

# The Elusive Portfolio Risk Management

The topic of risk management has attracted a lot of attention in recent years from institutional fund managers and owners of institutional funds. Considering the great minds behind Long Term Capital Management (LTCM), the collapse of LTCM has raised a lot of questions about the effectiveness of risk management practices and even the possibility of managing investment risks.

Before we discuss risk management, we need to define it. How does one define risk or risk management? Chances are, no two risk management practitioners will give you the same definition. Probably due to its elusive definition, risk management is also an area where software vendors and programmers, and consultants alike are trying to capitalize on. More often than not, their definitions of risk and risk management are biased towards complexity to justify their fees.

Let's narrow the context to the fund management industry, and specifically to portfolio risk management where the attention to risk management in the fund management industry has primarily been focused. Even within this narrow context, the definition of portfolio risk management remains elusive. Portfolio risk management covers a wide spectrum of activities from the simple setting of limits on investments or loans, to the more dynamic adjustment of investment portfolios to be in line with risk budgets.

Nevertheless, it is commonly accepted that investment management companies represent a different risk paradigm than their banking, brokerage and insurance peers. Risk for the fund management side is different. It is different for one simple reason: in most cases, it is not the investment manager's money at risk. The investors or clients assume the primary portfolio risk for traditional investment management products, such as equity funds, fixed income funds and balanced funds. The biggest risk investment management companies face is reputational risk - the impact that operational failures and poor portfolio performance, relative or absolute, can have on firms' reputations and their subsequent ability to attract and retain funds. Nevertheless, indirectly, investment management companies are exposed to the same risks as those faced by portfolios under management - that is, a lower market value would translate into lower revenues since management fees are normally charged upon market value of funds.

As institutional clients demand more transparency in the portfolio management process and impose risk restrictive portfolio mandates, fund managers are seeing the line blurring between portfolio compliance and risk management. This has created the need for a more disciplined portfolio risk management process and for new methods to calculate risk.

This article attempts to define general portfolio risks and how they can be measured and managed.

## **Volatility of Returns and Correlation**

Volatility is the most widely accepted definition of risk. Volatility, or standard deviation, measures the variability of returns. The higher the volatility, the higher the potential to make large profits or large losses. A high risk fund is synonymous with a fund with high volatility, such as equity funds. KLCI experienced a volatility of about 27% for the past 3 years as compared with MGS (Malaysian Government Securities) All index, which exhibited a volatility of about 3%. Drawing from that, equities are more volatile than bonds, which in turn are more volatile than cash. Obviously, cash under the bed has volatility of zero since it will never increase or decrease in value, ignoring inflation and natural disasters, of course.

However, how do we know how volatile a fund will be in the future? Unfortunately, we can only forecast the expected volatility. There are various methods in which expected volatility could be estimated but the easiest method is to calculate the historical volatility as the proxy for expected future volatility.

Another characteristic of volatility is that a security is expected to have higher volatility compared with a diversified portfolio, owing to the fact that not all securities move together, i.e. statistically the correlation of 2 different securities is not 1. For example, the 3 years monthly return volatility of Maybank was 27% while the KLSE's CI was 20%.

Using the statistical property that the volatility of 2 or more securities might not be perfectly correlated, the most obvious method to reduce volatility is to diversify the portfolio. Therefore, measures of correlation between securities are important to portfolio managers who wish to reduce risk through diversification. Correlation measures the degree to which the value of one variable is related to the value of another. The risk reduction effect of diversification would be greater with combination of securities that are less correlated or better still, negatively correlated. The objective of any portfolio manager is to be rewarded for undertaking risk and at the same time diversifying that risk away.

How does one interpret volatility or standard deviation? Well, statistically, a fund's returns are expected to fall within the range of plus and minus one standard deviation from its mean 68% (two-thirds) of the time, with the assumption that the fund's returns are normally distributed. For example, for a portfolio with expected return of 10% per annum and expected volatility of 10% per annum, its return is expected to range between 0% and 20%, 68% of the time.

Other than managing securities composition and asset allocation, a fund manager could also hedge a portfolio to control portfolio volatility.

In order to ensure diversification, exposure limits could be set on portfolios. Limits could be applied to exposures of single securities, related securities, credit ratings, industries and maturity bands. In addition, for fixed income portfolios, limits could be set on portfolio modified duration, a measure of sensitivity of value of a portfolio to changes in interest rates, to control volatility.

### **Tracking Error Risk**

Tracking error is a very misunderstood measure of risk and performance management. It is defined as the standard deviation of excess return. It is often mistaken for excess return or even average excess return. Most people understand or appreciate that standard deviations of asset returns is a useful measure of risk. We know that large standard deviations imply riskiness. Tracking error is analogous to standard deviations of returns except it measures riskiness relative to a benchmark rather than absolute returns.

What does it tell you and how is it useful? It is best to approach this with an illustration. Suppose on average a fund manager gives the investor an excess return of 5%. The tracking error will tell us whether excess returns in most periods were close to the 5% or spread over a larger range. If excess returns are clustered around the 5% level, the tracking error will be small. If the returns are widely distributed, then the tracking error will be large. Using the tracking error we can tell whether the fund manager is good at providing stable excess returns or whether the fund manager is prone to yielding large swings in performance. Ideally, for a given level of excess return, we would rather have a small tracking error.

A fund manager could calculate tracking error measures to estimate the *probability or consistency* of a fund's `excess return' from the benchmark. Fund managers could then set an appropriate tracking error limit as a risk budget target for the fund. Again, there are many ways to estimate tracking error and a straightforward method is to use the past to estimate the future.

### **Beta**

Beta is another relative risk measure. It is a measure of market risk, measuring the fund sensitivity to market movements. Market movement is generally represented by KLCI movement. A fund with beta of greater than 1 is more volatile than its benchmark. It is expected to gain more when the benchmark rises and lose more when the benchmark declines. A fund with beta of less than 1 is conversely less volatile than its benchmark.

Fund managers could then adjust the portfolio beta to change the risk characteristic of a fund. When the market is expected to rise, the fund managers could increase the portfolio beta by increasing high beta securities in the portfolio. Conversely, if the market is expected to decline, low beta stocks could be added to the portfolio to replace high beta stocks. Also, hedging is another tool to manage portfolio beta.

### **Risk Management Is Not Panacea For All Evils**

Risk management, no matter how sophisticated, does not eliminate risk. Rather, it highlights and monitors it, in light of existing circumstances. One clear lesson from the turbulent times of recent crises is the need for frequent updating of underlying risk measurements and appropriate portfolio re-balancing to manage those risks.

A good risk management culture with proper risk management protocols and understanding of the importance of risk management could potentially protect and enhance portfolio values whilst satisfying client mandates.