CREDIT RISK/ALM

BRIDGING THE GAP IN RISK MANAGEMENT – FROM ALM TO IFRS 9

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Introduction – a new world of risk

The world is changing fast for banks' asset liability management (ALM) specialists. In times of increased profit and loss volatility, many have found themselves in a new position – sandwiched between credit risk and finance. Suddenly everyone wants a piece of the ALM action, including those expertly constructed models they'd barely noticed before. At the same time, they want to know the potential impact of not only interest rates but also a growing number of macroeconomic variables. And how, they ask, will the credit losses expected today affect interest income tomorrow?

So why the new interest, from the credit risk team in particular? One important reason, among others, is the introduction of International Financial Reporting Standard 9 Financial Instruments, more succinctly known as IFRS 9. In 2018, this new accounting regulation will replace International Accounting Standard 39 (IAS 39) and, in particular, require banks to plan for possible credit losses far earlier in the lending cycle rather than after a customer has defaulted.

As KPMG explains: "In the past, concerns have been raised about 'too little, too late' provisioning for loan losses. The new expected credit loss model for the recognition and measurement of impairment aims to address these concerns, and accelerates the recognition of losses by requiring provisions to cover both already-incurred losses and some losses expected in the future. The new standard will have a massive impact on how banks account for credit losses on their loan portfolios. Provisions for bad debts will be bigger and are likely to be more volatile, and adopting the new rules will require a lot of time, effort and money."[1]

This forward-looking approach to credit loss is set to bring the accounting and risk management functions of banks closer together than ever before – and make credit risk management an even more integral part of ALM.

Close companions – where credit risk meets ALM

ALM typically views the balance sheet from two clear perspectives. The first is the fair value perspective, looking at fair value volatility over time. The second is the income perspective, which concerns itself with net income over time. For a retail bank, income is likely to be generated mainly by interest; for a private bank or wealth manager, fee income will be more important.

Thanks to major changes in the banking industry, aspects of credit risk management have been creeping steadily into the world of ALM for some time. As regulatory requirements continue to increase for banks, credit loss calculations are becoming a regular feature of risk and balance sheet management techniques.

Pricing bonds with credit spreads – credit adjusted valuation

With bonds now a popular investment choice for banks, it is increasingly important to consider the credit risk they represent.

The requirements of Basel III and its liquidity coverage ratio (LCR) are largely responsible for turning banks into bond investors, as they look to hold more high quality liquid assets for compliance purposes. A current lack of opportunities in the corporate lending space may also be driving interest in corporate bonds. Whatever the impetus for buying and trading bonds, banks need to make credit adjusted valuations of these financial instruments – and are commonly using credit spreads to do so.

In simple terms, a credit spread can be seen as the difference between the yield on a bond, with some risk of default, and the yield on a risk-free instrument. Or, in the words of the European Banking Authority (EBA): "It is the risk arising from variations in the 'premium' that the market requires for different types of instrument, reflecting both credit and other market risks (e.g., liquidity). This is a separate risk type, but closely associated with interest rate on the banking book."[2]

According to the Basel Committee on Banking Supervision (BCBS): "Credit spreads capture the expected loss from default (i.e., PD multiplied by LGD) and are a measure of the mean of the distribution of default losses (see chart). A change in credit spreads represents a shift in the mean of the default distribution."[3]

The problem is that the credit risk of a bond is not only reflected in the credit spread but also its demand in the market and the liquidity of the asset. When interest rates rise, for example, and government bonds start delivering strong returns, lower quality bonds will be traded far less often. But when rates are low, the opposite happens and demand for lower quality but higher yields increases. Put another way, credit spreads cover more than just credit risk; spread risk due to changes in supply and demand and liquidity risk are also key factors.
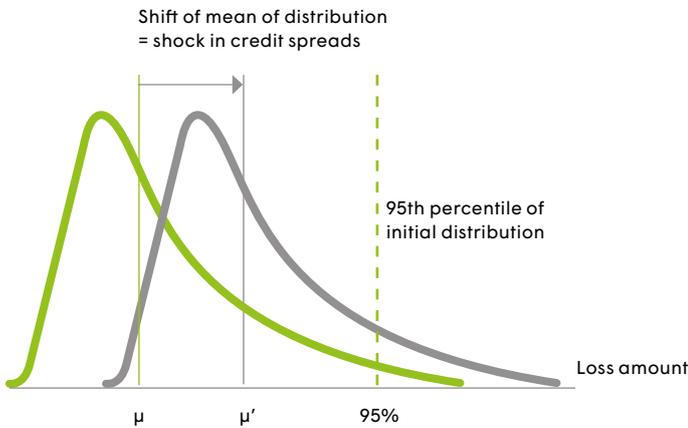
What's more, whereas implied credit spreads are easy to obtain given the existence of a market price, they can also clearly only apply to securities that have an official market price – not to the exposures to small businesses and private individuals that make up the majority of retail banking customers.

[1] **SOURCE 1:** KPMG, FIRST IMPRESSIONS: IFRS 9 FINANCIAL INSTRUMENTS, SEPTEMBER 2014.

[2] **SOURCE 2:** EBA, FINAL REPORT: GUIDELINES ON THE MANAGEMENT OF INTEREST RATE RISK ARISING FROM NON-TRADING ACTIVITIES, MAY 2015.

[3] **SOURCE 3:** BCBS, FUNDAMENTAL REVIEW OF THE TRADING BOOK: A REVISED MARKET RISK FRAMEWORK, OCTOBER 2013.

Frequency distribution of losses from default

Shift of mean of distribution
= shock in credit spreads

95th percentile of
initial distribution

Loss amount

μ   μ'   95%

Simulating credit adjusted net interest income with stress tests

Stress testing has become a common requirement for banks around the world, and is another example of where credit risk management and balance sheet management now collide. With the aim of determining how a bank will cope in an economic crisis, stress tests typically consider market risk, the treatment of securitizations, sovereign risk, non-interest income and expenses – and, most relevantly to this paper, credit risk, cost of funding and interest income.

The credit risk methodology for stress testing requires banks to provide starting values for the risk parameters probability of default (PD) and loss given default (LGD) which are then, in combination with the outstanding exposure amounts at future points in time, used to simulate their default flows (the amount lost through loan defaults) and impairment flows (the amount available in loan loss allowances) under both, the baseline and the adverse scenario.
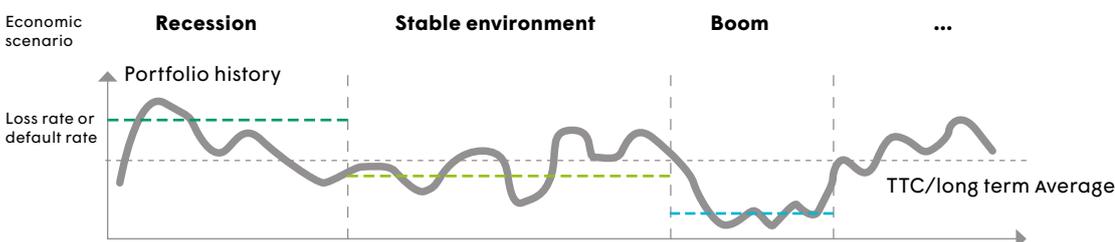
Although stress tests do not demand very sophisticated calculations for credit risk, they do require you to come up with the correct parameters: the so-called point-in-time (PIT) indicators for PD and LGD. Both of these risk parameters, PD(PIT) and LGD(PIT), should be forward-looking projections of default rates and loss rates, and above all capture current trends in the business cycle.

They should be used for all credit risk related calculations, except those for risk weighted assets, under both baseline and adverse scenarios. And most notably they can be reused in a similar way for impairment calculations under IFRS 9.
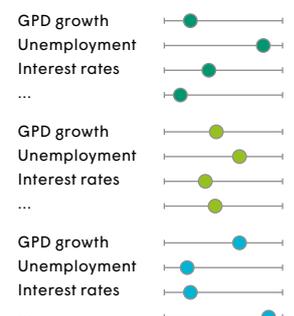
Banks however must before applying the starting values for PD(PIT) and LGD(PIT) to the above mentioned model, recalculate these values. The rationale behind this adjustment is that the provided PIT starting values are estimated based on historical data and therefore need to be adjusted by applying the scenarios provided by the regulators. In case of stress testing these adjustments represent the regulators perspective in terms of expectations about the defined adverse scenario whereas for IFRS 9 purposes the same adjustments for future expectations are representing the banks perspective on the evolution of the business cycle. The difficult question which needs to be answered when including expectations about the future in a loan loss forecast under various scenarios is, whether the correlations between the macro factors and the risk parameters hold in a stress scenario, or a re-calibration for each scenario is required?

On the cost of funding and interest income side of the stress test, default flows must also be taken into consideration to reflect the impact of the defaults on the interest income of a bank. For the latest stress testing exercise, banks had to project their balance sheet over a three-year horizon under the constant balance sheet assumption to provide information about the interest income and expenses under the baseline and adverse scenario. Next to the price evolution of the asset and liability side caused by the effects from re-pricings and new business, the net interest income is impacted by two additional effects. The first effect can be assigned to nondefaulted assets and is incurred when a loan is paid back earlier than expected. The second effect stems from assets transitioning from non-defaulted assets to defaulted assets or in other words when a loan stops being paid back at all. This is also where the interesting aspect of this exercise lies, and where credit losses hit the bank from two angles. Naturally, anyone who defaults on a loan will also stop paying interest. And so the more defaults that occur in a stress scenario, the more the bank will lose in terms of net interest income – on top of the amount left permanently outstanding on loans. It is exactly at this point that credit risk management and interest rate risk management meet head on.

Historic analysis

Macro factors

Economic scenario

Recession   Stable environment   Boom   ...

Portfolio history

Loss rate or default rate

TTC/long term Average

GPD growth
Unemployment
Interest rates
...

GPD growth
Unemployment
Interest rates
...

GPD growth
Unemployment
Interest rates
...

Bringing accounting into the picture with IFRS 9

Fundamentally, IFRS 9 will ask banks to combine models that were formerly restricted to ALM with credit risk management models, while strengthening the link between accounting and risk management, too.

The main goals of IFRS 9 are to: increase transparency for stakeholders, as rating agencies push for compliance; align how risk is monitored, managed and accounted for; and, perhaps most importantly, to incorporate forward-looking assumptions as well as past events and current conditions. Thanks to latter objective, it will see accounting move from an incurred loss model to an expected loss model.

To manage impairment, IFRS 9 stipulates that banks include a loss allowance in their financial statements that amounts to the expected credit loss (ECL) on their financial assets. This loss allowance must be included from the origination of the asset until it is derecognized. And under the IFRS 7 regulatory standard, financial statements must disclose a defined range of additional information that give a more complete picture of an organization's credit risk exposure.

As shown in the diagram below, IFRS 9 defines impairment according to three possible stages of deteriorating credit quality and increasing credit risk in an asset's life cycle.

At the heart of impairment calculation stands the following model, which as we discussed earlier is similar to that used in stress testing so far, with same risk parameters, PD(PIT) and LGD(PIT). The intention here is to calculate expected loss (EL) over the next twelve months or the complete lifetime of a loan and to discount these expected loss contributions with a discount factor derived from the loan's effective yield.

Because PD(PIT) and LGD(PIT) are point-in-time estimators that reflect current macroeconomic conditions, they require the calculation to be adjusted for future expectations to consider the forward looking element. If the economy is currently booming and everyone can pay back their debts then PD will be much lower. In a recession, people worry more about their next paycheck – and PD increases. The bottom line is that by changing the risk parameters to boom, bust or somewhere in between, you can estimate and allow for impending impairment.
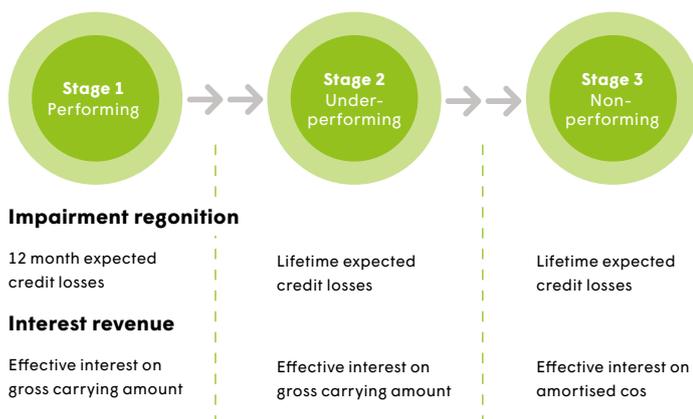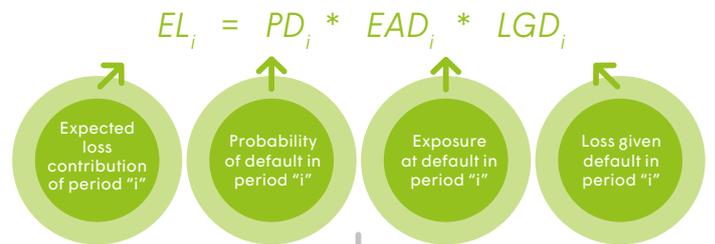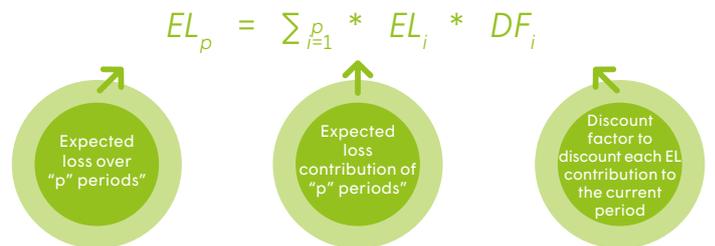
The challenge, of course, is to figure out what your future expectations are, and the level of adjustment required. This depends on the stage you're currently at in the macroeconomic cycle and relies on a wide range of variables, from GDP growth and unemployment rates to interest rates. But the BCBS has been clear that, however much it costs, banks must find a way to incorporate macroeconomic predictions into their expected credit loss calculations.

Generalized expected credit loss model

Impairment regonition

$$EL_i = PD_i * EAD_i * LGD_i$$

| Expected loss contribution of period "i" | Probability of default in period "i" | Exposure at default in period "i" | Loss given default in period "i" |

Impairment

$$EL_p = \sum_{i=1}^{p} * EL_i * DF_i$$

| Expected loss over "p" periods" | Expected loss contribution of "p" periods" | Discount factor to discount each EL contribution to the current period |

Modeling cash flows with exposure at default calculations

Exposure at default (EAD) calculations estimate the amount of outstanding debts at a particular point in time. Typically, EAD is not solely determined by contractual cash flows but also by implicit options such as the right to prepay a loan. Such behavioral modeling of cash flows and their impact on both present value and future income is very popular in ALM – and can also be incorporated into impairment calculations.

Again, it will be critical to factor in the macroeconomic conditions that are expected in the future. It goes without saying that bank customers are more willing and able to prepay loans in a boom phase than in a recession. But once a loan is prepaid, it also stops earning interest – so this decrease in earnings must be factored in too. In a recession, of course, loan loss rates increase and the value of collateral (e.g., house prices) may also decline. Multiple dimensions, in other words must be considered in the calculations for expected credit losses.

Under IFRS 9, the application of point-in-time parameters and macroeconomic expectations will create far more volatility than previous accounting regimes, especially when loans deteriorate from the first stage of credit quality (requiring 12-month expected credit loss calculations) to the second (lifetime credit loss calculations).

Change in credit quality since initial recognition

| Stage 1 Performing | Stage 2 Under-performing | Stage 3 Non-performing |

Impairment regonition

| 12 month expected credit losses | Lifetime expected credit losses | Lifetime expected credit losses |

Interest revenue

| Effective interest on gross carrying amount | Effective interest on gross carrying amount | Effective interest on amortised cos |

An ALM approach to credit risk management

We have already seen that prepayments are reducing the principal of a loan sooner than expected resulting in less earnings for a bank over the lifetime of the loan in terms of interest income. As a logical consequence prepayments must be considered amongst others in EAD calculations. ALM essentially views credit risk from the other way around. Consequently, the goal of credit risk adjusted ALM will be to include expected credit losses in forecasts of net interest income.

The credit default difference
The big difference between a prepayment and a credit default is that the former does not reduce the expected cash inflow from a loan but only alters it from a timing perspective while the latter can either stop it altogether (LGD = 100 percent) or reduce it significantly (LGD < 100 percent) and postpone the expected inflow given default (1-LGD). If the loan is collateralized, however, as in the case of a mortgage on a house, then it is possible that the value of the collateral has increased above the amount of the original loan. In that situation the LGD would be zero. But in a recession, the value could also fall far below the initial loan amount. If, for example, the mortgage was for $800 and the house is now worth $400, the LGD would be 50 percent.

In other words, for ALM purposes, you must consider:

- ECL write-off – the amount expected to be written off the balance sheet as a result of defaulted contracts in a set period

- ECL recovery – cash flows recovered from the foreclosure of collaterals on defaulted contracts

ECL income calculation

Expected credit losses (ECL) calculation:
- *WriteOff ECL_i = –(PD_i * EAD_i)*

- *Recovery ECL_i = PD_i * EAD_i * (1 – LGD_i)*

- *ECL_i = –(PD_i * EAD_i * LGD_i)*

– where

- *EAD_i = Exposure at default in period i*

- *PD_i = Probability of default in period i*

- *LGD_i = Loss given default in period i*

Both the write-off and recovery amounts will clearly have an impact on income and cash flow. But with the recovery amount also comes a time issue. For if, as in our example, house prices are falling, a property may be more difficult to sell, creating further uncertainty for the balance sheet.

Keep calculations consistent
In the new world of risk management, consistency is critical for banks. So, ECL write-off and recovery amounts should not only be incorporated into income simulation but also the calculation of other important risk metrics, from present value to gap profiles, and regulatory requirements for liquidity and capital management. This requires banks to think very differently from before: where risk was previously managed in silos, the same measures must now be applied enterprise wide.

What's more, every risk model that a bank develops should now factor in the same assumptions about the future. If certain macroeconomic variables are applied to one model, but left out of another, there will be marked inconsistencies across the bank's different functional areas – and a far less realistic view of risk overall.

Accounting and risk management – the alignment opportunity

As with many regulatory initiatives, it makes sense to view both stress testing requirements and the new rules of IFRS 9 as catalysts for positive change. In the case of these particular regulations, that means an opportunity to align accounting and risk management. But first banks must manage the regulatory impact on four key areas of their organization.

Impact 1: Business and strategy
The introduction of IFRS 9 will not only affect the calculation of loss allowances but also increase the volatility of impairments. It is therefore important for senior managers to understand and manage the business-wide strategic impact of these changes on shareholder value and what they mean for pricing, product strategies, capital, operational efficiency and investor relations.

Overall, business strategies, risk appetite and product pricing will need to be reviewed. And as portfolios become more volatile, banks will need to carefully review their business mix. The product cycle has changed dramatically – and long-term loans and variable prepayment models may no longer be viable.

Impact 2: Models
Credit risk models must now be clearly linked to other functional areas such as pricing, ALM and treasury. Just as risk and finance are now becoming more closely integrated, so the concerns of ALM and treasury are overlapping with those of credit risk – for example in the management of explicit or implicit prepayment options on a loan. In short, finance, treasury and ALM models could all potentially be used in combination to support impairment calculations – and should be governed centrally for consistent risk management.

Impact 3: Governance and controls
The forward-looking nature of IFRS 9's credit risk requirements makes it necessary for banks to review and improve their risk management framework. The imminent incorporation of lifetime horizons into impairment calculations, increased importance of macroeconomic factors and the amplified role of experienced credit judgments are, in combination, driving a new emphasis on governance.

Challenger banks in particular will need to put in place rigorous controls if they are to secure a place in the market. Under IFRS 9 it will be vital to carefully monitor for the deterioration of loans from stage one to stage two of the credit quality cycle – not just for several hundred loans but the whole asset base. So, they must also invest in highly automated risk management systems that can handle complex calculations and intensive data demands.

Impact 4: Data management
However powerful and automated a risk management system may be, it's nothing without high-quality data. Efficient data retention systems will therefore also be required to manage large volumes of detailed information – and make it easily available at various levels of granularity, to drive and support management decisions.

Conclusion – line up and be counted

In the coming age of IFRS 9, banks will see more and more interdependencies emerge between their different risk management functions, ALM included, and a growing focus on macroeconomic forecasts. ALM teams in particular could see their tried and tested techniques used in a wider context across their organization. The gap is certainly being bridged between risk management, finance and treasury. But consistency is paramount – and the models, methodologies and macroeconomic assumptions that are applied to risk calculations must remain constantly aligned, for a complete and accurate picture of risk present and future.

About FIS

FIS is a global leader in financial services technology, with a focus on retail and institutional banking, payments, asset and wealth management, risk and compliance, consulting and outsourcing solutions. Through the depth and breadth of our solutions portfolio, global capabilities and domain expertise, FIS serves more than 20,000 clients in over 130 countries. Headquartered in Jacksonville, Florida, FIS employs more than 55,000 people worldwide and holds leadership positions in payment processing, financial software and banking solutions. Providing software, services and outsourcing of the technology that empowers the financial world, FIS is a Fortune 500 company and is a member of Standard & Poor's 500® Index. For more information about FIS, visit **www.fisglobal.com**

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