Prepayment Risk Modeling for Residential Mortgage Backed Securities: The Unique Indian Experience

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ABSTRACT

The first public issue of securitized instruments is overdue in Indian capital market (SEBA 2008). Development of suitable pricing models would be helpful in trading these instruments. This paper is focused on prepayment risk of housing loan pools. Prepayment estimation is useful to project the cash-flows, which are essential for pricing. A few prevalent models and their variations are tested and suitably adjusted to make them readily applicable on the Indian data. It is found that the prepayment can best be explained by an adjusted Chinloy model with contracted rate (and not the current rate), age of the mortgage and burnout. This behavior is unique because the current rate does not have any bearing on the prepayments in India.

Keywords: Burnout, Coupon Rate, Prepayment, Pricing, Securitized Instruments

INTRODUCTION

The subprime crisis has changed the financial function of the globe. One of its reasons is reckless lending to undeserving borrowers of housing credit. It is an example of risk mismanagement. India, which has been recognized as one of the most important economy (NIC, 2008; Obama, 2010), is slowly but steadily changing to bring in autonomy and encourage growth of its financial markets, which are completely different than many global markets. Unlike American or European markets, the fixed income instruments’ segment in India is having negligible trade volumes in comparison to equity and derivatives segments. Mortgage Backed Securities (MBS), one of the most active instruments in American market, are conspicuous by their absence in a typical Indian portfolio. In order to infuse more activity, in Indian fixed income instruments market, an attempt to create necessary financial and legal infrastructure is being made. This is expected to introduce a variety of instruments, Residential Mortgage Backed Securities (RMBS) being one such class. The issuance of fresh guidelines for issuance of securitized instruments in 2008 (SEBA, 2008) may see issuance and listing of RMBS any time now. Secondary market for RMBS is so far (up to October, 2010) is nonexistent in

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India. The size of Indian mortgage industry is approximately $40 billion.

Since pricing of any instrument requires projections (amount, timing and associated risks) of cash-flows underlying the instrument, analyzing these risks; prepayment being one of them; becomes an absolute necessity. Hence there is an immediate need for exploring acceptable risk models for such instruments, which would be of immediate use.

**Primary Market for RMBS**

Before we discuss about prepayment risk, let us understand as to how the RMBS instruments take birth in Indian mortgage market. Housing, a common and important asset, is one of the primary needs of humans. Since it is capital intensive, purchase of this asset is mostly financed by mortgage loans. In India, typically the buyer of a house makes down payment (minimum 10%, generally 20%) from his/her own savings (equity); the rest of the amount is debt, financed by the lending institutions. Under this arrangement, the house is mortgaged in favor of the lender. The borrower occupies the house. As the borrower pays regular loan installments, the outstanding loan amount keeps on depleting and vanishes with the payment of last installment. In case of defaults in the installments, the lender has recourse only to the property which was financed by the loan. During the loan period, the mortgage loan is an asset for the lender and a liability for the borrower. This asset on the books of the lender is illiquid but can be converted into a liquid asset by the process of securitization.

Securitization is a synthetic technique, in which the lender can integrate similar illiquid assets to generate a pool. This pool of receivables is subsequently disintegrated into marketable securities and sold to the investors in the capital market. The instrument (marketable security) is known as Residential Mortgage Backed Security (RMBS). The instrument is having various risk elements associated with the pool including default risk, interest rate risk, co-mingling risk and one of the most important; prepayment risk. This paper is focused on the variables governing the variation in the prepayment levels of residential housing loan pools for India.

**Prepayment Risk**

Prepayments are receiving cash flows earlier than expected (Kothari, 2006). Prepayments are the double-edged sword of the mortgage backed securities market. They create opportunity, but also risk (Davidson & Herskovitz, 1994). Prepayment risk is resulting from cash flow deviations (Fabozzi et al., 2007). This underlines the fact that it is a kind of market price risk resulting from the uncertain time of cash flows (Spahr & Sunderman, 1992). If the outstanding balance is paid off in full, it is termed as complete prepayment; else, it is known as curtailment or partial prepayment (Kalotay et al., 2004). Prepayments are the most important for the pricing of RMBS instruments (Chen, 2004).

**Prepayment Modeling for India**

Most of the research on prepayments associated with Mortgage Backed Securities (MBS) has occurred in the U.S. (Daniel, 2008). There are evidences of prepayment modeling for other economies like Australia (Daniel, 2008), Japan (Sugimura, 2002), Italy (Baldan & Zen, 2009), Netherland (Jacobs et al., 2005) but there is no evidence of any research work on Indian prepayments. This surprise may be due to negligible activity in Indian MBS market as India has been a bit slow in adapting such innovative financial products like RMBS.

Since U.S. mortgage market has been the most active in research, in this paper the reference of prepayment models for U.S. mortgage market have been used as the benchmark. Since the Indian and U.S. MBS markets are at different maturity levels, the applicability of the current prepayment models in U.S. may not be applicable in India. Hence the research problem of this paper is to investigate the applicability of prepayment models on Indian RMBS pools.

The remaining part of the paper has been arranged in the following sequence. Next section
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