

Issue No. 28
January 2012

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PRiM News

Welcome!

The publication of the Alternative Investment Fund Managers Directive (2011/61/EU, "AIFMD") on July 1, 2011 was a significant milestone in the European fund industry. While the AIFMD is the most comprehensive regulatory text on alternative funds in Europe, it is also likely to influence traditional UCITS funds, particularly with regard to depositary liability. The influence of AIFMD will increase over time as market players become aware of its far-reaching implications.

This issue of the *PRiM Risk Newsletter*, therefore, focuses on alternative investment funds with a particular emphasis on the impact of AIFMD. For the interview, PRiM spoke to **Bill Scrimgeour, Global Head of Regulatory and Industry Affairs** at **HSBC Securities Services**, London. **Alan Picone, Director**, and **Sylvain Crépin, Manager**,

of **Deloitte Tax & Consulting S.A.** provided an article on alternative investment funds and the AIFMD. Another article on AIFMD was written by **Karine Kias, Consultant, avantage**.

In addition to those articles on alternative investment funds, we have also included an article on credit value adjustment provided by **Michel Dorval, Product Manager for Risk Management, Thomson Reuters Risk Management**.

Any ideas for future issues or any comments that you have are always welcome. Please send them to info@prim.lu.

Bonne lecture!
Paul Kleinbart

Note from the Editor:

The individual opinions expressed in this *Newsletter* do not necessarily reflect the opinion of PRiM nor of any other contributors to this edition

AIFs AND THE MYTH OF PROTEUS

Dr Alan PICONE, Director, Financial Risk Management & Actuarial Solutions, and Sylvain Crépin, Manager, Financial Risk Management, Deloitte Tax & Consulting S.A.



Alan Picone



Sylvain Crépin

The last four years have been incredibly challenging for the financial system and the Alternative Investment Fund (AIF) industry has not been spared. Although numerous academic studies have shown the positive impact that Alternative Investment Fund Managers (AIFMs) have on the markets in which they operate (reductions in inefficiencies and transaction costs, risk diversification and a broadening of the range of investment strategies available for investors), the recent financial turmoil has highlighted that they may also have had an impact in the amplification and the spreading of risks through the financial system. Some other matters such as gates or side pockets (unilaterally decided by AIFMs), fraud, insider trading or scandals, lack of transparency in AIFMs operations, AIFs' underlying securities' systemic or hidden risks, combined with an unprecedented volatile market, have greatly affected the confidence of European investors in AIFs and have undoubtedly added significant pressure for a tightening of the regulation of AIFMs. Restoring confidence by promoting a harmonised risk culture, more transparency and disclosure to investors is in our view a must, if we want to see the AIF industry sustain its growth in Europe and the benefits that it generates.

The recently approved Alternative Investment Fund Managers Directive (AIFMD¹) attempts to address these issues. It proposes a new framework for compliance, risk management and higher requirements for AIFMs, affecting a wide variety of fund types managed or distributed in the EU, among others: hedge funds, private equity and venture capital funds, real estate funds and infrastructure funds. The main developments in risk management aspects are the following:

- The requirement of a permanent risk management function, functionally and hierarchically separate from the portfolio management function;

¹ Directive 2011/61/EU

- The establishment of a documented risk management policy, which should comprise the necessary tools and procedures in order to measure, control and report on an on-going basis all the relevant risks that may be material for the AIFs, which the AIFMs manage;
- The monitoring and the periodic review of the risk management procedures, including valuation risk and non-financial risk such as operational risk, to ensure that AIFs' risk profiles, investment strategies and objectives are aligned at all times;
- The adoption of the appropriate liquidity risk management procedures on both the AIFs' assets and liabilities, ensuring that investment strategy, liquidity profile and redemption policy are aligned.

The European Securities and Markets Authority's (ESMA's) technical advice² that followed the AIFMD has provided level 2 guidelines on possible implementation measures regarding risk governance, risk procedures and risk monitoring, it has taken into consideration the heterogeneity of the AIF industry and, as a result, it has also chosen not to be overly prescriptive. This mainly stems from:

- Diversity in strategies through a wide spectrum of investment solutions, where innovation and business intelligence play a key role;
- Diversity in the investments held in portfolios, allocating across virtually all existing asset classes and sometimes engineering new ones;
- Diversity in the timely allocation, as the identification of opportunities and style drift effects are considered performance cornerstones and heavily sought after by investment managers.

The implementation of regulatory measures framing risk management is therefore, on the

one hand, a key milestone specifically under the angle of investor protection. On the other hand, it would be legitimate to investigate the extent to which a given unified and harmonised framework could practically address a multitude of risk profiles. This is arguably where the essence of the AIFMD's strength lies: providing a uniform structure, while allowing for flexibility. Attempting to impose prescriptive rules in the way AIF should practically organise their risk measurement and general management would certainly have been a pitfall of the guidelines, as they would not have been in a practical position to ensure both precision & specificity. Hence, efficient risk management should incorporate, but could by no means be limited to, the generic principles stated in these guidelines. The following guidelines are meant to illustrate this consideration.

Operational set-ups and key people risk: solid foundations for robust risk management

To some extent, operational risk may represent the most dangerous source of risk for AIFMs and AIF investors. Some of the most important financial losses within the investment banking or the AIF industry share the same underlying causes: Failures of operational risk management, failures in internal controls, inefficient or inadequate operational processes and lack of internal transparency. Although operational risk management is critical for any business activity, it is even more so for the AIF industry, which is often very atomised and made up of a large number of small companies. It therefore should be of tremendous importance for AIFMs to ensure a full adequacy, efficiency, robustness and quality of internal controls within their operational processes. This can usually start by an operational risk mapping, considering both human and technology sides along the chain. An adequate

² ESMA guidelines ESMA 2011/379

organisation should ensure complete independence between controls and fund management as well as a full audit path in the AIF valuation process. Procedures should be documented and any human interventions should be automated whenever possible. Lastly, IT systems should be regularly backed-up and access to data at risk should be controlled and restricted.

Besides the aspects of operational set-up, key people risk should also be considered at the organisation level, as the departure of one or two AIFMs can sometimes be important redemptions from the firm's investors. One way to mitigate this risk could be through a partnership association, aligning the AIFMs' interests with those of the AIF management company's shareholders.

Underlying securities risk modelling: beyond the geometric Brownian move

Risk measurement is about quantifying uncertainty. When it comes to financial markets, uncertainty essentially lies in the randomness of the sequence of returns of a given security. An accurate estimate of risk metrics would therefore recognise and model the specific features of this randomness. Whilst there are indeed many different ways to be random, observations in financial markets tend to demonstrate the existence of so-called universality rules³. These can be understood as a collection of features that supersede the details to have some global truth. While the return time series of IBM and Oracle, for example, look different at first sight, it turns out that following a transformation process they can be broken down to the very same distribution. As an inheritance

³ B. Mandelbrot, "The variation of certain speculative prices", - J. Business 36:394-419, 1963

from the past, the Brownian motion has imposed itself as a cornerstone of financial modelling. Since the pioneering work of Bachelier⁴, itself contemporary to Einstein's influential approach on the random movements of molecules suspended in a fluid, the reference of financial risk modelling has essentially been anchored around the Normal distribution paradigm.

An abundance of evidence, however, suggests that such a fundamental hypothesis is not confirmed by the empirical behaviour of markets. Indeed, the typical behaviour of a security does not obey the Normal assumption's prescriptions. In the context of AIFs that are vehicles in which complex products featuring non-linear derivative strategies are held, the deviation from normality is so critical that it renders any attempt to model in a Gaussian scheme, albeit convenient and easy-to-implement, unable to capture and replicate the observations found in financial markets.

Tail-risk management and correlation risk management: beware of still waters

The above has material consequence in terms of accurate risk estimation and incidentally on the risk management value chain. In plain terms, the statistical distributions of returns observed in practice in AIFs exhibit far more extreme events than a Normal assumption would forecast, particularly at daily scales. Risk management decisions, such as hedging through building positions in derivatives or defining a risk envelope, are very likely to be seriously impacted in this respect. A sound and effective program in managing risks would therefore specifically focus on tail-risk.

⁴ L. Bachelier, « Théorie de la spéculation », Gauthier-Villars 1905

Incidentally, more than anywhere else, risks are heavily located in the tails for AIFs. This has to do with the nature of investments and strategies, where short-selling together with deep out-of-the-money investing are common methods to build exposures (e.g., for event-driven or statistical arbitrage strategies). Such strategies typically provide small gains very often and huge losses very rarely. Yet continuous small gains do not balance in the sense of statistical average tail losses. As a result, the distribution is left-skewed with risk events particularly concentrated in the tails [5]⁵. The very same patterns actually apply for joint distribution of returns through correlation risk – an analysis of the correlation of securities under a normal regime would fail to capture the dependence relationship between tail risks. That is, tail risks turn out to be far more correlated than normal events where nothing specific happens.

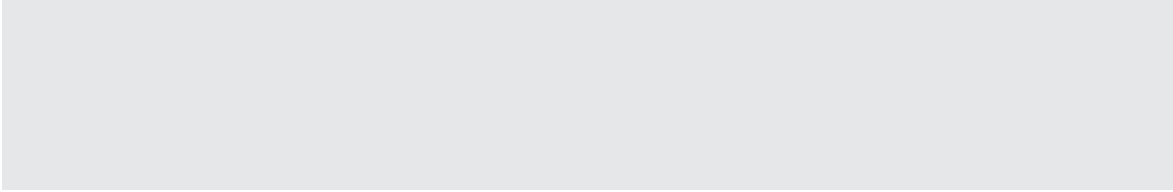
The above-described effects are well known by hedge fund managers and often declined into quantitative models for the detection of opportunities (such as structured credit, Commodities Trading Advisor ("CTA") or managed futures strategies). They are, however, less systematically factored into a risk management analysis - arguably for the sake of convenience. This has led to an unbalanced sophistication between portfolio selection and effective risk management, materialising in massive failures (LTCM, Amaranth, Philadelphia). Only a consistent integration of risk management into the decision-making chain involved in early stages and in continuous monitoring could significantly alter this picture.

5 A. McNeil, R. Frey and P. Embrechts, « Quantitative Risk Management », Princeton 2005

Diversity of investment strategies and risk profiles

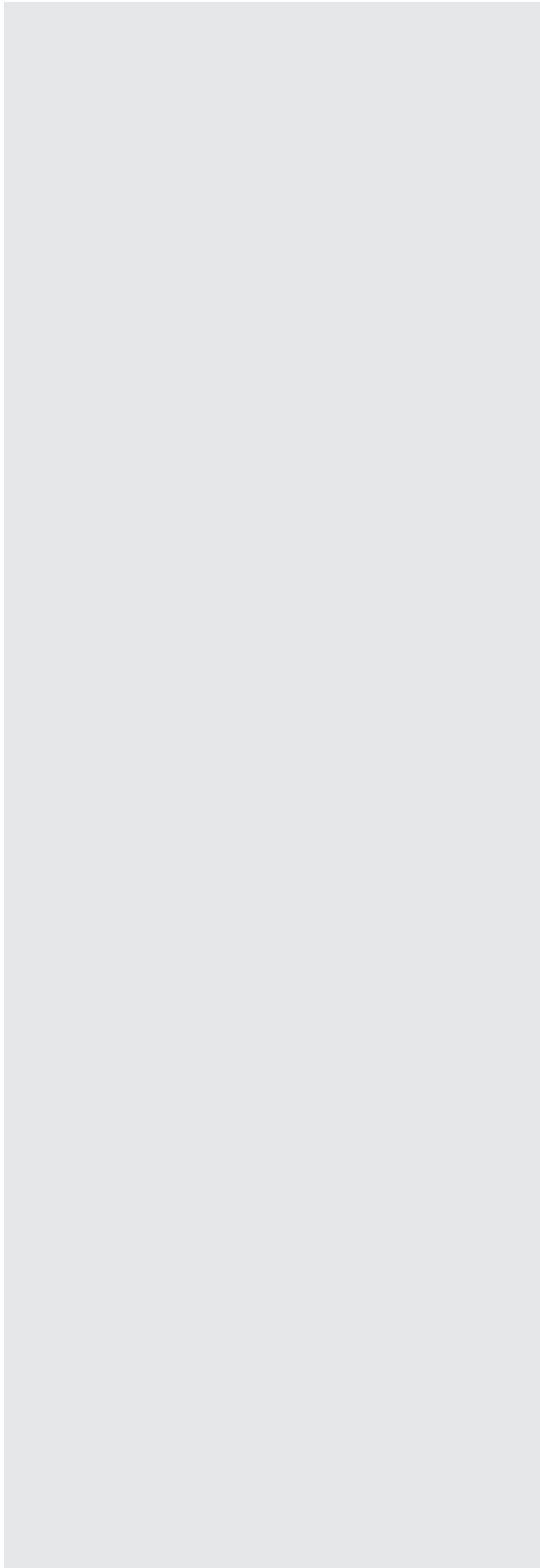
As we mentioned above, the very wide spectrum of investment vehicles within the AIF industry makes it very hard, if not impossible, to provide a unified risk measurement framework. There is no such thing as "a typical alternative fund portfolio" and thus there should be no such thing as a "one risk model fits all" approach when risk modelling alternative investment strategies. On the contrary, we think that good risk modelling should be bottom-up, starting by asking the relevant questions: what are the risk profiles of the underlying securities in the portfolio, when are assets likely to be bought or sold (i.e., what risk premium or inefficiencies are they trying to capture), what is the average daily turnover of the portfolio and the average duration of the trades. These are some of the aspects that can help differentiate an adequate risk measure from one fund to another. For instance, we would not recommend the same risk modelling for a merger arbitrage fund, a diversified futures fund and a high frequency equity arbitrage fund: even if they may trade the same assets, the typical entry and exit points and the holding periods as well as other considerations make their risk profiles fundamentally different.

The above is even more relevant when applied to real estate funds, where liquidity risk, both on the assets and the liabilities of the fund, can be a major risk factor. Liquidity risk management, a key pillar of the AIFMD, is all the more relevant to AIFMs as the liquidity risk premium is often what investors seek in AIFs. AIFs' assets are usually less liquid than the traditional ones in which UCITS funds invest: real-estate investments, mortgages, convertible bonds, illiquid equities,



emerging currencies, over-the-counter derivatives, etc. New tools and techniques are needed to measure liquidity risk, as the traditional bid/ask spread and mean traded volume may not reflect the intrinsic liquidity profile of the instrument. Furthermore, the liability side is difficult to assess: redemption dynamics may exhibit percolation features and strong non-linearity, which may trigger greater liquidity risk at a time when liquidity is most needed.

Whilst the above considerations would certainly be of decisive value when integrated into the risk management value chain, most of the gap is qualitatively filled by the existence of a structured framework for AIFs. ESMA 2011/379 (AIFMD Level 2) set forth a range of necessary measures paving the way for risk governance in products whose complexity range is very widespread and on average substantially greater than the UCITS framework. Most of the stakes actually lie in the implementation for AIFs of a risk management framework that would recognise their distinctive risk patterns, while allowing for a proportional and pragmatic treatment of risks. In the AIF industry, which is permanently seeking ways to reinvent itself and demonstrate innovation, managing risks is a tremendous challenge. The Directive itself embodies this programme: this is about developing a framework to capture constantly risks for funds that can assume a wide range of shapes just like Proteus in Greek mythology.



KEYNOTE INTERVIEW: ALTERNATIVE FUNDS

An Interview with Bill Scrimgeour, Global Head of Regulatory and Industry Affairs, HSBC Securities Services, London



Bill Scrimgeour

PRiM interviewed **Bill Scrimgeour, the Global Head of Regulatory and Industry Affairs at HSBC Securities Services, London**, to gain a better understanding of the current trends that are affecting alternative funds, including AIFMD. The following text contains Bill Scrimgeour's responses to PRiM's questions.

PRiM: The Alternative Investment Fund Managers Directive (AIFMD) basically defines alternative funds as non-UCITS funds. That is fairly general. How would you define alternative funds?

Bill Scrimgeour: When the idea of AIFMD first started, there was a lot of discussion about how to define alternative funds. The result of those discussions was basically that it is too difficult to define alternative funds, because of a lack of consistency and a high level of crossover between them and traditional funds. The characteristics that are often associated with alternative funds, e.g., leverage, performance fees, use of derivatives and monthly NAVs, are also found in UCITS funds these days. Alternative funds have thus become relatively "mainstream" as the characteristics that were once unique to them are now being incorporated into many types of traditional funds. We saw this coming as early as ten years ago, as alternative funds became more institutionalised. Although AIFMD was created for non-UCITS funds, it is likely that its depositary provisions will eventually apply to UCITS funds as well in the interest of investor protection. The biggest issue in AIFMD is depositary liability. AIFMD is a step towards a more level playing field between alternative and traditional funds and the differences between the two are likely to narrow further in the future, for example, when AIFMD depositary liability standards are applied to UCITS depositaries under UCITS V. We are seeing a similar trend in the U.S. market with the Dodd-Frank Act,

which has imposed additional controls on U.S. hedge funds.

PRiM: What do you consider to be the main challenges for managing risk in alternative funds?

Bill Scrimgeour: Not only through AIFMD, but also due to other regulatory changes, such as UCITS IV, the fund industry has significantly improved its approach to risk management. Most fund custodians and fund administrators today include the risks specifically associated with funds among the responsibilities of their chief risk officers. A key risk for funds that is likely to become more important in the future, particularly for alternative investment funds, is counterparty risk, i.e., the risks linked to the counterparties of a fund's investments. Many alternative funds use prime brokers to manage a large part of their counterparty risk. But the use of prime brokers and their relationship with fund custodians (or in the future depositaries) raises other issues that can be difficult to manage. If, for example, the depositary is responsible and can be held liable for ensuring the safekeeping of a fund's assets, how can the depositary manage assets that are being held separately by a prime broker?

I do not see a need for any major changes in risk management techniques for alternative funds, except perhaps for counterparty risk. VaR models may need to be changed to accommodate the unique nature of counterparty risk in funds. Stress testing will become increasingly important for funds,

particularly as a means of managing systemic risk.

PRiM: In reaction to the financial crisis of 2008 – 2009, investors appear to be moving away from aggressive, high-risk investments. Do you see that as a long-term trend that will impact the growth of the market for alternative investment funds?

" A key risk for funds that is likely to become more important in the future, particularly for alternative investment funds, is counterparty risk, i.e., the risks linked to the counterparties of a fund's investments. "

Bill Scrimgeour: The press often attributes a large part of the recent financial crisis to hedge funds. I cannot agree with this idea. Hedge funds in fact can be safer than traditional funds, because they can use alternative techniques to manage risk more effectively. Hedge funds are more efficient for ensuring and facilitating the flow of capital than normal funds. Particularly in a recession, hedge funds and private equity funds are effective in ensuring the free flow of capital.

I think that hedge funds are generally becoming more regulated and thus more "mainstream". As hedge fund managers start accepting higher levels of regulation, more investors will start investing in hedge funds and the size of the hedge fund market will increase. Particularly if hedge funds want to access public institutional investors, then they will be forced to accept higher levels of regulation. This trend will favour European markets, in which alternative funds are more strictly regulated. The cost of complying with extensive regulation, however, is likely to discourage small hedge funds with less than 250 million USD in assets from moving to European markets. They are likely to stay in locations like the Cayman Islands or

move to markets like Singapore, which are not as demanding in terms of regulatory requirements. For this reason, the Cayman Islands is likely to remain popular and retain its large share of the hedge fund market. Europe will become the destination for regulated hedge funds. AIFMD will help stabilise the European alternative fund market in general and thus move it up a notch.

PRiM: Viewed from outside the country, how would you assess the contribution that Luxembourg might make to the world of alternative funds? What risks and opportunities might there be?

Bill Scrimgeour:

Luxembourg could become a very important market for regulating alternative funds and providing European passports for regulated hedge funds. Luxembourg's legislation, its expertise and its reputation make it the main choice for any redomiciling management companies. AIFMD is creating increased focus on the relationship with the depositary, since this aspect was not clearly defined in the past. UCITS V is likely to focus on bringing UCITS fund depositaries to the same level of liability as in AIFMD. So AIFMD will become a precedent for UCITS and for the creation of a level playing field for all funds, thus making them more modern and more flexible. Through its sophisticated legislation and its expertise, Luxembourg is likely to play a significant role in this trend.

PRiM: Thank you for sharing your views with us.

"UCITSV is likely to focus on bringing UCITS fund depositaries to the same level of liability as in AIFMD. So AIFMD will become a precedent for UCITS and for the creation of a level playing field for all funds, thus making them more modern and more flexible."

AIFMD AND RISK MANAGEMENT, A TRAGIC COMEDY IN 3 ACTS

Karine Kias, Senior Consultant, avantage



Karine Kias

Most of us in the alternative investment world sighed with relief when the AIFM directive was voted and published last June. The European Parliament and Council had softened some of the content that had us throwing our arms in the air in protestation for the past two years. That was, however, only Act 1 of what we used to call a tragedy for the investment and asset management industry.

Luxembourg did not wait long to start identifying an adoption strategy and roadmap with the changes already introduced in the law of the 13 February 2007 relative to alternative investments. We have all now been thrown into Act 2. Six months down the road, with another (short) 6 months ahead to comply, the plot thickens. At least as far as risk management is concerned, we now know where to stand with Article 42bis. In three paragraphs, the text of law has set the scene. Specialized Investment Funds (SIF) now have to:

1. implement appropriate risk management systems to detect, measure, manage and follow up on risks associated with the investment position and in general with the portfolio risk;
2. structure and organize themselves so as to minimize the risk of conflicts of interest between the SIF and the people involved in its management directly or indirectly; and
3. be aware of the CSSF guidelines that will be published for compliance requirements regarding the points mentioned above.

Three paragraphs that at first sight seem quite innocent and reminiscent of the UCITS branded funds, but that open a world of difficulties for the industry players. The alternative investment industry as we know it in Luxembourg is a world apart, an environment where investors have to prove that they are educated and to that

extent require a lower level of protection, where flexibility and the ability to react are key and are reflected in lighter regulatory requirements (stakeholders, ease of set up, fewer investment restrictions and lighter reporting). In short, an environment conducive to thinner management structures and therefore one that will need to adapt to comply with the requirements that are now being imposed.

The first paragraph creates management and cost pressure since, in so few words, it requires the funds and/or managers to develop and test a risk management framework. The goal is to monitor the alignment of the risk figures with the investment strategy. Not an easy task when the underlying assets are difficult to value and the risk exposures are difficult to classify. The population of SIFs being furthermore so diverse, this is far from a "cookie cutter" exercise. The hidden effect of such an exercise is the resource requirement: both that required to set up an independent risk management function and that required to manage risk on a day-to-day basis.

The second paragraph requires the managers and funds to re-structure themselves so as to minimize the potential risk of conflict of interest. This will require a full review of each and every management team, board and requesting financial and tenure information for each person of influence, a sort of "Know Your Managers" exercise that could generate additional cost should this be embedded in day-to-day processes. Additionally would clients be pleased to know that some data are "shared" with other market players for the purpose of "conflict of interest"? This is an environment where the real information about the target investment is only known at a late stage in the process and very often code names are used to protect the confidentiality. Therefore it will be difficult to reconcile the transparency requirement with the need for confidentiality.

With experience in UCITS branded funds and in view of the risk management requirements of UCITS IV, these core requirements could be addressed with a certain level of knowledge, if not of comfort. But this is without apprehending fully the mention that ultimately it is the role of the CSSF and its prerogative to define the application framework of the Article 42bis through its Circulars. If we take the level of detail published in the consultation of ESMA as a benchmark, we will face detailed regulatory requirements to implement by 30 June and later, so as to implement the AIFMD in its full risk management intention.

So the curtain has almost fallen on Act 2, but Act 3 is still to be written and the final denouncement will depend on how you, the key protagonists, address the change. While there are undoubtedly challenges to address and loose plot lines that have yet to be resolved, there is still scope for this tragic comedy to deliver a happy ending for the Luxembourg alternative investment community. In trying to align alternative investment regulations with the UCITS brand, the regulator has opened new doors to market SIF and hedge fund-like vehicles to a greater audience. A world of opportunities... So rather than approaching the AIFMD and SIF law compliance as a costly and valueless exercise, managers may wish to embrace the fact that it will allow them a greater understanding of their market, correlation between risk returns in their alternative products and most of all in the impact on their investor behaviours and profiles.

BUILDING CVA ON TOP OF AN EXISTING RISK INFRASTRUCTURE

Michel Dorval, Product Manager for Risk Management, Thomson Reuters Risk Management



Michel Dorval

The potential cost of doing business with certain counterparties is now a significant concern for anyone trading in the financial markets. In the past, the valuation of counterparty credit risk (CCR) was largely ignored, thanks to the relatively small size of derivatives exposures and the high credit rating of the counterparties involved – in general, other highly rated financial institutions. As the size of derivatives exposure increased and the credit quality of the counterparties fell in the wake of the 2008 crisis, however, the valuation of counterparty credit risk could no longer be assumed to be negligible and had to be priced in, more in particular credit value adjustment (CVA).

A CVA captures the counterparty default risk inherent in over-the-counter derivatives portfolios. In a sense, the CVA is similar to loss reserves made on loan portfolios; on the other hand CVA is a highly volatile figure that depends directly on fluctuating daily market prices.

This article explains the 'CVA landscape', like the drivers and the different approaches that banks can adopt in response to these drivers. It provides practical help for banks looking to implement CVA projects effectively taken into account the implications of each of these strategies.

CVA appears in several different contexts. The original context was in managing P&L volatility arising from counterparty default risk in large OTC books. Since then, the CVA concept has been taken up by accounting standards organisations (specifically, with the development of IFRS 9 and ASC820 standards for fair value), as well as forming part of the requirements for additional regulatory capital, as put forward in the Basel III framework.

Since the current Basel II counterparty credit risk rules cover only default risk and no

CVA risk, the Basel Committee on Banking Supervision introduced in the Basel III framework a new capital charge for potential mark-to-market losses associated with any deterioration in the creditworthiness of a counterparty. These new guidelines put forward both a standardised and advanced CVA charge.

Following the 2008 credit crunch, front offices realised that better quantification, pricing, and management of their counterparty credit risk was crucial because CVA losses dominated default losses during the crisis. Some banks created specific CVA desks that managed CVA P&L and collected charges from the originating desks in return for insulating them against counterparty default losses. The total CVA book may represent a very large part of a bank's P&L, making it important to hedge the overall CVA and so avoid CVA uncertainty having a negative impact on bank profitability. It is up to each bank to decide the level of CVA management it will try to attain in both short and long terms.

To this end, it may be helpful to categorize a bank's CVA strategy into four broad stages, with the sophistication and cost increasing at each stage:

- 1. Measure:** A CVA measuring capability is created to calculate and aggregate CVA risks. Accounting and risk management departments will be the principal users of this function. This stage fulfils compliance obligations under accounting and regulatory standards.
- 2. Advise:** In addition to measuring CVA, the bank will advise its trading departments on CVA-related risks. For example, position limits may be set to include CVA or traders may be given minimum spreads to charge on a counterparty-by-counterparty basis.

3. Hedge: At this level the CVA is transferred from the trading desks to a CVA desk, perhaps through a one-time charge to the trading desk. The CVA desk is then responsible for managing the CVA P&L and, for example, for hedging it through the CDS market.

4. Trade: Here the CVA desk becomes a profit centre. The bank is not only hedging its own CVA risks, but it is also actively taking CVA positions.

The choice will depend on the size of the bank and the scope of its derivatives book, the strategic direction the bank is following and the regulatory and accounting standards in place. So banks with only limited derivatives activity may opt to stay at a compliance level and restrict investment in CVA measurement to whatever is required to be in line with the accounting and supervisory regime in place. A larger derivatives player on the other hand will transfer CVAs from individual trading departments to a consolidated CVA desk that will hedge or even trade CVA.

Having previously invested in the capabilities necessary for calculating economic and regulatory capital, most banks will already have in place all, or at least parts, of the different elements required to build a CVA solution. Unfortunately, these elements might be (and usually are) dispersed across different departments, where they serve specific purposes. A more consolidated approach is required for CVA. These elements can be broadly grouped under the headings of data, analytics and reporting.

Most of the data will already be present in the bank, as it is standard input to current platforms used to calculate market and counterparty credit risk. The challenge, however, lies in consolidating and normalising this data so that it can be used for a centralised CVA computation.

The securities data is usually available from the front-office trade capture and pricing systems and may already have been consolidated into risk management systems to calculate Value-at-Risk (VaR) for market risk or Potential Future Exposure (PFE) for credit risk.

The static data required is generally the same as that used by limit management solutions. Market data, such as yield curves, equity prices, FX rates and volatilities, can be sourced from trading and risk management systems.

Credit risk data, such as loss given default or recovery rates, ratings and probability of defaults, is entered into systems for the calculation of economic or regulatory capital, particularly if the bank is already using an internal ratings approach for regulatory capital.

In terms of analytics a complete CVA solution could potentially cover different functions like beside an EPE (Expected Positive Exposure) engine also components like calibration, wrong way risk and calculation of sensitivities to support hedging.

In terms of methodology, the requirements of CVA overlap with those required to estimate PFE in many respects. CVA also entails a simulation of the future evolution of market data, deal pricing on future dates along these paths and aggregation, while incorporating the effects of netting and collateral agreements. Many of the challenges are the same: the performance of portfolio simulation, portfolio netting and collateral agreements modelling, a need for aging and reinvestment strategies, provision for the rapid pricing of complex structured derivatives and so on.

The common use of PFE is to compute exposures that feed into limit management systems and regulatory capital calculations,

where the bank has approval for the Internal Model Method (IMM)¹. Calibration for PFE is therefore performed principally on historical market data to capture through-the-cycle risk. Regulatory requirements specify three years of past history, with an additional calibration over a period of significant stress for the bank². The same calibration could arguably be applied to compute CVA in the context of risk management. If, on the other hand, the purpose is to calculate CVA for trading and hedging or fair value accounting, then calibration needs to be inferred from current market data (also referred to as risk-neutral pricing).

The CVA function is generally also tasked with checking for wrong way risk. Wrong way risk occurs when the exposure to the counterparty increases at the same time as the counterparty's credit quality deteriorates. This correlation between exposure and credit quality is difficult to express as a model. Academics and practitioners have proposed various models for wrong way risk, but while these papers explain interesting relationships they are not general enough. Hence, a common practice does not yet exist for detecting wrong way risk.

The CVA function also needs to support pre-trade CVA inquiries. This may be handled in different ways: approximated and delivered as guidance or by means of an exact computation. The latter needs to be performed rapidly, but it is worth noting that only the simulation of the new deal and aggregation with the previous deals in the same netting set need to be performed. All other values can be reused from a larger overnight batch.

- 1 BIS , Basel II : International Convergence of Capital Measurement and Capital Standards – A Revised Framework – Comprehensive Version – June 2006
- 2 BIS , Basel III : A global regulatory framework for more resilient banks and banking systems – December 2010 (rev June 2011)

While CVA is computed on a netting set basis and the CVA contribution of different netting sets is additive, CVA must also be allocated back to the transaction level. The contribution of a granular level to the total CVA can be based on different mathematical definitions (marginal, incremental, component, etc.). Note that this is generally different from the additional CVA that the counterparty would be charged at the time the deal was done.

Hedging requires a vast number of sensitivities covering credit risk, other underlying market variables, volatilities, and correlations. While the credit calculations may be quite inexpensive to calculate, most other sensitivities will require multiple Monte Carlo simulations to be run. The efficient generation of Monte Carlo-based sensitivities is therefore critical to this process.

The following table summarizes the links between the four broad stages and the functionalities discussed.

ANALYTICS REQUIRED	STAGE 1 MEASURE	STAGE 2 ADVISE	STAGE 3 HEDGE	STAGE 4 TRADE
Data				
EPE engine for CVA and DVA				
Calibration for accounting and regulatory reporting				
Wrong Way Risk				
Attribution to trade or other granular level				
Pre-deal impact				
Sensitivities for hedging				

(DVA = Debt Value Adjustment)

Any decision on reporting capabilities must be made with user profiles in mind. A CVA desk or risk management team would tend to be primarily interested in aggregated CVA figures. They would, however, also need drill-down capabilities to support the validation of the figures and to enable them to answer requests from the trading desks to approve new deals.

Aggregated views usually follow counterparty and instrument hierarchies and must show in a transparent manner the netting and collateral agreements that are in place. Traders are focused on their desk's activity and are primarily interested in pricing (which also means knowing how much to add as CVA), in current CVA amounts, in details of any defined limits, in receiving guidance about which counterparties are favoured or to be avoided and in whether or not a new transaction will 'pass'.

Technical requirements depend on the size of the bank's OTC derivatives operation and the scope of its CVA strategy. The number of prices that need to be simulated and the consequent amount of data that needs to be handled depend on the number of Monte Carlo paths, the number of simulation time steps and the number of transactions. If CVA is calculated purely for compliance with accounting and supervisory requirements, then a regular daily batch simulation is sufficient. Should the bank require fast,

intra-day simulations to quantify the impact of new deals, then it needs to bring the CVA computation closer to the front office. A solution to deliver this capability could mean having separate engines and data stores, fed with overnight results from a centralised CVA computation, but additionally allowing

quick incremental CVA calculations and re-aggregations on netting set basis.

In conclusion, existing risk infrastructures will be a good starting point on which to build a CVA capability. What this article has aimed to show, however, is where the gaps may be and where additional work will need to be done, in line with the stance adopted by each bank towards CVA, as compliance necessity or potential profit generator.

PRiM News

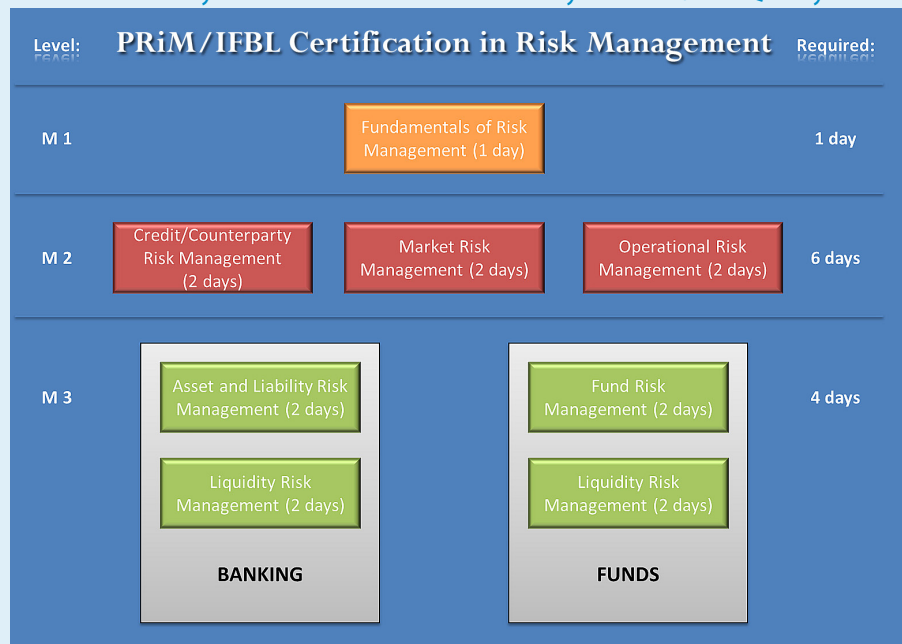
PRiM/IFBL CERTIFIED TRAINING PROGRAMME IN RISK MANAGEMENT

As announced in the last *PRiM Risk Newsletter*, PRiM and the IFBL have developed a certified training programme in risk management, which will be launched in 2012. To obtain the PRiM/IFBL certificate "Risk Management Specialist", candidates will have to complete a total of 11 days of training and pass the exams for each course taken during those 11 days. Candidates will have a choice of specialising in banking or the investment fund industry. The certificates will be issued by the PRiM/IFBL Quality Circle Risk Management.

The diagram summarises the programme and shows the courses that are required.

The course schedule is published by the IFBL and can be found on their Web site, www.ifbl.lu.

If you would like to know more about the PRiM/IFBL Certified Training Programme in Risk Management, please send an E-mail to info@prim.lu or call the PRiM Secretariat at 26 94 59 97.

**ALFI-PRiM RISK MANAGEMENT CONFERENCE**

PRiM is pleased to announce the yearly ALFI-PRiM Conference on Risk Management that will take place in Luxembourg on 18 April 2012. This year's conference will focus on the following areas

- UCITS IV: Lessons learnt (e.g., liquidity, disclosures, KIID, ...)
- UCITS IV: Risk governance and framework
- UCITS IV: Stress testing
- Depository risk and liability
- UCITS IV: Risk governance and framework
- Regulatory interaction between UCITS IV, AIFMD and MiFID II in terms of risk management and investor protection
- Risk Management considerations under AIFMD and for SIFs
- Hong Kong's view on risk management and disclosures
- Panel discussion: An inside and outside view on risk management

The full conference programme will be published soon on www.alfi.lu and www.prim.lu. We will inform our members via e-mail.

NEXT EDITION: MARCH 2012

THEME: Sovereign Risk

CONTRIBUTORS WELCOME