

# Are Bank Bailouts Welfare Improving?

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# Massive Bailouts during GFC

- Possibly averted severe economic depression (Bernanke 2009)

# Massive Bailouts during GFC

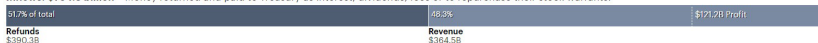
- Possibly averted severe economic depression (Bernanke 2009)
- Turned out not as costly ex post, as initially feared ...

## The State of the Bailout

**Outflows: \$633.6 billion** – This includes money that has actually been spent, invested, or loaned.



**Inflows: \$754.8 billion** – Money returned and paid to Treasury as interest, dividends, fees or to repurchase their stock warrants.



Source: ProPublica Bailout Tracker

# Potential long-term costs

- ⇒ Enhanced expectations of future bailouts
- ⇒ More reckless financial risk-taking
- ⇒ More frequent and more severe future financial crises

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  - ▶ 3.65 % increase in average wealth

# Main Challenges

- Widespread financial crises and bailouts are infrequent
  - ▶ hard to establish empirical links among them
  - ▶ hard to measure their probabilities
- Expectations of future bailouts are unobservable
  - ▶ measurement problems, Hett and Schmitt (2017)
  - ▶ identification issues, Dam and Koetter (2012)
- Unclear welfare consequences of changes in risk taking
  - ▶ could be welfare beneficial
  - ▶ require a structural model

# Our analytical framework

- Calibrated quantitative General Equilibrium model in which households value safe, liquid deposits
- Banks are partly funded with **callable** deposits **collateralized** by illiquid assets
- In a financial crisis, early withdrawals trigger **firesale** of asset **claims** from banks to **Patient Investors (PIs)**
- Probability of a financial crisis **depends** on banks' balance sheet positions
- Government **partially** insures returns on firesale assets

# Policy Tools

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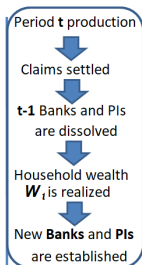
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  - ▶ fraction  $\chi \in [0, 1]$  of a bailout eligible firesale transaction is insured

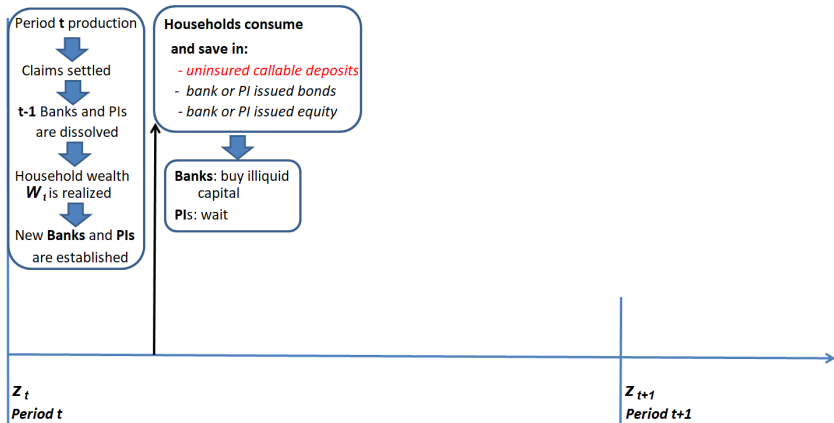
# Timing of events in the model



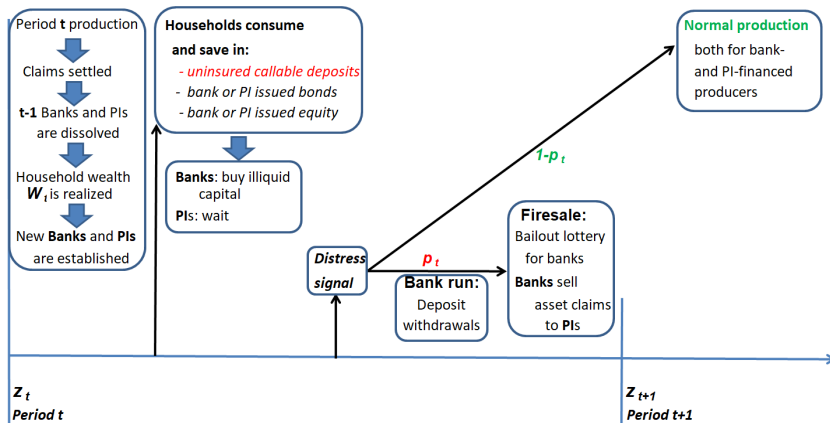
$Z_t$   
Period  $t$

$Z_{t+1}$   
Period  $t+1$

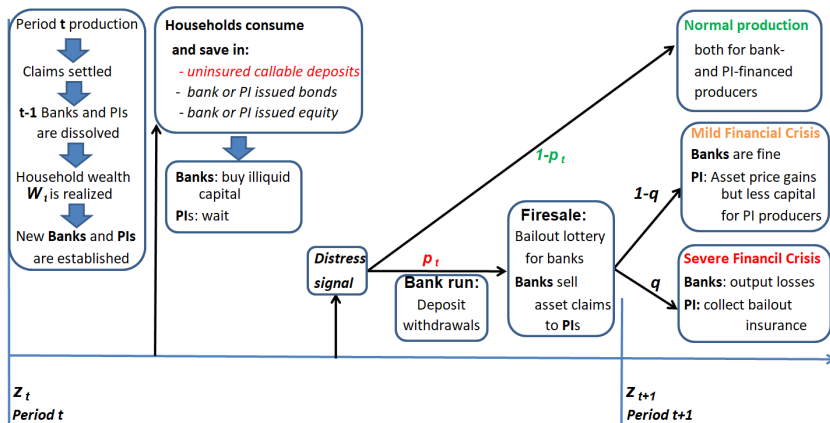
# Timing of events in the model



# Timing of events in the model



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# Distress probability is EQUAL to the default probability

$$p_t \equiv \Pr(\text{default} | W_t, z_t) = (1 - p_t) \Pr(\text{default} | \text{normal production})$$

$$+ p_t q \Pr(\text{default} | \text{severe financial crisis})$$

$$+ p_t (1 - q) \left[ \begin{array}{c} \eta \Pr(\text{default} | [\text{mild crisis} \\ \text{bailout eligible}]) \\ + \\ (1 - \eta) \Pr(\text{default} | [\text{mild crisis} \\ \text{ineligible}]) \end{array} \right]$$

Individual bank's default risk is always positive due to idiosyncratic revenue shocks

# Financial friction: Collateral constraint

- The amount of callable deposits issued by banks is constrained by the expected **firesale** value of their assets
- Individual banks do not take in account their effect on firesale prices. Overborrow short-term
- Pecuniary externality PLUS collateral constraint leave scope for policy improvements



# Calibration

# Policy parameters

PARAMETER	VALUE
Capital Adequacy Ratio (CAR)	8 %
Ex ante probability of bailout eligibility	$\eta = 0$
Fraction of patient investor losses insured	$\chi = 0$

# Calibration moments

Six parameters are estimated to match six moments

MOMENTS IN PER CENT	DATA	MODEL
Average risk spread*	1.50	1.50
Average real return on bonds*	3.94	3.93
Average share of callable funding*	31.54	31.78
RGDP Drop during Great Recession	8.65	8.60
RGDP Drop during Great Depression	34.75	34.98
Average financial crisis probability	1.266	1.266

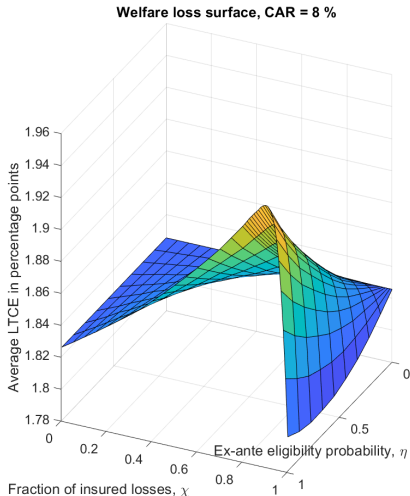
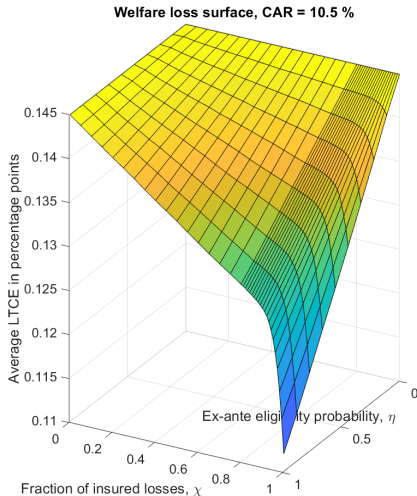
\* Period: 1986Q1-2007Q4; Source: U.S. Flow of funds, NIPA data, FRED database

# Results

# The effects of higher Capital Adequacy Requirement

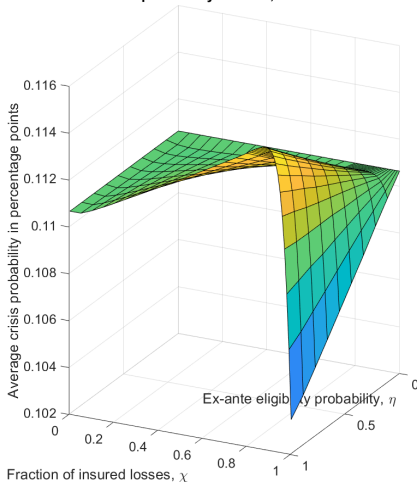
MOMENTS IN PER CENT	CAR=8%	CAR=10.5%
Average financial distress probability	1.33	0.11
Average welfare loss (LTCE)	1.83	0.14
Average wealth relative to "first best"	-2.63	1.02
Average real return on bonds	3.93	4.26

# Welfare consequences of Bailout policy

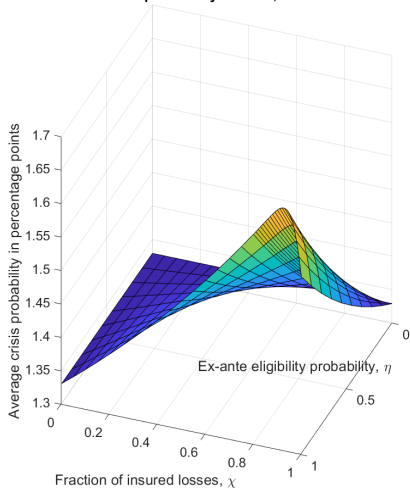


# Bailout policy effects on crisis probability

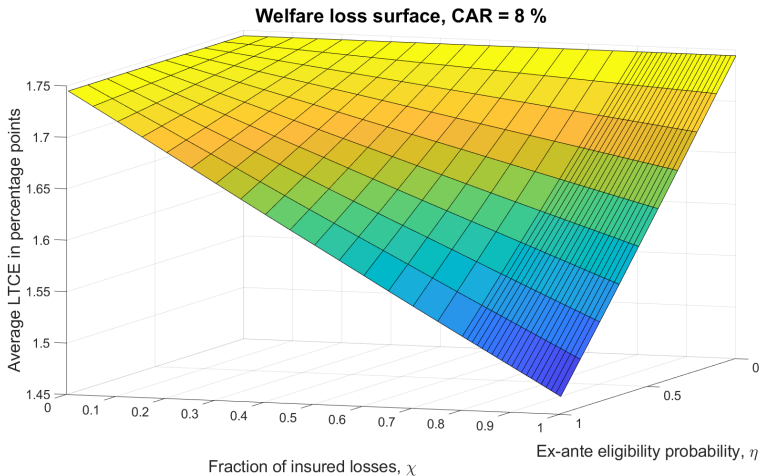
Crisis probability surface, CAR = 10.5 %



Crisis probability surface, CAR = 8 %

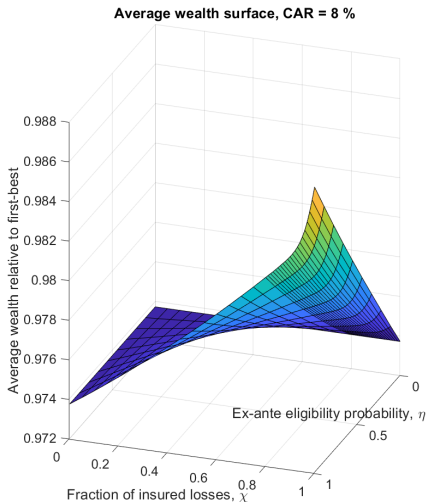
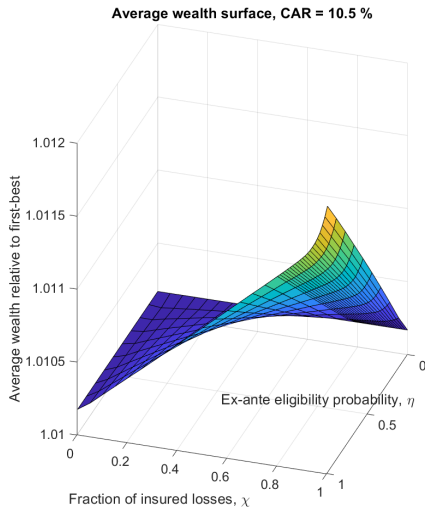


# Bailout policy effects on welfare loss: exogenous probability model





# Wealth effects of bailout policies



# Policy implications

- Basel III enhancements in bank equity buffers are highly beneficial
- Bank bailouts are beneficial if complemented with effective regulation, but detrimental to financial stability and welfare without it
- Policy makers should resist rollbacks of Capital Adequacy Regulations

Thank you!

# Estimated parameter values

PARAMETERS		VALUE
Household discount factor	$\beta$	0.96
Liquidity preference weight	$\gamma$	0.006
Relative TFP of the banks-financed sector	$\frac{z^B}{z^P}$	1.57
St.Dev of idiosyncratic bank productivity shocks	$\sigma^i$	0.025
Probability of a severe crisis after a bank run, %	$q$	57
Fraction of bank revenue lost in a severe crisis, %	$1 - \lambda$	40

Period utility function:  $\frac{C^{1-\sigma}}{1-\sigma} + \gamma \frac{D^{1-\sigma}}{1-\sigma}$

Production function:  $z^J K^\theta (A \times 1)^{1-\theta}$  with  $J = B, P$

Idiosyncratic bank shocks:  $\zeta^i \left[ (1 - \delta) K + z^B K^\theta (A \times 1)^{1-\theta} \right]$

$\ln \left( \zeta^i \right) \sim N \left( 0, (\sigma^i)^2 \right)$

# Related literature on bank bailouts

- Theoretical models on policy options regarding bank runs
  - ▶ Mostly *two or three-period* models as in Diamond and Dybvig (1983)
  - ▶ Keister (2014), Gorton and Huang (2004), Farhi and Tirole (2012), Diamond and Rajan (2002, 2012)
  - ▶ **Stein (2012)**
- Infinite-horizon macro models
  - ▶ Chari and Kehoe (2016): no intertemporal links
  - ▶ Bianchi (2016): no banks
  - ▶ Gertler, Kiyotaki, and Queralto (2012): no bank defaults
  - ▶ Angeloni and Faia (2013): exogenous cost of bank defaults, no asset-firesales
  - ▶ Collard, Dellas, Diba, Loisel (2012): zero risk taking is optimal
  - ▶ **Elenev, Landvoight, Van Nieuwerburgh (2021): no firesales**

# Basic macroeconomic parameters

Few parameters calibrated based on standard RBC values

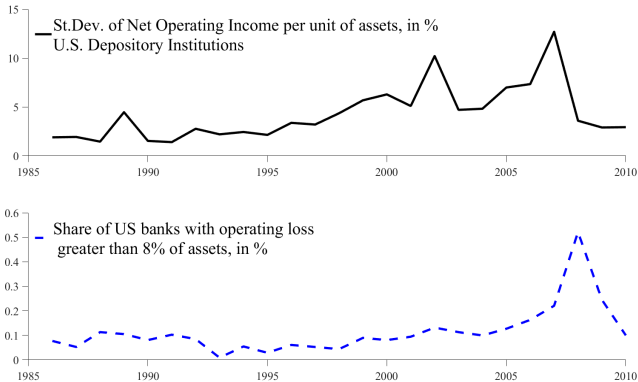
PARAMETER	VALUE
Capital income share	$\theta = 0.33$
Depreciation rate	$\delta = 0.1$
Relative Risk Aversion	$\sigma = 2$

Aggregate labour productivity process estimated from PWT9.0

$$\exp(z_t) = \exp(z_{t-1})^{0.88} \exp(\varepsilon_t)$$

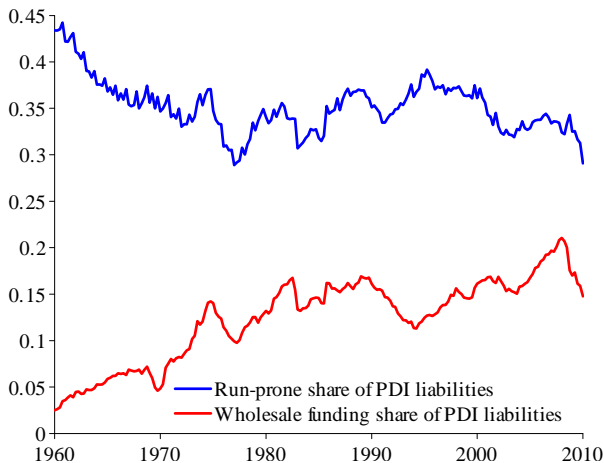
$$\varepsilon_t \sim N(0, 0.029^2)$$

# GFC revealed substantial amount of risk in the U.S. financial system



Source: WRDS Bank Regulatory database

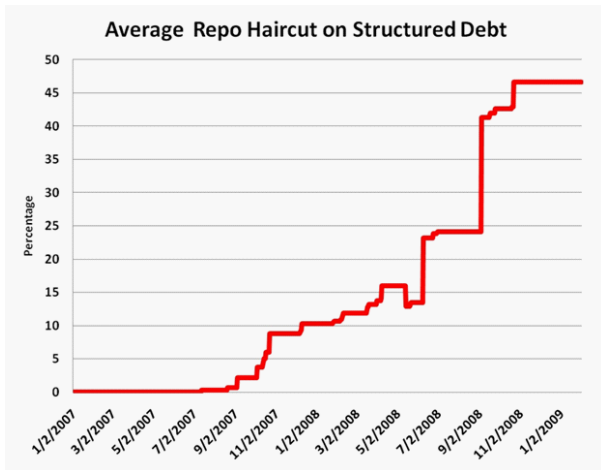
# Composition of run-prone liabilities shifted toward wholesale funding



Data source: U.S. Flow of Funds Accounts



# Bank runs on wholesale funding can be costly



Source: Gorton and Metrick (2010).

# An example of partial insurance

In March 16 2008, JPMorgan Chase bought *Bear Stearns* for \$2 per share (stock swap), which is less than 7% the stock value 2 days before.

New company funded by loans from

- Federal Reserve Bank of New York: \$29 billion
- JPMorgan Chase (junior loan): \$ 1 billion

with no further recourse to JP Morgan Chase assets.

# Distributions of distress probabilities

