Temporary Shocks, Permanent Impacts: The Effects of Liquidity on Job Search and Reemployment

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Liquidity and Job Search

In the US, searching for a job is often financially stressful

- Unemployed job-seekers highly constrained: ≈$960 in checking account (SCF, 2013)
- Search is expensive: liquid assets drop by $1,000 over 6-month spell (Ganong and Noel, 2019)

Unemployment insurance (UI): provides temporary liquidity during job search

- Lengthens time spent unemployed & job-hunting

Does subsidizing job search improve reemployment outcomes?

- Mixed effects on post-UI job quality, usually short-run
- Not representative: mostly reflect long-term unemployed

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- New source of variation: delayed UI benefit payments
  - High frequency, wealth-constant shock to liquidity
  - Delays very common in the UI system
- Natural experiment: California UI system glitch in 2013, only delays subset of claimants
  - Delayed & non-delayed claimants well-balanced on observables
  - Use matched design for cleaner causal estimates
- Benefits of our setting:
  - Unique variation: affects claimants at different points in the spell
  - Rich data: see UI spell outcomes, next jobs, long-run labor market outcomes

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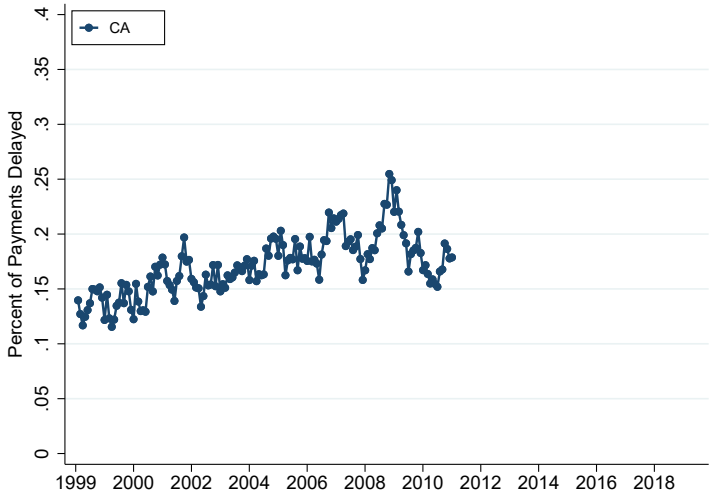
Payment Delays Are Common In the UI System



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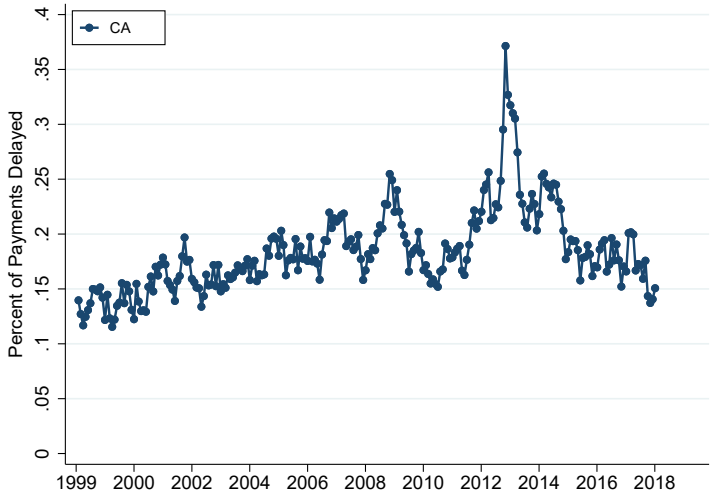

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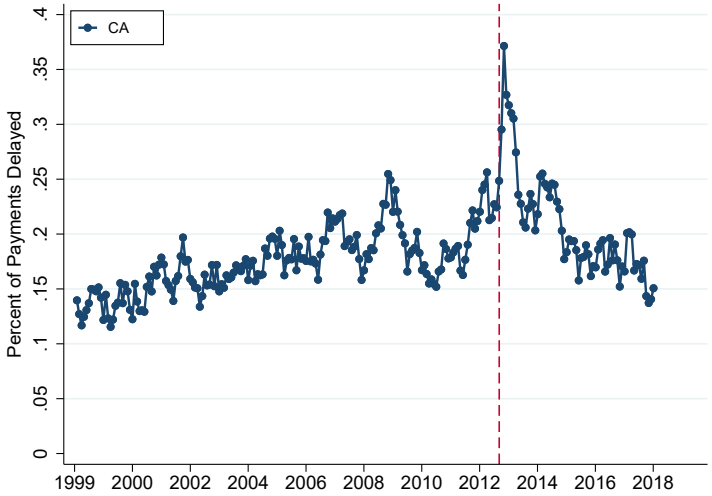

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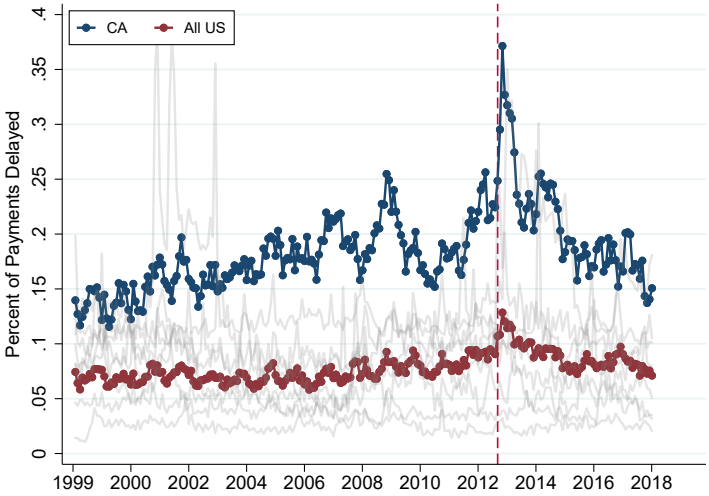

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Preview of Results

- **Sizable liquidity shock**: $825 in benefits delayed, fully paid after 34 days
- Large short-run effects
- Effects persist over time (5+ years later)
- Effects vary substantially by claimants' time into spell at outage
- Key channel for results: duration dependence

Preview of Results

- Sizable liquidity shock: $825 in benefits delayed, fully paid after 34 days
- **Large short-run effects**:
  - Shorter unemployment spells: 2.4 fewer weeks on UI, 5.6 fewer weeks until next job
  - Find better jobs: 4.6% higher wages, higher quality firms
  - Improved matches: longer tenure, closer workplace, same industry
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Preview of Results

- Sizable liquidity shock: $825 in benefits delayed, fully paid after 34 days
- Large short-run effects
- **Effects persist over time** (5+ years later):
  - $500 (6%) higher earnings each quarter, 2.5pp higher employment
  - 3.5% higher earnings, conditional on employment
- Effects vary substantially by claimants' time into spell at outage
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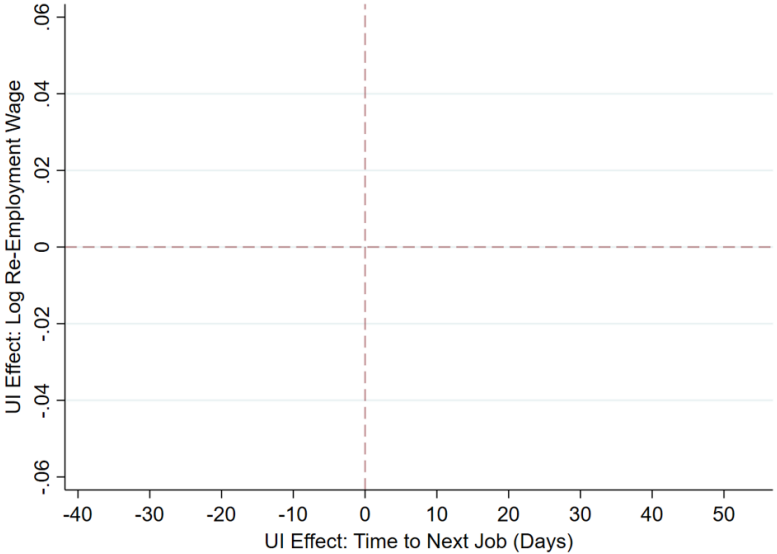
Preview of Results

- Sizable liquidity shock: $825 in benefits delayed, fully paid after 34 days
- Large short-run effects
- Effects persist over time (5+ years later)
- **Effects vary substantially by claimants' time into spell at outage**:
  - Largest for newer UI claimants (<15 weeks into spell) and declining in spell age
  - Unique advantage of our variation: prior designs miss these patterns
- Key channel for results: duration dependence

Preview of Results

- Sizable liquidity shock: $825 in benefits delayed, fully paid after 34 days
- Large short-run effects
- Effects persist over time (5+ years later)
- Effects vary substantially by claimants' time into spell at outage
- **Key channel for results: duration dependence**
  - Negative causal effect of unemployment on reemployment outcomes
  - Delays reduce time-to-job-finding $\Rightarrow$ find better jobs

Benchmarking Our Main Effects



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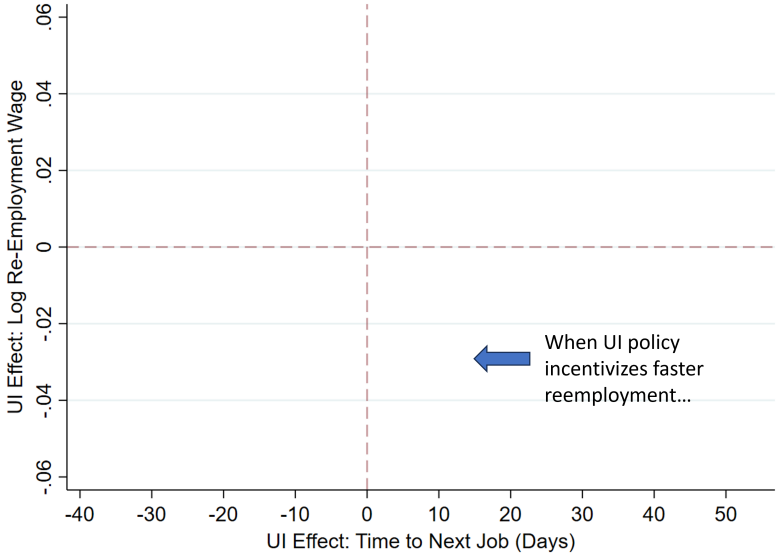

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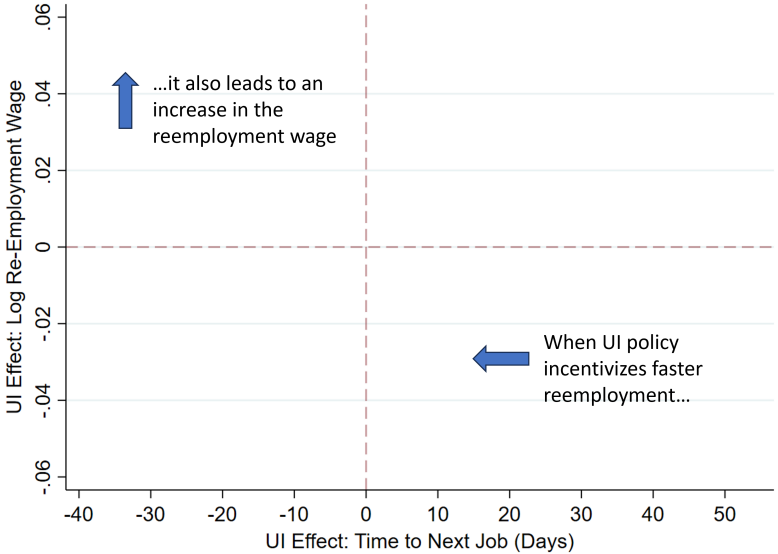

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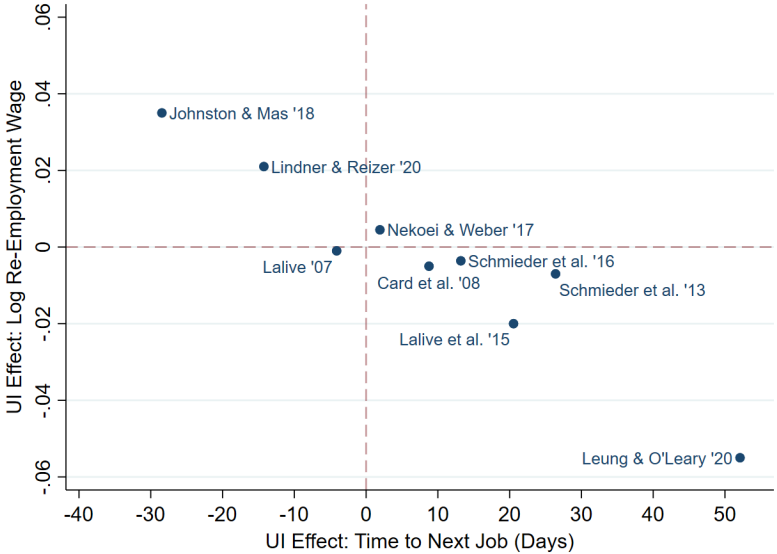

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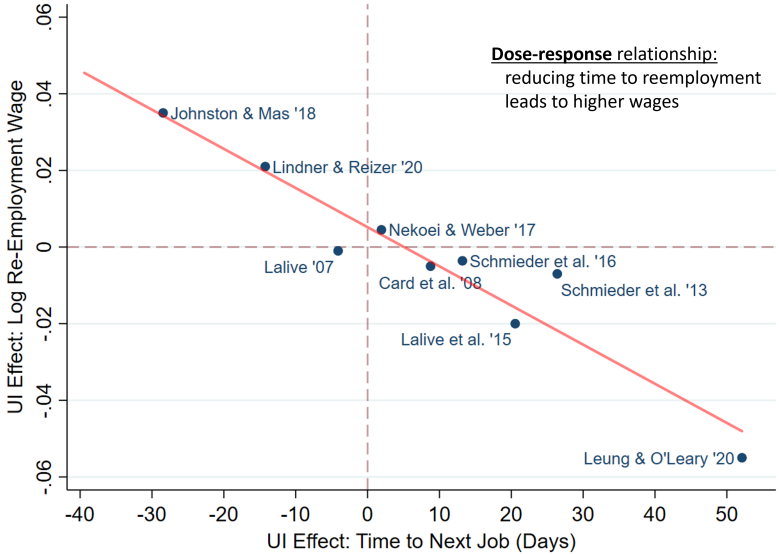

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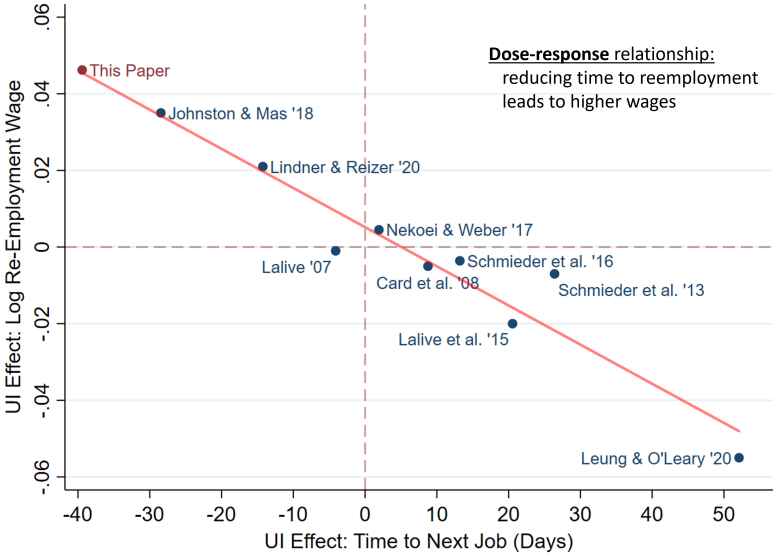

Contributions

UI and future job outcomes

(*e.g.*, Lalive, 2007; Schmieder et al., 2016; Nekoei and Weber, 2017; Johnston and Mas, 2018; Farooq et al., 2022)

- Find large cost to future labor market outcomes; first to show persistence
- Uncover novel heterogeneity over the spell: largest effects for newer UI entrants

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- New test for causal duration dependence: persistence of reemployment effects

Effects of liquidity during job search

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- Everyday liquidity shock: substantial effects on job search and reemployment

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Outline

Data Sources

Merge together detailed administrative records from the California UI system (EDD):

1. UI claim microdata
   - Initial claim application: demographics (e.g., race, gender, age), address
   - Transaction-level UI payments info: exact benefit amounts, disbursal dates
2. Linked employer-employee earnings data
   - Covers all labor employment/earnings in the state
   - Includes all salary components: wages, bonuses, tips, etc
3. Firm-level demographics and information (QCEW)
   - Covers all firms employing at least one worker in California
   - Detailed firm industry, age, exact establishment locations

Salient Features of the UI Program

- UI benefits provide temporary income to no-fault job losers
  - Fixed biweekly benefits: ≈$300 per week in CA
  - Target 50% replacement of pre-UI wages
  - Maximum duration of regular benefits typically 26 weeks
- Maximum benefit duration extended due to the Great Recession
  - Federal UI program extended benefits through end of 2013
  - All claimants eligible for benefits for ≥19 weeks after outage
  - Maximum duration for estimation sample is 73 weeks (ex-post)

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UI Benefit Timing and Payment Delays

- Claimants must certify every two weeks to receive UI benefits (mail, phone, web)
  - 2013: >90% receive/return a paper form by mail ⇒ manual validation checks by EDD
- Benefits can be delayed due to claimant or system-side issues:
  - Delays very common in California: about 20% of weekly payments pre-outage
- Economic interpretation of a delay:
  - Delayed benefits induce high frequency variation in claimants' liquidity
  - Key: only shifts timing, not amount of benefits

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▸ Detailed payment timeline

The 2013 UI Payment Outage

- Paper forms processing very time-intensive: payment backlogs early in the Great Recession
- State hires outside contractor to build new, **automated** payment processing system
  - Designed to eliminate manual caseworker checks on benefit payment
  - System introduced Sept 2013, immediately runs into issues
- New system has two contemporaneous glitches when implemented:
  - First issue: 101k claimants never mailed paper forms, plausibly random per agency
  - Second issue: payments frozen if you switched away from paper forms

  $\Rightarrow$ Interaction generates payment delays for subset of claimants

▸ More details ▸ Ambiguous claimants ▸ Compliance analysis

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▸ More details ▸ Zip-level variation ▸ County-level variation

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The Mercury News

California computer problems delay unemployment checks

September 21, 2013 at 10:41 a.m.

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Los Angeles Times

Glitch cuts off 80,000 Californians from unemployment checks

SEPT. 23, 2013 12 AM PT

Agency Messaging: Only a Temporary Shock

- EDD messaging highlighted computer issue & forthcoming UI payments
- Agency website, 9/15:

  "*A small amount of certifications will require* **some** *one-time manual intervention to be processed. Enhancements* **will be installed over the weekend**...*it is not necessary to call EDD on this issue.*" Screenshot

- 9/24: delayed claimants notified, reiterating forthcoming benefits Screenshot
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How Would Claimants Interpret the Payment Outage?

- Did claimants think benefits were temporarily delayed or permanently cut?
- Our read of available evidence: likely a **temporary liquidity shock**
  - News agencies reported it as a temporary glitch
  - The EDD told claimants that benefits would be forthcoming after issue was fixed
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- First-best research design: use claimants randomly delayed due to outage
- Complication: UI claims data do not identify reason for payment delay
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▸ Sample Restrictions Waterfall

Matching to Eliminate Remaining Differences

- Restrictions work well to isolate outage variation
  - Delayed, non-delayed broadly similar on observables
  - Ensure balance: explicitly match delayed claimants with non-delayed pair
- Two-step matching: nearest neighbor (by propensity score) within discrete covariate cells (e.g., Smith et al, 2019; Schmieder et al., 2023; Jager, 2023; Arnold, 2023)
  - Exact match: time-into-UI-spell at outage, any previous delay
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▸ Propensity Score Overlap ▸ Unmatched Distribution of Spell Age

Summary Statistics

	Delayed	Not Delayed (All)	Not Delayed (Matched)
Female	.46	.46	.46
Citizen	.88	.88	.88
Age at Filing	42	43	42
Race			
White	.37	.36	.37
Black	.072	.082	.073
Asian	.19	.18	.19
Hispanic	.36	.36	.36
Education			
HS Grad or Less	.43	.44	.43
Some College/Associate's	.3	.32	.3
College Graduate or More	.24	.21	.24
UI Claim			
Weekly Benefits	322	328	320
Potential Benefit Duration	28	29	28
Predicted Reemployment Score	.26	.29	.28
Weeks Into Spell At Outage	17	17	17
1(Had Pre-Outage Delay)	.52	.37	.52
Prior Labor Market			
Labor Market Experience (Quarters)	45	45	45
Tenure at Separating Firm (Quarters)	17	17	17
Avg Coworker Pay	12,104	12,261	12,041
Estimated Worker Wage Premium	.31	.31	.3
Number of Claims	68,348	125,640	42,273

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Avg Coworker Pay	12,104	12,261	12,041
Estimated Worker Wage Premium	.31	.31	.3
Number of Claims	68,348	125,640	42,273

Summary Statistics

	Delayed	Not Delayed (All)	Not Delayed (Matched)
Female	.46	.46	.46
Citizen	.88	.88	.88
Age at Filing	42	43	42
Race			
White	.37	.36	.37
Black	.072	.082	.073
Asian	.19	.18	.19
Hispanic	.36	.36	.36
Education			
HS Grad or Less	.43	.44	.43
Some College/Associate's	.3	.32	.3
College Graduate or More	.24	.21	.24
UI Claim			
Weekly Benefits	322	328	320
Potential Benefit Duration	28	29	28
Predicted Reemployment Score	.26	.29	.28
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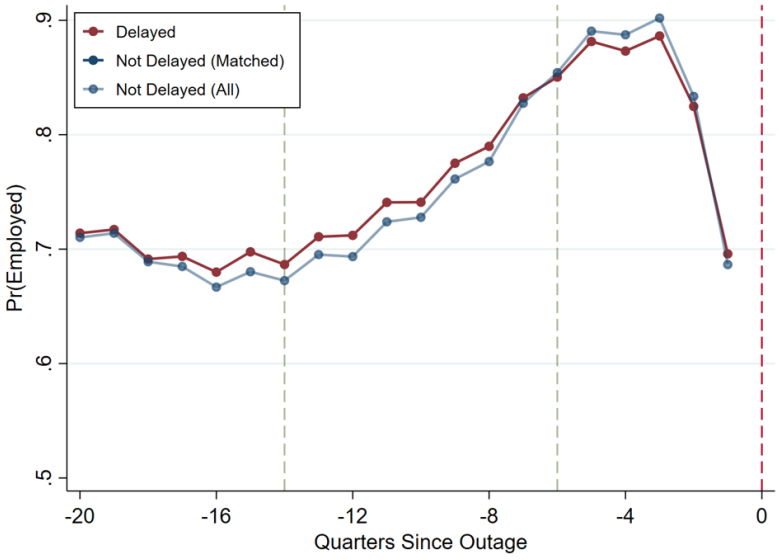
Matching: Pre-Outage Employment Rates



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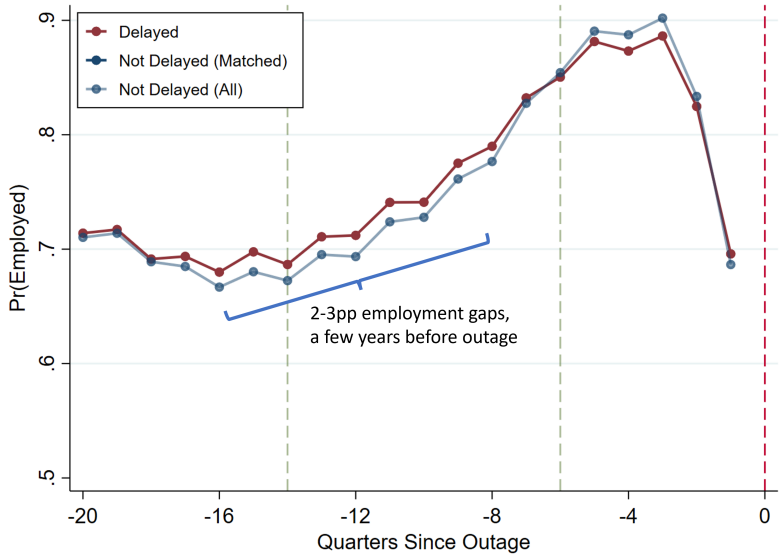

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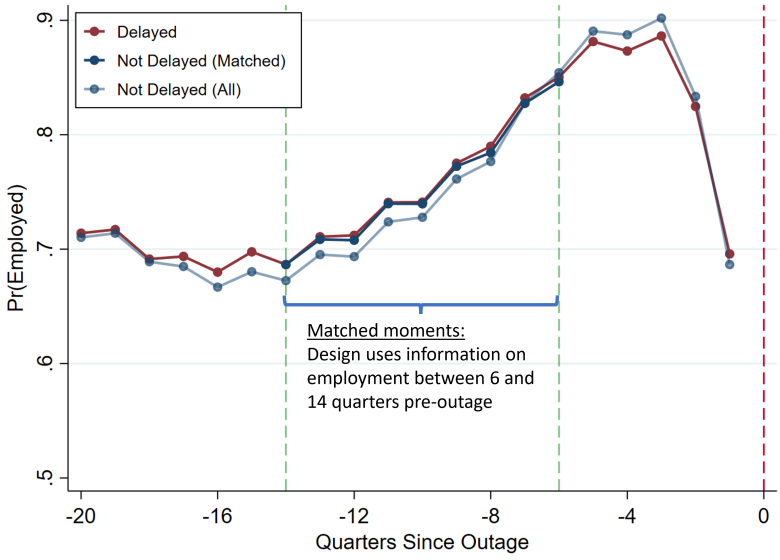

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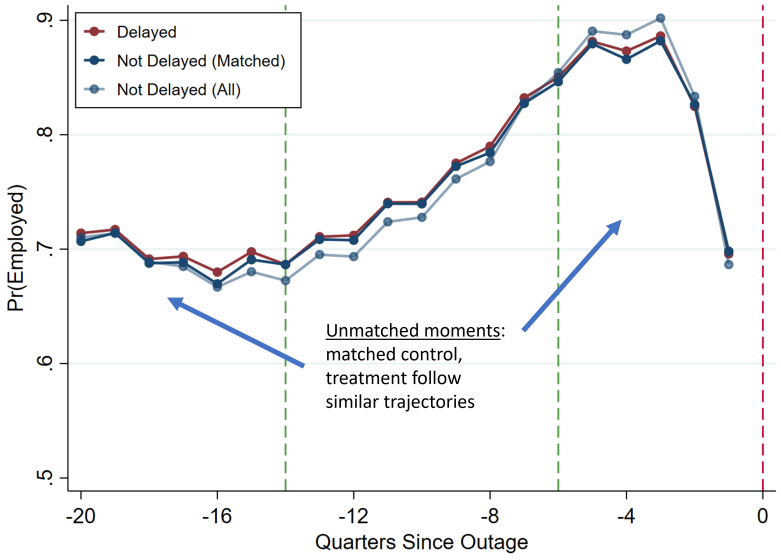
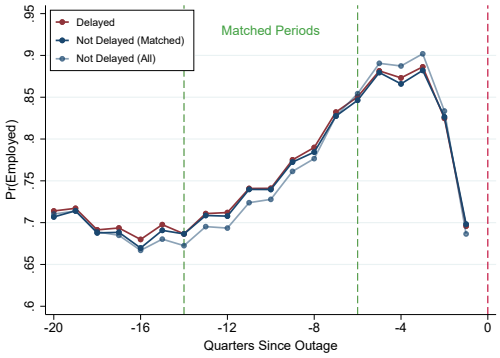
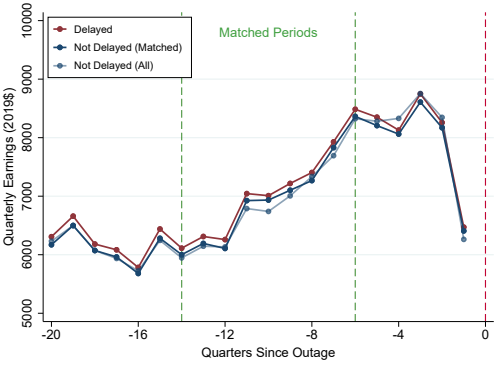


Matching: Pre-Outage Means

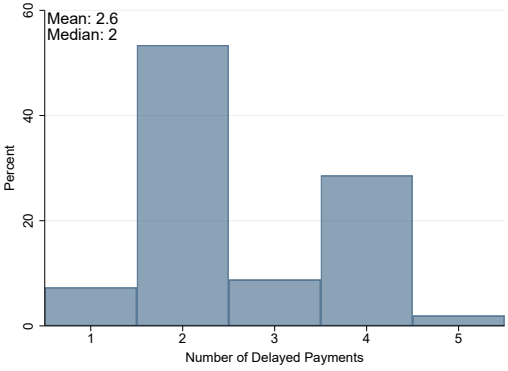


Employment

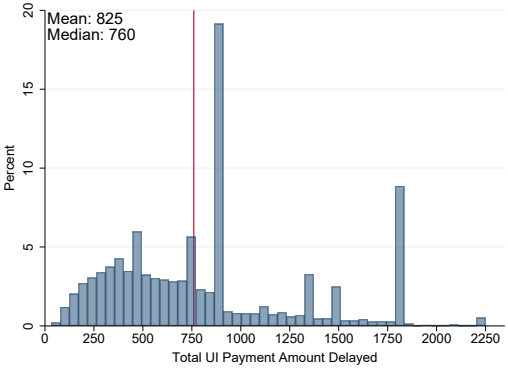


Quarterly Earnings

How Big Were The Outage Liquidity Shocks?



Number of UI Payments



Total Delayed Payment Amounts

- Claimants fully compensated after an average of 34 days

Outline

Job Search Model: Intuition

- Model of job search with duration dependence
  (Schmieder et al, 2016; Nekoei and Weber, 2017)
  - Negative causal effect of unemployment on reeemployment outcomes
  - Benefits of search: encounter more jobs over time
  - Costs of search: increasingly perceived as negatively selected employee
- Implications for delay shock
  - Liquidity constrained claimants: expect faster reemployment
  - Net effect on reemployment wage theoretically ambiguous!

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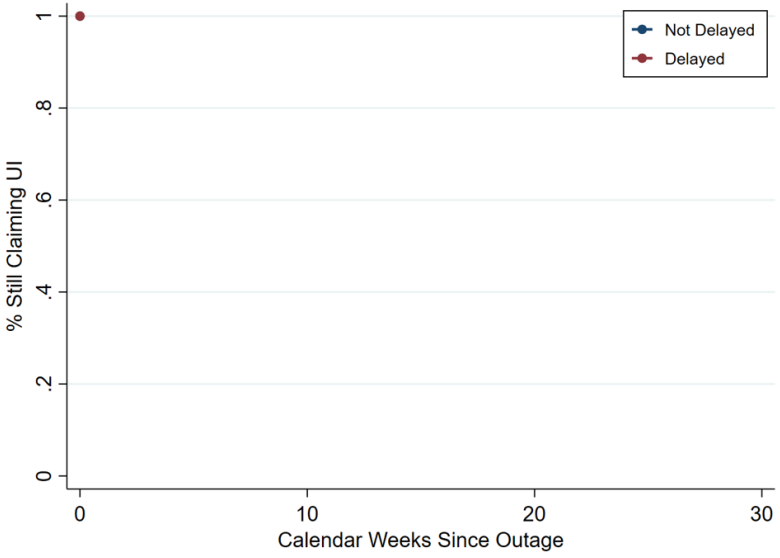

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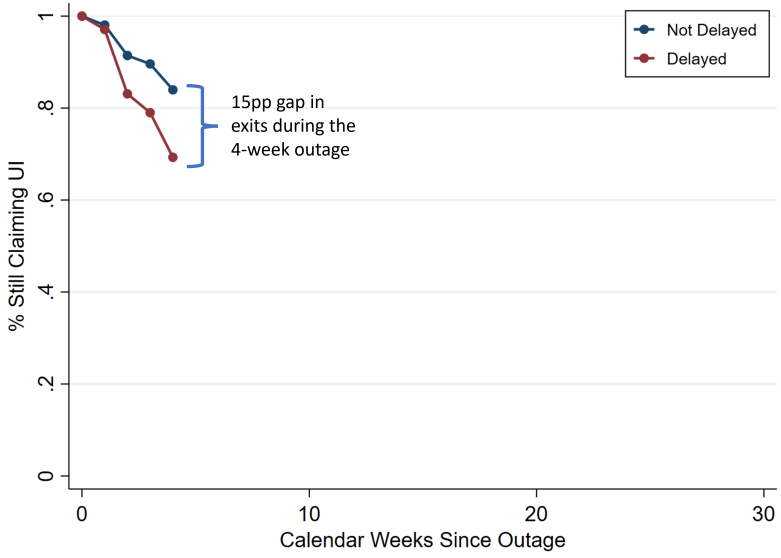

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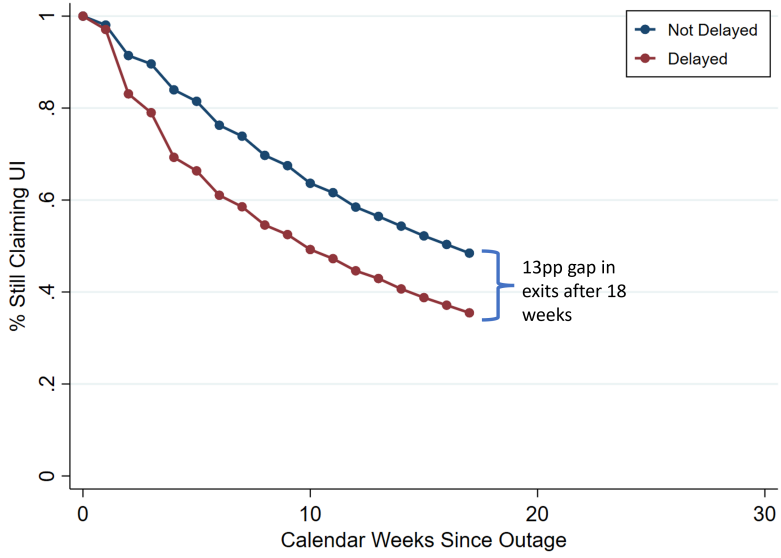

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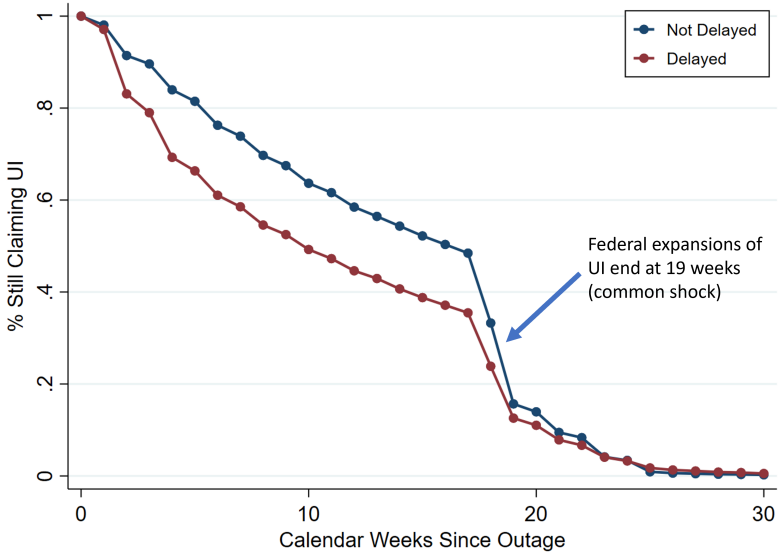

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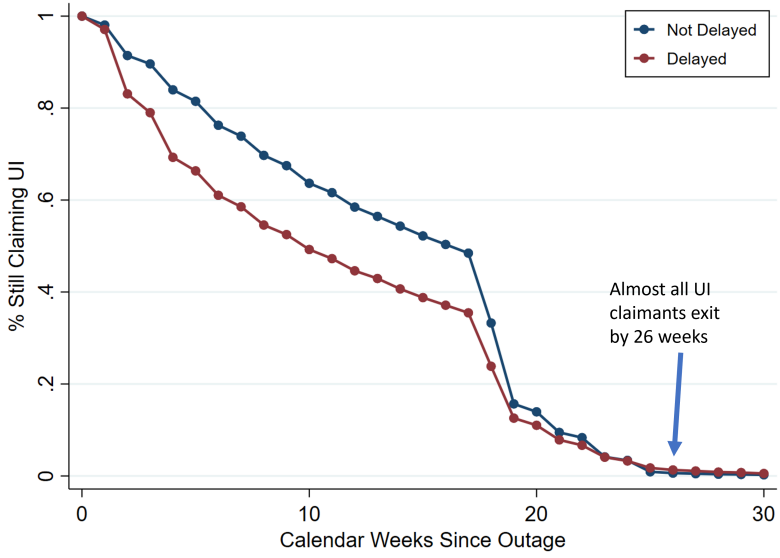
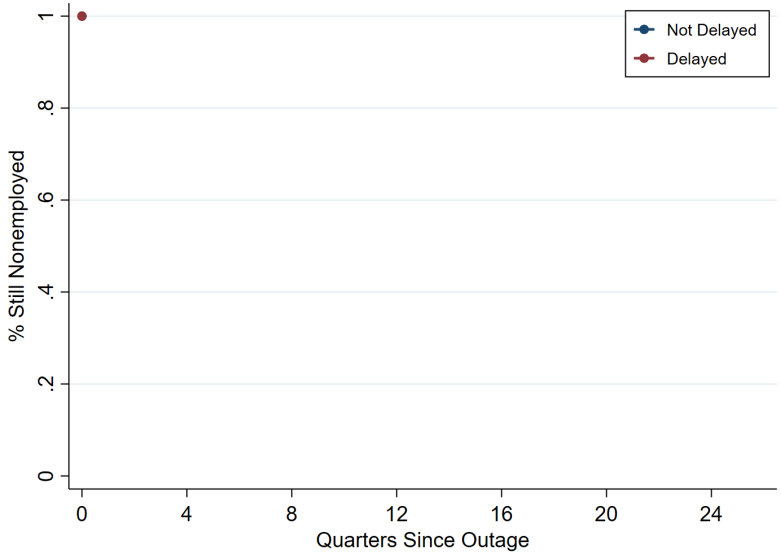


Nonemployment Survival: How Long Until Claimants Find a Job?



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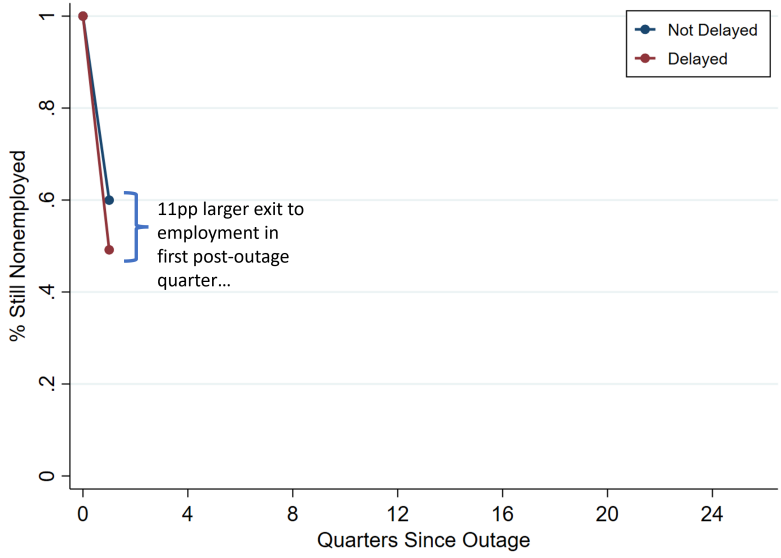

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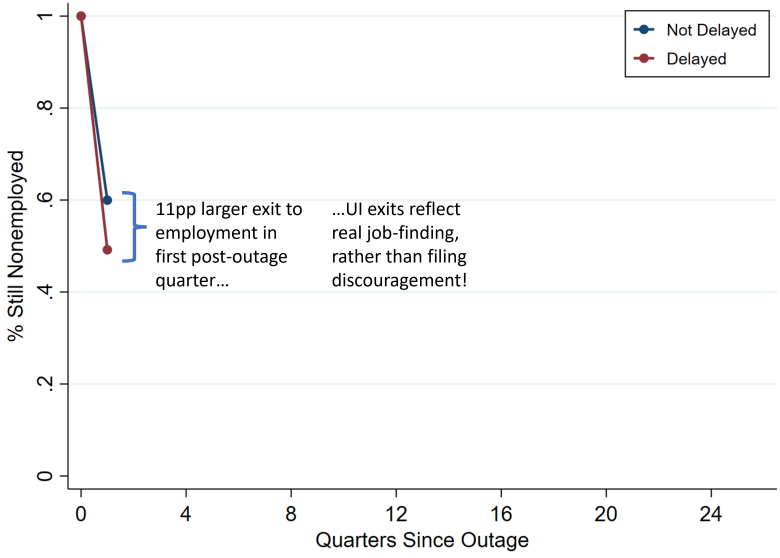

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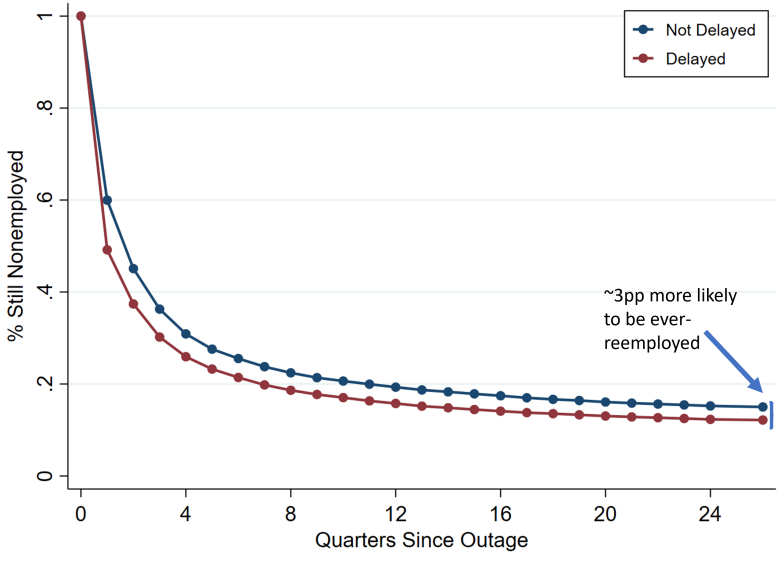
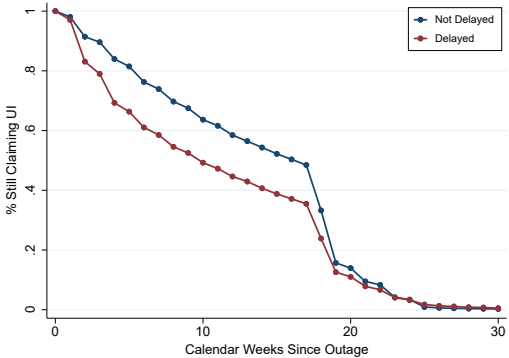
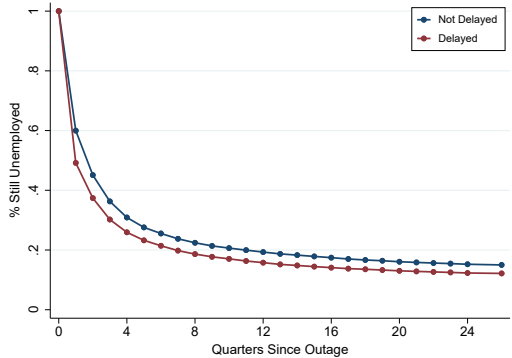




UI Spell (Weeks)



Nonemployment Duration (Quarters)

- Gap in UI exit rates opens precisely during the outage
- These UI exits not simply discouragement: observe increase in job-finding!
- High rate of continued claiming consistent with liquidity shock

Regression Implementation

To convert from graphs to estimates, we specify simple fixed-effects regression of the form:

$$y_i = \alpha \text{Delayed}_i + \mathbf{X}_i'\beta + \varepsilon_i$$

where:

- $\mathbf{X}_i$ vector of demographic controls, including industry and education FE
- SEs clustered at the claim level

Identification assumption: conditional on $\mathbf{X}_i$ within matched sample, delays during the system outage are as-good-as-random

Table 1: Unemployment Spell Outcomes

	(1) 1(Exhaust UI)	(2) UI Duration (Weeks)	(3) 1(Reemp. Within 4 Quarters)	(4) Ever Reemp.	(5) Nonemp. Dur. (Quarters)
Delayed	-.0695***	-2.38***	.0463***	.0302***	-.438***
	(.0061)	(.12)	(.0032)	(.0024)	(.031)
Control Mean	.31	13	.72	.85	5.8
Spell FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Education FE	Yes	Yes	Yes	Yes	Yes
N Spells	110,621	110,621	110,621	110,621	95,761

Standard errors in parentheses

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How Did Faster Exits Affect Job Matches?

- Previous evidence shows that claimants left UI, found jobs faster: were they worse jobs? Estimate effects on next firm wage, firm-level characteristics
  - Measure of reemployment wage: first full quarter earnings (Johnston and Mas, 2018)
- Distinguish between two broad sets of outcomes:
  - Reemploying firm quality: firm-specific measures, preferred by all workers
  - Reemploying firm **match** quality: worker-firm specific measures

▸ Summary Statistics for Reemployed

Table 2: Next Hire Firm Quality

	(1) Log Reemp. Earnings	(2) Log Avg. Coworker Pay	(3) Firm-Specific Pay Premium	(4) Prob. of Wage Loss
Delayed	.0462***	.0512***	.0111***	-.045***
	(.0106)	(.00738)	(.00288)	(.00645)
Control Mean	8.6	8.8	.15	0.41
Spell FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Education FE	Yes	Yes	Yes	Yes
N Spells	72,470	93,661	94,788	92,052

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▸ More On Firm Pay ▸ More on Firm Size ▸ Estimating Firm Wage Premia

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Table 3: Next Hire Match Quality

	(1) Tenure	(2) Distance	(3) Switched Industry	(4) Any Previous Firm Return	(5) Return to Separating Firm
Delayed	.558***	-.657***	-.0364***	.112***	.0486***
	(.074)	(.23)	(.0044)	(.0062)	(.0056)
Control Mean	5.4	23	.51	.4	.23
Spell FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
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Robustness Checks

- Not driven by differential out-of-state mobility Link
  - Merge data to Infutor address records: 92% of claimants stay in California through 2019, unaffected by delay shock
- Not driven by positively selected delay compliers Link
  - Reemployed delayed, non-delayed balance on observables
  - Unlikely: marginal reemployed likely lower quality ex-ante (outcome test logic)
- Not driven by differential recalls to prior employers Link
- Placebo outage delays: affected claimants strongly selected on observables Link
  - We interpret the glitch period as reflecting "clean" variation in delays
- Unlikely to reflect GE effects: similar employment effects by county-level UR Link

Summing Up: Short-Run Outcomes

- Mean liquidity shock of $825, 34 days before being fully compensated
- Delayed claimants exit UI and find a job faster, staying in the labor market at higher rates
- Move to better firms:
  - Better firm quality: 4.6% higher pay, 1.1% higher firm pay premium
  - Better firms for these workers: closer, less likely to switch industry, stayed at firm longer
- These worker-firm match components are important:
  - Represent over half of displaced workers' earnings losses (Lachowska et al, 2020)
  - Industry switching post-job loss associated with large earnings losses (Huckfeldt, 2022)

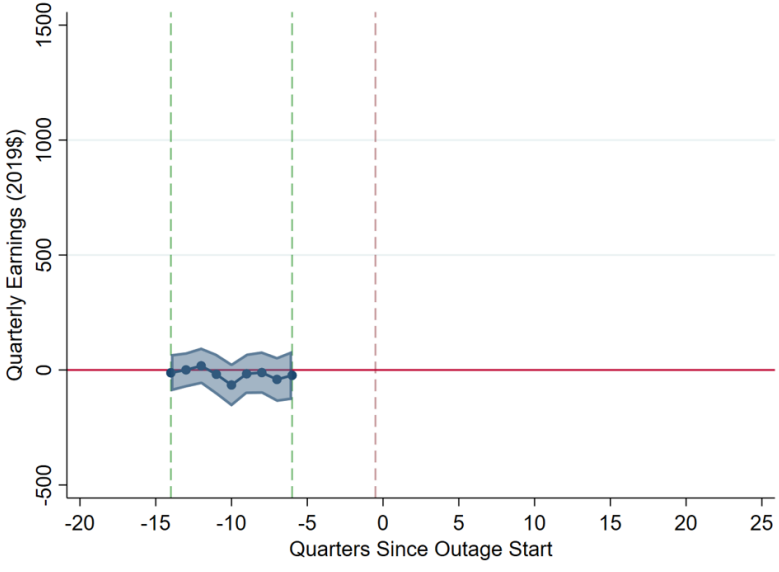
Outline

Estimation: Matched Differences-In-Differences

$$y_{i,t} = \alpha_i + \gamma_{\mathbf{l}(i),t} + X_{i,t} + \sum_{k=-12}^{25} D_{i,t}^{k} \delta_k + \epsilon_{i,t}$$

- Where:
  - α_i: person fixed effect
  - $\gamma_{\mathbf{l}(i),t)}$: calendar quarter by education by displacement industry fixed effect
  - $X_{i,t}$: separate quadratic age profiles by gender, race, and education
  - $D_{i,t}^{k}$: indicators for delay during outage at k
- Identifying assumption: conditional independence
  - Design compares workers laid off from the same industry, same level of education, and the same point in time
  - Conditional on $\gamma_{\mathbf{l}(i),t)}$, within matched sample, delay during the glitch is as good as random

Long-Run Trajectories: Quarterly Earnings



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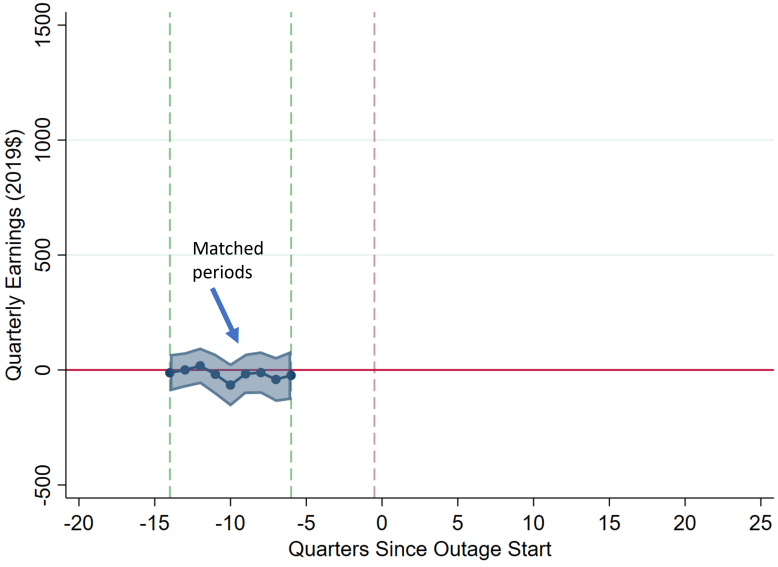

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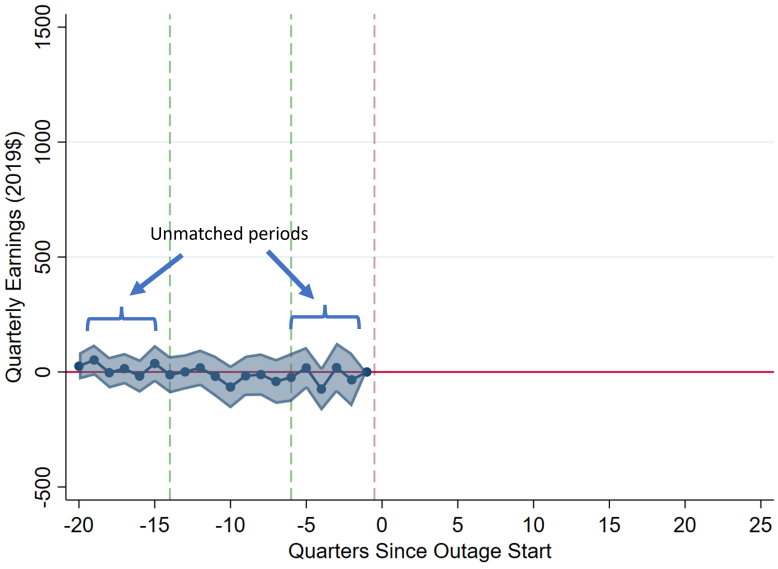

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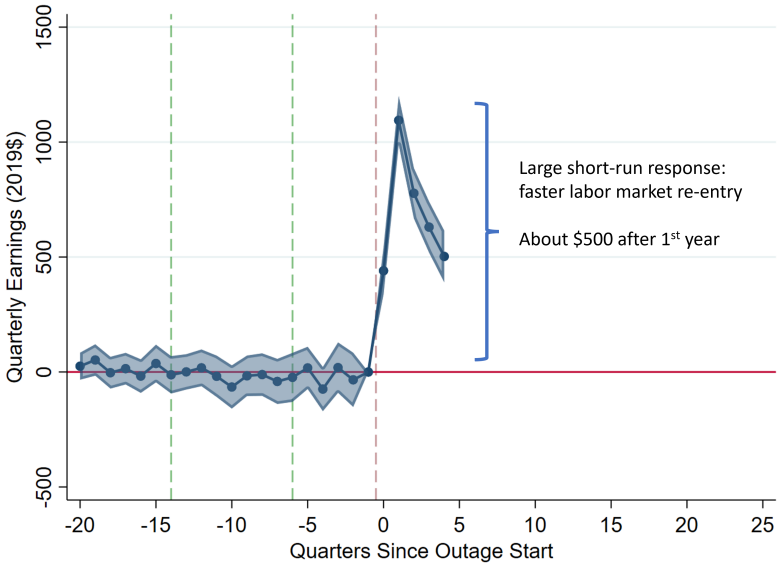

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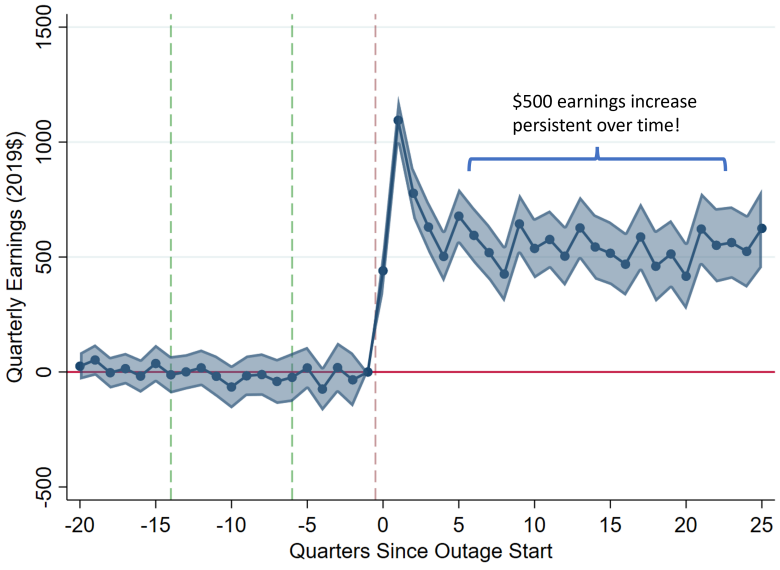
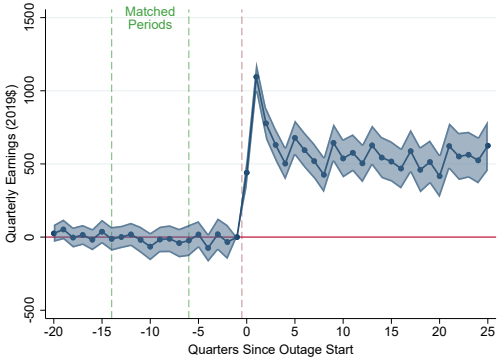
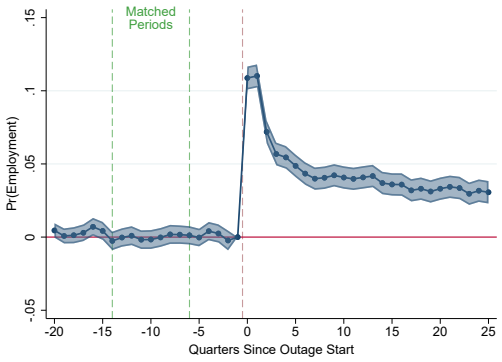


Long-Term Labor Market Outcomes



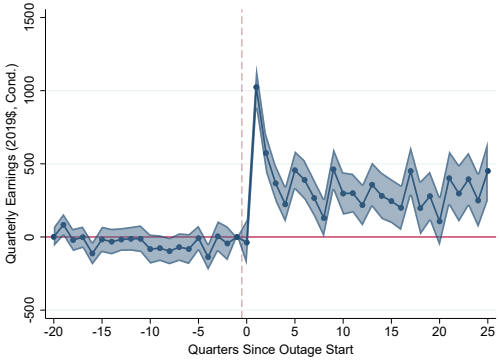
Quarterly Earnings



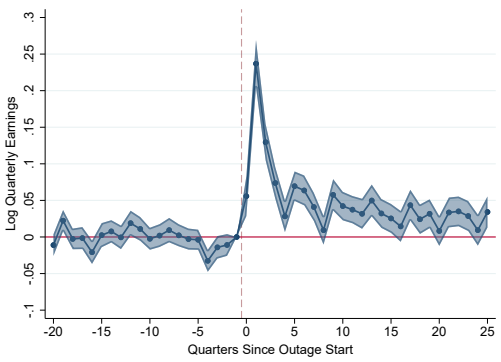
Employment

- Persistent effects of delays on future labor market trajectories!

Long-Term Labor Market Outcomes



Conditional Earnings



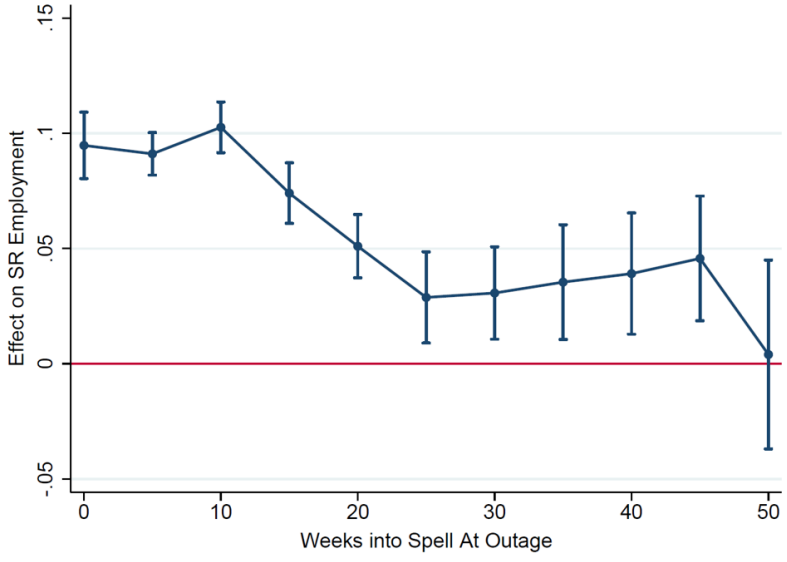
Log Earnings

- Even in longer-run, higher employment doesn't translate to worse jobs
- When conditioning on employment, delayed have higher earnings

Heterogeneity by Spell Age at Outage

- Novel component of variation: since outage happens in calendar time, claimants delayed at different points in the spell
- Explore heterogeneity by spell age at outage:
  - Group claimants into 5-week bins, estimate labor market effects within bin
- Explore persistence by estimating over two horizons:
  - Short-run: average of 1-4 quarter response
  - Long-run: average of 10-20 quarter response

Employment Effects By Time into Spell at Outage



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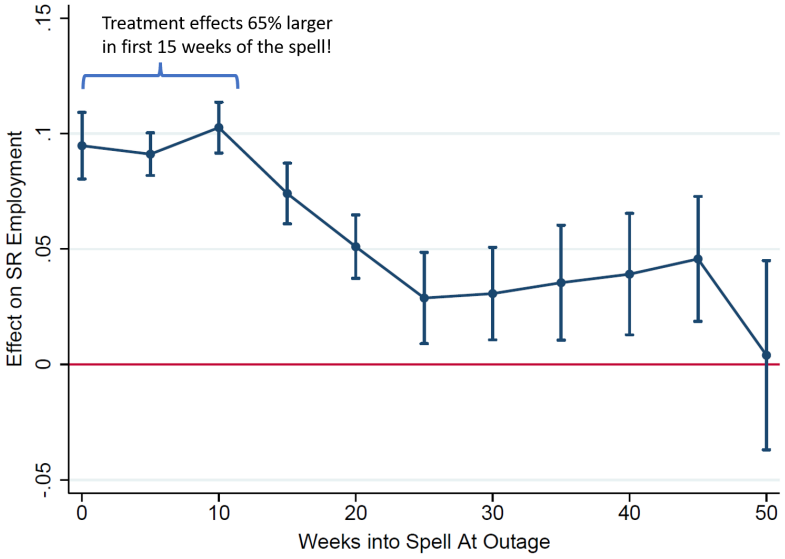

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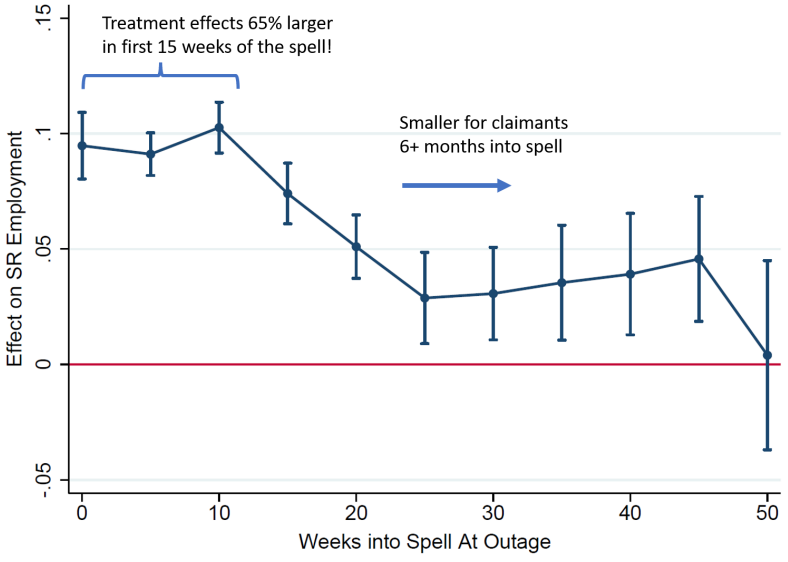
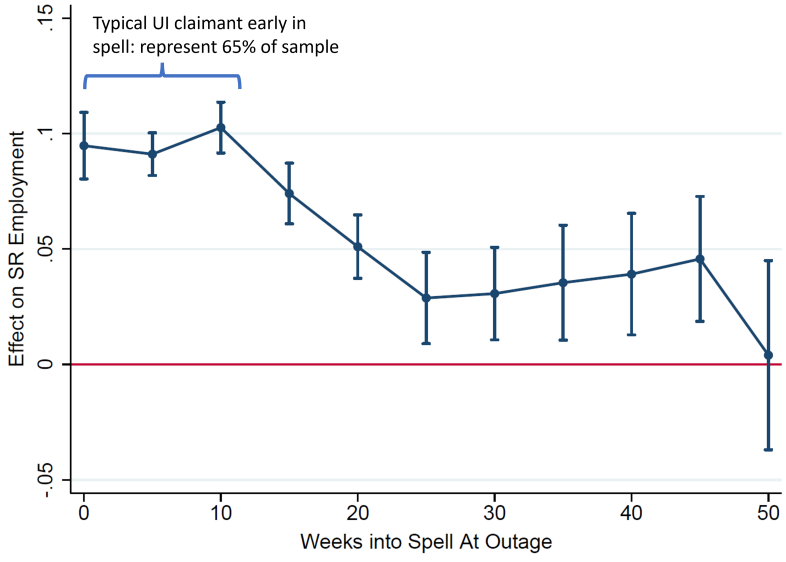
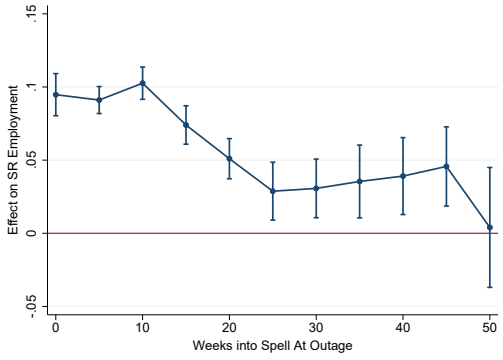


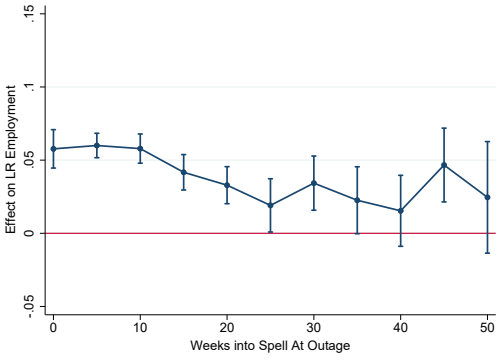
Employment Effects By Time into Spell at Outage



Employment Effects: Time into Spell at Outage



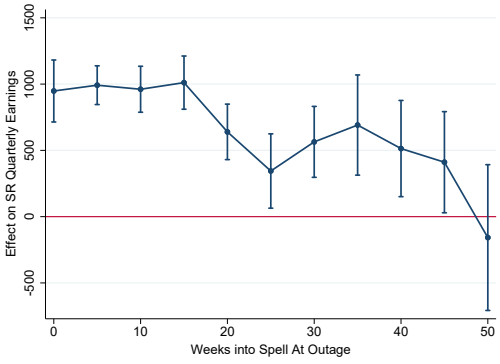
Short-Run



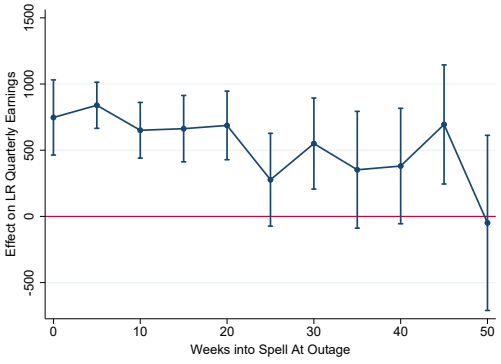
Long-Run

▸ Dynamic selection?

Earnings Effects: Time into Spell at Outage



Short-Run



Long-Run

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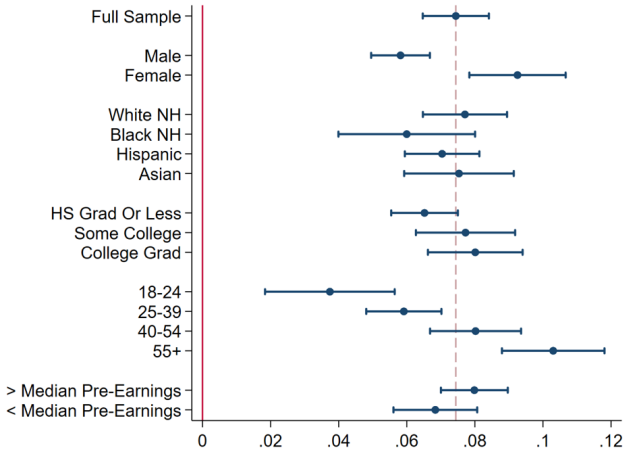
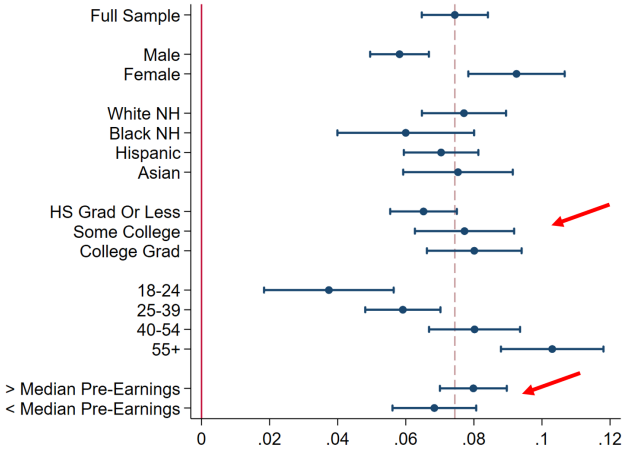
Subgroup Effects: Short-Run Employment



Subgroup Effects: Short-Run Employment



- Treatment effects smaller for disadvantaged groups
- But positive treatment effects in every subgroup!

Outline

Why Do Delayed Claimants Have Better Labor Market Outcomes?

Conclude

- Key finding so far: delayed claimants exit UI quicker, have better outcomes
- Consistent with models of job search incorporating duration dependence

  (Schmieder et al, 2016; Nekoei and Weber, 2017)
  - Benefits of continued search: claimants encounter more jobs over time
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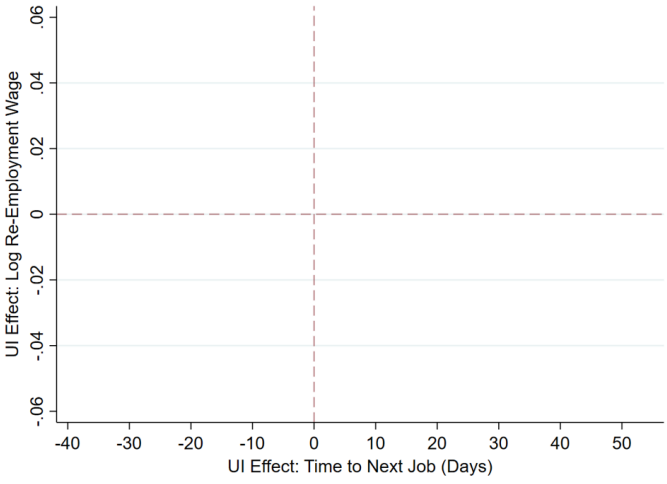
Test 1: Meta-Analysis of Duration and Wage Estimates



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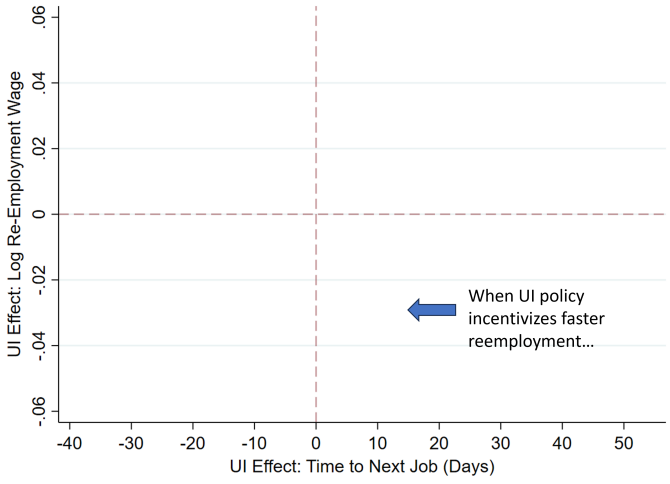

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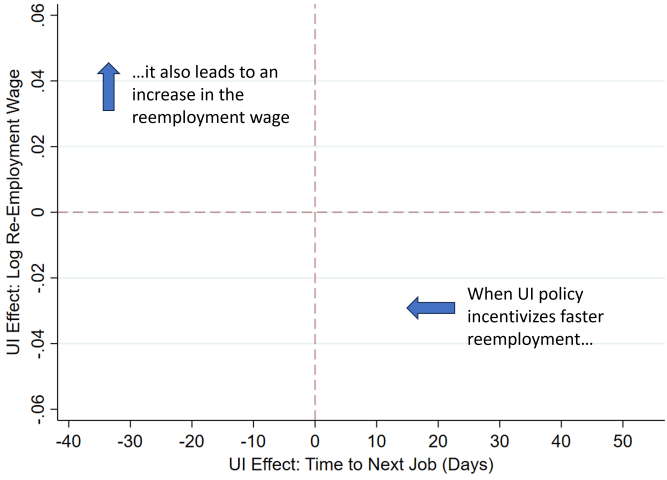

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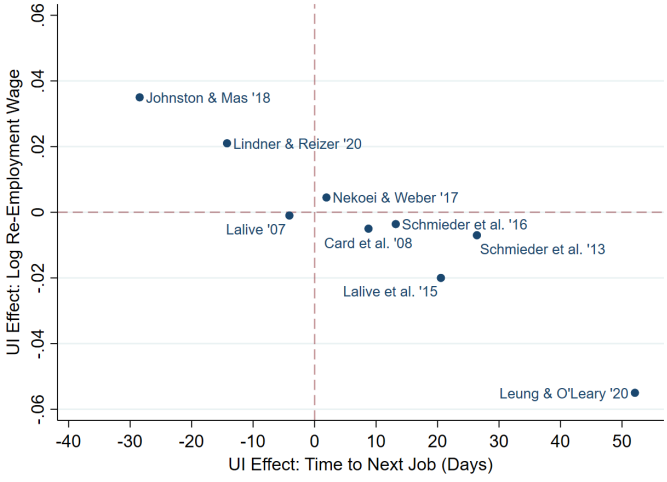

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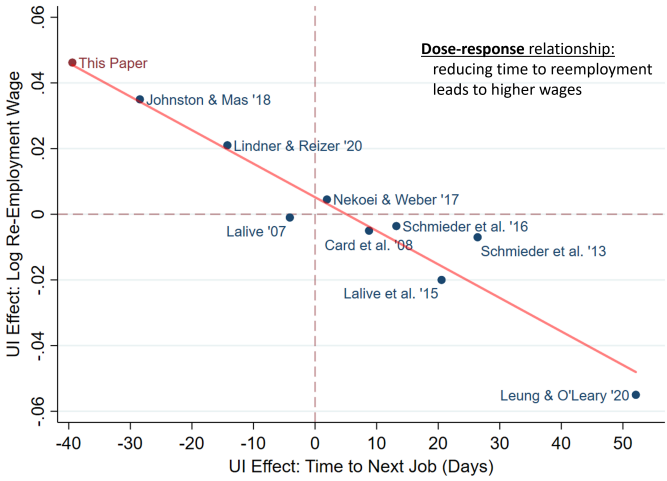

- Negative relationship between nonemployment duration and reemployment wages!

Test 2: In-Sample Treatment Effect Heterogeneity

Conclude

- Second test: use treatment effect heterogeneity across sample subgroups to test relationship between nonemployment duration, wage effects
  - Subgroups with larger decreases in duration should have larger increases in future wages
  - Can't select on duration: mechanical correlation
  - Practical problem: how do we form these subgroups on *treatment effects* ex-ante?
- Machine-learning approach: split analysis sample based on *predicted* treatment effects (Wager and Athey, 2018; Athey and Wager, 2021)
  - Train causal forest for treatment effect predictions
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Baseline estimates

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Heterogeneity estimation

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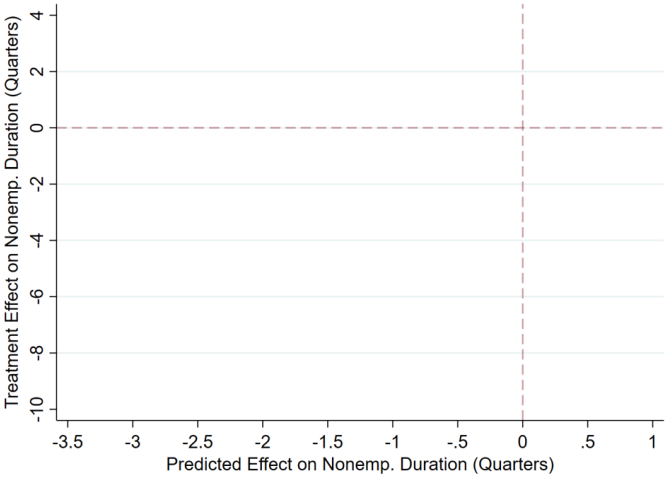
Details on estimation

Predicted vs Actual Nonemployment Duration TE's



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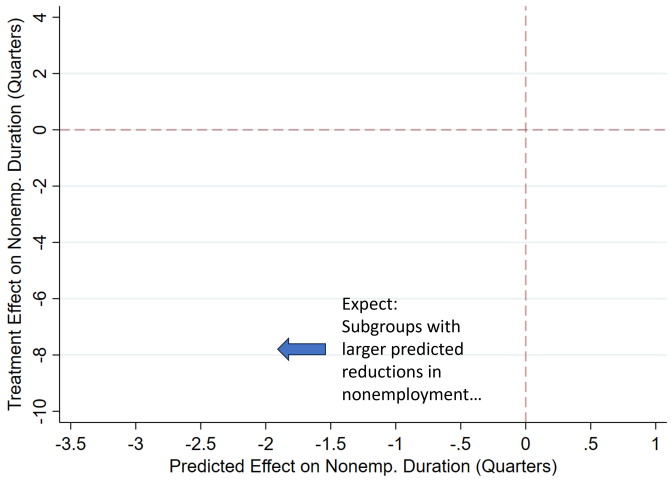

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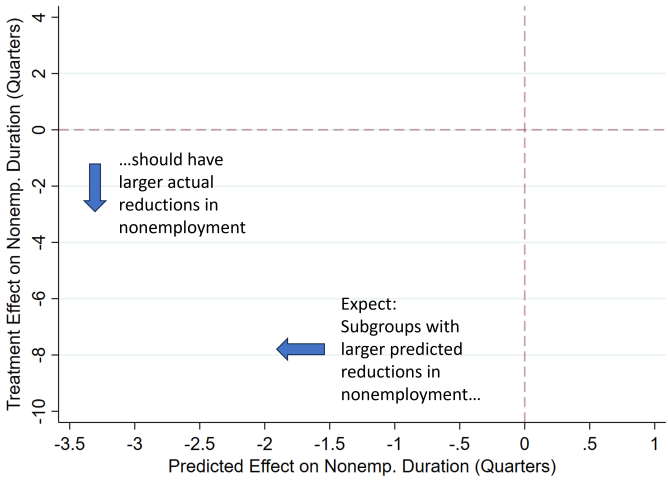

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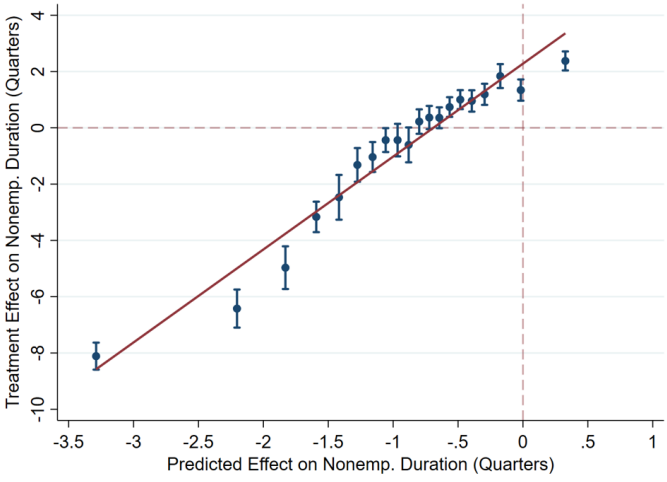

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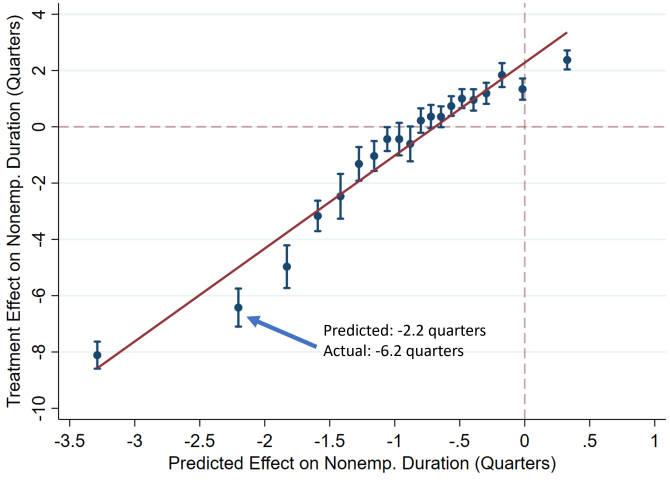
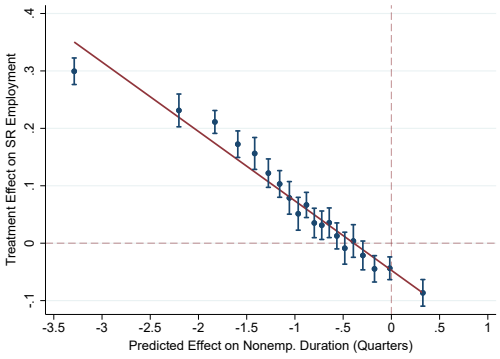
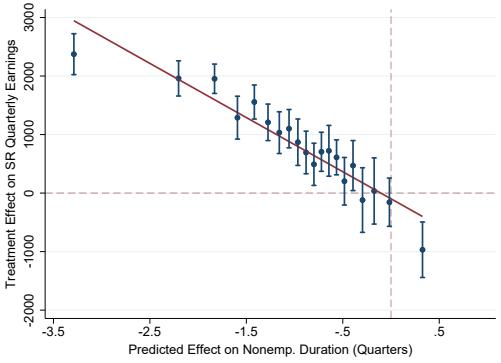


- Actual treatment effects rank-ordered in predictions!

Predicted Duration vs Labor Market Effects



Short-Run Employment



Short-Run Earnings

- Strong relationship in both figures: larger (predicted) effect subgroups have larger labor market gains

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Policy Takeaways

- Results: benefit delays ⇒ faster labor market reentry ⇒ better jobs
- Does this imply we should randomly cut UI?
  - No! Determine level of UI based on costs and **benefits** (Baily, 1977; Chetty, 2008)
  - Anecdotal evidence from claimants: very large consumption losses (housing, cars)
- Challenge: how to balance high **labor market** returns to faster reemployment with household consumption needs?
- Potential policy change: front-loading UI benefits

▸ Baseline Figure

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▸ Extensive margin

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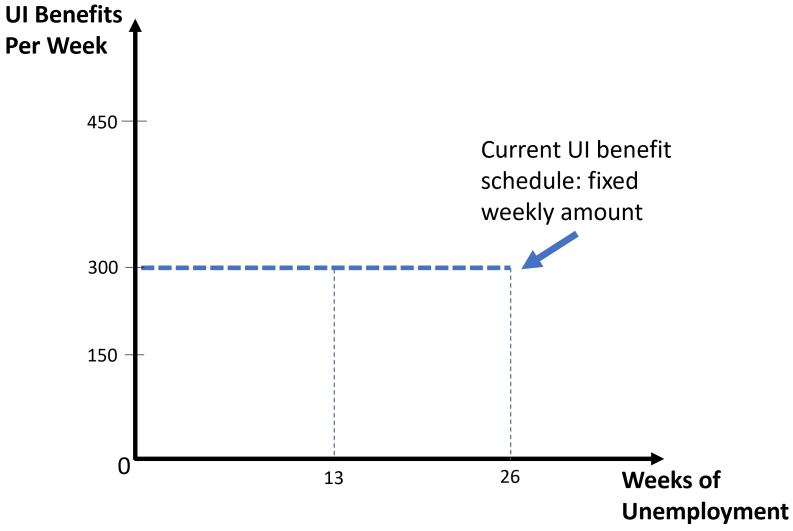
▸ Reform figure

A Front-Loaded UI Benefit Reform: Graphically



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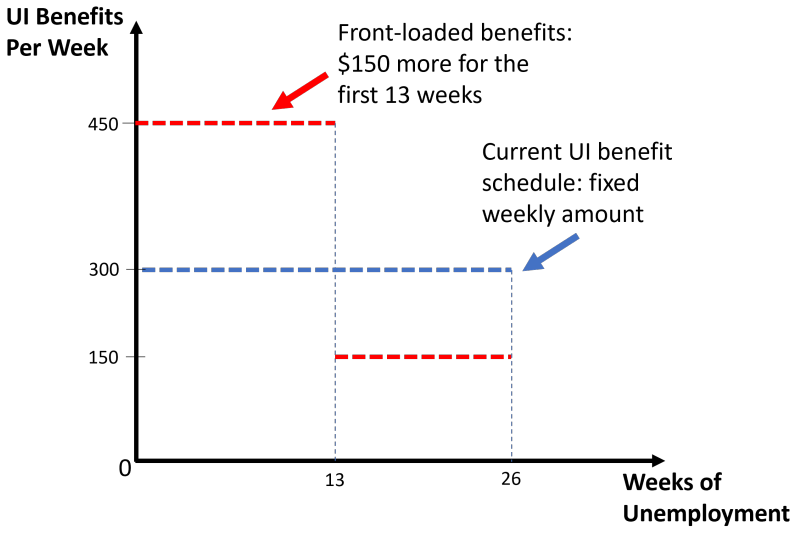

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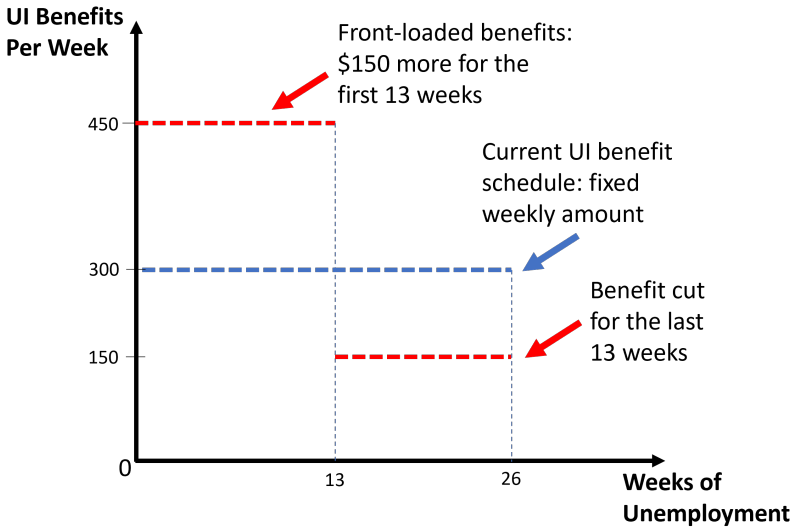

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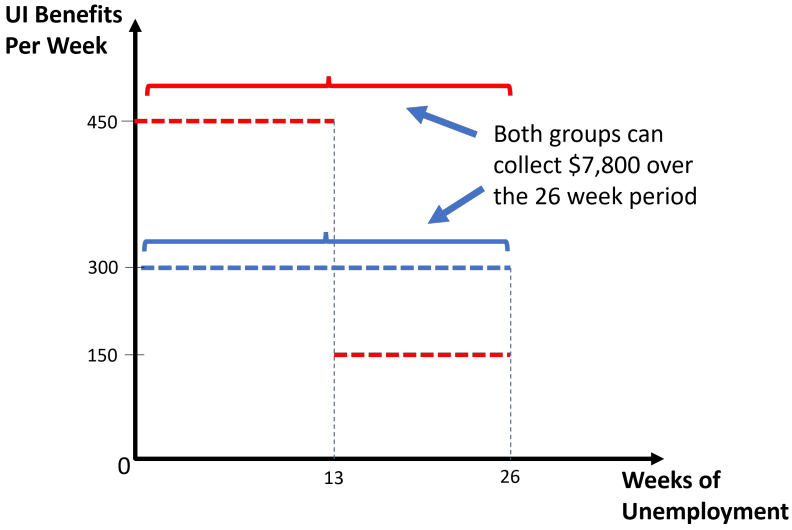

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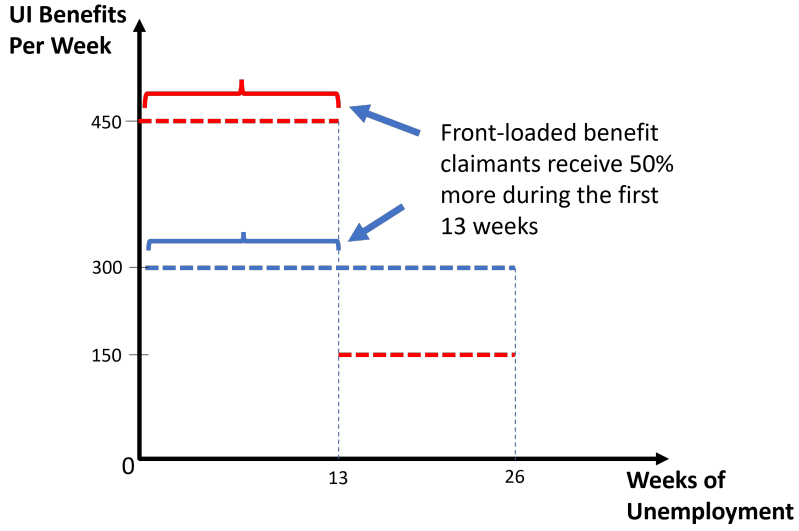

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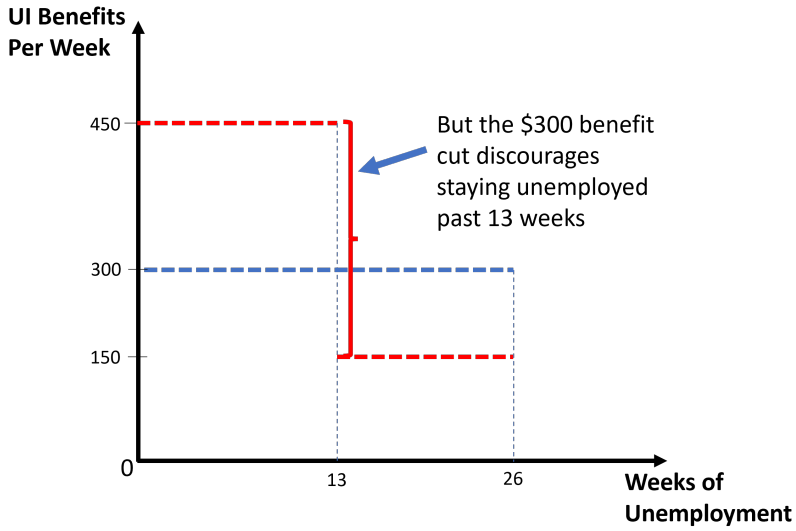

Conclusion

- Leverage novel variation in liquidity during unemployment spells: delayed UI payments
- Negative liquidity shock during UI results in
  - Faster UI exits and job-finding
  - Matched with higher quality firms
  - Higher earnings and employment in the long run
- Interpret findings through model of job search with duration dependence
  - Estimates imply that costs of duration dependence are larger than search benefits
- Takeaway: large potential costs to UI-induced extensions of job search
  - Important to estimate effects for representative set of claimants
  - Paper suggests large job search benefits to reducing time spent unemployed

Thank you!

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Niklas Flamang
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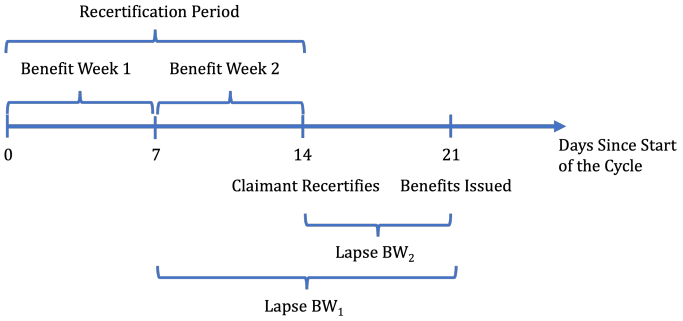
Appendix Results

Figure 1: Payment Week Timeline



1st Benefit Week Lapse (Lapse BW_1): 14 Days
2nd Benefit Week Lapse (Lapse BW_2): 7 Days

Define payment as delayed if Lapse BW_1 is over 17 days or Lapse BW_2 is over 10 days

Back

Other Delayed Groups

- We focus on UI claimants with plausibly exogenous reasons for payment delays
- Other groups were also delayed during the system partial outage
  - Claimants with serious claim issues
  - Claimants with internal flags on prior claims
  - Flags can be innocuous (set return to work, temporary layoff, internal claim start changes), or serious claim problems (firm dispute, insufficient wages)
- Both groups likely negatively selected: remove as part of data cleaning process
  - Remove claims with delayed first payments: serious issues, firm dispute, insufficient wages
  - Remove claims on temporary layoff: also not subject to typical job search requirements
  - To the extent that these claimants remain, should work against our main result

Back

Contemporaneous Reporting

- Extract all Aug-Nov 2013 articles from 9 largest CA newspapers, AP state wire about IT modernization, lemmatize headlines, and form a word cloud
- Qualitatively, articles generally describe the shock as temporary

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Figure 2: Zip-Level Variation in Percent of Claims Delayed

Back

Figure 3: County-Level Variation in Percent of Claims Delayed

Back

Figure 4: EDD Website, 9/15

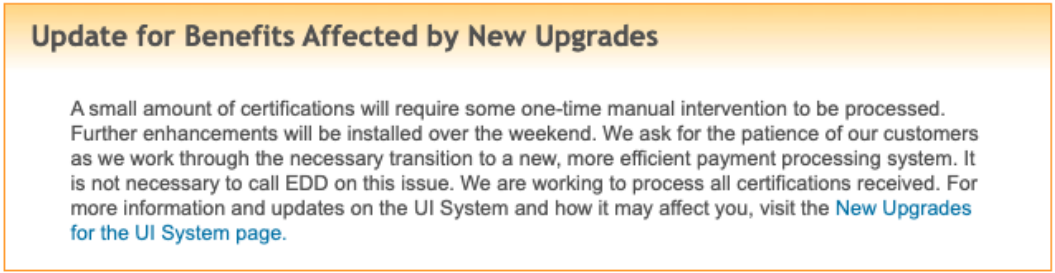
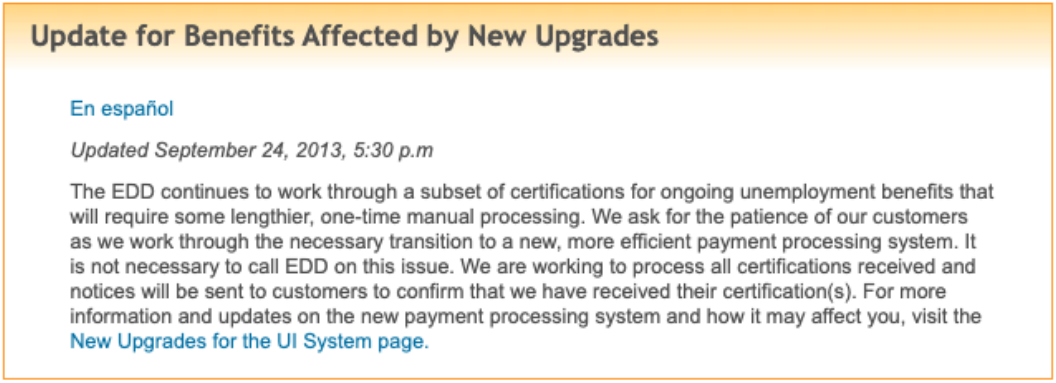


Figure 5: EDD Website, 9/24



Update for Benefits Affected by New Upgrades

En español

Updated September 24, 2013, 5:30 p.m

The EDD continues to work through a subset of certifications for ongoing unemployment benefits that will require some lengthier, one-time manual processing. We ask for the patience of our customers as we work through the necessary transition to a new, more efficient payment processing system. It is not necessary to call EDD on this issue. We are working to process all certifications received and notices will be sent to customers to confirm that we have received their certification(s). For more information and updates on the new payment processing system and how it may affect you, visit the New Upgrades for the UI System page.

Back to overview

Information Provided to Claimants

Figure 6: EDD Website, 10/7

Update for Benefits Affected by New Upgrades

En español

Updated October 7, 2013, 3:15 p.m.

The EDD is working to complete the transition to a new upgraded payment processing system as quickly as possible. We are supplying continual updates on our progress and are providing recommendations to our claimants, including how they can help us expedite this effort with the submission of their certifications for continuing benefits. For more information and updates on the new payment processing system and how it may affect you, visit the New Upgrades for the UI System page.

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Figure 7: Mean Delay, Conditional on Delay

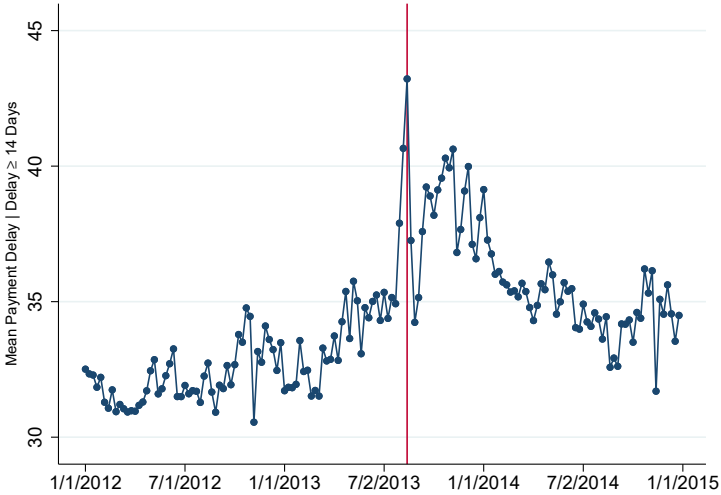
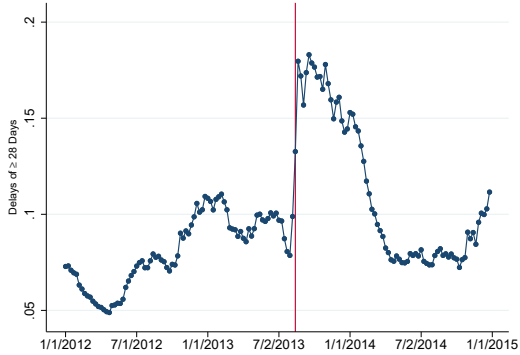


Figure 8: Distribution of Delays Around Sept 2013 System Outage

3+ Weeks

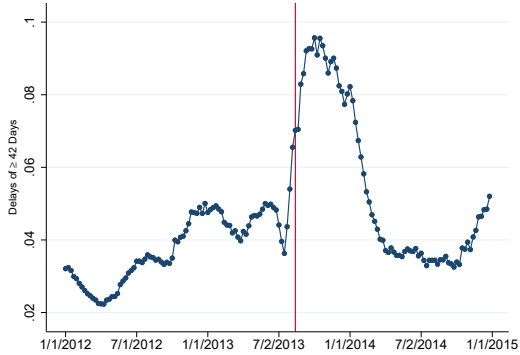


4+ Weeks

Back

Figure 9: Distribution of Delays Around Sept 2013 System Outage

5+ Weeks



6+ Weeks

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Table 4: Effect of Sample Restrictions

	Number of Claims by Group:			
Sample Restriction	Delayed	Not Delayed	Total	Percentage of all Claims
All Claims in Risk Set	145,210	171,510	316,720	1
+ Can Identify Separating Firm	144,883	171,237	316,120	1
+ Claim Not Always-Delayed Pre-Outage	123,338	166,265	289,603	.91
+ No Claims With Delayed First Payments	100,245	135,957	236,202	.75
+ No Reported Earnings While on UI	68,379	125,673	194,052	.61
+ Only Claims With Control-Treatment Matches	68,348	42,273	110,621	.35

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Figure 10: Overlap Plot

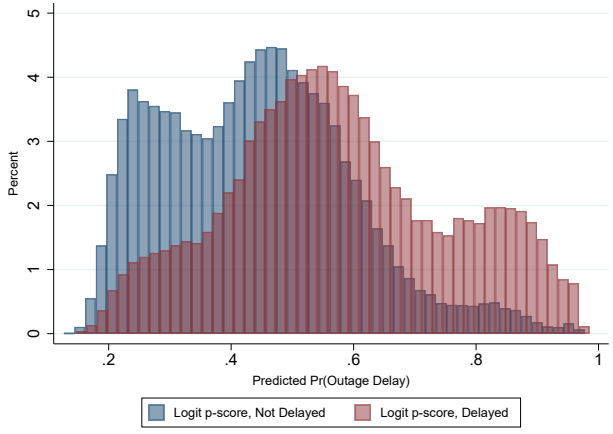

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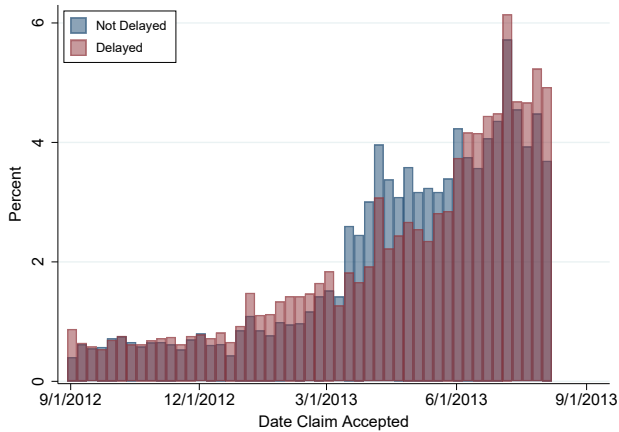
Figure 11: Delayed vs Non-Delayed: Spell Timing



Main imbalance: non-delayed reweighted to match treated on spell age

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Table 5: Summary Statistics: Prior Employment Variables

	Not Delayed (All)	Not Delayed (Reweighted)	Delayed
Employment History (Used in Matching)			
Labor Market Experience (Quarters)	42.54	41.81	42.10
Wages 6 Quarters Before Filing	6845.95	7029.28	7116.51
Wages 5 Quarters Before Filing	7411.63	7491.52	7562.27
Employment History (Not Used in Matching)			
Tenure at Separating Firm (Quarters)	15.41	15.24	15.55
Wages 4 Quarters Before Filing	7342.59	7314.13	7421.45
Wages 3 Quarters Before Filing	7790.13	7821.65	7844.22
Wages 2 Quarters Before Filing	8530.17	8627.26	8682.39
Wages 1 Quarter Before Filing	8490.94	8652.02	8738.91
Number of Claims	89,855	43,237	93,615

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Permanent or Temporary Shock?

- Based on EDD messaging and contemporaneous news reporting, claimants likely saw the outage as temporary
- However, could have interpreted delays as either lapse in payment or being kicked off UI
  - Temporary lapse in payments: wealth-constant variation in liquidity
  - Permanent benefit cut: exogenous shock to immediate liquidity
- In practice, empirical estimates consistent with first story:
  - Many workers continue claiming UI
  - Will see bigger effects on nonemployment duration (job-finding) than UI exits

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Table 6: First Stage: Outage Liquidity Shocks

	Number of Delayed Payments	Total UI Payment Amount Delayed	Mean Delay	Days Until Last Delayed Payment
Delayed	2.64***	825***	25.2***	33.8***
	(.013)	(6.4)	(.18)	(.2)
Spell FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Education FE	Yes	Yes	Yes	Yes
N Spells	110,621	110,621	110,621	110,621

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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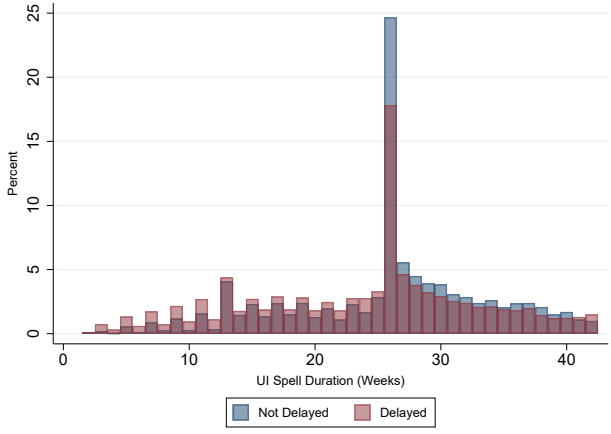
Figure 12: UI Spell Duration



- Delayed claims have shorter total UI duration!

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Out of State Mobility

- One concern: wage data only covers earnings in California
  - If workers move out of the state at differential rates, this could lead to a mechanical difference in observed reemployment outcomes
- To address this concern, we merge in quarterly residential history data from Infutor
  - Currently only have data on a 10% random sample of claimants.
- In practice: very high proportion of claimants "always-Californians", no differential effect from delayed payments.

Table 7: Out Of State Mobility

	(1) In Infutor	(2) Ever Outside CA Post	(3) Outside CA 1+ Years Post	(4) Outside CA 2+ Years Post	(5) Outside CA 5+ Years Post	(6) N Quarters Lived Outside CA
Delayed	-.00609	-.00294	-.00456*	-.00429	-.00454	-.164*
	(.0039)	(.0029)	(.0027)	(.0027)	(.0029)	(.09)
Control Mean	.65	.086	.078	.072	.057	2.2
Spell FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Education FE	Yes	Yes	Yes	Yes	Yes	Yes
N Spells	110,621	71,241	71,241	71,241	71,241	71,241

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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N Spells	110,621	71,241	71,241	71,241	71,241	71,241

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More on Firm Wage Premia Estimation

- We estimate a worker-firm job ladder model (Abowd et al, 1993; Card et al, 2013; Song et al, 2019)
- General idea: separate earnings into **worker** and **firm** earnings components by estimating:

$$y_{it} = \alpha_i + \psi_{\mathbf{J}(i,t)} + \mathbf{X}'_{it}\beta + \varepsilon_{it}$$

  where worker $= i$, corresponding firm $= \mathbf{J}(i, t)$
- Interpret α as the worker-specific premium, ψ as the firm-specific premium
  - Previous table: effects of delays on $\hat{\psi}$
- Pass standard "specification" tests (Card et al, 2013; Song et al, 2019)
  - Is mobility driven by transitory fluctuations? No.
  - Do mean residuals differ by joint distribution of α, ψ? Minimal deviations.

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Movers event study

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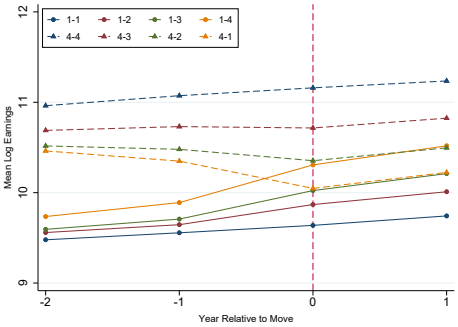
- Model assumption: no job changes based on transitory component of wages
  - Workers can't be more likely to move after a wage cut
- Test: Compute mean log earnings before/after a move, based on origin/destination firm FE
  - Intuition: look for wage drops right before a move



Mean residuals

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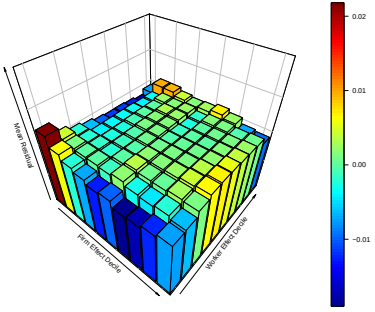
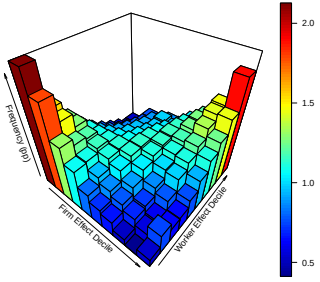
- Model assumption: single firm-specific wage premium for all workers
- Test: Compute residuals in each decile of worker-firm FE
  - Intuition: high FE firms pay premium for high FE workers ⇒ larger model residuals



Mean Residuals



Frequencies

Summary Statistics, Ever-Reemployed Sample

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	Delayed	Not Delayed
Female	.46	.45
Citizen	.87	.87
Age at Filing	42	41
Race		
White	.36	.35
Black	.074	.075
Asian	.18	.18
Hispanic	.38	.39
Education		
HS Grad or Less	.44	.45
Some College/Associate's	.3	.3
College Graduate or More	.24	.24
UI Claim		
Weekly Benefits	320	318
Potential Benefit Duration	28	28
Predicted Reemployment Score	.25	.27
Weeks Into Spell At Outage	17	17
1(Had Pre-Outage Delay)	.5	.5
Prior Labor Market		
Labor Market Experience (Quarters)	45	45
Tenure at Separating Firm (Quarters)	16	16
Avg Coworker Pay	11,863	11,839
Estimated Worker Wage Premium	.26	.26
Number of Claims	60,035	35,726

Table 8: Next Hire Firm Quality, Expanded Firm Pay

	(1) Avg. Coworker Pay	(2) Log Avg. Coworker Pay	(3) Chg. Log Avg. Coworker Pay	(4) Firm Avg. Pay	(5) Log Firm Avg. Pay	(6) Chg. Log Firm Avg. Pay
Delayed	236	.0512***	.059***	236*	.0546***	.0591***
	(143)	(.00738)	(.00638)	(136)	(.00745)	(.00628)
Control Mean	9,943	8.8	-.23	9,766	8.8	-.24
Spell FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Education FE	Yes	Yes	Yes	Yes	Yes	Yes
N Spells	93,661	93,661	92,052	95,761	95,761	95,761

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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Table 9: Placebo Delay Outages: 1 Year Pre/Post

	(1) Placebo Cohort: September 2012	(2) Placebo Cohort: September 2014	(3) True Delay Cohort: September 2013
Worker FE	-0.024	0.024	0.000
	(0.003)	(0.005)	(0.004)
Hispanic	-0.032	-0.066	-0.006
	(0.002)	(0.003)	(0.002)
White	0.018	0.055	0.012
	(0.002)	(0.003)	(0.002)
Citizen	0.024	0.032	0.002
	(0.001)	(0.002)	(0.002)
Female	0.028	0.012	0.003
	(0.001)	(0.003)	(0.002)
Age at Filing	-1.366	-1.127	-0.578
	(0.058)	(0.080)	(0.061)
Claims	277,144	166,851	193,514

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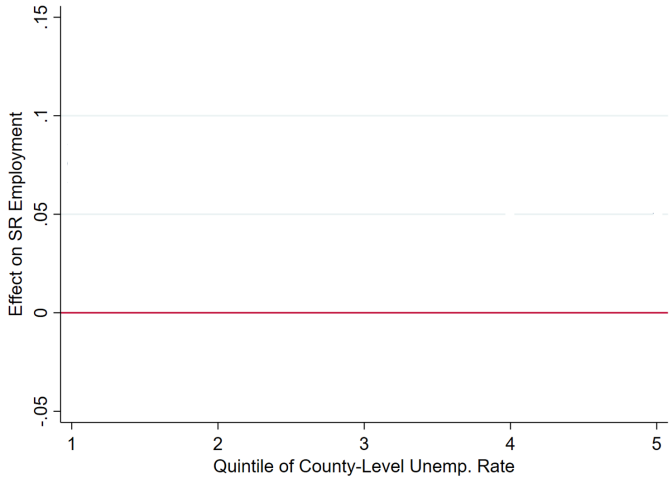
Test 3: Labor Market Tightness

- Third test: model predicts that treatment effects should be larger in tighter labor markets
  - Job seeker has been "passed over" by more potential employers
- What do treatment effects look like across low, high unemployment rate counties?
  - Bin into quintiles based on 3-month prior county unemployment rate
  - Reestimate effects wthin each bin

Split by County-Level UR



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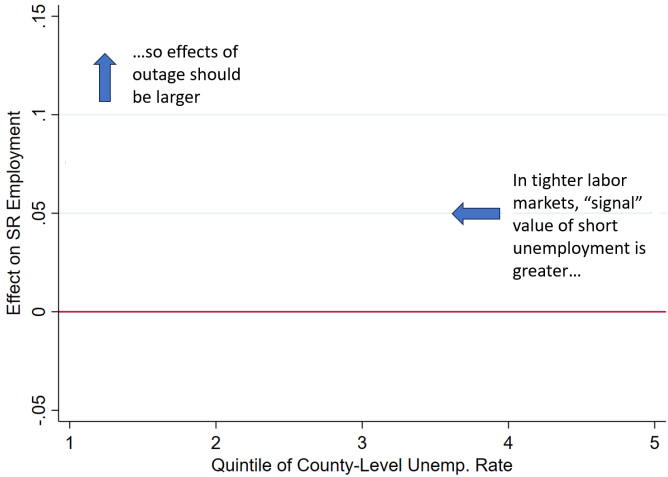
Split by County-Level UR

▸ Back to SR Robustness ▸ Back to Dur. Dep. Mechanisms

Split by County-Level UR



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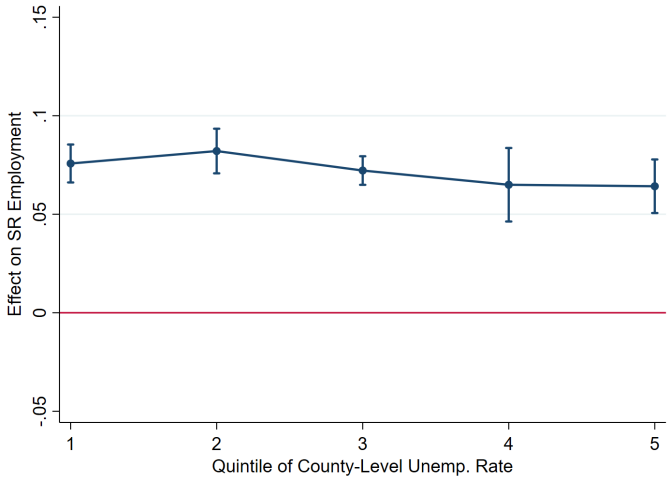
Split by County-Level UR



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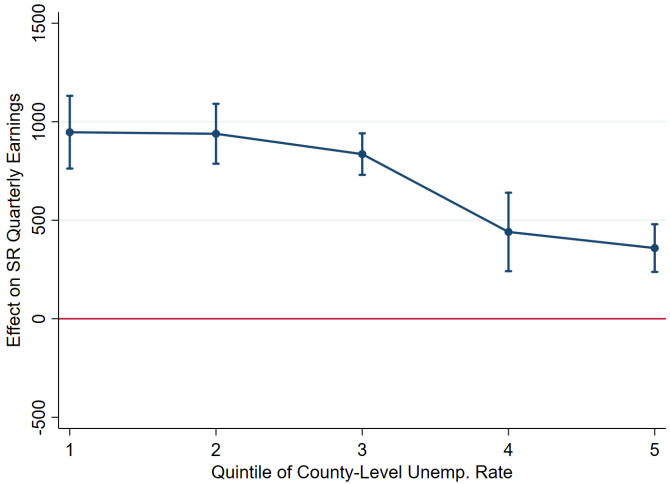
Split by County-Level UR



Back to SR Robustness
Back to Dur. Dep. Mechanisms

Table 10: Next Hire Firm Quality, Expanded Firm Size

	(1) Log Firm Size	(2) Firm Size: 1 Person	(3) Firm Size: 10+ People	(4) Firm Size: 50+ People	(5) Num. Of Estabs.
Delayed	.0178	-.00233**	.006**	.00661**	.926
	(.021)	(.0011)	(.0026)	(.0031)	(2.3)
Control Mean	5.8	.023	.89	.73	49
Spell FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Education FE	Yes	Yes	Yes	Yes	Yes
N Spells	95,761	95,761	95,761	95,761	95,761

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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Table 11: Next Job Quality, No Separating Firm Recall

	(1) First Comp. Qtr. Log Reemp. Wage	(2) Log Avg. Coworker Pay	(3) Firm-Specific Pay Premium	(4) Chg. Log Avg. Coworker Pay	(5) Chg. Firm-Specific Pay Premium
Delayed	.0509***	.0575***	.0173***	.0579***	.0154***
	(.0115)	(.00891)	(.00282)	(.00868)	(.00326)
Control Mean	8.6	8.8	.15	-.29	-.11
Spell FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Education FE	Yes	Yes	Yes	Yes	Yes
N Spells	54,374	69,396	70,211	67,886	69,818

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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Table 12: Next Hire Match Quality, No Separating Firm Recall

	(1) Match Wage Premium	(2) Chg Match Wage Premium	(3) Distance	(4) Switched Industry	(5) Any Previous Firm Return
Delayed	.0189***	.00804	-.0718	-.00925**	.104***
	(.0051)	(.0065)	(.3)	(.0036)	(.0054)
Control Mean	-.13	-.15	24	.67	.22
Spell FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Education FE	Yes	Yes	Yes	Yes	Yes
N Spells	46,790	45,102	68,566	71,069	71,069

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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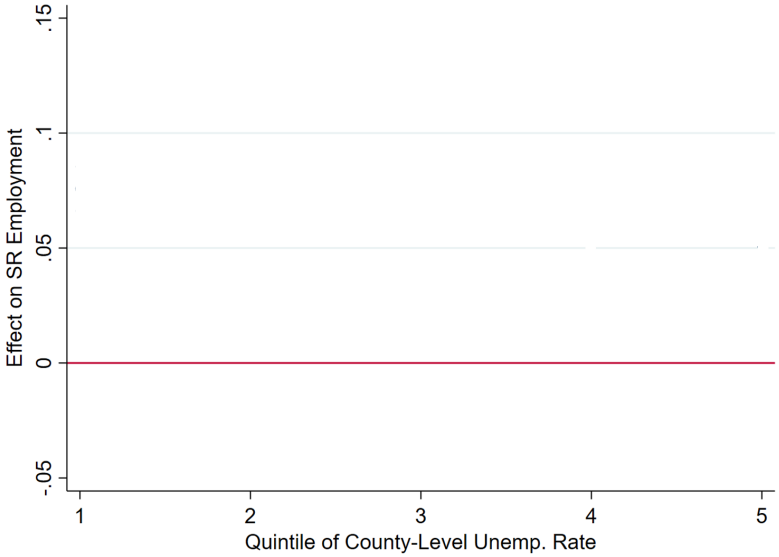
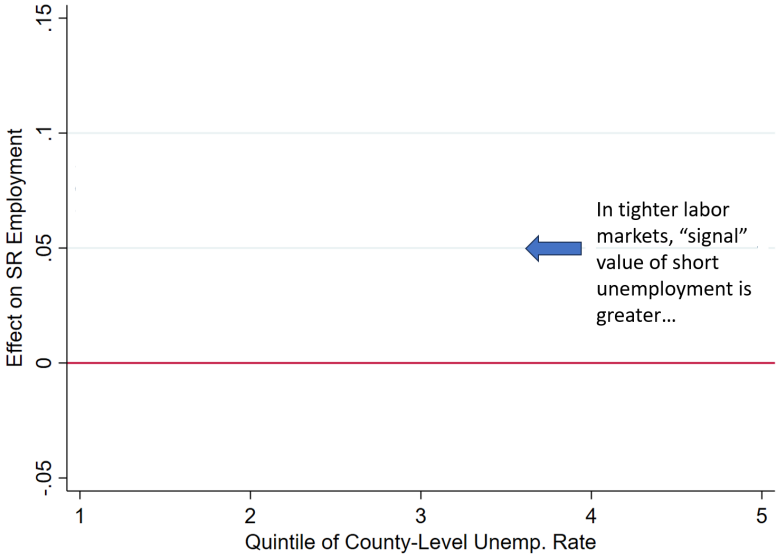
What About Dynamic Selection?

- Note: matching procedure imposed exact matches on spell age, so for each spell age we have a valid treatment effect estimate
- Difficult to compare effects across spell ages: claimants are different
  - Claimants 24 weeks into spell look worse than claimants 3 weeks into spell
  - Treatment effect for less productive workers might be bigger
- To adjust for the observable component of dynamic selection, we reweight the sample across spell age to match on covariates (e.g., Bell et al, 2023)
  - Estimate propensity score for median spell age (11 weeks into spell) using prior covariate set
- In practice: doesn't change the treatment effect profile very much Back

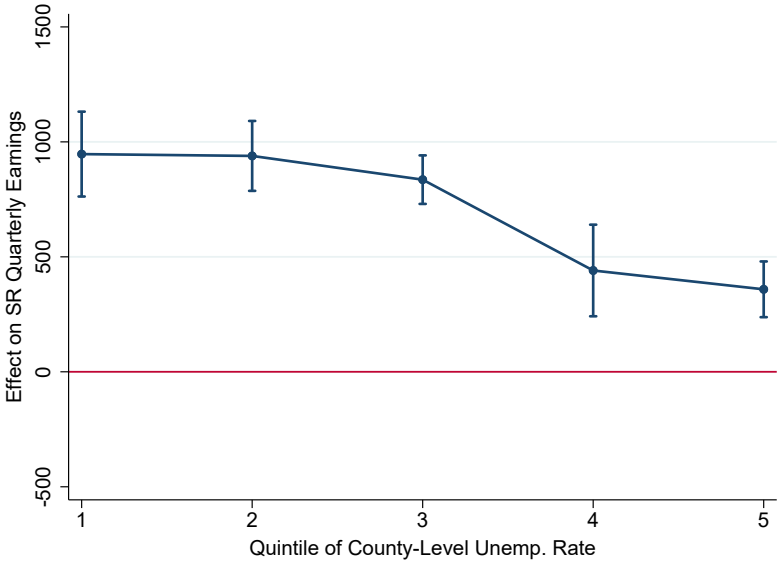
Effects by County-Level UR



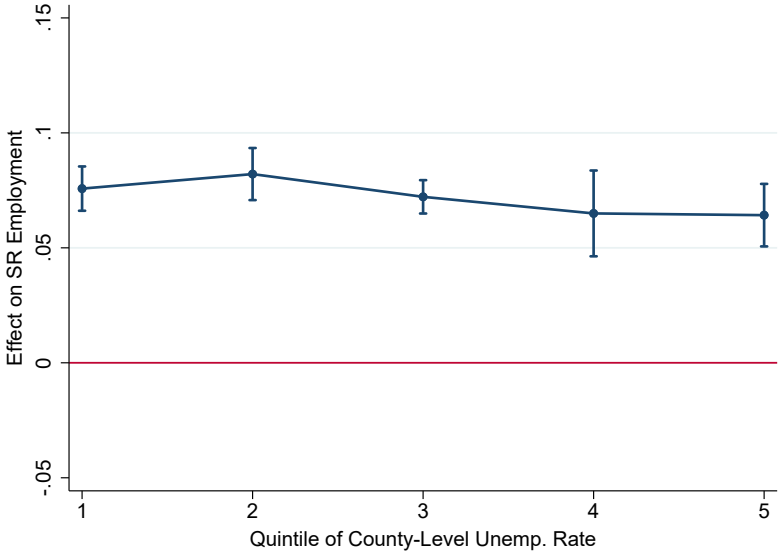
Effects by County-Level UR



Effects by County-Level UR



Effects by County-Level UR



Causal Forest: Details

- Random causal forest: predict treatment effect heterogeneity using covariates
  (Wager and Athey, 2018; Athey and Wager, 2021)
  - Train causal random forest model to predict nonemployment duration treatment effects using rich vector of pre-outage covariates
  - Honest estimates: use ten disjoint subsets of the data to train the model and form out-of-sample predictions
- Models work well: used widely in industry, policy settings (labor enforcement, criminal recidivism)

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