IFRS9 Forward-Looking Modeling

Do We Use OLS Regression Efficiently?

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IFRS9 Regulatory Requirement and Practical Implementation

- With the introduction of IFRS9, one of the requirements practitioners had to address was the inclusion of reasonable and supportable information that is available without undue cost or effort when measuring expected credit losses.
- Also, related to measuring expected credit losses, several regulatory paragraphs emphasized the importance of incorporating this reasonable and supportable information in recognizing lifetime expected credit losses.
- After several years of implementing IFRS9, the most common approach observed in practice quantifies the macroeconomic environment's effect on a bank's risk parameters, usually aggregated at the segment level. For instance, practitioners calculate the default rate at the segment level and regress it against macroeconomic indicators.
- In addition to the choice of modeling level, various model designs appear in practice, with most of them using the Ordinary Least Squares (OLS) method as the estimation technique.

IFRS9 Regulatory Requirement and Practical Implementation cont.

- Among the most frequently used approaches, practitioners select:
  - OLS regression in the form of the target variable against macroeconomic indicators (with or without time lags);
  - OLS regression, including macroeconomic indicators and an autoregressive term of the target;
  - Two-step error correction models;
  - Principal Component Analysis (PCA) combined with OLS regression;
  - OLS regression with various transformations of the target variable, such as logit or probit.
- As seen above, this list of model designs is not exhaustive. In practice, various combinations of transformations and methods may be used - most of which rely on OLS as the estimation method. However, each design and its combinations present specific challenges when applied to IFRS9 forward-looking (FLI) modeling.
- In IFRS9 FLI modeling, model design plays a critical role - arguably even more so than in other credit risk exercises.
- Given the importance of model design, this presentation aims to challenge the efficient use of the OLS estimation method in the context of IFRS9 forward-looking modeling.

IFRS9 Forward-Looking Modeling Principles

When developing FLI models, practitioners usually adhere to certain principles. The following list outlines some of the most commonly applied ones:

- The model should convey a clear and coherent narrative.
- The model should capture all relevant historical events significantly impacting the target variable.
- The model should incorporate key events that are not reflected in macroeconomic forecasts.
- The model should balance the impact of the economy with other factors, such as internal changes or regulatory shifts.
- The statistical techniques used to develop the model should be straightforward and interpretable yet robust enough to capture key historical patterns and forward-looking assumptions.
- The relationship between model variables should remain reasonably stable over time.
- The model's forecasting performance must be tested on an out-of-time sample.
- Expert input should have a controlled influence on model outcomes to minimize potential bias.

The above principles often lead to specific challenges that practitioners encounter during modeling. While there isn't always a one-to-one correspondence between principles and challenges, they are closely related and can often be meaningfully linked. The following slide summarizes some of these key challenges and proposes possible approaches within the OLS regression framework.

IFRS9 Forward-Looking Modeling Challenges and OLS Regression

One of the most critical aspects of developing FLI models is model design. Too often, practitioners emphasize the statistical method rather than how the model is structured. Achieving the right balance between statistical rigor and a design integrating expert input (business insights) is crucial for developing a successful FLI model. The following list highlights some common challenges practitioners face during this process and potential enhancements to the standard OLS regression approach to help address them.

1.
   - Challenge: Low ratio between the number of observations and the available predictors.
   - Approach: OLS model averaging approach, blockwise model design.
2.
   - Challenge: Incorporating expert input regarding the expected macroeconomic indicators.
   - Approach: OLS model averaging approach, blockwise model design, PCA + OLS regression, supervised macroeconomic index, constrained OLS regression.

IFRS9 Forward-Looking Modeling Challenges and OLS Regression cont.

3.
   - Challenge: Asymmetric or opposing impacts of macroeconomic indicators under different economic conditions or when specific indicator thresholds are reached.
   - Approach: Constrained OLS regression, threshold OLS regression, supervised macroeconomic index.
4.
   - Challenge: Balancing the impact of macroeconomic indicators and other predictors.
   - Approach: Constrained OLS regression.
5.
   - Challenge: Ensuring a stable model and reliable forecasts.
   - Approach: Constrained OLS regression.
6.
   - Challenge: Meeting statistical criteria for model selection.
   - Approach: Simulation-based analysis of violations or limitations in OLS regression assumptions.

Practitioners should bear in mind that the above approaches are not mutually exclusive and are intended only as suggestions for addressing specific challenges. Furthermore, the list is not exhaustive; practitioners may encounter other challenges in real-world applications and adopt alternative solutions.