

Primatics CRE Modeling Webinar

Introducing Evolv's Commercial Real Estate (CRE) Model

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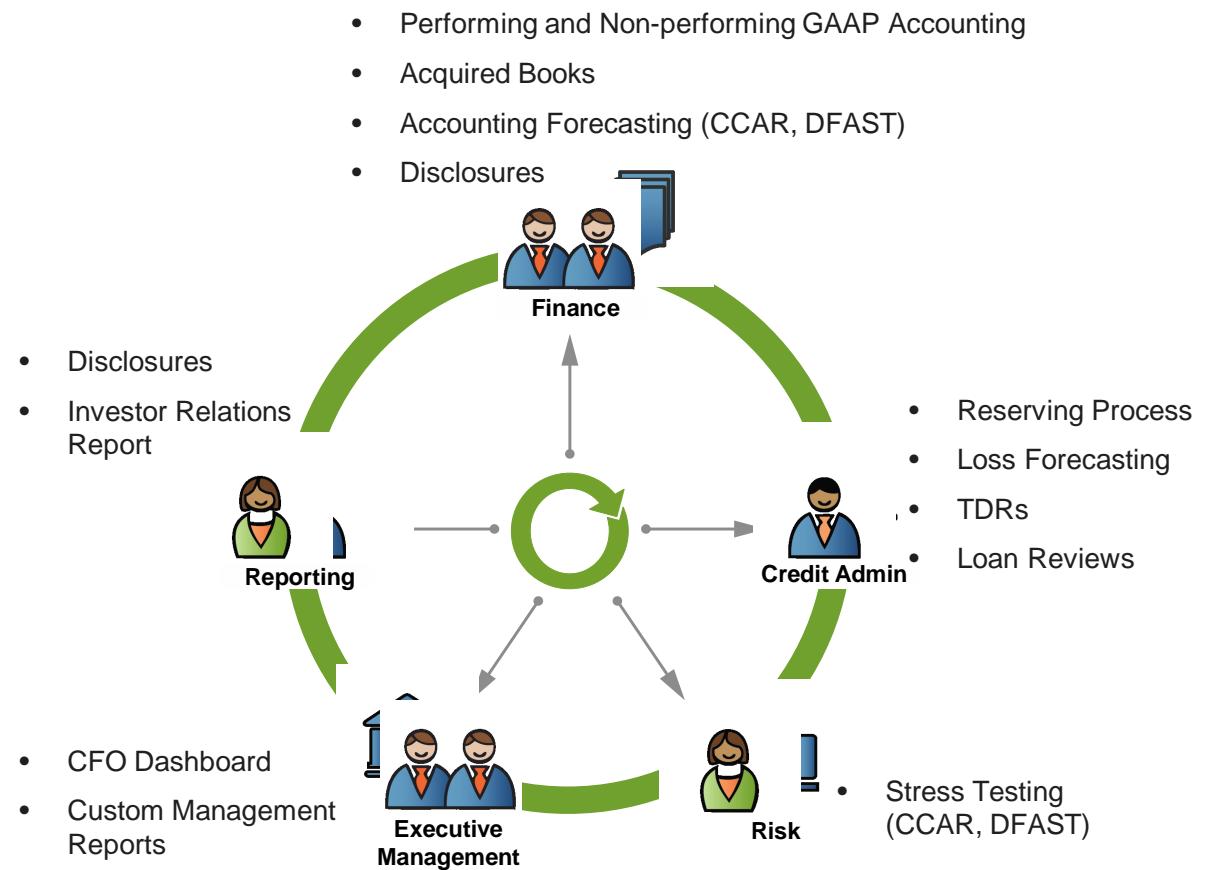
Dr. Joseph L. Breeden
Prescient Models



Primatics Financial - Overview

Primatics' mission is to help banks and financial institutions evolve. We provide an enterprise-grade SaaS solution for accounting, valuation and compliance of loan portfolios

- We focus on loan portfolios – the core business of banks
- Our solution, Evolv, empowers banks' users to comply with regulations, manage complexity and make better decisions
- We provide a SaaS (Software-as-a-Service) Solution with best-in-class security, flexibility and business scalability
- We currently have 50+ customers across all asset sizes, including over 15 Tier 1 (\$10B+) financial institutions



Prescient Models - Overview

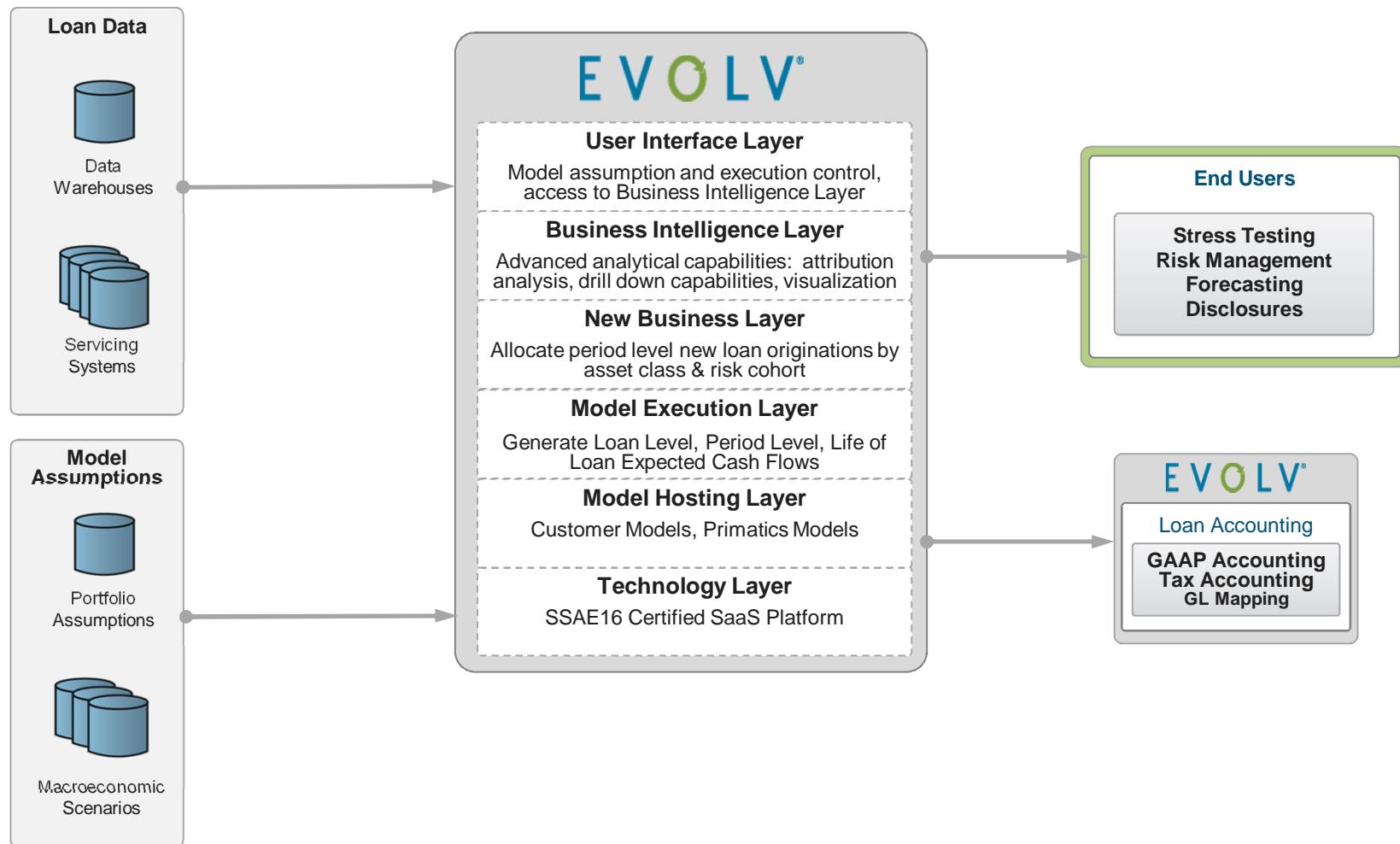
- Prescient Models is a leader in loan-level forecasting and stress testing technology with a global clientele.
- With an emphasis on predicting probabilities, not just rank-order scores, Prescient's models address all aspects of the P&L, including loss forecasting, attrition / prepay, balance growth, revenue, and expenses.
- Prescient's models create a uniform modeling connection from loan pricing through account management to economic capital.

Table of Contents

- Overview of Evolv Platform
- The Technology of Evolv's CRE Model
- Applications of Evolv's CRE Model

Overview of Evolv Platform



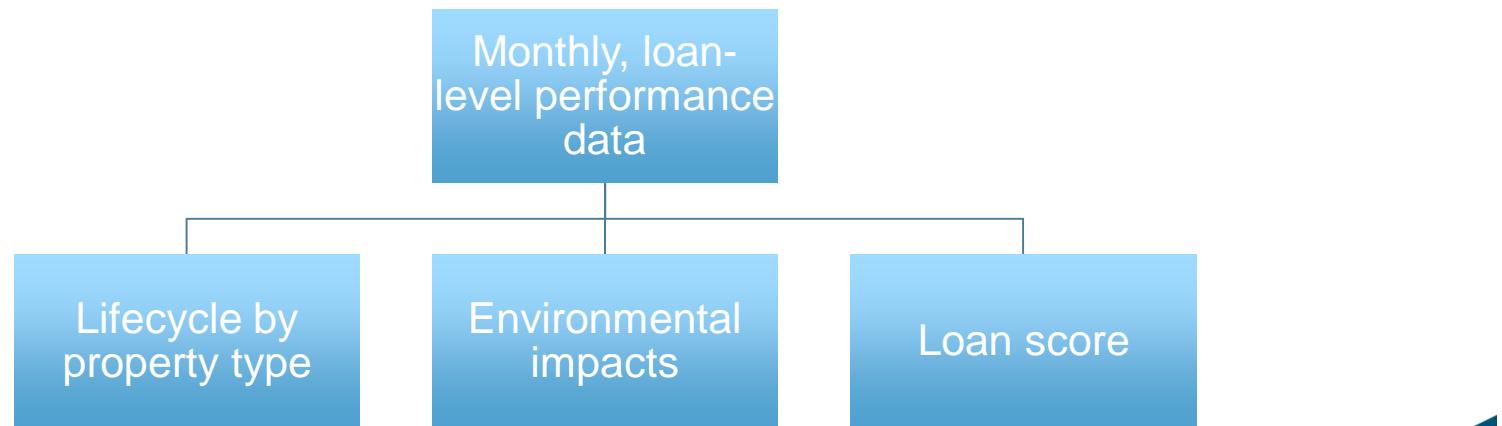


The Technology of Evolv's CRE Model



Model Structure

- An expected loss structure (PD, EAD, LGD) plus attrition rates.
- All models are loan-level.
- Probability of Default (PD) and Loss Given Default (LGD) are modeled with an Age-Period-Cohort structure.
- “Age” is replaced with “Time to Maturity”. Maturity dates are dynamic, so “Age” will be negative and moving forward or backward depending upon changes in loan terms.

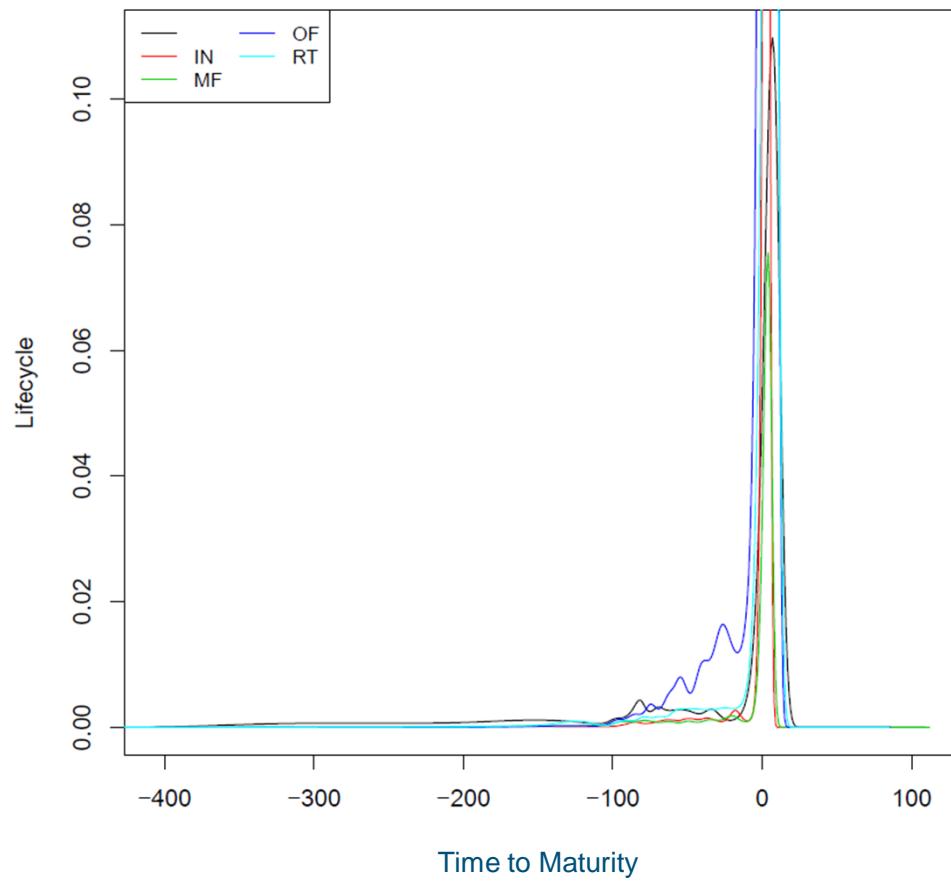


Modeling Sequence

PD:

1. Create loan-level APC-style model with binomial distribution to product a lifecycle function versus time-to-maturity and an environmental function versus calendar date.
 2. Create model correlating the environmental function to macroeconomic factors. Use appropriate transforms and lags
 3. Create scoring model with GLM incorporating lifecycle and environment as fixed inputs. The “score” is actually a scenario-based, loan-level probability model.
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- Repeat for LGD and Attrition.
 - EAD is handled via simulation.

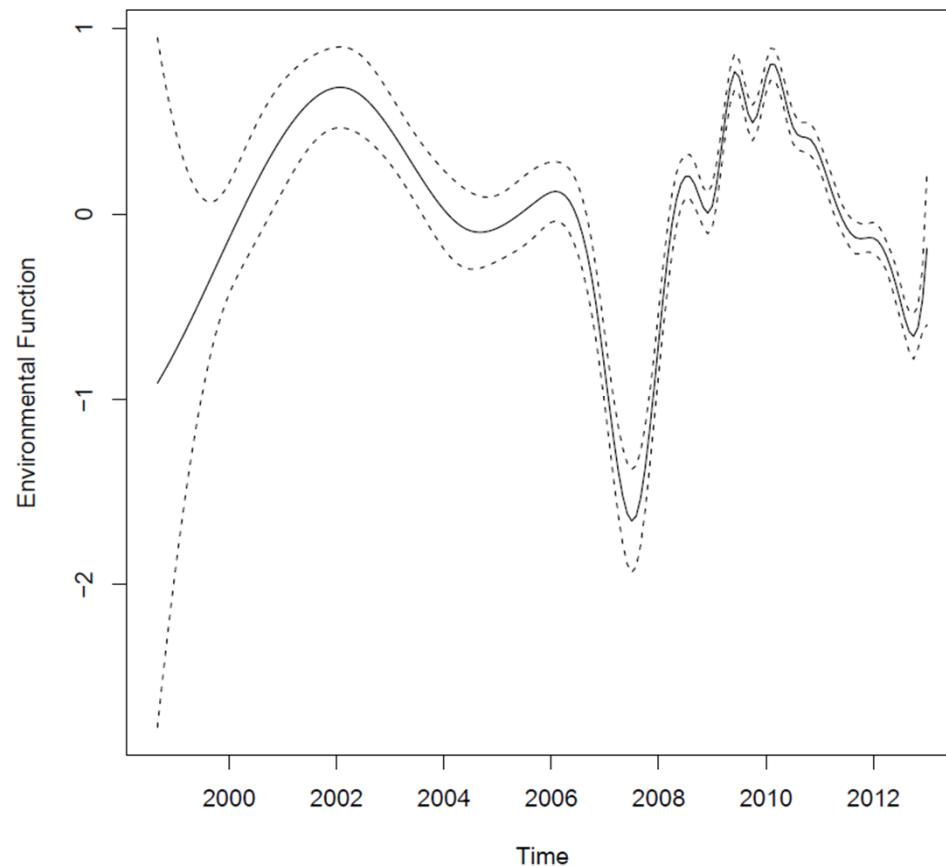
Product Lifecycles



Product categories have different, though similar lifecycles. (Industrial, Multifamily, Office, Retail, and Other)

Risk of default rises dramatically as loans approach maturity without being extended.

Macroeconomic Environment



The environment measures how many more (+) or fewer (-) defaults we observed as compared to the usual lifecycle.

This measure captures both the 2009 recession and the previous 2001 recession as expected, with higher uncertainty in the past.

Macroeconomic Factors

Macroeconomic factors are correlated to the historically measured environment in order to extrapolate to the future.

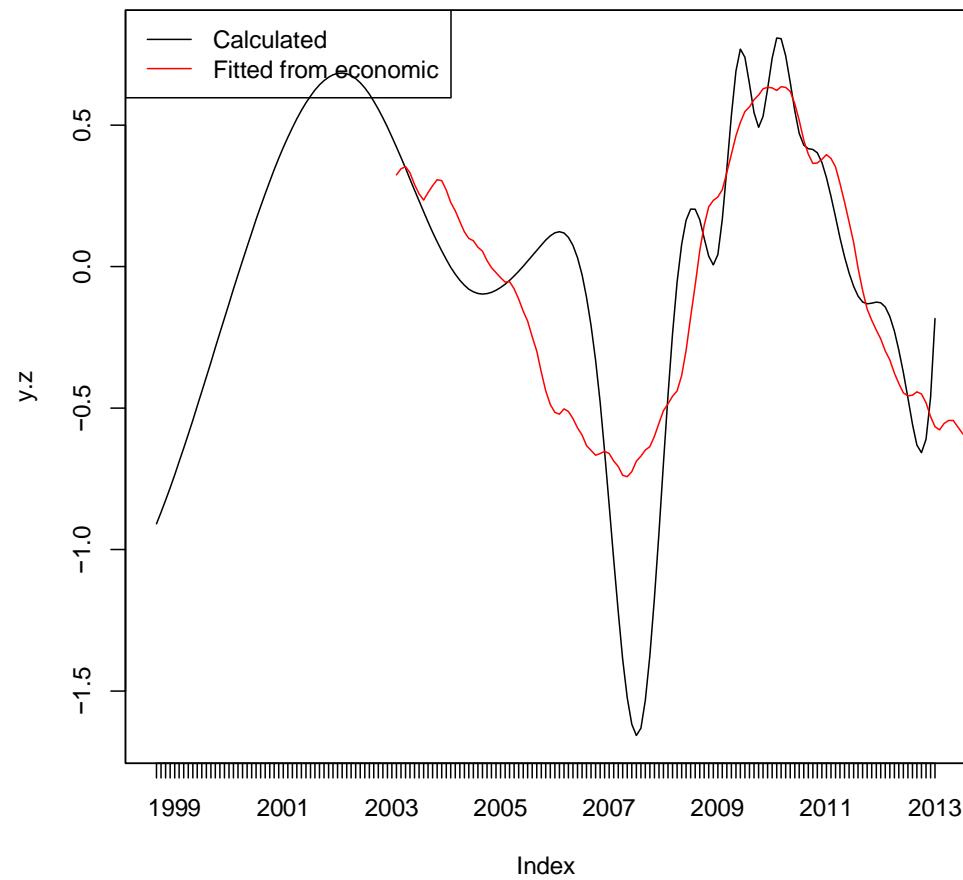
After testing a wide range of measures, we found the following to be most predictive for PD and LGD:

- Commercial Property Price, 12-m change (log-ratio)
- Unemployment Rate, 12-m change (log ratio)
- Real GDP, 12-m change (log ratio)

The log-ratio is used rather than % change, because % change is asymmetric and skewed:

For percent-change transformations, $+10\% - 10\% \neq 0$.

Macroeconomic Overlay



The resulting macroeconomic fit allows us to create forward-looking, scenario-based forecasts and stress tests.

Scoring Factors

Fixed from most recent observation:

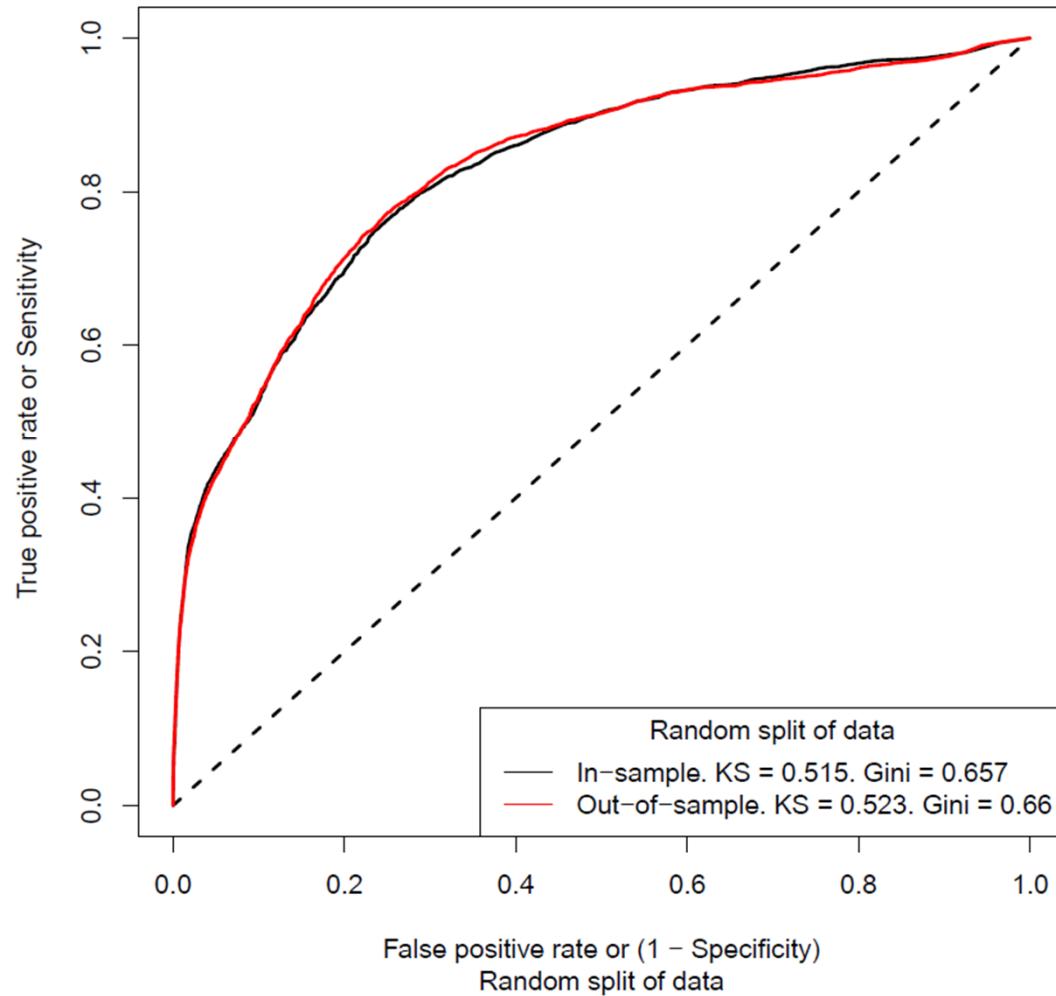
- Property Type
- DSCR NCF (Ratio of net cash flow to debt service); current year, previous year, and two years prior
- Occupancy Fraction
- Property Status
- Property Condition
- Delinquency History

Factors that vary with the macroeconomic scenario

- Current LTV
- Current Note Rate

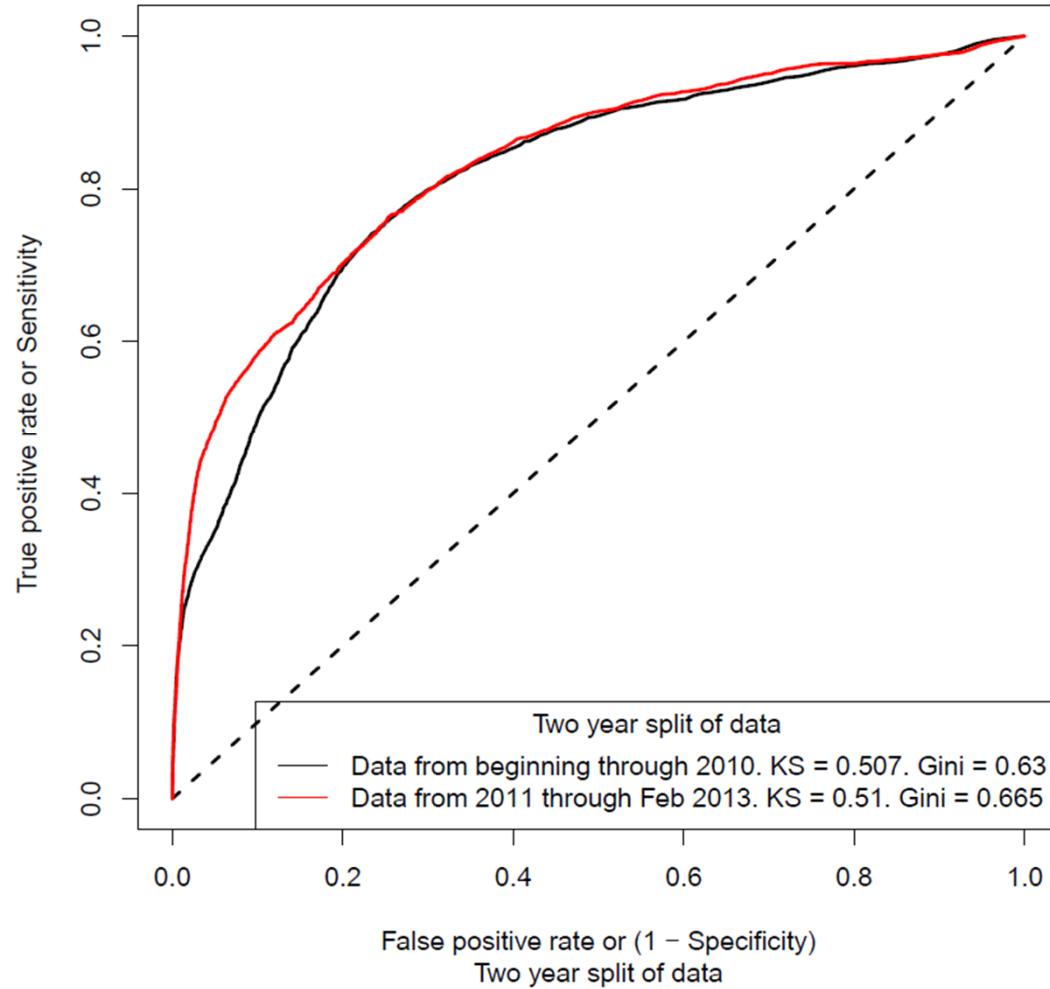
Out-of-sample Tests

ROC curves



Out-of-time Tests

ROC curves



Applications of Evolv's CRE Model



Applications of Evolv's CRE Model

The combination of Evolv and Prescient Models is very powerful, evidenced by the many applications and business uses of the CRE Model, including:

- Forecasting losses
- Forecasting gross interest income
- Generating NPVs
- Regulatory stress testing
- General stress testing/scenario analysis
- Generating results for accounting
- Challenger model

Q&A

- Send questions through chat to John Lankenau or through Q&A window

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