Unemployment Insurance and Macro-Financial (In)Stability

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  - Weakens bank balance sheets: Banks hold more and riskier mortgages. Literature

This paper presents evidence for the (de)stabilizing effects of UI

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2. **County and state level evidence** on house prices and mortgages

Main Findings

1. Quantitative GE model evidence:

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  - Cross-sectional studies potentially understate destabilizing effects of UI.

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  - Event study after an unexpected cut in UI in Missouri

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- Higher UI $\rightarrow$ higher loan-to-income (LTI) ratios
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- House prices and mortgage loans respond more to aggregate shocks
  - Cross-sectional (border-county) evidence

Quantitative Model

Environment: Households-I

- OLG of finitely-lived households
- Subject to idiosyncratic income and unemployment risk.
- Unemployed receive UI benefits.
- HHs receive utility from consumption and housing services.
- HHs can either rent or own a house of desired size; can save in liquid assets.

Environment: Households-II

- House purchase can be done through a defaultable fixed-rate mortgage
- Terms of mortgage contracts (down payment and mortgage interest rate) are endogenous
- Homeowners can resize their house and/or refinance their mortgage

HH's Problem

Final Good Producers and Banks

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  - combine labour and capital to produce final good
  - finance a fraction of their wage bill in advance from banks

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    - credit supply $\propto$ bank net worth
  - credit supply = credit demand from firms & households $\rightarrow$ eq'm bank lending rate

Quantitative Results

Quantitative Exercise

- Calibrate the model economy to match US moments, most importantly
  - E-U-E transition rates, income risk, unemployment insurance
  - Household and bank balance sheets
  - Aggregate quantities and prices

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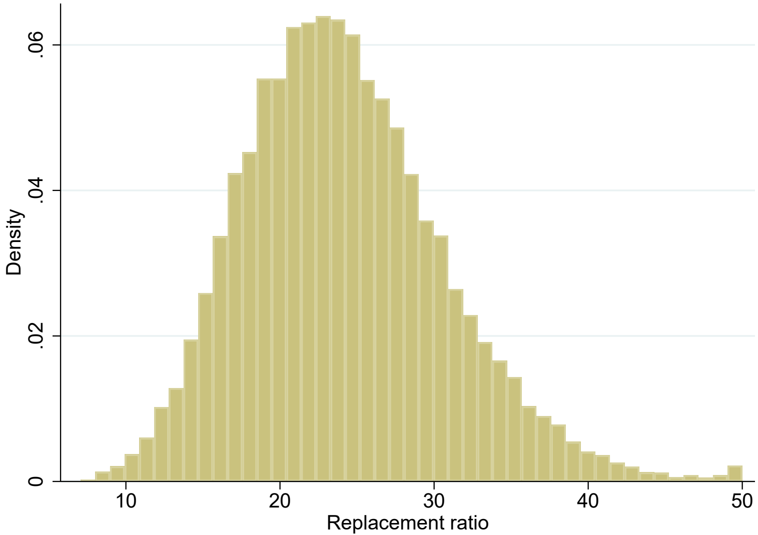
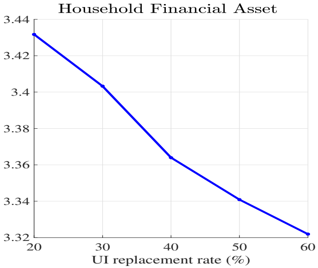
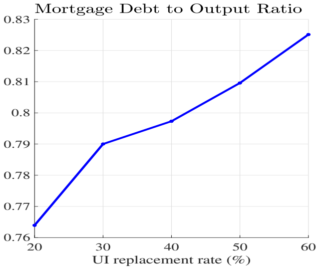
- Study
  1. Steady state effects of higher UI on household and bank balance sheets
  2. Destabilizing effects of UI: a boom-bust experiment.

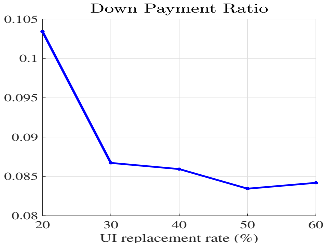
Large variation in UI replacement rates ($\frac{\text{maximum UI benefit}}{\text{county median income}}$) in US counties

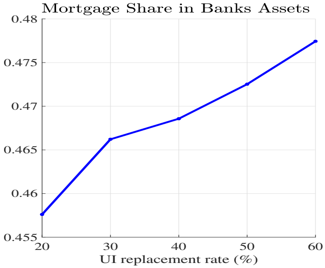


Steady-State Comparisons

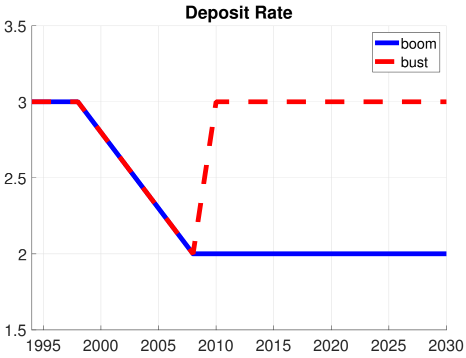


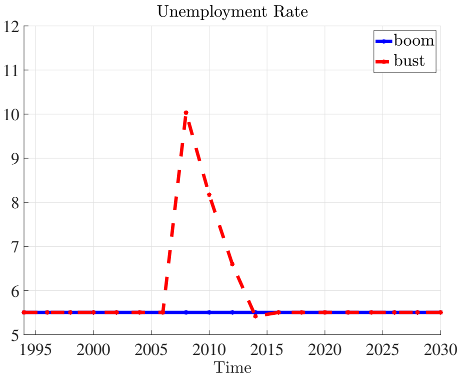






Boom-Bust Experiment: (De)Stabilizing Effects of Unemployment Insurance

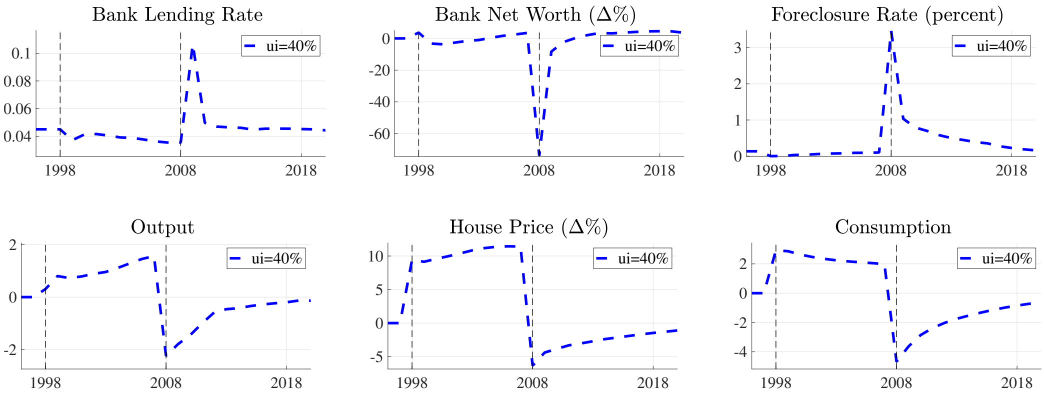




A Remark:

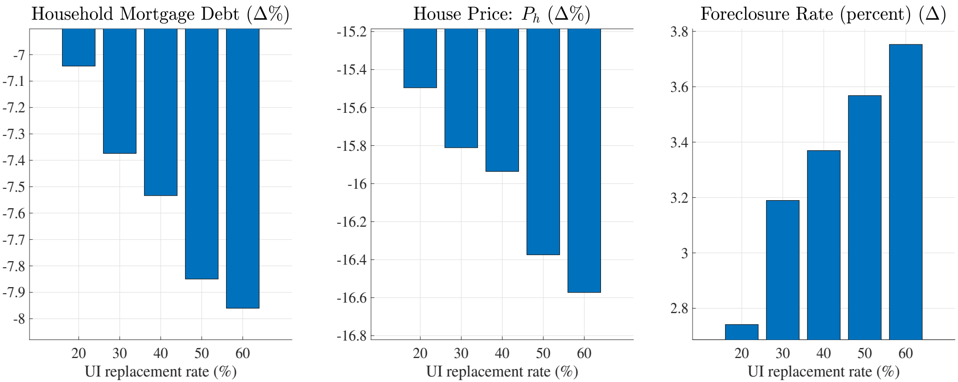
Results generalize to productivity, house price expectations, & bank leverage shocks.

Boom-Bust Dynamics (UI=40%)



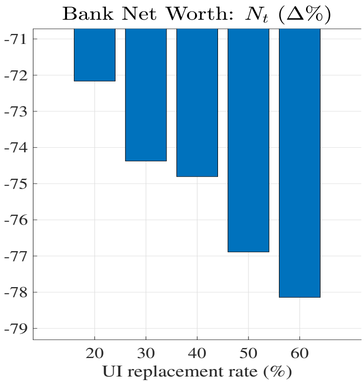
Housing Market

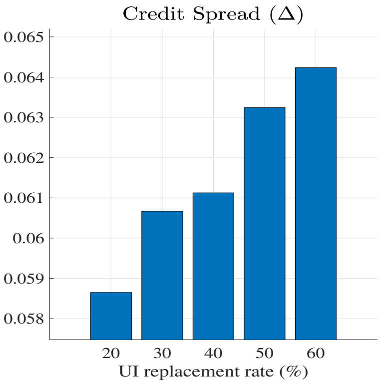
Higher UI amplifies the **bust** in the housing market



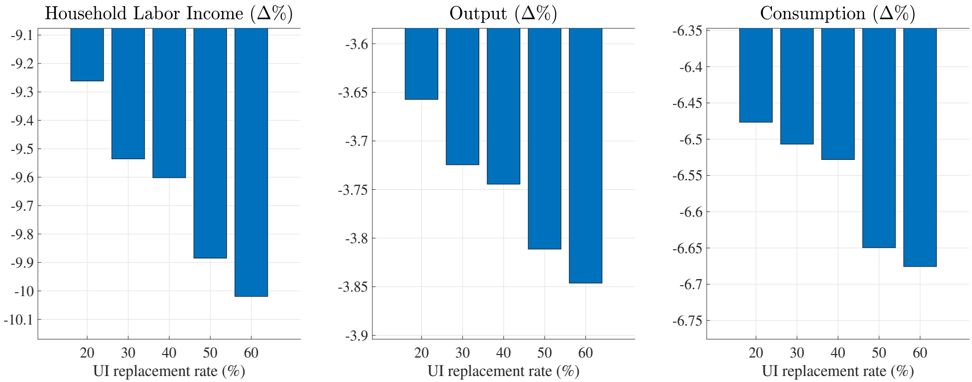
Banking Sector

Higher UI amplifies the **bust** in the banking sector



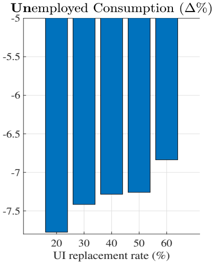


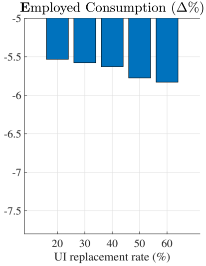
Higher UI amplifies the **bust** in income, output, and consumption.



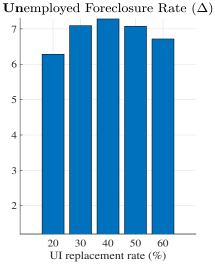
UI helps unemployed but hurts employed

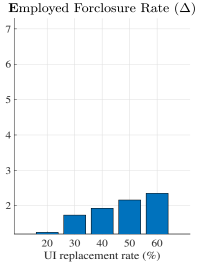
Consumption





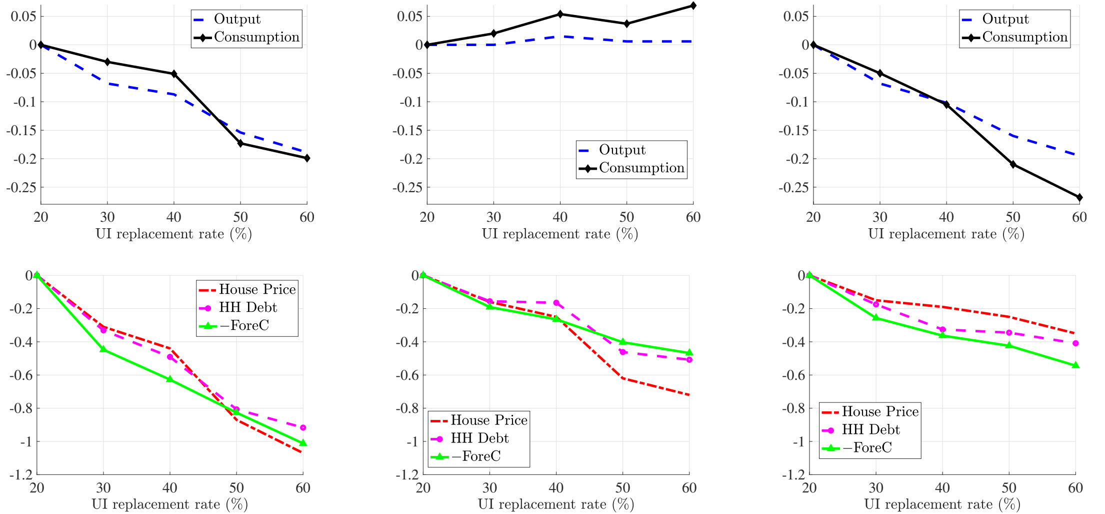
Foreclosure Rate





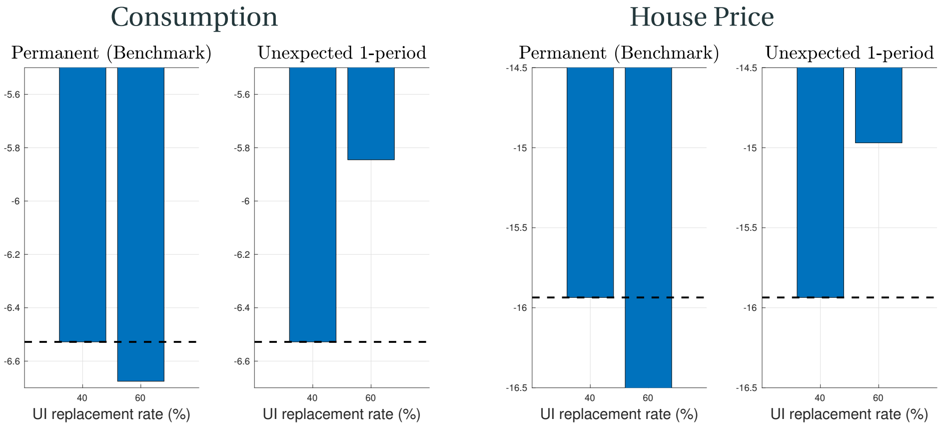
GE Matters: Bank balance sheet channel **amplifies** the destabilizing effect of UI

Benchmark	=	No BBS Effect	+	BBS Effect



Unexpected temporary UI expansion stabilizes

- Increase discretionary UI benefits in the benchmark model (UI=40%) to 60% during the bust



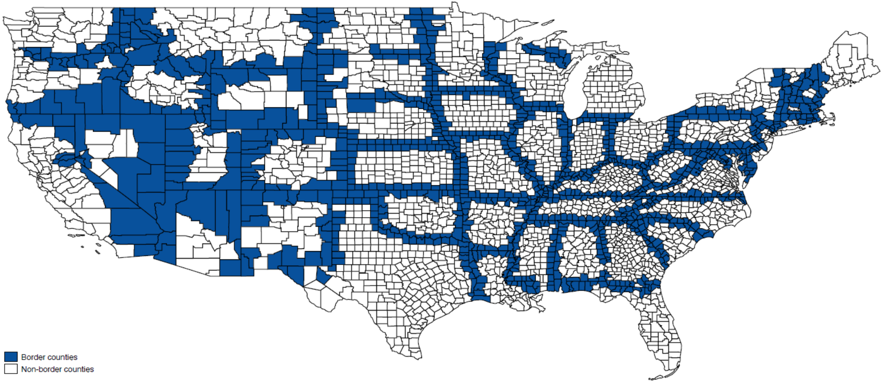
Evidence from US States and Border Counties

Evidence for two key implications of the quantitative model

1. Mortgage debt/leverage is higher in regions with higher UI.

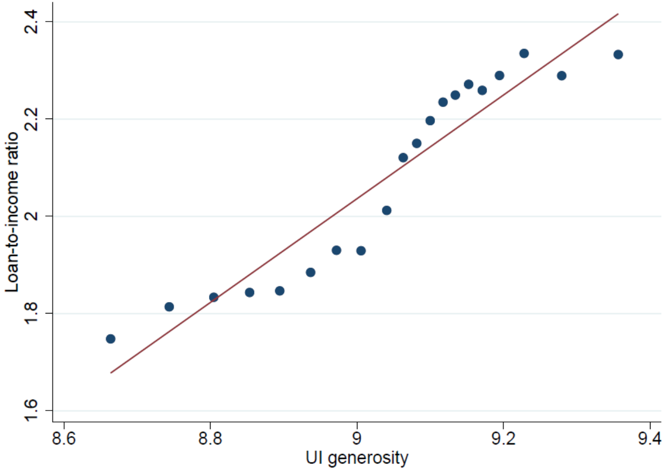
2. Regions with higher UI experience larger fluctuations in aggregates.

Empirical Methodology: Border Discontinuity Design



We use counties that have borders to each other but are in different states.

Strong positive correlation between UI Generosity and Loan-to-Income ratio



Using Panel data at the county level:

$$LTI_{bcy} = \beta * UIbenefits + \gamma * Controls + YearFE + CountyFE + BankFE + \varepsilon_{bcy}$$

Dependent Variable: Loan-to-income ratio								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
UI Benefits	0.462***	0.261***	0.148***	0.216***	0.220***	0.213***	0.042***	0.056***
	(0.032)	(0.041)	(0.040)	(0.077)	(0.076)	(0.074)	(0.015)	(0.017)
Controls	N	Y	Y	Y	Y	Y	N	Y
Year FE	N	N	Y	Y	Y	Y	N	N
County FE	N	N	N	Y	Y	Y	N	N
Bank FE	N	N	N	N	Y	N	N	N
Bank*Time FE	N	N	N	N	N	Y	N	Y
Pair*Time FE	N	N	N	N	N	N	Y	Y
Obs.	2,950,010	2,021,977	2,021,977	2,021,977	2,021,365	2,008,819	2,220,346	1,510,563
R^2	0.075	0.082	0.100	0.183	0.305	0.370	0.204	0.415

2. UI amplifies the effect of interest rates on newly issued mortgages

	All		Pair(matching)	Pair(border)
	(1)	(2)	(3)	(4)
$\Delta Int.Rate^{10y}_{q-1}$ X UI Ben.	-0.039***	-0.036***	-0.016*	-0.017*
	(0.009)	(0.011)	(0.009)	(0.009)
$\Delta Int.Rate^{10y}_{q-1}$	-0.337***			
	(0.113)			
County Controls	Y	Y	Y	Y
State Controls	Y	Y	Y	Y
Macro Controls	Y	Y	Y	N
County FE	Y	Y	Y	Y
Month FE	Y	N	N	N
Time FE	N	Y	N	N
Pair(matching)*Time FE	N	N	Y	N
Pair(border)*Time FE	N	N	N	Y
Obs.	93,873	93,873	29,214	34,932
R^2	0.490	0.774	0.892	0.933

Standard errors in parentheses

* p<0.10,** p<0.05, *** p<0.01 Volatility Regression

2. UI amplifies the effect of interest rates on house prices

	All		Pair(matching)	Pair(border)
	(1)	(2)	(3)	(4)
$Int.Rate^{10y}_{q-1}$ X UI Ben.	-0.002***	-0.002***	-0.002**	-0.001*
	(0.000)	(0.000)	(0.001)	(0.001)
$Int.Rate^{10y}_{q-1}$	-0.017***			
	(0.005)			
County Controls	Y	Y	Y	Y
State Controls	Y	Y	Y	Y
Macro Controls	Y	Y	N	N
County FE	Y	Y	Y	Y
Seasonality FE	Y	N	N	N
Time FE	N	Y	N	N
Pair(matching)*Time FE	N	N	Y	N
Pair(border)*Time FE	N	N	N	Y
Obs.	280,903	280,903	175,826	124,384
R^2	0.180	0.297	0.705	0.722

Standard errors in parentheses

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

Conclusions

- We provided evidence from
  - a quantitative GE model &
  - micro data from US and mortgage markets that

  UI destabilizes aggregate fluctuations and raise financial instability risks.
- The arguments can be extended to other policies that lowers income risk, e.g.
  - other social insurance policies and progressive income taxation.

Thanks!

Motivation: unemployment and homeownership

In PSID, on average over the years,

- 34% of unemployed head of households were homeowners when they were unemployed.
- 38% if either head or spouse were unemployed.
- 51% homeownership rate among head of households who experienced some unemployment.
  - 58% homeownership rate among households where head or spouse experienced some unemployment.

Literature on Stabilizing Effects of Unemployment Insurance

Unemployment insurance as an automatic stabilizer:

- McKay and Reis (2016, 2020), Di Maggio and Kermani (2017)

Stabilizing effects of discretionary unemployment insurance extensions:

- Nakajima (2012), Hagedorn, Karahan, Manovskii, and Mitman (2013), Kekre (2019), Coglianese (2015), Hsu, Matsa, and Melzer (2018), Chodorow-Reich, Coglianese, and Karabarbounis (2018)

Countercyclical unemployment insurance:

- Kroft and Notowidigdo (2016), Landais, Michaillat and Saez (2018), Nakajima (2019)

Contribution relative to

- Quantitative papers: we study new channels
- Micro evidence: we provide new facts on mortgages and house prices introduction

Missouri Experiment

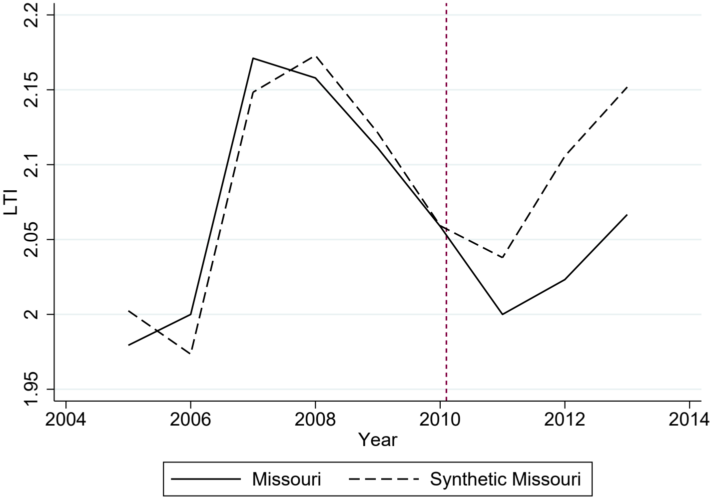
- Unexpected cut in UI generosity in Missouri in April 13, 2011.
- UI duration in Missouri decreased from 73 weeks to 57 weeks.

	Weights
Connecticut	0.021
Illinois	0.113
Indiana	0.294
Minnesota	0.041
Nebraska	0.024
Ohio	0.004
Tennessee	0.402
West Virginia	0.101

	Missouri	Synthetic Missouri
LTI	2.08	2.08
Ave. Wages	39570.50	39571.20
$\Delta log(Wages)$	2.70	2.70
HP	253.74	255.39
Unemp. Rate	6.72	6.73
Pop.	5900265.67	6370584.61
$\Delta log(GDPpc)$	0.53	0.53
log(GDP pc)	10.66	10.66

Missouri Experiment

LTI-UI Relation



Renter's problem given individual state $\widehat{\theta} = (\underbrace{i}_{\text{inv. type}}, \underbrace{j}_{\text{age}}, \underbrace{a}_{\text{liq. asset}}, \underbrace{y}_{\text{income}})$

Renter can either continue to rent or buy a house:

$$V^r\left(\widehat{\theta}\right) = max\left\{\underbrace{V^{rr}\left(\widehat{\theta}\right)}_{rent}, \underbrace{V^{rh}\left(\widehat{\theta}\right)}_{buy}\right\}$$

The value of becoming a homebuyer is given by

$$V^{rh}(\widehat{\theta}) = \max_{c,h,d,a' \geq 0}\left\{u(c,h) + \beta_i EV^h(\theta')\right\}$$

subject to

$$c + p_h h + a' = y(j,z;w) + R_i a + d(q^m\underbrace{(\widehat{\theta};h,d)}_{\theta} - \varphi_m) - \varphi_f I(d > 0)$$

$$d \leq (1 - \underbrace{\iota}_{=0})p_h h$$

Homeowner's Problem

Homeowner can stay, sell, resize, refinance or default:

$$V^{h}(\theta) = max\left\{\underbrace{V^{hh}}_{stay}, \underbrace{V^{hr}}_{sell}, \underbrace{V^{hu}}_{resize}, \underbrace{V^{hf}}_{refi}, \underbrace{V^{d}}_{default}\right\}$$

where V^{rh} is the homebuyer's value, given by:

$$V^{hd}(\theta) = \max_{c,s,a'\geq 0}\left\{u(c,s) + \beta E\left[\pi V^{r}(\theta') + (1-\pi) V^{d}(\theta')\right]\right\}$$

s.to

$$c + \frac{d'}{1+r_i} + p_r s = a + w(1-\tau) y(j,z) + \max\left\{(1-\varphi_e) p_h h - d, 0\right\},$$

In case of selling the house:

- $\pi = 1$ and the higlighted part is replaced by $p_h h - d$

External Parameters

Preferences:

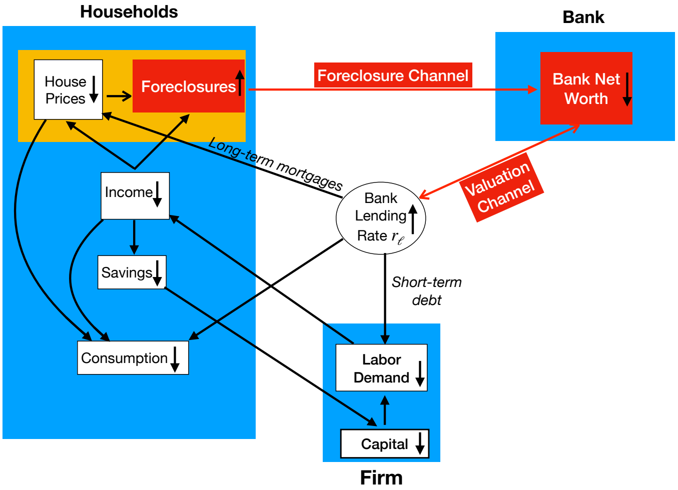
$$u(c,s) = \frac{\left(c^{1-\gamma} s^{\gamma}\right)^{1-\sigma}}{1-\sigma}$$

Parameter	Explanation	Value
σ	risk aversion	2
α	capital share	0.3
ρ_ε	persistence of income	0.955
σ_ε	std of innovation to AR(1)	0.198
φ_h	selling cost for a household	7%
φ_e	selling cost for foreclosures	25%
ζ	fixed cost of mortgage origination	2%
δ_h	housing depreciation rate	2.5%
τ	variable cost of mortgage origination	0.75%
η	rental adjustment cost	1

Internally Calibrated Parameters

Parameter		Value
β_K	discount factor–capitalist	1.06
β_D	discount factor–depositor	0.76
$\underline{h}$	minimum house size	0.53
r	deposit rate	0.03
γ	weight of housing services in utility	0.23
$\bar{H}$	housing supply	1.0
ϕ_k	share of wage bill financed from banks	1.42
β_L	bank discount factor	0.82
ξ	bank seizure rate	0.23
κ	rental maintenance cost	0.05
δ_k	capital depreciation rate	0.10

Interactions and amplification channels during the bust



- Focus on the effects of long-term interest rates on the housing markets at the county level and estimate

$$\Delta y_{c,t} = \beta_1 \Delta Int.\, Rate^{10y}_{t-1} + \beta_2 \Delta Int.\, Rate^{10y}_{t-1} \cdot UIBen._{c,t} + UIBen._{c,t}$$
$$+ Macro\, Controls_{t-1} + State\, Controls_{c,t} + County\, Controls_{c,t}$$
$$+ \theta_c + \mu_t + \epsilon_{c,t}$$

- Monthly county level mortgage (compiled by Neil Bhutta) and house prices data

Credit Spreads from Gilchrist and Zakrajsek (AER, 2012)

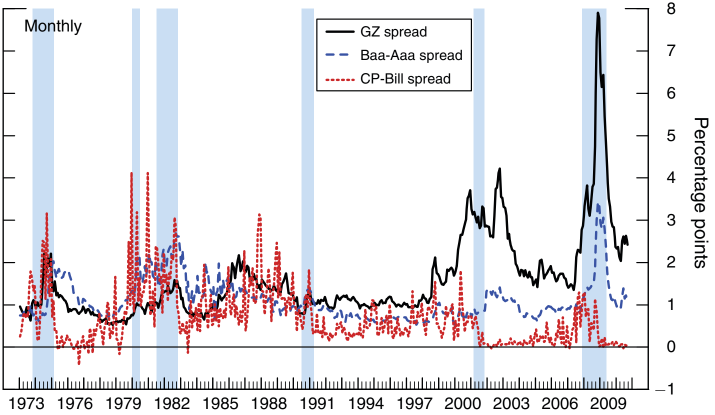


Figure 1. Selected Corporate Credit Spreads

Notes: Sample period: 1973:1–2010:9. The figure depicts the following credit spreads: GZ spread = the average credit spread on senior unsecured bonds issued by nonfinancial firms in our sample (the solid line); Baa–Aaa = the spread between yields on Baa- and Aaa-rated long-term industrial corporate bonds (the dashed line); and CP–Bill = the spread between the yield on one-month A1/P1 nonfinancial commercial paper and the one-month Treasury yield (the dotted line). The shaded vertical bars represent the NBER-dated recessions.