



MARKET PERSPECTIVE

Can firms prepare in advance for a major default in the market?

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INTRODUCTION

Over the last week, seismic events have fundamentally altered the capital markets landscape. Weary eyed risk professionals have spent 15 hour days answering a multitude of management concerns:

How exposed are we?

Could this have been foreseen?

Would it have made a difference?

A deteriorating market environment also necessitates the need for additional, proactive responses to these queries.

This market perspective presents a number of timely and creative approaches for addressing your current risk management issues.

When a credit default occurs, the exposure at default is calculated using the positive exposure to the defaulting counterparty, appropriate recognition of netting where legally permitted. Prior to an actual default, the potential future exposure (PFE) can be derived using basic 'MtM plus Add-On' style calculations or by using a sophisticated simulation engine. CVaR can also be estimated by integrating credit rating transition matrices into the calculation.

PFE measures are effective for quantifying future exposures and are the basic metrics used in trading credit limit systems. What they do not tell the risk manager, however, is the full cost of an actual default that has actually occurred in the market.

The reason is that the various positive and negative positions interact within trading portfolios, independent of counterparty, to generate factor sensitivities and resulting estimates of market risk. When a credit event occurs, these market risk numbers are instantaneously skewed as the defaulting

counterparty's trades contributing to these measures are crystallized and removed from mark-to-market status. In this situation, nothing has happened in the actual market data and no trading has occurred.

Nevertheless, we now have potential breaches in market risk limits and we have potentially significant rebalancing to do before trading can continue on a normal basis. Furthermore, the necessary portfolio rebalancing often must be performed in an environment of market panic characterized by high levels of illiquidity driven by increased concern about the credit worthiness of remaining counterparties in the market.

The current environment demands that risk managers have tools to evaluate the market risk impact of a hypothetical default in advance.

In the immediate aftermath of a major default, such prior analysis allows a firm to focus on implementing corrective action rather than working out their position.

One way of achieving such foresight is the creative use of scenarios. These would involve some or all of the following steps.

- Determine relevant counterparties based on a combination of the size of bilateral exposures with them and concerns about their credit worthiness. It is these counterparties that form the basis for the next steps.
- For *each* relevant counterparty, create a portfolio where trades with that individual counterparty have been removed. This is to simulate the hypothetical position where the counterparty whose trades have been removed is in default.
- As a first step, recalculate the market factor sensitivities for each alternate portfolio and also rerun the value-at-risk estimation. This gives a first approximation to the market risk impact of a default by the corresponding counterparty. Equally importantly, it gives a clear indication of the specific open positions that need to be closed to bring market risk back into line. Having this information in advance can allow time to develop an optimal plan indicating which surviving counterparties are most appropriate for placing the relevant hedge transactions. *In many cases these trades can actually reduce credit exposure rather than increase it, provided they are placed with the right counterparties.*
- An optional second step is to create scenarios with shifts in credit curves and spreads. Effectively this means pricing counterparty trades using rating based credit spreads applied to the discount curves. The scenarios would basically revolve around widening spreads across the market reflecting fear of further adverse revelations.
- Rerun market risk and hedging measures under the new scenarios. This shows how skewed the hypothetical positions would be when counterparty credit risk is reflected in valuations. This can give an indication of the real cost of rebalancing an institution's risk position in a credit stressed environment.

The above approach could supplement standard reporting, giving risk managers a head start in the process of repairing damage after a credit default in the market.

Another question raised by the default scenario is around correlations. Specifically, are historic behaviors observed in a largely default free environment relevant for calculating VaR (historic or MC) in a highly credit conscious one?

As an example, risk managers typically look at two years of data for estimating VaR and VaR shortfall. The problem is that correlations based on the last two years of data may not correspond to the future once default fears become widespread. A 'thought experiment' may reveal interesting patterns within the portfolio.

The absolute value of the standard correlation coefficients (r^2) could be systematically raised by creating new correlation coefficients (r^{2}) using the formula:*

$$s_{ij} = r_{ij}^2 / |r_{ij}^2|$$

$$r_{ij}^{2*} = s_{ij} \{1 - [1 - |r_{ij}^2|] k\} \text{ for } k = .75, .50 \text{ and } .25$$

or systematically reduced by using the formula:

$$r_{ij}^{2*} = (r_{ij}^2) k \text{ for } k = .75, .50 \text{ and } .25$$

The VaR results would then be recalculated for each case. This series of results could be graphed for both VaR and VaR shortfall, showing the possible effects of a magnitude change in correlations.

A particularly interesting result would be the rate of change in the shortfall estimate, a kind of correlation convexity in the tail thickness.

All the above alternatives would enable risk professionals to provide better information to their management concerning the true picture as market conditions change rapidly in a crisis. More importantly, they provide the

basis for careful analysis of how to respond when a default actually occurs. All of them are possible as long as the risk systems being used:

- Are flexible in their scenario generation capabilities
- Can apply scenarios across all risk reports as well as simply reporting P&L changes
- Allow input correlations to be stressed for multiple VaR runs
- Have a calculation engine that is powerful enough to handle multiple VaR and sensitivity runs in a timely and accurate manner

SunGard's Adaptiv suite of risk management

solutions has these features, allowing for basic, advanced and creative 'on the fly' scenarios to be created and applied across the entire reporting suite.

Goes the ancient Chinese proverb and curse: *May you live in interesting times.*

This is certainly the case for financial market participants. In an environment characterized by extreme volatility and counterparty uncertainty, preparedness is paramount for the risk manager. Through the use of well-designed scenarios that stress correlations and account for illiquidity and counterparty trauma, risk professionals can develop a blueprint to navigate effectively through financial market turmoil.

About Adaptiv

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