newly exhausted UI recipients can receive the extension, and "phase-out" represents the N months after the extension ends. For the initial allowance rate panel, extension periods are lagged four months to account for processing time. A state's UI extension is considered endogenous if the state unemployment rate increased by at least one percentage point in the 6 months before the extension, or if the extension was triggered automatically by the Federal-State Extended Benefits program rules; otherwise, the extension is considered exogenous. Standard deviations in parentheses.

Table 4. Estimated Effect of New Extensions on Application and Allowance Rates

	All Programs		SSDI		SSI	
	Application	Allowance	Application	Allowance	Application	Allowance
New Extension (0/1)	0.056 **		0.005		0.050 ***	
	0.023		0.013		0.017	
New Extension 4 months ago (0/1)		-0.461		-0.384		-0.313
		0.361		0.373		0.372
State unemployment rate	0.053 ***		0.025 ***		0.043 ***	
	0.008		0.005		0.006	
State unemployment rate 4 months ago		-0.216		-0.220		-0.266 **
		0.139		0.149		0.133
State unemployment rate 6 months ago	0.009 **		0.012 ***		0.002	
	0.005		0.003		0.003	
State unemployment rate 10 months ago		-0.701 ***		-0.776 ***		-0.600 ***
		0.127		0.131		0.124
Constant	0.550 ***	54.83 ***	0.202 ***	53.93 ***	0.409 ***	52.00 ***
	0.055	1.25	0.037	1.34	0.041	1.19
R^2	0.795	0.756	0.754	0.729	0.823	0.754
Sample size	6477	6477	6477	6477	6477	6477

Note: All regressions include linear and quadratic time trends and month and state fixed effects. SSDI and SSI samples both include concurrent applications. Standard errors in parentheses.

*** - Significantly different from zero at the 99 percent confidence level ** - 95 percent confidence level * - 90 percent confidence level

Table 5. Estimated Effect of New, Ongoing, and Phased-Out Extensions on Application and Allowance Rates

	All Programs		SSDI		SSI	
	Application	Allowance	Application	Allowance	Application	Allowance
First Months of Extension (0/1)	0.074 ***		0.008		0.068 ***	
	0.015		0.007		0.014	
First Months of Extension, Lagged 4 months (0/1)		0.509 *		0.629 **		0.466 *
		0.270		0.291		0.252
Ongoing Extension (0/1)	0.110 ***		0.039 ***		0.087 ***	
	0.018		0.010		0.015	
Ongoing Extension, Lagged 4 months (0/1)		0.979 ***		0.798 **		1.093 ***
		0.370		0.400		0.372
Extension Phase-Out (0/1)	0.086 ***		0.086 ***		0.047 ***	
	0.021		0.014		0.016	
Extension Phase-Out, Lagged 4 months (0/1)		1.113 ***		0.835 **		1.258 ***
		0.378		0.409		0.408
State unemployment rate	0.037 ***		0.021 ***		0.029 ***	
	0.008		0.005		0.006	
State unemployment rate 4 months ago		-0.368 **		-0.358 **		-0.427 ***
		0.160		0.174		0.157
State unemployment rate 6 months ago	0.004		0.007 ***		-0.001	
	0.004		0.003		0.003	
State unemployment rate 10 months ago		-0.762 ***		-0.804 ***		-0.680 ***
		0.141		0.145		0.140
Constant	0.633 ***	55.62 ***	0.240 ***	54.48 ***	0.470 ***	52.93 ***
	0.056	1.41	0.039	1.51	0.044	1.38
R^2	0.800	0.758	0.757	0.731	0.828	0.757
Sample size	6477	6477	6477	6477	6477	6477

Note: All regressions include linear and quadratic time trends and month and state fixed effects. SSDI and SSI samples both include concurrent applications. Standard errors in parentheses.

*** - Significantly different from zero at the 99 percent confidence level ** - 95 percent confidence level * - 90 percent confidence level

Table 6. Estimated Effect of New Extensions on Application and Allowance Rates

	All Programs		SSDI		SSI	
	Application	Allowance	Application	Allowance	Application	Allowance
New Endogenous Extension (0/1)	0.150 ***		0.071 ***		0.107 ***	
	0.045		0.024		0.033	
New Endogenous Extension 4 months ago (0/1)		-1.906 ***		-1.874 ***		-1.674 ***
		0.574		0.580		0.588
New Exogenous Extension (0/1)	-0.034		-0.058 ***		-0.005	
	0.037		0.020		0.030	
New Exogenous Extension 4 months ago (0/1)		0.902 *		1.022 *		0.970 **
		0.488		0.567		0.458
State unemployment rate	0.052 ***		0.024 ***		0.042 ***	
	0.008		0.005		0.006	
State unemployment rate 4 months ago		-0.197		-0.200		-0.249 *
		0.138		0.148		0.133
State unemployment rate 6 months ago	0.010 **		0.013 ***		0.002	
	0.005		0.003		0.003	
State unemployment rate 10 months ago		-0.712 ***		-0.787 ***		-0.610 ***
		0.127		0.130		0.124
Constant	0.550 ***	54.84 ***	0.202 ***	53.94 ***	0.409 ***	52.01 ***
	0.055	1.25	0.037	1.34	0.041	1.19
R^2	0.795	0.756	0.755	0.730	0.824	0.755
Sample size	6477	6477	6477	6477	6477	6477

Note: All regressions include linear and quadratic time trends and month and state fixed effects. SSDI and SSI samples both include concurrent applications. Standard errors in parentheses.

*** - Significantly different from zero at the 99 percent confidence level ** - 95 percent confidence level * - 90 percent confidence level

Table 7. Estimated Effect of New, Ongoing, and Phased-Out Extensions on Application and Allowance Rates

	All Programs				SSDI				SSI			
	Application		Allowance		Application		Allowance		Application		Allowance	
First Months of Endogenous Extension (0/1)	0.087	***	-0.490		0.018	*	-0.410		0.074	***	-0.568	
	0.020		0.509		0.011		0.541		0.015		0.507	
First Months of Exogenous Extension (0/1)	0.066	**	1.524	***	0.004		1.655	***	0.066	***	1.508	***
	0.027		0.522		0.013		0.595		0.025		0.467	
Ongoing Endogenous Extension (0/1)	0.102	***	0.091		0.033	***	-0.012		0.078	***	0.209	
	0.020		0.471		0.013		0.533		0.016		0.434	
Ongoing Exogenous Extension (0/1)	0.120	***	1.881	***	0.046	***	1.616	**	0.096	***	1.989	***
	0.025		0.706		0.017		0.764		0.020		0.682	
Endogenous Extension Phase-Out (0/1)	0.078	***	0.419		0.084	***	0.269		0.035	*	0.567	
	0.024		0.445		0.016		0.487		0.018		0.427	
Exogenous Extension Phase-Out (0/1)	0.103	***	1.920	**	0.087	***	1.373		0.073	***	2.053	**
	0.036		0.777		0.023		0.851		0.027		0.877	
State unemployment rate	0.037	***			0.020	***			0.029	***		
	0.008				0.005				0.006			
State unemployment rate 4 months ago			-0.322	**			-0.315	*			-0.381	**
			0.159				0.172				0.154	
State unemployment rate 6 months ago	0.004				0.008	***			0.000			
	0.004				0.003				0.003			
State unemployment rate 10 months ago			-0.715	***			-0.760	***			-0.634	***
			0.134				0.141				0.133	
Constant	0.628	***	55.01	***	0.236	***	53.92	***	0.465	***	52.33	***
	0.057		1.34		0.039		1.46		0.046		1.28	
R^2	0.800		0.762		0.758		0.734		0.828		0.761	
Sample size	6477		6477		6477		6477		6477		6477	

Note: Extension indicators enter allowance rate regressions with a four-month lag. All regressions include linear and quadratic time trends and month and state fixed effects. SSDI and SSI samples both include concurrent applications. Standard errors in parentheses. *** - Significantly different from zero at the 99 percent confidence level ** - 95 percent confidence level * - 90 percent confidence level

Table 8. Timing of Disability Application Relative to Unemployment Insurance Exhaustion

Month	All	Never extended	Already extended	Extended (further)
>2 mo before UI ends	116.5	99.4	29.4	7.0
1-2 mo before UI ends	97.1	66.7	21.2	9.5
Month UI ends	108.0	65.0	24.0	19.0
1-2 mo after UI ends	77.4	50.9	15.5	11.0
3-6 mo after UI ends	57.5	36.2	13.1	8.3
7-12 mo after UI ends	43.5	25.1	12.4	6.0
13-24 mo after UI ends	39.6	22.2	10.0	7.5
25-48 mo after UI ends	24.7	12.7	6.8	5.2

Note: Figures are applications in the average month over the given time period.

Table 9. Accelerated Failure Time Regression Results for Disability Applications

	All	Disabled	Non-Disabled	SSDI (among eligible)	SSI (among eligible)
UI Expires Next Month (0/1)	-0.080	0.439 **	-0.163	-0.099	-0.003
	(0.144)	(0.204)	(0.198)	(0.166)	(0.536)
	[5.15]	[-18.71]	[13.8]	[6.26]	[0.24]
UI Expires Current Month (0/1)	-1.121 ***	-1.047 **	-0.864 **	-1.112 ***	-9.50
	(0.326)	(0.422)	(0.430)	(0.377)	(235.140)
	[91.14]	[43.81]	[92.89]	[88.61]	[1207.52]
UI Expired Last Month (0/1)	-0.015	0.401	0.020	-0.020	1.073
	(0.163)	(0.309)	(0.217)	(0.188)	(0.767)
	[0.94]	[-17.03]	[-1.58]	[1.21]	[-61.54]
New Extension (0/1)	-0.573 **	-0.653 **	-0.474	-0.598 **	7.92
	(0.264)	(0.315)	(0.401)	(0.299)	(639.937)
	[41.5]	[27.86]	[44.92]	[42.76]	[-100.58]
On Extension (0/1)	0.875 ***	1.341 ***	0.700 **	0.792 ***	6.02
	(0.230)	(0.319)	(0.308)	(0.261)	(235.131)
	[-44.72]	[-52.56]	[-44.44]	[-40.66]	[-101.9]
Initial Expiration (0/1)	0.875 ***	1.311 ***	0.558	0.852 **	15.40
	(0.324)	(0.372)	(0.432)	(0.374)	(347.300)
	[-45.22]	[-51.39]	[-37.46]	[-43.59]	[-163.98]
ln(Previous Earnings)	-0.042 *	-0.032	-0.021	-0.066 **	-0.018
	(0.022)	(0.030)	(0.027)	(0.026)	(0.055)
	[-2.62]	[-1.39]	[-1.65]	[-4.1]	[-1.4]
ln(Spouse's Earnings)	0.014 *	0.026 **	0.004	0.012	0.010
	(0.008)	(0.011)	(0.010)	(0.009)	(0.031)
	[0.86]	[1.1]	[0.31]	[0.75]	[0.79]
ln(UI Benefit)	0.065	-0.007	0.094 *	0.034	-0.053
	(0.045)	(0.069)	(0.052)	(0.055)	(0.119)
	[4.08]	[-0.31]	[7.55]	[2.11]	[-4.01]
ln(SSDI Benefit)	0.172 **	0.103 *	0.205 **	0.471 **	0.032

		*				*		*		
	(0.040)		(0.059)		(0.048)		(0.098)		(0.052)	
	[10.84]		[4.45]		[16.44]		[29.18]		[2.45]	
Unemployment Rate (Current)	-0.093	***	-0.191	***	-0.057		-0.063	*	-0.226	*
	(0.031)		(0.070)		(0.036)		(0.036)		(0.126)	
	[-5.88]		[-8.24]		[-4.56]		[-3.92]		[-17.19]	
Unemployment Rate (At Job Loss)	0.116	***	0.208	***	0.110	***	0.064	*	0.176	
	(0.031)		(0.069)		(0.036)		(0.035)		(0.124)	
	[7.31]		[8.98]		[8.78]		[3.96]		[13.33]	
Disabled (0/1)	-2.595	***					-2.738	***	-1.241	***
	(0.073)						(0.084)		(0.282)	
	[242.73]						[255.77]		[107.86]	
Currently Uninsured (0/1)	-0.466	***	-0.002		-0.705	***	-0.229	***	-0.862	**
	(0.070)		(0.104)		(0.091)		(0.081)		(0.339)	
	[29.87]		[0.07]		[57.97]		[14.36]		[58.11]	
Constant	12.726	***	7.442	***	11.283	***	12.603	***	14.80	***
	(0.603)		(1.392)		(0.739)		(0.849)		(2.447)	
ln(sigma)	1.100	***	1.185	***	0.715	***	1.161	***	0.857	***
	(0.041)		(0.034)		(0.125)		(0.050)		(0.122)	
ln(kappa)	-0.265	***	-2.227	***	0.364	**	-0.255	**	-0.985	
	(0.088)		(0.385)		(0.143)		(0.103)		(0.643)	
Log-likelihood	-10193.6		-4806.97		-5289.07		-8542.18		-307.711	
N	1301646		191048		1110598		1291362		27742	
Joint significance of UI Expires Current Month and Initial Expiration										
Test statistic	2.62		0.92		2.39		2.18		0.00	
p-value	0.11		0.34		0.12		0.14		0.98	

Note: Standard errors in parentheses. Marginal effects (mean derivative of the predicted hazard rate with respect to variable, divided by the mean predicted hazard, times 100) in brackets. All specifications also include demographic variables.

*** - Significantly different from zero at the 99 percent confidence level ** - 95 percent confidence level * - 90 percent confidence level

Table 10. Accelerated Failure Time Regression Results for Allowed and Not Allowed Disability Applications

	Allowed		Not Allowed	
UI Expires Next Month (0/1)	-0.252		-0.226	
	(0.235)		(0.191)	
	[18.74]		[18.63]	
UI Expires Current Month (0/1)	-1.500	***	-1.312	***
	(0.516)		(0.434)	
	[174.91]		[165.95]	
UI Expired Last Month (0/1)	-0.374		-0.185	
	(0.235)		(0.198)	
	[29.01]		[15.02]	
New Extension (0/1)	-1.218	***	0.235	
	(0.363)		(0.505)	
	[129.74]		[-16.35]	
On Extension (0/1)	0.874	**	0.849	***
	(0.378)		(0.324)	
	[-45.96]		[-48.29]	
Initial Expiration (0/1)	1.086	**	0.812	*
	(0.529)		(0.441)	
	[-54.93]		[-47.72]	
ln(Previous Earnings)	-0.090	**	-0.013	
	(0.038)		(0.024)	
	[-6.21]		[-0.96]	
ln(Spouse's Earnings)	0.009		0.020	**
	(0.012)		(0.010)	
	[0.61]		[1.5]	
ln(UI Benefit)	0.021		0.080	
	(0.075)		(0.051)	
	[1.44]		[6.09]	

ln(SSDI Benefit)	0.073		0.134	***
	(0.056)		(0.035)	
	[5.03]		[10.15]	
Unemployment Rate (Current)	-0.108	**	-0.067	**
	(0.042)		(0.033)	
	[-7.44]		[-5.06]	
Unemployment Rate (At Job Loss)	0.090	**	0.076	**
	(0.042)		(0.033)	
	[6.18]		[5.75]	
Disabled (0/1)	-2.452	***	-2.216	***
	(0.117)		(0.093)	
	[238.51]		[243.43]	
Currently Uninsured (0/1)	-0.062		-0.676	***
	(0.106)		(0.086)	
	[4.25]		[50.99]	
Constant	19.146	***	14.242	***
	(1.121)		(0.745)	
ln(p)	-0.375	***	-0.275	***
	(0.030)		(0.026)	
Log-likelihood	-5289.88		-6498.65	
N	1301646		1301646	
Joint significance of UI Expires Current Month and Initial Expiration				
Test statistic	3.06		7.59	**
p-value	0.08		0.01	

Note: Standard errors in parentheses. Marginal effects (mean derivative of the predicted hazard rate with respect to variable, divided by the mean predicted hazard, times 100) in brackets. All specifications also include demographic variables.

*** - Significantly different from zero at the 99 percent confidence level ** - 95 percent confidence level * - 90 percent confidence level

Table A1. Summary Statistics for Individual-Level Sample

	All	Disabled	Non-Disabled	SSDI (among eligible)	SSI (among eligible)
Apply for SSDI or SSI within 48 Months of Job Loss	0.08	0.24	0.04	0.07	0.14
	(0.26)	(0.43)	(0.20)	(0.26)	(0.35)
Eligible for SSDI in Current Month	0.99	0.98	0.99	1	0.66
	(0.09)	(0.13)	(0.08)	(0.00)	(0.47)
Eligible for SSI in Current Month	0.02	0.04	0.02	0.01	1
	(0.14)	(0.19)	(0.14)	(0.12)	(0.00)
Weeks of UI	31.85	31.44	31.93	31.90	28.94
	(12.54)	(12.74)	(12.50)	(12.53)	(13.44)
Real Spouse's Earnings	14466	10087	15250	14550	2939
	(24660)	(19673)	(25370)	(24731)	(6297)
Real Earnings Before Job Loss	25123	20332	26108	25303	5819
	(29100)	(20836)	(30429)	(29147)	(4672)
Real UI Benefits	233.09	209.96	237.84	234.36	114.57
	(124.62)	(122.72)	(124.48)	(124.12)	(94.18)
Real SSDI Benefits	972.43	907.57	984.03	979.73	465.43
	(398.79)	(380.50)	(400.87)	(391.75)	(381.89)
Unemployment Rate at Job Loss	5.75	5.87	5.73	5.75	6.12
	(1.56)	(1.59)	(1.56)	(1.56)	(1.61)
Current Unemployment Rate	5.54	5.66	5.52	5.54	5.92
	(1.54)	(1.61)	(1.53)	(1.54)	(1.57)
Disabled	0.17	1	0	0.17	0.28
	(0.38)	(0.00)	(0.00)	(0.37)	(0.45)

Currently Uninsured	0.37	0.44	0.36	0.37	0.73
	(0.48)	(0.50)	(0.48)	(0.48)	(0.44)
Age at Job Loss	40.81	43.69	40.21	40.81	39.87
	(11.22)	(11.01)	(11.18)	(11.23)	(11.44)
Black (0/1)	0.13	0.13	0.13	0.13	0.14
	(0.34)	(0.33)	(0.34)	(0.34)	(0.35)
Other Non-White (0/1)	0.05	0.04	0.05	0.05	0.07
	(0.21)	(0.21)	(0.21)	(0.21)	(0.26)
Male (0/1)	0.46	0.53	0.44	0.46	0.51
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)
High School Graduate Only (0/1)	0.32	0.35	0.31	0.32	0.31
	(0.47)	(0.48)	(0.46)	(0.47)	(0.46)
Some College (0/1)	0.30	0.33	0.29	0.30	0.21
	(0.46)	(0.47)	(0.45)	(0.46)	(0.41)
College Degree (0/1)	0.19	0.11	0.21	0.20	0.06
	(0.40)	(0.31)	(0.41)	(0.40)	(0.23)
Number of Kids	0.93	0.83	0.95	0.92	1.61
	(1.20)	(1.19)	(1.20)	(1.19)	(1.51)
Married (0/1)	0.61	0.58	0.62	0.61	0.88
	(0.49)	(0.49)	(0.49)	(0.49)	(0.32)
Foreign-Born (0/1)	0.10	0.08	0.10	0.10	0.18
	(0.30)	(0.28)	(0.30)	(0.30)	(0.39)
Nativity N/A (0/1)	0.05	0.04	0.05	0.05	0.07
	(0.22)	(0.19)	(0.23)	(0.22)	(0.26)
2nd Wealth Quintile (0/1)	0.20	0.21	0.20	0.20	0.16
	(0.40)	(0.41)	(0.40)	(0.40)	(0.36)
3rd Wealth Quintile (0/1)	0.19	0.18	0.19	0.19	0.09
	(0.39)	(0.39)	(0.39)	(0.39)	(0.28)
4th Wealth Quintile (0/1)	0.17	0.16	0.17	0.17	0.04
	(0.38)	(0.37)	(0.38)	(0.38)	(0.19)
5th Wealth Quintile (0/1)	0.16	0.12	0.17	0.16	0.01

	(0.37)	(0.33)	(0.37)	(0.37)	(0.08)
Wealth N/A (0/1)	0.05	0.05	0.05	0.05	0.14
	(0.22)	(0.21)	(0.22)	(0.22)	(0.34)
Unique individuals	28,728	4,861	23,867	28,483	718
Person-spells	33,385	5,693	27,692	33,115	857
Person-years	138,129	20,970	117,159	137,013	3,022
Person-months	1,335,031	196,741	1,138,290	1,324,477	28,599

Note: Standard deviations in parentheses.

Table A2. Accelerated Failure Time Regression Results for Disability Applications - All Variables

	All	Disabled	Non-Disabled	SSDI (among eligible)	SSI (among eligible)
UI Expires Next Month (0/1)	-0.080	0.439**	-0.163	-0.099	-0.003
	(0.144)	(0.204)	(0.198)	(0.166)	(0.536)
	[5.15]	[-18.71]	[13.8]	[6.26]	[0.24]
UI Expires Current Month (0/1)	-1.121***	-1.047**	-0.864**	-1.112***	-9.50
	(0.326)	(0.422)	(0.430)	(0.377)	(235.140)
	[91.14]	[43.81]	[92.89]	[88.61]	[1207.52]
UI Expired Last Month (0/1)	-0.015	0.401	0.020	-0.020	1.073
	(0.163)	(0.309)	(0.217)	(0.188)	(0.767)
	[0.94]	[-17.03]	[-1.58]	[1.21]	[-61.54]
New Extension (0/1)	-0.573**	-0.653**	-0.474	-0.598**	7.92
	(0.264)	(0.315)	(0.401)	(0.299)	(639.937)
	[41.5]	[27.86]	[44.92]	[42.76]	[-100.58]
On Extension (0/1)	0.875***	1.341***	0.700**	0.792***	6.02
	(0.230)	(0.319)	(0.308)	(0.261)	(235.131)

	[-44.72]		[-52.56]		[-44.44]		[-40.66]		[-101.9]	
		*		*						
Initial Expiration		*		*				*		
(0/1)	0.875	*	1.311	*	0.558		0.852	*	15.40	
									(347.30	
	(0.324)		(0.372)		(0.432)		(0.374)		0)	
									[-	
	[-45.22]		[-51.39]		[-37.46]		[-43.59]		163.98]	
ln(Previous								*		
Earnings)	-0.042	*	-0.032		-0.021		-0.066	*	-0.018	
	(0.022)		(0.030)		(0.027)		(0.026)		(0.055)	
	[-2.62]		[-1.39]		[-1.65]		[-4.1]		[-1.4]	
ln(Spouse's				*						
Earnings)	0.014	*	0.026	*	0.004		0.012		0.010	
	(0.008)		(0.011)		(0.010)		(0.009)		(0.031)	
	[0.86]		[1.1]		[0.31]		[0.75]		[0.79]	
ln(UI Benefit)	0.065		-0.007		0.094	*	0.034		-0.053	
	(0.045)		(0.069)		(0.052)		(0.055)		(0.119)	
	[4.08]		[-0.31]		[7.55]		[2.11]		[-4.01]	
		*				*		*		
		*				*		*		
ln(SSDI Benefit)	0.172	*	0.103	*	0.205	*	0.471	*	0.032	
	(0.040)		(0.059)		(0.048)		(0.098)		(0.052)	
	[10.84]		[4.45]		[16.44]		[29.18]		[2.45]	
		*		*						
Unemployment		*		*						
Rate (Current)	-0.093	*	-0.191	*	-0.057		-0.063	*	-0.226	*
	(0.031)		(0.070)		(0.036)		(0.036)		(0.126)	
	[-5.88]		[-8.24]		[-4.56]		[-3.92]		[-17.19]	
Unemployment		*		*		*				
Rate (At Job Loss)	0.116	*	0.208	*	0.110	*	0.064	*	0.176	

		*		*		*				
	(0.031)		(0.069)		(0.036)		(0.035)		(0.124)	
	[7.31]		[8.98]		[8.78]		[3.96]		[13.33]	
		*						*		
		*						*		**
Disabled (0/1)	-2.595	*					-2.738	*	-1.241	*
	(0.073)						(0.084)		(0.282)	
	[242.73]						[255.77]		[107.86]	
		*		*		*		*		
		*		*		*		*		**
Age at job loss	-0.249	*	-0.186	*	-0.223	*	-0.275	*	-0.428	*
	(0.024)		(0.046)		(0.030)		(0.029)		(0.106)	
	[-3.51]		[-1.57]		[-5.02]		[-3.75]		[-2.27]	
		*		*		*		*		
Age at job loss		*		*		*		*		**
squared	0.002	*	0.002	*	0.002	*	0.002	*	0.005	*
	(0.000)		(0.000)		(0.000)		(0.000)		(0.001)	
	[N/A]		[N/A]		[N/A]		[N/A]		[N/A]	
		*		*		*		*		
		*		*		*		*		
Black (0/1)	-0.500	*	-0.426	*	-0.383	*	-0.491	*	0.107	
	(0.083)		(0.141)		(0.100)		(0.097)		(0.330)	
	[34.41]		[18.39]		[33.65]		[33.17]		[-7.94]	
Other Non-White										
(0/1)	-0.110		-0.267		0.086		-0.144		-0.529	
	(0.156)		(0.219)		(0.211)		(0.179)		(0.514)	
	[7.08]		[11.53]		[-6.7]		[9.23]		[45.23]	
Male (0/1)	-0.025		-0.016		-0.081		-0.118		0.442	
	(0.063)		(0.093)		(0.079)		(0.078)		(0.281)	
	[1.61]		[0.67]		[6.47]		[7.34]		[-33.82]	
High School	0.454	*	0.176		0.461	*	0.475	*	0.506	

Graduate Only (0/1)		*				*		*		
		*				*		*		
	(0.084)		(0.128)		(0.103)		(0.097)		(0.324)	
	[-27.83]		[-7.58]		[-35.9]		[-28.52]		[-36.5]	
		*				*		*		
		*		*		*		*		
Some College (0/1)	0.625	*	0.259	*	0.730	*	0.514	*	0.360	
	(0.089)		(0.131)		(0.116)		(0.103)		(0.350)	
	[-37.19]		[-11.1]		[-53.05]		[-30.38]		[-25.86]	
		*		*		*		*		
College Degree		*		*		*		*		
(0/1)	1.327	*	0.589	*	1.518	*	1.210	*	1.369	*
	(0.120)		(0.187)		(0.165)		(0.136)		(0.830)	
	[-66.62]		[-24.96]		[-85.37]		[-61.21]		[-72.42]	
								*		
								*		**
Number of Kids	0.051	*	0.012		0.051		0.109	*	0.276	*
	(0.028)		(0.039)		(0.035)		(0.033)		(0.099)	
	[3.19]		[0.51]		[4.11]		[6.76]		[20.95]	
						*				
						*				
Married (0/1)	0.094		-0.150		0.249	*	-0.053		0.268	
	(0.075)		(0.108)		(0.095)		(0.086)		(0.421)	
	[-5.95]		[6.45]		[-20.17]		[3.3]		[-21.53]	
		*		*		*		*		
		*		*		*		*		
Foreign-Born (0/1)	0.845	*	0.664	*	0.956	*	0.879	*	0.980	**
	(0.118)		(0.165)		(0.158)		(0.137)		(0.424)	
	[-44.86]		[-27.96]		[-58.78]		[-45.59]		[-62.07]	
		*		*						
Nativity N/A (0/1)	0.308	*	0.895	*	0.153		0.258		0.215	

				*						
	(0.146)		(0.265)		(0.160)		(0.170)		(0.528)	
	[-18.1]		[-36.98]		[-11.72]		[-15.08]		[-15.56]	
Currently Uninsured (0/1)	-0.466	***	-0.002		-0.705	***	-0.229	***	-0.862	**
	(0.070)		(0.104)		(0.091)		(0.081)		(0.339)	
	[29.87]		[0.07]		[57.97]		[14.36]		[58.11]	
2nd Wealth Quintile (0/1)	0.123		0.023		0.109		0.198	*	0.610	
	(0.087)		(0.128)		(0.107)		(0.102)		(0.377)	
	[-7.61]		[-0.97]		[-8.59]		[-11.94]		[-41.4]	
3rd Wealth Quintile (0/1)	0.265	***	0.020		0.372	***	0.280	***	0.575	
	(0.093)		(0.136)		(0.117)		(0.107)		(0.502)	
	[-16.03]		[-0.88]		[-27.59]		[-16.65]		[-38.34]	
4th Wealth Quintile (0/1)	0.449	***	0.155		0.551	***	0.396	***	0.524	
	(0.102)		(0.151)		(0.132)		(0.116)		(0.644)	
	[-26.31]		[-6.67]		[-38.99]		[-23.05]		[-34.82]	
5th Wealth Quintile (0/1)	0.693	***	0.155		0.905	***	0.631	***	7.637	
	(0.117)		(0.170)		(0.159)		(0.131)		(839.126)	
	[-38.55]		[-6.67]		[-57.64]		[-35.04]		[-100.34]	
Wealth N/A (0/1)	0.357	**	0.168		0.305	*	0.335	*	0.463	

	(0.149)	(0.236)	(0.174)	(0.174)	(0.429)
	[-20.74]	[-7.22]	[-22.27]	[-19.24]	[-32.07]
Constant	12.726***	7.442***	11.283***	12.603***	14.80***
	(0.603)	(1.392)	(0.739)	(0.849)	(2.447)
ln(sigma)	1.100***	1.185***	0.715***	1.161***	0.857***
	(0.041)	(0.034)	(0.125)	(0.050)	(0.122)
ln(kappa)	-0.265***	-2.227***	0.364**	-0.255**	-0.985
	(0.088)	(0.385)	(0.143)	(0.103)	(0.643)
Log-likelihood	-10193.6	-4806.97	-5289.07	-8542.18	-307.711
N	1301646	191048	1110598	1291362	27742
Joint significance of UI Expires Current Month and Initial Expiration					
Test statistic	2.62	0.92	2.39	2.18	0.00
p-value	0.11	0.34	0.12	0.14	0.98

Note: Standard errors in parentheses. Marginal effects (mean derivative of the predicted hazard rate with respect to variable, divided by the mean predicted hazard, times 100) in brackets. All specifications also include demographic variables.

*** - Significantly different from zero at the 99 percent confidence level ** - 95 percent confidence level * - 90 percent confidence level