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ASSET-LIABILITY MANAGEMENT (ALM) IN THE CONCEPT OF STRESS TESTING

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MINI-ROUNDTABLE

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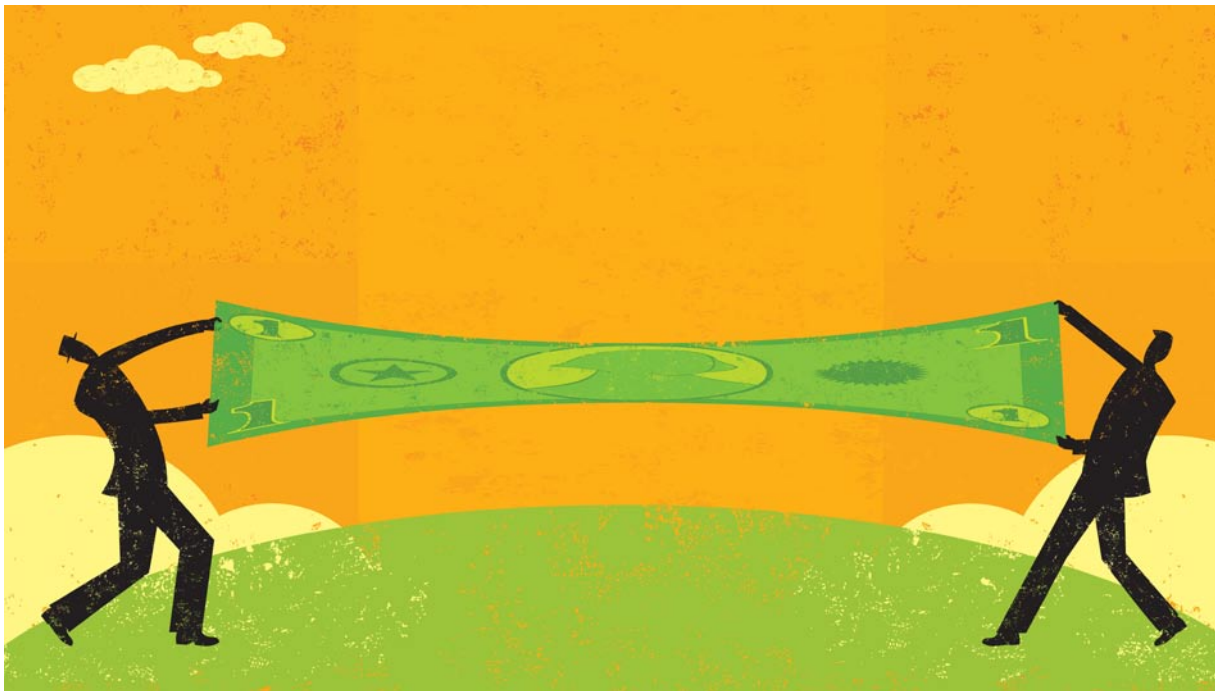

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Wei Chen has led several initiatives including enterprise stress testing and IFRS 9/CECL in recent years. He has worked closely with major financial institutions around the world on business process and requirements, methodology, solution design and implementation. He has more than 15 years of banking and insurance experience in the areas of credit risk, market risk, asset and liability management and liquidity risk from both regulatory and internal management perspectives.

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Prashant Dinodia is a subject matter expert with over 14 years of experience in several areas of risk management, particularly ALM. He has spent considerable time across several geographical regions globally, as a banker and consultant. Currently, he is the solution lead for ALM solutions at SAS, where he helps financial institutions derive maximum value from their balance sheet management initiatives.

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Xavier Vandermosten is a risk domain expert who advises financial institutions on how best to improve their operational, market, ALM and liquidity risks measurements and regulatory compliance. Before joining SAS in 2011, he worked in the financial sector for 20 years, spending around half of his career leading a team in charge of measuring operational, credit, market and business risks, and the other half in IT, leading application development projects. He is a certified financial risk manager of the Global Association of Risk Professionals.

R&C: Could you outline some of the main asset and liability management (ALM) challenges financial institutions (FIs) face? How have the risks and exposures evolved in recent years?

Chen: Given the increasing sophistication of the banking business and the development of funding and risk management instruments, asset-liability management (ALM) requires modernisation. The interactions of the inherent risks underlying banking business call for a comprehensive approach to risk management. The original idea of ALM at banks was to centralise interest risk management, freeing the bank's business units to handle other risks, including credit risk. The global financial crisis demonstrated how increasing interest rates can drive up credit risk which, in turn, quickly leads to funding liquidity issues, which can further damage a bank's equity and start a vicious cycle in the entire financial system. Interest rates, credit risk, liquidity risk, reputation risk and so on, cannot be managed in isolation. One challenge to the traditional ALM function is the incorporation of the behavioural and contingent cash flows from both banking and trading activities that are dynamic to the underlying macroeconomic environment. The importance of a coherent view of the underlying cash flows to a bank's net interest income, funds transfer pricing, credit provisioning, liquidity risk and equity risk becomes more obvious to both bank management and regulators. The enterprise stress testing pioneered by US regulators has led the industry to think about total balance sheet management and optimisation.

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>
> *Prashant Dinodia, SAS*

Dinodia: ALM has always been a tricky area in the sense of determining which business function should be responsible for it. Depending upon the organisation, we have seen it being housed in risk management, treasury or finance. While operationally it may be owned by a particular department, it is something which needs to be enterprise wide as it has implications across these areas. There is hardly any other area of risk management which is as pervasive as ALM. Recently, this has become even

more challenging as the scope of ALM has widened and the need for some of these stakeholders to be operationally involved with ALM has deepened. This has meant that ALM is no longer a reporting or analytical exercise but is something which is a shared infrastructure. However, most organisations have not been able to reorganise their ALM function, including people, processes and technology, with this enterprise-wide orientation. The other aspect, in terms of the evolution of ALM, has been around what an ALM function is now expected to achieve. While reporting and compliance around interest rate risk and liquidity continues to be important, most institutions expect their ALM processes to deliver in areas far beyond traditional ALM – not only the scope, but also in terms of their interaction. FIs no longer need a data cruncher which produces an asset-liability committee (ALCO) pack, but an interactive and intelligent analytical engine which provides answers and insights around balance sheet management.

Vandermosten: Over the last decade, the financial services business has become more competitive, with very small, even sometimes negative, interest rates, and with rising costs caused by higher capital requirements and higher quality liquidity reserve requirements. All of this has increased pressures on profit margins. In that context, the scenario-based approach to anticipate liquidity and interest rate risk mismatches, and to anticipate margin profitability, might not be enough anymore to be competitive. Having performance analytical tools identifying the optimum balance sheet composition which provides maximum profitability while respecting all the regulatory and internal policy constraints, is required. Performing such an optimisation of the balance sheet considering not only ALM, but all the risk areas, is one of the biggest challenges in the years to come for financial institutions (FIs).

R&C: What steps can FIs take to measure and manage various risks related to ALM?

Chen: A fundamental change to ALM is to recognise the inherent risks to an FI's business. The industry has taken a few important steps in recent years. First, there has been the introduction of macroeconomic scenario-based risk management and financial planning. This is a good approach toward enhancing coherence. This step brings risk quantification in the industry to a new level. A lot of banks have found challenges in data scarcity and quality, as well as qualified modelling skills. Several risk management and accounting reporting initiatives, such as BCBS 239, regulatory stress testing, interest rate risk in the banking book (IRRBB), liquidity coverage ratio (LCR)/net stable funding ratio (NSFR) and IFRS 9, and current expected credit losses (CECL) in the US, are pushing banks to address these challenges. More specifically to ALM, this change requires scenario and model-based cash flow and economic value projection. The next step is applying

the same scenarios and underlying cash flows and values across net interest income (NII), economic value of equity (EVE), funds transfer pricing (FTP), and credit and liquidity risk management for a coherent view by management. Integrating this view into financial and capital planning is a step forward which will allow a dynamic view and proactive management of the fundamental business. For an FI with certain maturity, scenario-based risk and finance integration balance sheet management and optimisation can be achieved for financial stability and competitive strength. Of course, these steps do not have to be strictly sequential. A phased approach is often seen in practice.

Dinodia: We have seen many institutions struggle because their approach to ALM is tactical and narrowly defined. ALM framework is often scoped out to perform things which are required by current regulation or immediate needs. This leads to a situation where, when any new regulation or business situations arise, ALM is not able to help or add adequate value. So, to manage ALM risks proactively, the underlying ALM framework should be defined in conjunction with the overall risk management framework and with a target-state roadmap in mind. What may be best practice today could be lagging practice in a few years. Banks need to continuously benchmark themselves and make sure that ALM evolves over time. In many cases, we have seen organisations fall into the trap of not touching things for fear of breaking something. ALM is a dynamic area of risk where the various aspects are evolving. Data processes, models, reports and ALM strategies should mimic the underlying nature of ALM risks.

Vandermosten: In the journey from Excel-based solutions to an ALM solution that allows for ALM to be managed in an integrated way and complies with the liquidity and IRRBB regulatory requirements, to a solution that allows for managing the balance sheet considering not only ALM, but all the risk domains, to a solution that allows for optimising the balance sheet, all those steps while adapting to the constantly evolving models, best practices and regulations, it is important and cheaper overall to make the right strategic choices from the beginning. Banks need to choose a flexible and scalable solution, for which the solution provider shares the bank's vision.

R&C: What benefits can customisable modelling systems bring to an effective ALM framework?

Chen: Risk and financial modelling is crucial to building an effective ALM framework because the challenges in data, methodology and skills modelling are evolving quickly. This evolution requires modelling systems to be more agile than ever before. This is why artificial intelligence (AI) and machine learning (ML) techniques are getting a lot of attention. Generally speaking, the modelling evolution itself will drive up

the number of models and the number of model versions. Proper model life cycle management and governance, as well as performance monitoring, is becoming more important than ever. FIs can no longer rely on spreadsheet based, semi-manual labour intensive and error-prone approaches. Powerful data management and integration tools are certainly critical in this Big Data era. But equally critical is powerful data exploration, visualisation and analysis tools that can provide more insights to the modelling teams. Efficient model implementation and execution is another key to the success of a good modelling framework. Banks cannot sustain a long implementation and validation cycle in the information age. A componentised, highly configurable, self-service model implementation platform would help significantly. Given the sophistication of the models and the large volume of data, a good modelling system should be able to take advantage of the scalability that the new technology offers. An efficient model execution can give management valuable time to react.

Dinodia: ALM managers would often say that ALM is more an art than a science. This is because if you compare ALM to other financial risks, such as market risk or credit risk, you will find that the risk factors, such as the deposit behaviour of a customer, customer loyalty, market wide liquidity availability, reputational events and the pricing strategies of peer banks, are quasi-quantitative. Deterministic models and traditional analysis will not capture the risks and outcomes which are most probably the areas where ALM can add value. This is where customisable and integrated modelling concepts can help. In the ALM world, models need to talk to each other and need to cater for risk factors and situations which are multidimensional. This does not mean ALM models and frameworks need to become black boxes; rather, they should support common business scenarios which can happen in the business environment, enabling banks to use the solution as a realistic and smart analytical tool. AI/ML models in ALM certainly have several use cases, but again, it is not the complexity of the model which will add value but whether the model allows you to simulate the risk events and factors which matter, and provide

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reasonably accurate results. It is much better to be roughly right than precisely wrong.

Vandermosten: The most important factor with ALM models is their forecasting accuracy and their easy integration into decision making. This is a shift from simply paying attention to a model's technical capability or description. Model performances will be measured constantly, and if a new model performs better, it will replace the previous one. ALM solutions thus need to allow for multiple models to be tested in parallel and to be able to dynamically replace one model with another very quickly. This flexibility provides a competitive advantage.

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R&C: How important is it to stress test aspects such as interest rates and liquidity risk? What insights can this process provide to FIs?

Chen: Stress testing, or more generally scenario-based analysis, of the key risks, including interest rates and liquidity risk, will provide banks with an insightful and forward-looking understanding of the risks inherent to an institution's core business and its future growth. Many institutions have used so-called 'what-if' analysis for management to proactively examine potential vulnerabilities and to increase the confidence in planning. Again, this benefit can only be achieved if the institution has a good stress testing framework in place. Institutions that do not have this vision, and thus do not sufficiently invest, will certainly not see these benefits. We have seen several US institutions that have invested in stress testing, initially under pressure from the US comprehensive capital analysis review (CCAR) requirement, start to reap the benefits. The chief risk officer (CRO) of one of the world's largest banks gave a specific example of how he was able to understand the bank's resilience to the dangers of the Chinese housing bubble through the bank's stress testing capability.

Dinodia: It is not uncommon for institutions to dismiss regulatory stress testing as a compliance burden with little business value. However, stress testing is extremely useful, particularly if institutions perform it as a means of gaining insight, rather than

simply being a 'check box' process. This is particularly true for liquidity risk, because, by definition, it is something which emerges during stress events. Therefore, it is almost impossible to capture liquidity risk without some degree of stress testing. Even liquidity ratios like LCR and NSFR are frameworks based on stress testing. In general, stress testing forces institutions to model and contemplate scenarios which normally may never be modelled and analysed in day to day analysis, and stress testing results can be challenged as something that is very unlikely or imprecise, but the insights and risks that they uncover are real and extremely valuable.

Vandermosten: While stress testing has become increasingly important over the last decade for regulators and boards, it has been quite common in the ALM field for some time, at least for large FIs. This is probably because ALM is the most naturally forward-looking domain: FIs want to anticipate potential liquidity or profitability shortages, even in stressed but still possible conditions. We even see 'stresses of the stress'.

R&C: To maximise the results of ALM stress testing, is it necessary to run different internal and regulatory scenarios, and compare a range of risk exposures? How can FIs achieve this level of analysis?

Chen: A scenario-based approach has many benefits, but it still largely depends on scenarios. Flexibility to define and run different scenarios is very important to a true ALM stress testing capability. If an ALM system can only accommodate certain predefined scenarios it will obviously suffer. It is important that ALM systems can manage a flexible configuration of a wide range of scenarios. A configurable and powerful system is a good way to achieve this level of analysis.

Dinodia: Scenarios need to be diverse and cover all plausible situations. Some institutions make the mistake of stopping at testing against just one or two extreme scenarios. The outcome is often that stakeholders may dismiss the scenario as unrealistic or a risk-manager's fear-mongering. Or worse, that it fails to capture the range of outcomes by being too restricted. One of the reasons that regulatory scenarios are often made common across the industry is to allow horizontal comparisons of results across the peer group. It does not mean that the scenario adequately captures the plausible risk factor events applicable to a particular institution. Similarly, scenarios used by one institution may not be appropriate for another. Or, for that matter, a scenario used a few years ago may not be appropriate now. Institutions should employ a range of scenarios, both regulatory and internal, allowing them to unearth risks according to their businesses and environment.

Vandermosten: Stress testing is also about making assumptions on the future evolution of the balance sheet, taking into consideration stressed conditions. This requires FIs to consult almost all the divisions and business lines of an organisation, not only for the base case, but also for stress scenarios. What are the most relevant business stresses that FIs can incur? What is the potential impact on each business line, and on each market interest or FX rate of a stress scenario? These questions must be answered from a business perspective, and must then be translated in ALM calculation scenario parameters. For instance, before the referendum of the 23 June 2016, Brexit could have been a relevant stress scenario for many FIs. Instead, it is now a base case scenario. Therefore, it is important to be able to analyse dynamic scenarios, where the size of the balance sheet and the market data is evolving through time, as the horizon of such analysis is typically between one and five years, and to have the capability to easily 'translate' business assumptions into parameters.

R&C: To what extent can ALM stress testing assist FIs to meet their regulatory requirements, particularly in terms of analysis, reconciliation and reporting?

Chen: Meeting regulatory requirements should not be the only goal of any risk and financial analysis in an institution, but it is still essential. The requirements to achieve model governance, analysis and reporting accuracy, timeliness and adaptability have significantly increased in recent years. Reconciliation between risk and finance data, analysis results and reports is an inevitable requirement today. A modern ALM system is well positioned to assist institutions to meet these requirements because of its importance to an FI's core business and the fundamental handling of both assets and liabilities. Of course, the key to success is an ALM function that overcomes myriad challenges. With a traditional, inflexible ALM framework, it is difficult to achieve the ultimate benefits. Many banks have painful experiences to share in their CCAR and Dodd-Frank Act Stress Tests (DFAST) exercises.

Dinodia: Traditionally, there has been a tendency by some institutions to look at ALM as a pure risk management or internal reporting exercise where process robustness, governance and control, and data quality, were not given due importance. However, most institutions are starting to realise that an ALM framework is a foundation aspect which, in turn, needs to feed and support several other areas of risk and finance, often involving regulatory reporting. Also, it makes sense to get things like data and models right once, rather than having to invest time and money each time the same data element or result needs to be used for regulatory or internal reporting purposes.

Vandermosten: An ALM stress testing solution must be sufficiently flexible and scalable to incorporate changes in an FI's balance sheet activities, portfolio composition, and any new risk that may appear. It should also allow for calculating new stress scenarios in a timely manner to address rapidly emerging risks. In a period of important stress, it might even be critical for the regulators, and the FI itself, to be able to run some scenarios allowing the right regulatory and management decisions to be taken in time.

R&C: What essential advice would you offer to FIs looking to enhance their ALM processes? Does the regulatory outlook suggest this issue will only become increasingly important in the years ahead?

Chen: It is difficult to say for sure where the regulatory requirement will go because there are multiple considerations for regulators. However, the benefit of a sound ALM process is beyond regulatory compliance. ALM has not been primary for regulatory compliance but for an institution's own management. An institution will likely only see the benefits that it wants to see. Learning from the past and the mistakes of others would be helpful.

Dinodia: FIs should not look at ALM as merely a regulatory or reporting exercise. Rather, they should design a framework which helps the institution to gain business insight and strategically manage its balance sheet. FIs should also automate their business and spend more time on analysing results, improving assumptions and scenarios and performing business relevant *ad hoc* analysis. Finally, FIs should concentrate on building capabilities and a strong ALM foundation.

Vandermosten: The new final European Central Bank (ECB) guidelines for Internal Capacity Adequacy Assessment Process (ICAAP) and Internal Liquidity Adequacy Assessment Process (ILAAP) are clearly underlining the need to integrate ICAAP and ILAAP into banks' global risk management and business decision-making processes. They also both confirm the need for adequate stress testing. ALM must become better governed, actually be used in decision-making processes by all relevant stakeholders, such as finance, treasury, risk, business lines and management, and become part of global risk management and stress testing. To reach those goals, the automation, integrability, flexibility and scalability of an ALM system are key. R&C