

Value Added Risk Management

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"I do not want to belong to any club that would accept me as a member." Groucho Marx

"I get no respect." Rodney Dangerfield

I. Introduction

How risk management can add value to the investment process depends in large part on the business type. The expectations at banks, hedge funds, mutual funds, and other institutions are very different.

Post the financial crisis of 2008, sell side risk management is primarily focused on fulfilling regulatory requirements. The Federal Reserve and other regulatory bodies emphasize risk reporting and enforcement of a limit structure. Satisfying regulators has become the primary focus of risk managers with adding value to trading a secondary and often unfulfilled objective.

Buy side is a range of businesses including hedge funds, mutual funds, insurance companies, and asset managers, each emphasizing different requirements from the role. For hedge funds and mutual funds, marketing is very important, a box that needs to be checked because of investor concerns. Clients want independent analysis of potential losses, without often fully understanding the process. The actual power of the function to influence decision making is frequently misunderstood by parties outside the organization. Many hedge funds that have sustained large losses had risk functions but their recommendations were ignored. The effectiveness of the risk function depends critically on portfolio managers and the CIO incorporating their analysis. The safety investors believe results from existence of the function and oversight can at times be misplaced.

Adding value has to include risk managers making important contributions to the bottom line. Unfortunately, many risk managers have been marginalized mainly because of a lack of a deeper understanding of trading and markets.

A distinction has to be made between risk reporting and analysis. Banks have separate risk production and analysis teams, with analysis conducted by front office risk managers and risk technology producing risk reports. Often deficiencies in reports mean that front office risk managers spend most of their time aggregating and preparing risk reports for final presentation. This results from having to aggregate outputs from multiple systems. Hedge funds generally use outside vendor systems to produce their risk information. Risk reporting is increasingly cheap and error free because it is automated with the trend continuing. Risk reports are an important starting point as without information it is difficult to discuss the portfolio, know what needs to be further investigated, and conduct analysis. Risk reports, however, are not the full picture and regardless of the business, properly done analysis is essential and adds significant value.

Much of the industry focus has been on obtaining better loss estimates through superior analytics. This perspective is advocated by vendors that provide the software and reports. While superior analytics are

always helpful, improve understanding and fulfill regulatory, client and other requirements, they can't replace analysis which entails understanding of the portfolio positioning, exposures, and trades and how to make improvements.

The risk management value added proposition is the focus of this paper. Risk management for discretionary hedge funds has been discussed in detail in Mazaheri (2008), systematic strategies (2019), and private equity (2019).

The paper is organized as follows. Section II discusses risk reporting and its role in the investment process. In section III risk analysis is discussed. Section IV has a detailed discussion of risk management for various financial firms and the respective value-added proposition. Section V contains our concluding remarks.

II. Risk Reporting

Risk reports at banks are produced by risk technology. VaR or Expected Shortfall, the backbone of sell side risk management is calculated by the risk technology team. Exposures such as sensitivities (Greeks, interest rate and credit sensitivities etc.) are often calculated by front office systems and aggregated by the risk technology team. This is problematic for reasons beyond integrity of the information. Front office often doesn't use VaR in decision making and it is for the most part a regulatory, reporting, and governance metric. Many traders and desk heads don't know the exact definition of VaR, it is not used to manage trades or portfolios only becoming part of the discussion with risk professionals when limits are breached or for regulatory capital. Simplicity in one number results in many assumptions in the calculation. Risk information that is of value to trading, exposures etc. are produced by front office systems and the role of the risk group is aggregation.

Aggregate risk reporting of exposures adds significant value when done properly also incorporating second order effects. Due to separation of trading desks often across businesses, knowing the total of for example high yield and equity exposures provides valuable information in managing aggregate loss because of the strong correlation between these asset classes, particularly in stress. Furthermore, aggregation of second order effects such as convexity provide management a better understanding of loss potential.

The information that is aggregated can sometimes be enhanced with better understanding of trading strategies. Lehman had a risk and exposure report called the Dick Fuld Risk Report that was sent daily to the CEO of the company and upper management. In this report, a large risk arbitrage portfolio's exposure was presented as equity long, short, and net delta. The loss potential of a merger book is best expressed through deal break p&l and net delta for stock deals is an aggregate spread measure, not a telling risk metric. Furthermore, there are no shorts for cash deals increasing the net number.

A second example of poor risk reporting and possible implications is from my experience from the stress of 1998 while I was at Paribas. While emerging markets were in a meltdown, the options books delta was regularly reported as flat. The book however, was positioned as short Eastern European sovereign bond put options delta hedged with Brazil C bonds, the most liquid EM bond at the time and "flat" was on a beta adjusted basis. The basis resulting from hedge mismatch was significant during a market

meltdown. Risk reports in this situation gave misleading information to management about the potential loss profile.

Risk reporting is most useful when it is sufficiently detailed and customized to capture exposures accurately and risks arising from trading. This often means customization. An important user of these reports is front office and it is best to incorporate their input in what information is most useful.

III. Risk Analysis

Risk reports often do not include the full picture and need to be complimented with analysis. Portfolio analysis is often not part of the report for a number of reasons including that the analysis is specific to current positioning and concentrated trades. The questions investigated can originate from front office, senior management, or the risk group itself. In addition, standardized risk reports can flag questions that require follow up. This can lead to new reports to the extent the positioning and the questions are of ongoing interest.

Risk analysis often involves a deep dive to understand the drivers of risk and return: How is the portfolio positioned and when will it make or lose money? A second area where analysis can add value is alternative expressions of trade idea particularly for concentrated trades. Trade idea generation is a front office responsibility but the same idea can be implemented several ways and risk may be able to add value on implementation. Trade implementations with various risk/reward based on the same idea need to be examined and presented to front office for consideration. Sub-optimal risk/reward implementation occurs for various reasons. In discretionary trading, the front office team have specific training, for example in fundamental research and expertise is often asset class specific. A credit or equity trader/analyst looks to implement their views in the asset class of their expertise often without consideration of alternative implementations and derivatives for example can be under-utilized. Options can help cut tail risk, reduce cost of investments by generating income, and create convex payouts. An independent evaluation of trade structure is also important because traders and analyst often optimize on their view with little margin of error. Fundamental analysts are often not completely focused on mark to market of positions, with primary concern of final outcome. Credit traders for example calculate default probability and recovery of instruments with little examination of the path of getting to maturity. Many leveraged loans during the 2007-08 crisis were eventually redeemed at par, there weren't massive defaults, yet the index went to low 70's, below most recovery estimates, resulting in large negative mark to market before eventual recovery. Risk can add value by hedging tails and providing analysis that leads to better sizing.

IV. Risk Management Value Added Proposition for Various Financial Firms

Risk managers are often reminded by trading that they are a cost center. When empowered, experienced risk managers can indeed generate revenue and help prevent losses that are beyond the risk tolerance of the organization. Risk management has to provide value added analysis and reporting. Risk analysis and reporting that doesn't incorporate the strategy characteristics leads to poor loss

quantification, focus on erroneous considerations, and unfruitful conversations with trading. The importance of understanding the strategies is presented through a few examples.

Risk or merger arbitrage is a trade with binary outcomes: the merger closes or breaks. Post-merger announcement, the distribution of the target and acquirer firms change. In a stock deal for example, the correlation becomes almost one. The volatility of the spread is often small and not reflective of the risks of the trade: A merger is a short out of the money option trade hence all the distributional characteristics. Risk arbitrage doesn't lend well to VaR type risk modeling based on N years of time series of data.

A second strategy example is convertible arbitrage. The strategy involves purchase of convertible bonds, hybrid instruments, and hedging of exposures. Convertibles have 4 risk factor exposures: equity, interest rate, credit, and volatility because of the embedded option. The equity exposure arising from the embedded option(s) is often hedged. If interest rate risk is also hedged, credit and volatility remain as 2 sources of risk. Some traders use CDS to hedge credit exposure as well, creating a purer play on Vega and gamma of the option. Understanding of the trade and sources of risk are important. At Barclays, the head of market risk and global equities wanted a limit on the convertible desk that was based on convertible bond market value. With such a limit, once the bond prices went up because of the credit improving there would be a breach, requiring bonds that were in effect less risky to be sold. The limit suggestion was a source of amusement for the convert desk.

A final example is statistical arbitrage. Some implementations of the strategy flatten the book completely by end of day because of gap risk while markets are closed. Since bank risk reports are based on end of day holdings, risk reports report zero VaR and exposures. This creates challenges because during the day the book has significant exposure.

The risk value added proposition varies by financial institution type. At investment banks the role was and has become increasingly regulatory. Devising and monitoring of risk limits is an important function. Larger trades and exposures have to be approved. Most importantly, regulators need to be satisfied that excessive losses will not occur and there is a disciplined process in place.

In this setting, a number of complexities exist. A risk limit framework that is too restrictive can adversely limit allocation of capital by front office, something that is not the role of risk management. This can take many forms but one example is having restrictive limits at the various desk level of a business. Strict desk level limits prevent the business from allocating the risk budget between desks and taking advantage of the opportunity set.

Equally problematic are limits that are meant to contain orderly as opposed to excessive losses. Consider an equity delta (this includes outright stock position) limit that is restrictive. If for a stress equity move, 15% for example, the resulting loss is within what can be tolerated for the business, the limit is putting unnecessary constraints. Risk limits should be focused on losses that are beyond what the organization is comfortable with and not unnecessarily constrain front office decision making.

Hedging of portfolio tail risk is an area that risk management can add considerable value at both banks and hedge funds. This is because it is cheaper to hedge the tail of the aggregate portfolio as opposed to tails of individual portfolios because of tail offsets. When the portfolio being hedged consists of several asset classes this could introduce basis and a hedge that can be ineffective. The p&l for tail hedges (cost

and potentially return) need to be allocated to the various businesses in a systematic way that has buy in from throughout the organization with a methodology discussed in Mazaheri (2007).

In a hedge fund, the risk value added proposition offers different challenges. Foremost, there is no regulatory component. The function exists for essentially 2 reasons: because investors demand it and to add value to the investment process. Portfolio construction is an area where risk management can add considerable value when risk budgeting or allocation based on loss concepts is used to size trades and exposures. Traders often underestimate losses on their holdings and capital allocation based on their estimates would provide perverse incentives. Portfolio construction is very important at a hedge fund because of scarcity of capital, as opposed to banks where leverage is readily available and hence cheap capital makes it possible to put on most good risk reward (and some bad risk reward) trades.

Communication with the prime brokers and counterparties is an important function at a hedge fund where risk management can add significant value. This is particularly true during stress or when the hedge fund is experiencing larger drawdown as margin requirements for example take additional importance. These communications require full understanding of the loss potential of the portfolio and risk better than anyone else at the hedge fund has full grasp of the issues.

Risk based performance management is an important question that needs to be properly quantified at all firms engaged in risk taking. How to quantify skill from market exposure is a difficult question and can be even more complex when the positions involve non-linear instruments. Unfortunately, this type analysis is often not done, for a variety of reasons including many not truly being interested in quantification of skill. Selling market exposure (beta) as skill (alpha) is a common occurrence throughout the industry and investigation of these questions can result in uncomfortable answers.

Cash management at banks is done through the Treasury function which relies on risk and liquidity to ensure the bank is properly funded. Similarly, at a hedge fund a team is responsible for meeting variation margin and all other cash management activities. Due to constrained leverage, the cash management function is very important at a hedge fund and integrating the decisions with risk outputs becomes very important. Total investment level for example should incorporate being able to meet variation margin and also liquidity of the holdings. Risk management is well equipped to do much of this analysis.

V. Concluding Remarks

Risk reporting, analysis and the value added by each was presented. The value added proposition for the function was discussed for various financial businesses. For risk to be a partner in the investment process, risk managers need to have a solid understanding of trading and capital markets.

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