Behavioral cash flow modeling

A large percentage of most bank’s assets and liabilities are without a contractual maturity (e.g. customer sight deposits or overdrafts) or contain embedded options. These products often form the basis for the majority of profit generation for certain business areas within banking organizations. To estimate future repricing and rollover of on demand positions and the exercise of embedded options, banks implement behavioral models.

Modeled cash flows serve as an important input for different aspects of a successful ALM and balance sheet management, such as liquidity risk management, interest rate risk management and funds transfer pricing. Effective behavioral models with good predictive ability allow banks to avoid both unexpected losses and liquidity gaps and the cost of holding unnecessarily large liquidity buffers and capital reserves. The consistent implementation of such models requires carefully designed governance and risk management processes in order to incorporate the behavioral models into the overall asset and liability management framework.

New regulations drives changes to the behavioral modeling framework

As a result of the important role liquidity shortages played in the development of the 2007-2008 financial crisis, much regulatory attention has been given to how banks should manage their liquidity situation. A key part of the new regulation involves holding larger liquidity buffers1 to cover the liquidity risk connected to on demand products and introducing effective cost/benefit allocation to effectively steer the liquidity usage within the bank2. Upcoming updates in the EBA guidelines3 for interest rate risk measurement in the banking book will also require further analysis of the interplay of customer behavior and embedded optionality to the interest rate risk in low interest rate environment. In particular, the effect of the (effective) 0% interest rate floor on the margin compression risk of consumer deposits should be studied.

This results in a need to update bank’s ALM and liquidity management frameworks including an improved estimation of the liquidity and interest rate profile under both business as usual and stressed scenarios, in order to estimate the size of the required liquidity buffer and capital reserve as well as to plan asset liability management activities.

BearingPoint’s approach to behavioral cash flow modeling helps to create value

The BearingPoint approach to behavioral cash flow modeling provides financial institutions with a potent input for liquidity profile and interest rate risk calculations, which in turn leads to a more efficient allocation of liquidity and financial resources. It is a structured approach to generate cash flow forecasts and is compliant with regulatory requirements. The cash flow projections serve as a basis for interest rate risk management, liquidity planning and stress testing as required by the regulatory authorities.

The first step of the BearingPoint approach involves clear assignment of responsibilities and definition of governance, operation, validation and reporting processes. This is a prerequisite for setting up the behavioral cash flow modeling and successfully integrating it into performance and risk management.

3. (2013) EBA, “Consultation Paper on revision of the ‘Guidelines on Technical aspects of the management of interest rate risk arising from non trading activities in the context of the supervisory review process’”
The BearingPoint behavioral models are designed to be robust and perform consistently and verifiably well over time. Furthermore, they are flexible and thus allow for the generation of different scenarios. To achieve this, various model parameterizations need to be defined since, as described in the EBA Discussion Paper on higher outflows of retail deposits⁴, the cash outflows in times of stress are significantly different depending on counterparty and product types. The formation of product clusters to be parameterized separately is done in two steps. First potential product clusters, which can be expected to have a similar behavior, are identified based on static properties. In the second step, the potential clusters are validated through a statistical analysis.

The risk of volume changes and repricing of on demand products is measured based on the observed deviation from predicted changes. Therefore the more accurate the trend forecast is, the lower the measured risk will become. While expected future repricing frequency can be derived as a combination of the expected rate of future interest rate changes and decisions on when and how to pass on interest rate changes, on demand volume trends are mainly derived from analysis of historic volume and interest rate data. There are periodic volume trends caused by regular payment patterns and non-periodic trends which are influenced by e.g. reputation, marketing or interest rates. The risk of volume changes is measured by identifying the probability distribution which best fits the unexpected changes in volume and repricing frequency using the Kolmogorov-Smirnov-Test and long historical time series of high quality, segmented data, with a sufficiently high frequency.

The identified trends and the probability distributions of changes should be used for forecasting future volumes and repricing frequencies. Depending on the purpose of the modeling, different quantiles of the probability distribution should be used. While a business liquidity forecast can use the trend forecasts directly, a liquidity at risk forecast would e.g. look at a 95% or 99% quantile of the distribution of the deviation of the future volumes from the business forecast.

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Identify product clusters
Validate clusters
Model cluster volume

Statistical analysis
Forecasting
Historic data
Outflows

Trend analysis
Risk measurements
Cash flow forecast

Figure 2: Approach to behavioral cash flow clustering and modeling

Figure 3: The three main steps to model behavioral clusters

The BearingPoint approach to behavioral cash flow modeling provides a flexible framework to integrate a state of the art modeling methodology with an ALM and risk management processes.

4. (2013) EBA, “Discussion Paper on retail deposits subject to higher outflows for the purposes of liquidity reporting under the draft Capital Requirements Regulation (CRR)”

About BearingPoint

BearingPoint consultants understand that the world of business changes constantly and that the resulting complexities demand intelligent and adaptive solutions. Our clients, whether in commercial or financial industries or in government, experience real results when they work with us. We combine industry, operational and technology skills with relevant proprietary and other assets in order to tailor solutions for each client’s individual challenges. This adaptive approach is at the heart of our culture and has led to long-standing relationships with many of the world’s leading companies and organizations. Our 3350 people, together with our global consulting network serve clients in more than 70 countries and engage with them for measurable results and long-lasting success.

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