

WHITEPAPER

Wrong Way Risk

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Dan Travers and Jean-Marc Schwob explain how a credit risk system that combines numerical analysis with risk sensitivities can help risk managers to detect 'wrong-way risk' and highlight potential hot spots in their credit portfolios..

Wrong-way risk is defined by the International Swaps and Derivatives Association (ISDA) as the risk that occurs when "exposure to a counterparty is adversely correlated with the credit quality of that counterparty". In short it arises when default risk and credit exposure increase together. The terms 'wrong-way risk' and 'wrong-way exposure' are often used interchangeably.

Ordinarily in trading book credit risk measurement, the creditworthiness of the counterparty and the exposure of a transaction are measured and modelled independently. In a transaction where wrong-way risk may occur, however, this approach is simply not sufficient and ignores a significant source of potential loss.

Basel II highlighted the issue of wrong-way risk as an area which should be specifically addressed by banks in their risk management practice as far back as 2001. In recent months however wrong-way risk has come more sharply into focus as an area of concern for risk managers and one that may have been neglected by many.

There are a number of reasons for this. In part it is due to the advancements in credit derivative trading that bring creditworthiness into the trading book as a market factor. It also is due to the sub-prime crisis in 2007, the subsequent market volatility and the increasing attention being paid to credit risk.

Examples:

Firstly consider some examples where the potential for wrong-way risk exists to illustrate why it is such an important subject in contemporary risk management circles. Monoline insurers such as Ambac and MBIA have been hit hard by the sub-prime crisis. As bond guarantors, the monolines specialised in guaranteeing mortgage-backed securities and when the mortgage market went into freefall, their creditworthiness followed suit as they found themselves unlikely to be able to pay out on all of the likely insurance claims. We learnt the lesson that almost all exposure mitigation from monoline insurance could be negated by the guarantors' increased probability of default under exactly the conditions where the insurance was most valuable.

The monoline case is a particularly stark example of wrong-way risk but it has served to highlight the ad hoc approach that many financial institutions had adopted. Some were unaware of the potential risk they were running while others chose to ignore it, assuming that the worst-case scenario would or could not occur.

As there are different degrees of correlation, so too there are different shades of wrong-way risk. Take the case where a bank buys an equity put option or enters into a reverse repo. If the counterparty and the underlying issuer are one and the same, these would be extreme cases of wrong-way risk. Less obvious scenarios are where the counterparty and the underlying issuer are in a similar industry, or the same country or geographical region.

Whilst focusing on wrong-way risk, one should not forget that right way risk must surely be the normality in derivative markets. Indeed most derivative transactions are entered into for hedging purposes; a gold producer would normally short gold to protect its naturally long position against a fall in gold prices; an airline would normally want to protect itself against a rise in fuel prices by entering into long oil derivative contracts; and a company would normally issue calls, not puts on its stock.

Know Your Customer:

The legitimate concern is where financial institutions unwittingly take on wrong-way risk. The fact that derivative transactions are becoming more complex, with many more interlinked underlying risk factors affecting their value, leads to a lack of clarity over what the underlying exposure sensitivity may be. As a result wrong-way risk can sometimes go undetected. Perversely, the focus on heavily quantitative risk modelling such as VaR and other simulation based risk measures that these derivatives have precipitated has, in some cases, led to dangerously diminished reliance on the intuitive and experience based side of risk management. Wrong-way risk cases would not normally be highlighted within risk and capital models that treat Potential Future Exposure and Probabilities of Default independently.

It is increased attention to the interaction of these two risk factors that has been so crucial to the detection and management of wrong-way risk. Relying on purely quantitative methods to accomplish this is only a partial solution. In today's derivatives market, whilst there is much reliance on quantitative metrics, we should not forget some of the judgement calls that need to be made by credit managers.

Let us return to the earlier example of the gold producer, the more usual strategy for a gold producer would be to hedge their exposure to a fall in gold prices by entering into short positions. In a scenario where a gold producer is going long on gold, one would have to question the acumen of this potential counterparty or any other counterparty that is seemingly engaged in counterintuitive transactions. It may be that the customer is already over-hedged, but the customer's motivation for entering into 'wrong-way' transactions should always be questioned by a diligent credit manager. Such examination not only highlights potential wrong-way risk but serves as a due diligence process for credit managers, forming part of the general 'know your customer' principle. Similarly, it is important to look at the management and competence of counterparties, and not just their financial statements.

Finding Wrong Way Exposures:

With more complex counterparty portfolios, consisting of hundreds or thousands of deals, it is not so easy for the credit manager to determine where the exposure sensitivity lies and if those events of increasing exposure correspond to increased likelihood of counterparty default. Currently many firms have no option but to make a judgement based on experience as to the type of transactions that should be viewed as giving rise to wrong-way risk. So how do we usefully unite a traditional credit manager's judgement with the highly quantitative world of trading book risk management?

The first step is to understand the risk factors involved in the bilateral portfolio with each counterparty and how these risk factors may influence potential exposure values. This intermediate step is to examine the risk factors involved in the transactions – such as interest rates, exchange rates, the price of certain commodities, the movement of credit spreads – and the effect they will have on exposure.

An automated analytic process can be applied to a portfolio, to monitor this relationship between stated risk factors and the change in exposure, producing an exposure sensitivity report.

€ (Millions)	May '08	Jun '08	Aug '08	Nov '08	Jan '09	May '09	May '10	May '11	May '12	May '13	May '14
USD FX	0.006	0.035	0.061	0.083	0.075	0.044	-0.117	-0.425	-0.368	-0.233	0
EUR IR Vol.	0.01	0.065	0.125	0.187	0.233	0.27	0.234	0.237	0.268	0.161	0.051
USD IR Vol.	0.004	0.022	0.038	0.04	0.025	0.005	-0.009	-0.001	0	0	0
EUR IR	0.048	0.259	0.422	0.446	0.387	0.294	0.155	0.199	0.225	0.222	0.001
USD IR	-0.005	-0.027	-0.04	-0.054	-0.068	-0.034	0.188	0.172	0.056	0.001	0

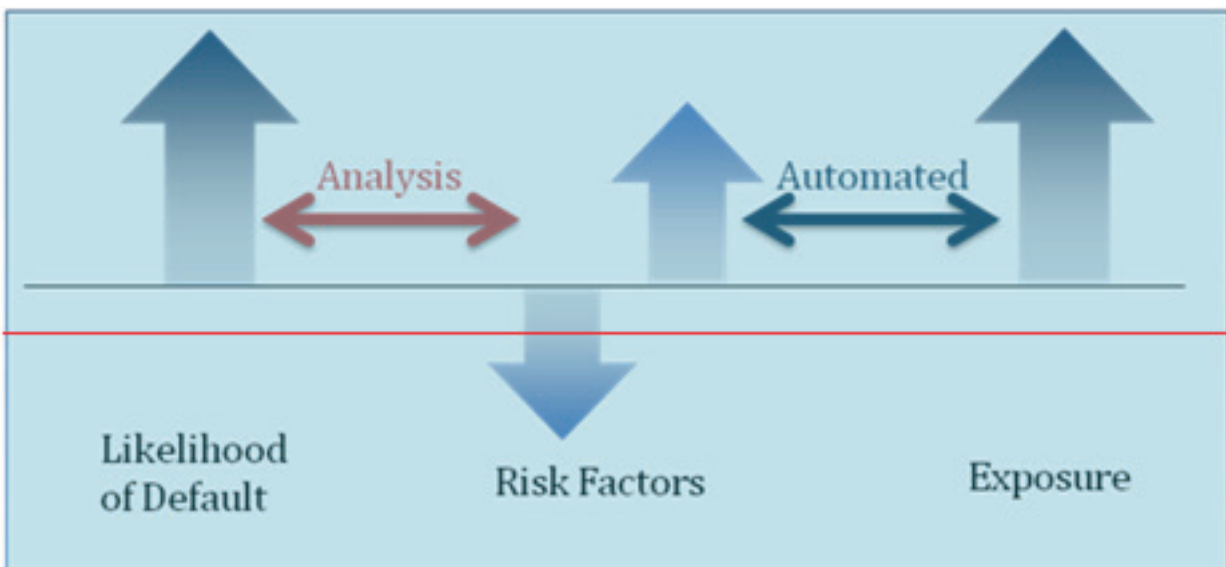
This report can be produced per counterparty, country or sector, linked to a firm’s credit risk system, and then consolidated into a global report, highlighting certain exposure ‘hotspots’ for each counterparty, counterparty group or aggregation node.

The effect of the exposure sensitivity report is to reduce the reliance on purely judgemental decisions and add some quantitative analysis to the process, creating a far more reliable replacement for the manually-driven spreadsheets and questionnaires used today by many credit managers. The knowledge that these reports contain all of the risk factors and sensitivities for each counterparty in one place means that credit managers can focus their analysis on the creditworthiness of counterparties.

Banks can then implement a process around these exposure sensitivity reports. In fact, exposure sensitivities represent powerful information for traders and risk managers alike. Traders may use this information to select the optimal counterparty for a derivative transaction (by selecting a counterparty where the transaction reduces exposure sensitivity rather than increases it). And Risk Managers may use the sensitivity data as the first step in identifying wrong-way exposures.

The second step to identifying wrong-way exposures is to assess how your counterparties’ creditworthiness may be affected by the same market risk factors considered above, i.e. the natural business risk sensitivity of a legal entity. These data can be captured in the main credit system. In some cases, this information can be derived from the static data of the counterparty, such as the industry or the country of operation. For example, company A (an airline) may be sensitive to an increase in oil prices, while company B (an oil producer) may be sensitive to a fall in oil prices. Similarly, one can assume that a bank domiciled in a non-G7 country may be sensitive to a fall in its local currency. Further judgements should be made where possible in less obvious cases, such as Northern Rock - an analysis of their business model at any time leading up to the credit crunch would have shown the firms uncomfortably high sensitivity to a rise in short term interest rates.

Figure A: Credit Risk System



Reporting:

The resulting information should then be linked to the main credit system by a combination of manually entering the data and by setting up automated rules based on characteristics such as the industry and geography of the counterparty. Once this link to the credit system is established, it is then possible to compile a report where the sensitivity of the company's business can be matched with the sensitivity of the counterparty's portfolio of transactions, and wrong-way exposures identified above a certain threshold, and/or with low-rated entities.

SWAPCO INC.				
WRONG-WAY EXPOSURE REPORT (Date: xx/xx/xxxx)				
Name	Rating	Risk Source	Direction	Sensitivity (\$ Mill)
ABC Thai Bank	B	USD/THB	Down	\$ 17.2
XYZ Korean Bank	B	USD/KRW	Down	\$ 12.0
US Oil Driller	B B	WTC	Down	\$ 14.6
Japanese Bank 1	B B B	JPY/USD	Down	\$ 58.1
International Airline	B B B	WTC	Up	\$ 46.3
Japanese Bank 2	B B B	JPY/USD	Down	\$ 15.9

Note that the default sensitivity data are essential to identify entities with correlated default probabilities. This will help to highlight credit concentration risk within the enterprise. Further, if these data are collected with a quantitative frame of reference, they can serve as input for a bank's developing trading book credit VaR model.

Conclusion:

This combination of numerical analysis and rules - and/or judgement-based credit sensitivities - empowers credit managers to make more informed judgements regarding counterparty credit losses and to detect potential wrong-way risk without a huge amount of computational activity or expense. Moreover, this allows the traditional credit managers' experience and skill in analyzing the loan book to be brought to bear more effectively on the trading book. It also helps the bank satisfy regulators that it has its management of wrong-way risk under control.

Linking exposure sensitivity reports into the main credit risk system is crucial, as it means that this analysis is not done in isolation. It creates the opportunity to capture wrong-way exposures across many counterparties, based on specific risk factors, and to integrate the resulting information into core counterparty credit reporting.

This approach creates a far more robust process for measuring and tracking wrong-way risk when compared to a piecemeal approach with little or no rigorous analysis of the drivers of exposure sensitivity. Furthermore it is an approach that can lead to straight-forward reporting, enabling those with responsibility for managing risk across the bank to get a clear and comprehensive view of the wrong-way exposures for all counterparties.

In our next article we will examine whether and how credit exposure profiles should be adjusted to reflect wrong-way risk.

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. Visit www.sungard.com/adaptiv

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