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Unemployment Insurance and Consumer Credit

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ABSTRACT

This paper examines the impact of unemployment insurance (UI) on credit markets, both before and after job loss. Exploiting heterogeneity in the generosity of unemployment insurance across US states and over time, we find that UI helps the unemployed avoid defaulting on their mortgage and credit card debt. For every $1,000 in additional maximum UI benefits, the eviction rate among the unemployed drops by 15%. From lenders' perspective, fewer defaults improve the credit quality of low income borrowers who are at risk of being laid off. We find that this improvement expands credit access for the poor, even while they are employed. For every $1,000 in additional maximum UI benefits, low income households are offered 2.6% in additional credit and interest rates on credit cards and mortgages decrease by 0.5%. These results show that the poor benefit from the insurance provided by a stronger social safety net even without experiencing a negative shock.

I. Empirical strategy

The unemployment insurance system of the United States provides temporary income to eligible workers who become involuntarily unemployed. Under the joint federal-state system, created by Congress in 1935, the basic framework for insurance provision is common nationwide, but each state has the autonomy to set program parameters such as the amount of benefits paid to unemployed workers. We use this variation across states and over time to identify the effect of UI on credit worthiness and credit access.

Information on UI benefits is from the US Department of Labor's "Significant Provisions of State UI Laws" from 1980 through 2011. These annual publications detail the UI benefit schedules in each state. Under each system, eligible claimants receive a weekly benefit payment for a specified number of weeks, where the benefit amount and duration are determined by the worker's employment history during a base period. To measure the generosity of each state's UI system, we focus on *max benefit*, the product of the maximum weekly benefit amount (in thousands of dollars) and the maximum duration allowed. The results are robust to other specifications for the generosity of the benefit criteria.

Max benefit provides a proxy for the total UI benefits that a UI claimant can receive in a given year (US Congress, US House of Representatives, 2004). Unadjusted for inflation, the average of *max benefit* is $8,750 per year. Significant variation also exists across states. In 2011, for example, the maximum total benefit over an unemployment spell varies from about $6,000 in Mississippi to more than $28,000 in Massachusetts.

As we would expect for a measure of UI generosity, *max benefit* is reflected in the aggregate realized value of UI benefits paid by states. Using annual data on state UI payments from 1992 through 2010 from the US Bureau of Economic Analysis (BEA) "Regional Economic Accounts," we regress the natural log of total UI payments on the benefit criteria and state and year fixed effects. The results, reported in Table I, indicate that a $1,000 increase in *max benefit* is associated with a 5 log point increase in UI payments (Column 1). In a log-log specification, we find the elasticity of maximum total benefits to actual compensation payments is approximately 1.0 (Column 2). These patterns are not explained by

state-level macroeconomic conditions, specifically the state unemployment rate (Bureau of Labor Statistics), state real gross domestic product (GDP) growth rate (Bureau of Economic Analysis), and house prices index growth (Case-Shiller; see Columns 3 and 4).

A number of factors lead to variation in unemployment insurance benefits across states and over time (Blaustein, 1993). Underlying economic conditions play a critical role. For example, the degree of a state's industrial urbanization, underlying trends in local unemployment rates, and higher average wage levels are commonly associated with benefit increases. A number of noneconomic factors also affect changes in UI benefits. Political forces, such as reelection concerns by incumbent officials, haggling and logrolling within legislative bodies, party preferences, and lobbying efforts by various constituencies, have historically been important determinants of many UI law changes.

One concern is that UI benefit laws may be correlated with other determinants of borrowers' credit quality, which could potentially confound our estimates. To evaluate the determinants of state UI benefits, we estimate the correlation between benefit levels and the various state macroeconomic variables. The results, which are also reported in Columns 5 through 7 of Table I, show no evidence of a relation. The estimated correlations are all small in magnitude and none are statistically significant.

As a falsification test, we also explore the relation between UI benefit levels and other transfer benefit payments. Regardless of state macroeconomic controls, a $1,000 increase in *max benefit* is associated with about a 1 log point *decrease* in transfer payments (not statistically significant; Columns 8 and 9). This findings helps to rule out two potential hypotheses. First, the changes in UI benefit levels do not appear to be correlated with changes in other government benefits. Second, governments do not appear to be raising UI generosity at times when other transfer programs reveal unusually high or low levels of need.

II. UI benefits, credit default, and eviction

In the first part of our analysis, we assess whether the UI benefits alleviate household financial distress. Specifically, we test whether delinquencies and defaults on mortgage loans vary with UI

generosity. Viewed from a creditor's standpoint, we ask: Does UI affect borrowers' creditworthiness? In this persuit, we exploit two data sets: bank Call Reports and the SIPP.

A. Call reports

To measure mortgage delinquencies and defaults at the state level, we first use the Federal Deposit Insurance Corporation's (FDIC) Statistics on Depository Institutions. These data are compiled from bank regulatory filings (Call Reports), in which banks report income statement and balance sheet information. We use these filings to examine mortgage loan balances, delinquent loan balances, and "charged-off" loan balances (these are the portion of loan balances that are deemed to be lost and unrecoverable due to default). We categorize banks by the state of their headquarters and aggregate loan balances to the state level. These data allow us to measure state-level variation in loan delinquency and default, and to do so over a relatively long time series, from 1992 to 2011. In contrast, mortgage servicing data is only available more recently. Given that we estimate UI effects using changes over time, having a longer time series affords us more statistical power.

We estimate the effect of UI generosity with the following difference-in-difference model:

$$Y_{st} = \propto + \beta Max\ Benefit_{st} + \vec{\theta} X_{st} + \gamma_s + \delta_t + \varepsilon_{st}.$$

The dependent variables are the proportion of loans that are charged-off during the year and the proportion of loans that are 90+ days delinquent at year-end. Standard errors are adjusted for clustering at the state level. Regression results are reported in Table II. For both mortgage charge-offs and delinquencies, we find that increases in UI generosity improve the likelihood of loan repayment. We estimate that a $1,000 increase in *Max Benefit* is associated with an 8 basis point decline in loan charge-offs (Column 1) and a 25 basis point decline in loan delinquencies (Column 3). Adding state-level controls for the unemployment rate, real GDP growth and home price growth has little effect on the *Max Benefit* coefficient estimates, though these control variables do affect loan delinquencies and defaults as

you would expect (Columns 2 and 4). That is, problem loans increase with unemployment and decrease with GDP and house price growth. Since 2008, charge-offs have averaged 1% of the loan balance and delinquencies have averaged 3.6% of the loan balance, so a $1,000 increase in *Max Benefit* reduces the proportion of problem loans by just under 8% relative to these averages.

Our measure of mortgage delinquencies and defaults is imperfect in two ways. First, it measures state-level variation with noise, since we can only assign loans to states based on the location of the bank that owns the loan and not based on the location of borrower. Of course, it is the location of the borrower for which UI generosity is relevant. In robustness exercises, we exclude the four states – Delaware, North Carolina, Nevada and South Dakota – that are outliers in banking assets per capita and for which it seems likely that many loans on banks' balance sheets pertain to out-of-state borrowers. Dropping these states from the analysis has little effect on the results (Columns 5-8).

A second concern about these data is that the delinquency and default rates are not representative of the entire mortgage market; loans held in bank portfolios are of higher quality than the overall market, which also includes GSE-owned and securitized mortgage loans. Accordingly, our estimate of the effects of UI generosity in this sample cannot necessarily be generalized to all mortgage loans. To address this concern, we verify these effects using representative, household-level data.

B. Household-level analysis of mortgage delinquency and eviction

We next use the Survey of Income and Program Participation (SIPP), a longitudinal survey conducted by the Census, to examine mortgage delinquency, homeowner eviction, and job layoffs at the household level. The SIPP assesses household economic distress once for each panel of households, in the Adult Well-being Topical Module. Respondents are asked "Did you fail to pay the full amount of the rent or mortgage over the prior twelve months?" as well the follow-up question "Were you evicted from your home or apartment for not paying the rent or mortgage?" We code two indicator variables, *Mortgage Delinquency* and *Eviction*, based on respondents' answers to these questions. Throughout the panel, the SIPP also tracks employment history, from which we code *Layoff*, an indicator for whether anyone in the

household has been laid off from work in the year prior to the Adult Well-being interview.

Having a measure of layoff status allows us to refine the empirical analysis. We continue to focus on state-level changes to maximum UI benefits, but we add an additional comparison between those who have been laid off and those who have not. Given that UI benefits are available to the former group, we would expect increases in UI payments to mitigate delinquency specifically in that group. This additional comparison is helpful if our state-level controls are not sufficient in accounting for differences in economic conditions that might be correlated with UI generosity.

For this analysis, we restrict the regression sample to homeowners that have an outstanding mortgage. We estimate the following model:

$$Y_{ist} = \propto + \beta Max\ Benefit_{st} + \gamma Max\ Benefit_{st} * Layoff_{it} + \delta Layoff_{it} + \vec{\theta} X_{st} + \varepsilon_{ist}.$$

Table III presents the results from this analysis. Focusing first on mortgage delinquency, we find that delinquencies decline with UI generosity, particularly among homeowners that were laid off from work in the previous year. In models without the interaction term, the relation between *Max Benefit* and delinquency or eviction is not statistically significant (Columns 1 and 3). The average effect, however, obscures an important relationship among the relevant subpopulation. Allowing the coefficient on *Max Benefit* to vary by layoff status, we find that increases in *Max Benefit* do indeed reduce delinquencies. We estimate an interaction coefficient of -0.0018 ($p < 0.005$), which suggests that as the maximum UI benefit increases by $1,000, delinquencies decline by 18 basis points in the Layoff group relative to the non-Layoff group. For a one standard deviation increase in *Max Benefit* ($3,600 in 2010), the model implies a 64 basis point reduction in the likelihood of delinquency, 12% reduction relative to the mean. The coefficient on *Layoff* is 0.08, implying that households suffering a layoff would suffer an 8 percentage point increase in delinquency in the absence of unemployment insurance. Evaluating the model at the mean of *Max Benefit* in 2010 ($11,000), the results suggest that Layoff increases the probability of

delinquency by 6 percentage points.

Analysis of evictions display a similar pattern: the likelihood of eviction decreases with UI generosity, particularly among those laid off from work. Eviction shows no relationship with *Max Benefit* on average (Column 3) or for households not suffering a layoff (Colum 4). However, we find a negative and significant coefficient on the interaction of *Max Benefit* and *Layoff*. The estimated coefficient implies that, for every $1,000 increase in *Max Benefit*, the likelihood of eviction decreases by 3 basis points ($p < 0.001$). Relative to the prevalence of evictions among all mortgagors in the sample (0.20%), this estimate implies that $1,000 of additional UI benefits reduces evictions by 15%.

III. UI benefits and credit terms

A. Mortgage Interest Rates

To evaluate the impact of UI generosity on mortgage terms, we use survey data on mortgage interest rates published by the Federal Housing Finance Agency (FHFA), the regulator of Fannie Mae and Freddie Mac. On a monthly basis, the FHFA surveys a sample of mortgage lenders (including mortgage companies, banks, and savings associations) on the terms and conditions of all purchase mortgage loans closed during the last five days of the month. At annual frequency for 1978 to 2010 the FHFA publishes the average mortgage interest rate at the state level, based on the borrower's location.

We regress the average mortgage interest at the state-level, both in logs and in levels, on UI generosity along with a vector of controls for state-level economic conditions (X_{st}), state fixed effects (γ_s) and year fixed effects (δ_t):

$$Y_{st} = \propto + \beta Max\ Benefit_{st} + \vec{\theta} X_{st} + \gamma_s + \delta_t + \varepsilon_{st}$$

The regression estimates are shown in Table IV. We find a consistent and statistically significant pattern: as *Max Benefit* increases, mortgage interest rates decline. Focusing first on log interest rates, we estimate

a coefficient of -0.0042 ($p < 0.001$) on *Max Benefit*, implying a 0.42 log point decline in interest rates for every $1,000 increase in maximum unemployment benefits. State-level controls for the unemployment rate, GDP growth, and house price growth have little impact on this estimate. Examining the level of mortgage interest rates as the dependent variable (Columns 3 and 4), we find similar results. We estimate a coefficient of -0.037 ($p < 0.02$) on *Max Benefit* in a model without state-level controls and a coefficient of -0.038 ($p < 0.02$) with state-level controls.

To gauge the economic magnitude of these estimates, consider the observed variation in *Max Benefit* across states in 2010. A one standard deviation change in maximum UI benefit ($3,600) corresponds to about a 1.5% decline in interest rates. Comparing the state with the most generous UI benefit and the state with the least generous benefit (a $22,200 difference), our estimate implies a 9.3% difference in mortgage interest rates. Given our expectation that UI generosity will affect mortgage rates by influencing default risk and the associated credit spread, it is perhaps more informative to normalize by the average mortgage-treasury bond spread of 1.82% during this period rather than the overall mortgage rate. A one standard deviation increase in *Max Benefit* implies a roughly 7% decrease in mortgage spreads and a change from the minimum to the maximum generosity implies a roughly 45% decline in mortgage spreads. Furthermore, note that these estimates correspond to the average savings across mortgage borrowers in a state. Although the average savings are somewhat modest, this estimate likely belies substantial heterogeneity in savings across borrowers. We would expect higher risk borrowers—particularly those at greater risk of unemployment—to realize substantially higher savings.

To summarize, we find a robust relationship between changes in UI generosity and mortgage interest rates: as UI becomes more generous, lenders reduce mortgage interest rates. Mortgage lenders appear to respond to the reduced risk of default in pricing mortgage loans.

B. UI Generosity and Credit Card Terms

The credit market effects of UI go beyond mortgages. We investigate the effect of UI generosity on credit card terms using data on credit card mail offers collected by Mintel Comperemedia. Mintel

collects a sample of roughly 1,000 households each month, surveying household demographics in addition to compiling information from all credit card mail offers received by the household during the month. We study variation in the average interest rate and average credit limit offered to households during the period from 2000 to 2008. The independent variable of interest remains *Max Benefit*. For this model we include a vector of household-level controls (Z) in addition to state and year fixed effects:[1]

$$Y_{ist} = \propto + \beta Max\ Benefit_{st} + \vec{\theta} X_{st} + \vec{\varphi} Z_{it} + \gamma_s + \delta_t + \varepsilon_{st}.$$

The results are reported in Table V. Controlling for income and education, households in states with more generous UI benefits receive offers with lower interest rates and higher credit limits. Focusing first on log interest rates, we estimate a coefficient of -0.0036 on *Max Benefit* (Column 1), which implies that a one standard deviation increase in *Max Benefit* ($3,600) reduces interest rates by 1.3%. Our findings are similar for the level of interest rates: increasing *Max Benefit* by $1,000 reduces the offered interest rate by 5.4 basis points (Column 1). The effect on credit limits is more substantial. For Log(Credit Limit) we estimate a *Max Benefit* coefficient of 0.026, which implies that a one standard deviation increase in *Max Benefit* raises the offered credit limit by 9%. For the level of the credit limit we estimate a coefficient of 362 on *Max Benefit*, which implies a $1,300 increase in offered credit limit when UI generosity increases by one standard deviation.

These results suggest that credit card lenders respond to the decrease in default risk by increasing credit supply to households in states with generous UI benefits.

[1] The household-level controls are: indicators for each of four education categories (based on education of the head of household) and indicators for 12 categories of household income.

Table I: Unemployment Insurance and Economic Conditions (1992-2011)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Log of unemployment payments	Log of unemployment payments	Log of unemployment payments	Log of unemployment payments	Unemployment rate	Real GDP growth	House price growth	Log of transfer benefit payments	Log of transfer benefit payments
Mean DV:					[0.054]	[0.028]	[0.041]		
Max Benefit	0.05*		0.04**		-0.0004	-0.001	-0.002	-0.010	-0.011
	(0.02)		(0.02)		(0.001)	(0.001)	(0.002)	(0.010)	(0.010)
Log(Max Benefit)		1.01***		0.93***					
		(0.26)		(0.17)					
Unemployment rate			10.43***	10.70***					2.42***
			(1.30)	(1.11)					(0.76)
Real GDP growth			-2.44***	-2.13***					-0.52**
			(0.40)	(0.36)					(0.21)
House price growth			-0.49***	-0.46***					(0.02)
			(0.16)	(0.15)					(0.07)
Obs	969	969	969	969	1020	1020	1020	969	969
R^2	0.979	0.981	0.988	0.99	0.815	0.489	0.526	0.995	0.995
State FEs?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs?	Y	Y	Y	Y	Y	Y	Y	Y	Y

Robust standard errors in parentheses; clustered at state level
* significant at 10%; ** significant at 5%; *** significant at 1%

Table II: Unemployment Insurance and Mortgage Charge-Offs and Delinquencies (Call Reports, 1992-2011)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
					Excluding DE, NC, NV, SD			
	Charge-off Rate All Mortgages	Charge-off Rate All Mortgages	Delinquency Rate All Mortgages	Delinquency Rate All Mortgages	Charge-off Rate All Mortgages	Charge-off Rate All Mortgages	Delinquency Rate All Mortgages	Delinquency Rate All Mortgages
Mean DV (%):	[0.28]	[0.28]	[1.23]	[1.23]	[0.22]	[0.22]	[1.09]	[1.09]
Max Benefit	-0.08***	-0.08***	-0.25***	-0.24***	-0.09***	-0.09***	-0.24***	-0.23***
	(0.03)	(0.02)	(0.09)	(0.08)	(0.03)	(0.02)	(0.09)	(0.08)
Unemployment rate		13.5***		31.0**		9.5***		25.2**
		(4.7)		(13.7)		(3.0)		(11.4)
Real GDP growth		-1.3		-1.5		-0.8		0.2
		(1.0)		(2.6)		(1.0)		(2.3)
House price growth		-1.0**		-1.1		-1.2**		-1.6
		(0.5)		(1.4)		-0.6		-1.3
Obs	1020	1020	1020	1020	940	940	940	940
R^2	0.44	0.49	0.57	0.59	0.41	0.45	0.57	0.59
State FEs?	Y	Y	Y	Y	Y	Y	Y	Y
Year FEs?	Y	Y	Y	Y	Y	Y	Y	Y

Robust standard errors in parentheses; clustered at state level
* significant at 10%; ** significant at 5%; *** significant at 1%

Table III: Unemployment Insurance, Mortgage Delinquency and Layoffs (SIPP, 1993-2010)

	(1)	(2)	(3)	(4)
	Mortgage Delinquency	Mortgage Delinquency	Eviction	Eviction
Mean DV:	[0.054]	[0.054]	[0.002]	[0.002]
Max Benefit	-0.0012	-0.0009	0.0001	0.0002
	(0.001)	(0.001)	(0.0002)	(0.0002)
Max Benefit*Layoff		-0.0018***		-0.0003***
		(0.001)		(0.0001)
Layoff		0.08***		.005***
		(0.01)		(0.001)
Obs	64950	64950	64916	64916
R^2	0.01	0.02	0.001	0.002
State FEs?	Y	Y	Y	Y
Year FEs?	Y	Y	Y	Y
State-year Controls?	Y	Y	Y	Y

Robust standard errors in parentheses; clustered at state level
* significant at 10%; ** significant at 5%; *** significant at 1%

Table IV: Unemployment Insurance and Mortgage Interest Rates (MIRS, 1980-2010)

	(1)	(2)	(3)	(4)
	Log(Interest Rate) Mortgage Loans	Log(Interest Rate) Mortgage Loans	Interest Rate Mortgage Loans	Interest Rate Mortgage Loans
Mean DV (%):			[8.39]	[8.39]
Max Benefit	-0.0042***	-0.0043***	-0.037**	-0.038**
	(0.001)	(0.001)	(0.02)	(0.02)
Unemployment rate		-0.002		-0.026
		(0.001)		(0.0)
GDP growth		-0.126		-1.438
		(0.09)		(1.0)
House price growth		0.003		-0.057
		(0.02)		(0.2)
Obs	1580	1580	1580	1580
R^2	0.99	0.99	0.99	0.99
State FEs?	Y	Y	Y	Y
Year FEs?	Y	Y	Y	Y

Robust standard errors in parentheses; clustered at state level
* significant at 10%; ** significant at 5%; *** significant at 1%

Table V: Unemployment Insurance and Credit Offers (Mintel, 2000-2008)

	(1) Log(Interest Rate) Credit Cards	(2) Interest Rate Credit Cards	(3) Log(Credit Limit) Credit Cards	(4) Credit Limit Credit Cards
Mean DV:		[11.55]		[36,860]
Max Benefit	-0.0036***	-0.054***	0.026***	362***
	(0.0010)	(0.018)	(0.007)	(107)
Obs	127,805	128,007	96,214	96,215
R^2	0.17	0.14	0.13	0.15
State FEs?	Y	Y	Y	Y
Year FEs?	Y	Y	Y	Y
State-year Controls?	Y	Y	Y	Y
Borrower Characteristics?	Y	Y	Y	Y

Robust standard errors in parentheses; clustered at state level
* significant at 10%; ** significant at 5%; *** significant at 1%