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Predictive Analytics for Retail Lending

Big Data in Retail Lending

- With every great new technology, the biggest challenge is translating to practical value.

- Google is an artificial intelligence company
  - processing huge volumes of data
  - to make best-guesses on customer needs
  - where no "right answer" is known
  - with minimal regulation

  - This is an ideal use for the unstructured analysis of big data, but it is not the retail lending problem.

Data Analysis in Retail Lending

- The input data is highly regulated, with the same inputs available to all lenders.
- Insufficient history for unstructured macroeconomic analysis.
- The dominant structures in retail lending models are known. Unstructured analysis would be a disaster.
- Any AI-based result would never pass validation or examiner review.
- Any model output eventually rolls up to a finance report, involving even more layers of regulation and review.

The Opportunity of Big Data

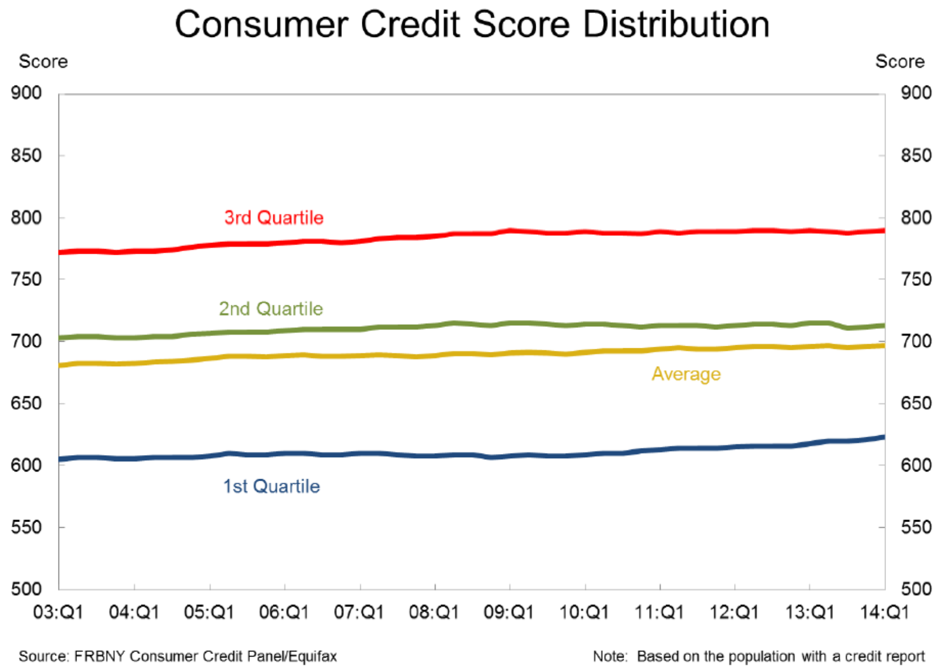
- Using algorithms that allow for the incorporation of business expertise.
- Analyzing large data sets using model structures optimized for retail lending.
- Taking predictive analytics to the individual.

What are Predictive Analytics?

- Seeing the future
- Understanding the past

Predictive vs. Prescriptive

- Scores rank-order.
- FICO / Bureau scores measure overall risk on existing loans, not the risk after you give them a new loan. They don't measure product-specific risk or forward-looking risk.



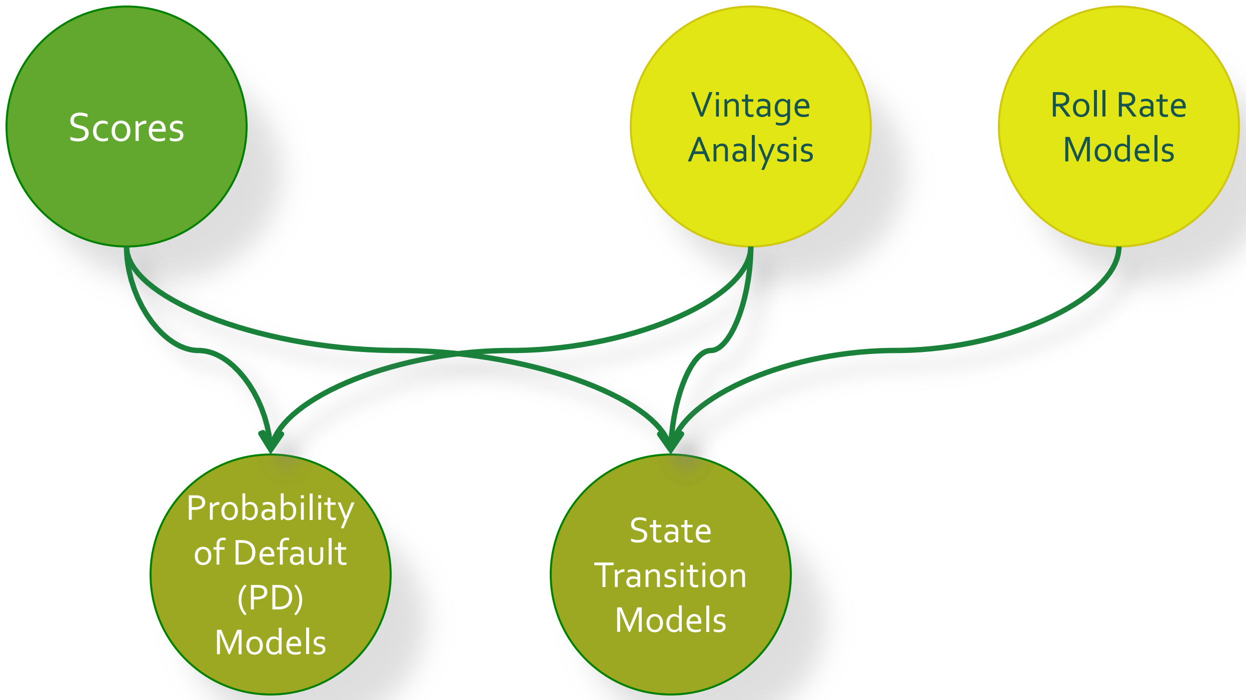
Follow the Money…

- The big analytics spends today are on regulatory compliance.
- The Fed, OCC, FDIC, and NCUA have all put forecasting and stress testing on center stage – predictive analytics.
- Examiner instructions to the biggest lenders: "You don't need loan-level models, but you need to build best-in-class models… Loan-level models are best-in-class."

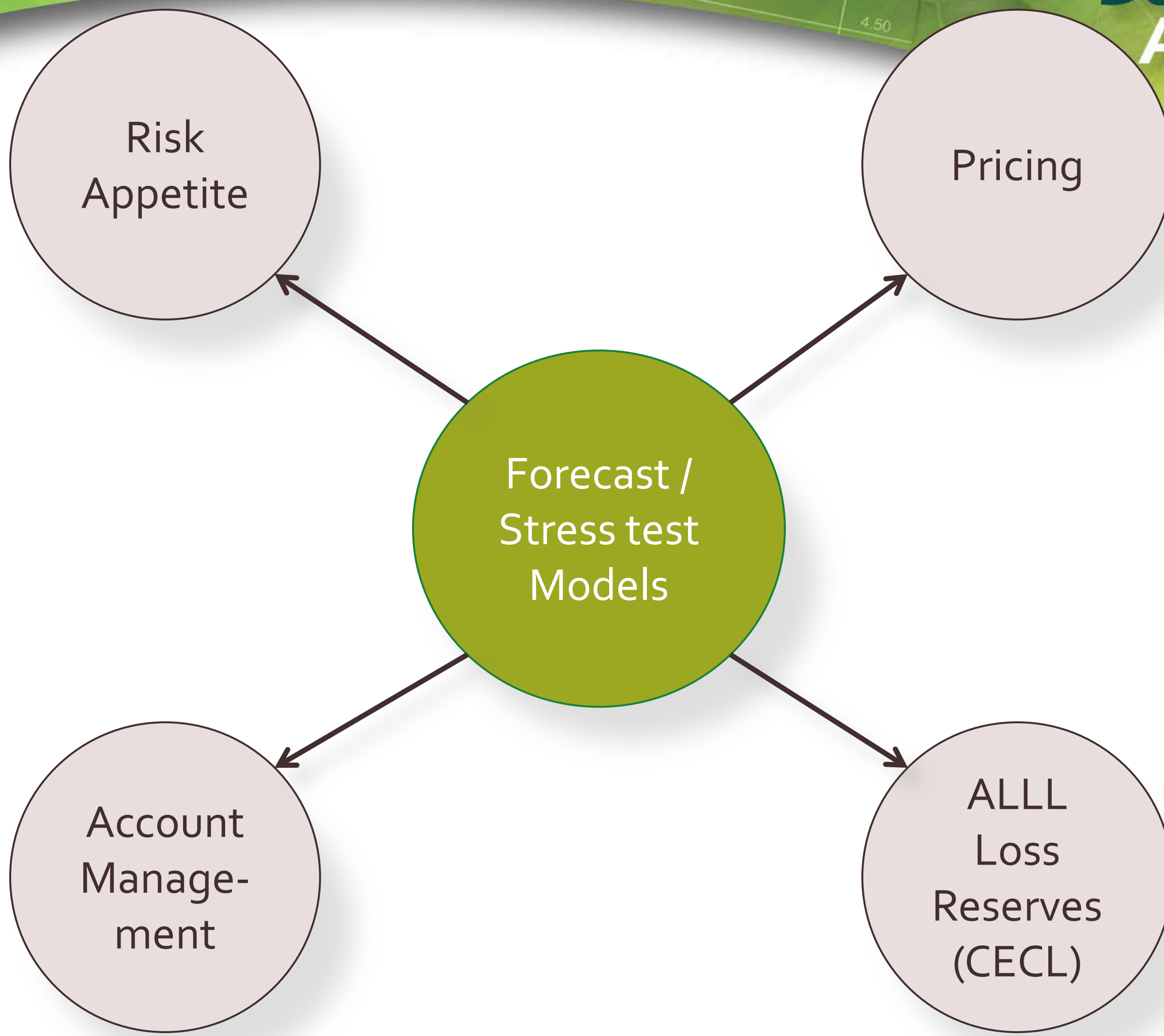
The Next Generation in Modeling

Account Decisioning

Portfolio Forecasting



Finding Value in the Spending



Pricing

- Pricing is often meet-the-market or moving average. In 2005, mortgage lenders were pricing based upon 2003 originations.
- Pricing often ignores loss timing. New loans are always low risk, but don't stay that way.
- Pricing models rarely consider the future environment or even the current or average environment.

Pricing Failures

- All banking crises are pricing failures first.
- The pricing model most likely to "break the bank" is "meet the market", but any approach can be done badly.
- In 2004 and 2005, mortgage lending executives were saying, "Grow the portfolio 40%, but don't drop the cut-off [FICO] score."
  - The result? Hard-working teams met their objectives earning big bonuses.
  - FICO tracking was constant.
  - Two to three years later, these portfolios collapsed from bad loans.
  - No one priced for the risk. They just priced for FICO.

Risk Appetite

- How much of an economic downturn can I withstand before my new loans become unprofitable?

- All predictive models must consider future economic conditions. What conditions am I priced for?

Account Management

- Forward-looking probability models.
- Line assignment and next-sell based upon probabilities, not rankings
- Competing risks: default versus prepayment

Loss Reserves

- ALLL models will finally become predictive models under CECL.
- Forecasting models, stress test models, and pricing models will all converge.

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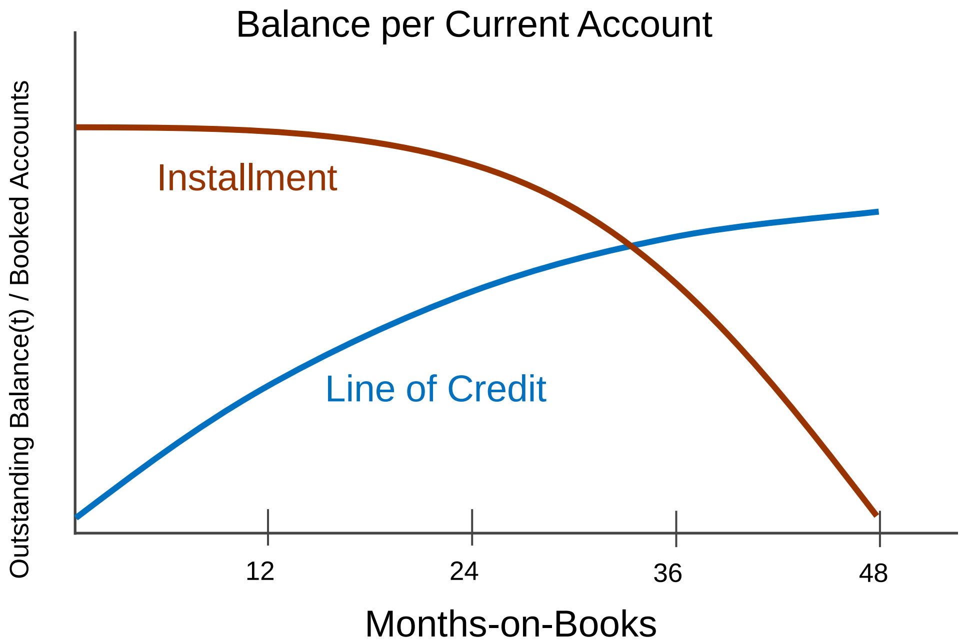
Components of Predictive Models

Moving to Quantitative Pricing

- Best practice is to estimate future margin quantitatively. Over the life of the loan.
- How will these evolve?
  - Balance growth / pay-down
  - Attrition / Prepayment risk
  - Loss timing
  - Credit risk
  - Future environment
  - Recoveries
  - Expenses

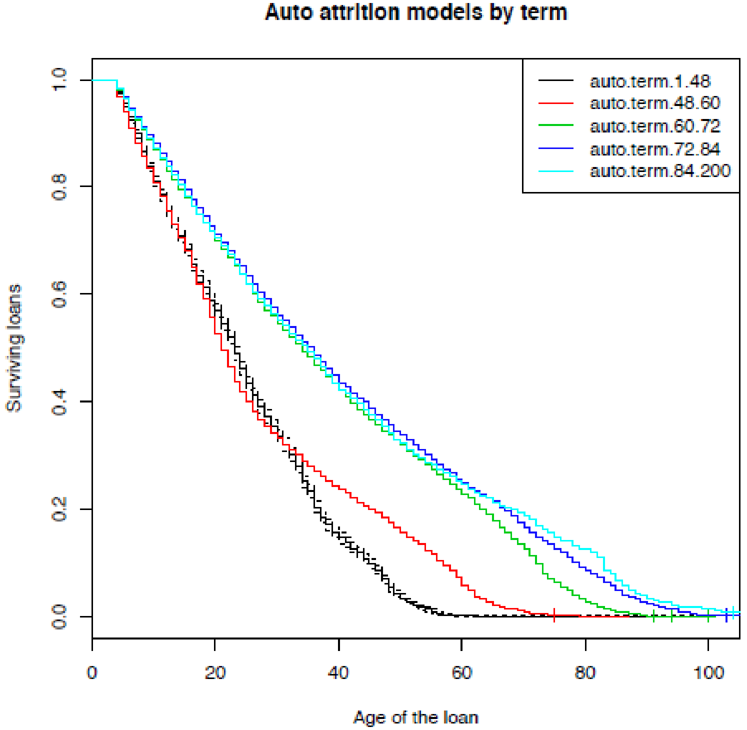
Balance Growth / Pay-down

- Balance dynamics are sensitive to the product, term, and segment.
- Balances are very dynamic through the life of the loan.



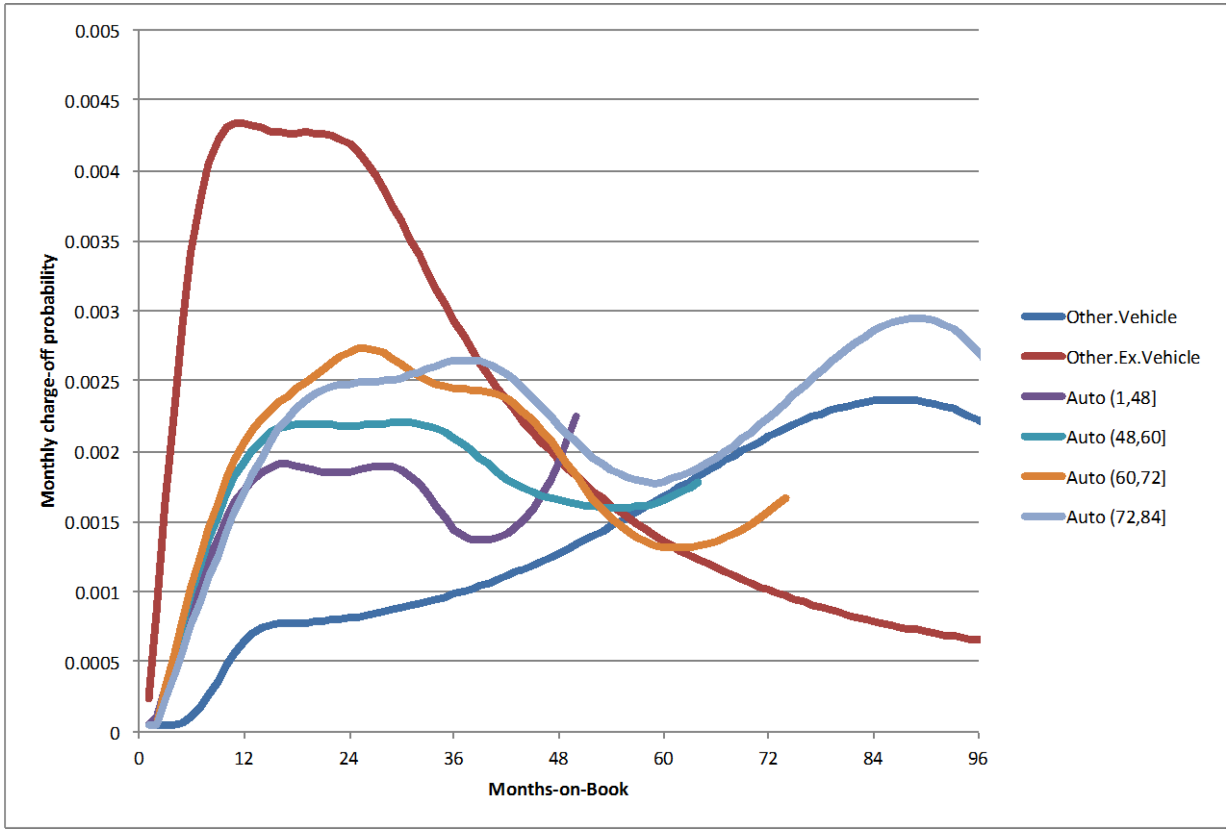
Attrition / Pay-off

- How long will the loan be with us?
- Don't count the interest income in pricing if the loan pays off early.
- Different segments behave differently.



Loss Timing

Do the losses come early or late in the product?

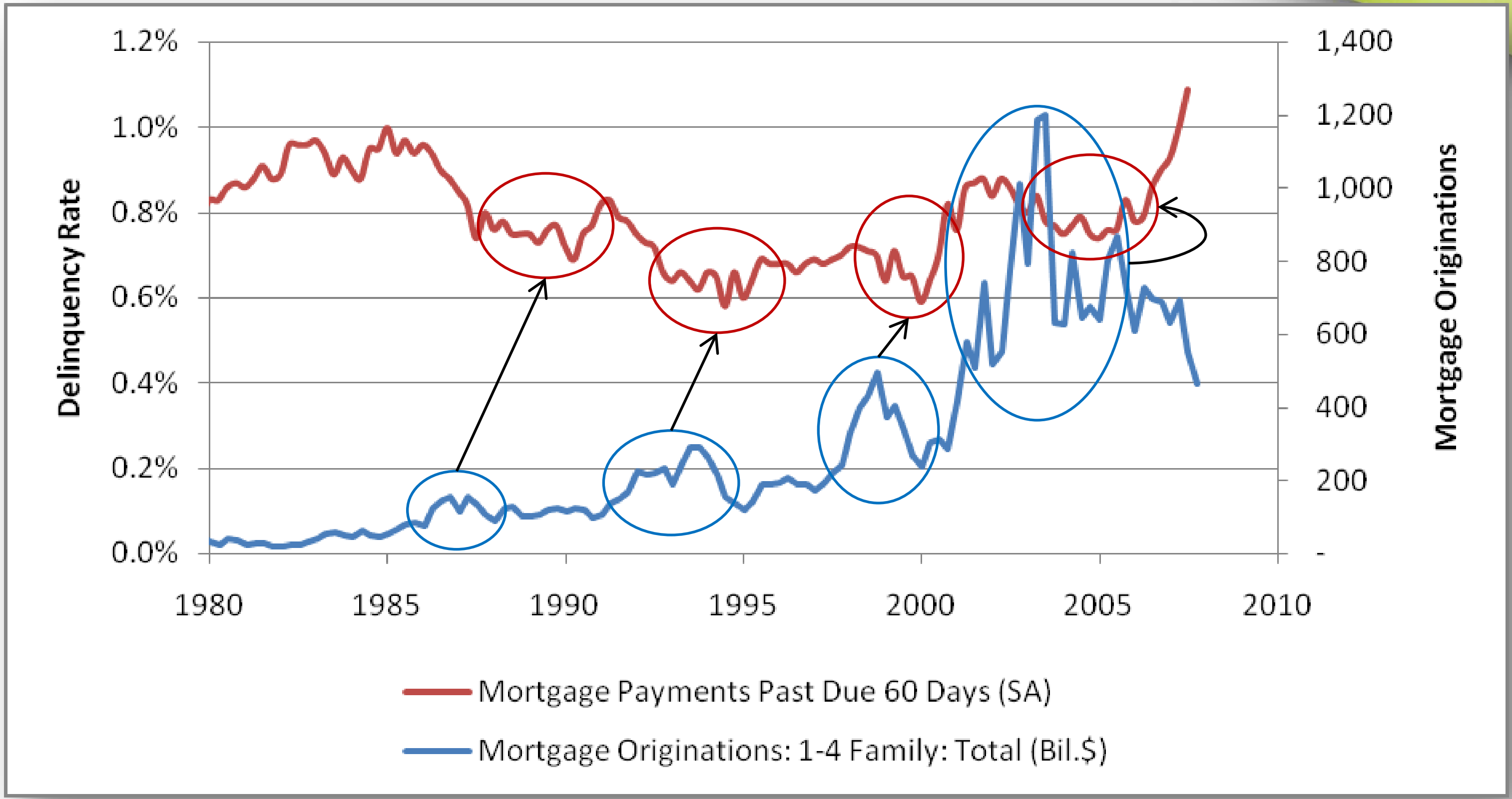


Credit Risk

Credit risk is more than just FICO and LTV

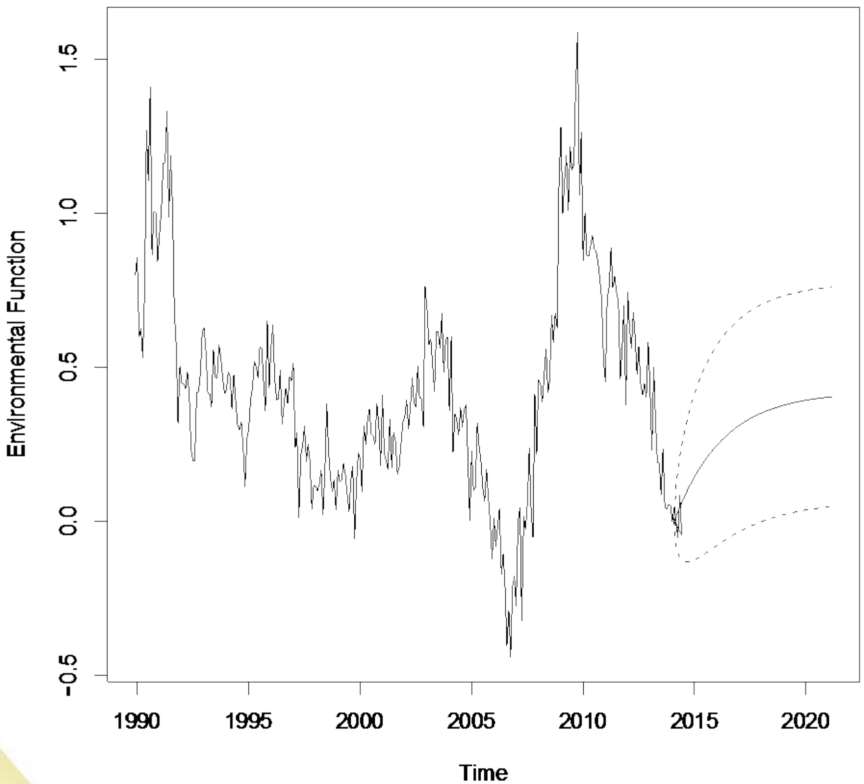
- Product: Auto, Card, Mortgage
- Channel: Direct or Indirect
- Collateral: New, Used, None
- The CU relationship: Deposit Balance, Payroll
- Adverse selection

Modeling Through Cycles



We can price loss trends, because even our own past booking volume patterns effect those trends.

The Future Environment



- Don't price for the past environment.
- Don't price for the current environment.
- Price for the near future and through the lifecycle – consistent with CECL ALLL proposal.

The graph shows a mean-reverting model that relaxes the current economic environment onto the long-run average. This is input to a loss forecasting model for new originations.

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How do CUs compete?

Predictive Analytics for CUs

- As a regulatory requirement, 95% of the spend is on reporting and compliance.
- Build predictive models first for pricing at a fraction of the cost of regulatory compliance models.
- Pooled repositories across CUs can bridge the data gap.
- The first institution with a loan-level, forward-looking pricing model was a Credit Union.

Contact Us

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