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MARKET PERSPECTIVE

Credit Charging in the Trading Book - The End of Credit Risk Management as we know it?

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It is becoming increasingly common for banks to charge their front office trading units for the expected losses and the capital cost of credit risk generated by their derivative trades. This charge is an internal estimate of the cost of counterparty credit risk incurred in the course of trading activities and serves as a method of encouraging the front office to manage credit exposure prudently and charge for it properly. At the same time, the credit risk so created is itself monitored, managed and hedged in the derivative markets by a desk established specifically for this function.

The philosophy behind credit charging is essentially identical to the thinking behind other market mechanisms commonly used today for addressing economic, social and environmental problems once managed through regulation. Consider schemes to control polluting emissions: simple limits on emissions of monitored polluting facilities used in the last century are slowly giving way to carbon trading schemes designed to use the market for carbon credits to foster efficient ways of reducing emissions.

So is credit risk management destined to follow the path of carbon trading? Will a market for credit risk replace credit limits? What is the role of credit departments in this future world? In this paper, Dan Travers and Jean-Marc Schwob examine the scope of credit charging in the trading book, as well as the long term business and technological implications of the increased reliance on such a charge.

Origins of Credit Charging

To consider the origins of credit charging we should look first at the bank's P&L. Banks are required (i.e. under FAS 157) to remove from the fair value of derivative positions the Credit Value Adjustment (CVA) – or expected loss – associated with counterparty positions. In recent times, due to the volatility in the credit markets, changes in the CVA have caused huge swings for banks' reported earnings – in some cases amounting to billions of dollars quarterly. This increased volatility of P&L has elicited a commensurate increase in scrutiny of the CVA and how to manage it.

This has usually been tackled through two related measures:

1. creating a Credit Portfolio Management (CPM) desk to manage the volatility in the CVA post-trade, and;
2. charging risk-takers for the incremental CVA they incur at the time of trade.

The basic concept is simple – centralize the management of overall CVA, since a counterparty will straddle many traders and desks, but de-centralize P&L responsibility for making new credit risky trades down to traders. So, for example, if a trader is attempting to book a hedge with a professional dealer, this may prompt a number of counterparties to be tested, and allow the trader to deal with the counterparty producing

the least credit charge. A properly defined credit charge creates incentives for desired behaviour in the dealing room, driven by minimising expected losses and ultimately capital. On the other hand, if the trade is instigated at a customer's request, then the trader will be able to price the deal correctly, including the credit charge.

Poacher turned Gamekeeper

The CPM desk has the responsibility to levy this charge and then manage overall credit risk for the bank, including responsibility for credit default losses, changes in P&L due to CVA changes and consequently hedging the CVA volatility. This role is not usually housed in the Risk Management area of the bank.

The CPM desk is usually viewed as a profit centre, charged with managing its P&L while purchasing the bank's credit risk. This view aligns the CPM function with that of the Front Office, where a profit centre is used to optimise the bank's credit risk profile. Is this a case of the poacher turned gamekeeper? Have banks come to the realisation that the best way to stop poachers is to employ a poacher?

So it appears that traditional Credit Risk Management is losing part of its control responsibility to what is essentially a Front Office function. This will undoubtedly raise some alarm bells in risk management and regulatory circles, especially in light of the recent financial crisis where risk management was already deemed too much in the thrall of the front office.

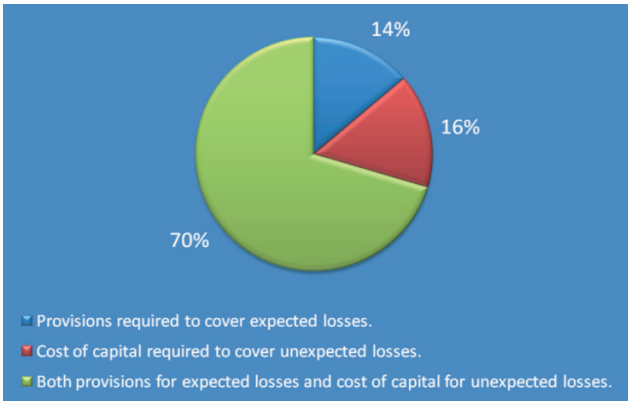
Expected or Unexpected Losses?

The focus of this paper is on the broader concept of charging a cost of credit to traders at the time of trade to motivate them to manage counterparty credit risk effectively. Although presented initially in the narrow context of CVA, there are broader uses and ramifications of this approach.

First we need to define the credit charge in terms of the scope of risk that it needs to cover. Here we consider whether credit charging should pertain to either or both of the following risk components:

1. The required provisions to cover expected credit losses that are to be incurred in the normal course of business.
2. The cost of capital required to cover unexpected losses in a credit portfolio.

A recent joint PRMIA-SunGard survey of credit risk practitioners found that 70% of respondents would define the credit charge as covering both expected and unexpected losses. Of the remaining 30%, 16% opted for a single economic capital-based measure (covering unexpected losses only, i.e. exclusive of expected losses), whilst only 14% of respondents viewed the credit charge as a provisioning measure covering expected losses only.



How should 'Cost of Credit' be defined?

Clearly economic capital is high on the agenda of credit risk managers, and there is a view that any credit charging mechanism should take this into account.

The first method, based on expected losses, is essentially the CVA approach. It is captured by a relatively simple formula, applied on a counterparty-by-counterparty basis, namely the product of Expected Exposure, Probability of Default (PD) and Loss Given Default (LGD). Its major drawback is the fact that it understates the true credit cost of putting an OTC derivative position on the books. First, Expected Exposure does not represent a 'worst-case' number, i.e. it is not modelled at a high confidence level. Secondly the simple use of PD and LGD parameters does not adequately capture extreme credit events and their correlations. So unexpected losses are not captured in this approach and the effects of

portfolio diversification to reduce these losses are ignored.

It should be noted that refinements of the CVA measure are indeed employed in banks in practice to capture wrong-way risk and other finer points of the expected credit loss. Some institutions have attempted to correct the CVA measure for unexpected losses by multiplying it by a fixed scaling factor to proxy the total cost of economic capital. This crude method has the advantage of simplicity, but it still ignores the effects of correlation and diversification within the credit portfolio.

Ideally, the cost of credit should also include the cost of economic capital required to cover the incremental unexpected credit losses of the transaction. The capital amount should be calculated using a simulation approach that combines both potential future exposure and default events across multiple counterparties. Moreover, the simulation must be performed on the institution's entire credit portfolio rather than each counterparty portfolio in isolation, in order to capture the benefits of portfolio diversification – an important mitigation effect to extreme credit loss. This raises enormous computational challenges, especially when we consider that we want to calculate the incremental cost of capital of a single new deal, and that such a calculation should ideally be performed in real-time.

The real-time requirement is important. As the cost of credit should be included in the pricing of a transaction, dealers need to determine their credit charge prior to entering into the deal. The preferred approach is for the credit charge to be calculated by the credit system at the same time as a pre-deal limit check.

Since a pre-deal limit check must calculate the incremental exposure from the proposed transaction on the bank's bilateral portfolio with the counterparty, it is a relatively straightforward step to combine the incremental expected exposure with PD and LGD parameters to calculate the incremental CVA. (This, of course, assumes that the bank has a method such as Incremental Monte Carlo simulation for calculating an accurate Expected Exposure profile pre-deal.) Such a method would still ignore PD correlations and credit portfolio diversification; incorporating these effects in the simulation would significantly increase the computational challenge. However, with grid-based simulation methodologies and Incremental Monte Carlo techniques, calculating a real-time, full portfolio-based credit charge is more commercially feasible than it may seem.

The End of Credit Limits?

The increased focus on credit charging in the trading book raises the interesting question of whether it foreshadows the demise of credit limits. Traditionally counterparty risk has been controlled via limits that cap the exposure to a given counterparty or group of counterparties. One may contend that credit limits are a crude framework as they only represent an amount of exposure, not risk.

Credit limits struggle to cope with situations of wrong-way risk (positive correlation between potential future exposure and probability of default) or double-default in the presence of credit derivative or risk transfer mechanisms. Furthermore, credit limits do not reflect overall diversification and concentration effects within the credit portfolio.

If a complete and accurate credit charging methodology and process was implemented across all trading and banking book activities, then one could argue that credit limits are no longer needed. Indeed, each and every transaction would be incrementally assessed, in real time, against the institution's entire portfolio (not just the counterparty portfolio), and an accurate charge would be levied on the business that would be sufficient to cover the provisioning requirements and the cost of credit capital pertaining to the deal. As long as this charge is included in the price of the transaction, the only limit becomes the amount of economic capital the bank is willing to set aside to cover its credit risk portfolio. Essentially, any deal would be acceptable as long as it is priced to take the counterparty risk charge into account, since this charge would include the bank's target return on capital. The credit charge 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.

One can see that if credit limits were to disappear, this would introduce a high level of dependency on the CPM function to manage the credit portfolio actively after the fact. Notably there needs to be a process to enforce the management of passive increases in the credit charge against particular name(s). In a credit limits world this will be picked up by an excess, but in a pure credit charging world the positions managed by CPM would be controlled by straight market risk limits. Such limits would ensure that CPM keeps any unhedged exposures to a particular name, sector, country, basis (etc.) within acceptable levels. This raises the interesting situation where, in this new world, the main credit control mechanism is transferred from credit risk to market risk limits.

Despite all this, some scepticism about the prospect of credit limits disappearing is warranted. Most credit risk professionals would agree that credit limits still have relevance for the following reasons:

- **Technological limitations.** In order for an accurate incremental 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 feasible.

- **Model limitations.** Whilst there are many credit portfolio models available (KMV, CreditMetrics, etc.), these suffer from a lack of accuracy due to their reliance on 'fuzzy' parameters such as LGD assumptions 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 etc. 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.

The Changing Role of Credit Departments

Traditionally, the main function of Credit Departments has been to review the creditworthiness of counterparties, approve credit limits, monitor and investigate breaches and enforce dealer discipline. If we move to a world with increased reliance on managing credit risk through credit charging and reduced emphasis on credit limits, the role of credit control departments must change. What used to be a policing role may evolve into a more analytical role, possibly encompassing:

- Approval and review of internal ratings, which would determine the PD curves used in the models. (This raises an interesting question:

should internal-rating-driven PDs be used only for counterparties without observable credit spreads, or should their use apply to all counterparties?)

- Validation of credit portfolio models and exposure calculation methodologies (EAD & PFE models)
- Administration of a fair credit charging methodology
- Establishment and monitoring of 'macro' concentration limits to act as a stop-gap for the deficiencies of credit portfolio modelling
- Ownership of credit risk monitoring systems

Conclusion

Credit charging in the trading book is spurring an existential debate about the role of credit risk management within financial institutions. The prospect of credit limits disappearing, and the notion that "any deal is acceptable as long as it is priced appropriately", may send shivers down the spine of traditional credit risk managers. Nevertheless, the debate does reflect the need to charge - and incentivise - dealers according to the full range of risks that their activity creates, including the effect of those risks on the institution's economic capital.

With trading schemes being broadly applied in areas such as electricity and gas markets and, more recently, carbon trading, the results have been mixed and the jury is still out as to whether these approaches can provide a complete solution. Similarly in credit risk: a complete reliance on credit portfolio models as a means of controlling credit risk should be viewed as dangerous, but the practice can be beneficial to credit risk management of the bank if the following policies are in place:

- Ensuring the cost of credit charged to the dealer by the CPM desk is consistent and the best estimate of credit cost available – including, for example, wrong-way risk, portfolio effects and the potential for unexpected losses
- Keeping in place traditional credit limits to ensure that the weaknesses of credit charging do not damage the bank unexpectedly

Although this could change the risk landscape considerably, we believe that a judicious combination of credit charging and credit limits can result in more responsive, incentive-based and leaner credit risk management.

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[1] Indeed, with a netting agreement in place, some trades can reduce credit exposure and generate a net credit to the trading desk.

[2] Having calculated the amount of capital required to ensure the survival of the institution, we then need to calculate the cost of incremental capital. Most firms will do this by factoring in their target return on equity, e.g. 15%. This approach may be refined by accounting for the firm's current capital adequacy situation; if capital is constrained, its incremental cost will be expensive as it is a scarce resource, whereas if an bank has ample free capital it would be somewhat cheaper.

[3] Of course, some of these considerations may be reflected in the setting of limits in the first place, but this is usually done in a rather haphazard and intuitive fashion.

[4] Incremental Monte Carlo refers to a simulation framework where scenario level results from a full portfolio simulation are stored in memory and made available for future incremental calculations. When a new transaction is added to the portfolio, the engine only simulates the new transaction and adds the results to the pre-computed, stored grid of simulation results in a scenario-consistent manner before re-aggregating the data.

About Adaptiv

SunGard's Adaptiv provides enterprise-wide credit and market risk management and operations solutions for financial services institutions. Adaptiv assists institutions of varying size and complexity to deploy technology to meet both internal and regulatory requirements for risk management and operational control. Adaptiv helps financial services institutions from the banking, hedge fund, asset management, insurance and corporate sectors with our deep understanding of risk management and operational processes.

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