DFA

DeepFuture Analytics

Preparing for CECL

Current Expected Credit Loss (CECL) Model

DeepFuture Analytics

- Covers loans, debt securities, trade receivables, reinsurance receivables, lease receivables, and loan commitments that are not classified at FV/NI

- Recognizes an allowance for expected credit losses on financial assets
  - Expected Credit Loss is defined as: "An estimate of all contractual cash flows not expected to be collected from a recognized financial asset (or group of financial assets) or commitment to extend credit."

Features of CECL

- Considers more forward-looking information than is permitted under current U.S. GAAP
  - Based on relevant information about past events, current conditions, and <u>reasonable and supportable forecasts</u> that affect the expected collectibility of the financial assets' remaining contractual cash flows
  - Includes quantitative and qualitative factors specific to borrowers and the economic environment in which the entity operates. In addition to evaluating the borrowers' current creditworthiness, the assessment <u>includes an evaluation of the forecasted direction of the economic cycle</u>.
- Departs from the incurred loss model which means the probable threshold is removed
- Uses the time of value of money concept
- Neither a worst-case nor a best-case outcome is assumed

Current Expected Credit Loss (CECL)

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The American Banker's Association released their study on what would be required for CECL:

1. Vintage analysis ... could become a minimum requirement in order to support the ALLL estimate under CECL.

7. Credit quality disclosures may increase significantly under CECL [Credit quality analysis beyond scores and delinquency]

9. Support for the length of "forecastable futures" may be needed [Reversion from current PD to through-the-cycle PD]

11. Guidance related to individual vs. pool analysis is critical [Combining loan attributes with pool forecasting]

Vintage Analysis

Vintage Analysis

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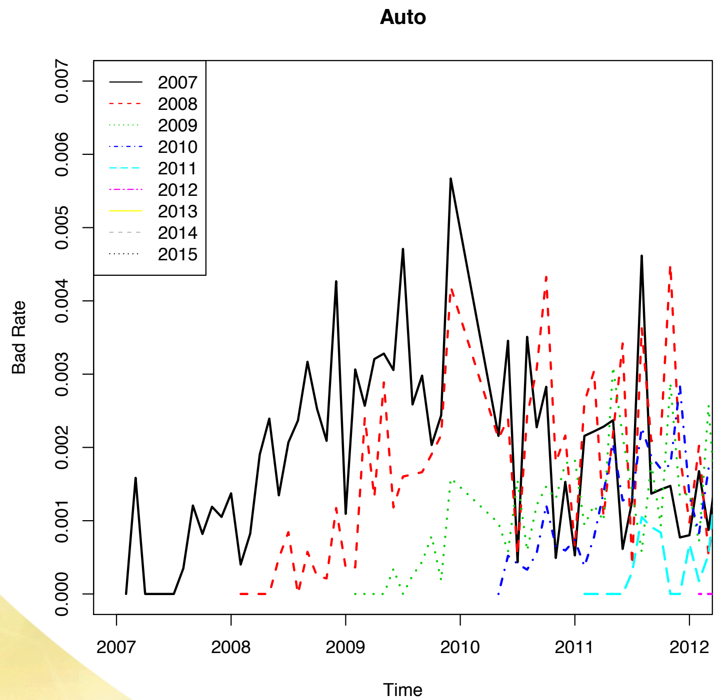
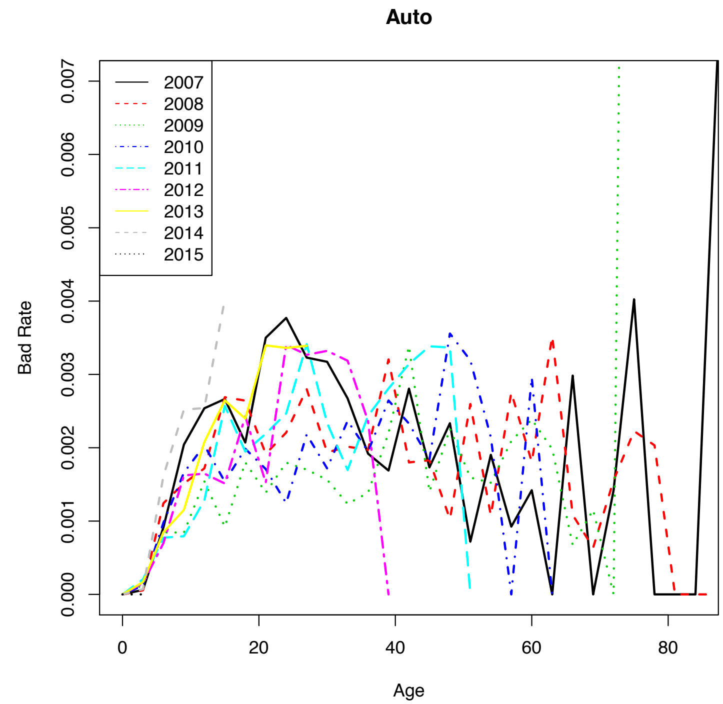
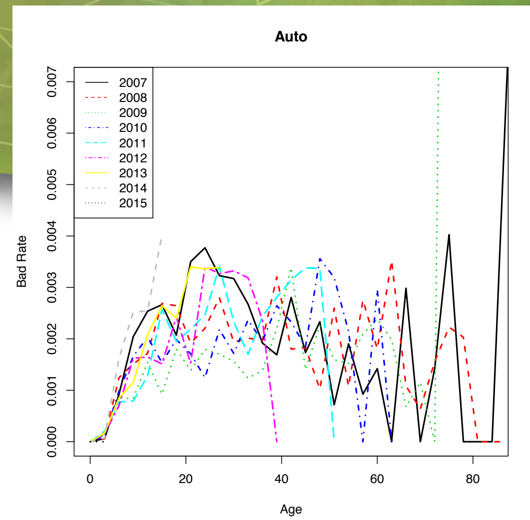
A "vintage" is a group of loans booked in a specific time period, aka a "static pool" or "origination cohort".

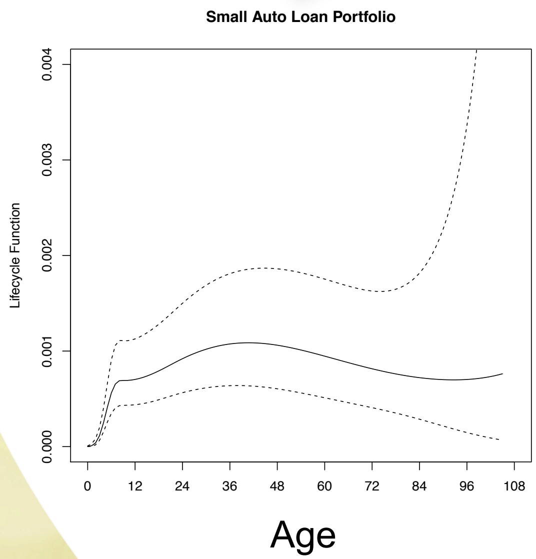
Comparing vintages lets us visualize loss timing, relative credit risk, and environmental impacts.

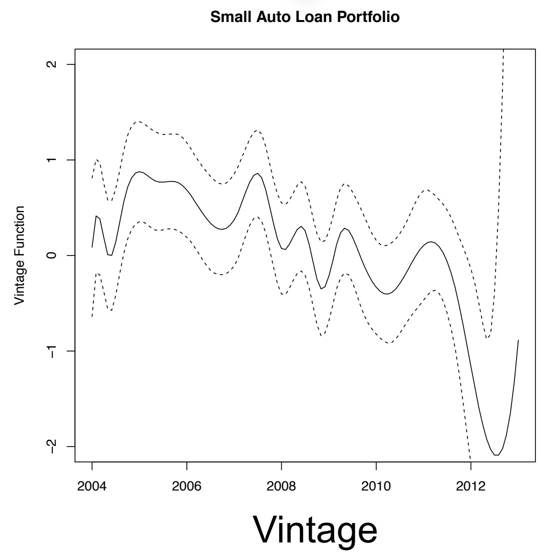


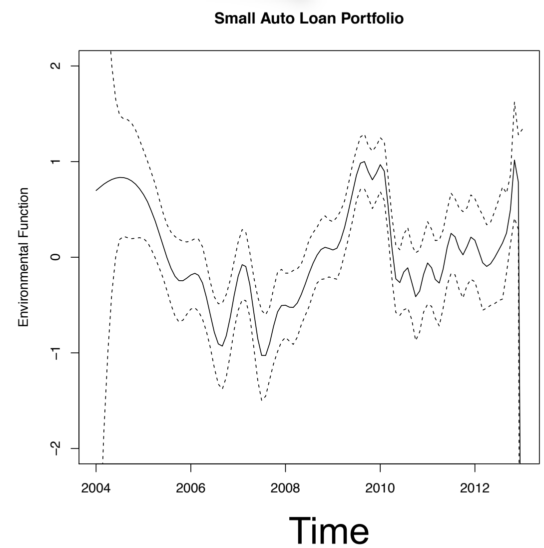


Vintage Modeling









Everything starts with vintage modeling. Life-of-loan forecasting requires lifecycles.

Capturing Lifecycles

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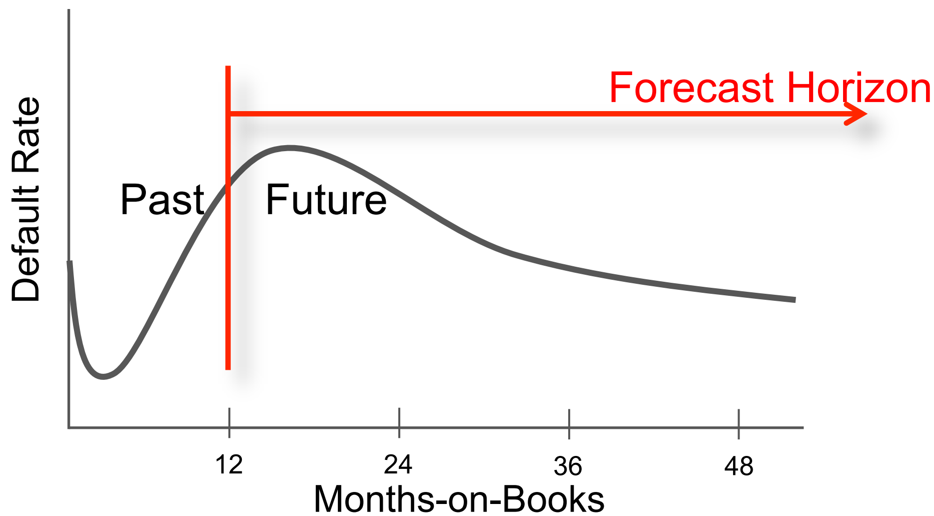
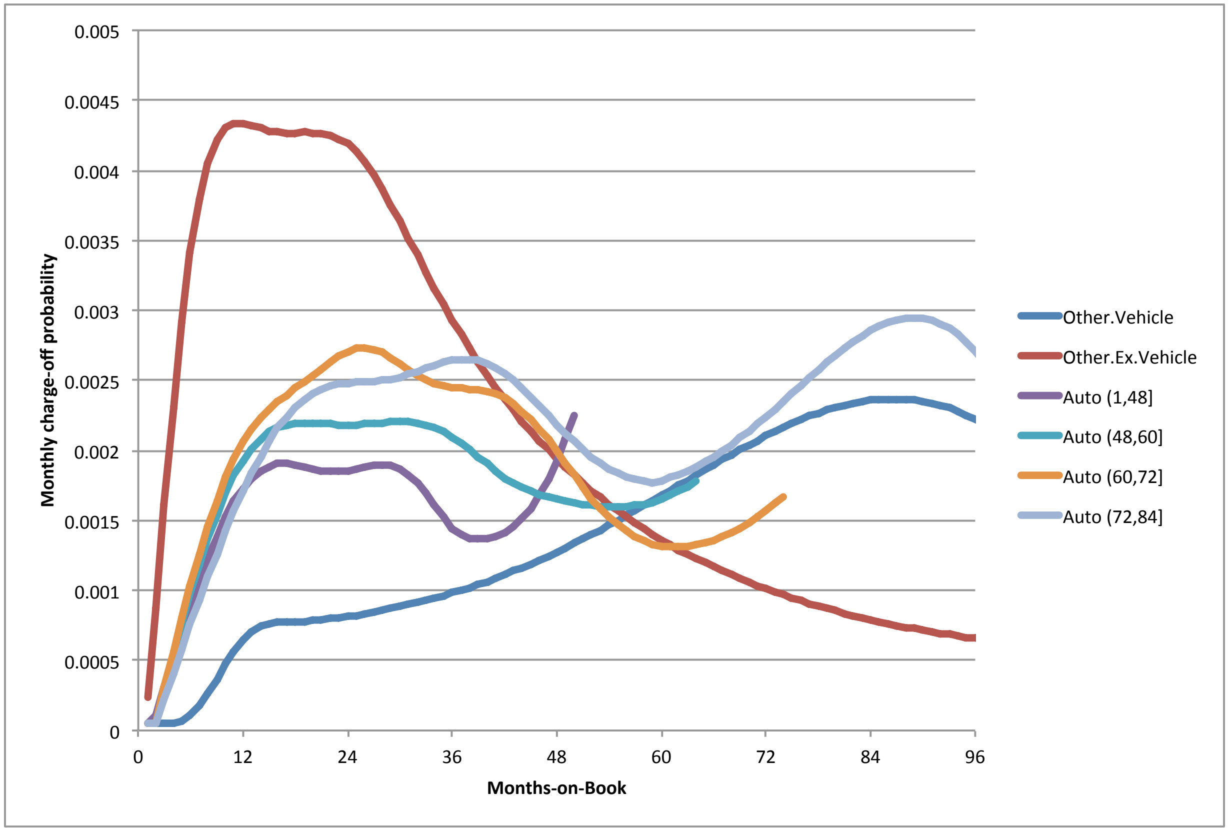
By knowing the lifecycle, we can predict the default probability for accounts of any age through their remaining life.



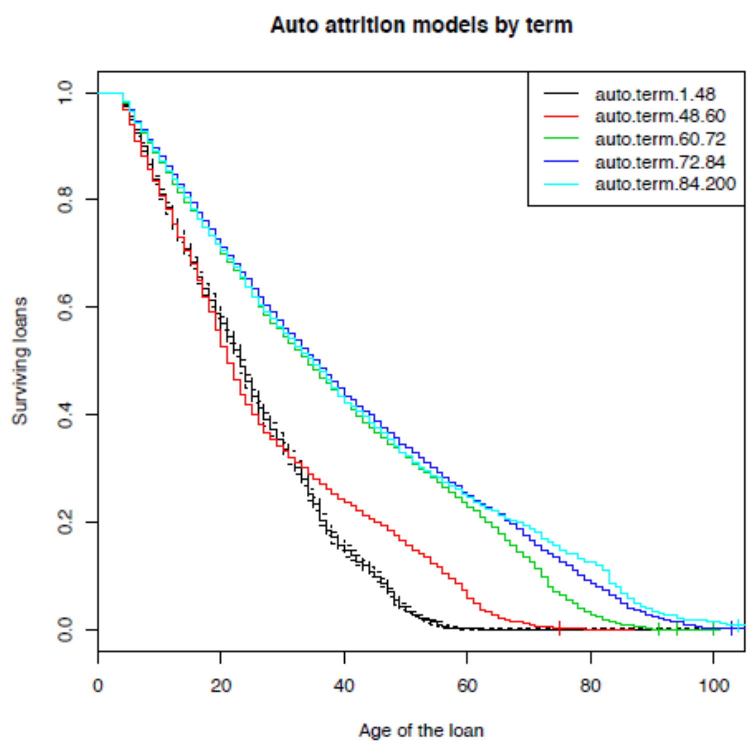
Lifecycles – Loss Timing

Product-specific, industry-generic.



Lifecycles – Attrition / Pay-off Timing

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



Economic Environment: Current and Future

"Forecastable Futures"

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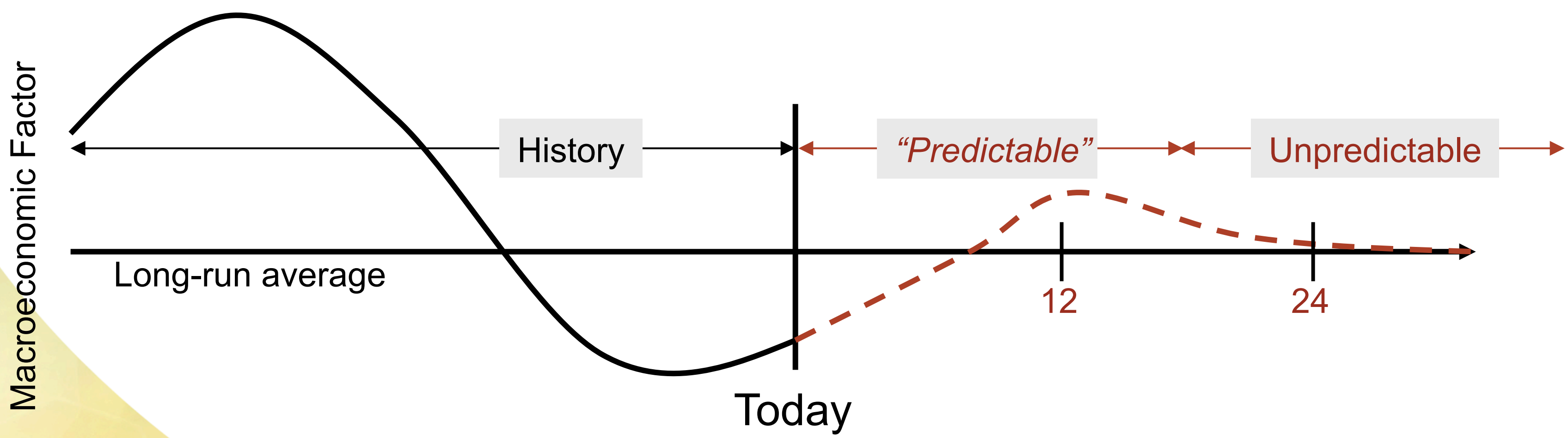
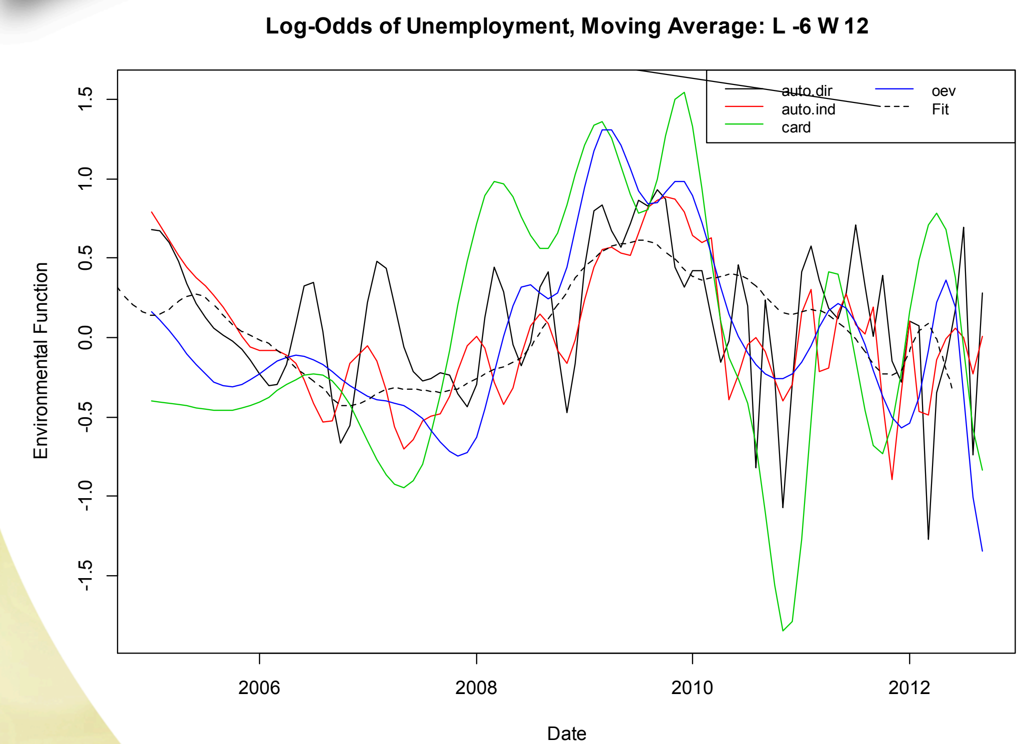
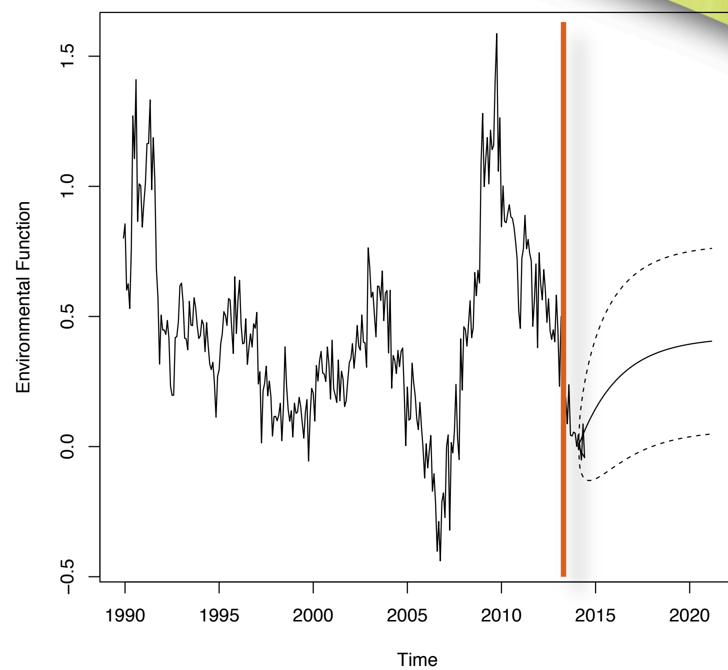
- "An estimate of expected credit losses shall be based on internally and externally available information considered relevant in making the estimate … Those factors include … an evaluation of both the current point in, and the forecasted direction of, the economic cycle."
- "Reasonable and supportable" for macroeconomic scenarios would seem to be to use a consensus economic forecast for the near term (say, next 12 months), and then relax onto the long run average for the rest of the loan's lifetime.



The Future Environment





We explain the near term using macroeconomic factors and an economic scenario.

The long-term is modeled with a mean-reverting scenario.

Procyclicality

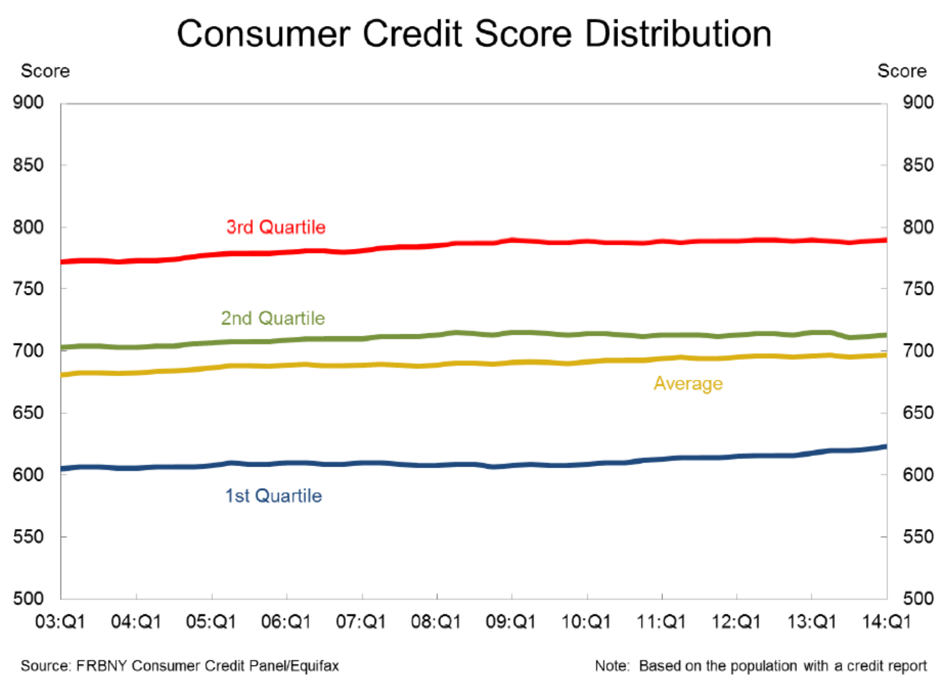
- Loss reserves can grow or shrink based upon current and projected economic conditions.
- The loss model must take into account the inherent lags between economic conditions and loan default, so releasing loss reserves after a recession will be a slow process, but it should happen.

- Loss reserves are intended to be procyclical (unlike regulatory capital), growing going into a recession and shrinking coming out of a recession.

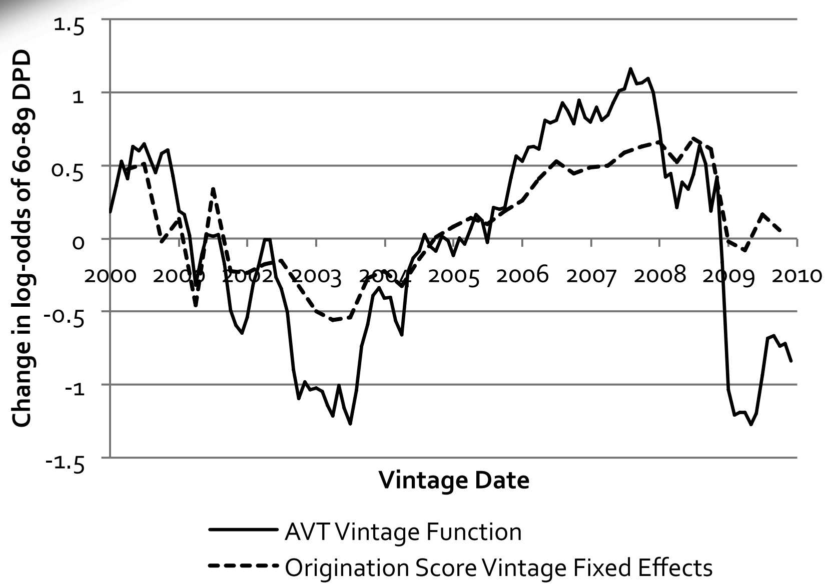
Credit Quality

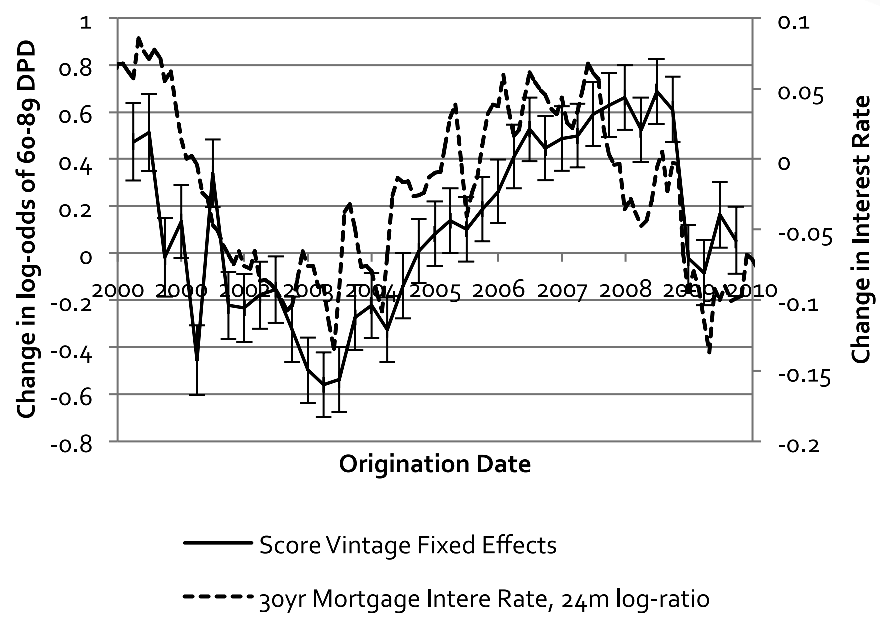
Predictive vs. Prescriptive

- 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.



Understanding Credit Quality





Credit quality is more than a score. The above graph shows the change in log-odds of default, by vintage, compared to the best possible model from score attributes.

This adverse selection correlates to economic conditions at *the time the loan was written*.

Individual + Pool

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We can combine lifecycle and environment effects in a single score.

```
glm(formula = Bad ~ 1 + offset(lifecycle + environment) +
    Bureau.Score + log(LTV) + Subcategory + Log.Dep.Bal + Term,
    family = binomial, …)

Coefficients:
                  Estimate Std. Error z value Pr(>|z|)
(Intercept)      10.306961   1.367256   7.538 4.76e-14 ***
Bureau.Score     -0.012886   0.001830  -7.043 1.88e-12 ***
log(LTV)          1.203598   0.546832   2.201   0.0277 *
SubcategoryNew           0
SubcategoryUsed   0.133842   0.312062   0.429   0.6680
Log.Dep.Bal      -0.918796   0.187975  -4.888 1.02e-06 ***
Term             -0.017266   0.008915  -1.937   0.0528 .
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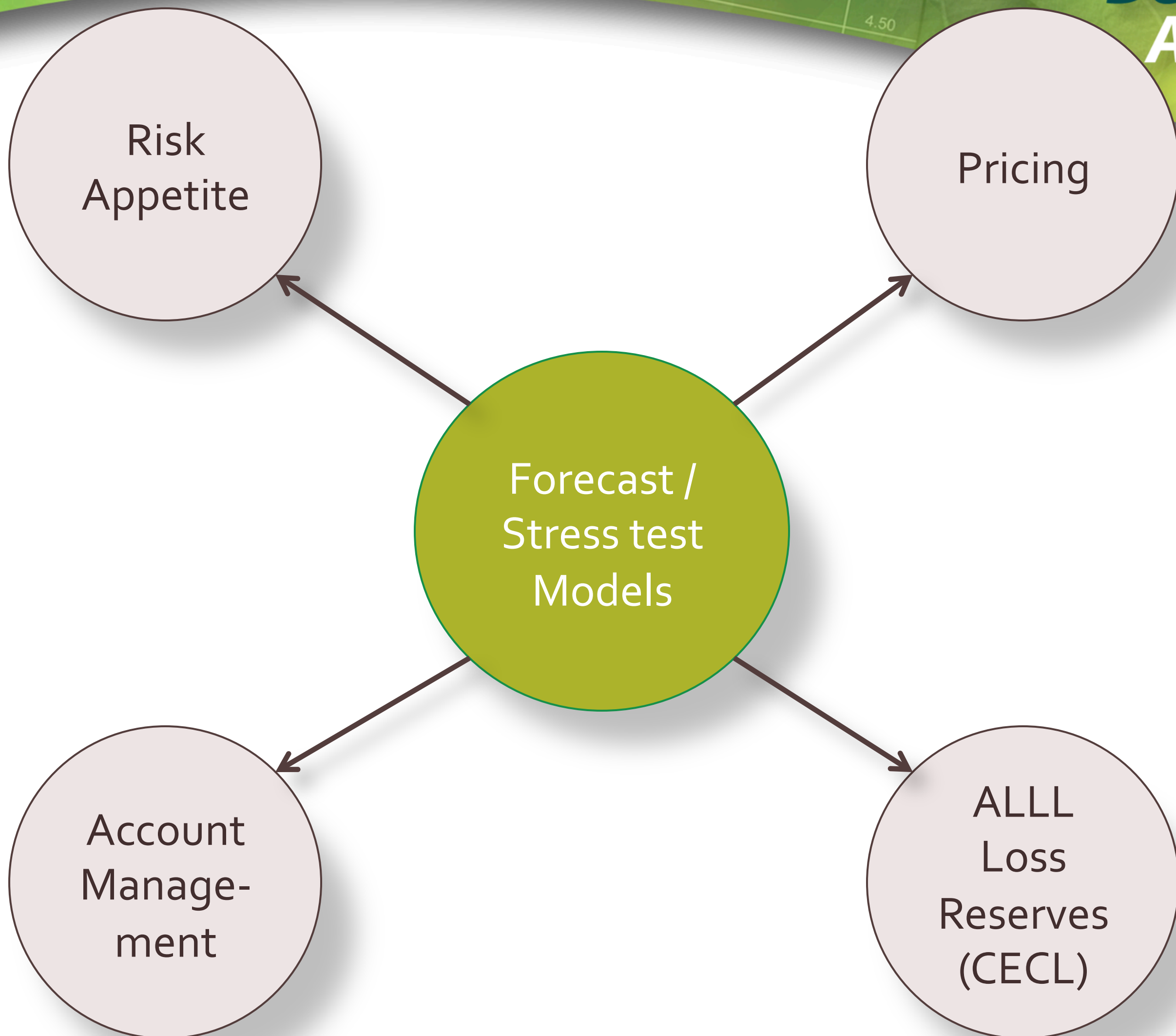
Leveraging the Investment

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.

Used Direct Auto Loan Margin Estimate

		Tier 9	Tier 8	Tier 7	Tier 6	Tier 5	Tier 4	Tier 3	Tier 2	Tier 1
TERM	LTV	550-579	580-609	610-639	640-659	660-679	680-699	700-729	730-759	760+
48	130%	~	~	~	~	~	~	6.50%	5.07%	5.07%
48	120%	~	~	~	8.90%	7.75%	6.99%	5.85%	4.26%	4.44%
48	110%	~	~	14.75%	8.02%	6.97%	6.27%	5.22%	3.56%	3.71%
48	100%	~	~	10.85%	7.16%	6.21%	5.57%	4.62%	3.11%	3.11%
48	80%	15.50%	13.76%	7.74%	5.63%	4.86%	4.36%	3.60%	2.34%	2.34%
48	60%	10.09%	7.86%	5.25%	3.96%	3.41%	3.05%	2.51%	1.63%	1.63%
60	130%	~	~	~	~	~	~	4.40%	3.30%	3.30%
60	120%	~	~	~	~	5.40%	4.89%	3.96%	2.89%	2.89%
60	110%	~	~	10.86%	5.56%	4.85%	4.38%	3.54%	2.42%	2.42%
60	100%	~	~	8.12%	4.97%	4.33%	3.90%	3.13%	2.11%	2.11%
60	80%	11.06%	10.36%	5.77%	3.91%	3.39%	3.05%	2.44%	1.59%	1.59%
60	60%	6.96%	5.30%	3.73%	2.64%	2.29%	2.05%	1.63%	1.06%	1.06%
72	130%	~	~	~	~	~	~	10.36%	8.28%	8.28%
72	120%	~	~	~	~	~	10.54%	8.92%	6.98%	6.98%
72	110%	~	~	~	11.97%	10.46%	9.46%	7.97%	6.20%	6.20%
72	100%	~	~	17.42%	10.70%	9.33%	8.42%	7.07%	4.90%	4.90%
72	80%	24.01%	22.88%	12.92%	8.41%	7.32%	6.59%	5.51%	3.51%	3.51%
72	60%	16.60%	14.92%	8.61%	6.20%	5.38%	4.84%	4.03%	2.57%	2.57%
84	130%	~	~	~	~	~	~	12.40%	9.44%	9.73%
84	120%	~	~	~	~	~	11.93%	10.26%	8.13%	8.37%
84	110%	~	~	~	~	11.81%	10.71%	9.18%	7.02%	7.02%
84	100%	~	~	22.29%	11.67%	10.54%	9.54%	8.15%	6.18%	6.18%
84	80%	~	~	15.82%	9.18%	8.01%	7.47%	6.36%	4.79%	4.79%
84	60%	~	~	10.66%	6.77%	5.89%	5.32%	4.51%	3.37%	3.37%

Computing expected margin by marketing segment allows lenders to identify risk-reward opportunities in their local market.

Pricing after CECL

- CECL will be a significant investment in data, technology, and systems. What will you do with that investment?
- Top 30 banks are making equivalent investments today in CCAR (stress testing). They are asking the same questions.
- Doing CECL right provides all the components necessary for lifetime forecasting of losses, revenue, and margin, by origination segment – the basis of risk-based pricing.

Contact Us

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