The Actuary in Banking

The North American Experience

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October 3, 2017
Mortgage Market

- Investors
  - FHA / VA (GNMA)
  - Conventional (GSE)
  - Portfolio Held
  - Private label security

- Loan Features
  - Mostly 30 year, fixed rate loans (QM compliant)
  - Borrower has option to refinance to a lower interest rate
  - In general, no recourse to borrower in the event of a default
History

- Lenders and investors typically require mortgage insurance for a mortgage loan if down payment is less than 20% of the home value.

- Private mortgage insurers (PMI) provide coverage for a portion of the top portion of the mortgage (for example, if a borrower puts down 10%, PMI may provide coverage of 25%). After 25% the government-sponsored entities (Fannie Mae and Freddie Mac) provide coverage.
Background

- PMI is written by a property casualty company; therefore, for 30 or more years casualty actuaries were required to opine on the PMI’s reserve levels.

- This knowledge has also allowed CAS members to expand into providing work for:
  - GSEs
  - Banks
  - Reinsurance market
FASB Current Expected Credit Loss (CECL)

- New accounting framework proposal for loan loss reserves
- Reserve for lifetime losses as opposed to incurred losses (i.e. serious delinquencies)
- The scoring models allow for an integrating risk-based lifetime loan loss reserve for each loan at origination for your clients:
  - Loss Estimate (Portfolio Loan) = Default Score * Severity * Original Loan Amount
  - Loss Estimate (GSE loan) = Repurchase Score * Severity * Original Loan Amount
CECL Challenges

- CECL Challenges = opportunity for actuaries
- Data
- Models
- Expertise
- Potential uncertainty and volatility for certain exposures with limited historical data
Key distinction is the requirement to forecast ultimate losses
Would no longer be the statistical mode or most likely outcome
FASB does not mandate that the estimate be a probability-weighted calculation
  • Could simply be an estimate based on the two outcomes: 1) no credit loss and 2) some credit loss
Update management estimates of expected credit losses at each reporting period
  • Changes in estimate reflected in earnings
Actuaries are already doing these analyses for other reasons!
If implemented, there will be an accounting impact to such work!
  • Loss reserve opinion framework would translate well to this objective
Still under review for final standard - Timing for implementation no earlier than 2019
Historical Home Loan Statistics

Percentage of Outstanding Loan Balance Delinquent at Calendar Year End
Commercial Bank Residential Loans

Note: Delinquent loans include those loans past due 30 days or more at calendar year end.
Commercial Bank data based on data from www.federalreserve.com
Data from MBA National Delinquency Surveys. Includes loans 30+ days delinquent and foreclosures.
Mortgage Scoring Products

- **Default Score:**
  - Lifetime probability and timing of default at the loan-level
  - Utilizes borrower credit quality, loan characteristics, and economics to estimate default probability
  - Developed using a database of over 30 million mortgages

- **Repurchase Score:**
  - Lifetime probability and timing of repurchase at the loan-level
  - Utilizes borrower and loan characteristics and performance estimates to estimate repurchase probability
  - Developed using actual repurchase data from the GSE’s on over 10 million mortgages
Model Schema
Econometric Model Variables

Prepay Rate
- Credit Score
- Loan Amount
- Loan-to-Value Ratio
- PMI Indicator
- Original Term
- Loan Purpose
- Documentation Type
- Amortization Features
- Occupancy Type
- Property Type

Economic Data
- Home prices
- Interest Rates
- Unemployment Rates

Foreclosure Rate
- Credit Score
- Loan-to-Value Ratio
- DTI
- Amortization Features
- Loan Term
- Documentation Type
- Property Type
- Loan Purpose
- Occupancy Type
- Spread at Origination
Mortgage Scoring Products

- **Current Model Uses:**
  - Quality Control Priority Review
  - Correspondent Benchmarking
  - Loan Loss Reserving
  - Capital Modeling
  - Non-QM Evaluation / Product Development
  - MSR Loan Performance Estimates
  - Mortgage Insurance Reserving
  - Risk-based pricing

- **Relied Upon and Validated by:**
  - Private Lenders / Servicers / Non-Bank Lenders
  - Mortgage and financial Guarantee Insurers
  - Global Insurers/reinsurers
  - GSE’s
  - HUD

- Thorough documentation provided for model validation purposes

**Companies use the repurchase score to identify and prioritize pre-funding quality control reviews to minimize the risk of repurchase prior to review by the GSE’s.**

**Clients use the default and repurchase score to develop risk-based pricing for specific TPO’s that deliver higher-risk products.**
Credit Model Framework

- Key Drivers of Credit Losses
  - Underwriting characteristics
  - Economic conditions
  - Loan Level Model Calibration
    ✓ Underwriting characteristics (FICO, LTV, documentation, I/O, etc.)
    ✓ Economic factors
    ✓ Both paid and “incurred”
    ✓ Persistency
    ✓ Review data at granular level
GSE Delivery

- The GSEs have been in the process of deleveraging their balance sheet
  - Selling mortgage backed securities to third parties;
  - Buying reinsurance deals to limit their exposure
- CAS members have been helping in the above areas
  - As consultants advising companies; and
  - As company employees pricing deals
Importance of capturing the most relevant attributes - propensity to default by loan characteristics for residential mortgages

Illustrative Loan Characteristics

Amortization

FICO-LTV

Interest Only

Loan Purpose

Property Type

Documentation

Loan Size

Occupancy

Interest Only

Loan Purpose

Property Type

Prime

Alt-A

Subprime
Model Framework

Mortgage credit losses susceptible to CY economic effects
Model Framework

Comparison of Default Rates to HPA Ranges

Note: Default Definition = Default_NC by FICO Cohort with Exponential Fit
Illustrative Example of Scoring

Borrower Risk

(All Loans Not in CBBA Included in "Rest Of State" Area)
Illustrative Example of Scoring

Loan Product Risk
(All Loans Not in CBSA Included in “Rest Of State” Area)
Illustrative Example of Scoring
Closing Thoughts

- Innovative credit risk modeling is extremely valuable in mortgage analysis
  - FASB initiative elevates the importance of this skill set
  - Challenge = How to ensure consistent level of rigor
  - SOPs and qualifications – “appointed actuary” type function

- Value independence and transparency

- Critical considerations: underwriting attributes and economic conditions

- Develop assumptions at granular level – loan level
  - Assumptions should be tailored to portfolio specific characteristics at the loan level

- Don’t overlook tail risk

- Continually innovate!
Thank you

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October 3, 2017