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1 Additional Information to Institutional Background and Data

1.1 Institutions

Here, we provide a few additional details regarding the German UI system. For additional information on the unemployment institutions see Hunt (1995).

In this paper we analyze the system from July 1987 onwards. Prior to 1983 potential UI durations did not vary with age and were capped at 12 months. The implementation of the post-1987 regime occurred stepwise between 1983-1987 and the reform is analyzed in detail by Hunt (1995). We do not analyze these changes here, since the sample size in each of the short periods in which the UI system is stable is relatively small. Besides being potentially imprecisely estimated, they would not be easily compared to labor supply effects in other years, since both the economic environment and the magnitude of the cutoffs is different.

UI benefits are paid for by worker and employer contributions. There is no experience rating of employers, so that employer contributions do not depend on the number of workers who were laid off and received UI benefits in the past. There is a cap on earnings insured, but according to Hunt (1995) it affects only a small number of UI recipients. The benefits are determined based on net earnings. In Germany UI benefits are not taxed themselves, but can push total income into a higher income tax bracket.

Unlike UI benefits, unemployment assistance (UA) benefits are funded by general revenues. The wealth threshold for UA is not very stringent, but given the wealth distribution in Germany it is likely to be binding for part of our sample.

UI and UA replacement rates were reduced by one (three) percentage points in 1994 for individuals with (without) children. Yet, controlling for a post-1994 dummy in the cyclical analysis in the main paper does neither show a significant decline in labor-supply effects nor affect the main results.

1.2 The German Social Security Data

The German Social Security Database contains employment records for full and part-time private sector employees, public sector workers who are not classified as permanent civil servants, and the individuals receiving unemployment insurance or unemployment assistance benefits. The data does not cover the self-employed, civil servants and before 1999 individuals in "minor" employment relationships below a very low income threshold.[1] The data covers about 80 percent of the total workforce at any given point in time. For each employment spell the data set contains information on the day of spell begin and end, the identity of the employer, industry, occupation,

[1] In 1996, the threshold was 590 Deutsche Mark (about 300 Euro) per month in West and 500 Deutsche Mark in East Germany.

education, gender, the county ("Kreis") where the employer is located, and the average daily gross wage. There is no information on hours apart from whether the job was full- or part-time. Wages are top-coded at the social security contribution limit which affects about 15 percent of the overall population but a much smaller fraction in our sample of unemployed workers. For unemployment insurance and assistance spells, the benefit payments and the start and end date are available.

In order to impute eligibility for UI we calculate the total number of months worked full time since either the last UI spell or the point in time 7 years before the start of the current UI spell, whichever occurred last. For all results that pool individuals over several years (either the period before or after the 1999 reform) we restrict the sample to individuals who worked for at least 52 months by this measure, which assures that every individual is eligible for the maximum UI duration of her age group. When we estimate elasticities for each year separately (the first estimation step for the results in Table IV) we use a slightly larger sample to improve efficiency, since at lower maximum durations the experience requirements are also lower. Thus for calculations around the age 42 (age 45 for post 1999) we restrict the sample to having worked a minimum of 36 months, around the age 44 (age 47 cutoff) to having worked 44 months, and around the age 49 cutoff to having worked 52 months. While this increases our sample size and precision of the estimates it does not considerably affect the demographic composition of the analysis sample or the point estimates.

The data covers employment spells until 2008. For this reason there is less time to observe whether individuals return to work towards the end of the analysis period relative to non-employment spells early in the period. For the main outcome variable this paper therefore uses non-employment duration top-coded at 36 months, i.e. non-employment duration for individuals who do not find a job within 36 months is set to 36 months irrespective of whether or not they we observe them employed later on. We experimented with moving the cutoff to 48 or 60 months in Appendix Table W4. While the estimated marginal effects are larger for longer horizons, the elasticities are virtually unchanged. Table W4 also shows results for time-to-job duration, which only includes individuals who eventually find a job before 2008, and time-to-job duration for individuals who find a job within 36 months. These measures make clear that the effect on non-employment duration is not only driven by an increase of individuals who are top-coded. The effect on time-to-job duration in Column (1) is nearly the same as for the main non-employment measure. Furthermore the marginal effect on time-to-job duration in Column (2) is around 50 percent of the effect in Column (3), indicating that the effect on our preferred non-employment duration measure is about half due to increases in time-to-job duration and half due to spells that are top-coded at 36 months. Table W4 also shows that there are relatively small increases at the thresholds in the fraction of individuals who do not find a job within 36, 48 or 60 months and that these increases are declining the further out the horizon.

The wage in our data is the average daily pre-tax wage over the employment spell and included bonus payments. We deflate the wage to prices in 2000. We calculate experience as the time worked in full time employment prior to the current employment spell, measured in years. Similarly employer tenure is calculated as total time worked full time with the current employer until the start of the current employment spell. Equivalently for occupation and industry tenure. It should be noted that this is a fairly conservative way of calculating tenure, since it only counts full time and would exclude breaks from the employer. A survey based measure would probably yield higher tenure levels. We translate the categorical education variable into a continuous years of education variable using the following assignment: Up to "Mittlere Reife" degree with or without apprenticeship training 10 years, "Abitur" with or without apprenticeship training 13 years, "Fachhochschule" - vocational college - degree 16 years, and "Hochschulabschluss" 18 years.

2 Methodology

2.1 Estimating the Effect of UI Extensions on Survival and Hazard Functions using a Regression Discontinuity Design

The main analysis of the paper focuses on effects of UI extensions on the mean. However, the RD approach can also be used to study how how the distribution of unemployment durations changes at the age cutoff by providing nonparametric estimates of the survival functions just before and just after the cutoff. RD estimates for the survival functions are created by estimating the following equation:

$$P(Dur \geqq x)_{ia} = \beta_{0,x} + \beta_{1,x} D_{a \geq a^*} + f(a) + \varepsilon_{ai}, \tag{1}$$

This equation is the same as the main RD estimation equation, except for the difference that in the regression the left hand side variable is a dummy for the duration being longer than x months, where we estimate this for $x = 1...25$. Since $F(x) = P(Dur \geqq x)$ is the survival function, the estimates for $\beta_{1,x}$are estimates for the shift of the survival function at the discontinuity, while $\beta_{0,x}$ are estimates for the survival function just to the left of the cutoff (with the right normalization of the age variable). Similarly, one can estimate the hazard function as a linear probability model for $P(Dur = x | Dur \geq x)$, within the same RD framework. Note that these survival and hazard functions should not be viewed as consistent estimates on the individual level, but rather as estimates of the average survivor function in the population to the left and right of the cutoff. Consequently the RD strategy identifies the causal effect of UI extensions on the average survival function in the population, but it does not determine whether the shape of the survival function, and change thereof, is driven by behavioral responses (true duration dependence) or selection.

Figure W-3 (a) shows the results for duration of UI benefit receipt, Panel (b) shows the estimates

for non-employment duration. The survival function for individuals eligible to 18 months of UI relative to individuals eligible to 12 months is already clearly shifted outward around 3-4 months after the beginning of the spell. Thus unemployed individuals adjust their search behavior a long time before running out of UI depending on whether they are eligible to longer durations. The figure also reveals that about 28 percent exhaust their UI benefits in the 12 month eligibility group, while only about 20 percent in the 18 month eligibility group.

2.2 Alternative Specifications for Estimating the Effect of UI Extensions over the Business Cycle

Tables W11 and W12 show alternative ways of estimating how the effect of UI extensions on Non-employment varies over the business cycle. In Table W12 we pool our data from 1987 to 2004 for all spells of individuals age 40 to 49. We then estimate a linear regression of non-employment duration on potential UI duration, and potential duration interacted with the change in the unemployment rate in that year. In the spirit of the RD methodology, we control for a flexible (quartic) age polynomial, so that the identification of the potential UI duration coefficient comes from the age discontinuities. Since the age profile may depend on the economic environment, we also interact the age polynomial with the change in the unemployment rate. Finally to allow for the possibility that the 1999 reform reduced the effect of UI on non-employment (and the timing of this may be correlated with the business cycle), we also interact the age polynomial and the age polynomial times change in unemployment with a dummy for post 1999 reform.

Column (1) shows the result for estimating the model without the interaction of potential UI duration and the change in the unemployment rate and Column (2) adds this interaction term. Columns (3) and (4) replicate the first two columns but controlling for additional observables: time of year, gender, education, west Germany, nationality, pre UI wage and UI benefit level. One additional month of UI benefits is estimated to increase non-employment durations by about 0.12 months before the 1999 reform. This is very similar to the range of estimates from the RD estimation (about 0.1 to 0.13 months). After 1999 the effect declines to only about 0.065 months. The interaction term of potential UI duration with the change in the unemployment rate is quite small and statistically insignificant (despite fairly precise standard errors). The bottom panel calculates implied elasticties from this model. For this the model is used to predict non-employment duration for everyone in the sample under the assumption that they receive 12 and 18 months of benefits. Comparing the difference in predicted non-employment durations allows computing the implied elasticity with the standard elasticity formula from Table I. The implied elasticity is with 0.093 (or 0.071 for the model with additional controls) slightly smaller than the average elasticity of 0.12 over all cutoffs in Table IV. Similarly the effect of changes in the unemployment rate on this elasticity are somewhat smaller in Column (2) and virtually identical in Column (4) to the estimates

from the 2 step procedure in Table IV.

Table W11 shows as another alternative a cox proportional hazard model, very similar to the models in Meyer 1990 and Katz and Meyer 1990. The dependent variable is the hazard of leaving non-employment in a given month. On the right hand side we control for age and the same demographics as in the pooled linear model. The effect of potential UI duration on the hazard is captured by a piecewise linear spline function of months of remaining UI benefits. This specification closely follows Meyer 1990, with the difference that we are looking at monthly rather than weekly hazard rates, which makes it impossible to directly compare the coefficients (but given that potential UI durations are considerably longer in our sample it is not feasible to use the same splines that Meyer is using).

As in Katz and Meyer (1990) one can simulate the model for different potential UI durations and from the predicted non-employment durations derive elasticities, which are reported at the bottom of the panel. The implied elasticities are again quite similar to the elasticities derived from the RD estimates.

2.3 Construction of Weights (Table V, Column (4)) and Comparison with United States

To assess whether over-time changes in sample characteristics affect the correlation of labor supply elasticities with the business cycle, we re-weight the observations in each year to match the distribution of observable characteristics of our sample in 2002. To generate these weight, for each sample year we merge observations from that year with the sample from 2002. We then estimate a probit model of the probability that a given observation in this merged sample belongs to the year 2002. The predictors in this regression are gender, age, age squared, education in years, whether a person in a German citizen, and dummies for 5 main industries (see Appendix Table W12). Using predicted propensity score p, we then weighted each observation in the RD regressions underlying Table IV with the weight $\omega = p/(1-p)$.

In order to compare our sample of unemployed individuals with the U.S. we use the yearly March Current Population Survey (CPS) from 1987 to 2004 and the biyearly Displaced Worker Survey Supplement (DWS) to the CPS from 1988 to 2004. The March CPS does not have direct information on who is a UI recipient at the interview time, so we created two samples to compare with the German data: one containing all unemployed individuals at the time of the survey and another one containing all individuals who received any UI benefits during the previous year. While neither of them quite represents an inflow sample into UI (like the German data), they provide a useful benchmark to compare characteristics. Since tenure on the last job before unemployment is not available in the March CPS, we also use a sample of Job Losers from the DWS. We again created two samples, one with all individuals who lost a job in the last 3 years and one with the additional restriction of having received UI benefits after losing the job. While self identified job

losers are not quite representative for the universe of unemployed workers, they are probably closer to our sample definition of unemployed individuals with high attachment to the labor force prior to job loss. We aggregate industry codes up to the same 5 sectors used for the German data (the definition of the sectors was chosen to make them as comparable as possible across countries and time periods).

Table W14 shows summary statistics for the German UI sample and the 4 US samples. All five columns restrict the sample to the analysis age range of age 40 to 49. The CPS and DWS samples are very similar. Fraction female and years of education are slightly higher in the DWS. The main differences appear to be in the sectoral composition, with less construction and service workers in the DWS, but more manufacturing and trade. The main differences between the US and German samples are fewer women and lower levels of education in Germany with more emphasis on manufacturing. As mentioned in the text, 3 years after job loss, about 15 percent or workers are still not employed in the DWS sample. Given the time since job displacement in the Displaced Worker Survey is based on calendar years and the survey is either in January of February, at 36 months after displacement the actual number is likely to be higher (for two years after displacement, the fraction not employed is about 21 percent in the DWS). The duration of unemployment is smaller in the survey data used by Katz and Meyer (1990a,b), but they discuss potential sources of measurement error due to recall problems. The average duration of spells in unemployment as defined by statistical authorities is also smaller, yet this ignores duration of time spent out of the labor force and is affected by institutional features of the labor market (e.g., Machin and Manning 1999).

Table W13 shows the correlation between labor supply elasticities and business cycle measures when the German UI sample is re-weighted to match the observable characteristics of the US samples. The methodology to create the weights is the same as for creating weights to match the 2002 distribution in each year.

2.4 Measuring the Welfare Components

The welfare equation in the text holds for marginal changes in the potential benefit duration. To estimate the components of $\frac{dB}{dP}\big|_1$, $\frac{dB}{dP}_2\big|$, and $\frac{dD}{dP}$ empirically given a discrete increase in P, we estimate the corresponding components by integrating numerically over the shifts in the survival function. Consider estimating $\frac{dD}{dP}$: An obvious estimate would be the change in D associated with an increase in P, e.g. from $P^1 = 12$ months to $P^2 = 18$ months: $\frac{\Delta D}{\Delta P}$. Note that since $D = \sum_{t=0}^{\infty} S(t)$, $\frac{\Delta D}{\Delta P}$ is the same as the area between the survival functions above and below the cutoff: $\sum_{t=0}^{\infty} S_{P^2=18}(t) - S_{P^1=12}(t)dt\,/6$.

In principle one could also estimate $\frac{dB}{dP}\big|_1 \approx \frac{\Delta B}{\Delta P}\big|_1 = \left(\sum_{t=P^1}^{P^2} S_{P^1}(t)\right)/6$ and $\frac{dB}{dP}\big|_2 \approx \frac{\Delta B}{\Delta P}\big|_2 =$

$\left(\sum_{t=0}^{P^2=18} S_{P^2}(t) - S_{P^1}(t)\right)/6$. One problem with this is that in practice a substantial fraction of people stop receiving UI benefits before the exhaustion date without exiting non-employment. This is partly due to people dropping out of the labor force and partly due to people losing eligibility (e.g. because they are sanctioned for refusing job offers). Thus the survival functions for remaining on UI benefits are not the same as for remaining in non-employment and the above approximations for $\frac{dB}{dP}\big|_1$ and $\frac{dB}{dP}\big|_2$ do not work very well when using the non-employment survival functions. It is natural to use the UI benefit survival functions $S_P^{UI}(t)$ instead in these calculations. The problem with this is that, for example in the case of $\frac{dB}{dP}\big|_1 \approx \frac{\Delta B}{\Delta P}\big|_1 = \left(\sum_{t=P^1}^{P^2} S_{P^1}^{UI}(t)\right)/6$ we would like to measure the increase in B that would have occurred if behavior hadn't changed. But of course we don't observe how fast people would have dropped out of UI at the lower threshold after the benefit expiration (i.e. $S_{P^1}^{UI}(t)$ is equal to 0 for $t \geq P^1$). We therefore use our estimate for $S_{P^1}^{UI}(t)$ up to P^1 and fit a flexible exponential function to extrapolate $S_{P^1}^{UI}(t)$ up to P^2.[2] Using this extrapolation we can implement our numerical estimates for $\frac{dB}{dP}\big|_1$ and $\frac{dB}{dP}\big|_2$.

Figure W5 shows the measurement of the three components at the age 42 cutoff for the 1987 to 1999 period. The figure presents the survival functions for remaining in non-employment above and below the age threshold at which UI benefit durations increase from 12 to 18 months. Similarly it shows the survival functions for remaining on UI benefits for both groups. These four survival functions are estimated pointwise at each point of support using regression discontinuity estimation (using the same methodology as described in section 2.1 of this appendix). Finally it shows the interpolated survival function for remaining on UI benefits for the people below the age threshold, which is used to create a counterfactual survival function beyond 12 months of UI benefits. The shaded areas mark the areas corresponding to the cost and benefit indexes: $X = \frac{dB}{dP}\big|_1$, $Y = \frac{dB}{dP}\big|_2$, and $Z = \frac{dD}{dP}$.

For columns (7) and (8) in Table IV in the main text we replicate this methodology in each year and for each age threshold and then follow the methodology as for the other columns in the table.

3 Derivation of Theoretical Results

3.1 Derivation of Welfare Formula

The model describes the job search behavior and utility of a worker from the beginning of the unemployment spell (period $t = 0$) onwards up to a finite period $t = T$. We first derive the main welfare formulas in the text and then show how the model can be extended to allow for stochastic wage offers (and thus a reservation wage), heterogeneity and endogenous ex ante behavior.

In our model UI durations do not affect the probability of jobs ending. An effect on the dismissal rate would probably be most likely if workers are eligible for UI after short employment

[2] We use the functional form: $S(t) = exp(\beta_1 t + \beta_2 t^2 + \beta_3 t^3 + \beta_4 t^4)$ which provides a very good fit.

spells and if UI induces workers to take up seasonal jobs. In our empirical analysis we do not find that longer UI durations affect the inflow rate into UI. Since individuals have to work for at least 12 months in Germany to be eligible for UI this should not create incentives to take on seasonal jobs.

A worker in our model is either employed or unemployed (we do not model labor force participation decisions here). A person holds assets A_t at the beginning of period t and there is a lower bound on assets A_L which means individuals are credit constraint. By the end of the model horizon individuals have to repay all debt ($A_T \geq 0$). When employed a worker receives a wage w_t, has to pay a tax of τ and we assume he will keep the job until the end of the model horizon. The life-time value of utility if a person finds a job at the beginning of period t can be written as

$$V_t(A_t) = \max_{A_{t+1} \geqq L} \left(v\left(A_t - A_{t+1} + w_t - \tau\right) + V_{t+1}\left(A_{t+1}\right)\right),$$

where $v(c_t^e)$ is the flow utility while employed. While unemployed, the worker receives a fixed level of UI benefits $b < w_t$ for at most a fixed number of P periods. After exhausting UI benefits, the worker receives a fixed baseline utility and no further transfer payments (though this is easily generalized). The duration of non-employment is $D \equiv \sum_{t=0}^{T-1} S_t$, where $S_t \equiv \prod_{j=0}^{t}(1-s_j)$ is the survivor function at time t. Total lifetime of workers at the time of entering unemployment is thus broken up into 3 periods: duration of receiving UI benefits ($B \equiv \sum_{t=0}^{P-1} S_t$), the duration of non-employment without receiving UI benefits ($D-B$), and the duration of employment ($T-D$).

The value for a person who does not find a job at the beginning of a period is

$$U_t(A_t) = \max_{A_{t+1} \geqq L} \left(u\left(A_t - A_{t+1} + b_t\right) + J_{t+1}\left(A_{t+1}\right)\right),$$

where $u(c_t^u)$ is the flow utility while unemployed. The value of job search in each period can be expressed as

$$J_t(A_t) = \max_{s_t} \left(s_t V_t(A_t) + (1-s_t) U_t(A_t) - \psi(s_t)\right),$$

where $\psi(s_t)$ is the differentiable, increasing, and convex cost of job search (below, we allow search costs to vary over time). If we assume that $U(.)$ is concave,[3] optimal search intensity in each period is implicitly defined by

$$V(A_t) - U(A_t) = \psi'(s_t).$$

This formula will be used below to assess the effect of changes in search costs and reemployment wages on the path of search intensity.

[3] See Lentz and Tranaes (2005) and Chetty (2008) for a discussion of this point.

Welfare Effect of UI Extensions. Assuming the social planner sets taxes to achieve a balanced budget of the UI system and that workers respond optimally to incentives, we can derive the effects on welfare of changes in the potential duration of UI benefits P.[4] Social welfare at time $t = 0$ can be written as $W_0 = s_0 V_0(P,\tau) + (1-s_0)U_0(P,\tau) - \psi(s_0)$.

To be able to work with derivatives with respect to P, we assume that P can be increased by a fraction of 1 and that if P is not an integer number, it means a fraction of the period $int(P)$ is covered by the higher benefit level b. In other words b_t can change within a period and the benefits in a period is the fraction that is covered time b.

In that case a marginal change in P can be analyzed. A marginal change in P normalized by b is the same as a marginal change in b_P in the next period (Since we start at time 0 the period after benefits are exhausted is period P).

Note that in period P by the first order condition of the individual we have:

$$\frac{\partial s_P}{\partial P}\frac{1}{b} = \frac{\partial s_P}{\partial b_P} = -\frac{u'(c_P^u)}{\psi''(s_P)}$$

Furthermore, let a_t be a one time payment of amount a_t in period t independent of whether the individual is employed or not:

$$\frac{\partial s_P}{\partial a_P} = \frac{v'(c_P^e) - u'(c_P^u)}{\psi''(s_P)}$$

And:

$$\frac{\partial s_P}{\partial w_P} = \frac{v'(c_P^e)}{\psi''(s_P)}$$

Combining this we can decompose the disincentive effect into the moral hazard and the liquidity effect:

$$\frac{\partial s_P}{\partial P}\frac{1}{b} = \frac{\partial s_P}{\partial b_P} = \frac{\partial s_P}{\partial a_P} - \frac{\partial s_P}{\partial w_P}$$

Looking at this from the perspective of the first period we get some useful relations:

For $x_P = w_P, b_P, a_P$:

$$\frac{\partial s_0}{\partial x_P} = \frac{1}{\psi''(s_0)}\left[\frac{\partial V_0}{\partial x_P} - \frac{\partial U_0}{\partial x_P}\right]$$

Using the envelope condition of the individual maximization problem we get:

$$\frac{\partial U_0}{\partial b_P} = \prod_{i=1}^{P}(1-s_i)u'(c_P^u)$$

[4] We follow the existing applied literature on the optimality of the UI system by focusing on a constraint optimization within the class of typical UI systems (e.g., Baily 1978, Chetty 2008). A large theoretical literature has derived the full optimal time-path of UI benefits (e.g., Hopenhayn and Nicolini 1997, Shimer and Werning 2006, Pavoni 2007).

$$\frac{\partial V_0}{\partial b_P} = 0$$

$$\frac{\partial U_0}{\partial w_P} = s_1 v'(c_1^e) + \sum_{t=2}^{P-1} \left[\prod_{i=1}^{t-1} (1-s_i) \right] s_t v'(c_t^e)$$

$$\frac{\partial V_0}{\partial w_P} = v'(c_0^e)$$

$$\frac{\partial U_0}{\partial a_P} = \frac{\partial U_0}{\partial b_P} + \frac{\partial U_0}{\partial w_P}$$

$$\frac{\partial V_0}{\partial a_P} = \frac{\partial V_0}{\partial w_P}$$

From this one can see that:

$$\frac{\partial s_0}{\partial P}\frac{1}{b} = \frac{\partial s_0}{\partial b_P} = \frac{1}{\psi''(s_0)} \left[-\frac{\partial U_0}{\partial b_P} \right]$$

$$\frac{\partial s_0}{\partial w_P} = \frac{1}{\psi''(s_0)} \left[\frac{\partial V_0}{\partial w_P} - \frac{\partial U_0}{\partial w_P} \right]$$

$$\frac{\partial s_0}{\partial P}\frac{1}{b} = \frac{\partial s_0}{\partial b_P} = \frac{\partial s_0}{\partial a_P} - \frac{\partial s_0}{\partial w_P} \tag{2}$$

Note that the unconditional average marginal utility of consumption while employed over the time horizon T is:

$$\begin{aligned} E_{0,T-1} v'(c_t^e) &= \frac{1}{T-D} \left\{ s_0 T v'(c_0^e) + \sum_{t=1}^{T-1} \left[\prod_{i=1}^{t-1} (1-s_i) \right] s_t (T-t) v'(c_t^e) \right\} \\ &= \frac{1}{T-D} \left\{ (1-s_0) \frac{\partial U_0}{\partial w} + s_0 \frac{\partial V_0}{\partial w} \right\} \end{aligned} \tag{3}$$

The marginal welfare effect of increasing P, normalized by the UI benefit level is:

$$\begin{aligned} \frac{dW_0}{dP}\frac{1}{b} &= \frac{dW_0}{db_P} = (1-s_0) \left(\frac{\partial U_0}{\partial b_P} - \frac{\partial U_0}{\partial w} \frac{d\tau}{db_P} \right) - s_0 \frac{\partial V_0}{\partial w} \\ &= (1-s_0) \frac{\partial U_0}{\partial b_P} - \left((1-s_0) \frac{\partial U_0}{\partial w} + s_0 \frac{\partial V_0}{\partial w} \right) \frac{d\tau}{db_P} \end{aligned}$$

Using the results from before we obtain:

$$\frac{dW_0}{dP}\frac{1}{b} = S(P)\, u'(c_P^u) - \frac{d\tau}{db_P} (T-D)\, E_{0,T-1} v'(c_t^e) \tag{4}$$

where $S(\xi) = \prod_{i=0}^{\xi}(1-s_i)$, is the survivor function for staying in unemployment, or in other words $S(P)$ is the exhaustion rate.

Differentiating the government budget constraint we get:

$$\frac{d\tau}{db_P} = \frac{d\tau}{dP}\frac{1}{b} = \frac{1}{T-D}\left(\frac{dB}{dP} + \frac{B}{T-D}\frac{dD}{dP}\right) \tag{5}$$

Note that:

$$\frac{dB}{dP} = \sum_{t=0}^{P-1}\frac{dS(t)}{dP} + S(P) \text{ and } \frac{dD}{dP} = \sum_{t=0}^{T-1}\frac{dS(t)}{dP}$$

Welfare Formula

Define: $\frac{dB}{dP}\Big|_1 = S(P)$ and $\frac{dB}{dP}\Big|_2 = \sum_{t=0}^{P-1}\frac{dS_t}{dP}$. Combining these equations we get:

$$\frac{dW_0}{dP} = \left.\frac{dB}{dP}\right|_1 b\left[u'(c_P^u) - E_{0,T-1}v'(c_t^e)\right] - \left(\left.\frac{dB}{dP}\right|_2 + \frac{B}{T-D}\frac{dD}{dP}\right) b E_{0,T-1}v'(c_t^e) \tag{6}$$

Note that using the approximation that the hazard s is constant, we have that $D = \frac{1}{s}$. In this case one can show that: $\frac{dB}{dP}\Big|_2 = \frac{dD}{dP}\xi$, where $\xi \equiv \left(1 - Ps(1-s)^{P-1} - (1-s)^P\right)$.

We can then rewrite the welfare equation as:

$$\frac{dW_0}{dP} = \frac{dB}{dP} b\left[u'(c_P^u) - E_{0,T-1}v'(c_t^e)\right] - \frac{dD}{dP} b\Omega \tag{7}$$

where $\Omega \equiv \xi u'(c_P^u) + \frac{B}{T-D}E_{0,T-1}v'(c_t^e) > 0$.

Increasing potential benefit durations by one month will increase total expenditure on UI by $\frac{dB}{dP}b$. If we normalize equation (8) by $\frac{dB}{dP}b$, we get the marginal welfare gain by increasing total UI expenditures by 1 (through an increase in P):

$$\frac{dW^*}{dP} = \frac{dW_0}{dP} \Big/ \left(\frac{dB}{dP}b\right) = \left[u'(c_P^u) - E_{0,T-1}v'(c_t^e)\right] - \frac{\frac{dD}{dP}}{\frac{dB}{dP}}\Omega \tag{8}$$

Moral Hazard and Liquidity Effects

Therefore for analyzing the welfare effects of UI extensions over the business cycle, it is sufficient to investigate the cyclicality of $\frac{dB}{dP}$ and $\frac{dD}{dP}$, as long as the relevant marginal utilities remain approximately constant over the cycle.

If we normalize the welfare gain by the expected marginal utility of an employed person $E_{0,T-1}v'(c_t^e)$ and if one uses the approximation that $E_{0,T-1}v'(c_t^e) \approx v'(c_P^e)$, which may be a reasonable approximation if unemployment durations are short relative to lifetime employment, or if the people with shorter durations than P who have lower $v'(c_t^e)$ are outweighed by individuals with longer durations then we can write the welfare equation (6) as:

$$\frac{d\widetilde{W}}{dP} = \frac{dW_0}{dP} \Big/ E_{0,T-1}v'(c_t^e) = \left.\frac{dB}{dP}\right|_1 bR - b\left[\left.\frac{dB}{dP}\right|_2 + \frac{dD}{dP}\frac{B}{T-D}\right] \tag{9}$$

where $R = \frac{-\partial s_P/\partial a_P}{\partial s_P/\partial w_P}$ is the ratio of the liquidity to the moral hazard effect. For the case of a constant hazard, we can then rewrite the welfare equation based on sufficient statistics as:

$$\frac{d\widetilde{W}}{dP} = \frac{dB}{dP}bR - \frac{dD}{dP}b\widetilde{\Omega} \tag{10}$$

where $\widetilde{\Omega} \equiv \xi(1+R) + \frac{B}{T-D} > 0$.

3.2 Extension 1: Stochastic Wage Offers

This extension and the next two draw on Chetty (2008). Suppose individuals are offered jobs with a wage from a stochastic offer distribution: $w_t \sim w_m + F(w_t)$. Assume the offers are i.i.d. across periods and there is no recall of previous offers. Optimal search behavior is described by a reservation wage (McCall 1970), where wages above the reservation wage $w_t \geq R_t$ are accepted.

$$V_t(w_t, A_t) = \max_{A_{t+1} \geqq L} \left(v\left(A_t - A_{t+1} + w_t - \tau\right) + V_{t+1}\left(A_{t+1}\right)\right) \tag{11}$$

Unemployed individuals receive UI benefits b_t. Thus the value for a person who does not find a job at the beginning of a period is:

$$U_t(A_t) = \max_{A_{t+1} \geqq L} \left(u\left(A_t - A_{t+1} + b_t\right) + J_{t+1}\left(A_{t+1}\right)\right) \tag{12}$$

At the beginning of a period a unemployed person has to chose a search intensity s_t and a reservation wage R_t. the value at the beginning of a period is:

$$J_t(A_t) = \max_{s_t, R_t} \left(s_t Prob(w_t \geq R_t) EV_t(A_t) + (1 - s_t Prob(w_t \geq R_t)) U_t(A_t) - \psi(s_t)\right), \tag{13}$$

where $p \equiv Prob(w_t \geq R_t)$ is the probability that an offer comes with a wage above the reservation wage and $EV_t(A_t)$ is the expected value of being employed conditional on receiving an

acceptable offer.

$$EV_t(A_t) = E\left[V_t(w_t, A_t) | w_t \geq R_t\right] = \frac{1}{Prob(w_t \geq R_t)} \int_{R_t}^{\infty} V_t(w_t, A_t)\, dw_t$$

Using the envelope condition again, the marginal welfare gain from increasing P, normalized by the UI benefit level, is given as:

$$\frac{dW_0}{dP}\frac{1}{b} = \frac{dJ_0}{db_P} = (1 - ps_0)\frac{\partial U_0}{\partial b_P} - \left((1 - ps_0)\frac{\partial U_0}{\partial w} + ps_0\frac{\partial EV_0}{\partial w}\right)\frac{d\tau}{db_P}$$

The marginal utility of consumption while employed is given as:

$$(T - D)E_{0,T-1}v'(c_t^e) = (1 - Ps_0)\frac{\partial U_0}{\partial w} + ps_0\frac{\partial EV_0}{\partial w}$$

Therefore we can write the welfare gain as:

$$\frac{dW_0}{dP}\frac{1}{b} = \widetilde{S}(P)\, u'(c_P^u) - \frac{d\tau}{db_P}(T - D)\, E_{0,T-1}v'(c_t^e)$$

where $\widetilde{S}(t) = \prod_{i=0}^{t}(1 - p_i s_i)$ is the survival function and $D = \sum_{t=0}^{T-1}\widetilde{S}(t)$ the expected non-employment probability. The government budget constraint is still given as before and therefore:

$$\frac{d\tau}{db_P} = \frac{d\tau}{dP}\frac{1}{b} = \frac{1}{T - D}\left(\frac{dB}{dP} + \frac{B}{T - D}\frac{dD}{dP}\right)$$

Therefore the marginal welfare gain from an increase in P is given as:

$$\frac{dW_0}{dP} = \widetilde{S}(P)\, b\left[u'(c_P^u) - E_{0,T-1}v'(c_t^e)\right] - \left(\sum_{t=0}^{P-1}\frac{d\widetilde{S}(t)}{dP} + \frac{B}{T - D}\frac{dD}{dP}\right) b\, E_{0,T-1}v'(c_t^e)$$

Compared to the welfare formula in the paper this is identical, except that the survivor function is now determined by the probability of finding a job and the probability of the wage offer being acceptable. To know how the marginal benefit of UI extensions vary over the business cycle, the same components have to be measured as in the main formula: the benefit exhaustion rate, the shift in the survivor function until the exhaustion point, the non-employment effect of an extension and the marginal utility of the unemployed and employed. In particular it is not necessary to have information about variation of the wage offer distribution or the reservation wage over the cycle, since any effect through these channels is already captured in the reduced form labor supply effects.

3.3 Extension 2: Heterogeneity

Suppose that the economy consists of N individuals, indexed by i, with utility functions u_i, v_i, and ψ_i. Let A_t^i and w_t^i denote the assets and wages of individual i at time t. Conditional on the benefit schedule, the individual choice problem is identical to the homogeneous model. Social welfare is given by the sum of expected utilities subject to the constraint that total UI benefits paid equal total taxes collected in expectation:

$$W_0(P) = \sum_{i=1}^{N} \left(s_0^i V_{i,0}(A_0^i) + (1 - s_0^i) U_{i,0}(A_0^i) - \psi_i(s_0^i) \right)$$

The marginal welfare effect of increasing P, normalized by the UI benefit level is

$$\begin{aligned}
\frac{dW_0}{dP}\frac{1}{b} &= \sum_{i=1}^{N} \left((1 - s_0^i) \left(\frac{\partial U_{i,0}}{\partial b_P} - \frac{\partial U_{i,0}}{\partial w^i} \frac{d\tau}{db_P} \right) - s_0^i \frac{\partial V_{i,0}}{\partial w^i} \right) \\
&= \sum_{i=1}^{N} \left(S_i(P)\, u_i'(c_P^u) - \frac{d\tau}{db_P} (T - D_i)\, E_{0,T-1} v_i'(c_t^e) \right) \\
&= \overline{S}(P) \sum_{i=1}^{N} \left(\frac{1}{N} \frac{S_i(P)}{\overline{S}(P)} u'(c_P^u) \right) - \frac{d\tau}{db_P} (T - \bar{D}) \sum_{i=1}^{N} \left(\frac{1}{N} \frac{T - D_i}{T - \bar{D}} E_{0,T-1} v'(c_t^e) \right) \qquad (14)
\end{aligned}$$

where $\overline{S}(t) = \sum_{i=1}^{N} S_i(t)$, $\bar{B} = \sum_{i=1}^{N} B_i = \sum_{i=1}^{N} \sum_{t=0}^{P-1} S_i(t)$ and $\bar{D} = \sum_{i=1}^{N} D_i = \sum_{i=1}^{N} \sum_{t=0}^{T-1} S_i(t)$.

Note that $\bar{E} u'(c_P^u) \equiv \sum_{i=1}^{N} \left(\frac{1}{N} \frac{S_i(P)}{\overline{S}(P)} u'(c_P^u) \right)$ is the average expected marginal utility of an exhaustee in the population, while $\bar{E}_{0,T-1} v'(c_t^e) \equiv \sum_{i=1}^{N} \left(\frac{1}{N} \frac{T - D_i}{T - \bar{D}} E_{0,T-1} v'(c_t^e) \right)$ is the average expected marginal utility while employed weighted by the expected employment duration of the individual.

The government budget constraint is:

$$\tau = \frac{\overline{B}\, b}{T - \overline{D}}$$

Differentiating the government budget constraint we get:

$$\frac{d\tau}{db_P} = \frac{1}{T - \overline{D}} \left(\frac{d\overline{B}}{dP} + \frac{\overline{B}}{T - \overline{D}} \frac{d\overline{D}}{dP} \right)$$

Plugging this into equation (14) and multiplying by b we get:

$$\frac{dW_0}{dP} = \overline{S}(P)\, b \left[\bar{E} u'(c_P^u) - \bar{E}_{0,T-1} v'(c_t^e) \right] - \left(b \sum_{t=0}^{P-1} \frac{d\overline{S}(t)}{dP} + \frac{Bb}{T - D} \frac{d\overline{D}}{dP} \right) \bar{E}_{0,T-1} v'(c_t^e)$$

This is again essentially identical to the main welfare formula in the paper, except that the

employment effects and marginal utilities now correspond to population averages. To assess the welfare benefits of UI benefit extensions over the business cycle it is necessary to measure these statistics for the population entering UI at various points in time. Whether the reduced form statistics vary over the cycle because the behavior and marginal utility of individuals truly depends on the economic environment, or because the characteristics of the unemployed vary over time, is irrelevant from a welfare analysis perspective. The marginal welfare effect of a UI extension depends simply on the behavior and utility of whoever would be affected by it.

3.4 Extension 3: Endogenous Ex-Ante Behavior

We again follow Chetty (2008) and model the possibility that individuals adjust their behavior prior to becoming unemployed, such as precautionary savings or buying alternative means of insurance, by adding an additional period $t = -1$ before the first unemployment period. In this period there is a probability of p of getting laid off at the end of the period and a probability of $1-p$ of receiving tenure and remaining employed until T. The individual has access to an insurance policy that pays $\$z$ if he is laid off and charges a premium $\omega(z)$ if he remains employed. The value function in period -1 is:

$$J_{-1}(A_{-1}) = \max_{A_0,z} v(w_{-1} - \tau - A_0) + pJ_0(A_0 + z) + (1-p)Tv\left(w_t - \tau + \frac{A_0 - \omega(z)}{T}\right)$$

The budget constraint is given as:

$$pBb = (T + 1 - p(T - D))\tau$$

Defining social welfare as before, $W = J_{-1}$, and taking the derivative of J_{-1} with respect to b_P we get:

$$\frac{dW}{dP}\frac{1}{b} = \frac{dJ_{-1}}{db_p} = -v'(c^e_{-1})\frac{d\tau}{db_p} - (1-p)Tv'\left(w_t - \tau + \frac{A_0 - \omega(z)}{T}\right)\frac{d\tau}{db_p} + p\frac{dJ_0}{db_p}$$

where

$$\frac{dJ_0}{db_p} = (1-s_0)\frac{\partial U_0}{\partial b_P} - \left((1-s_0)\frac{\partial U_0}{\partial w} + s_0\frac{\partial V_0}{\partial w}\right)\frac{d\tau}{db_P}$$

Define the average marginal utility while being employed as:

$$
\begin{aligned}
E_{-1,T-1}v'(c_t^e) &= \frac{1}{T+1-p(T-D)}\Bigg\{(1-p)Tv'(c_{-1}^e) \\
&\quad +p\left(s_0Tv'(c_0^e)+\sum_{t=1}^{T-1}\left[\prod_{i=1}^{t-1}(1-s_i)\right]s_t(T-t)v'(c_t^e)\right)\Bigg\}
\end{aligned}
$$

Taking the derivative of the budget constraint yields:

$$
\frac{d\tau}{db_P}=\frac{p}{(T+1-p(T-D))}\left(\frac{dB}{dP}+\frac{pB}{(T+1-p(T-D))}\frac{dD}{dP}\right)
$$

Then rearranging yields the following equation:

$$
\begin{aligned}
\frac{dW}{dP}\frac{1}{b} &= pS(P)\,u'(c_P^u)-\frac{d\tau}{db_P}(T+1-p(T-D))\,E_{-1,T-1}v'(c_t^e) \\
&= pS(P)\,\left(u'(c_P^u)-E_{-1,T-1}v'(c_t^e)\right) \\
&\quad -p\left(\sum_{t=0}^{P-1}\frac{dS(t)}{dP}+\frac{pB}{(T+1-p(T-D))}\frac{dD}{dP}\right)E_{-1,T-1}v'(c_t^e)
\end{aligned}
$$

This equation has to be summed over every individual, employed and unemployed, to aggregate up to the population, while our main welfare equation only has to be summed up over the number of individuals that become unemployed. To get an equivalent expression divide by p. This yields the analogous welfare equation to the main text, where $\frac{pB}{(T+1-p(T-D))}$ is essentially the expected unemployment rate in the model. Therefore while ex ante behavior can mitigate the welfare loss from unemployment, it does so by changing the marginal utilities that are elements of the welfare formula, thus with information about the marginal utilities, the formula can still be applied. Therefore as in the previous extensions of the model, information about the employment effects and the marginal utilities of individuals who are unemployed is sufficient to calculate the marginal welfare effect of UI extensions, even with endogenous ex ante savings behavior. Furthermore Chetty (2008) shows how this can be rewritten using a moral hazard and liquidity effect.

3.5 Incentives to Wait until Claiming UI

If we assume that there is no discounting, a linear utility function (or alternatively no liquidity constraints) and no UA, then an individual should simply maximize the expected UI benefit payments Bb which in the case of constant b is equivalent to maximizing the duration of receiving UI benefits (B). Whether an individual has an incentive to wait before claiming UI, depends on the distribution of possible nonemployment durations (D).

To fix ideas, let us consider the age 42 threshold, where potential UI durations P increase from 12 to 18 months. Suppose an individual becomes unemployed d months before becoming eligible for the higher potential benefits durations. The individual will wait if the expected duration of receiving UI when not waiting B_{nw} will be lower than the expected duration of receiving UI when waiting B_w.

For each D, one can calculate the payoff from waiting d months. For example, suppose $D = 14$ months. Waiting for d months yields an actual UI benefit duration B_w of $14 - d$ months, while not waiting yields $B_{nw} = 12$ months. Clearly waiting is beneficial for up to 2 months. If D is less than 12, then waiting is never beneficial, and will in fact cost money since not waiting would yield $B_{nw} = D$ months, while waiting only yields $B_w = D - d$ months. On the other hand, as long as $D - d$ is larger than 12 it is always beneficial to wait, since then $B_{nw} = 12$ months, while waiting yields $B_{nw} = max(D - d, 18)$ months.

In practice an unemployed individual faces a distribution of possible nonemployment durations D. To compute whether waiting is beneficial it is necessary to integrate over D. Doing so, the expected benefit durations from integration can be easily expressed using the survivor function of remaining in nonemployment S_t: $B_{nw} = \sum_{t=1}^{12} S_t$, while $B_w = \sum_{t=d}^{18} S_t$,. Waiting is beneficial as long as $B_w > B_{nw}$. The intuition behind this is that while B_w is integrating the survivor function over a larger duration (18 months rather than 12), it does so later on in the nonemployment spell (by d months). Since the survivor function is a decreasing function of t, the larger d, the smaller B_w will become. Essentially waiting is trading of receiving benefits for a shorter period but at a higher probability for benefits for a longer period but at a lower probability of actually using them. Based on the average survivor function in our own data, we computed that $B_w = B_{nw}$. after about 3.5 months.

Accounting for UA reduces the incentive to wait, since during the waiting time neither UI nor UA benefits are received, but after UI benefits b_UI are exhausted, UA benefits of level b_{UA} can be claimed. In this case waiting is beneficial as long as: $(B_w - B_{nw})b_{UI} > db_{UA}$. For men effective UA benefits are on average roughly half the size of UI benefits, in this case waiting is beneficial for about 1.5 months. For women who receive pretty low levels of UA, waiting is beneficial for up to 2.5 months. Given there are 34% women in our main sample (see the Data Appendix), the average wait time that takes account the presence of UA benefits would be about 1.8 months.

Web Appendix

Table W-1: Means and Standard Deviations of Main Variables by Age Groups

	(1) Analysis Sample Age 40-41 1987-1999	(2) Analysis Sample Age 42-43 1987-1999	(3) Analysis Sample Age 44-45 1987-1999	(4) Analysis Sample Age 47-48 1987-1999	(5) Analysis Sample Age 49 1987-1999	(6) Analysis Sample Age 43-44 1999-2004	(7) Analysis Sample Age 45-46 1999-2004	(8) Analysis Sample Age 47-48 1999-2004
Panel A: Unemployment Variables								
Maximum UI benefit duration (imputed)	12	18	22	22	26	12	18	22
	[0]	[0]	[0]	[0]	[0]	[0]	[0]	[0]
Duration of UI benefit receipt in months	6.8	8.8	10.4	11.3	13.2	6.4	8.6	10.2
	[4.9]	[7.1]	[8.6]	[8.8]	[10.4]	[4.6]	[6.7]	[8.2]
Non-employment duration in months	15.5	16.5	17.5	19.2	20.5	16.2	17.4	18.7
	[14.2]	[14.3]	[14.6]	[14.8]	[14.9]	[14.3]	[14.4]	[14.6]
Duration until next job	8.3	8.8	9.1	9.4	9.7	8.4	9.0	9.5
	[8.4]	[8.8]	[9.0]	[9.2]	[9.5]	[8.3]	[8.7]	[9.1]
Time between end of job and UI claim	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3
	[3.6]	[3.5]	[3.4]	[3.4]	[3.5]	[3.5]	[3.4]	[3.4]
Daily Post Unemployment Wage in Euro	64.0	63.6	63.4	63.1	63.3	60.8	59.8	58.7
	[29.1]	[28.7]	[28.8]	[29.2]	[29.8]	[30.3]	[29.7]	[29.4]
Post Wage - Pre Wage in Euro	-10.3	-10.8	-11.1	-11.7	-11.7	-11.5	-12.1	-12.7
	[28.6]	[28.5]	[27.9]	[29.7]	[28.9]	[27.2]	[26.9]	[27.1]
Log(Post Wage) - Log(Pre Wage)	-0.17	-0.17	-0.18	-0.19	-0.19	-0.19	-0.21	-0.22
	[0.47]	[0.48]	[0.48]	[0.49]	[0.48]	[0.52]	[0.52]	[0.53]
Switch industry after unemployment	0.72	0.71	0.71	0.69	0.69	0.68	0.67	0.66
	[0.45]	[0.45]	[0.45]	[0.46]	[0.46]	[0.47]	[0.47]	[0.47]
Switch occupation after unemployment	0.63	0.63	0.62	0.61	0.60	0.62	0.61	0.61
	[0.48]	[0.48]	[0.48]	[0.49]	[0.49]	[0.49]	[0.49]	[0.49]
Ever employed again	0.84	0.82	0.78	0.72	0.67	0.78	0.75	0.71
	[0.37]	[0.39]	[0.41]	[0.45]	[0.47]	[0.42]	[0.43]	[0.45]
Non-employment spell censored	0.26	0.28	0.31	0.37	0.41	0.28	0.31	0.35
	[0.44]	[0.45]	[0.46]	[0.48]	[0.49]	[0.45]	[0.46]	[0.48]
Next job is fulltime employment	0.90	0.90	0.89	0.89	0.88	0.89	0.88	0.88
	[0.30]	[0.31]	[0.31]	[0.32]	[0.32]	[0.31]	[0.32]	[0.33]
Log(Wage) 5 years after start of UI	4.18	4.16	4.15	4.13	4.12	4.06	4.02	4.00
	[0.46]	[0.47]	[0.47]	[0.49]	[0.49]	[0.52]	[0.53]	[0.53]
Employed 5 years after start of UI	0.52	0.50	0.47	0.42	0.38	0.29	0.27	0.25
	[0.50]	[0.50]	[0.50]	[0.49]	[0.49]	[0.45]	[0.44]	[0.43]
Unemployed 5 years after start of UI	0.14	0.16	0.17	0.18	0.19	0.042	0.045	0.048
	[0.35]	[0.36]	[0.37]	[0.38]	[0.40]	[0.20]	[0.21]	[0.21]
Panel B: Demographic Variables								
Daily Wage in Euro	75.4	75.4	75.4	75.6	76.0	73.4	73.0	72.5
	[32.3]	[32.9]	[32.7]	[34.6]	[33.8]	[34.0]	[33.8]	[33.9]
Education years	11.0	10.9	10.8	10.7	10.6	11.1	11.1	11.0
	[2.35]	[2.29]	[2.20]	[2.04]	[1.97]	[2.47]	[2.45]	[2.42]
Female	0.34	0.35	0.36	0.36	0.36	0.32	0.34	0.35
	[0.47]	[0.48]	[0.48]	[0.48]	[0.48]	[0.47]	[0.47]	[0.48]
Non-German	0.11	0.12	0.13	0.14	0.14	0.054	0.056	0.058
	[0.31]	[0.32]	[0.33]	[0.35]	[0.35]	[0.23]	[0.23]	[0.23]
Actual experience (censored 1975)	12.1	12.4	12.7	13.2	13.6	14.4	15.0	15.4
	[5.34]	[5.59]	[5.72]	[5.71]	[5.61]	[6.43]	[7.00]	[7.35]
Firm tenure	6.25	6.51	6.84	7.39	7.69	6.25	6.53	6.81
	[5.20]	[5.44]	[5.69]	[5.96]	[6.07]	[5.62]	[5.96]	[6.26]
Occupation tenure	8.10	8.43	8.78	9.38	9.73	9.24	9.73	10.1
	[5.41]	[5.64]	[5.84]	[5.99]	[6.04]	[6.32]	[6.76]	[7.06]
Industry tenure	7.74	8.06	8.44	9.05	9.42	5.37	5.67	5.96
	[5.52]	[5.76]	[5.98]	[6.15]	[6.21]	[6.18]	[6.54]	[6.85]
Number of Spells	228552	224666	225785	221325	108741	174019	167618	164394

Notes: The table shows means and standard deviations (in brackets) for the main variables used in the analysis. Wages are in prices of 2000.
The sample for this table consists of individuals who had worked for 52 months in the last 7 years without intermittent UI spell.

Table W-2: Regression Disccontinuity Estimates of Effect Of Potential ALG Duration on Employment Outcomes - Excluding Observations within One Month of Age Threshold

	(1) UI Benefit Duration	(2) Non-Emp Duration	(3) Time until Claim	(4) Ever emp. again	(5) Emp. 5 years later	(6) UI 5 years later
D(age>=42)	1.80	0.76	0.0089	-0.011	-0.0047	0.0052
	[0.039]**	[0.094]**	[0.022]	[0.0024]**	[0.0032]	[0.0022]*
Observations	433959	433959	433959	433959	433959	433959
D(age>=44)	1.01	0.35	0.0033	-0.0045	-0.0075	0.0052
	[0.051]**	[0.097]**	[0.022]	[0.0027]	[0.0032]*	[0.0025]*
Observations	431416	431416	431416	431416	431416	431416
D(age>=49)	1.34	0.37	0.00078	-0.0078	-0.0029	0.0067
	[0.089]**	[0.14]**	[0.030]	[0.0040]	[0.0045]	[0.0035]
Observations	311424	311424	311424	311424	311424	311424

Notes: Coefficients from RD regressions. Local linear regressions (different slopes) on each side of cutoff. Standard errors clustered on day level (* P<.05, ** P<.01)).
The sample consists of individuals starting unemployment spells between July 1987 and March 1999, who had worked for 52 months in the last 7 years without intermittent UI spell.

Table W-3: Regression Discontinuity Estimates of Smoothness of Predetermined Variables around Age Discontinuities - Excluding Observations within One Month of Age Threshold

	(1) Years of Education	(2) Female	(3) Foreign Citizen	(4) Tenure Last Job	(5) Experience Last Job	(6) Occ Tenure Last Job	(7) Ind Tenure Last Job	(8) Pre Wage
D(age>=42)	0.014	0.0045	0.0018	-0.035	-0.013	-0.049	-0.026	0.12
	[0.015]	[0.0031]	[0.0024]	[0.030]	[0.056]	[0.040]	[0.018]	[0.22]
Observations	433959	433959	433959	433959	433959	433959	433959	401275
D(age>=44)	-0.019	-0.0015	0.000023	-0.040	-0.088	-0.071	-0.030	-0.067
	[0.014]	[0.0030]	[0.0026]	[0.031]	[0.053]	[0.040]	[0.019]	[0.22]
Observations	431416	431416	431416	431416	431416	431416	431416	396510
D(age>=49)	0.023	0.0091	0.00048	-0.041	-0.14	-0.029	-0.017	-0.39
	[0.016]	[0.0040]*	[0.0038]	[0.039]	[0.073]	[0.054]	[0.024]	[0.31]
Observations	311424	311424	311424	311424	311424	311424	311424	276592

Notes: Coefficients from RD regressions. Local linear regressions (different slopes) on each side of cutoff. Standard errors clustered on day level (* P<.05, ** P<.01)).
The sample consists of individuals starting unemployment spells between July 1987 and March 1999, who had worked for 52 months in the last 7 years without intermittent UI spell.

Table W-4: Regression Discontinuity Estimates of Potial UI Duration Effect on Employment Outcomes: Bounds Analysis and Dropping Individuals with Long Wait times

	(1) Lower Bound ALG Duration	(2) Lower Bound Non-Emp Duration	(3) Upper Bound ALG Duration	(4) Upper Bound Non-Emp Duration	(5) Less than 15 Days until UI Claim ALG Duration	(6) Less than 15 Days until UI Claim Non-Emp Duration
D(age>=42)	1.66	0.55	1.87	0.95	1.75	0.91
	[0.040]**	[0.089]**	[0.037]**	[0.088]**	[0.042]**	[0.100]**
$\frac{dy}{dP}$	**0.29**	**0.095**	**0.32**	**0.17**	**0.29**	**0.15**
	[0.0070]**	[0.015]**	[0.0064]**	[0.015]**	[0.0071]**	[0.017]**
Observations	452749	452749	452749	452749	323559	323559
D(age>=44)	0.93	0.28	1.10	0.54	1.09	0.48
	[0.048]**	[0.091]**	[0.048]**	[0.090]**	[0.056]**	[0.10]**
$\frac{dy}{dP}$	**0.24**	**0.070**	**0.28**	**0.14**	**0.27**	**0.12**
	[0.012]**	[0.023]**	[0.012]**	[0.023]**	[0.014]**	[0.025]**
Observations	450280	450280	450280	450280	321900	321900
D(age>=49)	1.11	0.15	1.62	0.78	1.47	0.66
	[0.079]**	[0.12]	[0.079]**	[0.12]**	[0.091]**	[0.14]**
$\frac{dy}{dP}$	**0.29**	**0.040**	**0.42**	**0.20**	**0.37**	**0.16**
	[0.021]**	[0.031]	[0.020]**	[0.032]**	[0.023]**	[0.034]**
Observations	329680	329680	329680	329680	233086	233086

Notes: Coefficients from RD regressions. Local linear regressions different slopes on each side of cutoff. Standard errors clustered on day relative to cutoff (* P<.05, ** P<.01)).

The first two columns show lower bound estimates: the density of observations close to cutoff is compared within a 1 month window on each side of the cutoff and then a number of individuals equal to the excess mass on the right side of threshold and who have the longest non-employment durations is moved to the left of the threshold. Columns 3 and 4 show upper bounds, using the same method but moving indivduals with the lowest non-employment durations. The last two columns drop individuals where UI take up was more than 15 days after the end of their last employment (in particular this includes individuals who had to wait 90 days before receiving UI because they voluntarily quit their jobs).

Table W-5: The Effect of Extended UI Durations on Non-employment Durations – Different Duration Measures

	(1) **Main Meas.** Non-emp Dur Cutoff 36 mo	(2) Time-to-Job Dur Cens 2008	(3) Time-to-Job Dur within 36 mo	(4) Non-emp Dur Cutoff 48 mo	(5) Non-emp Dur Cutoff 60 mo	(6) Ever emp again	(7) Not empl. in 36 months	(8) Not empl. in 48 months	(9) Not empl. in 60 months
Age 42 cutoff: $\frac{dy}{dP}$	**0.13**	**0.13**	**0.073**	**0.16**	**0.18**	**-0.0017**	**0.0028**	**0.0021**	**0.0018**
	[0.014]**	[0.026]**	[0.010]**	[0.019]**	[0.023]**	[0.00037]	[0.00044]**	[0.00043]**	[0.00041]**
$\eta_{y,P}$	**0.12**	**0.12**	**0.13**	**0.12**	**0.12**	**-0.031**	**0.15**	**0.13**	**0.13**
	[0.013]**	[0.024]**	[0.017]**	[0.015]**	[0.016]**	[0.0066]	[0.024]**	[0.027]**	[0.028]**
Observations	452749	374487	329549	452749	452749	452749	452749	452749	452749
Age 44 cutoff: $\frac{dy}{dP}$	**0.10**	**0.13**	**0.028**	**0.13**	**0.16**	**-0.0014**	**0.0031**	**0.0022**	**0.0017**
	[0.022]**	[0.040]**	[0.016]*	[0.029]**	[0.036]**	[0.00061]	[0.00070]**	[0.00066]**	[0.00065]**
$\eta_{y,P}$	**0.12**	**0.16**	**0.062**	**0.13**	**0.14**	**-0.035**	**0.21**	**0.17**	**0.14**
	[0.026]**	[0.050]**	[0.036]*	[0.029]**	[0.031]**	[0.015]	[0.047]**	[0.051]**	[0.054]**
Observations	450280	359778	315880	450280	450280	450280	450280	450280	450280
Age 49 cutoff: $\frac{dy}{dP}$	**0.11**	**0.065**	**0.056**	**0.14**	**0.15**	**-0.0019**	**0.0028**	**0.0019**	**0.0015**
	[0.029]**	[0.043]	[0.022]**	[0.039]**	[0.049]**	[0.00089]	[0.00098]**	[0.00095]**	[0.00093]
$\eta_{y,P}$	**0.13**	**0.099**	**0.14**	**0.13**	**0.13**	**-0.067**	**0.17**	**0.12**	**0.10**
	[0.034]**	[0.066]	[0.056]**	[0.038]**	[0.041]**	[0.031]	[0.059]**	[0.062]**	[0.064]
Observations	329680	230838	203982	329680	329680	329680	329680	329680	329680

Notes: Table shows estimated marginal effects of one additional month of UI eligibility (i.e. coefficients from RD regressions rescaled by the increase in potential benefit durations). RD estimates from local linear regressions with different slopes on each side of cutoff. Standard errors clustered on day level (* P<.05, ** P<.01)).
The sample for this table consists of individuals starting unemployment spells between July 1987 and March 1999, who had worked for 52 months in the last 7 years without intermittent UI spell.

Table W-6: Effect of Extended UI Durations – Pooling All Unemployment Spells (No Experience Restrictions)

	(1) UI Benefit Duration	(2) Non-Emp Duration	(3) Time until Claim	(4) Ever emp. again	(5) Emp. 5 years later	(6) UI 5 years later
D(age>=42)	0.98	0.45	-0.023	-0.0022	0.0024	0.0020
	[0.016]**	[0.036]**	[0.020]	[0.00072]**	[0.0012]	[0.00095]*
Observations	2467954	2467954	2186734	2467954	2467954	2467954
D(age>=44)	0.46	0.21	0.0079	-0.00056	-0.0041	0.0029
	[0.019]**	[0.036]**	[0.020]	[0.00078]	[0.0013]**	[0.0011]**
Observations	2293865	2293865	2068431	2293865	2293865	2293865
D(age>=49)	0.76	0.40	0.0042	-0.0047	0.0010	0.0028
	[0.032]**	[0.050]**	[0.022]	[0.0013]**	[0.0017]	[0.0014]
Observations	1550099	1550099	1377439	1550099	1550099	1550099

Notes: Coefficients from RD regressions. Local linear regressions (different slopes) on each side of cutoff. Standard errors clustered on day level (* P<.05, ** P<.01)).

Table W-7: Regression Discontinuity Estimates of Effect of Potential ALG - Period April 1999 to December 2004

	(1) ALG Duration	(2) Non-Emp Duration	(3) Time until Claim	(4) Ever emp. again	(5) Emp. 5 years later	(6) UI 5 years later	(7) Log Wage Difference	(8) Log Post Wage
Panel A: All observations								
D(age>=45)	1.74	0.44	-0.044	-0.0020	-0.00038	-0.0014	-0.0022	0.0010
	[0.044]**	[0.11]**	[0.025]	[0.0032]	[0.0034]	[0.0016]	[0.0046]	[0.0048]
$\frac{dy}{dP}$	**0.29**	**0.073**	**-0.0074**	**-0.00033**	**-0.000063**	**-0.00023**	**-0.00036**	**0.00017**
	[0.0073]**	[0.018]**	[0.0042]	[0.00053]	[0.00057]	[0.00026]	[0.00076]	[0.00079]
$\eta_{y,P}$	**0.59**	**0.065**	**-0.086**	**-0.0064**	**-0.0035**	**-0.078**	**0.027**	**0.00065**
	[0.015]**	[0.017]**	[0.049]	[0.010]	[0.031]	[0.089]	[-0.057]	[0.0030]
Observations	326887	326887	326887	326887	326887	326887	237698	248322
D(age>=47)	0.98	0.26	-0.030	-0.0022	0.0024	0.0014	0.0036	0.00068
	[0.059]**	[0.11]*	[0.026]	[0.0035]	[0.0033]	[0.0016]	[0.0049]	[0.0050]
$\frac{dy}{dP}$	**0.25**	**0.066**	**-0.0075**	**-0.00055**	**0.00060**	**0.00034**	**0.00091**	**0.00017**
	[0.015]**	[0.028]**	[0.0064]	[0.00087]	[0.00083]	[0.00040]	[0.0012]	[0.0013]
$\eta_{y,P}$	**0.53**	**0.073**	**-0.12**	**-0.015**	**0.045**	**0.15**	**-0.088**	**0.00086**
	[0.031]**	[0.031]**	[0.098]	[0.024]	[0.063]	[0.17]	[-0.12]	[0.0064]
Observations	317781	317781	317781	317781	317781	317781	221053	231246
Panel B: Excluding observations within 1 month of discontinuity								
D(age>=45)	1.73	0.47	-0.029	-0.0027	-0.0020	-0.00062	-0.0043	0.00042
	[0.040]**	[0.10]**	[0.023]	[0.0029]	[0.0031]	[0.0014]	[0.0042]	[0.0043]
$\frac{dy}{dP}$	**0.29**	**0.078**	**-0.0049**	**-0.00045**	**-0.00034**	**-0.00010**	**-0.00072**	**0.000069**
	[0.0066]**	[0.017]**	[0.0039]	[0.00049]	[0.00052]	[0.00023]	[0.00070]	[0.00072]
$\eta_{y,P}$	**0.58**	**0.070**	**-0.058**	**-0.0089**	**-0.019**	**-0.036**	**0.054**	**0.00026**
	[0.013]**	[0.015]**	[0.045]	[0.0095]	[0.028]	[0.080]	[-0.052]	[0.0027]
Observations	341248	341248	341248	341248	341248	341248	248148	259278
D(age>=47)	1.02	0.29	-0.041	-0.0018	0.0013	0.00092	0.0031	0.00025
	[0.053]**	[0.10]**	[0.023]	[0.0031]	[0.0031]	[0.0015]	[0.0045]	[0.0046]
$\frac{dy}{dP}$	**0.25**	**0.072**	**-0.010**	**-0.00046**	**0.00033**	**0.00023**	**0.00077**	**0.000063**
	[0.013]**	[0.025]**	[0.0059]	[0.00078]	[0.00078]	[0.00037]	[0.0011]	[0.0011]
$\eta_{y,P}$	**0.55**	**0.080**	**-0.16**	**-0.012**	**0.025**	**0.097**	**-0.074**	**0.00032**
	[0.029]**	[0.028]**	[0.090]	[0.021]	[0.059]	[0.16]	[-0.11]	[0.0058]
Observations	331584	331584	331584	331584	331584	331584	230664	241263

Notes: Coefficients from RD regressions. Local linear regressions (different slopes) on each side of cutoff. Standard errors clustered on day level (* P<.05, ** P<.01)).
The sample for this table consists of individuals starting unemployment spells between April 1999 and December 2004, who had worked for 52 months in the last 7 years without intermittent UI spell.

Table W-8: The Correlation of Annual Regression Discontinuity Estimates of Extensions in UI Benefit Durations on Non-Employment and Actual Benefit Duration with Measures of the Change of the Economic Environment from the year of entering UI to the next year.

Dependent Variable	(1) Mean & Standard Deviation	(2) Nonemployment Duration: Rescaled Marginal Effect	(3) UI-Benefits Duration: Rescaled Marginal Effect	(4) Nonemp. Duration Marg. Effect scaled by UI-Benefits Duration Marg. Effect	(5) UI Exhaustion Rate (Additional UI Beneficiaries holding Survivor Function constant)	(6) Additional UI Beneficaries due only to Shift of Survivor Function	(7) Nonemployment Duration Elasticity
Independent Variable		$\frac{dD}{dP}$	$\frac{dB}{dP}$	$\frac{dD}{dP} / \frac{dB}{dP}$	$\left.\frac{dB}{dP}\right\|_1$	$\left.\frac{dB}{dP}\right\|_2$	$\eta_{D,P}$
Real GDP Growth	2.20	0.0047	-0.018	0.044	-0.013	-0.0047	0.0080
from Year t to t+1	[1.61]	[0.0068]	[0.0076]*	[0.023]†	[0.0053]*	[0.0048]	[0.0075]
Change in Unemployment Rate	0.15	0.0073	0.041	-0.037	0.025	0.016	0.0025
from Year t to t+1	[0.83]	[0.012]	[0.011]**	[0.044]	[0.0090]*	[0.0076]*	[0.014]
Mean of Dep Var		0.10	0.28	0.36	0.44	-0.15	0.11

Notes: See Table 4 in paper.

Table W-9: Table: The effect of characteristics of unemployed workers on entering ALH at the ALG exhaustion points

	(1) Age 40-41	(2) Age 42-43	(3) Age 44-48	(4) Age 49
Education years	-0.020	-0.026	-0.027	-0.029
	[0.0010]**	[0.0012]**	[0.00082]**	[0.0020]**
Tenure	-0.000059	-0.00071	-0.00057	-0.0014
	[0.00048]	[0.00051]	[0.00030]	[0.00063]*
Female	-0.19	-0.19	-0.23	-0.24
	[0.0056]**	[0.0062]**	[0.0039]**	[0.0087]**
Log Pre UI Wage	-0.15	-0.13	-0.12	-0.10
	[0.0100]**	[0.011]**	[0.0065]**	[0.014]**
Log UI Benefit Lev	0.19	0.16	0.15	0.14
	[0.012]**	[0.013]**	[0.0077]**	[0.017]**
West Germany	-0.11	-0.085	-0.084	-0.089
	[0.0087]**	[0.0097]**	[0.0064]**	[0.016]**
Non-German	0.15	0.16	0.21	0.24
	[0.0073]**	[0.0077]**	[0.0045]**	[0.0097]**
Observations	38434	31084	78386	15767
Mean of Dep. Var.	0.53	0.50	0.50	0.50

Notes: The sample for this table consists of individuals starting unemployment spells between July 1987 and April 1999, who had worked for 52 months in the last 7 years without intermittent UI spell.

Table W-10: Regression Discontinuity Estimates of Effect of Potential UI durations by Periods with Declining and Rising Unemployment Rates (UER)

	(1) ALG Duration	(2) Non-Emp Duration	(3) Time until Claim	(4) Ever emp. again	(5) Emp. 5 years later	(6) UI 5 years later	(7) Log Wage Difference	(8) Post UI Log Wage
Panel A: Declining UER (1987-1991)								
D(age>=42)	1.74	1.01	0.048	-0.020	-0.016	-0.0016	-0.0077	-0.0029
	[0.089]**	[0.21]**	[0.048]	[0.0056]**	[0.0071]*	[0.0044]	[0.010]	[0.011]
Elasticity	0.64	0.18	0.086	-0.066	-0.084	-0.037	0.10	-0.0018
Observations	89427	89427	89427	89427	89427	89427	48363	49635
D(age>=44)	1.03	0.61	0.066	-0.011	-0.0091	0.0033	0.0053	0.0084
	[0.11]**	[0.21]**	[0.050]	[0.0058]	[0.0071]	[0.0050]	[0.010]	[0.012]
Elasticity	0.50	0.16	0.20	-0.061	-0.083	0.12	-0.14	0.010
Observations	85847	85847	85847	85847	85847	85847	45192	46417
D(age>=49)	0.97	0.23	0.0065	-0.0037	-0.021	0.0061	-0.0041	-0.0021
	[0.18]**	[0.27]	[0.056]	[0.0081]	[0.0084]*	[0.0063]	[0.013]	[0.015]
Elasticity	0.52	0.075	0.028	-0.033	-0.30	0.26	0.11	-0.0031
Observations	76973	76973	76973	76973	76973	76973	38080	39037
Panel B: Growing UER (1992-1997)								
D(age>=42)	1.95	0.70	0.010	-0.0089	-0.00083	0.0072	-0.0073	-0.0039
	[0.050]**	[0.12]**	[0.028]	[0.0030]**	[0.0039]	[0.0029]*	[0.0067]	[0.0073]
Elasticity	0.61	0.11	0.020	-0.027	-0.0041	0.12	0.065	-0.0025
Observations	267711	267711	267711	267711	267711	267711	157209	160598
D(age>=44)	1.11	0.33	0.0020	-0.0034	-0.0064	0.0060	-0.0011	-0.0054
	[0.066]**	[0.12]**	[0.028]	[0.0034]	[0.0042]	[0.0032]	[0.0068]	[0.0076]
Elasticity	0.61	0.10	0.0085	-0.023	-0.072	0.20	0.019	-0.0068
Observations	269821	269821	269821	269821	269821	269821	155595	158859
D(age>=49)	1.59	0.47	-0.034	-0.010	0.0025	0.0079	-0.011	-0.022
	[0.11]**	[0.17]**	[0.040]	[0.0054]	[0.0056]	[0.0050]	[0.012]	[0.013]
Elasticity	0.75	0.14	-0.15	-0.097	0.041	0.25	0.18	-0.034
Observations	180693	180693	180693	180693	180693	180693	92254	94407

Notes: Coefficients from RD regressions. Local linear regressions (different slopes) on each side of cutoff. Standard errors clustered on day level (* P<.05, ** P<.01)).
The sample consists of individuals starting unemployment spells between July 1987 and March 1999, who had worked for 52 months in the last 7 years without intermittent UI spell. Observations within 1 month of discontinuity are excluded.

Table W-11: Hazard Model, Age 40-49, Period 1987-2004

	(1) Hazard	(2) Hazard	(3) Hazard
Female	-0.19	-0.19	-0.19
	[0.0075]**	[0.0075]**	[0.0075]**
November/January/February	0.16	0.16	0.16
	[0.0069]**	[0.0069]**	[0.0069]**
December	0.15	0.15	0.15
	[0.012]**	[0.012]**	[0.012]**
Education years	-0.013	-0.013	-0.013
	[0.0014]**	[0.0014]**	[0.0014]**
west	-0.17	-0.17	-0.17
	[0.0077]**	[0.0077]**	[0.0077]**
Non-German	-0.42	-0.42	-0.42
	[0.013]**	[0.013]**	[0.013]**
Log Pre UI Wage	-0.087	-0.087	-0.087
	[0.011]**	[0.011]**	[0.011]**
Log UI Benefit Lev	-0.038	-0.038	-0.038
	[0.014]**	[0.014]**	[0.014]**
Chg. Unemp Rate	0.012	0.015	0.018
	[0.029]	[0.024]	[0.025]
NoUI	-0.090	-0.096	-0.16
	[0.024]**	[0.024]**	[0.031]**
UI0	0.24	0.23	0.17
	[0.034]**	[0.034]**	[0.039]**
NoUI X Change UR	-0.067	-0.067	-0.046
	[0.024]**	[0.024]**	[0.030]
UI0 X Change UR	-0.049	-0.049	-0.028
	[0.035]	[0.035]	[0.040]
UI_1_5	0.046	0.049	
	[0.0050]**	[0.0048]**	
UI1_5 X Change UR	0.0011	0.00077	
	[0.0054]	[0.0051]	
UI_1_2			0.11
			[0.018]**
UI_3_5			0.027
			[0.0080]**
UI1_2 X Change UR			-0.021
			[0.020]
UI3_5 X Change UR			0.0091
			[0.0088]
UI_6_15	0.015		
	[0.0022]**		
UI_16_25	0.0069		
	[0.0028]*		
UI6_15 X Change UR	-0.0042		
	[0.0019]*		
UI16_25 X Change UR	-0.0033		
	[0.0029]		
UI_6_25		0.012	0.012
		[0.0018]**	[0.0018]**
UI6_25 X Change UR		-0.0039	-0.0041
		[0.0011]**	[0.0011]**
Cubic Age Polynomial	Yes	Yes	Yes
Interactions Age Poly., Change UR, and Post 1999	Yes	Yes	Yes
E[Nonemp Dur | ALG=12 mon]	14.6	14.5	14.6
E[Nonemp Dur | ALG=18 mon]	15.6	15.5	15.5
Elasticity at av. UR	0.17	0.16	0.15
Elasticity at ChgUR = -1	0.25	0.23	0.23
Elasticity at ChgUR = +1	0.12	0.11	0.11
Months at Risk	2028572	2028572	2028572
Subjects	132763	132763	132763

Notes: Cox Proportional Hazard Model Regressions. Coefficients are the coefficients on the covariates (not Hazard Ratios). Sample: Unemployed workers between age 40 and 49 with maximum potential UI Duration. For definition of UI Splines see Meyer 1990 (though here numbers refer to months instead of weeks).
Implied Non-emp. Duration elasticities are calculated for a person with average sample characteristics. Confidence Levels: * P<.05, ** P<.01).
The sample for this table consists of individuals starting unemployment spells between July 1987 and December 2004, who had worked for 52 months in the last 7 years without intermittent UI spell.

Table W-12: Pooled Linear Regression Model of the Effect of Potential UI Duration on Non-employment Duration, Unemployed Individuals Age 40-49 during 1987 to 2004

	(1) Non-employment Duration	(2) Non-employment Duration	(3) Non-employment Duration	(4) Non-employment Duration
Pot. UI Duration in months	0.12	0.12	0.11	0.12
	[0.013]**	[0.014]**	[0.013]**	[0.014]**
Pot. UI Dur X Post 1999	-0.052	-0.055	-0.087	-0.092
	[0.022]*	[0.023]*	[0.022]**	[0.023]**
Pot. UI Duration X Change UR		-0.0070		-0.014
		[0.013]		[0.013]
Female			2.69	2.69
			[0.028]**	[0.028]**
November/January/February			-2.00	-2.00
			[0.026]**	[0.026]**
December			-2.36	-2.36
			[0.047]**	[0.047]**
Education years			0.17	0.17
			[0.0051]**	[0.0051]**
West Germany			1.81	1.81
			[0.030]**	[0.030]**
Non-German			5.02	5.02
			[0.044]**	[0.044]**
Log Pre UI Wage			1.37	1.37
			[0.044]**	[0.044]**
Log UI Benefit Lev			0.37	0.37
			[0.053]**	[0.053]**
Age Polynomial (1-4th Power)	Yes	Yes	Yes	Yes
Interactions Age Poly., Change UR, and Post 1999	Yes	Yes	Yes	Yes
Observations	1372307	1372307	1327027	1327027
Implied Non-employment Duration Elasticity for Increase in Pot UI Dur from 12 to 18 Months				
Elasticity at avg. ChgUR	**0.093**	**0.093**	**0.071**	**0.071**
Elasticity at ChgUR = -1		**0.10**		**0.087**
Elasticity at ChgUR = +1		**0.088**		**0.061**

Notes: Dependent variable is non-employment duration in months. Sample: Unemployed workers age 40 to 49 with maximum potential UI Duration. Implied Non-emp. Duration elasticities are calculated for a person with average sample characteristics over entire period. Confidence Levels: * P<.05, ** P<.01).

Table W-13: Comparing German UI Analysis Sample with Unemployed Workers in US

	(1) Germany UI Spells Jul 1987-2004 Max Pot Duration Age 40-49	(2) United States CPS March 1987-2004 All Unemployed Individuals Age 40-49	(3) United States CPS March 1987-2004 Individ. who received UI Ben in prev year	(4) United States DWS 1988-2004 All Job Losers Age 40-49	(5) United States DWS 1988-2004 received UI ben. Age 40-49
Female	0.34	0.43	0.41	0.45	0.44
	[0.47]	[0.50]	[0.49]	[0.50]	[0.50]
Age	44.4	44.1	44.2	44.2	44.2
	[2.87]	[2.84]	[2.85]	[2.86]	[2.86]
Age Squared	1979.2	1954.0	1961.5	1959.1	1966.1
	[255.1]	[252.2]	[252.9]	[253.5]	[254.3]
Education years	11.1	12.8	12.9	13.3	13.2
	[2.45]	[2.15]	[2.06]	[2.46]	[2.40]
Tenure at previous / lost job	6.65	.	.	6.10	6.67
	[5.69]	.	.	[6.59]	[6.70]
Citizen	0.92	0.88	0.92	.	.
	[0.28]	[0.32]	[0.27]	.	.
Sector: Mining and Logging	0.0078	0.020	0.020	0.017	0.022
	[0.088]	[0.14]	[0.14]	[0.13]	[0.15]
Sector: Construction	0.16	0.18	0.18	0.10	0.11
	[0.37]	[0.39]	[0.38]	[0.31]	[0.31]
Sector: Manufacturing	0.38	0.21	0.29	0.26	0.32
	[0.48]	[0.40]	[0.45]	[0.44]	[0.46]
Sector: Trade; Transportation; Utilities; Information	0.22	0.24	0.21	0.33	0.31
	[0.41]	[0.43]	[0.41]	[0.47]	[0.46]
Sector: All Services, Government	0.24	0.35	0.31	0.30	0.25
	[0.42]	[0.48]	[0.46]	[0.46]	[0.43]
Exhausted unemployment benefits	0.38	.	.	0.22	0.42
	[0.49]	.	.	[0.41]	[0.49]
Number of Spells	1399618	14140	17459	9720	4825

Notes: Table shows variable means with corresponding standard deviations in brackets. Column (1) shows characteristics of our main analysis sample of unemployed individuals between 1987 and 2004. Column (2) shows average chracteristics for all unemployed individuals age 40 to 49 in the March CPS, pooling years 1987 to 2004. Column (3) report characteristics of individuals age 40 to 49 in the March CPS who identified themselves as having received some UI benefits during the preceding year. Column 4 shows characteristics of displaced workers in the Displaced Worker Supplement to the CPS between 1988 and 2004 who idetified themselves as having lost a job in the previous 3 years and who are age 40 to 49. Column (5) shows the sample sample but restricted to individuals who also received UI benefits after losing their job.

Table W-14: The Correlation of Labor Supply Elasticities from Regression Discontinuity Estimates with the Economic Environment – Reweighted to Match U.S. Distribution of Observable Characteristics

	(1) Mean & SE	(2) Non-Emp Duration Elasticity	(3) Non-Emp Duration Elasticity Reweigthed to CPS March Unemp	(4) Non-Emp Duration Elasticity Reweigthed to CPS March UI Ben in prev. year	(5) Non-Emp Duration Elasticity Reweigthed to DWS Job Losers	(6) Non-Emp Duration Elasticity Reweigthed to DWS Job Losers who received UIB
Unemployment Rate in Percent	9.09	-0.013	-0.017	-0.012	-0.019	-0.017
	[1.63]	[0.0071]	[0.017]	[0.017]	[0.018]	[0.018]
Change in Unemployment Rate	0.13	-0.018	0.017	0.0057	0.0054	-0.00074
	[0.77]	[0.014]	[0.035]	[0.035]	[0.037]	[0.037]
Real GDP Growth	3.07	0.014	0.0069	0.0056	0.0077	0.0068
	[1.66]	[0.0075]	[0.019]	[0.019]	[0.020]	[0.020]
Mass Layoff Rate	1.31	-0.039	-0.059	-0.046	-0.053	-0.055
	[0.52]	[0.022]	[0.056]	[0.057]	[0.058]	[0.059]
Average Log Wage Loss in Year-Quintile Cell	-0.14	0.090	0.10	0.12	0.13	0.17
	[0.14]	[0.17]	[0.29]	[0.29]	[0.31]	[0.31]
Mean of Dep Var		0.12	0.11	0.097	0.082	0.083
Observations in Row 1-4		51	51	51	51	51
Observations in Row 5		238	238	238	238	238

Notes: Columns (2)-(6) report coeffients from a 2 step regression. In the first step the effect of Extended UI durations on non-employment durations are estimated separately for all years and age thresholds using the regression discontinuity estimator. In the second step the resulting elasticities/marginal effects are regressed on measures of the economic environment. Each reported coefficient represents the coefficient on those measures, given in the row names. The second step regressions also include a dummy for elasticities measured after the 1999 reform. is from a separate regression. Coefficients from RD regressions. Local linear regressions (different slopes) on each side of cutoff.
Stars indicate confidence levels: * P<.05, ** P<.01.

Table W-15: Additional Measures and Alternative Specifications for the Correlation of Annual Regression Discontinuity Estimates of Extensions in UI Benefit Durations on Nonemployment and Actual Benefit Duration with the Economic Environment

	(1) Bandwidth for RD Est. 1 Year	(2) Lower Bound for Estimates in RD Est.	(3) Sample Restr. to UI take up within 15 Days of Job Ending	(4) Sample Reweighted to Characteristics of Year 2000	(5) Full Sample: No Experience Restrictions Bandwidth 2 Years	(6) Full Sample: No Experience Restrictions Bandwidth 1 Year
Nonemp. Duration Marginal Effect: $\frac{dD}{dP}$						
Real GDP Growth from Year t-1 to t	0.015 [0.0073]†	0.013 [0.0055]*	0.0050 [0.010]	0.0099 [0.011]	–	–
Real GDP Growth from Year t to t+1	0.011 [0.0078]	0.0094 [0.0061]	0.0013 [0.010]	0.0062 [0.012]	–	–
Change in Unemployment Rate from Year t to t+1	0.00029 [0.015]	-0.0050 [0.011]	0.011 [0.018]	-0.011 [0.020]	–	–
Fraction of Establishments with Mass Layoffs in Year t	-0.034 [0.023]	-0.036 [0.017]†	-0.029 [0.031]	-0.022 [0.020]	–	–
UI-Benefit Duration Marginal Effect: $\frac{dB}{dP}$						
Real GDP Growth from Year t-1 to t	-0.014 [0.0089]	-0.012 [0.0082]	-0.013 [0.0088]	-0.010 [0.0088]	–	–
Real GDP Growth from Year t to t+1	-0.018 [0.0086]†	-0.018 [0.0077]*	-0.019 [0.0082]*	-0.018 [0.0082]*	–	–
Change in Unemployment Rate from Year t to t+1	0.044 [0.013]**	0.042 [0.012]**	0.044 [0.013]**	0.047 [0.012]**	–	–
Fraction of Establishments with Mass Layoffs in Year t	0.068 [0.024]*	0.062 [0.022]*	0.059 [0.024]*	0.059 [0.022]*	–	–
Nonemp. Duration scaled by UI-Benefit Duration Marginal Effect: $\frac{dD}{dP} / \frac{dB}{dP}$						
Real GDP Growth from Year t-1 to t	0.072 [0.022]**	0.059 [0.024]*	0.031 [0.029]	0.050 [0.025]†	0.0058 [0.027]	0.043 [0.027]
Real GDP Growth from Year t to t+1	0.070 [0.023]**	0.052 [0.025]†	0.032 [0.030]	0.045 [0.026]	0.054 [0.024]*	0.091 [0.019]**
Change in Unemployment Rate from Year t to t+1	-0.072 [0.048]	-0.060 [0.048]	-0.035 [0.053]	-0.056 [0.047]	-0.10 [0.042]*	-0.14 [0.038]**
Fraction of Establishments with Mass Layoffs in Year t	-0.23 [0.060]**	-0.19 [0.071]*	-0.18 [0.083]*	-0.17 [0.065]*	-0.17 [0.072]*	-0.24 [0.053]**
Nonemp. Duration Elasticity : $\eta_{D,P}$						
Real GDP Growth from Year t-1 to t	0.020 [0.0080]*	0.015 [0.0063]*	0.0099 [0.013]	0.013 [0.0100]	–	–
Real GDP Growth from Year t to t+1	0.017 [0.0086]†	0.012 [0.0069]†	0.0065 [0.013]	0.0091 [0.010]	–	–
Change in Unemployment Rate from Year t to t+1	-0.0071 [0.017]	-0.0089 [0.013]	0.0044 [0.023]	-0.012 [0.019]	–	–
Fraction of Establishments with Mass Layoffs in Year t	-0.054 [0.025]*	-0.046 [0.020]*	-0.054 [0.038]	-0.035 [0.022]	–	–

Notes: Stars indicate confidence levels: †P<.1, * P<.05, ** P<.01.
For additional detailed notes see Table 5 in the main text.

Table W-16: Table: Main Outcomes; At least 4 layoffs in Firm and Month

	(1) ALG Duration	(2) Non-Emp Duration	(3) Time until Claim	(4) Ever emp. again	(5) Emp. 5 years later	(6) UI 5 years later
D(age>=42)	1.93	1.12	-0.0051	-0.016	-0.0049	0.0043
	[0.070]**	[0.16]**	[0.031]	[0.0041]**	[0.0056]	[0.0045]
$\frac{dy}{dP}$	**0.32**	**0.19**	**-0.00086**	**-0.002 7**	**-0.00081**	**0.00072**
	[0.012]**	[0.026]**	[0.0051]	[0.00069]**	[0.00093]	[0.00075]
$\eta_{y,P}$	**0.64**	**0.19**	**-0.013**	**-0.047**	**-0.023**	**0.064**
	[0.023]**	[0.027]**	[0.080]	[0.012]**	[0.026]	[0.066]
Observations	122841	122841	122841	122841	122841	122841
D(age>=44)	1.19	0.55	0.049	-0.0067	-0.0019	0.0041
	[0.091]**	[0.16]**	[0.030]	[0.0043]	[0.0057]	[0.0045]
$\frac{dy}{dP}$	**0.30**	**0.14**	**0.012**	**-0.001 7**	**-0.00047**	**0.0010**
	[0.023]**	[0.041]**	[0.0075]	[0.0011]	[0.0014]	[0.0011]
$\eta_{y,P}$	**0.62**	**0.17**	**0.26**	**-0.041**	**-0.018**	**0.11**
	[0.047]**	[0.051]**	[0.16]	[0.026]	[0.056]	[0.12]
Observations	126328	126328	126328	126328	126328	126328
D(age>=49)	1.73	0.73	-0.023	-0.019	-0.0028	0.00040
	[0.15]**	[0.22]**	[0.037]	[0.0067]**	[0.0066]	[0.0062]
$\frac{dy}{dP}$	**0.43**	**0.18**	**-0.0058**	**-0.004 7**	**-0.00070**	**0.000100**
	[0.037]**	[0.054]**	[0.0093]	[0.0017]**	[0.0016]	[0.0015]
$\eta_{y,P}$	**0.83**	**0.23**	**-0.14**	**-0.16**	**-0.041**	**0.011**
	[0.071]**	[0.068]**	[0.23]	[0.058]**	[0.096]	[0.17]
Observations	92756	92756	92756	92756	92756	92756

Notes: Coefficients from RD regressions. Local linear regressions (different slopes) on each side of cutoff. Standard errors clustered on day level (* P<.05, ** P<.01)).

Table W-17: The Correlation of Labor Supply Elasticities from Regression Discontinuity Estimates with the Ec onomic Environment - Bandwidth: 2 Year, Diff Slopes: Yes, Polynomial: Lin; SE: Two Step Method; At least 4 layoffs in Firm and Month

	(1) Mean & SE	(2) Non-Emp Duration Elasticity $\eta_{D,P}$	(3) Non-Emp Duration Marg. Effect $\frac{dD}{dP}$	(4) UI-B enefits Du ration Marg . Effect $\frac{dB}{dP}$	(5) Marg. Effect Non-emp Dur with resp. to UI-Benefit Dur $\frac{dD}{dB}$	(6) UI Benefit Exhaustion Rate $\frac{dB}{dP}\|_1$	(7) $\frac{dB}{dP}$ minus Exhaustion Rate $\frac{dB}{dP}\|_2$	(8) $\frac{dB}{dP}$ minus Exhaustion Rate + $\frac{dD}{dP} * UR$
Real GDP Growth from Year t-1 to t	2.15 [1.58]	0.0076 [0.015]	0.0046 [0.013]	-0.012 [0.013]	0.043 [0.037]	-0.0075 [0.010]	-0.0049 [0.0088]	-0.072 [0.12]
Real GDP Growth from Year t to t+1	2.20 [1.61]	0.021 [0.014]	0.018 [0.012]	-0.017 [0.013]	0.078 [0.034]*	-0.013 [0.010]	-0.0042 [0.0090]	0.10 [0.12]
Change in Unemployment Rate from Year t-1 to t	0.13 [0.78]	-0.027 [0.028]	-0.021 [0.024]	0.045 [0.023]†	-0.16 [0.064]*	0.035 [0.018]†	0.010 [0.017]	-0.038 [0.23]
Change in Unemployment Rate from Year t to t+1	0.15 [0.83]	-0.0053 [0.026]	0.00049 [0.023]	0.056 [0.019]*	-0.10 [0.064]	0.033 [0.017]†	0.022 [0.015]	-0.035 [0.21]
National Unemployment Rate in Year t	9.09 [1.64]	-0.0021 [0.015]	-0.0039 [0.013]	-0.015 [0.013]	0.029 [0.038]	-0.014 [0.0097]	-0.0013 [0.0088]	0.11 [0.11]
Mass Layoff Rate	1.31 [0.53]	-0.057 [0.042]	-0.040 [0.037]	0.067 [0.036]†	-0.22 [0.11]†	0.057 [0.029]†	0.0099 [0.026]	-0.12 [0.34]
Mean of Dep Var		0.16	0.14	0.31	0.45	0.40	-0.093	1.17
Observations in Row 1-4		51	51	51	51	51	51	51
Ind. Observations in Row 1-4		594057	594057	594057	594057	594057	594057	594057

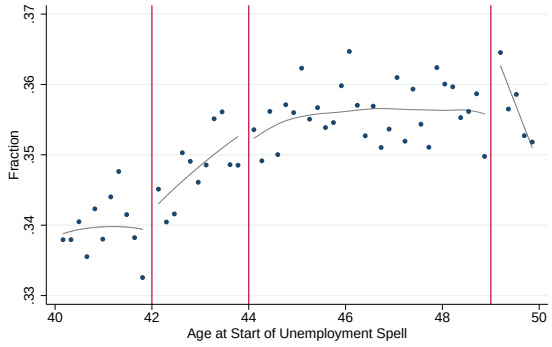
Notes: Stars indicate confidence levels: †P<.1, * P<.05, ** P<.01.
Columns (2)-(5) report coeffients from a 2 step regression. In the first step the effect of Extended UI durations on n on-employment durations are estimated separately for all years and age thresholds using the regression discontinuity estimator. In the second step the resulting elasticities/marginal effects are regressed o n measures of the economic environment. Each reported coefficient represents the coefficient on those m easures, given in the row names. The second step regressions also include a dummy for elasticities meas ured after the 1999 reform.

Table W-18: Regression Discontinuity Estimates of Effect of Potential Unemployment Insurance (UI) Durations (P) on Months of Actual UI Benefit Receipt and Months of Nonemployment by Subgroups

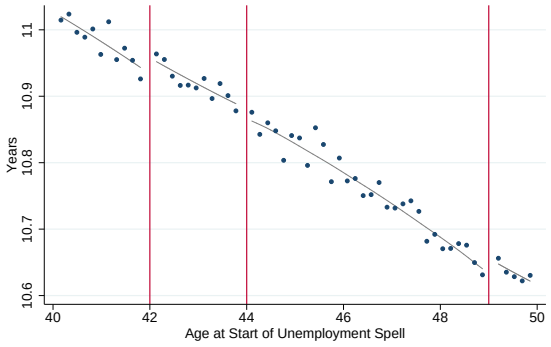
		UI Benefit Duration	Nonemployment Duration
Education - with or without Abitur (College Entrance Exam)			
Less than Abitur	D(age>=42)	1.83	0.75
		[0.04]	[0.10]
	Effect of 1 add. Month of Benefits $\frac{dy}{dP}$	0.31	0.12
Abitur or more	D(age>=42)	1.64	0.79
		[0.09]	[0.22]
	Effect of 1 add. Month of Benefits $\frac{dy}{dP}$	0.27	0.13
	P-Value for Equality of Effects	0.05	0.87
Job Tenure			
≤ 5 years	D(age>=42)	1.81	0.73
		[0.04]	[0.11]
	Effect of 1 add. Month of Benefits $\frac{dy}{dP}$	0.30	0.12
> 5 years	D(age>=42)	1.75	0.88
		[0.09]	[0.22]
	Effect of 1 add. Month of Benefits $\frac{dy}{dP}$	0.29	0.15
	P-Value for Equality of Effects	0.54	0.54
Gender			
Men	D(age>=42)	1.54	0.64
		[0.05]	[0.11]
	Effect of 1 add. Month of Benefits $\frac{dy}{dP}$	0.26	0.11
Women	D(age>=42)	2.27	0.94
		[0.07]	[0.16]
	Effect of 1 add. Month of Benefits $\frac{dy}{dP}$	0.38	0.16
	P-Value for Equality of Effects	0.00	0.12
Probability of receiving Unemployment Assistance after UI Benefits			
$Prob > 0.5$	D(age>=42)	1.58	0.62
		[0.05]	[0.11]
	Effect of 1 add. Month of Benefits $\frac{dy}{dP}$	0.26	0.10
$Prob \leq 0.5$	D(age>=42)	1.95	1.07
		[0.07]	[0.16]
	Effect of 1 add. Month of Benefits $\frac{dy}{dP}$	0.32	0.18
	P-Value for Equality of Effects	0.00	0.02

Notes: The coefficients estimate the magnitude of the change in the dependent variable at the age threshold. The two coefficients within each column of each panel are from a fully interacted RD regression, where the age-splines, constant and RD dummy are interacted with a dummy for the subgroup. The reported P-value corresponds to a test of equality between the two coefficients based on this interacted method. Standard errors (in parentheses) are clustered at the day relative to the threshold level (* P<.05, ** P<.01).
The sample consists of individuals starting unemployment spells between July 1987 and March 1999, who had worked for at least 52 months in the last 7 years without intermittent UI spell. The probability of receiving unemployment assitance is estimated by probit using pre-determined characteristics (see the text and Web Appendix).

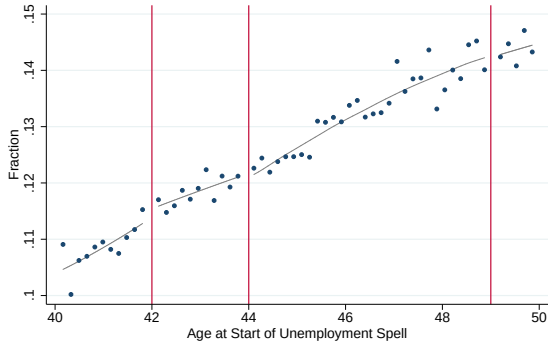
Figure W-1: Baseline Characteristics around Age Discontinuities



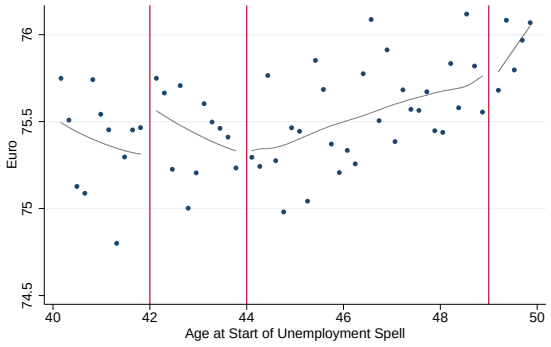
(a) Female



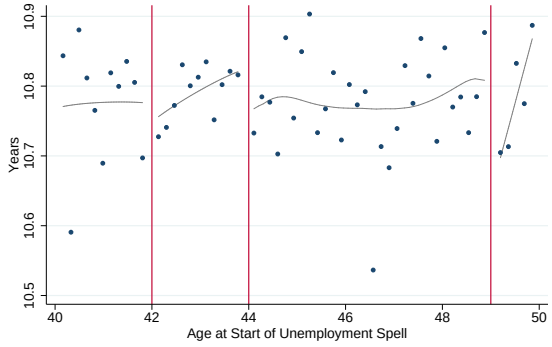
(b) Education in Years



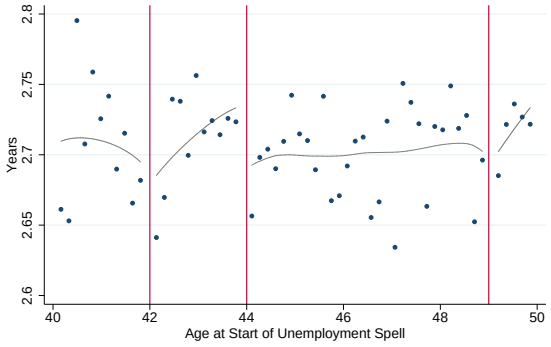
(c) Foreign Citizenship



(d) Previous Wage



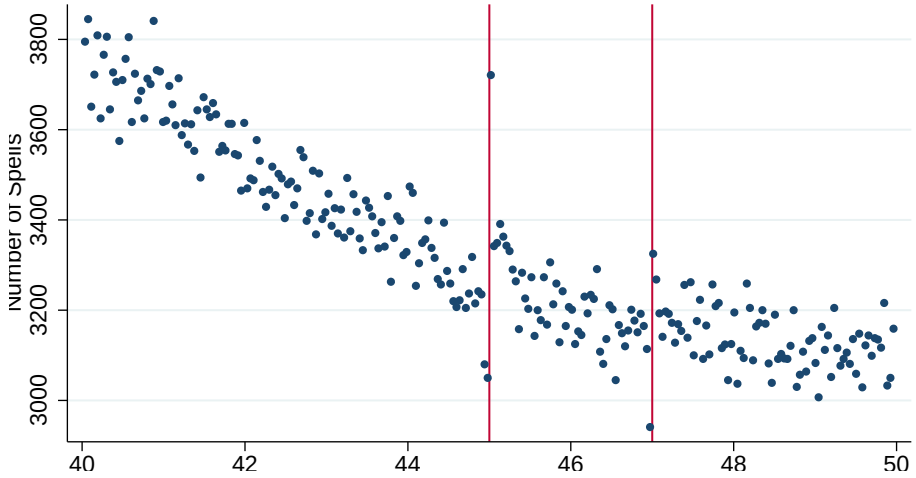
(e) Actual Experience



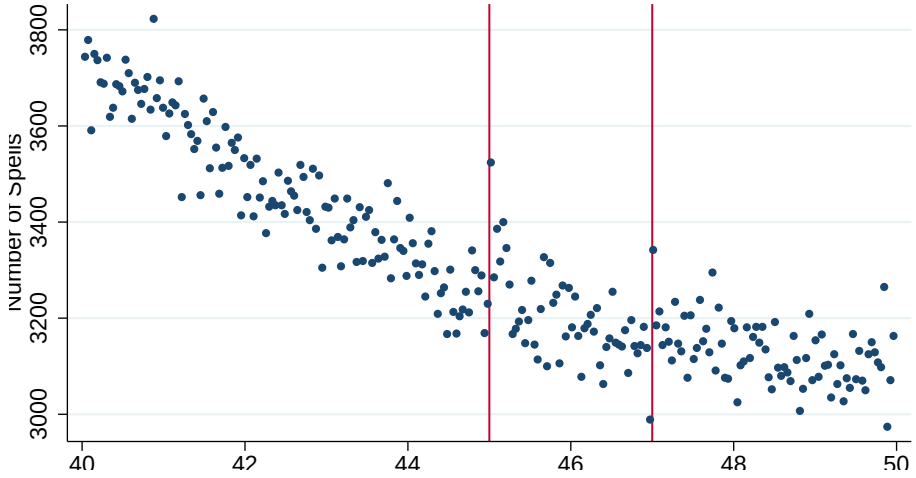
(f) Employer Tenure

Notes: For sample description see Figure 1.

Figure W-2: Density around Age Cutoffs for Potential UI Durations - Period March 1999 to December 2004



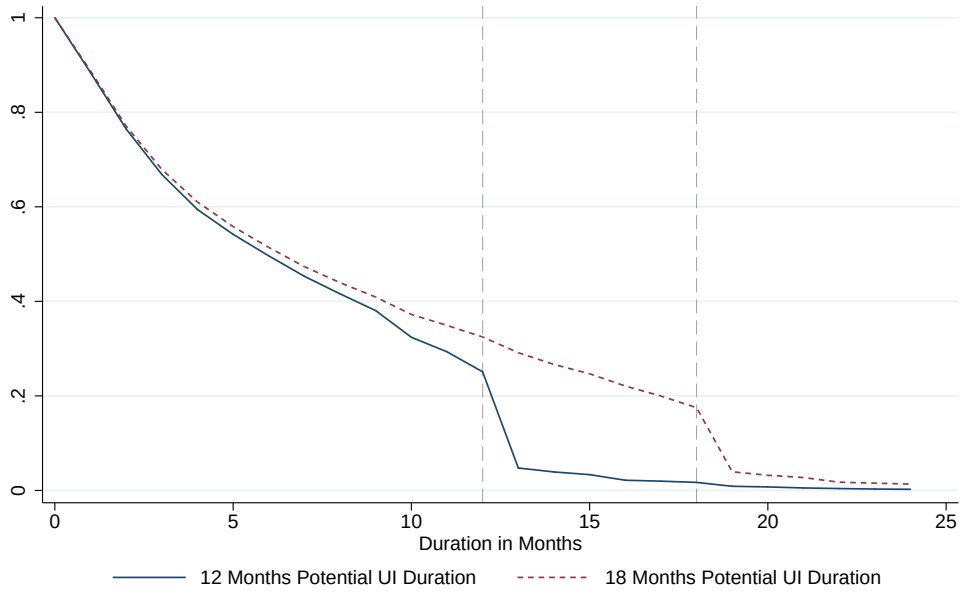
(a) Age on date of UI claim



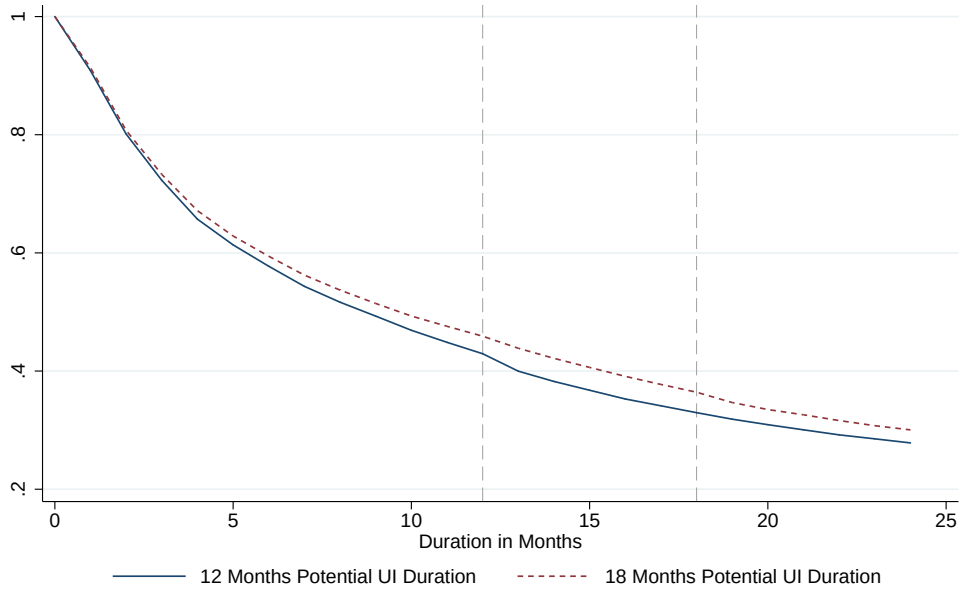
(b) Age at Job Loss

Notes: The top figure shows density of spells by age at the start of receiving unemployment insurance (i.e. the number of spells in 2 week interval age bins). The bottom figure shows the density by age at the end of the last job before the UI spell. The vertical lines mark age cutoffs for increases in potential UI durations at age 45 (12 to 18 months) and 47 (18 to 22 months). The sample are unemployed worker who had worked for at least 6 out of the last 7 years (and did not receive UI benefits in that time).

Figure W-3: Effect of Increasing Potential UI Durations from 12 to 18 Months on the Survival Functions - Regression Discontinuity Estimate at Age 42 Discontinuity



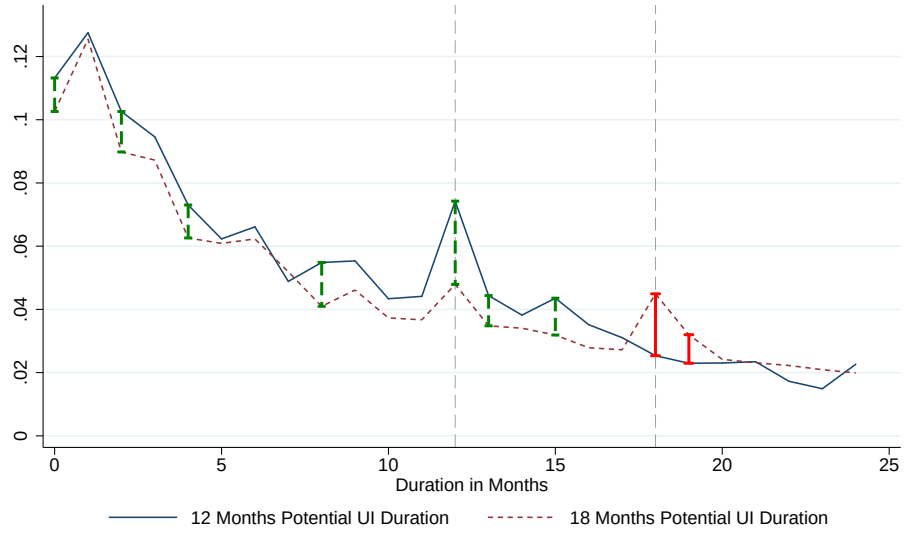
(a) Survival functions for staying in UI (ALG) built up from RD estimates



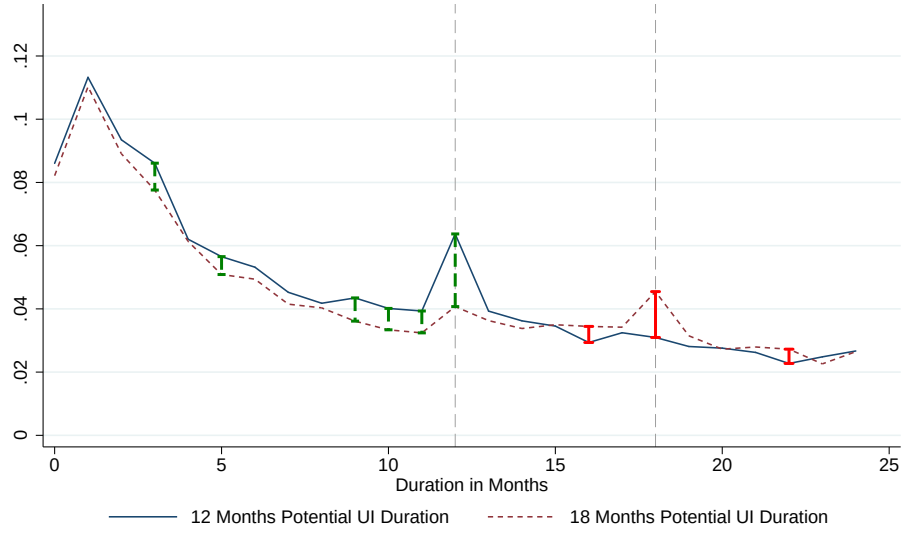
(b) Survival functions for staying in non-employment built up from RD estimates

Notes: The survival functions in both figures are estimated pointwise at each point of support using regression discontinuity estimation. For details see text.

Figure W-4: Effect of Increasing Potential UI Durations from 12 to 18 Months on the Monthly Hazard Functions - Regression Discontinuity Estimate at Age 42 Discontinuity



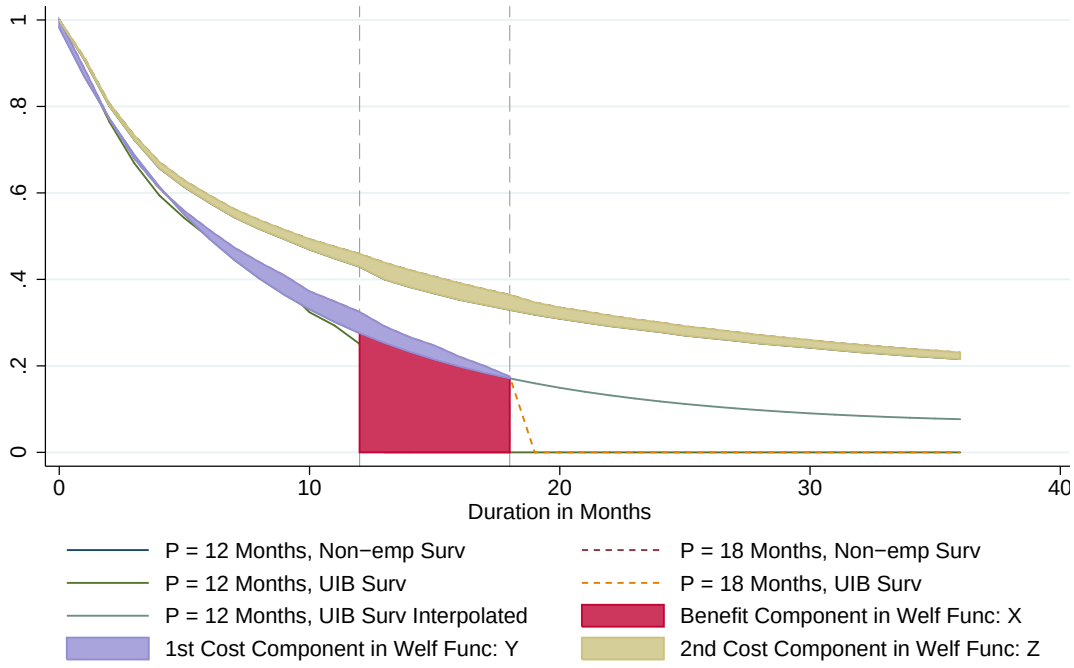
(a) Empirical Hazard of Leaving Non-employment during Period of Falling Unemployment 1987-1991



(b) Empirical Hazard of Leaving Non-employment during Period of Rising Unemployment 1992-1997

Notes: The hazard functions in both figures are estimated pointwise at each point of support using regression discontinuity estimation. Vertical bars indicate that the hazard rates are statistically significant form each other on the 5 percent level. For details see text.

Figure W-5: Measuring the Cost and Benefit Indexes of the Welfare Equation using the Regression Discontinuity Design



Notes: The figure shows survival functions for remaining in non-employment above and below the age threshold at which UI benefit durations increase from 12 to 18 months. Similarly it shows the survival functions for remaining on UI benefits for both groups. These four survival functions are estimated pointwise at each point of support using regression discontinuity estimation. Finally it shows the interpolated survival function for remaining on UI benefits for the people below the age threshold, which is used to create a counterfactual survival function beyond 12 months of UI benefits. The shaded areas mark the areas corresponding to the cost and benefit indexes of the welfare equation in the main text: $X = \frac{\partial B}{\partial P}\Big|_1$, $Y = \frac{\partial B}{\partial P}\Big|_2$, and $Z = \frac{\partial D}{\partial P}$. For more details see text.