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Observations on CECL Quantitative Modeling Approaches

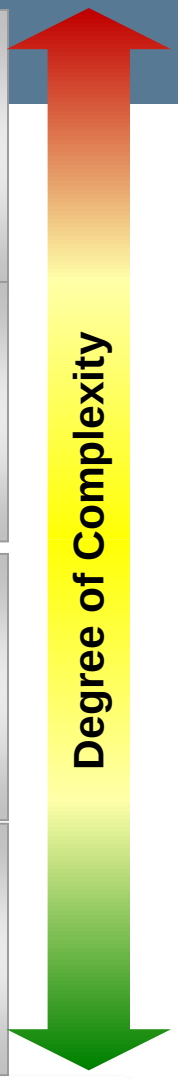
SIFMA – Audit Committee Concerns – Focus on the Finance Agenda

December 3, 2018

We've seen four types of model methodologies to relate the future macro forecast to probability of default, loss given default, and exposure at default or drawdown

We are seeing four main model types being deployed within the industry

- **Factor Models**
  - Loan- or portfolio-level models where changes in factors are related to changes in PD and prepayments. Factors can be FICO, interest rates, loan to value, debt service coverage ratio, property type, liquidity, etc.
  - Requires a linkage model to relate factors to the macro economy
- **Macro Models**
  - Regression models at the loan- or portfolio-level that directly link the macro economy to movements at either the loan or segment level
  - Can be a mix of Markov chain type approaches that measure portfolio migration or as an example, may model delinquencies directly
- **Vendor Models**
  - Mix of vendor models from the rating agencies (Moody's or S&P) to the vendors catering to smaller community banks. Some use bank data while others supplement with peer or industry data
  - Use varying methodologies with the rating models being factor type models that then have a relationship to the macro forecast
- **Historical Averages, Discounting, Management Judgment**
  - Uses the historical average of PD and LGD to determine the relationship and then discounting back
  - Used when banks can't find a valid statistical relationship using other means or use management judgment to adjust for the economy



There are a lot of components to consider when validating a CECL model. They span methodology, data, prepayments, discounting, and forecast accuracy.

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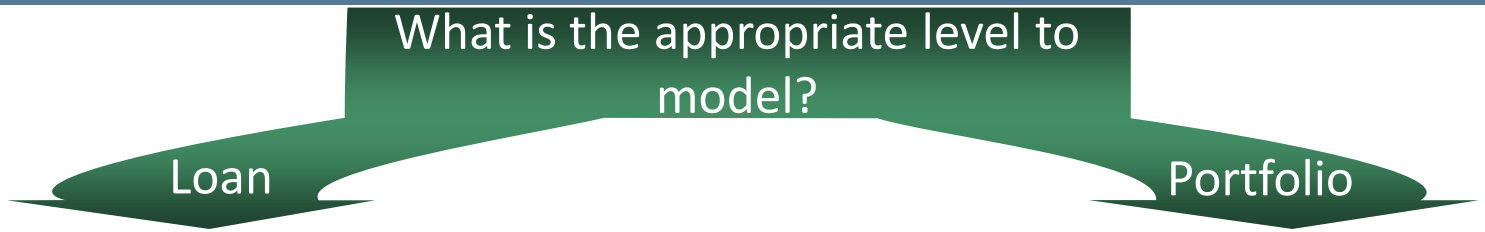
There seems to be confusion in the industry regarding the appropriate level of estimation



- Some in the industry are proposing that for banks in the $10B+ range they must model at the loan level
  - There is nothing in the guidance prescribing this
  - The regulatory bodies we have spoken with at this time are not expecting banks to model at the loan level – especially if the data does not exist
  - DFAST Bank's are trying to leverage their DFAST modeling for CECL
  - It should be ok for a financial services firm to use a mix of modeling approaches. As an example maybe they have loan level information for a commercial portfolio but not a retail portfolio. It should be ok to mix methods
  - Some in the industry are proposing using peer loan level data sets however, these may not be indicative of the risk inherent and the migration seen in the institutions own portfolio therefore this approach can have drawbacks
- For many banks loan level history does not exist and would take years to build the required data bases
- This said we do recommend banks start accumulating vintage level information to meet the CECL requirements

Many are trying to ensure a linkage or consistency between CECL and stress testing. While DFAST is no longer required for banks <$250B there is a regulatory expectation banks will still continue to perform stress tests to infer capital adequacy.

Start thinking about model validation as part of your CECL task list

Task	Accounting	Finance	ERM	IT	Audit	Underwriting	Board
Research Update No. 2016-13	Lead	✓	✓		✓	✓	✓
Identify Risk Factors	✓	✓	Lead			✓	✓
Analyze Asset Classes	Lead	✓	✓			✓	
Assess Impact on Underwriting		✓	✓			Lead	
Perform Impact Analysis on ALLL	✓	Lead	✓		✓		
Scenario Analysis	✓	Lead	✓		✓		✓
Coordinate with Reviewers	Lead	✓			✓		✓
Analyze Existing Data	Lead	✓	✓	✓		✓	
Store & Retain Existing Data	✓			Lead			
Determine IT Resources Needed		✓		Lead			✓
Develop Implementation Plan	Lead	✓	✓	✓	✓	✓	✓
Update Accounting Systems	Lead			✓			✓
Develop Required Disclosures	Lead	✓			✓		✓
Select Methodology & Forecast	✓	✓	✓				Lead
Update Controls & Procedures	✓	✓	✓	✓	✓	✓	
Prepare CECL Documentation	Lead	✓	✓		✓	✓	
ALLL Model Validation	Lead	✓	✓		✓		✓
Perform Preliminary CECL	Lead	✓	✓				✓
Report to Board Quarterly	✓	✓	✓	✓	✓	✓	✓

Considerations

- **Do we have the competencies to conduct a validation in house e.g. model validation group?**
- **Do we have the bandwidth to do this inhouse? Will it compete with other projects.**
- **Can we take an à la carte approach? As an example validate the data, governance, or simple models.**
- **Make sure to ask the vendor for a validation report of their model!**

Internal audit will need to work with Accounting, Finance, and ERM to validate the model. Model validation can be performed internally depending on the complexity of the models and process and the competencies existing within the organization.

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