

Indirect Interventions for Stabilizing Housing Markets*

Reproduction of Unemployment Insurance as a Housing Market Stabilizer (Hsu, Matsa, and Melzer 2018)

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Abstract

Preventing home foreclosures due to their associated costs is a key concern for policymakers during periods of economic instability. (Hsu, Matsa, and Melzer 2018) investigate the impact of unemployment insurance (UI) to stabilize the housing market in the United States, evaluating that UI expansions during the Great Recession aided in preventing foreclosures and stabilized home values. This paper replicates the analysis of their study and investigates alternative factors that impacted foreclosure rates and home valuation. **Keywords:** housing market stability, personal finance, great recession, unemployment insurance, foreclosures, economic policy, united states

1 Introduction

During periods of severe economic and housing market instability such as the time of the Great Recession, policymakers are concerned with the potential of a significant increase in the number of mortgage defaults, wherein a mortgage agreement is broken most often caused by the mortgagor (borrower in a mortgage agreement) failing to make payments. Mortgage defaults directly lead to the process of foreclosures which create additional cost for lenders who attempt to recoup the cost of the property. However, it is not always clear what type of intervention is most appropriate and/or feasible to relieve this issue provided the likelihood of high strain on the economy during such times. In the paper *Unemployment Insurance as a Housing Market Stabilizer* (Hsu, Matsa, and Melzer 2018), it is discussed that there exists a debate on the reasoning for mortgage defaults rendering it difficult to effectively design an intervening policy. Some mortgagors may choose to purposefully default on their mortgages, in the cases where the value of the debt significantly outweighs the price of the property. Their paper focuses on the expansions of unemployment insurance and benefits during the Great Recession, and hypothesises that it resulted in a significant reduction of the number of foreclosures during that time, as well as dampening changes in housing prices as a result of labor market instability. In this paper, we will be replicating the analysis originally presented by (Hsu, Matsa, and Melzer 2018) as well as expanding on their analysis of housing price changes.

2 Data

We would like to investigate the relationship between changes in unemployment benefit generosity and the number of home foreclosures within the United States. The original analysis performed by (Hsu, Matsa, and Melzer 2018) is done in Stata. For the purposes of aiding reproducibility, we will be reproducing their scripts using R (R Core Team 2020), `dplyr` (Wickham et al. 2021) and converting data filetypes with `haven`

*Code and data are available at: <https://github.com/chan-roy/HousingMarkets>

(Wickham and Miller 2021). Data is retrieved for presenting within this report using [here](#) (Müller 2020). Plots are created using `ggplot2` (Wickham 2016). Tables are generated using `kableExtra` (Zhu 2021).

As a reproduction, we will be utilising the same data as the original paper, as made available and obtained from openICPSR (CITATION). There are five separate datasets used within the paper:

- Attributes relating to unemployment benefits for each state for the years of 1991-2010, obtained from the Bureau of Labor Statistics, Bureau of Economic Analysis, Department of Labor, and Hirsch and Macpherson (2003).
- Factors of mortgage borrowers relating to potential of delinquency from the Survey of Income and Program Participation (SIPP) years 1991, 1992, 1993, 1996, 2000, 2004, 2008 and supplemented by the corresponding unemployment insurance program characteristics obtained from the Department of Labor.
- Household data of mortgage borrowers from the NLSY79 survey years 2010 and 2012 for foreclosure related variables.
- Characteristics of mortgages and housing relating to foreclosure risk by state from NLSY79 2010 and 2012.
- Home price growth, unemployment rates, and unemployment insurance data of each state from 2008 to 2013, obtained from Zillow, Bureau of Labor Statistics, and Department of Labor respectively.

The following table, Table 1 is a reproduction of Table 1 from the original paper, showing summary statistics of the variables of interest for our analysis.

Table 1: Summary Statistics

| | Mean | Median | SD |
|--|-----------|-----------|-----------|
| State characteristics (1991-2010, N = 1020) | | | |
| Unemployment insurance | | | |
| Max Benefit (\$ thousands) | 8.45 | 7.88 | 3.08 |
| Max Weekly Benefit (\$ thousands) | 0.32 | 0.30 | 0.11 |
| Max Regular Duration (weeks) | 26.14 | 26.00 | 0.75 |
| Real Max Benefit (2011 \$ thousands) | 10.71 | 10.18 | 3.24 |
| log of Max Benefit | 8.99 | 8.97 | 0.33 |
| Max Benefit / wages (% of semi-annual wages) | 46.14 | 45.67 | 11.07 |
| UI trust fund reserves (% of semi-annual wages) | 1.60 | 1.45 | 1.18 |
| UI trust fund reserve ratio < 0 (%) | 4.80 | 0.00 | 21.40 |
| Max EB EUC (\$ thousands, 2009, N = 51) | 17.72 | 17.39 | 8.37 |
| Max EB EUC Duration (weeks, 2009, N = 51) | 40.02 | 46.00 | 11.95 |
| Economic variables | | | |
| Unemployment rate (%) | 5.47 | 5.20 | 1.82 |
| log of real GDP per capita | 10.46 | 10.47 | 0.31 |
| Average annual wages (\$ thousands) | 38.31 | 36.85 | 10.74 |
| Union coverage (%) | 14.13 | 13.55 | 5.85 |
| SIPP household characteristics and delinquency data (1991-2010, N = 52,713) | | | |
| Mortgage and housing | | | |
| Delinquent prior 12 months (%) | 5.40 | 0.00 | 22.61 |
| Evicted prior 12 months (%) | 0.15 | 0.00 | 3.89 |
| Loan-to-value (%) | 0.59 | 0.60 | 0.32 |
| Negative equity indicator (%) | 0.05 | 0.00 | 0.23 |
| Mortgage payment (\$ per month, N =) | 900.87 | 766.50 | 595.07 |
| Mortgage payment per week / max weekly benefit (%) | 0.61 | 0.51 | 0.39 |
| Employment, income, and assets | | | |
| Max Benefit per household (\$ thousands) | 6.50 | 6.70 | 4.02 |
| Layoff within household in prior 12 months (%) | 0.15 | 0.00 | 0.36 |
| Annual earnings (\$ thousands) | 52.66 | 42.25 | 55.39 |
| Liquid financial assets (\$ thousands) | 0.43 | 0.04 | 8.98 |
| Net worth (\$ millions) | 0.19 | 0.09 | 0.95 |
| Education (highest within household) | | | |
| No high school diploma (%) | 0.06 | 0.00 | 0.23 |
| High school diploma only (%) | 0.21 | 0.00 | 0.41 |
| Some college studies (%) | 0.33 | 0.00 | 0.47 |
| College degree (%) | 0.23 | 0.00 | 0.42 |
| Some graduate studies (%) | 0.18 | 0.00 | 0.39 |
| Foreclosure initiation (%) | 4.08 | 0.00 | 19.79 |
| NLSY household characteristics and foreclosure analysis (2010 and 2012, N = 7689) | | | |
| Mortgage and housing | | | |
| Foreclosure completion (%) | 1.93 | 0.00 | 13.77 |
| Loan-to-value, main property (% , N =) | 0.44 | 0.44 | 0.37 |
| Loan-to-value, other properties (% , N =) | 0.04 | 0.00 | 0.16 |
| Negative equity indicator, main property (% , N =) | 0.03 | 0.00 | 0.17 |
| Negative equity indicator, other properties (% , N =) | 0.00 | 0.00 | 0.05 |
| Employment, income, and assets | | | |
| Layoff in prior 24 months (%) | 0.11 | 0.00 | 0.31 |
| Annual earnings (\$ thousands) | 81512.43 | 66000.00 | 72523.39 |
| Net worth (\$ thousands) | 300998.91 | 141000.00 | 534014.04 |

3 Model

As we are primarily interested in how changes in unemployment benefits affect the number of mortgage defaults, we would like to use a model that encompasses the relationship between these two factors. We will be using and replicating the results of model 2 in the original paper, which models the relationship between mortgage delinquency and unemployment benefits. There exists a significant amount of variability between each state’s unemployment benefits (Hsu, Matsa, and Melzer 2018) and we want to account for economic differences between households, so control variables are included. The model uses the data from SIPP.

$$Delinquent_{is} = \alpha + \beta MaxEBEUC_s \times Layoff_i + \delta Layoff_i + \zeta X_i + \lambda_s + \epsilon_{is}$$

MaxEBEUC is the product of the maximum weekly unemployment benefits, unemployment insurance and emergency unemployment compensation, and the maximum number of weeks for which the benefits can be paid, *Layoff_i* is the indicator of whether a layoff occurred within the household in prior 12 months, and $\zeta X_i, \lambda_s$ represent the control household and state variables respectively.

4 Results

Firstly, we will replicate Figure 3 of the original paper, plotting mortgage delinquency against maximum unemployment benefits, to quickly visualise and validate that there is a relationship between them.

As we can see from the plot, there exists a negative correlation between unemployment benefits and mortgage delinquency, as increases in benefits reflect a decrease in delinquency. Next, we perform our linear regression using the aforementioned model, for which we show the results in Table @ref{tab:modelTable}

Table 2: Summary of Linear Regression Results

| | Mortgage delinquency | | |
|------------------------------|----------------------|--------------|--------------|
| | 1 | 2 | 3 |
| Max EB EUC * Layoff | -0.246 (0.07) | -0.30 (0.07) | |
| Max EB EUC Duration * Layoff | | | -0.33 (0.08) |
| Layoff | 10.2 | 10.1 | 9.95 |
| Observations | 12,606 | 12,606 | 12,606 |
| R^2 | 0.03 | 0.03 | 0.03 |

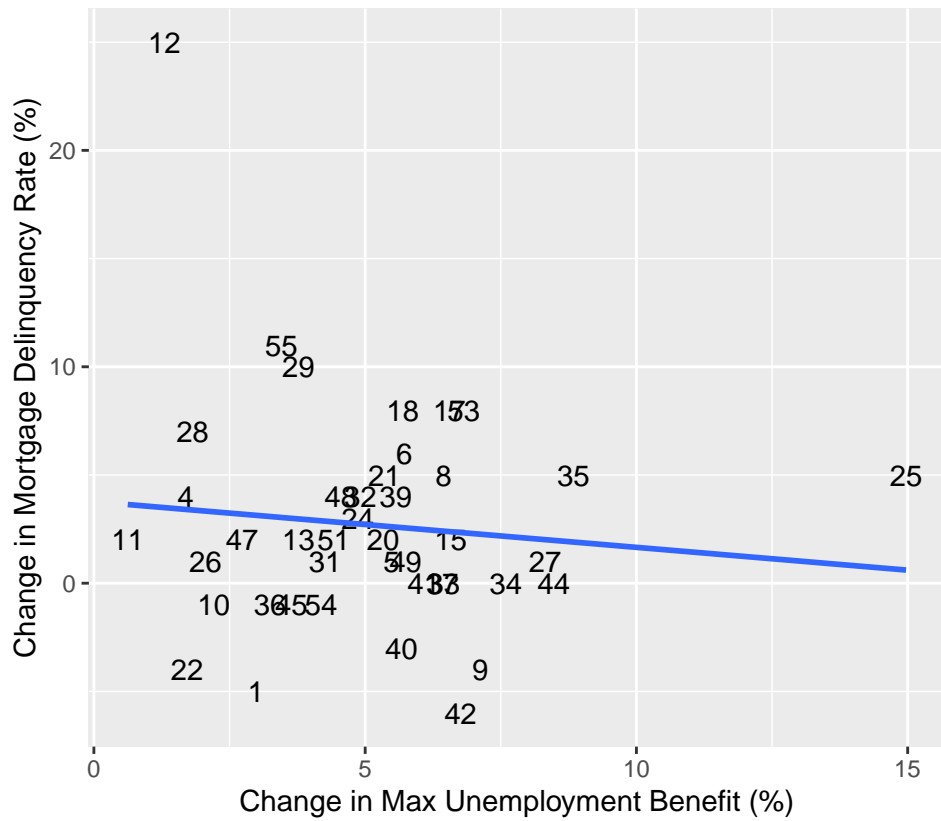
^a Standard error in brackets

5 Discussion

5.1 Weaknesses

- unfamiliarity with Stata, code conversion may not have fully replicated original processes
- variable of house price growth was not made available, which required us to exclude it from our models
- weights were not applied for SIPP and NLSY analysis due to complications with applying different weights by year, summary statistics figures and model estimates differ
- however, we still were able to achieve a consistent result with the original paper despite weights not being applied

Negative correlation between mortgage delinquency and max unemployment benefits



* Numbers correspond to U.S. FIPS codes for states

Figure 1: Correlation between change in mortgage delinquency and max benefit by state, for SIPP years 1991 and 2010

Appendix

A Enhancement

A.1 Datasheet for Dataset

References

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