Violent market moves over the past 18 months have brought risk management to the forefront and highlighted the need for guidance on best practices for investors. Many institutional investors were surprised by the market’s behaviour during the current crisis. Some have argued that current risk management practices failed when they were needed most, and with multi-sigma events extending across formerly uncorrelated asset classes, investors have questioned the meaning of the term “well-diversified portfolio”. What does sound risk management mean for plans, foundations, endowments and other institutional investors? How should these institutions think about best practices in risk management? We start with three guiding principles:

1. Risk management is not limited to the risk manager. Anyone involved in the investment process, from the CIO to the portfolio managers, should be thinking about risk. Risk management should not be limited to an after-the-fact reporting function but must be woven into the investor’s decision-making process, whether it is the asset allocation decision or the process for hiring managers. Those responsible for asset allocation and management should be risk managers at heart and consider risk and return tradeoffs before making investment decisions.

2. If you can’t assess the risk of an asset, maybe you shouldn’t invest in it. For those institutions invested in alternative asset classes, such as private equity and hedge funds, or which have exposure to complex instruments, such as derivatives and structured products, the risk management requirements have greatly increased. These investors need a framework for managing risk that far exceeds what was needed for the straightforward stock and bond investing that prevailed only 10 years ago. We argue that one should assess one’s risk management capabilities before making the decision to invest in certain asset types.

3. Proactive risk management is better than reactive risk management. Being prepared for unlikely events is perhaps the most important lesson learned from the recent crisis. This applies to both market risk and nonmarket risks such as counterparty, operational, leverage and liquidity. Addressing this issue transcends the

Best practices for Investment Risk Management

Three pillars should form the basis of any complete risk management structure – risk measurement, risk monitoring and RAIM. Jennifer Bender and Frank Nielsen of MSCI Barra write
simple use of the output of models and tools. It requires an institutional mindset that analyses the global economic outlook, understands the aggregate portfolio exposures across asset classes, and is willing to use the model output intelligently to align the portfolio structure with the plan sponsor's assessment of the risks that may impact the portfolio.

In our view, a risk management framework should be aligned with the investment objectives and investment horizon, and tackle multiple aspects of risk, not limited to a single measure such as tracking error or value at risk (VaR). We also believe that an effective framework should measure, monitor and manage exposures to economic and fundamental drivers of risk and return across asset classes to avoid over-exposures to any one risk factor. Finally, it should also manage risk for normal times but be cognisant of and aim to be prepared for extreme events.

**Three pillars for risk management**

In order to establish sound market risk management principles for institutional investors, we rely on three pillars: risk measurement, monitoring and management (or risk-adjusted investment management, RAIM). Risk measurement refers to the tools institutional investors use to measure risk. Risk monitoring focuses on the process of evaluating changes in portfolio risk over time. RAIM refers to how investors may adjust their portfolios in response to expected changes in risk. Robust risk management integrates all three areas.

The risk manager's toolkit may include a variety of measures capturing different views of risk.

On one hand, institutional investors need to manage the total risk of their investments, which means protecting themselves from asset-liability deficits, declines in broad asset classes and, more generally, any losses large enough to make it difficult to meet the investor's obligations. On the other hand, institutions need to manage the risk of managers underperforming their benchmarks, which involves monitoring the tracking error and performance relative to the assigned benchmark.

To assess future risks, it is essential to measure and monitor risk both at the aggregate level and at the factor level. For risk measurement, most institutional investors measure aggregate portfolio risk with volatility or tracking error, which rely on individual volatilities and correlations of asset classes and managers. However, while volatility, tracking error and correlations capture the overall risk of the portfolio, they do not distinguish between the sources of risk, which may include market risk, sector risk, credit risk and interest rate risk, to name a few. For instance, energy stocks are likely to be sensitive to oil prices and BBB corporate bonds are likely to be sensitive to credit spreads. An analysis of the sources of risk requires portfolio decomposition along various characteristics or exposures via a factor model. Institutional investors can use portfolio decomposition to understand how much return and risk from different asset classes or managers resulted from prescribed factor exposures in the past, or how much risk to expect.

**Risk monitoring**

Risk monitoring enables institutions to monitor changes in the sources of risk on a regular and timely basis. For instance, many well-diversified US plans saw a growing exposure to financial sector, housing and credit risk from 2005-2006. While risk managers may not have foreseen a looming correction, the ability to monitor these exposures would have at least alerted them to the risks in the event of a correction. Portfolio decomposition plays an important role in stress testing. Here, the sources of risk are stressed by the risk manager to assess the impact on the portfolio. Stress testing is flexible in enabling risk managers to gauge the impact of an event on the portfolio. The stress scenario might be real or hypothetical, commonplace or rare, but stress tests are used typically to assess the impact of large and rare events. Scenarios can come in different flavours, such as macro shocks, market shocks or factor shocks.

A discussion of stress testing leads naturally into the problem of managing tail risk, or the risk of some rare event occurring. Whereas stress tests do not address the likelihood of extreme shocks occurring, other methods for analysing tail risk do. This recent period of turmoil has acutely highlighted both the importance of managing tail risk and the inadequacy of generic tail risk measures, such as parametric value at risk (VaR).

It is important to note that risk monitoring requires the necessary IT and infrastructure resources for support. First, accurate data are essential, as is sufficient coverage of the assets held in the portfolio. Delays in a risk manager's ability to view changes in holdings, prices or characteristics are often caused by infrastructure limitations. In some cases, data may not be readily available, or the resources required to collect data from custodians or individual managers may be prohibitively expensive. In addition, hard-to-model assets, such as complex derivatives, hedge funds and private equity, can pose a challenge for even the most advanced systems.

“In our view, a risk management framework should be aligned with the investment objectives and investment horizon, and tackle multiple aspects of risk, not limited to a single measure such as tracking error or value at risk (VaR).”
One consequence of the current crisis may be that investors become more cautious when they choose their investments. Warren Buffett, for example, commented at his recent shareholder meeting on complex calculations used to value purchases: “If you need to use a computer or a calculator to make the calculation, you shouldn’t buy it.” Even though that statement may be extreme, the point is well taken. The damage that exotic, illiquid and hard-to-value instruments have triggered over the last 18 months highlighted the need to be able to assess the risks of investments before money is allocated to them.

Risk management

The third pillar in the proposed framework is risk-adjusted investment management (RAIM), which puts risk measurement and monitoring outputs into action. While risk measurement provides the measures, and risk monitoring ensures that the measures are timely and relevant, without the ability to make adjustments to the portfolio, this information is of limited value for protecting the investor against losses. RAIM aligns the investment decision-making process with the risk management function. For instance, RAIM might be used to make portfolio adjustments as either the correlations between assets or managers rise or the probability of certain tail risk or disaster scenarios increases. RAIM could also facilitate the management of risks coming from certain sources of return, or it could aid in better diversifying the portfolio. Specifically, RAIM could be used in the development of overlay strategies that would facilitate certain hedges, e.g., currency hedges or tail risk insurance.

As an example, the declines in the broad equity market last year caused many pension plans to become underfunded. Decision makers may decide that their tolerance for losses should be limited to a specific percentage. They should then decide whether that limit should be maintained through a passive hedge or through a trigger mechanism defined by the breach of clearly-defined parameters of a risk measure. Some pension plans started hedging their equity exposure to limit downside risk, though for many it was too late. One reason why pension plans may not have hedged their market exposure more frequently is the cost of hedging. Hedging reduces the performance of the portfolio in up markets, but in periods when the market declines, hedging limits the downside.

All three pillars – risk measurement, risk monitoring and RAIM – are indispensable to a complete risk management structure. The diagram above summarises the three pillars, illustrated with specific examples. The chart uses the same idea that was presented before, namely, that risk measures can be categorised by normal and extreme times and relative versus absolute investment objectives.

Conclusion

Recent events have put into stark relief the inadequacy of the current state of risk management. Much has been said about the need for better risk management and a greater degree of risk awareness in the broader investment community. Risk management is a dynamic area, and any set of best practices is bound to evolve over time.

Each of the three domains outlined in our piece is critical for risk management. Risk measurement means having the right tools to measure risk accurately from various perspectives. Risk monitoring means observing the risk measures on a regular and timely basis. Risk-adjusted investment management means using the information from the measurement and monitoring layers intelligently to ensure that the portfolio management process is aligned with expectations of risk and risk tolerance.

While each pillar encompasses a different aspect of risk management, each is indispensable to a strong risk management process. Moreover, they are interdependent and should be aligned with the investor’s objectives. Their interconnectedness drives the key conceptual theme – that risk management and the investment process should be fully integrated.
The Technology

Jonathan Hudacko, executive director, head of multi-asset class analytics at MSCI Barra, takes a look at the technology that underpins the risk management best practices described in the main article.

MSCI Barra’s portfolio risk and performance business is divided into two areas: equity analytics and multi-asset class analytics. The reason for this division is that when we began the Barra business in 1975, we started out by providing equity risk modelling services and then over the years we have expanded into other asset classes, such as fixed income, hedge funds and commodities.

Behind both our equity and multi-asset class platforms lie a range of country and regional risk models based on a set of fundamental factors — including growth, value, size, liquidity, leverage and momentum — that are well-defined and intuitive for institutional investors to use. These multi-factor risk models differentiate us from other vendors, who typically employ only statistical analysis. The problem with the statistical approach is that investors don’t really know what they’re pulling out from the data and therefore it is difficult for them to decide on a particular course of action.

The equity analytics business focuses on the Barra Aegis product (which has strong penetration in the equity trading and portfolio management market) and our ModelsDirect risk model line. MSCI Barra is one of the original pioneers of risk modelling, and we are able to maintain our position in the field by continually innovating, both in terms of our software products and our models.

Our multi-asset class platform, BarraOne, encompasses the equity, commodity, credit and fixed income asset classes. Earlier this decade, we saw increasing demand for multi-asset class tools from our traditional asset management and asset owner client base. One driver of this demand was the introduction of UCITS III in the EU, which freed investment managers from being restricted to a particular style of management or asset class. As a result, they started to look for risk platforms that provided both multi-asset class coverage and a choice of risk modelling approaches — such as Monte Carlo Value at Risk, stress testing and risk decomposition into primary risk factors.

The forthcoming addition of Markit CDS data to BarraOne will add further value to the product; eligible subscribers will be able to carry out streamlined risk analysis and make trading decisions around single name and index credit.
default products based on industry
standard inputs. The combination of
this powerful data set and the respons-
siveness of the BarraOne platform will
allow clients to view risk across different
classes and investment styles. Further,
the integrated risk modelling approach
offered in BarraOne allows users to
explore commonalities and diversifica-
tion across names, which they can use
to help construct their hedge positions.

Also included in BarraOne is a default
probability model (known as Barra
Default Probabilities) that integrates
information from the Barra equity risk
models into a forecast of downgrade
or even default. From an empirical
perspective, we have observed that
credit default swaps and the Barra
Default Probabilities react at different
times and levels in the early stages of a
company’s troubles. While the behav-
ior typically converges, comparing the
two data sets can present interesting
insights.

The concept driving the Barra
products is the lifecycle of risk. We
look at risk at every step of the invest-
ment process and design our prod-
ucts accordingly. Our aim is to provide
a coherent and complementary set of
tools designed to help our clients view
risk at the high level, as well as to easily
drill down to a more granular level.

Indeed, many clients use the Barra products
not only for hedging purposes, but also for
investment strategy management.

Institutional investors, including fund
managers and pension plans, can use
BarraOne to:

- Understand the sources of port-
folio or plan risk coming from
common factors or idiosyncratic to
specific securities
- Capture non-linear risk using Monte
Carlo and Historical Value at Risk
simulations
- Perform stress testing to assess
portfolio P&L under market
dislocations
- Analyse sources of return using
Brinson Allocation-Selection and
fixed income performance attribu-
tion methodologies
- Perform interactive decision
support using tools such as Multiple
Portfolio Comparison, Mean-Vari-
ance Optimisations, Trade Scenario
Analysis, and FX Hedging
- View and group portfolios using
traditional fixed income and equity
analytics to understand the funda-
mental metrics of risk
- Prepare regulatory reports to
address their obligations under
certain regulations such as the
Ucits III directives
- Minimise operating costs, tech-
nology challenges and support
requirements by relying on
BarraOne’s browser-based
technology

Indeed, many clients use the Barra products
not only for hedging purposes, but also for
investment strategy management.