

An Equilibrium Model of Housing and Mortgage Markets with State-Contingent Lending Contracts

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Summary

- ▶ Main question: what is the equilibrium mortgage contract when payments can be state-dependent?
- ▶ Approach: GE model with endogenous house prices, housing supply, home-ownership. Features aggregate income risk, strategic + liquidity default.
 - Stylized framework + risk neutrality \implies closed-form solutions.
- ▶ Main findings:
 1. Unique equilibrium contract: Home Equity Insurance Mortgage (HEIM).
 - Mortgage fully indexed to house prices.
 2. In absence of strategic default, contract would index to wages to minimize liq. defaults.
 3. Misalignment of contract preferences among borrowers \implies potential instability.

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Evaluation

- ▶ Elegant paper that uses strong assumptions to generate sharp results.
- ▶ May not want to take results completely literally.
 - Full house price insurance on mortgages may be extreme.
- ▶ But paper is full of valuable insights about mortgage design.
- ▶ Generalizing results implies that **standard mortgage** with **tail house price insurance** might be a great contract for the real world.

Interpreting the HEIM Result

- ▶ Striking result: **unique** equilibrium contract is HEIM fully indexed to house prices.
- ▶ But this means that the equilibrium ownership arrangement is...renting?
- ▶ “Owners”:
 - Put zero money down at purchase.
 - On net, pay fixed amount in exchange for housing services.
 - Receive none of the gains and losses on the value of the property.
 - Move out if they can't afford to pay.
- ▶ If ownership is effectively identical to renting, should owners still get utility boost θ_i ?

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Beyond HEIMs

- ▶ This paper can still guide mortgage design even without full HEIMs.
- ▶ (Robust) foundation of HEIM result: can't have strategic default at equilibrium.
 - Lender takes losses when borrowers strategically default.
 - Can drop strategic defaulters by lowering payments in default states, raising in non-default states.
- ▶ Why **complete** insurance? **Zero** cost to ownership/default.
- ▶ Indifference condition for owning (ignore liquidity default for now)

$$\underbrace{0}_{\text{rent}} = \sum_s \pi_s \max \left\{ \underbrace{\theta + P_1(s) - m(s)}_{\text{keep}}, \underbrace{0}_{\text{default}} \right\}$$

- ▶ No strategic default \iff no variation in $P_1(s) - m(s)$.

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- ▶ Now, can have some variation in $P_1(s) - m(s)$, don't need full insurance.
- ▶ But still need to make sure $\min_s \underline{\theta} + P_1(s) - m(s) \geq -k$.
- ▶ Takeaway: mortgages should include **tail insurance**, approaching full insurance as default costs (down payment) $\rightarrow 0$.
- ▶ Note: "skin in the game" important no matter what your forecast of house prices is!

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Liquidity Defaults

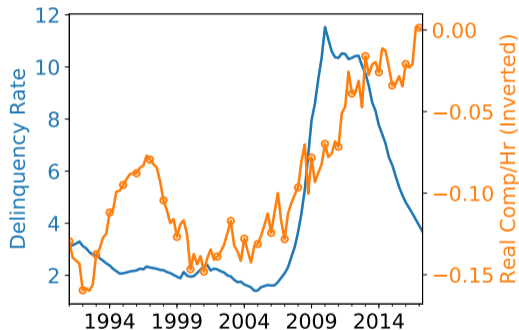
- ▶ With positive down payment/default cost, need tail insurance, but now have more flexibility on the rest of the contract. What should it look like?
 - P & T: minimize **liquidity default** by indexing to wages.
- ▶ Potential issue: liquidity default in the model if labor income $w(s)l_i$ is less than the mortgage payment $m(s)$, **even if above water**.
- ▶ In practice, borrowers with negative liquidity shocks may be able to sell, or do a short sale. Keeping borrowers above water (e.g., HEIM or tail insurance) might largely fix this.
 - But underwater borrowers can't. Liquidity default = strategic default at specific threshold.
- ▶ Many liquidity defaults due to unemployment, effectiveness of indexing to wages unclear.

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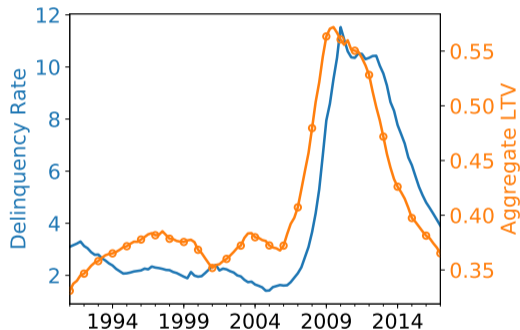
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Liquidity Defaults

- ▶ Mortgage delinquencies not strongly correlated with real wages.



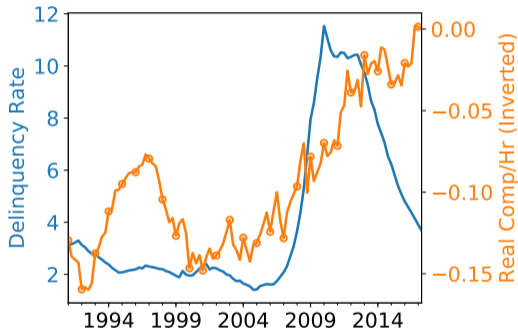
(a) Delinq. vs. Real Comp./Hr (Detrended)



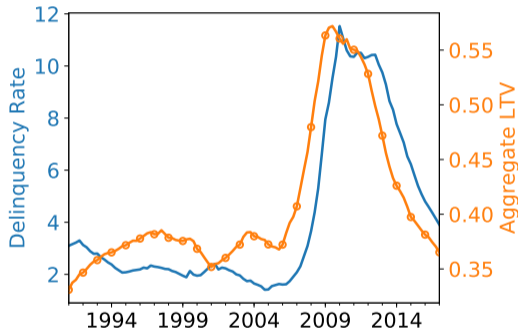
(b) Delinq. vs. Aggregate LTV

Liquidity Defaults

- ▶ Aggregate leverage (proxy for probab. underwater) plus 4Q delay delivers near perfect fit.



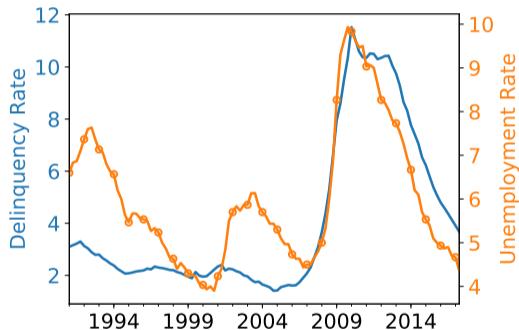
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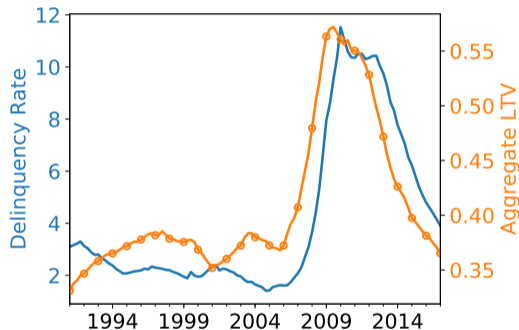
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Liquidity Defaults

- ▶ Unemployment more correlated with delinquency, but only when leverage high.



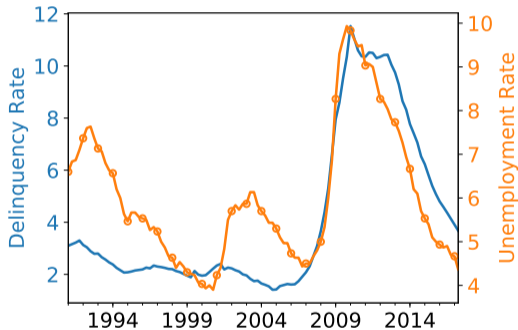
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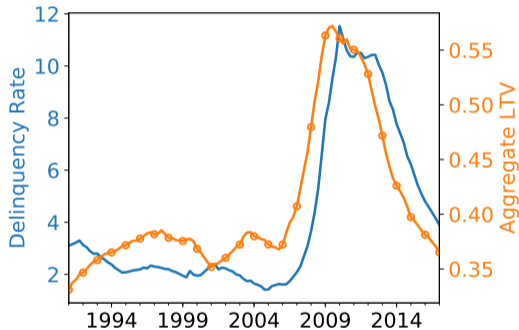
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Liquidity Defaults

- ▶ Takeaway: keeping borrowers above water may be the most effective way to prevent liquidity defaults.



(a) Delinq. vs. Unemployment



(b) Delinq. vs. Aggregate LTV

Liquidity Defaults

- ▶ On the other hand, liquidity defaults in the model could easily stand in for risk sharing.
 - Otherwise absent in the model due to risk neutrality.
 - Index payments to wages \implies consumption smoothing.
- ▶ Contract minimizing liq. defaults very similar to contract maximizing expected utility

$$\min_{m(s)} \sum_s \pi_s G\left(\frac{m(s)}{w(s)}\right) = \max_{m(s)} E\left[-G\left(\frac{m(s)}{w(s)}\right)\right].$$

- ▶ But wages move much less than interest payments, benefits of **aggregate** wage insurance might be small (Lucas calculation).
- ▶ Takeaway: outside of strategic default region, standard mortgage contract may be okay!

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Instability

- ▶ P & T instability result: equilibrium may not exist at all.
- ▶ Key is tension between different types of borrowers:
 - Low ownership utility borrowers have highest value from default option, **dislike** full HEIM.
 - Medium ownership utility borrowers prefer low average payment, **like** full HEIM.
 - High ownership utility borrowers want to minimize liq. default risk, **dislike** full HEIM.
- ▶ All intuitive and relevant forces, existence depends on balance of groups.
- ▶ Standard mortgage with tail insurance might relieve tension, improve stability.
 - Low average payment without overinsurance in normal times.

Conclusion

- ▶ Impressive paper full of important insights.
- ▶ Intuition is robust, even if results not taken literally.
- ▶ Standard mortgage contract with tail house price insurance worth considering!
- ▶ Related: Greenwald, Landvoigt, Van Nieuwerburgh (2017) study implications in model with levered intermediaries.
 - Agg. house price indexation increases financial fragility by destabilizing bank balance sheets.
 - Good reason not to provide full insurance when you don't need to.
 - But no equilibrium strategic default/tail insurance argument should still go through!