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Monthly condensed analyses of crucial real estate and economic issues offered by the UCLA Ziman Center for Real Estate and UCLA Anderson Forecast. Here, Xudong An, Associate Professor, Department of Finance, San Diego State University; Yongheng Deng, Professor of Finance and Real Estate, Department of Real Estate and NUS Business School, National University of Singapore; and Stuart A. Gabriel, Arden Realty Chair, Professor of Finance and Director, UCLA Ziman Center for Real Estate, explore how borrowers exercise the default option more ruthlessly during a period of economic weakness.

The Default Option: How Timing, Local Conditions and the HAMP Program Impact Mortgage Delinquency

By Xudong An, Associate Professor, Department of Finance, San Diego State University; Yongheng Deng, Professor of Finance and Real Estate, Department of Real Estate and NUS Business School, National University of Singapore; and Stuart A. Gabriel, Arden Realty Chair, Professor of Finance and Director, UCLA Ziman Center for Real Estate

The following article is condensed from the authors' in-depth study. The full article, with all attributions and source material, can be found [here](#).

Substantial research and debate have focused on how housing policy, the financial markets, and de-regulation contributed to the 2000s mortgage crisis. But what about the behavior of borrowers? Specifically, did borrowers' reaction to negative equity vary over the crisis period and in response to government policy?

Default is importantly driven by homeowner negative equity. However, borrowers do not always default when facing negative equity. Little is known about the time variation or drivers of borrower propensity to default. For example, do borrowers exercise the default option more ruthlessly during a period of economic weakness? If so, could such changes in behavior materially worsen mortgage outcomes and exacerbate the market downturn?

“HAMP innovations designed to curb home foreclosures may have inadvertently resulted in elevated default propensities.”

Our study shows that the propensity for borrowers to default rose markedly during the crisis period and among hard-hit metropolitan areas. Consistent with a theory of rational default, this trend could be due to increased borrower income constraints and/or pessimism about future house prices. The data also indicates the importance of local economic conditions and consumer sentiment to default option exercise. Among other explanatory factors, the Home Affordable Modification Program (HAMP) innovations designed to curb home foreclosures may have inadvertently elevated defaults. We find that the

behavior of mortgage borrowers is strategic: They are more likely to become delinquent when they expect lenders to modify defaulted loans.

Our estimates show that mortgage borrowers are more sensitive to negative equity in bad economic times. Further, the estimated changes in borrower behavior are economically significant: in the hazard model, the propensity to default in the presence of negative equity moved up from less than 0.1 in 2006 to over 0.8 in 2012 (Figure 1), translating into substantially higher defaults. For example, in 2006 a mortgage loan with 15 percent negative equity had only a 5 percent greater chance of entering into default than a loan with 0 percent equity; in marked contrast, by 2012, a loan with 15 percent negative equity was 150 percent more likely to default than a loan with 0 percent equity (Figure 2). This represents an explosion in defaults during the crisis, compounded by declines in home prices and markedly elevated borrower negative equity.

Borrowers' house-price expectations, income constraints, and opportunity costs of default may evolve over the business cycle, resulting in time-varying sensitivities to negative equity. Borrower default propensities are also sensitive to measures of consumer sentiment.

The HAMP Effect

Our studies find a structural break in mortgage default behavior in 2009 related to federal policy intervention associated with the HAMP program. Further analysis shows that those eligible for HAMP loan modification became significantly more sensitive to negative equity during the program implementation period, compared to the non-HAMP eligible control group. This suggests that while HAMP saved many defaulted borrowers from foreclosure, it may have induced others to enter into default. The ultimate impact of HAMP on borrowers' social welfare may have been beneficial, but the efficacy of the program in mitigating home foreclosure may have been diminished by increasing homeowner default.

What is the takeaway from our findings? From a credit risk-management perspective, the results show how borrowers exercise of the default option shifts over the economic cycle and in response to government policy. Mortgage originators, investors and regulators need to account for such shifts in behavior in their business planning. At the same time, Federal foreclosure prevention and loan work-out programs should be re-examined in regard to possible adverse, unintended consequences.

Figure 1 Default Rate versus Percentage of Loans with Negative Equity

This figure shows the percentage of subprime mortgage loans in our sample that had negative equity and that fell into 60-day delinquency during 2005Q1-2013Q1. Delinquency rate is to the left scale and percentage of loans with negative equity is to the right scale. The numbers are based on authors' own calculations.

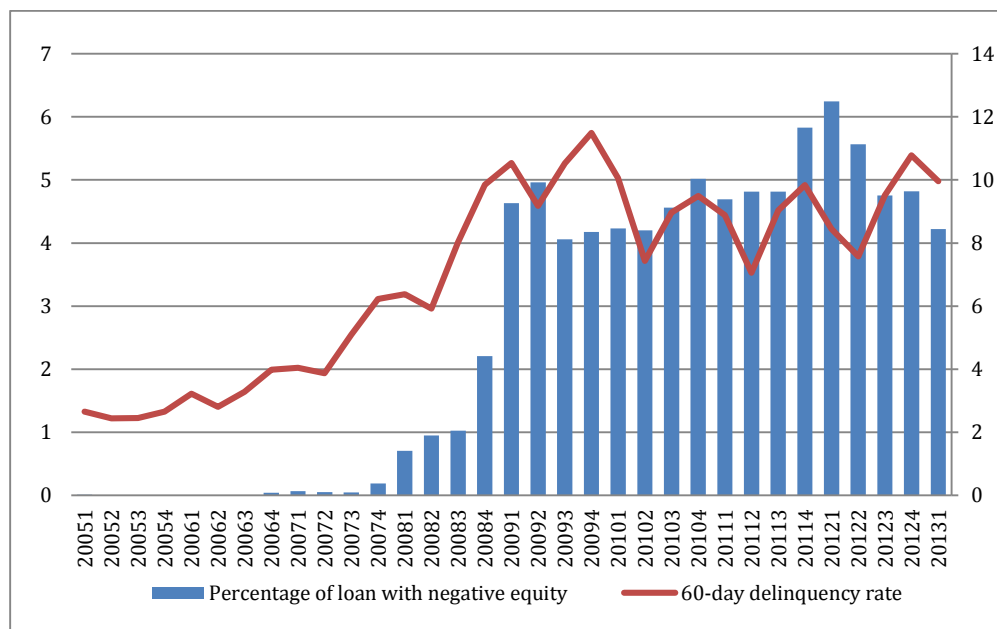


Figure 2 Rolling Window Estimates of the Negative Equity Beta

This figure shows the estimates of negative equity beta in a hazard model. The estimation is based on three-year rolling window samples of subprime and Alt-A loans in 10 MSAs, including New York, NY, Los Angeles, CA, Chicago, IL, Miami, FL, Dallas, TX, Atlanta, GA, Boston, MA, Phoenix, AZ, Detroit, MI, and Washington, DC. The dark line shows the point estimates and the dashed lines show the confidence interval.

