PIMCO Advisory’s Approach to RMBS Valuation

December 8, 2010
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# The Building Blocks of Valuation

- Credit sensitive mortgages are very complex assets and there is no simple way to determine their expected losses with certainty.

- Mortgage models are effectively making a forecast about the future, e.g., what path will home prices take over the next 30 years.
  - Models aren’t perfect and are rough approximate of expected future behavior.
  - Valuation of RMBS requires a combination of quantitative modeling and fundamental understanding of mortgage markets.
  - Effective use of models requires substantial judgment on the part of the modeler and end-user.

- PIMCO Advisory’s mortgage modeling process is the result of decades of experience & a deep fundamental understanding of the underlying assets.

<table>
<thead>
<tr>
<th>Macroeconomic Model</th>
<th>Mortgage Loan Credit Model</th>
<th>Waterfall Model</th>
<th>Valuation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects macroeconomic variables which drive the Mortgage Loan Credit Model</td>
<td>Projects the performance of each loan based on macroeconomic scenario and loan characteristics</td>
<td>Uses the results of the Credit Model to determine the impact on the tranches in the deal</td>
<td>Once cash-flow results are generated, they are discounted by an assumed interest rate to arrive at NPV</td>
</tr>
</tbody>
</table>
National House Price Situation

As Of September 30, 2010

<table>
<thead>
<tr>
<th>Case-Shiller HPI 20-City Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>YoY</td>
</tr>
<tr>
<td>Current</td>
</tr>
<tr>
<td>0.5%</td>
</tr>
</tbody>
</table>

House Price Appreciation

SOURCE: S&P, Haver Analytics
Significant Variation Exists Across Local Housing Markets

As Of September 30, 2010

Case-Shiller Peak to Trough HPD & Rebound (In Parentheses) - MSAs

- Las Vegas -57% (0.3%)
- Phoenix -54.5% (3.5%)
- Miami -48.5% (0.7%)
- Detroit -46.7% (4.3%)
- San Francisco -46.1% (20.2%)
- Tampa -42.7% (0%)
- San Diego -42.3% (12.5%)
- Los Angeles -41.9% (10.2%)
- Minneapolis -36.5% (13.9%)
- Washington D.C. -33.9% (13.8%)
- Chicago -29% (4.2%)
- Seattle -25.3% (1.1%)
- Atlanta -24% (3.9%)
- Portland -23% (0.5%)
- New York -21.7% (3.4%)
- Cleveland -21.6% (7.1%)
- Boston -20.1% (7.2%)
- Charlotte -15.5% (0.5%)
- Denver -14.3% (5.9%)
- Dallas -11.2% (4.7%)

SOURCE: S&P, Haver Analytics
Future interest rate paths are usually based on implied forward money market and mortgage interest rates.

Interest rates impact the collateral cashflows. In particular the projected interest rates impact refinanceability of the loans as well as any borrower payment shock.

SOURCE: PIMCO
The dates projected are a forecast along forwards made by PIMCO.
Mortgage Loan Credit Model

- The role of a mortgage loan credit model is to project mortgage default, prepay and loss severity on a loan basis – and by extension – on a mortgage-backed security

- PIMCO Advisory’s loss expectations are determined by employing proprietary loan level quantitative models

- The proprietary loan-level default model has the following three major components:
  - Incorporates borrower and property characteristics based on attributes known at the time of origination
  - Includes dynamic performance data from origination including borrower payment, interest rates, and home price histories
  - Incorporates future economic information on regional home-price appreciation and mortgage/interest rates

- We employ different sub-models by credit (subprime, Alt-A etc.) and product type (fixed vs. adjustable)

- The output of the model is a set of CPR, CDR and severity vectors
Loan-Level Default Analysis

- PIMCO Advisory’s loan level process models each individual loan in each securitization

- Historical loan performance is a critical factor in projecting future performance
  - In our model, loans are classified into two groups: performing and non-performing
  - The model incorporates not only the current status but also considers the previous history of the loan; if a loan was previously delinquent, the probability of future default increases
  - Based on the loan level characteristics and macro economic variables, transition probabilities are calculated, a random drawing against these calculated probabilities decides which performance group or exit group (prepayment or default) the loan goes during the next month
  - Since the parameters of the model are path-dependent, Monte-Carlo simulation is used
  - After updating all the information, a new set of probabilities is calculated, a new drawing is performed for the next month. This procedure repeats until the loan prepays or defaults. The loan level prediction is then aggregated into CPR/CDR vectors
Important Explanatory Factors of Credit Model

- **Static Factors**
  - Original borrower FICO
  - Documentation level
  - Property type (single unit, condo, two-four unit etc.)
  - Occupancy (owner, investor/second homes)

- **Dynamic Factors**
  - Current marked-to-market loan-to-value ratio; Current LTV is adjusted using regional home price indices.
  - Interest rates: impacts prepayment speeds and payment shock behavior
  - Home price appreciation / depreciation (HPA / HPD)
  - Seasoning / Loan age
  - Regional foreclosure timelines

- **Historical Payment Information**
  - Duration of delinquency
  - Fraction of time in delinquency

- **Finally our expert analysts manually calibrate the model for a variety of reasons, including but not limited to:**
  - Inherent model biases
  - Loan modifications
  - Servicer-level adjustments
Each loan is modeled individually over time.

Historic data tells us whether loan is current or delinquent as of today.

Loans may transition between current and delinquent states, and can terminate through prepayment or default.

Transition probabilities are a function of static, dynamic or path-dependent variables.

Sample for illustrative purposes only.
Loss Severity Analysis

For the purposes of loss severity, the same default probabilities are applied to maintain consistency. Additional components that contribute to the ultimate loss severity analysis include:

- Collateral deficiency (unpaid balance less REO sales price)
- Lost interest (accrued as servicer advances)
- Expenses (legal, property taxes, brokerage fees)
- Mortgage insurance considerations

The explanatory variables incorporated in the default probability have a linear relationship with loss severity. Historical trends can help predict loss severity sensitivities to inputs such as:

- Static Factors (at origination)
  - FICO
  - Property type
  - Occupancy (owner, investor/second)
  - Lien-Position
  - Mortgage Insurance
  - Judicial vs. non-judicial state

- Dynamic Factors
  - Interest-rate
  - Loan Balance
  - HPA/HPD
  - Current marked-to-market LTV
  - Regional Foreclosure Timelines
  - Time/Loan Age
Sample Adjustment: Accounting For Loan Modifications

Modified Loan Repository
- Including:
  - Modification type
  - Rate
  - Recap
  - Rate Freeze
  - Principal Forgiveness
- Modification date
- Modification magnitude

Loan Mod CF Overrides
- Prevents modified ARM loans from resetting
- Assuming HAMP mods, lifts WAC to PMMS rate 5y after modification date

Redefault Timing Adjustment
- Multiplier of model CDR for modified loans
- Based on empirical redefault timing for modifications categorized as:
  1) those with principal reduction
  2) those with payment reduction but no principal reduction
  3) other types of modification

Cashflow Engine

Model Curves
Model Curves are Input into the Cash-flow Engine and Allocated According to Each Deal’s Waterfall Structure

- Bonds get paid principal and interest and losses at a particular point in time
- The deal’s legal documents determine the waterfall rules

<table>
<thead>
<tr>
<th>Principal Allocation</th>
<th>Group 1</th>
<th>Group 2</th>
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<tbody>
<tr>
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<td>A1A</td>
<td>A2D K</td>
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<tr>
<td></td>
<td>A1B</td>
<td>A2A</td>
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