

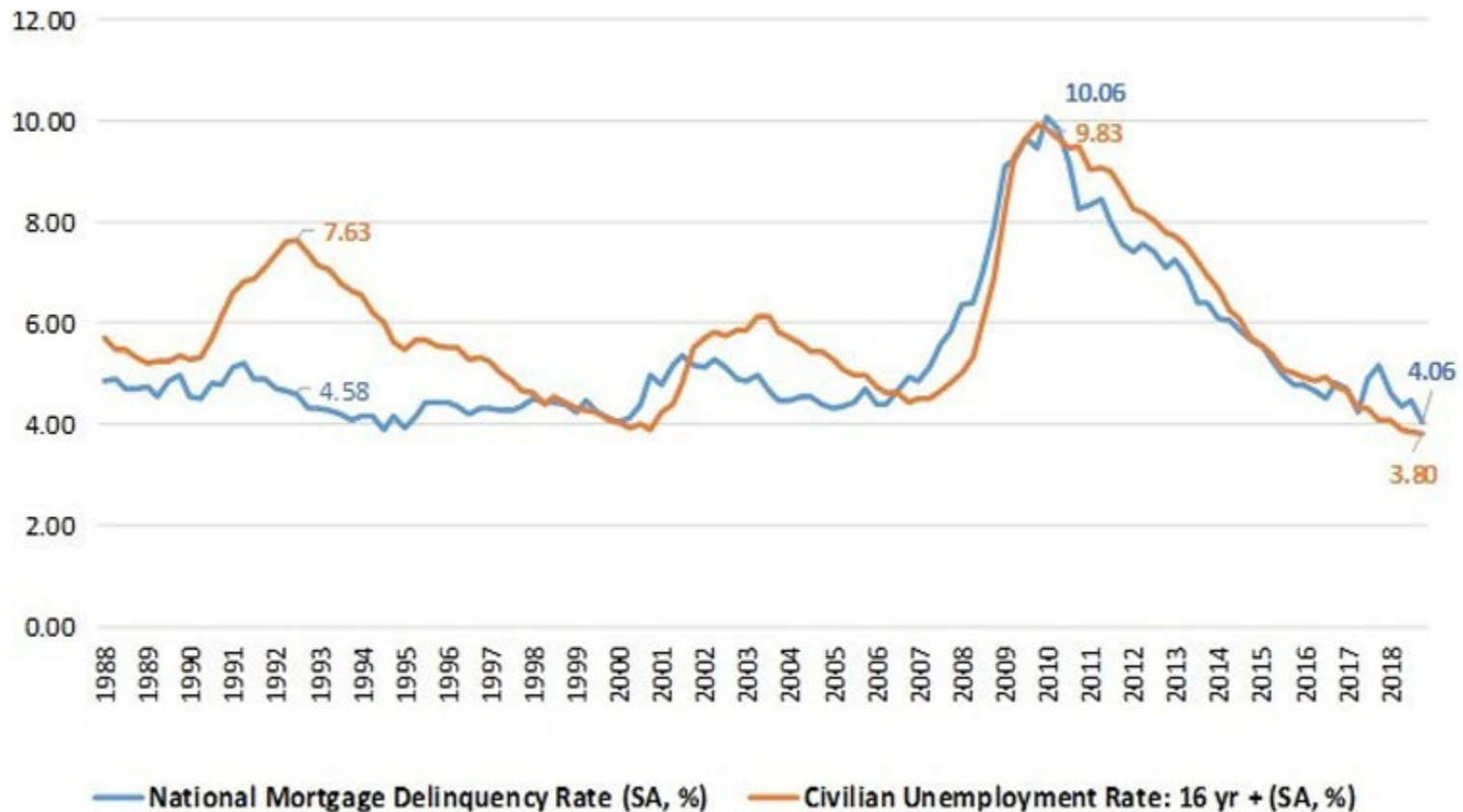
Employment and Earnings Effects of Mortgage Payment Subsidies for Unemployed Homeowners

Stephanie Moulton, Stephanie Casey Pierce,
Yung Chun, and Julia Brown

The research reported herein was pursuant to a research grant from the MacArthur Foundation, in collaboration with the Ohio Housing Finance Agency. The findings and conclusions expressed are solely those of the authors and do not represent those of the MacArthur Foundation or of the Ohio Housing Finance Agency.

Motivation

Chart of the Week: February 22, 2019
Mortgage Delinquency Rate and Unemployment Rate
Seasonally Adjusted, percent



Source: MBA's National Delinquency Survey; www.mba.org/nds; U.S. Bureau of Labor Statistics

Motivation

- Traditional Modifications (e.g., HAMP)
 - \$37.4 billion in direct assistance to homeowners during last crisis
 - Lower interest rate, extend loan term, increase or decrease principal balance; often permanent, require delinquency
 - Modified **10% of loans** 60+ delinquent between 2005 and 2011; half re-defaulted within 6 months (Adelino et al., 2013).
 - More effective: principal reductions (Goodman et al., 2011); **monthly payment reductions** (Voicu et al. 2012; Haughwout, Okah, and Tracy, 2016; Calem et al 2018)

Motivation

- Extended UI benefits from 2008 through 2013 prevented an estimated **1.3 million** foreclosures— more than the largest federal foreclosure programs combined (Hsu et al. 2018)
- Liquidity vs. Negative Equity?
 - Loan modifications may be insufficient to address liquidity shortfalls facing unemployed homeowners— they simply do not have money to make their monthly payments
 - Temporary mortgage payment *forbearance*, requires repayment at future date, lowers moral hazard (Foote et al. 2008)
 - Temporary mortgage payment *subsidies* during a job loss (Malpezzi, and Ortalo-Magné 2009; Foote et al. 2009)
 - Pennsylvania’s Homeowners’ Emergency Mortgage Assistance Program
 - FHA’s Emergency Homeowners’ Loan Program
 - Massachusetts Housing Finance Agency’s “MI-Plus” program
 - U.S. Department of Treasury’s Hardest Hit Fund (HHF) program

Research Question

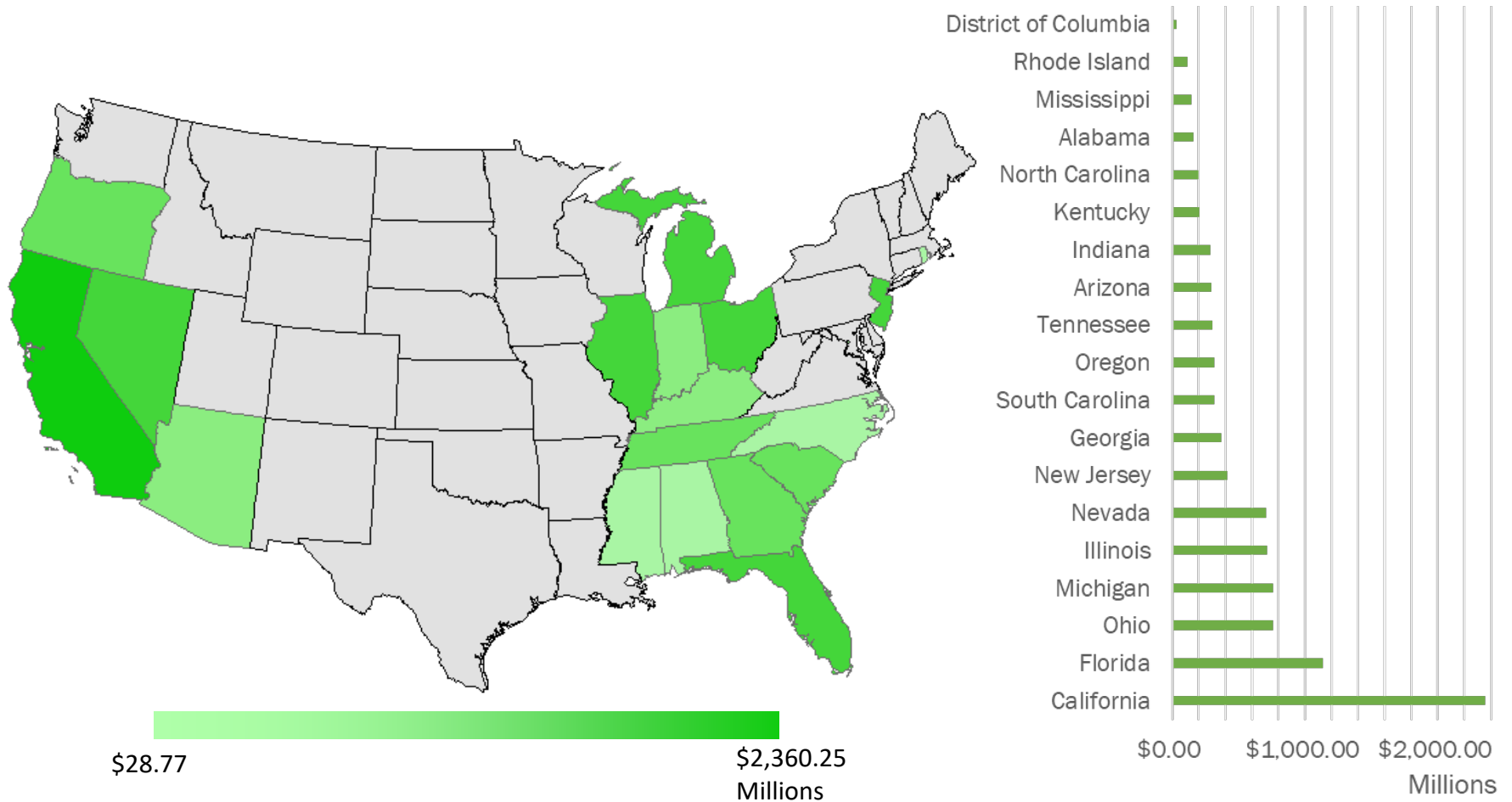
How does receipt of mortgage payment subsidies affect labor outcomes among homeowners who have experienced a job loss?

- Provide time for job search and allow the (local) housing market to recover rather than accepting lower-quality job; higher job quality and thus wages (Matsa and Brown 2019); similar to extended unemployment benefits (McCall & Chi, 2008; Nekoei & Weber, 2017)
- Prevent foreclosure-induced mobility that creates instability and can reduce ability to obtain and hold a job (Herkenhoff and Ohanian 2019)
- Creates disincentives to work while receiving benefits, increasing duration of unemployment, similar to extended unemployment benefits (Farber & Valletta, 2015; Farber et al. 2015; Lalive, 2007)
- Exacerbates homeowner “lock-in”, reducing ability/incentive to move for employment (Oswald 1996, 1997); “lock-in” may be exacerbated by negative equity (Ferreira, Gyourko, & Tracy, 2012, homeowners with negative equity 30% less likely to move in 2-yr period)

Context: Hardest Hit Fund

U.S. Department of Treasury \$9.6 billion Hardest Hit Fund

- Assisted 347,417 homeowners from 2010-2017 (\$6.99 billion)
- Targeted unemployed homeowners, no delinquency required
- Assist with mortgage payment during job search (12 to 36 months)



Context: Ohio HHF Program

Ohio HHF Program Recipients by Type of Assistance Received and Year

	All		2011		2012		2013		2014	
	% Assisted	Mean \$	%	Mean \$	%	Mean \$	%	Mean \$	%	Mean \$
			Assisted		Assisted		Assisted		Assisted	
Mortgage Payment Assistance	60.80%	\$11,782	65.23%	\$10,233	64.21%	\$9,953	58.11%	\$13,157	57.37%	\$13,289
Rescue Payment Assistance	82.65%	\$8,159	87.22%	\$7,485	86.10%	\$8,500	81.64%	\$8,747	76.44%	\$7,616
Mortgage Modification	6.32%	\$27,884	0.56%	\$18,890	0.80%	\$24,615	9.29%	\$27,433	12.59%	\$28,989
Lien Elimination	4.92%	\$19,555	1.87%	\$16,068	5.53%	\$20,015	5.49%	\$20,127	6.55%	\$19,464
Homeownership Retention	7.88%	\$6,934	0.36%	\$4,980	0.97%	\$6,255	13.78%	\$6,984	12.70%	\$6,955
N	24,426		5,502		5,027		8,417		5,480	

Research Design

- Estimate the causal effect of HHF on employment outcomes, relative to *otherwise similar homeowners*.
- Otherwise similar homeowners who have an unemployment shock but who do not receive HHF.
- The receipt of HHF is likely endogenous; unobservable characteristics that lead borrowers to select into HHF are likely correlated with employment outcomes.

Identification Strategy

- Include all Ohio homeowners with a new unemployment claim between 2011 and 2014, and who started an application for HHF assistance
- Among those who started the application for assistance (registrants), some did not receive assistance (recipients) for reasons that we assume are exogenous to employment outcomes:
 - lender did not participate in the Ohio HHF program
 - distance to intake agency increases transaction costs to complete application
- Our identifying assumption is that these HHF registrants are otherwise similar to HHF recipients, but did not benefit from the HHF treatment
 - ✓ We test for parallel trends in employment outcomes for the two year period prior to an unemployment claim

Empirical Model

Difference-in-Differences (with Individual Fixed Effects)

$$Y_{it} = \alpha + \beta_1 P_{it} + \beta_2 (H_i \times P_{it}) + \delta_i + \gamma_t + \varepsilon_{it}$$

Y = individual i employment outcome at time t

H = HHF recipient indicator

P = period (year or quarter) prior to the UI claim

δ_i = individual fixed effects

γ_t = calendar year fixed effects

Employment outcomes: (1) mean quarterly wages, (2) mean weeks worked per quarter, (3) whether or not the claimant is employed, and (4) percent of quarters employed

Data

(1) Ohio HHF Administrative Data

- 80,754 HHF registrants, 24,423 HHF recipients
- Household demographic and financial information
- HHF assistance information from 2010 through 2015

(2) Ohio Employment Data

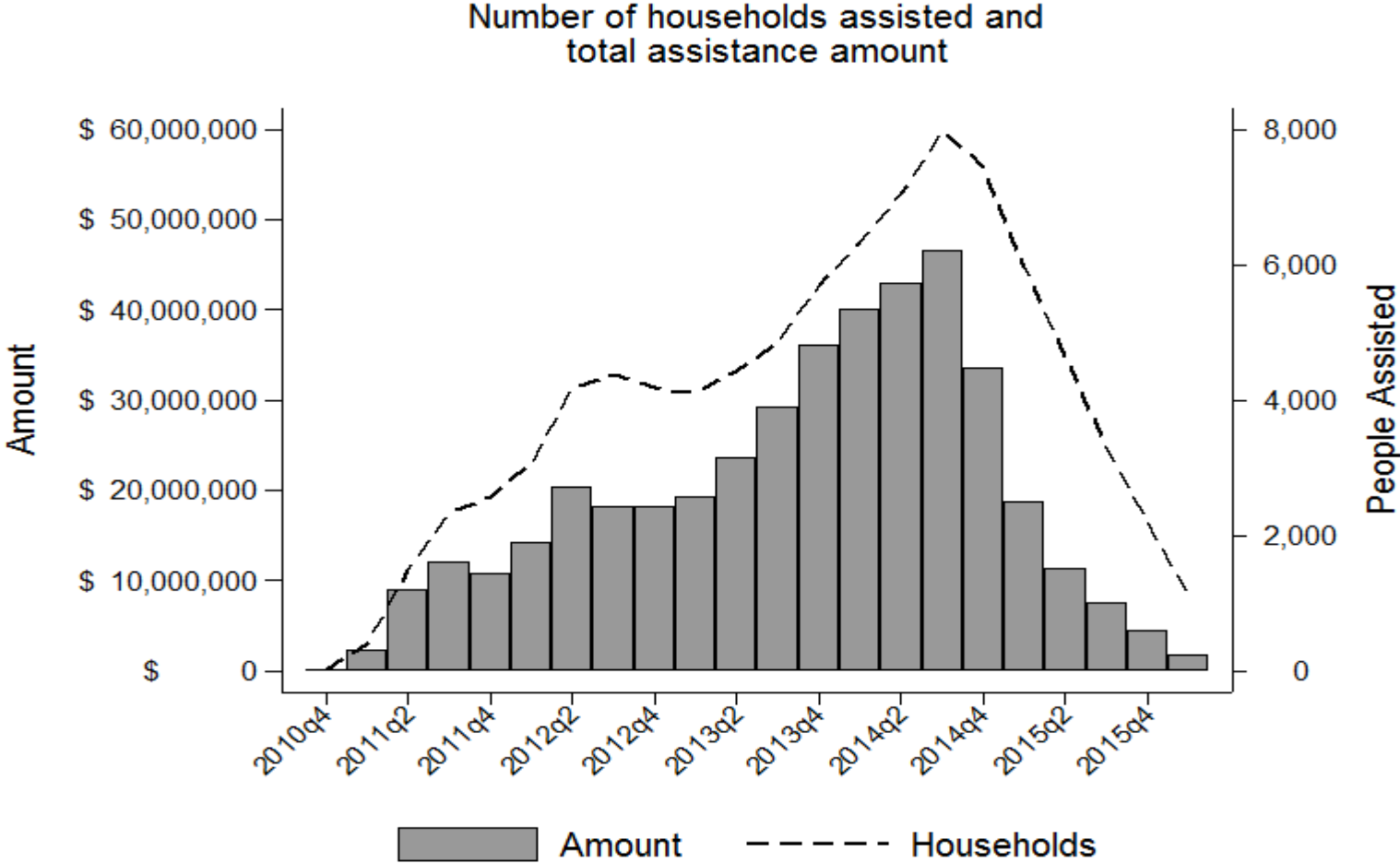
- Unemployment Insurance (UI) Wages, UI Claims
- Quarterly from Q1 2009 through Q4 2016

(3) CoreLogic Loan and Property Records data

- Property records tax and transaction data (identify Ohio homeowners)
- Loan level market analytics (LLMA) from 2009 through 2016

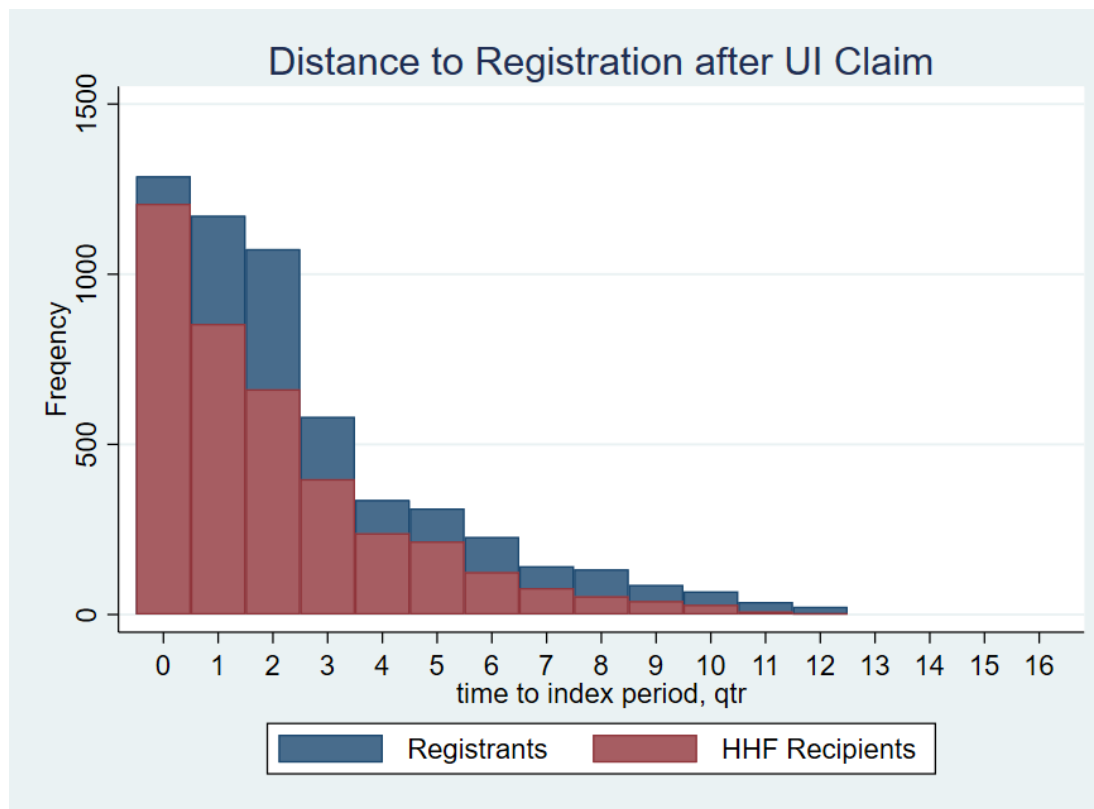
Sample Construction

1. Limit to households who received (registered for) HHF prior to January 1, 2014



Sample Construction

- Limit to homeowners with a UI claim, who (a) registered for HHF within one quarter after the UI claim, OR who (b) received HHF mortgage payment assistance within two quarters after the UI claim

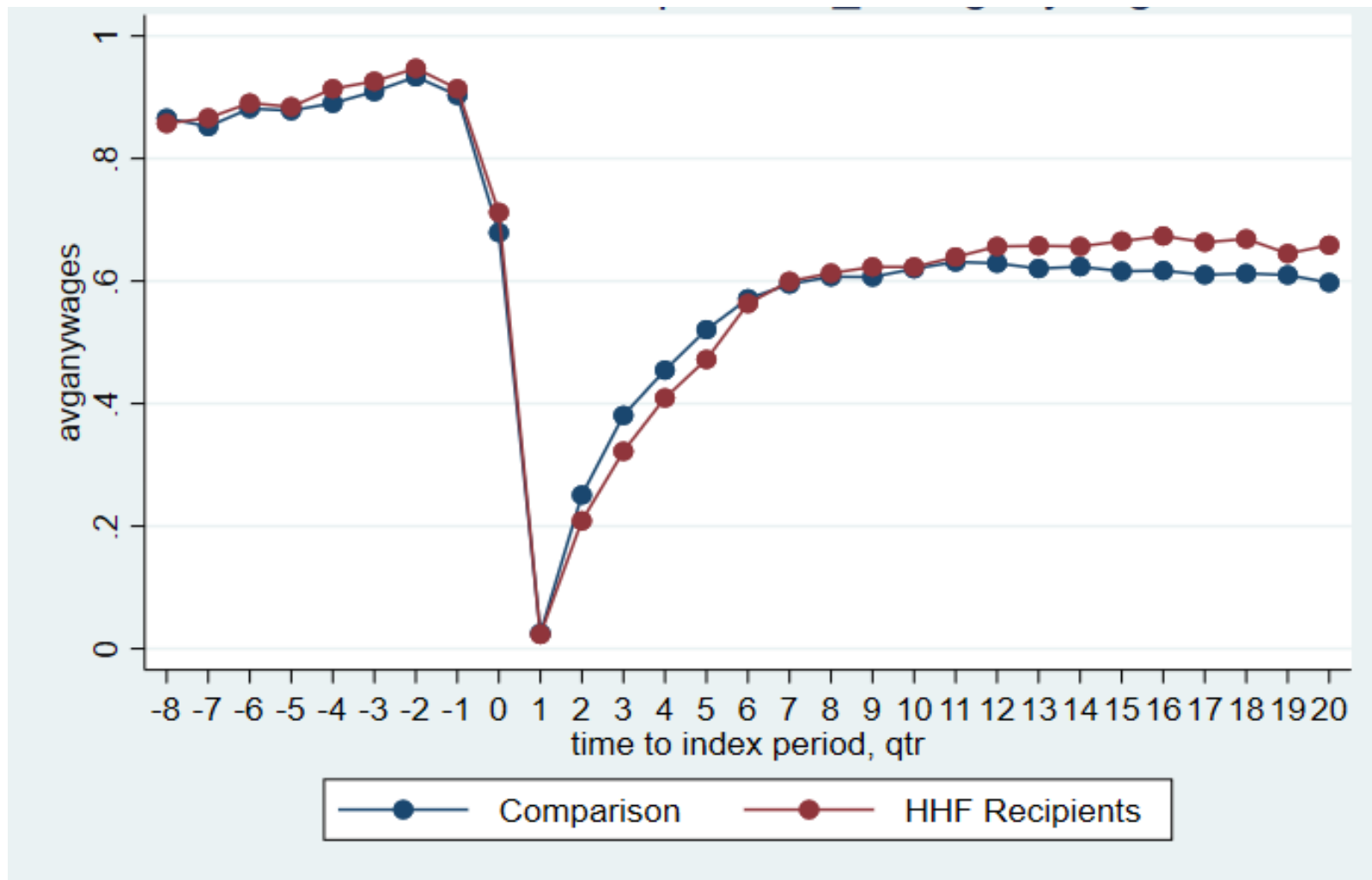


Baseline Characteristics, HHF Recipients and Registrants

	HHF Registrant (n = 1,805)	HHF Recipient (n = 852)	pvalue
Number of Borrowers	1.46	1.37	0.000
Household Size	2.97	2.61	0.000
Age as of UI claim	45.58	47.09	0.000
Male	0.56	0.48	0.000
Female	0.44	0.52	0.000
Race: Black	0.15	0.23	0.000
Race: White	0.80	0.73	0.000
UI Claim Year = 2011	0.48	0.42	0.003
UI Claim Year = 2012	0.34	0.37	0.264
UI Claim Year = 2013	0.18	0.21	0.014
Baseline annual wages	\$44,445	\$41,394	0.049
Baseline wks worked in year	40.24	41.97	0.008
Baseline quarters employed	3.40	3.50	0.034
Baseline avg quarterly wages	11,111	10,348	0.049
Baseline avg wks worked per qtr	10.06	10.49	0.008
Baseline average weekly wages	\$823	\$766	0.049
Baseline % quarters employed	0.85	0.88	0.034

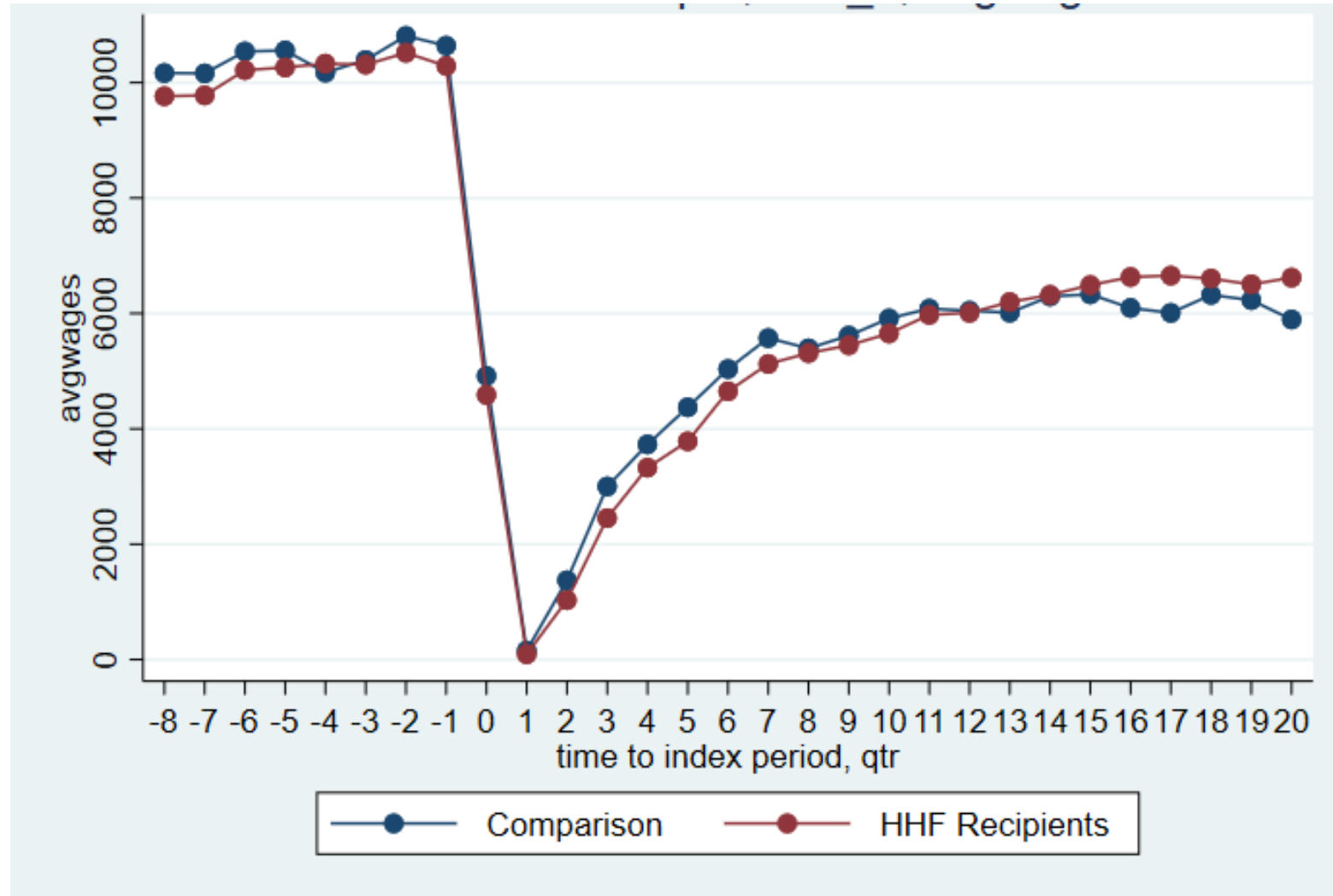
Results (unconditional)

Probability of Employment



Results (unconditional)

Quarterly Wages



Results (diff-in-diff)

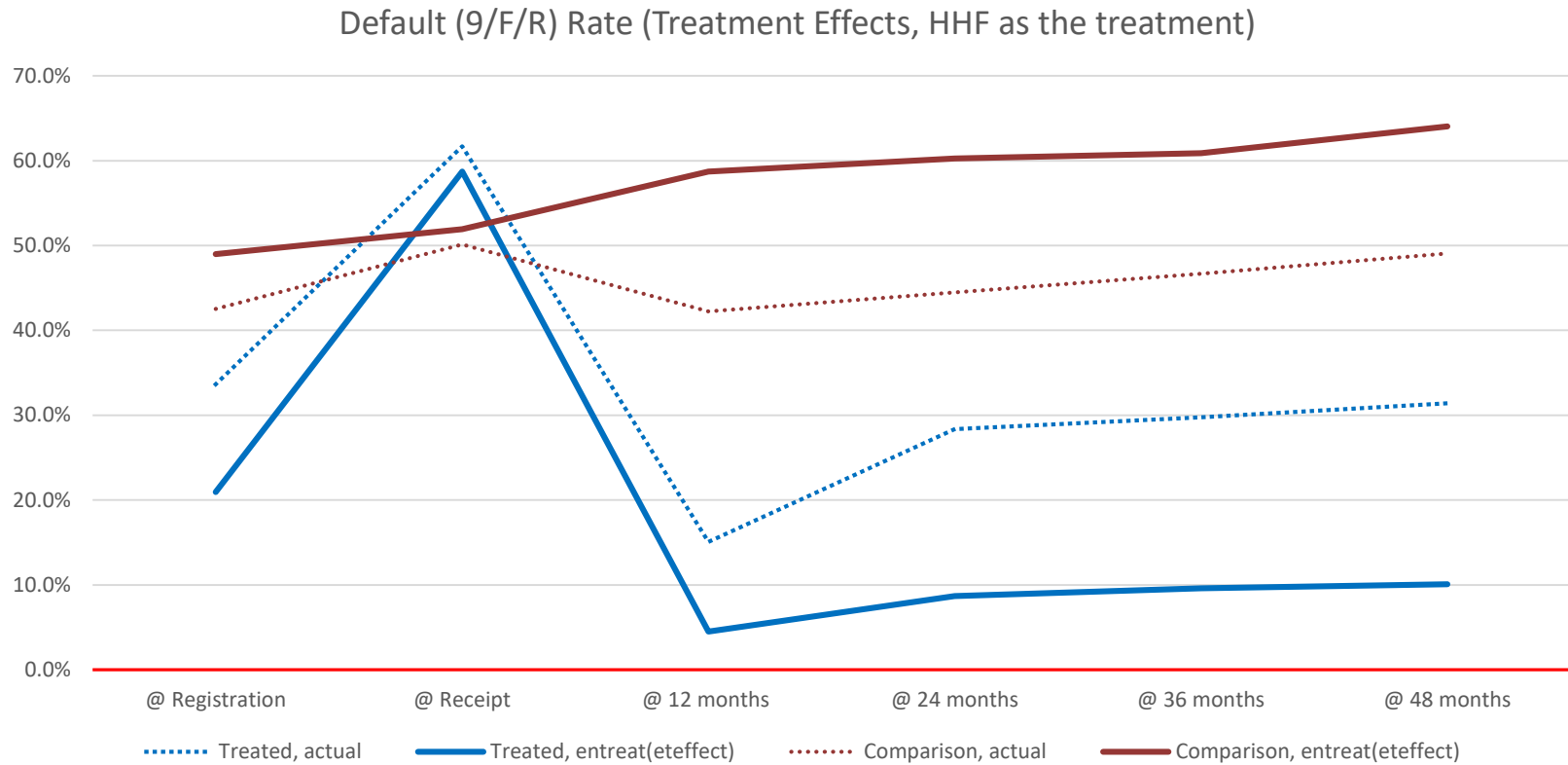
	(1)	(2)	(2)
	Average quarterly wages (inverse hyperbolic sine)	Average weeks worked per quarter	Percent of quarters employed
Year 2 Prior # HHF Recipients	0.109 [0.0826]	-0.0555 [0.148]	0.00338 [0.0107]
UI Claim Period # HHF Recipients	0.0286 [0.142]	-0.545*** [0.137]	-0.0277** [0.0108]
Year 1 Post # HHF Recipients	-0.224 [0.185]	-0.931*** [0.231]	-0.0535*** [0.0187]
Year 2 Post # HHF Recipients	0.472*** [0.182]	-0.0754 [0.249]	0.0269 [0.0196]
Year 3 Post # HHF Recipients	0.596*** [0.183]	0.304 [0.253]	0.0425** [0.0196]
Year 4 Post # HHF Recipients	0.696*** [0.217]	0.589** [0.293]	0.0689*** [0.0228]
Year 5 Post # HHF Recipients	0.586* [0.331]	0.626 [0.442]	0.0546 [0.0342]
Constant	9.612*** [0.315]	10.28*** [0.400]	0.882*** [0.0319]
Observations	18313	18313	18313

Standard errors in brackets; All models include individual and year fixed effects

*p<0.10; **p<0.05; ***p<0.01

Mechanisms? Stability?

Status of being in default on the mortgage (90 days+),
Endogenous Treatment Effects Model



Next Steps

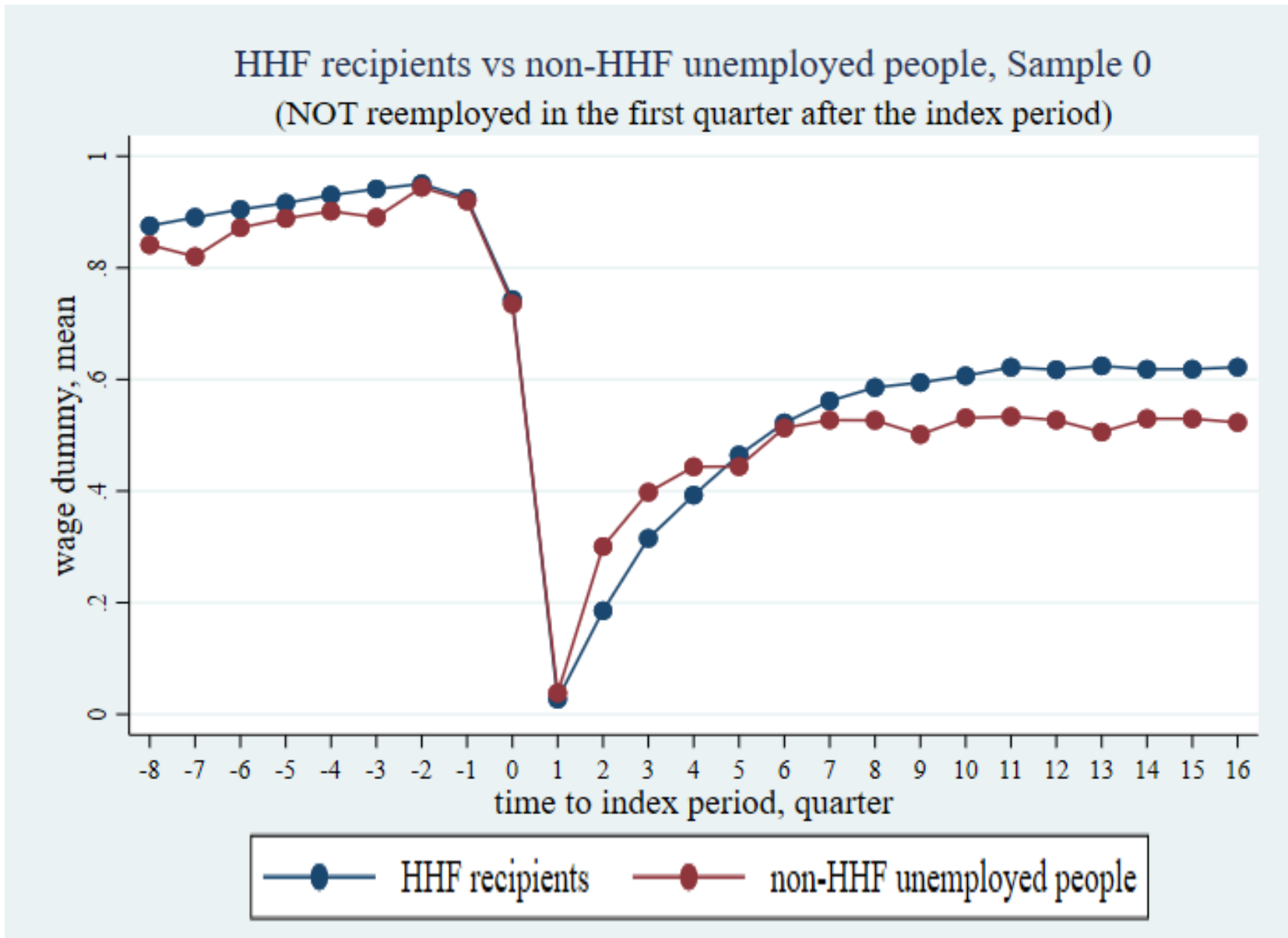
1. Expand sample
 1. Relax timing of UI claim relative to initial application date
 2. Model selection to apply for HHF; 80% random sample of unemployed homeowners in Ohio; instruments (lender, distance)
2. Explore heterogeneous treatment effects
 - Negative equity at time of UI claim?
 - Delinquent on mortgage at time of UI claim?
 - Timing of mortgage payment assistance relative to UI claim?
3. Compare mortgage payment subsidies to other types of subsidies through HHF (loan modifications, principal reductions)
4. Explore mechanisms underlying effects
 - Probability of moving (due to sale, vs. due to foreclosure)
 - Job match and job quality (wage rate as outcome rather than total wages; also employer and employment type; duration on job)

Discussion & Implications

- Receipt of mortgage payment subsidies with UI benefits:
 - ✓ Longer durations of unemployment relative to otherwise similar unemployed homeowners without mortgage payment subsidies; similar to EUB
 - ✓ Significantly higher increases in wages relative to unemployed homeowners not receiving subsidies (roughly 50 percent higher) by three years post UI claim
 - ✓ Significantly higher probability of being employed—these differences being persistent and significant through the end of our observation period, five years post the UI claim
- Importance of liquidity for homeowners, not (just) about negative equity
 - ✓ LMI homeowners have low levels of non-housing wealth, unable to buffer shocks
 - ✓ Temporary mortgage payment subsidies (or forbearance) for those with income shock, potentially less costly than permanent modifications

Thank you!

Next Steps Preview: 80% Random Sample



	(1)	(2)	(2)	(4)
	Log Average quarterly wages	Average weeks worked per quarter	Percent of quarters employed	Percent of quarters employed full time
Year 2 Prior # HHF Recipients	0.109 [0.0826]	-0.0555 [0.148]	0.00338 [0.0107]	0.00430 [0.0137]
UI Claim Period # HHF Recipients	0.0286 [0.142]	-0.545*** [0.137]	-0.0277** [0.0108]	-0.0357*** [0.0135]
Year 1 Post # HHF Recipients	-0.224 [0.185]	-0.931*** [0.231]	-0.0535*** [0.0187]	-0.0613*** [0.0173]
Year 2 Post # HHF Recipients	0.472*** [0.182]	-0.0754 [0.249]	0.0269 [0.0196]	-0.0215 [0.0185]
Year 3 Post # HHF Recipients	0.596*** [0.183]	0.304 [0.253]	0.0425** [0.0196]	-0.00201 [0.0192]
Year 4 Post # HHF Recipients	0.696*** [0.217]	0.589** [0.293]	0.0689*** [0.0228]	0.0143 [0.0219]
Year 5 Post # HHF Recipients	0.586* [0.331]	0.626 [0.442]	0.0546 [0.0342]	0.0159 [0.0313]
Year 2 Prior	-0.409** [0.191]	-0.183 [0.247]	-0.0333* [0.0196]	-0.000402 [0.0175]
UI Claim Period	-3.386*** [0.190]	-8.440*** [0.228]	-0.590*** [0.0183]	-0.483*** [0.0165]
Year 1 Post	-3.586*** [0.307]	-5.395*** [0.378]	-0.417*** [0.0304]	-0.276*** [0.0257]
Year 2 Post	-2.885*** [0.465]	-3.680*** [0.573]	-0.307*** [0.0459]	-0.157*** [0.0385]
Year 3 Post	-2.489*** [0.628]	-3.177*** [0.774]	-0.272*** [0.0619]	-0.110** [0.0518]
Year 4 Post	-2.355*** [0.795]	-2.957*** [0.982]	-0.262*** [0.0786]	-0.0813 [0.0656]
Year 5 Post	-2.219** [0.972]	-2.912** [1.204]	-0.269*** [0.0960]	-0.0508 [0.0800]
Constant	9.612*** [0.315]	10.28*** [0.400]	0.882*** [0.0319]	0.518*** [0.0272]
Observations	18313	18313	18313	18313

Standard errors in brackets; All models include individual and year fixed effects

*p<0.10; **p<0.05; ***p<0.01

Sample Construction

	UI CLAIM STARTS														Max UI Ends														
QUARTER	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
HHF Recipients	BASELINE PERIOD									HHF BEGINS	HHF Assistance																		
HHF Registrants	BASELINE PERIOD									HHF Register																			
	Year -2				Year -1				Year 0		Year 1				Year 2		Year 3				Year 4								