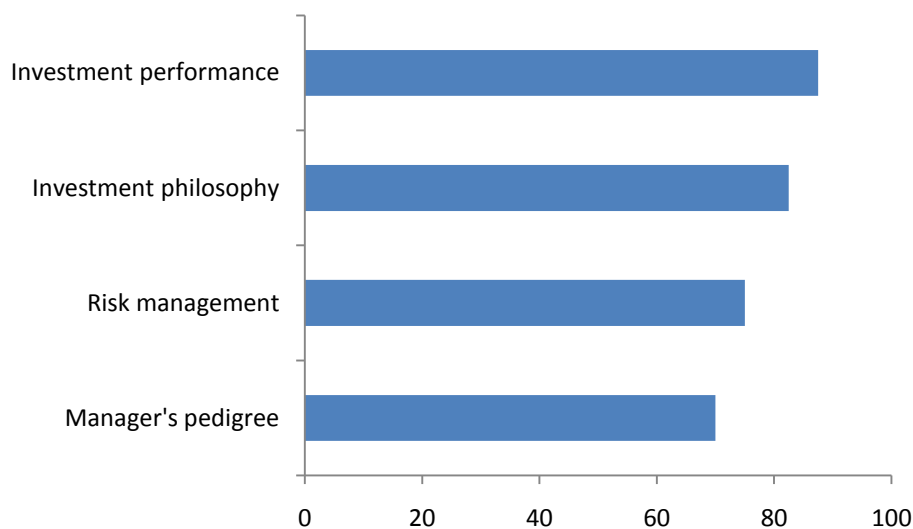


Fooled by Random Risk Management

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On the surface, the concept of risk management within the world of finance surely sounds noble and necessary and one that has rightfully garnered much attention among global investors, especially as many firms struggle to remain afloat in the still churning wake of the credit-crisis. In fact, a recent and exhaustive survey conducted by Deutsche Bank states that “risk management” is now ranked third in terms of importance to investors, which is still behind “investment performance” and “investment strategy”, but has noticeably displaced “manager’s pedigree” from its perch¹.



However, upon further inspection, what does this concept really mean? Would better risk management have prevented the recent credit crisis? Let’s go back a bit further in history - how about the Tech Bubble, the Asian Financial Crisis, 9/11, Black Monday and so forth – wasn’t risk management supposed to have prevented or at the very least alerted us to the pending economic fallout of such disasters, thus giving asset managers the tools and time to react in such a way that would have minimized the resultant financial losses?

In such severe market crashes, did our beloved risk management tools and models such as the now ubiquitous Value-at-Risk (VaR), for example, fail us? It seems to me that whenever financial markets unexpectedly run amuck, huge losses occur and investors turn to each other with arms raised high exchanging dumbfounded expressions, the call for better risk management and more regulation can be heard shortly thereafter being trumpeted loudly by practitioners, regulators and academics alike. Yet despite our best efforts through better and more refined risk management practices, new and seemingly more toxic forms of financial crises strike time and time again. One begs the obvious question, why?

More pointedly, is risk management really fulfilling its expected role? Do current risk management practices and methods actually give us a clearer and more quantifiable insight into the risk profile of our portfolios while also affording the means to confidently mitigate those risks?

In fact, there exist a fair number of skeptics who staunchly question the efficacy of the risk management practices being applied today. Nassim Taleb, author of the best-selling book ‘The Black Swan’, is perhaps risk management’s fiercest critique and arch nemesis of every risk manager and statistician, but you can be rest assured that risk managers

¹ 2008 Alternative Investment Survey’, http://www.db.com/presse/en/download/2008_Alternative_Investment_Survey.pdf (accessed 26 May 2008)

everywhere are reading his book with great interest, concern and a healthy dose of lip-biting unease.

Taleb argues that the risk management tools employed in the financial world are heavily flawed and fail to capture what is commonly referred to as “fat-tail” risk, statistician talk for those rare six standard deviation events that are only *supposed* to happen once every one hundred years. However, without going into the details of the book, he makes a strong point that these fat-tail events, in terms of financial crises, are happening a great deal more than the risk models say they ought to. Does this mean we should give up our beloved risk management tools and models? No.

Despite the venomous remarks Taleb makes throughout his book, I believe he simply wants us to acknowledge the shortcomings of risk management, to always be very skeptical of the results they produce and to realize that no matter how much data risk models process they will never fully prepare us for the next big crises. If they did, we wouldn't have major crises now would we?

Risk equals uncertainty, so how could we ever expect our risk models to fully quantify in detail ‘non-laboratory’ uncertainty and all of the infinite possibilities that come with it? To do so would be akin to an act of clairvoyance only befit to God himself.

In a nutshell, Taleb argues that our models are making inductions about the future of risk and returns based on historical data (e.g. historical correlations among different asset returns) and we seem to be accepting the results of these models as sacrosanct without much critical thought.

Complacently, we digest the data that is spit out of these models as if they were flawless, prognostic and fully representative of reality. This is simply a naive and costly mistake as exemplified in many well known hedge fund collapses such as Long-Term Capital Management (LTCM), where the best minds in the fields of asset and risk management, so sure of their models, were behind this fund's infamous demise and the potential systemic collapse of the entire financial system.

So what are the key lessons here? First, we need to revise our expectations regarding the capabilities of our risk models so that they are more realistically attuned. We simply need to understand that they are models, and they will never fully represent the subtleties and nuances of reality. At best, we should view the figures within a risk report as a static snapshot estimate of risk at particular points in time and not as the actual risk itself, which changes dynamically through time.

Consequently, we should be prepared to accept that our estimation could be wrong – perhaps very wrong – just as meteorologist's model may be very wrong in its forecast of future weather patterns. In the case that our models might be wrong, we should then ask ourselves if we have enough ‘buffer’ to sustain ourselves in the event our models and assumptions fail us.

Second, we need to be extremely careful in how we choose the inputs and parameters that guide our models and ultimately generate the end results we use for decision making. As the saying goes, ‘garbage in – garbage out.’ For instance, risk models face the same problem that plague the discounted cash flow model (DCF) and all its variants that we learned in Finance 101. The DCF is based on assumptions and inputs about the future of cash flows that allow us to derive an asset's fair value. Change the growth rate or discount factor and the DCF will produce a widely different valuation. Similarly, change your assumptions about the underlying risk factors and calculations framework employed in risk models and the resultant figures will be significantly different.

As such, a good risk manager should be able to identify key risk factors and incorporate them into a model that he feels will produce the best estimate of risk facing a portfolio, while being extremely aware that his assumptions could be wrong and should thus remain vigilant for any indications that could lead him to believe his original assumptions were partially or wholly inaccurate.

One way to statistically test *ex post* whether a model and the assumptions behind it were doing their job is through a process known as backtesting. Second, we should test out different variants of the model and adjust the inputs. For example, if you are running VaR, you should run the three major types (parametric, historical and Monte Carlo) and check them against each other – even across different vendors (assuming you are using off-the-shelf risk systems). Next, change the inputs such as data look-back period, decay factor, forecast

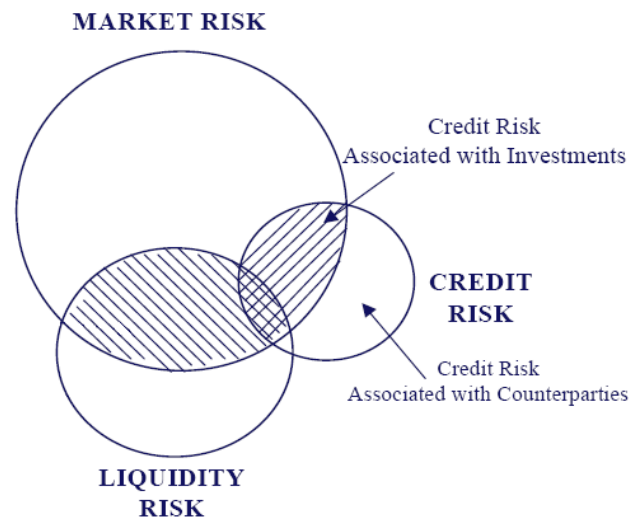
horizon and confidence level. Significant differences should raise an eyebrow and require investigation. Third, identify weaknesses of the model and use other models that may be able to address such weaknesses.

Continuing with VaR as an example, we should also employ multi-dimensional “what-if” stress tests to capture the possible adverse P/L impacts of extreme “fat-tail” events that VaR has been criticized for grossly underestimating over the years.

Fourth, we need to be aware of model risk. This is the risk that models are applied to tasks for which they are inappropriate or are otherwise implemented incorrectly. For example, if you are running a portfolio with a significant portion invested in derivatives with non-linear payoff functions (puts, calls, warrants, prepayments, etc.) one should not use parametric VaR to measure the portfolio’s risks. This is because parametric VaR assumes returns are normally distributed. While the risk of a portfolio with mainly delta-1 products (e.g. equities, CFDs, futures) can arguably be adequately measured with it, parametric VaR will not capture non-normal return distributions and convexity risks for a portfolio with many exotic options and structured products.

Furthermore, it is important that we identify all the different types of risks fund managers face and also understand their interrelationships among them as we tend to wrongly view them in isolation from one another.

Up until this point, we have been focusing solely on particular facets of market risk and the caveats of the tools employed to mitigate market risks (i.e. VaR, stress testing, backtesting, etc.). However, we should also be very concerned about liquidity risk (a type of market risk), operational risk, the use of leverage, credit risk (those associated with investments and our counterparties), etc. as these seem to have been the main culprits in most of the recent hedge fund blow-ups. Below is a Venn diagram visually depicting how risks overlap and interrelate (with the exception of operational risk)²²:



MFA's 2005 Sound Practices for Hedge Fund Managers

Liquidity risk is usually measured in terms of how many days it would take to liquidate a position and is usually derived from average trading volumes. The typical problem with the liquidity risk measure is that it doesn't really give you a clear picture of how many days it would take to liquidate a position under extreme market duress where market liquidity dries up fast, which is what we are really concerned about. As such, a simple way to create a more conservative liquidity risk figure is to multiply it by a factor that significantly increases the days it would take to liquidate a position. The fund manager should then have liquidity risk limits in place whereby the risk policy guidelines enforce him to reduce exposure to the position if, for example, it would take more than 10 days to fully liquidate (unless the fund and

²² 'MFA's 2005 Sound Practices for Hedge Fund Managers', http://www.hedgefundmarketing.org/MFA_Sound_Practices.pdf (accessed 26 May 2008)

its investors are comfortable in investing in relatively illiquid instruments). A corollary to liquidity risk is execution risk, i.e. liquidating a large quantity in a position which will push the market price of the security lower – so much so the actual average selling price deviates from the targeted selling price. One way around this is to have your broker sell the position over many separate orders or to use different brokers to execute the trade.

Operational risk is the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events³. Forms of operational risk include natural disasters, electrical failures, computer system failures, employee fraud, etc. Natural disasters can be mitigated through insurance whereas electrical and computer system failures can be mitigated by investing in solid infrastructure and back-up sites and forming a detailed Business Continuity Plan (BCP) familiar to all employees⁴.

Employee fraud, as epitomized in the recent Société Générale trading scandal with Jerome Kerviel, can be mitigated through better internal control practices that encourage independence and transparency. Leverage was certainly a factor in LTCM's downfall and also the collapse of Bear Stearns. These two firms were levered as high as 100 times and 40 times, respectively, which not only magnified their returns but exacerbated their losses. Surprisingly, these two funds are actually the exception as most hedge funds tend not to be levered more than 5 times.

A simple way to address the problem of leverage – don't use it or use very little of it wisely and monitor your margins incessantly using top-notch systems and software. Credit risk is the risk your counterparty may default or you may default on your obligatory payments, and relates particularly to fixed income securities. An obvious surefire way to mitigate credit risk is to invest in securities with very high credit ratings and low default probabilities (but, again, do not take these default probabilities as sacrosanct) and to avoid chasing higher yields, especially if you are unable to confidently assess the amount of risk you are taking on for that extra bit of yield. Conduct thorough due diligence on the company issuing the fixed income security and avoid investing in structured products that you don't understand such as credit-linked notes, credit-debt obligations, asset-backed securities, etc., which can prove to be ticking time bombs for even the most sophisticated investors.

This article has only touched upon a few of the key elements one should consider when learning about the broad topic of financial risk management. Nonetheless, hopefully the reader has learned a thing or two. In summary, we should not give up our risk management tools and practices, but we should not be so foolish to assume our models are perfect – in fact, they are far from it.

From an investor's perspective, they should always remain skeptical and should ensure that their risk managers are just, as if not even more skeptical of the risk management processes they implement on an intraday basis. They should seek to constantly monitor, fine-tune and back-test their models and question their assumptions, trying to prove them wrong, for the financial jungle is a vast and ever-changing landscape with an infinite number of what Taleb would call Black Swans - treacherous and unpredictable pitfalls silently waiting to ensnare the unworried and complacent investor.

³ 'Operational Risk', http://www.riskglossary.com/link/operational_risk.htm (accessed 26 May 2008)

⁴ 'What is Operational Risk?', <http://www.frbsf.org/publications/economics/letter/2002/el2002-02.html> (accessed 26 May 2008)