Mortgages and the Future of Housing Finance:
Loan Renegotiation and Redefault

Moderator:

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Session Overview

- Brevoort & Cooper → Foreclosure Aftershocks

- Mayer, et al
- Bhutta, Dokko, & Shan

} "Trigger Events" vs. "Ruthless Default"

Trigger Event vs. Ruthless Default

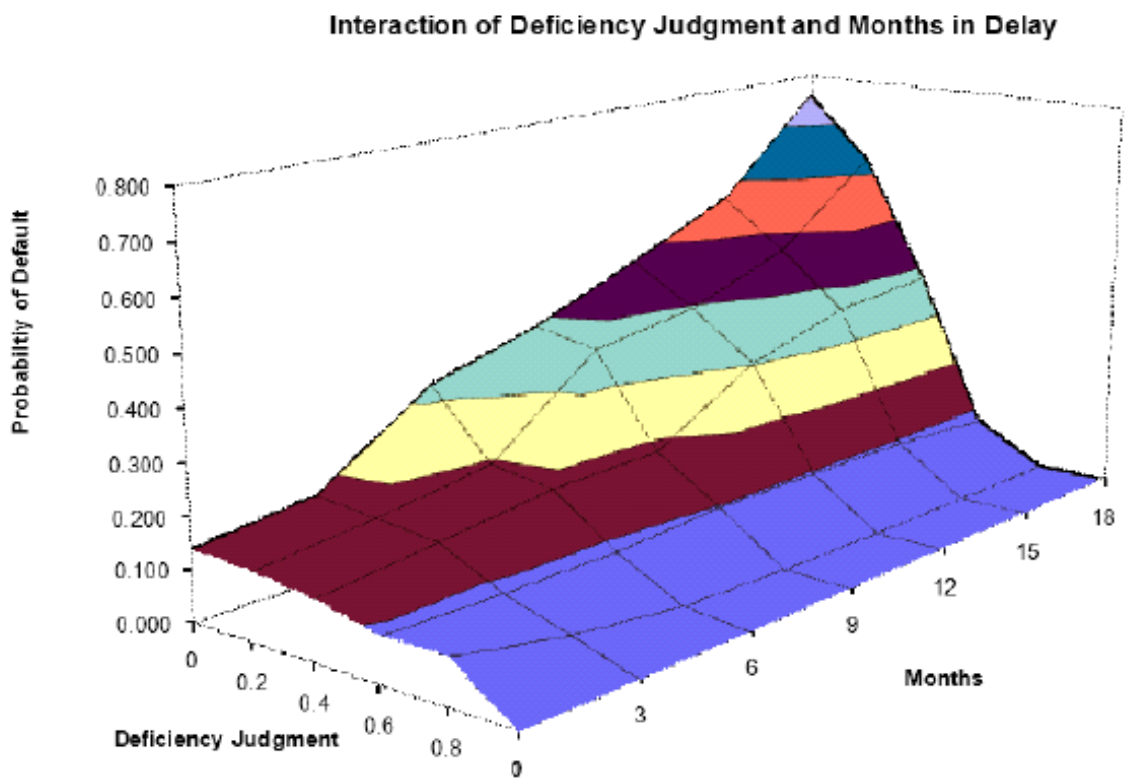
- An old debate in the "real estate" literature
  - "Ruthless Default" – stems from insights of option pricing models applied to mortgages
    - Titman & Torous (1989); Kau, et al (1992,1993); Kau & Keenan (1995,1999); Ambrose, Buttimer, & Capone (1997); Ambrose & Buttimer (2000, 2010)
  - "Trigger Events" – borrower solvency
    - Lekkas, et al (1993); Quigley & Van Order (1995); Vandell (1995), Elmer (1997), Deng, et al (2000)
  - Hybrid Empirical Models – attempt to link both theories
    - Kau & Keenan (1999); Ambrose & Capone (1998,2000); Ambrose, Capone & Deng (2001)

Trigger Events vs. Ruthless Default

- Why is it important to know whether borrower is "strategic"?
  - Necessary to avoid moral hazard problem associated with loan modification programs
    - Ambrose & Capone (1996), Riddiough & Wyatt (1994)
    - Theoretical Models: Ambrose and Buttimer (2000), Ambrose, Buttimer and Capone (1997)

Trigger Events vs. Ruthless Default

- Theoretical view of moral hazard problem at work:



Source: Ambrose, Buttimer, & Capone. "Pricing Mortgage Default and Foreclosure Delay," *Journal of Money Credit and Banking* 29:3 (1997) 314-325.

Trigger Events vs. Ruthless Default

- What do we know from previous studies?
  - Default is not the same as foreclosure
  - Strategic default appears to be primary cause for borrower default
    - Kau & Keenan (1999); Ambrose and Capone (1998); Ambrose, Capone & Deng (2001)
  - However, evidence also exists that trigger events do result in foreclosure
    - Ambrose and Capone (2000)

Trigger Events vs. Ruthless Default

- Previous studies were from a period of stable/rising house prices.
  - Very few borrowers had “negative equity”
  - Thus, difficult to test ruthlessness vs. trigger
- The papers in this session provide an update to the debate using data from a period with severe house price declines.

Brevoort & Cooper: Foreclosure Aftershocks

- Study credit scores after foreclosure "event" from 1999 to 2010.
- Major Findings:
  - Credit scores decline prior to foreclosure
    - This reflects delinquency period prior to "foreclosure"
  - Credit scores tend to recover after "foreclosure"
    - Prime borrowers do not recover to pre-event levels
- Implications:
  - Possible role of "trigger" events if borrower cohorts display divergent credit scores recovery rates

Brevoort & Cooper: Foreclosure Aftershocks

Alternative Views of Foreclosure:

1. Foreclosure is a "shock" that alters one's future risk
   - Decreases future access to credit
   - Destroys wealth
2. Foreclosure results from "trigger" event
   - "Trigger" is underlying cause of future credit problems – not foreclosure event
   - Implication – no need to slow foreclosure process
3. Foreclosure alters borrower preferences
   - Reduced stigma of credit event, lower default costs

Brevoort & Cooper: Foreclosure Aftershocks

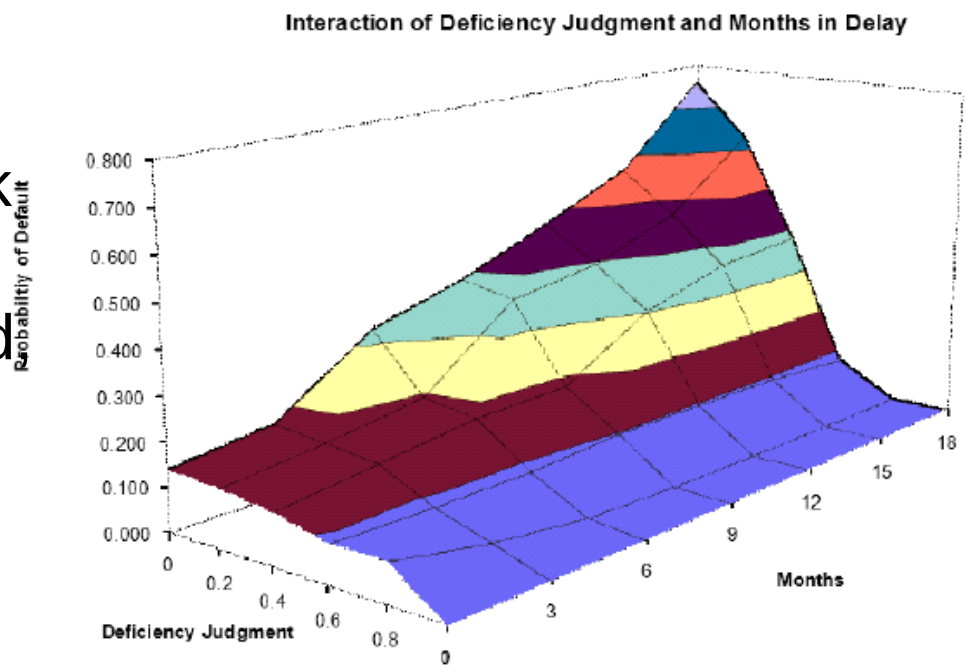
- Comments
  - Possible reasons for differences in score recovery after foreclosure:
    - Differences in borrowers
    - Differences in macro-economic environment (impacts ability to recover wealth)
    - Changes in bankruptcy laws & foreclosure processes
    - Changes in credit score calculation methods over time
  - Need to design empirical study to control for these possibilities
    - Matched sample design
    - Focus on percentage change in score after foreclosure

Comments on Mayer, *et al*

- *"almost all of the increase in post-Settlement Countrywide defaults came from mortgages that reset around the time the Settlement was announced."*
- Is effect caused by Settlement or Resets?
  - Results consistent with the "reset" causing default, not the Settlement.
    - Ambrose, LaCour-Little, and Huszar (2005) report that the default hazard rate is approx 77% higher at adjustment date for 3/27 loans.
    - Alternative method – estimate a hazard rate model that explicitly captures time-varying economic factors as well as Settlement date effect.

Comments on Mayer, *et al*

- The settlement reduced default transaction costs
  - E.g.: Suspended foreclosure process during modification period
- Previous theoretical work suggests that when default costs are reduced the probability of default increases
- Thus, results confirm intuition of option pricing models



Comments on Bhutta, Dokko, and Shan

- 2-stage estimation method to determine the extent that negative equity drives defaults:
  - First stage – hazard model of default based on "liquidity" factors
  - Second stage – estimate total default cost based on equity at t given no default and equity at t-1
  - Essentially, model is focused on ***level*** of negative equity

Comments on Bhutta, Dokko, and Shan

- Results are largely consistent with evidenced reported in the literature
  - For example, Ambrose and Capone (1998) focus on probability of foreclosure versus self-cure to demonstrate the presence of both trigger event and ruthless defaults.
    - E.g: Borrowers with high initial LTVs are more likely to end default in foreclosure than borrowers with low initial LTVs.
- However, theory and empirical tests do not recognize option values embedded in mortgages, thus empirical tests are open to alternative explanations.

Comments on Bhutta, Dokko, and Shan

- Theoretical Interaction of Default Option Value and Default Probability
  - Default Value:

$$d_t = l_t - v_t + c_t + p$$

    - *l* = loan value
    - *v* = property value
    - *c* = prepayment option
    - *p* = current payment due

- Theory: 2 Necessary Conditions for Default:
  1. Default today must be worth more than expected future default

$$d_t \geq \max\left(\frac{d_{t+s}}{(1+\delta)^s}\right), \forall s \in \{1, \ldots, T-t\}$$

  2. Negative equity is necessary

$$l_t - v_t + p \geq 0$$

Comments on Bhutta, Dokko, and Shan

- Implications of necessary default conditions:
  - Borrowers will exercise when house prices have declined such that borrower has negative equity
  - Loan amortization (age) will impact default
  - Borrowers will default when expected house price movements are minimal
  - Interest rates changes can have significant impact
  - Magnitude of house price decline effect changes based on interest rates

Comments on Bhutta, Dokko, and Shan

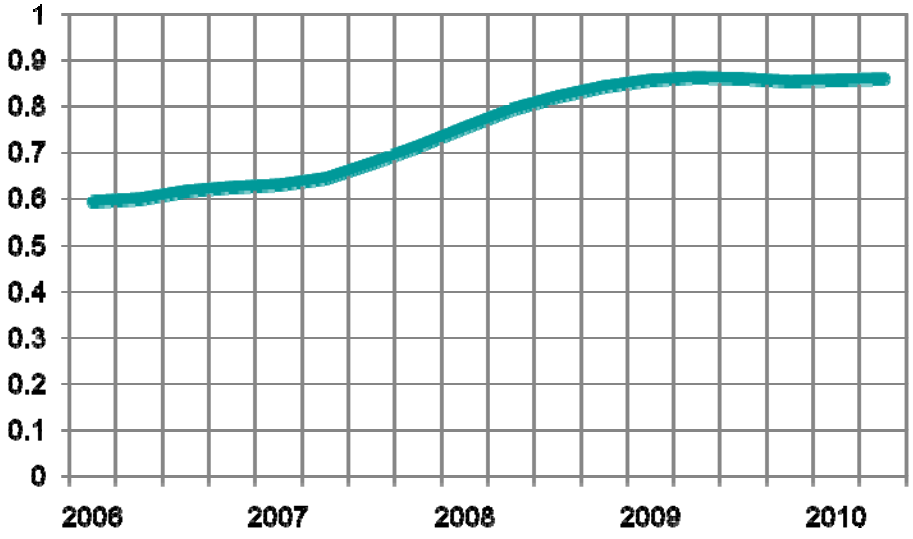
- Specific concerns:
  - Theoretical default conditions imply that equity (based on simple change in HPI) is not sufficient
    - Does not account for variance is HPI estimates
    - Need to estimate the probability of negative equity (Deng, 1997 and Deng, Quigley and Van Order, 1996)

$$PNEQ = \Phi\left(\frac{log(L) - log(V)}{\sqrt{\sigma^2}}\right)$$

  - Must know whether house price changes are slowing (point in the cycle)
  - Need 2-stage method:
    - Probability of default
    - Value of default

Comments on Bhutta, Dokko, and Shan

- What was the "value" of default?
  - Simulated using Ambrose, Capone, and Deng (2001) model for interest-only, 100% LTV mortgage originated in California in 1st quarter of 2006



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