Unemployment Insurance and Consumer Credit*

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October 13, 2013

Preliminary and Incomplete

ABSTRACT

This paper examines the impact of unemployment insurance (UI) on consumer credit markets. 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 debt. Lenders respond to this decline in default risk by expanding credit access for low-income households who are at risk of being laid off. We find that such households are offered greater credit and pay lower interest rates on their borrowing. Through credit markets, the poor benefit from the insurance provided by a stronger social safety net even without experiencing a negative shock.

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I. Introduction

Access to credit allows households to finance consumption and investment that they cannot afford out of their current income. Good credit enables one to smooth consumption, to buy a house, a car, and other durable goods, and to invest in education or job training. Credit is often required to rent an apartment, to obtain telephone and electricity service, and even to get a job. How is one to qualify for credit? Underwriting criteria vary with the type of credit, but income is given much attention, as uncertainty about future income casts doubt on households' ability to repay. By insuring households' income, social insurance can thus play an important role in consumer credit markets, including expanding access to credit and improving credit terms. In this way, social insurance has the potential to benefit low-income households even in the absence of a negative shock.

The role of social insurance in consumer credit markets is exemplified by the case of unemployment insurance (UI). In theory, the effect of UI payments on borrower default risk is ambiguous. Having a source of income following job loss can enable households with credit obligations, such as mortgage payments, to continue making loan payments rather than defaulting. On the other hand, increasing UI generosity may increase borrower delinquency in the presence of moral hazard of various forms. For example, increasing UI benefits can reduce incentives to search for new work, thereby slowing reemployment (Moffitt 1985; Meyer 1990) and increasing long-term unemployment risk (Schmeider et al. 2012); with less resources available to meet credit obligations over time, borrowers may default more often.[1] Furthermore, if the number of unemployed individuals grows with UI generosity (Topel 1983), then loan delinquency may rise as well.

We examine whether UI payments affect loan delinquency by exploiting variation in UI

[1] Households' incentive to avoid default mitigates this effect (Chetty 2008).

generosity across states and over time. States differ substantially in benefit generosity: in 2011, a laid-off worker could collect up to about $28,000 in regular benefits in Massachusetts, but only about $6,000 in regular benefits in Mississippi. States also adjust UI benefits differently over time: for example, between 1992 and 2011, maximum UI benefits grew by only 20% in Florida, but by 160% in New Mexico. During the recent recession, additional differences also emerged as unemployed workers in different states were eligible for different supplemental UI benefits though the Extended Benefits (EB) and Emergency Unemployment Compensation (EUC) programs.

Our analysis begins by examining time-series variation in regular UI benefits (excluding the supplemental EB and EUC programs). We examine household data on mortgage delinquency from the Survey of Income and Program Participation (SIPP) using a repeated cross-sectional research design. Our analysis identifies the effect of UI generosity by comparing trends in loan delinquencies to state-level changes in maximum benefits. We show that increases in UI generosity alleviate mortgage delinquency, specifically for unemployed homeowners. For every $1,000 increase in maximum regular UI benefits, a displaced worker's likelihood of mortgage delinquency declines by roughly 25 basis points, a 5% decline relative to the overall sample mean. As a falsification test, we confirm that delinquency is unrelated to UI generosity among homeowners who are not laid off and who, therefore, do not receive UI benefits.

Amidst the extreme job loss of the recent recession, Congress appropriated federal funds to extend the period of time for which unemployed individuals could collect unemployment benefits. Benefit extensions were paid under the EB and EUC programs. Exploiting variation across states in the duration of these extensions and in the weekly benefit amount paid, we find that these UI payments also reduce mortgage delinquency. The magnitude of the reduction is

similar as for regular benefits: a $1,000 increase in total EB and EUC payments is associated with a decline in the likelihood of mortgage delinquency of 25 to 35 basis points after being laid off.

The key identifying assumption underlying our analysis is that changes to UI benefits are independent of factors that might otherwise affect loan defaults among the unemployed. A potential concern is that states may be more likely to increase UI benefits during an economic boom, when states are flush with cash, loan defaults are already low and credit supply is already high. Direct evidence finds little support for this concern, as we find that states' maximum UI benefit is not significantly related to UI trust fund balances, state unemployment rates, average wages, GDP growth, or home price growth. Although we can only examine *observable* variables directly, *unobservable* state-specific factors also do not appear to explain our results, as controlling for state-by-year fixed effects has little effect on our results.[2] Furthermore, when we define a household-level benefit measure and control for more detailed state-by-year-by-layoff status fixed effects, we also obtain similar estimates.[3] Finally, if UI generosity indeed mitigates loan delinquency, one would expect the effects to be strongest among unemployed households with limited liquid assets; exploiting employment and asset information from the SIPP, this is specifically what we find. Based on this variety of tests, we conclude that the estimated effect of UI generosity is causal.

The effect seems to be long term, as UI benefits not only mitigate loan delinquency, but also reduce homeowner relocations and evictions. We find that an additional $1,000 in maximum UI benefits reduces mortgage default among unemployed homeowners by 2.4 to 11 basis points.

[2] In these analyses, trends among employed residents of states provide counterfactuals for trends among unemployed residents when UI benefit levels change.

[3] All of our estimates also control for household characteristics, including education, employment, income, liquid assets, and net worth.

These effects are sizeable. The decrease in evictions, a subset of defaults, associated with $1,000 greater maximum UI benefits corresponds to 12% of the overall sample mean.

These results have important implications for housing policy. Although foreclosures are considered costly for borrowers, lenders, and society (Campbell et al. 2011; Mian, Sufi, and Trebbi 2011), public policies aimed at stemming foreclosures during the recent crisis have had limited success.[4] The Home Affordable Modification Program (HAMP), the largest such effort, resulted in only a modest reduction in the rate of foreclosures and reached just one-third of its targeted 3 to 4 million indebted households, because it required the cooperation of lenders that lacked the organizational capacity (Agarwal et al. 2013). Whereas HAMP allocated $75 billion, it is expected to disburse only $16 billion (CBO 2012a). In comparison, $520 billion were disbursed in UI payments between 2008 and 2012 (CBO 2012b). In further tests, we find that UI payments reduce delinquency even among homeowners who have loan-to-value ratios above 120%. This finding suggests that foreclosure reduction policies that target loan affordability can be effective even among the subset of homeowners who have an incentive to strategically default.

Given these effects on delinquency and default, it is also natural to ask whether lenders account for these repayment patterns when determining credit supply for at-risk populations. If the lending market is competitive and lenders anticipate that UI payments will reduce default risk, for example, then we would expect lenders to offer better terms—lower interest rates or higher credit limits—when UI benefits are more generous. To assess changes in credit supply, we analyze purchase mortgages, home equity lines of credit (HELOCs), and credit card loans. For mortgages, we examine state-level data, from the Federal Housing Finance Agency, on the

[4] Federal and state governments have introduced policies aimed to prevent foreclosures during crises since at least the Great Depression (Rucker and Alston 1987).

average interest rate on purchase mortgage loans. For HELOCs and credit cards, we analyze household-level data, from Mintel Comperemedia, on credit offers received by mail, which offer a deeper view of credit supply, as they include both interest rates and credit limits.

We find that borrower improvement in credit worthiness appears to expand credit access for low-income households, even while they are employed. Applying a similar state-panel fixed effects approach as in our analysis of delinquency, we find that mortgage interest rates decline as UI benefits increase. For every $1,000 increase in maximum UI benefits, we estimate that mortgage loan interest rates decline by 4 basis points (0.5% decline relative to the 8.39% average interest rate) and the probability of receiving a HELOC offer increases by 0.8%. Likewise, credit card lenders offer households better credit terms when UI is more generous. Credit limits rise by 2.7% for every $1,000 increase in maximum UI benefits, while interest rates decline by roughly 0.3%. Among low-income households the changes are larger: a 4% increase in credit limit and a 0.6% decrease in interest rates for every $1,000 increase in maximum UI benefits.

These findings provide a novel contribution to the literature on optimal unemployment insurance, dating back to Baily (1978). Research on the costs and benefits of UI has traditionally emphasized the trade-off between costly distortions to labor supply (Moffitt 1985; Meyer 1990) and precautionary savings (Engen and Gruber 2001; Feldstein 2005) and facilitating consumption smoothing for the unemployed (Gruber 1997; Browning and Crossley 2001; Bloemen and Stancanelli 2005).[5] Our results point to additional benefits. First, UI payments reduce the costs associated with loan default, both those borne by the defaulting household and those borne by neighbors.[6] Second, UI payments facilitate credit access for at-risk households

[5] Chetty and Szeidl (2007) examine how consumption commitments, such as housing, affect food consumption after job loss.

[6] For the defaulting household, in addition to moving costs, the household faces reduced access to credit in the future and may bear considerable psychological costs from the financial strain of missing mortgage

even before they become unemployed: borrowers benefit from paying lower interest rates, and *may* also benefit from receiving more credit.[7] Empirical work suggests that many households do not receive as much credit as they desire: Gross and Souleles (2002) find that increases in credit card limits generate a significant rise in debt. In the models of Carroll (1997) and Chatterjee et al. (2007), credit access facilitates consumption smoothing, thereby benefiting households that face income uncertainty. However, as Laibson (1997) emphasizes, expanding access to credit can reduce welfare for households with self-control problems, as modeled through present-biased preferences.

Finally, our analysis highlights the importance of income shocks in explaining consumer loan default. Much of the literature on household financial distress focuses on household liabilities (see, for example, Fay, Hurst, and White 2002), perhaps because liabilities are well documented in credit reports and bankruptcy filings while income shocks are not. Furthermore, it can be challenging to separate whether the liabilities cause or result from household's distress. The definitive role of unemployment insurance in mitigating credit delinquency and default highlights the importance of income shocks as a determinant of households' financial distress.

The rest of the paper proceeds as follows. Section II describes key features of the unemployment insurance system and characterizes the variation in UI benefits that we exploit in our analysis. Sections III and IV present the empirical results for mortgage default and credit terms, respectively. Section V concludes.

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payments and the process of losing their home to foreclosure. For neighbors, the foreclosure often reduces the prices of other homes nearby (Campbell et al. 2011).

[7] Other papers examining unemployment insurance in the context of household finance include Gormley, Liu and Zhou (2010), who find that households' stock market participation, a measure of financial risk-taking, increases with UI generosity, and Sullivan (2008), who examines household borrowing during unemployment spells and controls for state-level UI benefits, but does not explore the role of UI benefits in mitigating loan default or expanding access to credit.

II. Unemployment Insurance

A. Regular Benefits

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.

Information on the generosity of individual state's UI benefits is from editions of the U.S. Department of Labor's publication "Significant Provisions of State UI Laws" from 1980 through 2011. These 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. Each state also caps benefits, specifying both a maximum weekly benefit and a maximum duration of benefits. The product of the maximum weekly benefit amount and the maximum duration allowed provides a measure of the generosity of each state's UI system. Although we focus on this measure, denoted as *Max Benefit*, throughout much of our analysis, the results are robust to other specifications for the generosity of states' benefit criteria, as described below.

Max Benefit provides a proxy for the total 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 $8,600 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. Figure 1 shows the geographic distribution, by quintile, of state benefit increases between 1992 and 2011, which is the period of our data on

delinquency. The benefit increases over this period have no clear geographic pattern. The smallest increase in *Max Benefit* over the period was $624 in Washington, DC, followed by $1,300 in Florida, and the largest increase was $14,790 in Massachusetts. Other states with large increases include Rhode Island, Minnesota, New Mexico, Connecticut, New Jersey, Washington, Pennsylvania, and Montana.

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 1991 through 2011 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 II, indicate that a $1,000 increase in *Max Benefit* is associated with a 0.04 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 (Columns 3 and 4), specifically the unemployment rate (Bureau of Labor Statistics), real gross domestic product (GDP) growth rate (Bureau of Economic Analysis), house prices index growth (Case-Shiller), and average wage (Bureau of Economic Analysis).

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 thought to be associated with benefit increases. Changes in UI benefits are also affected by politics and other noneconomic factors, including incumbent officials' reelection concerns, haggling and logrolling within legislative bodies, political party preferences, and lobbying efforts of various constituencies.

One concern for our analysis is that UI benefit laws might 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 various state macroeconomic variables. The results, which are reported in Columns 1 through 4 of Table III, 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. In contrast to the elasticity of UI payments to *Max Benefit*, which is 0.878 after including state macroeconomic controls ($p < 0.01$; Column 4 of Table II), the elasticity of transfer payments to *Max Benefit* is –0.038 (Column 5) and the elasticity of health insurance payments to *Max Benefit* is –0.034 (Column 6), and neither is statistically significant. These findings help 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, ruling out a possible omitted variable. Second, governments do not appear to be raising UI generosity at times when other transfer programs reveal unusually high or low levels of need.

B. Extended Benefits

In addition to the "regular" UI payments discussed above, states also provide unemployed workers with further assistance during times of high state unemployment. During such times, unemployment payments are extended: unemployed workers who exhaust their regular UI benefits are eligible to collect their weekly benefit for an additional period. We study the impact of extensions under two federal programs: Extended Benefits and Emergency Unemployment Compensation.

The Extended Benefits (EB) program, which was mandated by federal legislation adopted in 1970, provides an additional 13 weeks of benefits when the state's insured unemployment rate rises above 5% and is at least 20% higher than its level in the prior two years. Some states also participate in a voluntary component of the EB program whereby they provide up to 7 additional weeks of benefits, when the state's total unemployment rate rises above 8%, thereby providing up to 20 weeks of extended benefits in total.

The Emergency Unemployment Compensation (EUC) program was enacted as part of the American Recovery and Reinvestment Act of 2008 and was modified several times thereafter. This federally funded program provided additional weeks of benefits to unemployed individuals who had exhausted their regular state and EB benefits.[8] As of May 2009 (the time period of our data), the program authorized 20 weeks of benefit extensions in all states and an additional 13 weeks of extensions (i.e., 33 weeks in total) in states with total unemployment rates above 6.5%.

Including extensions due to both the EB and EUC programs, there is considerable variation in the duration of benefit extensions as of May 2009. As shown in Table I, the average state offered up to 40 total weeks of extensions with a standard deviation of 13.1. The number of maximum weeks in each state is displayed in Figure 2. The length of possible extensions varies from 20 weeks (the minimum from EUC) to 53 weeks (the maximum from both programs). The duration of benefits extensions is somewhat clustered regionally across the country, as would be expected given that they are in part triggered by economic conditions, an identification challenge that we discuss below. Nevertheless, note that the geographic pattern of possible benefit extensions, shown in Figure 2, is unrelated to the geographic pattern of regular benefit increases, shown in Figure 1. Although our analyses of the two programs exploit very different geographic

[8] In most states, EUC payments were paid immediately following the exhaustion of regular benefits, and EB payments began only after EUC benefits were exhausted.

variation in benefit generosity, they will find remarkably similar estimates for the impact of benefit generosity on mortgage delinquency and default.

To measure differences in extended benefit generosity in dollar terms, we calculate *Max EB&EUC*, the product of the state's maximum weekly benefit and the number of weeks of extended UI authorized (*beyond* the regular benefit period). As of May 2009, the average state offered $17,700 of maximum additional benefits with a standard deviation of $8,400.

III. UI benefits, mortgage delinquency, and default

We assess whether UI benefits affect mortgage delinquency and default using the Survey of Income and Program Participation (SIPP), a longitudinal survey conducted by the U.S. Census Bureau. The SIPP is well suited to our study because it tracks mortgage delinquency and employment status for a sizeable sample of households. The data also include rich information on relevant control variables such as income, assets, and mortgage leverage.

In each panel, the SIPP follows a national sample of roughly 40,000 households for four years, collecting information on monthly employment, income, and program participation through interviews that recur every four months. In supplemental interviews conducted annually, the survey also gathers information on household assets and liabilities, from which we observe mortgage leverage and household savings. Finally, the SIPP assesses mortgage delinquency once for each panel of households as part of the Adult Well-being topical module, in which respondents are asked, "Did you fail to pay the full amount of the rent or mortgage over the prior twelve months?" Throughout the analysis, we restrict the sample to homeowners with mortgage loans.

Our study uses seven SIPP panels, covering the period 1991-2011, with Adult Well-being

interviews roughly every three years during that period.[9] In total, the sample includes 64,922 households. Summary statistics for the full sample are reported in Panel B of Table I. In the full sample, 5.4% of households report being delinquent on their mortgage in the prior twelve months. Throughout each panel, the SIPP also tracks respondents' 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.

A. Regular UI Benefits

We begin by examining variation in maximum benefits under states' regular UI programs. We estimate the following linear probability model:

$$Delinquent_{ist} = \alpha + \beta Max\ Benefit_{st} + \gamma Max\ Benefit_{st} \times Layoff_{it} \qquad (1)$$
$$+\delta Layoff_{it} + \boldsymbol{\zeta}\mathbf{X}_{it} + \boldsymbol{\eta}\mathbf{Z}_{st} + \lambda_s + \mu_t + \varepsilon_{ist},$$

where $Delinquent$ is an indicator for mortgage delinquency, $\mathbf{X}$ is a vector of household characteristics, $\mathbf{Z}$ is a vector of state characteristics, λ and μ are state and year fixed effects, and ε is an idiosyncratic error. The results are similar when estimated using Probit or Logit specifications (see Appendix Table A1).

We begin by estimating a version of equation (1) that excludes the $Max\ Benefit_{st} \times Layoff_{it}$ interaction. In this specification, which is reported in Column (1) of Table IV, the coefficient on *Max Benefit* measures the average association between UI generosity and mortgage delinquency for all residents of a state. The estimate is negative but not statistically

[9] We use the SIPP panels 1991, 1992, 1993, 1996, 2001, 2004 and 2008. SIPP panels prior to 1991 do not include information on mortgage delinquency.

significant. This average effect, however, obscures an important relationship among the relevant subpopulation. Indeed, we would only expect UI generosity to affect mortgage delinquency for people who have been laid off and are eligible for UI benefits. Laid off workers are also at greater risk of mortgage default; we estimate that delinquency rates are 6.10 percentage points higher among those laid off ($p < 0.01$).

Allowing the coefficient on *Max Benefit* to vary by layoff status, we find that increases in UI benefits significantly reduce delinquencies for people who are out of work. The estimates are reported in Column (2) of Table IV. The $Max\ Benefit_{st} \times Layoff_{it}$ interaction coefficient is −0.23 ($p < 0.01$), suggesting that, for a $1,000 increase in the maximum UI benefit, delinquencies decline by 23 basis points more among laid off workers than among others. This coefficient implies that a one standard deviation increase in *Max Benefit* ($3,200) might decrease the likelihood of delinquency by 74 basis points, a 14% reduction relative to the mean.

Omitted variables are unlikely to explain this result. Equation (1) includes multiple controls for household characteristics and time-varying macroeconomic conditions, but they have little effect on the $Max\ Benefit_{st} \times Layoff_{it}$ interaction coefficient. Furthermore, UI benefit generosity has no discernible association with mortgage delinquency for homeowners who remain employed. The coefficient on the *Max Benefit* main effect is small and statistically insignificant. This lack of an association provides another falsification test, in addition to those explored in Tables II and III. In a final specification, we control even more flexibly for state economic conditions by including a full set of state-by-year fixed effects. The result, reported in Column (3) of Table IV, is very similar: the estimated interaction coefficient is −0.25 ($p < 0.01$). We include the full set of state-by-year fixed effects throughout the remainder of our analysis on delinquency and default.

B. Alternative Measures of Regular UI Generosity

Our estimate of the effect on delinquency is robust to using alternative measures of UI generosity. Table V reports results from models that are identical to the final specification in Table IV but use different measures of UI generosity. These regressions include the full set of household-level controls and state-by-year fixed effects. The various alternative generosity measures help both to establish the robustness of the relationship with UI generosity and to interpret its source and magnitude.

We first explore three different adjustments to the *Max Benefit* measure. First, we convert *Max Benefit* into 2011 dollars using the national Consumer Price Index. Whereas the earlier models control for inflation using year or state-by-year fixed effects, this model also treats a given nominal change in benefits as a larger real increase in earlier years than in later years, which adjusts the identifying variation in UI generosity. The resulting estimate for the interaction coefficient, reported in Column (1), is slightly larger (−0.31) and statistically significant ($p < 0.01$). Second, we examine *Max Benefit* in logs, which roughly speaking treats proportional changes in UI generosity equally. The estimated magnitude of the effect, reported in Column (2), is almost identical to estimate obtained from the analysis in levels: a one standard deviation change in *Ln(Max Benefit)* (0.3 log points) reduces the likelihood of delinquency by 73 basis points ($p < 0.05$). Third, we adjust UI generosity for wage differences across states by normalizing *Max Benefit* by the prior year's average semi-annual wage. We again find a negative coefficient on the interaction between UI generosity and *Layoff*. The magnitude of the interaction coefficient is slightly smaller than before: a one standard deviation increase in this measure of benefit generosity (0.093 points) reduces the likelihood of delinquency by 65 basis points.

Thus far, we have focused on measuring UI generosity at the state level and gauging the average effect of UI generosity on delinquency within the state. However, changes in *Max Benefit* do not affect all households equally, as households experience different changes in their benefit level when the maximum weekly benefit changes. To determine an individual's benefit level upon becoming unemployed, UI programs apply a benefit schedule that is increasing in the individual's prior wages and is capped at the state's maximum weekly benefit.[10] Low-wage workers are commonly due less than the state's maximum weekly benefit and therefore experience no change in benefit generosity when the maximum weekly benefit is raised.

In the next analysis we measure UI generosity at the household level and assess how much $1,000 of available UI for a given household changes their probability of delinquency. To estimate the maximum benefit available to each individual if they were to become unemployed, we use each individual's actual wages in the quarter prior to the year in which we measure delinquency. The next two columns of Table V report these results.

In the final two models reported in Table V, we decompose *Max Benefit* into two components, the maximum weekly benefit (in dollars) and the maximum duration of benefits (in weeks), and examine variation in those components separately. Focusing first on the maximum weekly benefit, we find a strong and statistically significant relationship with delinquency, of similar sign and magnitude to the main findings. In particular, we estimate an interaction coefficient of −6.84, which implies that a one standard deviation change in the maximum weekly benefit ($0.1 thousand) reduces delinquency by 68 basis points. Turning to the maximum duration of benefits, we again find that delinquency declines as benefits become more generous. The interaction coefficient of −0.78 implies that a one standard deviation change in the

[10] For a given individual, the weekly benefit is the lesser of: 1) the product of their actual weekly wages prior to unemployment and the state-specified wage replacement rate (typically, but not always 50%); and 2) the state-specified maximum weekly benefit (*Max Weekly Benefit*).

maximum benefit duration (0.8 weeks) reduces delinquency by 62 basis points. However, this estimate is not statistically significant, which is not surprising given the limited statistical power as there is little variation in benefit duration across states and over time. To examine changes in benefit duration that are based on greater variation, we next analyze the impact of the EB and EUC programs, which explicitly changed benefit duration while holding fixed states' weekly payment terms.

C. Extended UI Benefits

Next, we study the impact of UI benefit extensions on mortgage delinquency during the recent recession. This analysis, which also uses the SIPP data, takes advantage of substantial cross-state variation in the maximum duration of benefits as of mid-2009, when the 2008 panel of the SIPP measures mortgage delinquency. We estimate the following cross-sectional regression:

$$Delinquent_{is} = \alpha + \beta Max\ EB\&EUC_s \times Layoff_i + \delta Layoff_i + \boldsymbol{\zeta}\mathbf{X}_{\boldsymbol{i}} + \lambda_s + \varepsilon_{is}, \qquad (2)$$

where $Max\ EB\&EUC_s$ is the product of the state's maximum weekly benefit and the number of weeks of extended UI authorized (see Section II for more details). As in our analysis of regular UI benefits, we control for layoff status and for household-level characteristics, $\mathbf{X}_i$. We also include state fixed effects, λ_s, to control flexibly for variation in state-level economic conditions, which is crucial in this analysis because the duration of extended benefits is triggered by the level of state unemployment. The coefficient of interest, β, measures the differential effect of an additional $1,000 of maximum extended benefits on delinquency among households that

experience a layoff compared to those that remain employed.

The regression results, which are reported in Table VI, show that laid off homeowners are less likely to be delinquent on their mortgage payments in states where extended benefits are more generous. The estimates, reported in Column (1), suggest that the likelihood of mortgage delinquency declines by 25 basis points for every $1,000 of extended benefits authorized ($p <$ 0.01). This estimate is identical in magnitude to the earlier estimate for regular UI benefits, though slightly smaller if considered in proportion to the mean delinquency rate in the regression sample.

Given the explicit link between extended benefits and state unemployment rates, it is important to control flexibly for unemployment rates in order to get an unbiased measure of the effect of extended benefits. One concern with the estimate obtained from equation (2) is that state employment conditions may affect the probability of delinquency differently for laid off and non-laid off households because, for example, it is more difficult to find a new job amid high unemployment. Thus, the most likely concern is that an omitted variable might bias upward the estimate for β, i.e., closer to zero. To address this concern, we augment equation (2) by interacting the layoff indicator with a function of the state unemployment rate. Following Rothstein (2011) and Farber and Valetta (2013), who examine the effect of extended benefits on unemployment durations, we control for a cubic polynomial in the state unemployment rate, separately by layoff status:

$$\begin{aligned} Delinquent_{is} = \alpha + \beta Max\ EB\ EUC_s \times Layoff_i + \delta Layoff_i + \boldsymbol{\zeta}\mathbf{X}_{\boldsymbol{i}} + \lambda_s \\ + \mu_1 Unemployment_s \times Layoff_i + \mu_2 Unemployment_s^2 \times Layoff_i \\ + \mu_3 Unemployment_s^3 \times Layoff_i + \varepsilon_{is}, \end{aligned} \tag{3}$$

where $Unemployment_s$ is the total unemployment rate in the state. As predicted, the interacted unemployment-layoff controls increase the estimated magnitude of β. As reported in Column (2), laid off households' likelihood of mortgage delinquency declines by 30 basis points for every $1,000 of extended benefits authorized ($p < 0.01$)

Thus far, we have measured differences in benefit generosity under the EB and EUC programs in dollars, by multiplying the number of additional weeks authorized by the states' maximum weekly UI benefit. In a final specification, reported in Column (3), we isolate differences in benefit duration alone by replacing *Max EB&EUC* (measured in dollars) with *Max EB&EUC Duration* (measured in weeks). This model reveals the same relationship: mortgage delinquency is lower where benefits are more generous. Using the same controls as in equation (3), we find that each additional week of extended benefits reduces the laid off households' probability of delinquency by 34 basis points ($p < 0.01$).

D. Heterogeneity by Savings

Extending the main analysis, we explore whether the effects of UI on mortgage delinquency vary with household savings, as one might expect. Given the ability to smooth expenditures by drawing down savings, one might expect households with higher levels of savings to be less sensitive to UI generosity.

We hypothesize that delinquency is more sensitive to UI generosity among households that lack savings, because they can use their savings buffer to fund their mortgage payment and other expenditures during an unemployment spell. Households that lack savings, on the other hand, are likely to be particularly dependent on the cash transfers from UI.

In these tests, we begin by splitting the sample by asset holdings into two groups: households in the bottom quartile, who report savings of $500 or less, and households in the upper three quartiles. The results are reported in Table VII. For both regular and extended benefits, we find that increases in UI generosity reduce delinquency more for households that lack savings.

E. Heterogeneity by Mortgage Leverage

During the recent housing crisis, economists and policymakers debated whether foreclosures were caused by borrowers' inability to pay, e.g. due to job loss or payment increases on adjustable rate loans, or by borrowers' strong financial incentive to default and thereby avoid paying mortgage balances far in excess of the value of their homes. The answer to this question could help guide housing and foreclosure reduction policy. If ability to pay determines mortgage delinquency, then interventions that replace lost income or reduce mortgage payments through loan modifications will be effective. On the other hand, if strategic default is prevalent and homeowners default even when they are able to pay, then income replacement will be ineffective and mortgage principal reduction is necessary to avoid foreclosures.

Our main results imply that policies that make mortgages more affordable, such as by replacing lost income through UI payments, can be effective in reducing mortgage delinquency. An interesting follow-on question is whether UI payments are also effective among households with substantial negative equity and therefore a strong financial incentive to default.

For this analysis, we divide the regression sample by home equity and repeat the main analysis of UI as in the final specification of Table III. We consider three subsamples: positive equity, negative equity, and deep negative equity (i.e., loan-to-value of 120% or more). The

results, which are reported in Table VIII, show that UI payments reduce delinquency in all three categories.

These results are consistent with other evidence on mortgage payment shocks that indicate that delinquency declines substantially when mortgage payments are reduced (Fuster and Willen 2012; Tracy and Wright 2012).

F. Long Term Effects

To interpret the effects of UI generosity on mortgage delinquency, it is important to understand whether UI payments merely postpone delinquency or whether they also prevent foreclosures. To examine this issue, we code two indicator variables: *Eviction* and *Moved*. *Eviction* reflects respondents' answer to the question: "Were you evicted from your home or apartment for not paying the rent or mortgage?" (As before, the sample is restricted to homeowners with mortgage loans.) Although mortgage default can result in foreclosure and eventually eviction, default often forces homeowners from their homes through other procedures, such as short sales or deeds in lieu of foreclosure. To capture these events, we also code *Moved*, an indicator variable for whether the household moved residences during the past twelve months.

As with mortgage delinquency, we examine the impact of UI benefit generosity under both the regular and extended benefits programs. The results, reported in Table IX, suggest that more generous UI reduces both eviction and relocation after a layoff. The coefficient estimates are similar for analysis examining the regular and extended benefits programs, although the regular benefits estimates are more precise, consistent with the larger sample size and ability to exploit within-state variation.

Examining the impact of regular benefits on evictions, reported in Column (1), the

estimated coefficient on the $Max\ Benefit_{st} \times Layoff_{it}$ interaction is −0.024 ($p < 0.10$). This coefficient implies that a $1,000 increase in *Max Benefit* decreases the likelihood of eviction by 2.4 basis points, a 12% reduction relative to the overall sample mean (20 basis points). Analysis exploiting variation in extended benefits, reported in Column (2), obtains a similar, but less precisely estimated, point estimate: a $1,000 increase in EB and EUC payments is associated with a 1.9 basis point decline in the likelihood of eviction after being laid off.

Homeowners who are laid off are also less likely to relocate when UI is more generous. As reported in Column (4), a $1,000 increase in the maximum regular UI benefit is associated with a 10.5 basis point differential decline in the likelihood of moving for laid off homeowners. This effect is small relative to the unconditional probability of moving (8%), but of course many households move for reasons unrelated to financial distress. That UI has a larger effect on moving (10.5 basis points) than on eviction (2.4 basis points) is consistent with UI preventing not only evictions but also other forced moves related to mortgage default, such as following a short sale or providing a deed in lieu of foreclosure. Analysis exploiting variation in extended benefits, which is reported in Column (4) and again estimated less precisely, finds nearly the same effect of UI generosity: the interaction coefficient is −10.2 basis points.

In sum, we find that UI helps not only to postpone delinquency but also to keep laid off homeowners in their homes.

IV. UI benefits and Credit Supply

Having established the effect of UI generosity on delinquency and default, we next examine whether lenders respond by adjusting credit terms in response to UI generosity.

A. Mortgage interest rates

To evaluate the impact of UI generosity on mortgage terms, we examine state-level data on mortgage interest rates published by the Federal Housing Finance Agency (FHFA), which regulates 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 published the average mortgage interest rate at the state level, based on the borrower's location.

We regress the state-level average mortgage interest rate (r_{st}), measured in both logs and in levels, on UI generosity, controls for state-level economic conditions ($\mathbf{Z}_{st}$), state fixed effects (λ_s), and year fixed effects (μ_t):

$$r_{st} = \alpha + \beta Max\ Benefit_{st} + \boldsymbol{\eta}\mathbf{Z}_{st} + \lambda_s + \mu_t + \varepsilon_{st}. \tag{4}$$

The results are reported in the first two columns of Table X. We find that as *Max Benefit* increases, mortgage interest rates decline. For every $1,000 increase in maximum unemployment benefits, the state-wide average interest rate decreases by 3.8 basis points ($p < 0.02$; Column 1) or 0.4 log points ($p < 0.01$; Column 2).

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 the 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.

We conclude that mortgage lenders appear to respond to the reduced risk of default in pricing mortgage loans.

B. UI generosity and HELOC offers

Next, we examine offers for home equity lines of credit (HELOC). We obtained data on HELOC offers from Mintel Comperemedia, a leading market research firm that tracks direct mail and other advertising in the United States. Mintel collects a sample of roughly 1,000 households each month, surveying household demographics in addition to compiling information from all credit offers the household received by mail during the month. The sample period is from 2000 to 2011.

The independent variable of interest remains *Max Benefit*. We include flexible household-level controls for education and income ($\mathbf{X}_{it}$) in addition to state-level economic

conditions ($\mathbf{Z}_{st}$) and state and year fixed effects:[11]

$$HELOC_{ist} = \alpha + \beta Max\ Benefit_{st} + \boldsymbol{\zeta}\mathbf{X}_{it} + \boldsymbol{\eta}\mathbf{Z}_{st} + \lambda_s + \mu_t + \varepsilon_{ist}. \quad (5)$$

For the results, see Table X, Column (3). We find that homeowners are more likely to receive a HELOC offer when they are eligible for more generous UI benefits.

C. UI generosity and credit card terms

The credit market effects of UI go beyond home loans. Our data on credit offers are also from Mintel Comperemedia. To ensure comparability, we limit the sample to credit cards with no annual fee and no rewards.

We study variation in the average interest rate and average credit limit offered to households during the period from 2000 to 2011 using the same specification as in the HELOC analysis but for the different outcome variables. The results are reported in the last four columns of Table X.

Controlling for income, education, and state-level economic conditions, households in states with more generous UI benefits receive offers with lower interest rates and higher credit limits. We find that increasing *Max Benefit* by $1,000 reduces the offered interest rate by 6.1 basis points ($p < 0.01$; Column 4) or 0.4 log points ($p < 0.01$; Column 5), which implies that a one standard deviation increase in *Max Benefit* ($3,600) reduces credit card interest rates by about 20 basis points or 1.3%.

[11] 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.

The estimated effect on credit limits is more substantial. We find that increasing *Max Benefit* by $1,000 increases the offered credit limit by $451 ($p < 0.01$; Column 6) or 3.0 log points ($p < 0.01$; Column 7), which implies that a one standard deviation increase in *Max Benefit* ($3,600) raises the offered credit limit by about $1,450 or 10%.

We also investigate how these effects of UI generosity vary with household income. The results are reported in Panels B and C of Table XI. The effect of *Max Benefit* is largest in the lowest income group, those with income below $35,000. In this group, whose results are reported in Column (1), a $1,000 increase in *Max Benefit* corresponds to an 11.5 basis point decline in the interest rate ($p < 0.01$; Panel B) and a $1,042 increase the credit limit ($p < 0.01$; Panel C). In contrast, the estimated effects of *Max Benefit* are smaller and statistically insignificant for households with higher incomes (Columns 2 and 3).

All in all, the results for the various types of consumer credit suggest that lenders respond to the decrease in default risk by increasing credit supply to low-income households when they are eligible for greater unemployment insurance.

IV. Conclusion

The United States and other developed countries have robust social safety nets that provide households with assistance in the case of job loss, a workplace accident, disability, or health or other problems. The benefits and costs of such programs are typically evaluated in the periods when payments are received. But consumer credit markets can amplify the effects of social insurance for at-risk populations by affecting their credit risk. In this way, social insurance policies affect at-risk borrowers, despite not being targeted at them *per se*.

This paper focuses specifically on unemployment insurance, the largest government

transfer program outside of social security and government-sponsored health care. Exploiting heterogeneity in the generosity of unemployment insurance across US states and over time, we find that mortgage delinquency and default decline as UI becomes more generous. An additional $1,000 in maximum UI benefit reduces the delinquency rate among unemployed homeowners by 25 basis points, the relocation rate by 11 basis points, and the eviction rate by 2.4 basis points. The reduction in foreclosures is somewhere in between these last two estimates.

We find quantitatively similar reductions in mortgage delinquency and default associated with the expansions of unemployment insurance during the recent recession. These findings suggest that the unemployment insurance system in general—and the Extended Benefits and Emergency Unemployment Compensation programs in particular—worked to stabilize the U.S. housing market during the recent foreclosure crisis. Even if not by design, UI stemmed foreclosures in a period when more targeted public policies, such as the Home Affordable Modification Program (HAMP), underperformed their goals. Notably, unemployment insurance reduced delinquency even among homeowners with substantially negative home equity. This finding suggests that policies that improve loan affordability can reduce delinquency and prevent foreclosures, even without reducing principal (Tracy and Wright 2012; Fuster and Willen 2012).

Given these improvements in loan repayment after a layoff, robust unemployment insurance improves credit quality and 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 $900 (4%) in additional credit, and interest rates on credit cards and mortgages decrease by 0.5%. These results show that low income households benefit from the insurance provided by a stronger social safety net even without experiencing a negative shock.

By helping the unemployed avoid mortgage default, unemployment insurance may also

confer positive externalities. Mortgage foreclosure is costly, not just for borrowers but also for society. In addition to the costs for the homeowner and lender, neighboring properties are affected, as their home values decline (Campbell, Giglio, and Pathak 2011) and neighborhood crime rates increase (Ellen, Lacoe, and Sharyg 2013). Examining UI's role in mitigating these and other social costs is an interesting area for future research.

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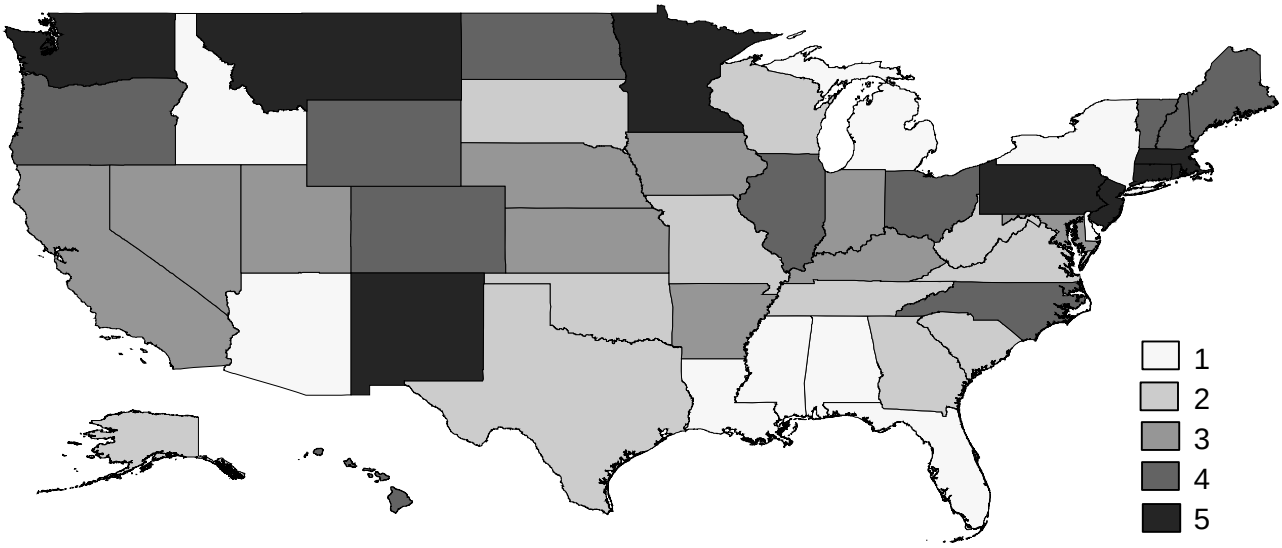

Figure 1. Geographic distribution of regular state unemployment insurance benefit increases between 1992 and 2011, by quintile.

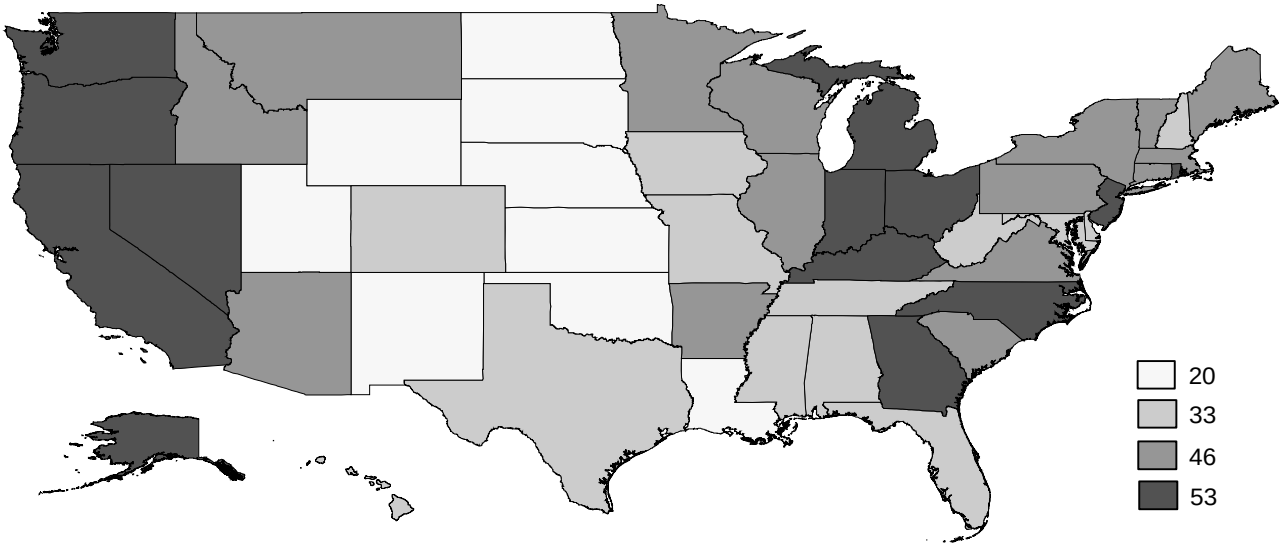

Figure 2. Weeks of extended benefits available to eligible unemployment insurance recipients under the Extended Benefits and Emergency Unemployment Compensation programs, May 2009.

Table I: Summary Statistics

	Mean	Median	Standard Deviation
Panel A: State Characteristics (1991-2011, N = 1,071)			
Unemployment Insurance			
Max benefit ($ thousands)	8.6	8.0	3.2
Max weekly benefit ($ thousands)	0.3	0.3	0.1
Max regular duration (weeks)	26.2	26.0	0.8
Real max benefit (2011 $ thousands)	10.8	10.2	3.3
Log of max benefit	9.0	9.0	0.3
Max benefit/wages (% of semi-annual wages)	38.1	37.5	9.3
Max benefit HH ($ thousands)	6.7	6.9	3.9
UI trust fund reserves (% of covered annual wages)	1.5	1.4	1.2
UI trust fund reserve ratio < 0? (%)	7.3	0	26.0
Max EB&EUC ($ thousands, 2009, N = 51)	17.7	17.4	8.4
Max EB&EUC duration (weeks, 2009, N = 51)	40.0	46.0	12.0
Economic Variables			
Unemployment rate (%)	5.6	5.3	1.9
Real GDP growth (%)	2.6	2.5	2.9
Home price growth (%)	3.3	3.5	6.6
Average annual wages ($ thousands)	47.2	46.1	13.1
Mortgage Variables			
Interest rate (%, N = 1,580)	8.4	7.7	2.6
Panel B: Household Characteristics, SIPP (1991-2011, N = 64,922)			
Mortgage and Housing			
Delinquent prior 12 months? (%)	5.4	0	22.6
Evicted prior 12 months? (%)	0.2	0	3.9
Moved prior 12 months? (%)	8.0	0	27.2
Loan-to-value (%)	59.2	59.8	31.6
Negative Equity (%)	5.4	0	22.6
Employment, Income and Assets			
Layoff within household in prior 12 months? (%)	14.7	0	35.4
Household annual earnings ($ thousands)	52.8	42.6	55.1
Liquid financial assets ($ thousands)	43.8	3.6	945.7
Net worth ($ thousands)	195.8	88.4	997.3
Education (maximum within household)			
No high school diploma (%)	5.5	0	22.7
High school diploma only (%)	20.3	0	40.2
Some college studies (%)	33.0	0	47.0
College degree (%)	22.8	0	42.0
Some graduate studies (%)	18.4	0	38.8

Table I: Summary Statistics (cont.)

	Mean	Median	Standard Deviation
Panel C: Household Characteristics, Mintel (2000-2011, N = 196,050)			
Credit Offers			
HELOC offer? (%)	14.3	0	35.0
Interest rate, credit card (%, N = 143,564)	11.8	10.6	4.0
Credit limit, credit card ($ thousands, N = 96,937)	36.3	30.0	32.2
Income/Assets			
Household annual income ($ thousands)	69.3	55.0	47.6
Education			
No high school diploma (%)	8.1	0	27.3
High school diploma only (%)	33.5	0	47.2
Some college studies (%)	21.6	0	41.1
College degree (%)	23.4	0	42.3
Some graduate studies (%)	13.4	0	34.1
Other			
Age	51.0	52.0	12.5

Table II: Social Insurance Payments and Unemployment Insurance Generosity (1991-2011)

Dependent variable:	Log of UI Payments (1)	Log of UI Payments (2)	Log of UI Payments (3)	Log of UI Payments (4)	Log of non-UI transfer payments (5)	Log of Health Insurance Payments (Medicaid and CHIP) (6)
Max Benefit	0.040*		0.040**			
	(0.021)		(0.016)			
Log of Max Benefit		0.966***		0.878***	-0.038	-0.034
		(0.168)		(0.132)	(0.100)	(0.186)
Unemployment rate			0.055***	0.060***	0.021**	0.005
			(0.014)	(0.011)	(0.009)	(0.014)
Real GDP growth			-0.026***	-0.023***	-0.004**	-0.002
			(0.004)	(0.004)	(0.002)	(0.004)
House price growth			-0.008***	-0.007***	0.000	-0.002
			(0.002)	(0.002)	(0.001)	(0.001)
Average wage			-0.005	0.00	-0.010***	-0.005
			(0.004)	(0.004)	(0.004)	(0.004)
Observations	1,071	1,071	1,071	1,071	1,071	1,071
R^2	0.979	0.982	0.986	0.989	0.995	0.990
State and year FEs?	Y	Y	Y	Y	Y	Y

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Robust standard errors, clustered at the state level, are reported in parentheses.

Table III: Unemployment Insurance Generosity and Economic Conditions (1991-2011)

	Dependent variable: Max Benefit					
	(1)	(2)	(3)	(4)	(5)	(6)
Unemployment rate	-0.057					
	(0.079)					
Real GDP growth		-0.018				
		(0.024)				
House price growth			-0.005			
			(0.008)			
Average wage				0.037		
				(0.082)		
UI Trust Fund Reserve Ratio					0.033	
					(0.188)	
UI Trust Fund Reserve < 0?						-0.506
						(0.480)
Observations	1,071	1,071	1,071	1,071	1,071	1,071
R^2	0.920	0.920	0.920	0.921	0.920	0.921
State and year FEs?	Y	Y	Y	Y	Y	Y

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Robust standard errors, clustered at the state level, are reported in parentheses.

Table IV: Unemployment Insurance Generosity and Mortgage Delinquency (SIPP, 1991-2011)

	Dependent variable: Mortgage Delinquency		
	(1)	(2)	(3)
Max Benefit	-0.11	-0.05	
	(0.12)	(0.13)	
Max Benefit*Layoff		-0.23***	-0.25***
		(0.07)	(0.08)
Layoff	6.10***	8.23***	8.35***
	(0.38)	(0.76)	(0.77)
Observations	64,922	64,922	64,922
R^2	0.05	0.05	0.05
Household-level controls?	Y	Y	Y
State-level controls?	Y	Y	-
State and year FEs?	Y	Y	-
State-year FEs?	N	N	Y

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Robust standard errors, clustered at the state level, are reported in parentheses.

Table V: Alternative Measures of Unemployment Insurance Generosity (SIPP, 1991-2011)

	Dependent variable: Mortgage Delinquency						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Real Max Benefit*Layoff	-0.31***						
	(0.07)						
Ln(Max Benefit)*Layoff		-2.43**					
		(1.03)					
(Max Benefit/Wages)*Layoff			-6.99*				
			(4.13)				
Max Benefit HH*Layoff				-0.48***	-0.45***		
				(0.07)	(0.12)		
Max Weekly Benefit*Layoff						-6.84***	
						(2.41)	
Max Regular Duration*Layoff							-0.78
							(0.53)
Layoff	9.60***	28.08***	8.72***	9.06***		8.47***	26.39*
	(0.95)	(9.24)	(1.66)	(0.66)		(0.88)	(13.74)
Observations	64,922	64,922	64,922	63,227	63,227	64,922	64,922
R^2	0.05	0.05	0.05	0.05	0.06	0.05	0.05
Household-level controls?	Y	Y	Y	Y	Y	Y	Y
State-year FEs?	Y	Y	Y	Y	-	Y	Y
State-year-layoff FEs?	N	N	N	N	Y	N	N

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Robust standard errors, clustered at the state level, are reported in parentheses.

Table VI: Unemployment Insurance Extensions and Mortgage Delinquency (SIPP, 2010)

	Dependent variable: Mortgage Delinquency		
	(1)	(2)	(3)
Max EB&EUC*Layoff	-0.25***	-0.30***	
	(0.08)	(0.09)	
Max EB&EUC Duration*Layoff			-0.34***
			(0.11)
Layoff	11.67***	39.9	32.0
	(2.04)	(30.69)	(26.92)
Observations	12,602	12,602	12,602
R^2	0.07	0.07	0.07
Household-level controls?	Y	Y	Y
State-year FEs?	Y	Y	Y
Layoff X cubic in unemployment rate	N	Y	Y

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Robust standard errors, clustered at the state level, are reported in parentheses.

Table VII: Unemployment Insurance and Mortgage Delinquency, by Household Savings

	Dependent variable: Mortgage Delinquency		
Sample:	Liquid Assets, Bottom Quartile (< $500)	Liquid Assets, Upper 3 Quartiles (≥ $500)	All Households
	(1)	(2)	(3)
Panel A: Regular UI Program			
Max Benefit*Layoff	-0.51*	-0.03	-0.29***
	(0.27)	(0.09)	(0.09)
Max Benefit*Layoff*Liquid Assets			0.19***
			(0.04)
Household-level controls?	Y	Y	Y
State-year FEs?	Y	Y	Y
Observations	15,624	49,298	64,922
R^2	0.07	0.04	0.05
Panel B: EB and EUC Programs			
Max EB&EUC*Layoff	-0.64**	-0.11*	-0.35***
	(0.30)	(0.06)	(0.09)
Max EB&EUC*Layoff*Liquid Assets			0.16***
			(0.03)
Household-level controls?	Y	Y	Y
State-year FEs?	Y	Y	Y
Layoff X cubic in unemployment rate	Y	Y	Y
Observations	3,384	9,218	12,602
R^2	0.08	0.06	0.07

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Robust standard errors, clustered at the state level, are reported in parentheses.

Table VIII: Unemployment Insurance and Mortgage Delinquency, by Home Equity

	Dependent variable: Mortgage Delinquency		
Sample:	Positive Home Equity	Negative Home Equity	Deep Negative Home Equity (LTV > 120%)
	(1)	(2)	(3)
Panel A: Regular UI Program			
Max Benefit*Layoff	-0.22***	-0.88**	-1.27**
	(0.08)	(0.38)	(0.60)
Layoff	8.13***	21.52***	27.65***
	(0.79)	(3.910)	(6.31)
Observations	61,407	3,515	2,102
R^2	0.04	0.11	0.15
Household-level controls?	Y	Y	Y
State-year FEs?	Y	Y	Y
Panel B: EB&EUC Programs			
Max EB&EUC*Layoff	-0.23**	-0.80***	-0.98***
	(0.10)	(0.23)	(0.30)
Layoff	63.9	-63.3	-115.31
	(39.0)	(196.3)	(319.9)
Observations	10,963	1,639	987
R^2	0.05	0.09	0.13
Household-level controls?	Y	Y	Y
State-year FEs?	Y	Y	Y
Layoff X cubic in unemployment rate	Y	Y	Y

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Robust standard errors, clustered at the state level, are reported in parentheses.

Table IX: Unemployment Insurance, Eviction and Moving

Dependent variable:	Eviction		Moved Homes	
	(1)	(2)	(3)	(4)
Max Benefit*Layoff	-0.024*		-0.105*	
	(0.013)		(0.059)	
Max EB&EUC*Layoff		-0.019		-0.102
		(0.016)		(0.067)
Layoff	0.398**	7.315	2.323***	22.422
	(0.154)	(5.356)	(0.662)	(53.887)
Observations	64,888	12,600	68,654	13,325
R^2	0.01	0.01	0.02	0.02
Household-level controls?	Y	Y	Y	Y
State-year FEs?	Y	Y	Y	Y
Layoff X cubic in unemployment rate	N	Y	N	Y

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Robust standard errors, clustered at the state level, are reported in parentheses.

Table X: Unemployment Insurance and Loan Terms

Loan type:	Mortgages			Credit Card Offers			
Dependent variable:	Interest Rate	Log Interest Rate	HELOC Offer?	Interest Rate	Log Interest Rate	Credit Limit	Log Credit Limit
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Max Benefit	-0.038**	-0.004***	0.008***	-0.061***	-0.004***	451***	0.030***
	(0.02)	(0.001)	(0.002)	(0.016)	(0.001)	(111)	(0.005)
Observations	1,580	1,580	196,050	143,564	143,357	96,937	96,936
R^2	0.99	0.99	0.10	0.19	0.23	0.16	0.15
State and Year FEs?	Y	Y	Y	Y	Y	Y	Y
State-year Controls?	Y	Y	Y	Y	Y	Y	Y
Borrower Characteristics?	N	N	Y	Y	Y	Y	Y

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Columns 1 and 2 report results from regression analyzing state average interest rates between 1980 and 2010 from the Monthly Interest Rate Survey. Columns 3 through 7 report results from regressions analyzing HELOC and credit card offers between 2000 and 2011 from Mintel. Robust standard errors, clustered at the state level, are reported in parentheses.

Table XI: Unemployment Insurance and Loan Terms, by Income Range (Mintel, 2000-2011)

Sample:	Income < $35,000 (1)	Income $35,000–$70,000 (2)	Income > $70,000 (3)
Panel A: Mortgage HELOC Offer?			
Dependent variable mean	0.091	0.142	0.177
Max Benefit	0.007*	0.008**	0.010**
	(0.003)	(0.003)	(0.004)
Observations	49,790	61,272	84,945
R^2	0.06	0.09	0.12
Panel B: Credit Card Interest Rate			
Dependent variable mean	12.327	11.858	11.418
Max Benefit	-0.115***	-0.021	-0.055
	(0.032)	(0.027)	(0.031)
Observations	41,192	45,228	57,144
R^2	0.18	0.18	0.20
Panel C: Credit Card Limit			
Dependent variable mean	32,919	35,987	39,567
Max Benefit	1,042***	15	287
	(218)	(305)	(188)
Observations	26,761	30,929	39,247
R^2	0.15	0.17	0.14
State and Year FEs?	Y	Y	Y
State-year Controls?	Y	Y	Y
Borrower Characteristics?	Y	Y	Y

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Robust standard errors, clustered at the state level, are reported in parentheses.

Table A-I: Unemployment Insurance and Mortgage Delinquency, Robustness

Dependent variable:	Mortgage Delinquency	Mortgage Delinquency	Mortgage Delinquency	Mortgage Delinquency	Mortgage Delinquency
Sample:	All	All	All	Pre-2008	Post-2008
Estimation method:	OLS	Probit	Logit	OLS	OLS
Max Benefit*Layoff	-0.25***	-0.01***	-0.03***	-0.33***	-0.43**
	(0.08)	(0.01)	(0.01)	(0.12)	(0.16)
Layoff	8.35***	0.56***	1.12***	8.72***	11.73***
	(0.77)	(0.05)	(0.11)	(1.02)	(2.33)
Loan-to-value	5.13***				
	(0.30)				
Negative Equity	1.64***				
	(0.56)				
Negative Equity*Layoff	7.74***				
	(1.52)				
Earnings	-0.03***				
	(0.002)				
Net worth ($ 100,000s)	-0.02**				
	(0.008)				
High school diploma only	-1.41*				
	(0.83)				
Some college	-1.30				
	(0.79)				
College degree	-4.60***				
	(0.88)				
Some graduate studies	-5.19***				
	(0.82)				
Observations	64,922	64,070	64,070	52,320	12,602
R^2	0.05			0.04	0.07
Household-level controls?	-	Y	Y	Y	Y
State-year FEs?	Y	Y	Y	Y	Y

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes: Robust standard errors, clustered at the state level, are reported in parentheses.