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Juvenile delinquent mortgages: Bad credit or bad economy? ☆

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ABSTRACT

We study early default, defined as serious delinquency or foreclosure in the first year, among nonprime mortgages from the 2001 to 2007 vintages. After documenting a dramatic rise in such defaults and discussing their correlates, we examine two primary explanations: changes in underwriting standards that took place over this period, and changes in the economic environment. We find that while credit standards were important in determining the probability of an early default, changes in the economy—especially a sharp reversal in house price appreciation—after 2004 were the more critical factor in the increases in default rates that we observe. An important additional result is that in spite of our rich set of covariates, much of the increase remains unexplained, even in retrospect. Thus, the fact that the credit markets seemed surprised by the rate of early defaults in the 2006 and 2007 nonprime vintages becomes more understandable.

Gee, Officer Krupke, we're very upset;
We never had the love that ev'ry child oughta get.
We ain't no delinquents,
We're misunderstood.
Deep down inside us there is good!

"Gee, Officer Krupke"—*West Side Story*

Rapid increases in US residential mortgage defaults during 2007 and into 2008 captured the attention of researchers, the public and policy makers, and had a chilling effect on credit markets worldwide. While these increases were noted originally in the nonprime market, foreclosure increases have in more recent months begun to spill over into the prime market. This paper studies a part of this phenomenon, early defaults in the nonprime market.

Historically, four key characteristics ("risk factors" or "underwriting criteria") have been thought to determine the probability that a mortgagor will default. Those factors are the loan-to-value ratio (LTV),[1] the debt service-to-income ratio (DTI), the mortgagor's credit score, and the extent to which the mortgagor's income and assets have been verified by third party sources such as employers, tax returns, and bank account statements. To expand the potential pool of borrowers, nonprime (subprime and alt-a) mortgages by design relaxed one or more of these underwriting criteria beyond the margins required for prime mortgage loans. A direct consequence is that we would expect the default experience of these relatively new mortgage products to be worse than that of prime loans. Indeed, industry data confirm that the performance of the very first vintages of nonprime loans was significantly worse than that of prime loans.[2]

Nonetheless, as shown in Fig. 1, beginning with the 2005 vintage the performance of nonprime mortgage loans became notably worse than previous vintages. The performance of the 2006 vintage deteriorated even further. By 12 months following origination, the 2005 vintage had a 90 day or more delinquency rate that was not reached by the 2003 vintage for 20 months, and the 2006 vintage at 12 months had a rate that was not reached by the 2003 vintage even by 30 months. Moreover, this sharp decline in loan performance was a surprise to investors in these loans in that to a

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[1] The LTV is calculated by taking the ratio of the mortgage balance to the value of the home. LTVs are typically expressed as a number ranging from 0 to 100 or higher. If the borrower has "negative equity" where the mortgage balance exceeds the value of the home, the LTV will exceed 100.

[2] The National Delinquency Survey published by the Mortgage Bankers Association of America (MBA) is one of the main sources of information on mortgage loan performance, including nonprime loans. However, it should be noted that mortgages are placed into these categories based on the servicer rather than the individual loan. Thus, if more than 50 percent of a servicer's portfolio is nonprime loans, then all of that firm's loans are lumped into the subprime category. Alt-a mortgages, according to the MBA, are divided between the prime and subprime groups. See http://www.mortgagebankers.org/files/Research/NDSFactSheet.pdf for details.

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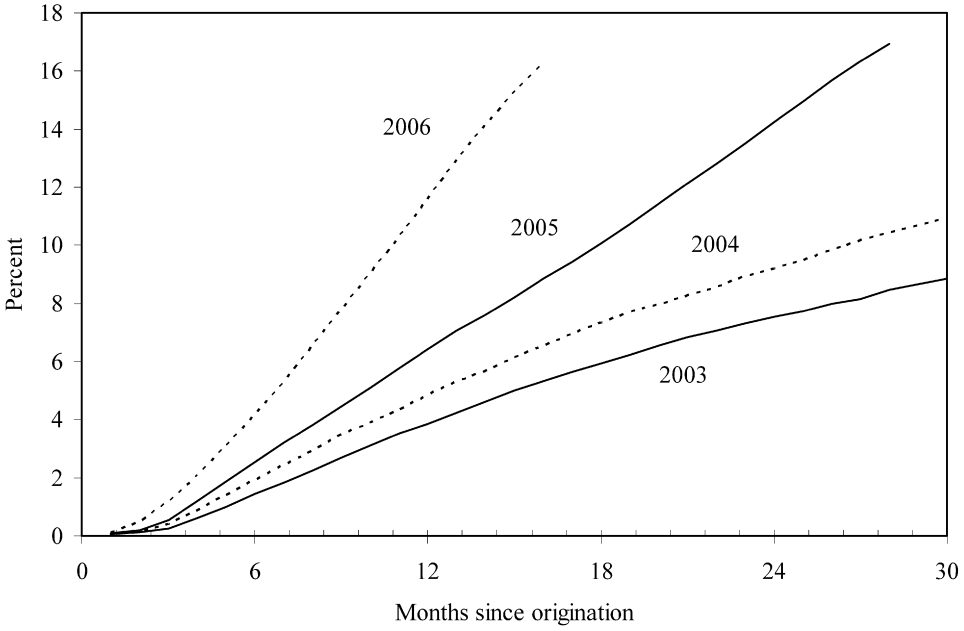

Notes: FirstAmerican CoreLogic LoanPerformance.

Fig. 1. Nonprime 90+ days delinquencies—by vintage.

large extent it seemed unexplained by the observed risk characteristics.

The sharp increase in defaults *very* early in the life of the loans suggests the moniker "juvenile delinquents." In the case of nonprime adjustable rate mortgages (ARMs), defaults often occurred well before the first interest rate reset while the initial "teaser" rate was still in effect. We define an "early default" as a mortgage that is 90 or more days delinquent within the first year after origination. We use this window since performance warranties by originators often covered the first year. The reasoning was that any serious underwriting problems with mortgages typically would manifest themselves within the first year. In our data, 10 percent of nonprime loans originated in 2007 experienced an early default, as compared to 2.7 percent of similar loans originated in 2003.

The purpose of this paper is to explore potential explanations for the sharp rise in early defaults of the 2005 through 2007 vintages of nonprime mortgages. We will examine how much of the deterioration in the early performance of these mortgages can be explained by changing risk characteristics of nonprime mortgages over time (i.e. "bad credit"). New and existing home sales peaked in late 2005 in many housing markets, and house prices began to soften and then to decline as these housing markets cooled. We will also explore the extent to which house price dynamics over the housing cycle as well as other local economic factors help to explain the early default behavior of the more recent vintages of nonprime mortgages (i.e. "bad economy"). Importantly, we will investigate the extent to which the effect of house price dynamics on early defaults depends on the risk profile of mortgages in a vintage—that is, are there important interaction effects that help to determine a vintage's share of juvenile delinquent mortgages in that vintage.

The next section provides a brief literature review of selective papers that are relevant to our analysis. We next describe our primary data source and discuss the evolution of the four basic risk factors for nonprime mortgages from 2001 to 2007. We provide tabulations of these risk characteristics and early default rates. We then turn to a multivariate analysis of early defaults. The final section draws insights from our analysis for the current housing policy debate and concludes.

1. Review of past literature

Residential mortgages are complex financial instruments that confer important options on the borrower. The extensive body of previous research on residential mortgage default has adapted option theory to the study of mortgage valuation, since there exist well-developed theory and empirical methods for valuing financial derivatives and their exercise (Black and Scholes, 1973).

An important feature of most residential mortgages is that they are "non-recourse" loans, either de jure or de facto. This means that in the event of a default, creditors can sell the house to cover the loan balance, but typically do not legally pursue the borrower for any deficiency.[3] This creates a "put" option for the borrower which he/she can exercise if the house value falls sufficiently relative to the loan balance. In addition to this default option, borrowers may continue to make the scheduled payments until the mortgage debt is discharged, or prepay the mortgage either by selling the house and paying off the balance on the mortgage or by refinancing into a new loan (Kau et al., 1995). The option to prepay is often referred to as the "call" option that borrowers hold when they take out a mortgage.

Foote et al. (2008) succinctly summarize the prediction of option theory for default when they argue that negative equity is a necessary but not a sufficient condition for default. Borrowers with positive equity ought to rarely if ever default, since (in the event of an idiosyncratic shock such as illness, loss of job or divorce) they can sell the house or refinance the mortgage. Borrowers with negative equity, on the other hand, may default in the face of similar shocks, since the option to refinance and/or sell the house is conditional on being able to raise cash to cover the difference between the mortgage balance and the proceeds of a sale or a new mortgage (Foster and van Order, 1984; Vandell, 1995).

Even borrowers with negative equity, however, default less frequently than simple models would predict [see Vandell (1995) for a summary of the empirical evidence and Elul (2006) for an

[3] While legal pursuit of borrowers' assets to cover deficiencies is available in most states, nine states impose restrictions that make it difficult for a lender to collect a deficiency judgment, including California and Arizona (Pence, 2003).