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Stability in consumer credit scores: Level and direction of FICO score drift as a precursor to mortgage default and prepayment ☆

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ABSTRACT

This article represents an extension of the expansive credit risk and credit migration literature, prominent in the corporate bond and securities risk pricing literature, to an analysis of the drift of consumer credit scores. A rich data set of residential mortgages is used to observe credit score migration post loan origination and in a test of the ability of credit score transition to serve as a precursor to potential default and prepayment. The results indicate credit scores provide signals and information to investors and servicing agents in a fashion similar to credit ratings on commercial paper as to default potential.

1. Introduction

Credit ratings published by agencies such as Moody's or Standard and Poor's play an increasingly important role in financial markets. This significance is highlighted by recently issued proposals by the Basel Committee that suggest ratings be used as a basis for calculating regulatory capital for financial institutions. A literature has developed around credit ratings and their utility as measures of default and business cycle events post issuance of debt (Bangia et al., 2002). In the construction of contemporary credit risk pricing models, analysis is employed in identifying relationships between credit rating transitions and overall credit quality (Hanson and Schuermann, 2006). Such analysis is dependent on calculating transition probabilities for different ratings classes. For example, given a matrix of rating classes what is the probability that an AAA bond downgrades to BBB, over a prescribed time horizon.

To date, however, there has been little effort to extend this literature to the consumer finance realm and the surrogate to corporate ratings, the consumer credit score. Just as changes in corporate ratings serve as leading indicators of default potential, analyzing consumer credit score drift can provide similar foresight to investors and servicing agents over the course of the loan as they seek to reduce risk and enhance the expected returns on mortgage portfolios. Both household and micro/macroeconomic factors can trigger changes in capacity to pay thereby increasing the probability of default or prepayment (Capozza and Thomson,

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2006; Vandell, 1995). Trigger events that occur post origination are not readily observable by investors or servicing agents. Due to the moral hazard in the mortgage process the borrower is under no compulsion to report changes in financial status to the lender/servicing agent (Ashcraft and Schuermann, 2006). Trigger events that do impact credibility, though delayed, can be observed through the credit score providing a type of signal of potential change in status of mortgage (Harrison, Noordeweir and Yavas, 2004; Longhofer and Peters, 2005).

Such performance information can be applied as a means to head off and project potential early termination costs, and thus abate some of the systematic risk in mortgages from both default and prepayment.[1] One of the most important and accessible indicators of a borrower's credit quality and their ability/willingness to retire their indebtedness is the FICO score. In the United States the FICO score produced by the Fair Isaac Corporation is used by 90 of the top 100 financial institutions and over 75% of the mortgage companies in underwriting mortgage loans.[2]

In 1958, Fair Isaac introduced their first scoring system, called Credit Application Scoring Algorithms, touting that the results could accurately predict the payment behavior of revolving credit holders, including whether they would pay on time, pay late, or not pay at all. By the mid-1990s Fair Isaac extended its business from credit card issues to the insurance industry, and small business. Meanwhile, Fannie Mae and Freddie Mac stepped up the use of FICO scoring for home mortgages despite criticism that credit scoring, which had helped overcome discrimination in the 1970s, now hampered implementation of Federal level affirmative action policies. Coupled with the credit collection agencies (e.g. Trans-Union, Equifax, and Experian) personal credit ratings have evolved into a mini-industry.

This article presents an investigation of FICO score changes (drift) over time for a sample of mortgage borrowers. The FICO score data is analyzed both as presented in an individual mortgage and grouped into categories referred to as grades. Allocating observed FICO scores into grades, similar to those of Moody's and Standard & Poor's corporate bond ratings, the analysis attempts to answer the following related questions:

(1) What is the FICO score experience of borrowers from origination of a mortgage through subsequent years following issuance?
(2) Is there a tendency for borrowers of various initial FICO scores to be upgraded or downgraded over the observation period?
(3) Is there temporal variation in score change over the period of observation?
(4) Do credit score migrations provide signals to investors and servicing agents relative to potential default and prepayment risk?[3]

These questions are addressed using a data set, from the state of Florida, of mortgages that includes information on origination and ongoing dynamic performance data, including the borrower FICO scores at periodic intervals over the observation period. Extending beyond the question of credit quality both static and dynamic obligor level factors are included in modeling credit score drift and default probability. For discussions on the links between credit ratings changes and bankruptcy/default modeling in a corporate setting, see for instance Altman (1968), Shumway (2001), and Hillegeist, Keating, Cram and Lundstedt (2004).

One of the objectives of this work is to provide a systematic review of the migration pattern in consumer credit scores, and to uncover the potential for ongoing observation of credit scores as a tool for predicting potential default in residential mortgages. The results suggest consumer credit scores have similar value to commercial debt ratings as signals of information on the future ability to pay of the obligor and his willingness to continue to pay under the current debt terms. The implications of these findings are significant as public and private sector risk management policies evolve in the mortgage industry post the 2008 credit collapse. The credit score is one of the few variables used by the underwriter that is not borrower provided (thus, outside the scope of borrower reporting bias), and also one of even fewer variables available to servicing agents and investors post origination (save for the payment history on the mortgage in question).

The remainder of the paper will proceed as follows. Section 2 presents consumer credit scores and illustrates the sample data organized into transition matrices with default probabilities. Section 3 presents the analysis of credit migration and a test of the relationship between credit score migration analysis and subsequent prepayment and default events. Section 4 provides final comments and suggestions for future work.

2. Consumer and corporate credit similarities

The literature on mortgage credit risk emphasizes the important roles of equity in the home and vulnerability to so-called triggering events in determining the incidence of delinquency and default. Relevant data that contain information on trigger events in the borrower's history are difficult to obtain and hard to quantify. The available evidence, however, indicates that loans made to borrowers with flawed credit histories (those who have had difficulties meeting scheduled payments on past loans) default or become delinquent more often than loans made to borrowers with good credit histories (Avery et al., 1996). Although a borrower's credit history has been shown to play an important role in determining mortgage loan performance (Alexander et al., 2002; Archer and Smith,

[1] Fannie Mae has recently begun requesting FICO scores from individuals with multifamily mortgage loans in their portfolio as part of an annual credit soundness review.

[2] The credit bureaus each have their own credit scores: Equifax produces the ScorePower, Experian's is the PLUS score, and TransUnion's credit score, and they all sell the VantageScore credit score produced in an arrangement with the three reporting firms. In addition, many large lenders, including the major credit card issuers, have developed their own proprietary scoring models. Fair Isaac provides credit scoring services around the globe and competes with domestic providers in many developed countries.

[3] The categories are similar to those used for mortgage pricing as presented in rate sheets for the state of Florida.