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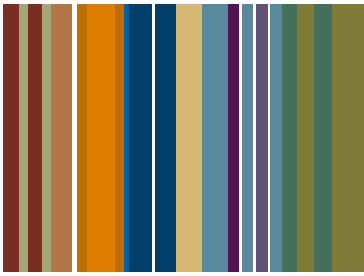

CREDIT LIMITS: RUBBER STAMP, STICK, OR CARROT?

As the role of credit limits evolves from restricting traders to supporting their risk-taking decisions, Jean-Marc Schwob, SunGard's Product Manager for Adaptiv Credit Risk, looks at the technology needed to enable this change and asks whether credit limits will evolve to the point where they are no longer necessary

In the last few years credit risk management has evolved from a policing function to a facilitating one. This evolution can be clearly seen in the changing use of credit limits which are now a key tool in setting and pursuing a financial institution's appetite for credit risk.

The setting of credit limits has moved from a purely reactive approach based on specific business needs, through to a restrictive approach focused on preventing breaches and finally arriving at a more risk sensitive approach tied to P&L designed to incentivise risk takers. In short, credit limits have evolved from 'rubber stamps' to 'sticks' to 'carrots'.

Limits are the main tool that banks use to control their credit exposures. Put simply, a limit acts as a cap on the exposure a financial institution is willing to have towards a particular 'entity'. A limit represents a certain amount of 'credit appetite' that should ideally not be exceeded.

'Entity' is understood in the widest possible sense; it not only refers to a legal entity, but could also be extended to 'super entities', such as corporate groups, countries, industry sectors and rating bands. Exposures to an entity may also be subject to sub-limits or allocations, for example product limits or branch limits. It has been suggested that limits act as a proxy for economic capital. Indeed the ultimate cap on a firm's appetite for potential losses is represented by its capital.

HOW TO SET CREDIT LIMITS

Limits should be set according to the credit quality and asset backing of the entity upon which they are placed. In that sense, limit amounts should be derived from two broad factors:

- A 'creditworthiness' factor, which may be expressed by the credit rating of the entity. A credit rating is nothing else than the assessment of a probability of default. It is important that financial institutions should have an internal rating process that is independent from external rating assessments.

- A 'size' factor, reflecting the amount of financial backing (in terms of shareholder funds, total assets or total revenue) that is available to support the extension of a line of credit.

From a matrix of the above qualitative and quantitative factors, a good credit limits system should be able to derive a credit limit

for a given entity automatically, and such limit should be dynamic, meaning it should adjust itself automatically if any of the parameters that drove its establishment were to change.

One may argue that a judgement-based override capability is necessary in order to allow a credit officer to adjust the matrix-derived credit appetite. This should be used with caution, however, as any subjective or extraneous factors should really be reflected in the entity's internal rating.

A possible overarching factor could also be used, represented by the financial institution's own capital. Indeed a firm's total risk appetite should ultimately bear some relationship to its capital, and, as mentioned above, limits may well be viewed as a proxy for economic capital.

In reality many limits are established in a reactive manner. Most of the time they simply sanction an amount that has been requested by the business. This 'rubber-stamp' approach is dangerous as it compromises the independence of the credit review function, and may also lead to a constant upward adjustment of a limit amount as the business asks for more – until a true 'credit appetite' figure is reached. The danger here is that the credit department loses sight of this elusive credit appetite figure. A better approach would be to establish the limit at the credit appetite level straight away, even if the business requires a lesser allocation initially. A sound credit policy would be to establish 'guidance' limits that represent true credit appetite, under which business allocations are granted – but should never exceed the overall guidance limit.

Sub-limits per product, branch or business area are not a reflection of a financial institution's credit appetite but rather business allocations of an overall approved appetite. Therefore the risk management function should not be the owner of such sub-limits. The main purpose of the credit risk department is to set and police the overall credit appetite, i.e. the main entity-level limits. Product or branch allocations (if any) should be owned by the business, which should be free to reallocate them as it wishes, as long as it respects the overall cap represented by the global credit limits.

WHAT DO REGULATORS SAY ABOUT CREDIT LIMITS?

Regulators clearly expect banks to have systems that are able to not only measure credit exposures, but also control them via a robust limit monitoring system. Credit limits are mentioned in the 'Pillar 2' section of the Basel II regulatory framework, which covers the supervisory review process and includes the monitoring and control environment and systems. This framework has been carried over into Basel III.

The Basel document makes particular reference to the use of limits as part of a bank's counterparty credit risk (CCR) management policies, processes and systems:

"The bank's CCR management system must be used in conjunction with internal credit and trading limits. In this regard, credit and trading limits must be related to the firm's risk measurement model in a manner that is consistent over time and that is well

understood by credit managers, traders and senior management."

Basel also makes reference to the importance of concentration risk in establishing a robust limit monitoring system:

"Banks must take account of large or concentrated positions, including concentrations by groups of related counterparties, by industry, by market, customer investment strategies, etc… Concentration limits should be defined in relation to the financial institution's capital, total assets or, where adequate measures exist, its overall risk level. "

Concentration risk is one of the biggest threats to a financial institution and a significant challenge for risk managers. The challenge is that concentration risk cannot be measured accurately as it depends on default correlation data that is less than reliable.

Concentration risk is particularly pertinent for entities within a given economic dependency group, country or industry sector. Most recently, Basel III regulators have identified exposures to systemically important financial institutions (SIFIs) as a source of concentration risk, for which higher capital charges will be necessary. It is therefore important that credit exposure monitoring systems are able to monitor such correlated portfolios of exposure under macro-limits.

THE LIMITS OF CREDIT LIMITS

A credit limit is in many ways a blunt instrument used to control and manage exposure. However, it says little about risk. The probability of making a loss, which depends on the creditworthiness (i.e. the probability of default) of the entity, is not reflected in the limit itself. A $10 million limit with a AAA-rated entity means exactly the same thing as a $10 million limit with a BB-rated entity in terms of exposure but certainly not in terms of risk.

Aggregating limits to achieve an illusory maximum credit appetite or capital proxy metric is quite meaningless, as overall credit portfolio effects (such as correlations between risk factors) would be ignored. A financial institution's true credit appetite should be measured in terms of its economic capital, not in terms of credit limits. As explained above, limits cannot easily be translated into an economic capital measure.

Despite these shortcomings, limits are still being used widely because they are operationally and intuitively useful to keep a cap on credit exposures. It is transparent to the business that a fully-utilised limit represents the worst-case loss amount if the customer were to default, with no recovery from the liquidation.

In this sense, credit limits are essentially a policing tool. A stick, not a carrot. However, one of the key trends is for the risk management function to move more into the so-called 'carrot' space. Instead of "thou shall not exceed limits", the message to traders should be "here is the price of credit risk for this transaction". Hence risk management is taking on a more facilitatory role by providing the business with metrics such as credit valuation adjustment (CVA) and cost of

economic capital. Traders are consequently being incentivised to behave in a more risk-conscious manner.

In a pre-deal limits checking situation, a dealer is now interested in knowing not only whether the deal is acceptable per credit limits availability, but also what is the cost of credit is for the proposed transaction. Taking this even further, a trader may wish to test a deal against a range of counterparties, compare the cost of credit for each of them, and hence price the deal to accurately reflect the counterparty risk involved.

ARE CREDIT LIMITS DOOMED?

If credit risk management follows its current path of evolution, from rubber-stamp to stick to carrot, one may be tempted to ask whether credit limits may one day disappear completely. After all, if a transaction can be priced accurately enough to cover the incremental effect on a firm's credit risk provisions and economic capital, then one could argue that credit limits are not needed anymore. Any deal should be acceptable as long as it is priced sufficiently to cover expected losses and the cost of capital required to insure against unexpected losses.

The credit charge thus levied against every credit-risky transaction could be used to buy protection against any undesirable names, or to re-balance the portfolio, allowing the institution to manage the integrity of its economic capital. This is akin to the Credit Portfolio Management function that now exists at most large financial institutions mainly to manage their CVA.

Whilst this is an academically attractive proposition, there is still some scepticism about the prospect of credit limits disappearing. Most credit risk professionals would agree that credit limits still have relevance for the following reasons:

Technological limitations. In order for an accurate incremental credit charge to be calculated on the entire portfolio, the institution would need to have an enterprise-wide solution capturing all credit-risky transactions across the trading and banking books in real-time. A new transaction would have to be simulated against the entire portfolio, again in real-time. Because of the rarity of credit events, a large number of scenarios (tens of thousands) would have to be computed, and stored in memory to allow an 'Incremental' Monte Carlo methodology to be employed. The collection of all positions across the bank in real-time is extremely challenging and in-memory storage of this volume of information may simply not be practical.

Model limitations. Whilst there are many credit portfolio models available, they suffer from a lack of accuracy due to their reliance on fuzzy parameters such as loss given default assumptions, credit ratings and default correlations. The model risk involved in managing credit risk purely on an economic capital basis is likely to be considered unacceptable. Credit limits may well be a crude control, but they are still viewed as more effective and transparent than a purely analytic ('black box') type of control.

Lack of liquidity in credit hedging market. If credit portfolio management becomes the only method of controlling credit risk, there is

a reliance on a liquid market that would allow credit protection to be bought on any name. This is clearly not a realistic expectation. Moreover, the market for hedging of counterparty exposures (which are dynamic by nature), via instruments such as contingent credit default swaps is far from sufficiently liquid to afford complete protection against counterparty risk in OTC derivative portfolios.

Over-reliance on market pricing of risk can magnify dangerous pro-cyclical effects. Credit charging for the purpose of hedging this risk on the market is usually based on market parameters such as implied volatility used to calculate potential future exposures and credit spread implied PDs. As we have seen in the past couple of years, reliance on such data can produce dangerous pro-cyclical effects and mask the true through-the-cycle (TTC) credit risk. It is the banks' responsibility (pointed out very clearly recently) to manage the TTC risks.

Other Limits: Other types of risks usually managed via a credit limits framework, such as product/tenor restrictions, country risk, settlement risk, may not be able to be accounted for in the Economic Capital calculation in a way that reflects the intention of these limits and restrictions.

AN IDEAL CREDIT LIMITS SYSTEM

The reports of the death of credit limits may be somewhat premature, however there are still several improvements that can be made both to increase the effectiveness of credit limits as a policing tool and also to help it fulfil its future role as a facilitatory function. For example, the following measures should be adopted to strengthen the traditional role of credit limits in terms of controlling exposure:

- Exposures should be measured as accurately as possible, ideally using a Monte Carlo simulation approach at every portfolio aggregation point.
- Transactions should be fed to the system in real-time, and exposures should be updated in real-time. An 'Incremental Monte Carlo' process should ensure that intra-day updates take into account portfolio effects.
- Credit Appetite limits should be established automatically based on a configurable matrix of qualitative and quantitative factors.
- Pre-deal limit checking should take place directly via interfaces from front office systems.
- Any breach of a limit should trigger a real-time alert.
- Limit excesses should be classified between 'Active' and 'Passive'. An Active Excess may be due to a dealing activity, whereas a Passive Excess may be due to market movements or a change in the limit amount.
- There should be a systematic workflow for the review of limit breaches.

Moving forward, however, the addition of the following features will create the added value that firms are seeking from credit limits by facilitating a risk-taker's decision process:

- An indication of the cost of credit associated with a potential transaction. This cost of credit may be the CVA (Credit Valuation Adjustment), or the cost of Economic Capital to cover the incremental exposure. Importantly, the cost of credit must reflect the true effect of the transaction on the bank's credit portfolio. This should be calculated via a simulation method. And to get a real-time response, this needs to harness an 'Incremental Monte Carlo' framework.
- The ability to perform a 'what-if' pre-deal check against a range of counterparties, so that the 'optimal' one can be selected in full knowledge of the credit cost associated with each counterparty.
- An indication as to the credit exposure sensitivities associated with a given counterparty portfolio. Such sensitivities can tell the risk-taker what sort of transaction may increase or reduce exposure (assuming a netting agreement is in place).
- The ability to access an offline 'sandbox' environment where various what-if scenarios and strategies can be tried out to optimise the bank's credit portfolio.

CONCLUSION: STICK AND CARROT NEEDED

As the role of credit risk management evolves from sanctioning and policing to facilitation, so will credit risk systems need to adapt to this new reality. Limits may well be seen as a crude proxy for economic capital, but we expect them to continue to be used universally as the most intuitive and robust tool to control credit risk. To be credible, however, an effective credit limit should be one that expresses true, global risk appetite ('exposure appetite', to be precise), and controls exposure that has been calculated accurately, at a meaningful portfolio aggregation point – for example to control concentration risk.

But limits are no longer the only tool in the box. Measures such as CVA and Economic Capital are getting more prevalent and ultimately need to become real-time, integrated components of a best-practice credit limits system. By providing accurate cost-of-credit measures to risk-takers in real-time, the risk management function achieves a closer alignment of incentives between the Enterprise and the front office. In this way risk management moves further from the policeman function into the role of trusted business partner.

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LEARN ABOUT SUNGARD'S ADAPTIV FOR CREDIT RISK MANAGEMENT

Adaptiv harnesses the most powerful and advanced simulation tools in a real-time risk aggregation framework to put actionable risk information in the hands of traders and risk professionals alike. A shared, accurate, real-time view of exposures creates a solid foundation for credit portfolio risk measures ranging from Potential Future Exposure to Credit Valuation Adjustment, allowing clear credit control, management and reporting.

SunGard's belief is that technology plays a significant part in helping your business to run competitively, cost-efficiently and successfully as you meet new regulatory requirements and compete in a challenging market.

SunGard's Adaptiv provides enterprise-wide credit and market risk management and operations solutions for financial services institutions.

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