Mortgage Prepayment and Default Behavior with Embedded Forward Contract Risks in China's Housing Market

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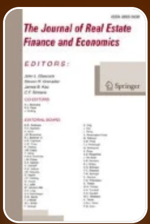

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Abstract

Most condominiums in China are sold forward on a pre-sale market, where purchasers and developers transact on an underlying property that is not yet completed. During the pre-sale period home buyers face a significant forward contract risk. However, home buyers can borrow mortgages from banks so that they can effectively share the forward contract risk with banks. This explains the phenomenon of irregularly high early-stage default and prepayment rates observed in residential mortgage lending in China, where there are few, if any, financial incentives for mortgage borrowers to exercise either put or call options. Mortgages collateralized by forward housing assets are riskier than are those with underlying assets traded on the spot market. However, currently Chinese

mortgage banks charge the same rate to all mortgage borrowers. This inefficiency in risk sharing between mortgage borrowers' groups in the forward and spot housing markets leads to mispricing in secondary mortgage sales and mortgage-backed security trading.

Notes

1. As of March 2007 the exchange rate of Chinese Yuan (CNY) is one U.S. dollar = 7.74 CNY.

2. There is a long history of not using risk-based interest rates in China or other central-planning economies. It is also a tradition that in those countries a unified product or service is provided to all consumers.

3. We use the terms ‘forward market’ and ‘pre-sell market’ interchangeably.

4. The pre-sale period used to be around four years, but has now decreased to one to two years.

5. A sample pre-sale contract can be found at the Miami real estate Web site, http://www.miamirealestatetrends.com

6. An alternative sampling method, namely stratified sampling, can be used for a large dataset. To correct for possible sample selection bias, a weighting scheme that is assumed to be independent of error distribution can be used in the maximum likelihood estimation. Specifically, the weight addresses the stratified choice-based sampling of mortgages across loan status cells. The weight is commonly defined as the inverse of the probability that the loan is being selected from a cell in which it was sampled.

7. Since 2006, the China Banking Regulatory Commission has established a series of rules for building up the personal credit system and regulating pre-sale practices.

8. Typically one cannot estimate directly which default option is in the money without knowing the entire path of individual house values. However, we can use the initial loan-to-value ratio and the diffusion process of house prices to

estimate the critical value for a borrower to exercise the put option, known as the probability of negative equity.

9. The housing price indices and their volatilities are estimated according to the three-stage procedure originally created by Case and Shiller (1989) and modified by Quigley and Van Order (1995).

10. Log Likelihood and the Schwarz-Bayesian Criterion (SBC), reported at the bottom of the table, provide for a comparison of the goodness of fit among alternative models. Models with lower values are considered preferable.

11. The construction of a DCI index is similar to that of a Herfindahl index. The higher the index, the more concentrated the defaulted loans are to developers.

12. It is worthy of mention that a DCI—a measure of developer's local market share—is only one way of proxying the developer's default risk. Other omitted factors, such as developer's default history, local market environment, etc., might also trigger developer default. We thank the editor for pointing this limitation out.

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