SOCIAL INSURANCE PROGRAMS AND THE LABOR MARKET[‡]

The Effect of Unemployment Benefits on the Duration of Unemployment Insurance Receipt: New Evidence from a Regression Kink Design in Missouri, 2003–2013[†]

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Despite the consensus that higher unemployment benefits lead to longer durations of unemployment, the precise magnitude of the effect is uncertain. Recent studies based on experiences in Western Europe (summarized in Card et al. 2015b) find a very wide range of elasticities of unemployment duration with respect to the level of Unemployment Insurance (UI) benefits—in the range of 0.3 to 2. Studies from the United States, mostly based on the Continuous Wage and Benefit History dataset, find a somewhat narrower range of elasticities, though none of these estimates incorporates data from the past decade (see Chetty 2010; Landais forthcoming; and the summary by Krueger and Meyer 2002).

In this paper, we provide new evidence on the UI benefit elasticity based on administrative data from the state of Missouri covering the period from 2003 to 2013. Our identification of the causal effect of UI benefit comes from a regression kink design (RKD) and relies on the quasi-experimental variation around the kink in the UI benefit schedule. A major advantage of the dataset is that it affords us the opportunity to investigate the Great Recession period.

We find that the elasticity of UI duration with respect to the weekly benefit amount is around 0.35 during the pre-recession period (2003–2007), which is on the lower end of estimates in the US literature. In contrast, UI durations are more responsive to benefit levels during the recession and its aftermath, with the elasticity estimate in the range of 0.65–0.9.[1]

I. Institutional Background and Empirical Strategy

Unemployment benefit levels in the United States are a function of earnings in the year prior to the claim. In Missouri, weekly benefits for eligible UI claimants are given by the formula

$$B \equiv \min(m \cdot Q, B_{max}),$$

[1] Kroft and Notowidigdo (2014) use state and year variation in UI benefits and the unemployment rate over the 1985–2000 period and show that in the SIPP data the duration effects of UI benefits are stronger when the unemployment rate is lower. Using German data, Schmieder, von Wachter, and Bender (2012) find that the nonemployment effects of additional months of potential UI duration are only modestly lower during downturns.

where Q is the highest quarter earnings in the "base period" (i.e., the first four of the preceding five calendar quarters),[2] $13 \cdot m$ is the replacement rate, and B_{max} is the UI benefit cap. The replacement rate was 52 percent for most years in our sample period, implying that $m = 4$ percent. The benefit cap, B_{max} ranged from \$250 to \$320 per week, depending on the claim year.

Since the UI benefit is a function of past earnings, it is likely to be correlated with worker characteristics that determine unemployment durations. A regression kink design circumvents this endogeneity problem by using the quasi-experimental variation induced by the cap in the benefit formula. Specifically, let Y be the unemployment duration, B the UI benefit level, and V the normalized high quarter earnings.[3] Card et al. (2015b) show that under smoothness conditions, the RK estimand

$$(1) \quad \frac{\lim_{v_0 \to 0^+} \frac{dE[Y|V=v]}{dv}\Big|_{v=v_0} - \lim_{v_0 \to 0^-} \frac{dE[Y|V=v]}{dv}\Big|_{v=v_0}}{\lim_{v_0 \to 0^+} \frac{dE[B|V=v]}{dv}\Big|_{v=v_0} - \lim_{v_0 \to 0^-} \frac{dE[B|V=v]}{dv}\Big|_{v=v_0}}$$

identifies a weighted average of the marginal effects of B on Y.[4] The identifying assumptions in Card et al. (2015b) give rise to the testable implications that the distribution of V and the conditional expectation/quantile functions of any predetermined characteristics are continuously differentiable at $V = 0$.

In a sharp RKD where all benefit assignments appear to follow the formula, B is a deterministic function of V and the denominator of (1) is a known constant. In reality, however, there appear to be small deviations from the formula. Therefore, it becomes necessary to apply a fuzzy RKD and estimate the slope change of the first stage function $E[B|V = v]$.

For estimation, we follow Card et al. (2015b) and adopt local polynomial estimators for the slope changes in the numerator and denominator of (1). We present estimates of the UI benefit elasticity using the analog of the Imbens and Kalyanaraman (2012) bandwidth for fuzzy RKD

("Fuzzy IK") and a "rule-of-thumb" bandwidth based on Fan and Gijbels (1996). Alternative bandwidth selectors and polynomial orders, as well as bias-corrected estimates per Calonico, Cattaneo, and Titiunik (forthcoming)—henceforth, CCT—are shown in Card et al. (2015a)—henceforth, CJLMP—and the estimates are largely similar.

II. Data

We use data on UI claimants from the state of Missouri who initiated a claim from mid-2003 through mid-2013. We observe the weekly benefit amount, past and future earnings, and the date and amount of each UI payment. We also observe the industry of the pre-job-loss employer and are able to construct job tenure with that employer. Since our focus is on the comparison of benefit effects before and after the Great Recession, we conduct all analyses separately for claims established in years 2003–2007 ("pre-recession" or "pre" period) and 2008–2013 ("post-recession" or "post" period). Sample selection is described in more detail in CJLMP. There are 295,639 and 409,753 observations in the pre- and post-recession analysis sample, respectively. We focus on the initial UI spell, which is the number of weeks of UI claim before a no-claim gap of more than two weeks, an outcome generally examined in existing empirical studies. The mean lengths of initial spell duration are 11.9 weeks and 24.3 weeks in the two samples, respectively.

III. Results

The identifying assumptions in Card et al. (2015b) for a valid RKD imply a continuously differentiable density of the running variable. CJLMP find a salient kink in the distribution of high quarter earnings in the pre period for workers previously employed in the manufacturing sector. To ensure that estimates are not influenced by this kink, we exclude manufacturing claimants in both periods.[5] After this exclusion, CJLMP show that there is no statistical evidence indicating a kink at the threshold.

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[2] Beginning in 2008, the formula used the average of the two highest quarters.

[3] Formally, $V = Q - \frac{B_{max}}{m}$, and the kink threshold is at $V = 0$.

[4] In the empirical analysis, we use log (duration) as the dependent variable and log (benefit) as the endogenous variable in order to directly estimate the benefit elasticity.

[5] Including manufacturing tends to result in smaller estimated elasticities both pre- and post-recession, with the pre-recession estimates close to zero.
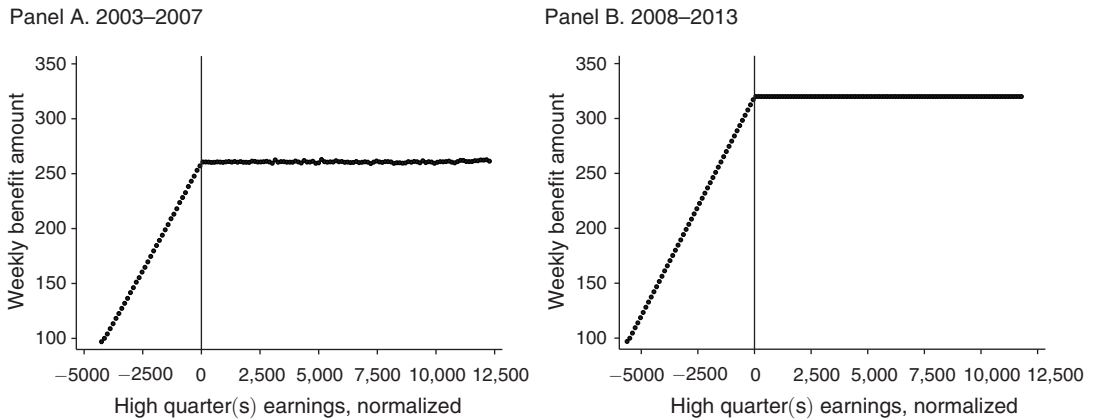
Panel A. 2003–2007

Panel B. 2008–2013

FIGURE 1. FIRST STAGE

As another test of the design validity, we examine the patterns of the predetermined covariates around the threshold. As with Card et al. (2015b), we construct an index, the predicted log initial UI spell duration, by using all the covariates available in the dataset: earnings in the quarter preceding job loss and indicators for industry, month of the year, calendar year and previous job tenure quintiles. CJLMP show that these indices move reasonably smoothly across the threshold.

As a first step in the main RKD analysis, we graphically present the relationship between base period high quarter earnings and benefit levels (first stage) and initial UI durations (outcome). In Figure 1, panels A and B plot binned averages of the observed weekly benefit amount against high quarter(s) earnings (V) for the two sample periods, respectively. There is a sharp kink in the relationship at $V = 0$ in both graphs that by and large represents the statutory replacement rate and the benefit cap. There are deviations from the piecewise linear formula in both periods, but the deviations are minimal. Around 0.30 percent and 0.35 percent of observations lie off the benefit schedule with an average deviation of $0.128 and $0.13 in the pre and post period respectively.[6]

In Figure 2, panels A and B depict the relationship between log initial UI spell duration and high quarter earnings for the two sample periods. In both graphs, the initial UI spell duration peaks at around $V = 0$, but the slope change around the threshold is more pronounced in the post period. The local linear estimates with the fuzzy IK and FG bandwidths are around 0.36 in the pre period, and 0.88 and 0.68 in the post period, all of which are significant. We can formally reject the equality of the pre and post elasticities (p-value < 0.01). To visualize the relationship between the elasticity estimates and the bandwidth choice, we plot the local linear estimates for the pre and post samples associated with a range of potential bandwidths in Figure 3 (quadratic estimates are shown in CJLMP), denoting the two bandwidths with vertical lines. For bandwidths between $600 and $8,000, the local linear estimated elasticities in the post period are always larger than those in the pre period: the smallest elasticity in the post period is 0.55, and the largest in the pre period is 0.38.[7]

One explanation for the lower responsiveness during the pre period is that the downward kink in benefit levels induces an offsetting *upward* kink in potential durations for a subpopulation of claimants at the same location, due to the fact

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[6] The seemingly larger fluctuation in Figure 1, panel A is mainly due to the changing benefit cap level during the pre-recession period ($250 between 2003 and 2005, $270 in 2006 and $280 in 2007) and the varying distribution of claim years conditional on V, as opposed to deviations from the schedule.

[7] We also estimate the UI benefit elasticity by year and its relationship with the labor condition is consistent with the two-period results. In particular, the correlation between the benefit elasticity and the annual unemployment rate is between 0.6 and 0.7.
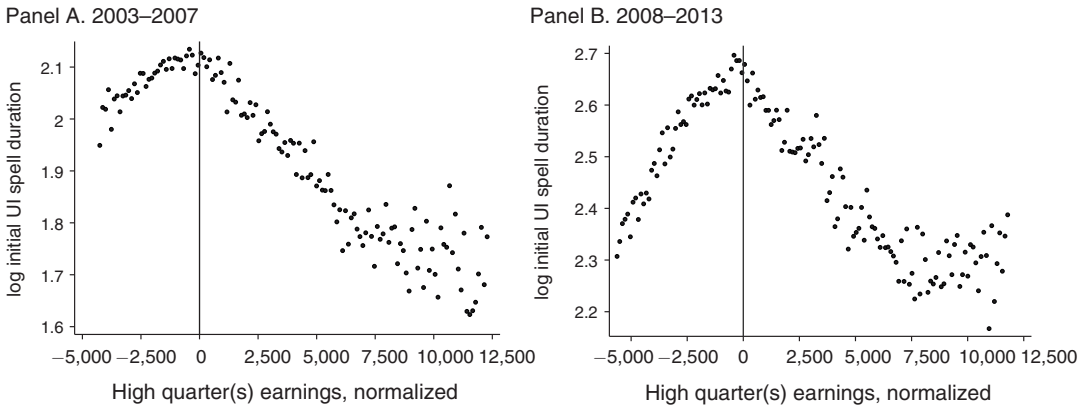
Panel A. 2003–2007

Panel B. 2008–2013

Figure 2. log Initial UI Spell Duration

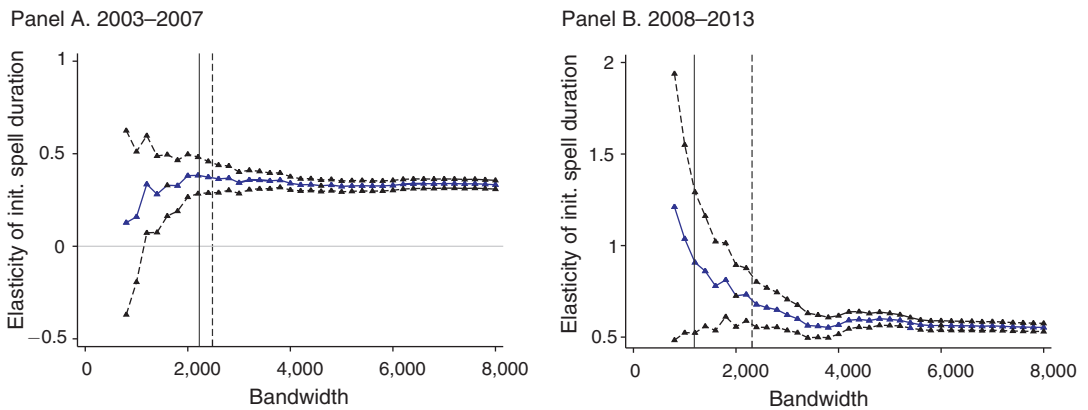Panel A. 2003–2007

Panel B. 2008–2013

Figure 3. Local Linear Fuzzy RK Estimates with Varying Bandwidths

Note: Fuzzy IK Bandwidth (solid vertical line): Elasticity Estimate (a) = 0.373 (standard error = 0.049); (b) = 0.882 (standard error = 0.200) FG Bandwidth (dashed vertical line): Elasticity Estimate (a) = 0.356 (standard error = 0.041); (b) = 0.684 (standard error = 0.067).

that potential durations are a function of benefit levels. This slope change complicates the interpretation of the estimated benefit elasticities at the kink point. If unemployment duration responds positively to potential duration, estimates of the effects of benefit levels will be biased downward. A related explanation is that UI potential durations were substantially extended during the Great Recession, up to an unprecedented 99 weeks as a result of federal Extended Unemployment Compensation (EUC) and state Extended Benefit (EB) programs. Because of these extensions, workers were less likely to exhaust their UI benefits in the post period: 37 percent of claimants exhausted

benefits in 2003–2007, while only 28 percent exhausted benefits after 2008. Since UI spells are right censored when claimants exhaust, the higher exhaustion rate in the pre-recession period may dampen duration effects. In order to mitigate the confounding effects of potential duration, we follow Card, Lee, and Pei (2009) and artificially censor the outcomes using a smoothed potential duration formula as detailed in CJLMP.

We find that in the pre-recession period, although the censoring removes the upward kink in potential duration at the threshold, estimates for the local linear models do not change much. The elasticity of censored initial claim duration

in the pre period is 0.39 (standard error = 0.06) using the fuzzy IK bandwidth and 0.36 (standard error = 0.04) using the FG bandwidth. In the post-recession period, local linear estimates are still significantly positive, though they are smaller than their uncensored counterparts with elasticity estimates of 0.64 (standard error = 0.16) for fuzzy IK and 0.49 (standard error = 0.06) for FG. This comparison indicates that some of the differences in pre- and post- recession elasticities can be attributed to the exhaustion of benefits, but not entirely.

IV. Discussion and Conclusion

It is beyond the scope of this paper to pin down the precise explanation for the larger responsiveness to UI benefit generosity during a worse labor market. There are several candidate explanations. First, this relationship is a prediction from simple one-sided search models (variants of McCall 1970; see e.g., Kroft and Notowidgdo 2011): lower offer arrival rates and higher job destruction rates during a recession make job seekers more likely to be unemployed in future periods and more sensitive to UI generosity. Second, by the same intuition, the longer UI potential durations during the recent recession may also render claimants more responsive to a change in benefit levels. Finally, we cannot rule out composition effects: unemployed workers in the recession might be more liquidity constrained and therefore were more responsive to UI.

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