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# Evolution of risk management from risk compliance to strategic risk management: From Basel I to Basel II, III and IFRS 9

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**Abstract** Risk management, for example relative to its finance counterpart, is a much younger function. This paper examines its evolution across different eras: Basel I, Basel II, III and its follow-ups, and in post International Financial Reporting Standard 9 (IFRS 9). The journey that started as risk compliance in the Basel I era has evolved to include a strategic role post Basel II, as the risk function needs to play a lead role in capital and business mix optimisation, informing corporate strategy. IFRS 9 is another game changer, making the impairment model predictive and 'risk-based'. These changes require a new partnership model between the risk and finance functions, first in capital management and now in IFRS 9. The paper discusses this necessary evolution of risk management, its strategic role in capital and business risk optimisation, and its essential role in IFRS 9 production and governance.

**Keywords:** *strategic risk management, Basel, advanced internal ratings-based approach (A-IRB), International Financial Reporting Standard 9 (IFRS 9), risk governance, stress testing, Internal Capital Adequacy Assessment Process (ICAAP), capital optimisation, provisions, impairment estimation, expected credit losses*

## INTRODUCTION

In this paper, the evolution of risk management from risk 'compliance' to 'strategic risk management' is discussed, from a historical perspective as it relates to four different eras:

- (1) Basel I;
- (2) Basel II;
- (3) 2007/8 financial crisis and Basel III and its follow-ups; and
- (4) IFRS 9.

The journey started with Basel I, when the risk function developed the risk metrics, defined the

'sandbox' (ie, risk limits) in terms of risk appetite, and monitored and reported on whether the risk exposures remains within the sandbox. This is of course necessary. In this era, the risk and finance function worked independently, mostly because Basel I capital was risk insensitive. Capital management was seen as the sole responsibility of finance. Among other financial disclosures, regulatory capital was not risk sensitive and thus was produced by the finance function in many banks.

Basel II's advanced internal ratings-based approach (A-IRB) was the first game changer whereby the

required capital under A-IRB became 'risk based', requiring specific risk knowledge. Pillar II and Internal Capital Adequacy Assessment Process (ICAAP) clearly separated the 'supply' and 'demand' sides of capital. The supply side is, of course, the available capital that is managed by the finance function to conduct the necessary capital market activities. The demand side is the 'required capital' that is proportional to the level of risk taken, and therefore is also called risk capital. Both economic capital and A-IRB regulatory capital are risk capital and are estimated and managed by the risk function. These changes made the risk function the owner of the demand side of capital management, requiring the finance and risk functions to establish an effective partnership for co-management of the supply and demand sides of the capital.

Basel III's demanding regulatory changes and the following tough macroeconomic environment combined put a lot of pressure on return on equity (ROE), forcing the banks (and insurance companies) to find efficiencies especially in capital management. Banks and insurance companies, in response to these pressures, are trying to re-engineer their capital, business mix and performance management processes to boost their ROEs. The risk function has a significant role to play. As mentioned, in its risk compliance role, the risk function defines a 'sandbox' in terms of risk appetite and monitors and reports on whether the first line remains within the sandbox. In reality, there are very different risky positions and strategies within the sandbox and most of them are in fact 'sub-optimal'. Financial institutions (FIs) must pursue the optimal risk strategy within the sandbox in order to maximise ROE, while staying within their risk appetite constraints. Identification of this optimal strategy is the risk function's responsibility. The optimisation strategies can only be identified and executed by an advanced risk function. This extends the risk function's traditional responsibility from being the effective brakes to being a co-pilot, turning risk compliance into strategic risk management.

IFRS 9 is the new game changer. The impairment model is no longer accounting based, but risk based. Provisions are estimated using predictive models, along with the economic forecasting and scenario development, all of which are done by the

risk function. Quarterly production of expected credit losses (ECLs), including analysis-of-change and what-if analysis, are also performed by the risk function, largely utilising the existing model development and stress testing capabilities. ECLs, however, are part of the financial disclosures which are, of course, the finance function's accountability. This, too, will require an advanced partnership between the risk and finance functions.

This paper is structured to discuss the evolution of the risk management following the above historical perspective in four distinct eras:

- (1) Basel I and its disintegrated stage between risk and finance.
- (2) Basel II and risk's functions ownership of risk based capital.
- (3) 2007/2008 financial crisis and Basel III, and risk function's responsibility to determine the optimal risk strategies.
- (4) IFRS 9, and the risk function's essential role in production of ECLs and its governance.

## **BASEL I AND RISK COMPLIANCE ERA**

Basel I capital was entirely risk insensitive and grossly simplistic. As a result, it was seen as a part of financial reporting and therefore was typically produced and reported by the finance function with no involvement from the risk function. Its obvious inadequacy created a need for management of the 'economic risk' which, of course, is the cause of the actual losses. The risk function evolved rapidly in response to this need of managing the true economic risk and the key risk metrics such as value at risk (VaR) were developed. A special version of VaR, economic capital (EC), was produced by the risk function, leading the way to risk adjusted profitability metrics (eg, risk adjusted return on capital (RAROC) and its derivations).

These early days of financial engineering gave way to the development of risk metrics, which enabled the risk function to define the organisation's risk appetite. It also measured and reported the economic risk exposures against these risk appetites, performing the 'risk compliance' role, which was a much welcomed improvement.

In this period, the risk and finance functions worked largely independently and there was not much of an attempt to integrate and co-manage the entirely risk insensitive regulatory capital and risk sensitive, but unproven and difficult to understand, economic capital.

## **BASEL II, A-IRB AND RISK SENSITIVE REGULATORY CAPITAL**

A-IRB was the first game changer whereby the required capital under A-IRB became 'risk sensitive'. Pillar II and ICAAP clearly separated the 'supply' and 'demand' sides of capital. The supply side is, of course, the available capital that is managed by the finance function to conduct the necessary capital market activities. The demand side is the 'required capital' that is proportional to the level of risk taken, and therefore is also called risk capital. Both EC- and A-IRB regulatory capital (RC) are forms of risk capital and need to be estimated and managed by the risk function. These changes made the risk function the owner of the demand side of capital management, requiring the finance and risk functions to establish an effective partnership for co-management of the supply and demand sides of the capital.

This partnership was not easy to develop. In the early stages, there was no holistic and integrated management of the supply and demand sides of capital. Moreover, the two measures of risk capital, namely EC and RC, were not linked.

At this stage, annual capital planning and strategic planning were not an optimisation exercise, but largely an aggregation exercise. The business units simply submitted their business plans typically driven by the revenue targets and the corporate functions aggregated these individual plans. Capital planning and management was nothing more than estimating the required capital to support these plans and monitor the actual capital consumption during the year against the plan. The capital estimations were simply the outcomes of the individual plans and there was no optimisation or harmonisation of the individual plans against an objective function, such as maximising the ROE for the FI as a whole, while meeting the income and strategic objectives as the constraints of this optimisation.

At this stage, financial institutions could not take advantage of being a single corporation; rather, they were managed as a collection of smaller businesses. The risk function became responsible for the management of the demand side of capital, but lacked the integration with the finance and strategy functions, as well as the necessary organisational alignment to fulfill the objective.

## **2007/8, FINANCIAL CRISIS AND BASEL III: INCREASING NEED FOR CAPITAL OPTIMISATION**

The regulatory response to the 2007/2008 financial crisis was strong, resulting in Basel III and its follow-ups. These demanding regulatory changes and the following tough macroeconomic environment put a lot of pressure on ROE, forcing the FIs to find efficiencies, especially in capital management. Banks and insurance companies, in response to these pressures, are still trying to re-engineer their capital, business mix and performance management processes to boost their ROE. Organisational re-alignments are required to support these new processes.

### **A developing role for corporate functions**

The role of the corporate functions is evolving. Owing to their elevated position, corporate functions need to play a crucial role in ensuring consistency across the enterprise, while capturing synergies among the different lines of business. In the pursuit of a common goal, corporate functions assume a pivotal role in performing enterprise-wide optimisation exercises that integrate such effects across different businesses and geographic regions of operation. It will be necessary for enterprise functions to set the course for the flotilla and ensure synchronised movement against the headwinds of a challenging macroeconomic environment. A new partnership among the risk, finance and strategy functions (and the actuarial function in insurance companies) needs to be established. The capital planning processes of ICAAP and Own Risk and Solvency Assessment (ORSA) are also integrating these previously relatively autonomous disciplines. The risk function, as the owner of risk

strategy and risk capital, becomes an active partner in capital management. In insurance companies, the corporate actuarial function also has an important role to play in the process. To create and foster these new partnerships, financial institutions will need to dissolve the traditional boundaries, manage the resulting organisational frictions and re-meld these functions to enable integrated capital management.

In the post-crisis global environment, many financial institutions operate in multiple geographic regions with multiple lines of business. These businesses face their local markets and local regulators, and need to meet their local needs. On the other hand, a financial institution benefits from having an umbrella of integrated businesses rather than having a collective but unintegrated set of businesses. Therefore, certain aspects of the organisation must be managed globally. Corporate functions, owing to their elevated positions at the corporate level, become agents in the integration of different operations across businesses and geographic regions. In doing so, they facilitate the determination and execution of a financial institution's global strategies. Capital and business mix management is one of the most important of these strategies. Consider the three-level capital and business mix management framework below:

- (1) *Level 1 — Strategic planning:* Optimal strategy needs to be selected from among the alternatives in order to maximise the ROE for the enterprise as a whole.
- (2) *Level 2 — Target setting:* The selected enterprise strategy is translated into capital budgets in terms of demand (economic and regulatory capital) and supply (available capital), as well as corresponding performance targets (eg, the return on EC).
- (3) *Level 3 — Limit and performance monitoring:* Realised capital usage and performance is monitored against their targets.

In the execution of these steps, the corporate functions are the process owners. They first facilitate the strategic planning partnering with the business leaders who provide a view of what is achievable in their businesses and regions of operation. Once the optimisation is achieved, target setting

is a mechanical exercise. Limit and performance monitoring is also coordinated by the corporate functions.

By performing these functions, corporate functions help identify and capture synergies among the financial institution's different business units. On the supply side, synergies can be achieved via the fungibility of available capital. With the help of the corporate functions, the supply of capital and liquidity can be transferred among the financial institution's regional businesses. On the demand side, the corporate risk function is equipped to take advantage of diversification benefits across the different businesses that result in minimisation of overall demand of capital at the enterprise level. The corporate risk function also makes sure that EC and RC are calculated consistently for all businesses so as to safeguard a level playing field among different business units (BUs). The corporate risk function also ensures that the processes used in evaluating EC and RC are properly governed. As the owner of the demand of capital, the corporate risk function teams up with the corporate finance/treasury function in capital planning and management.

On the other hand, the individual BUs, as profit centres, are responsible for the execution of these strategies so as to meet their performance target (eg, ROE). Individual BUs are also responsible for the day-to-day management of the risk and capital at their level and within their jurisdiction. Therefore, the roles and responsibilities between the corporate and business unit functions are complementary to each other.

### **Establishing an effective partnership between the risk and finance functions for effective capital management**

We will start the discussion with a simple practical question: 'Which corporate function owns capital management?' In many financial institutions, capital management is primarily owned by the finance function. The risk function reports the risk capital with respect to the base business plan and under stress scenarios. Finance then puts the supply (available capital) and demand sides together, presenting it to the capital management committees

and the board. This is not an ideal solution. Following such an approach, risk information is essentially reduced to numbers. Without the stories behind them and a clear understanding of the underlying risk drivers and their complicated interactions with the risk capital, the numbers alone are not useful in effectively communicating the risk information. Under this model, risk strategy and risk information are too far removed from capital management and the risk function is not an equal partner in capital management. As a result, an effective capital and business mix optimisation framework cannot be implemented. Capital and business mix optimisation needs to be performed with respect to alternative risk strategies of which the selection and translation into the risk capital need to be performed by the risk function.

Ideally, the risk function owns the risk capital and the finance function owns the available capital, and they partner for effective capital management. For effective implementation, this joint ownership model needs to be supported by establishing corporate processes and cross-functional teams among the risk, finance and strategy groups. These partnership models dissolve the traditional boundaries in capital management processes and may result in organisational friction. For example, the finance function, which is traditionally tasked to the management of (available) capital, may feel its territory invaded due to the risk function's ownership of risk capital and increased responsibilities in capital management. Financial institutions that can more effectively resolve these conflicts will have greater success in establishing useful capital management processes.

Another potential challenge is the integration of regional operations and business lines under the corporate capital management umbrella. Individual regional operations and business lines that previously enjoyed autonomy may resist taking directions from the corporate office. They may see this as 'over-centralisation' and ceding control to the corporate office over their business affairs; therefore, this change needs to be managed carefully. This is not centralisation, but rather establishing a common direction for the common good. It is not interfering with the businesses, but rather establishing a course

that is aligned with overall organisational goals. Once the strategic direction and business plan have been set by the corporate office through consultation with the lines of business (LOBs), the LOBs do have the autonomy to execute their respective plans.

### **Setting up an optimisation framework and determining the optimal risk strategies**

Only after establishing the above organisational alignment and the clarity of roles and responsibilities can optimisation frameworks be established as part of the capital and strategic planning. These frameworks can have a clear objective function such as maximising ROE and formal constraints such as achieving income targets, not exceeding available capital and meeting strategic objectives. These frameworks are extensively discussed.<sup>1-3</sup> These frameworks would also allow for the determination of effective strategies for co-management of alternative measures (of the demand side) of capital, such as regulatory capital (A-IRB and the new standardised approach as a floor going forward) and economic capital (eg, see Ozdemir et al.<sup>4</sup> and Ozdemir and Cubukgil<sup>5</sup>). The risk function is responsible for establishing these optimisation frameworks and identifying the optimal risk strategies, for example, to maximise ROE for the organisation. The control variables in this optimisation exercise are the risk strategy per line of business (ie, should each of the businesses move up or down on the risk curve considering their respective risk versus return relationships) and the relative size of each of the businesses to optimise the business mix for the organisation as a whole. In short, the risk is the control variable in the business of risk taking, which is best understood and quantified by the risk function. The risk function's involvement in setting up the optimisation framework and determining optimal risk strategies within this framework, subject to the organisation's risk appetite constraints, takes the role from traditional risk compliance to strategic risk management, from being effective brakes to a co-pilot in determining corporate strategy.

## THE ROLE OF THE RISK FUNCTION IN IFRS 9 PRODUCTION AND GOVERNANCE

IFRS 9 is another game changer. The impairment model is no longer accounting based, but risk based. Provisions are estimated using predictive models, along with the economic forecasting and scenario development all of which are done by the risk function. Quarterly production of ECLs, including analysis-of-change and what-if analysis, are also performed by the risk function, largely utilising the existing model development and stress testing capabilities. The ECLs, however, are part of the financial disclosures which are, of course, the finance function's accountability. This, too, will require an advanced partnership between the risk and finance functions.

### Risk governance of the impairment (ECL) process

The risk function's governance responsibility is comprised of five components:

- (1) Risk data governance.
- (2) Forecasting governance.
- (3) Model governance.
- (4) Governance of the manual credit staging override process utilised from the A-IRB process.
- (5) Production governance.

Risk data governance and model governance (including conceptual soundness validation and backtesting) are the generic risk governance components. Similarly, many banks have long established an economic forecasting governance framework for their stress testing programme whereby macroeconomic forecast scenarios are examined, effectively challenged and approved. This framework will also be utilised for IFRS 9.

The manual credit staging override process utilised from the A-IRB process incorporates the manual adjustments — in particular for the identification of watch-listed and impaired accounts, which affects staging migration to Bucket 2 and Bucket 3. The inputs required for the quantitative models used for probability of default (PD)

estimation are not continually refreshed and therefore there will be circumstances where model-based PDs lag. For example, according to a model-based PD calculation (with outdated inputs), a loan that may appear to be in Bucket 1 may, in reality, be in Bucket 2 or even 3. The bank needs to complement the model-based process with a manual monitoring process, typically by the first line of defence, so loans that should be watch-listed or impaired can be identified and the necessary downgrades to Bucket 2 and 3 can be made on a timely basis. The effectiveness of this manual credit process should be verified. Lastly, the production process and the effectiveness of the controls, as well as the robustness of the key assumptions, should be verified.

Based on obtaining reasonable assurance on all five components above, the chief risk officer (CRO) can provide his or her sign-off on the 'risk-based' ECL.

This is where the risk process ends and the finance process commences, during which finance needs to satisfy itself in accordance to accounting principles before IFRS 9 results can be used in financial disclosures.

There are also board-level accountabilities, in particular between two board subcommittees, the risk and audit committees. The latter is accountable for board-level oversight of the financial disclosures, whereas the 'risk-based' ECLs, governance of the risk models used, production and analysis fall under the jurisdiction of the risk committee. As a solution, some banks have already developed joint risk and audit committee sessions to discuss and oversee impairment (ECL) results.

The governance framework is depicted in Figure 1.

### Management overlay under IFRS 9

Under IFRS 9, the use of the management overlay will be different. Under the current regime, management has significant latitude to use judgment, in the absence of a more objective framework. Under IFRS 9's more objective, model-based framework, both the magnitude and the subjectivity of the management overlay will lessen.

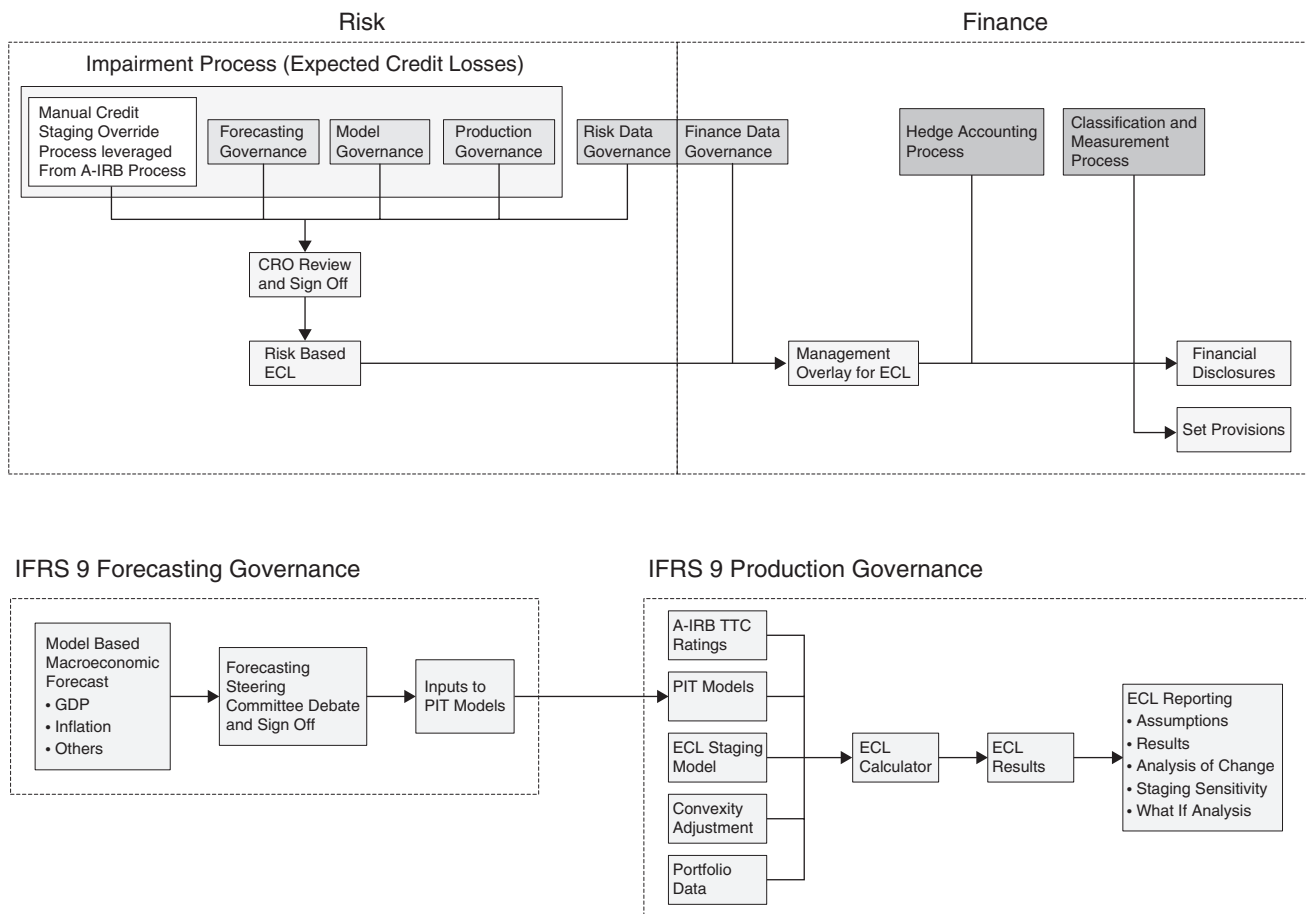


Figure 1: IFRS 9 governance framework

The model risk is a key source for management judgment under IFRS 9. The model risk arises from:

- (1) Potential errors in data, methodology or assumptions. Model error potential owing to these factors needs to be estimated by means of sensitivity analysis around the key model inputs and assumptions.
- (2) The model risk also arises when the conditional PD and loss given default (LGD) models are not sufficiently forward looking owing to data or methodology limitations. When this is the case, management judgment is required to supplement the results. For example, a certain IFRS 9 model may not be able to fully capture the impact of a downturn in the horizon and the corresponding

increase in the provisions in advance of the forthcoming downturn. If the management believes that this is the case, they are required to apply their judgment to increase the provisions further. (Ironically, the pro-cyclicality of IFRS 9 is already a major source of concern. Management would rather use management judgment to dampen the pro-cyclicality, not to increase it; therefore, compliance with the requirement will be difficult in practice.)

The risk function is best quantified to estimate the model error potential owing to the two factors above. Upon estimation of model error potential, risk function provides the ‘risk-based’ ECL including the tolerance level based on the model error

potential assessed. For example, for a particular reporting quarter, the risk function may determine that owing to model risk, the 'risk-based' ECL can be up to 10 per cent higher or 10 per cent lower.

Finance will need to maintain final authority for the management overlay under IFRS 9, which may incorporate other considerations outside of the model error potential when justified. In this partnership model between risk and finance, it is important to establish an objective and effective operating model. One model that would *not* work is if finance makes the overlay and the risk function is required to 'rationalise' and justify the overlay. This operating model would put the risk function in a difficult position, as it is required to use an objective framework to quantify and justify model error potential, as opposed to rationalising the final overlay, which could incorporate other considerations outside of the model error potential.

Instead, the risk function estimates the 'risk-based ECL', assesses the tolerances around the 'risk-based ECL' owing to potential model-based estimation errors and passes these to the finance function, without being accountable for the rationalisation of any or further overlay made by finance. If the finance function was to apply an overlay that resulted in the ECL being within the tolerance levels assigned by the risk function, the risk function would not be expected to rationalise the overlay, but can assert that the new result is a plausible estimation that is within the model risk tolerances. In summary, the risk function needs to pass the baton to the finance function cleanly.

### Production process and the following analysis

The risk function's responsibility for the production of quarterly risk ECL involves:

- (1) Refreshing the unconditional (A-IRB) PDs based on the new borrower-specific information that becomes available during the last quarter.
- (2) Forecasting and governance of the macroeconomic explanatory variables required to produce

conditional PD, LGD and exposure given default (EaD).

- (3) Production of (conditional forward looking) IFRS 9 PDs by inputting the macroeconomic explanatory variables estimated in point (2) above to the IFRS 9 models.
- (4) Determine the staging based on the new IFRS 9 PDs estimated in point (3) above.
- (5) Estimate one year ECLs for the loans in Bucket 1 and lifetime ECLs for the loans in Bucket 2.
- (6) Estimate (or refresh as needed) loss estimates for the impaired loans in Bucket 3.
- (7) Produce ECLs in Buckets 1, 2 and 3 loans for different portfolios and aggregate them as necessary.
- (8) Conduct the analysis below.

### Analysis of change

Analysis of change is to understand the sources of the change during the quarter. There are three separate reasons that need to be differentiated from each other:

- (1) Change owing to the macroeconomic outlook. If the current outlook has become more pessimistic, ECLs go up and vice versa.
- (2) Change owing to the portfolio change. If the portfolio has become riskier (owing to existing exposures that became riskier and/or new loans originated were riskier than the existing ones), ECLs go up and vice versa.
- (3) Change owing to the model change. Periodically the models are updated based on the backtesting results. It is important to isolate the impact of model change.

### Staging sensitivity

Movement of the loans between Bucket 1 and Bucket 2 has a very important impact governed by the PD-based thresholds. Some of the loans in Bucket 1 may already be close to the threshold, and may hit the threshold and move to Bucket 2 following further deterioration in the economic



outlook. It is vital to understand what it takes for this to happen when a substantial portion of the portfolio would move to Bucket 2 increasing ECLs materially. Therefore, the ‘magnitude of the shock’ or deterioration in the economic outlook that would cause this substantial increase in ECLs must be determined.

### *What-if analysis*

What-if analysis is to understand the impact of the ECLs of stress scenarios the bank is considering for risk management and ICAAP purposes.

### **Two essential implementation choices**

- (1) *Setting triggers based on change in a one-year PD versus lifetime PD.* IFRS 9 requires that PD-based triggers are used to determine significant credit deterioration, following which deteriorated loans in Bucket 1 are required to move to Bucket 2. In some banks these triggers are based on a one-year PD, whereas in others it is based on lifetime or annualised lifetime PDs. The latter would have been more accurate if it were possible to robustly estimate PDs over one year. In reality, PDs over one year rely on a forecast beyond one year, which are inherently difficult to estimate, introducing a lot of model risk and operational burden into the process.
- (2) *Convexity adjustment.* It is not possible to accurately calculate ECLs using a single ‘expected’ economic forecast scenario. Many banks use multiple scenarios; one for their base case and others to represent up and down scenarios. For example, the oil price will be US\$20 with a 5 per cent probability; US\$30 with a 15 per cent probability; US\$55 with a 50 per cent probability; US\$65 with a 25 per cent probability; and US\$85 with a 5 per cent probability. Note that these scenarios and the corresponding probabilities will need to be forecasted over a horizon of three to five years. Assigning robust probabilities to future scenarios on a consistent basis is very difficult, if it is at all achievable. In practice, the assignment of probability measures is quite likely to be *ad hoc*, subjective and inconsistent, which will also create an operational problem.

The probabilities assigned to these scenarios, as well as the severity of these assumptions, are extremely critical. Due to the cliff effects between Bucket 1 and Bucket 2, if the scenarios selected are a little too severe, and/or the probabilities assigned to them are a little too high, a substantial portion of the portfolio may migrate from Bucket 1 to Bucket 2, resulting in a very significantly increase in the provisions. Many banks, well aware of the cliff effect and the inherent subjectivity of the scenario and probability selection, will have the natural bias to avoid the cliff by means of scenario selection. It is only natural that they will establish an iterative process to avoid the cliff effects and back into the desired ECLs numbers by changing the scenario assumptions. The risk function will not only have to perform this extremely time- and labour-intensive iterative process, but will also be required to ‘rationalise’ the resulting scenarios. Neither is sustainable.

This ‘gaming of scenarios’ not only compromises the benefits of an otherwise more objective IFRS 9 framework, but also makes the comparison among banks very difficult, if not impossible. It is concerning to see that when the unjustified variability of A-IRB results among the banks is recognised as a major concern, effectively triggering Basel IV, a similar and possibly a worse source of unjustified variability is being introduced to IFRS 9 via the use of multiple scenarios.

To avoid this situation, Miu and Ozdemir<sup>6</sup> proposed a novel approach, called ‘convexity adjustment’ to deal with the issue without necessarily involving multiple scenarios, which will enhance the objectivity and replicability of the modelling results. The methodology corrects for the bias in the ECLs calculation as a result of the non-linearity. By doing so, one can evaluate ECLs with only the point estimate of the expected economic condition and its standard deviation, which could be determined in a much more objective fashion than the full probability measure.

### **SUMMARY AND CONCLUSIONS**

In this paper, the necessary evolution of the risk function, organisational re-alignments to support the integrated capital and business mix management processes, and the risk and finance partnership in

effective capital management in IFSR 9 has been discussed. The paper started by developing the role of the corporate office. Having an umbrella of integrated businesses brings a significant advantage over having a collective but not integrated set of businesses. Corporate functions, owing to their elevated positions, can provide integration among the different businesses and geographic operations. They facilitate the determination and execution of the financial institution's global strategies, of which capital and business mix management is a very important one. It was stated that the corporate office, by performing different functions, helps identify and capture synergies among the financial institution's different businesses.

The risk function is responsible for developing formal optimisation frameworks as part of the capital and strategic planning processes, and for utilising them to determine the optimal risk strategies in order to, for example, maximise ROE.

Finally development, operationalisation, and governance of IFRS 9 and the necessary partnership between the risk and finance functions were discussed. The governance of IFRS 9 was covered and then the IFRS 9 production process and the necessary quarterly analysis to understand the results and develop the corresponding action plans proactively were discussed.

The risk function has very important roles to play in capital management, capital and business mix optimisation and in IFRS 9, which extends the function's role from traditional risk compliance to strategic risk management.

## Author's note

The opinions expressed in this paper are those of the author and are not necessarily endorsed by the author's employer.

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