Calculating and managing risk factors across portfolios

The global financial crisis has caused institutional and retail investors alike to reevaluate how they manage, measure and ultimately hedge risks across portfolios – from asset allocation and manager selection to portfolio construction.

In our view, risk measurement is generally a quantitative exercise while effective risk management is more of a qualitative exercise.

When investors think about measuring risk, they want to understand their portfolios’ beta exposures to systematic risks. To get there, it is important to be able to “look through” the portfolios, measure and aggregate the underlying strategies, and roll them up to the portfolio level. Getting granular with the managers’ strategies – understanding, say, their biases and orientation toward risk, as well as the underlying liquidity of their investments – is a technique that will either support or refute one’s understanding of what managers are doing.
Rules of thumb for prudent risk management

While there is no uniform antidote, there are some basic risk-management principles that anyone running a broadly diversified portfolio can consider:

• Ensure that the portfolio’s risks are broadly diversified — across alpha sources, market betas and risk drivers. Some of this data will come from quantitative measures, while other measurements will come from a qualitative assessment of the portfolio’s holdings. An investor, for example, who is adding long-short managers to a portfolio of existing equity managers should make sure that he or she is not adding on similar equity risks.

• Understand what the dominant exposures are in your portfolio and size them properly to reflect your sensitivity to drawdown risk. However, when looking at the dominant exposures in a portfolio, there may be some exposures that investors can’t diversify away from — such as the variability of stock markets around the world.

• Avoid excess leverage. Within the portfolios, consider the underlying liquidity — not only the stated liquidity disclosed by the managers but also the nature of the managers’ underlying investments and whether those investments could become illiquid in a crisis.

The key is to avoid becoming a distressed seller. For instance, core direct real estate funds or credit-oriented hedge funds that employed modest amounts of leverage generally came through the financial crisis with positions intact because they were never in the position of being forced sellers. In contrast, those with excessive leverage were forced to unwind their holdings at disadvantageous prices.

Risk measurement tools should aggregate risks

Risk measurement tools should be able to take a holistic view and aggregate information across both traditional and alternative allocations. At a high level, it is important to look through to the broad systematic exposures, understand why they are there and make sure they remain within a targeted range.

One path to creating greater clarity of market risks is to group net exposures at the underlying strategy level, aggregate them at the portfolio level, and stress test them. As the example portfolio on the left-hand side of Exhibit 1 illustrates, the defensive strategies (i.e. market neutral) across the portfolio’s underlying investments make up 48% of the risk capital allocation, while strategies with credit and equity sensitivities, which are aggregated and rolled up, make up 23% and 29% of the risk allocation, respectively. On the right-hand side of the chart, the credit and equity exposures are adjusted into common risk units and then stress tested.
It is also important to understand how portfolio risks are changing over time. Effective risk measurement tools — which can track whether a portfolio’s equity and credit risks are rising or falling — can not only reduce the chances of unpleasant surprises, but also validate investors’ own understanding of how their portfolios are structured.

Getting granular with your managers

At the manager level, it is important to understand the driving factor exposures (e.g., size, style, momentum, etc.) to determine if they are intended and to assess if they are meaningful to the overall portfolio.

One way to do that is to take a granular look at each of the underlying manager’s strategies and holdings to see how they have changed over time. Among other things, the data will show whether or not each manager’s style is shifting, whether multiple managers in the portfolio are taking on similar or complementary risks, and whether they are generating returns from different sources. Such data can be used to refute or support the decisions that investors — at the portfolio level — are making.

At the same time, a quantitative analysis of managers’ historical returns can also give investors a better understanding of the managers’ returns in different environments and whether, as is desirable, they have exhibited asymmetric return patterns by capturing a greater percentage of the returns in “up” markets than they lose in “down” markets.

Options can hedge risks but are costly

Nevertheless, there are still exposures from which investors can’t escape. For most investors, the risk that causes the most concern has been equity risk.

The most explicit and predictable method of hedging against equity tail risk has been the purchase of put options — effectively an insurance contract against any dramatic event.

But such protection is costly. Given the amount of traditional “long” investments, there is always a strong, natural demand for out-of-the-money puts. The combination of high demand and the low interest rate environment has made puts even more expensive today.

As the highlighted box in Exhibit 2 illustrates, an investor who, at current prices, wanted to hedge against a 10% loss in the S&P 500 over the next 12 months would have to pay about 4.71% — a premium implying a breakeven market decline of about 14.7%.
Investors may try to offset the high costs by selling other options to reduce the upfront premiums. Creating zero-cost collars by selling calls is one way to mitigate the cost of buying the put. The problem with this strategy is that it narrows the range of return outcomes – which can lead to a “regret factor” of leaving too much upside on the table if the market rallies through the call’s strike price. For example, if an investor sells a call struck at 3.7% out of the market, he or she could be below break-even three months later if the market rallies more than 5% on a mark-to-market basis.

In the case of put spreads, selling lower strike price puts to minimize the outlay for the higher strike price might appear attractive when viewing the payoff at the expiration of the option hedge. But if the market sells off sharply in the interim and volatility increases, the value of the protection may be a lot lower than what was expected at the outset. Investors may think they are hedged, but on a mark-to-market basis, they are likely showing a loss.

Absolute return investments can result in asymmetric returns

Given that options represent an imperfect, high-cost solution, another alternative is absolute return – a more concentrated form of active management across a broad set of markets and asset types. The value that absolute return can add to portfolios is the addition of a more asymmetric return pattern, which offers upside participation and downside protection.

Endowments pioneered replacing “beta-one” strategies (those with 100% exposure to market volatility) with absolute return that introduced more asymmetry to their portfolios. These investors understood that a large exposure to domestic equities introduced a level of drawdown that was too large to tolerate and that diversification within traditional equity would only provide partial relief.
As the bottom chart in Exhibit 3 illustrates, event-driven, long short and convertible strategies delivered superior cumulative returns from January 2000 through December 2010, in part, because they captured a greater proportion of broad equity market returns in up markets than they lost in down markets. These strategies also tended to be among the better performing ones since hedge funds have typically attracted the top-quality managers who were opportunistic and skilled at exploiting inefficiencies and generating alpha.

With the memory of the 2008 and 2009 financial tumult still fresh in investors’ minds, there is a renewed interest in time-tested allocation principles. Proper sizing and diversification of risks combined with modest amounts of leverage can address a significant portion of left-tail risk. Meanwhile, investors can get a big-picture view of their portfolios “headline” risks by looking through the portfolios, assessing and aggregating the underlying risks and strategies. In addition, the use of option and absolute-return strategies can help manage anticipated risks and returns in portfolios.

In summary, while none of these strategies is a silver bullet, taken together, they can help to position a portfolio to deliver a different return distribution and a more palatable upside and downside potential.

### EXHIBIT 3
An allocation to alternatives added asymmetry to a traditional 60/40 stock-bond portfolio

Adding asymmetry to a strategic portfolio provides upside participation with a more limited downside

Average quarterly returns during positive markets [1/2000-12/2010]

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Average Quarterly Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P 500</td>
<td>6.46%</td>
</tr>
<tr>
<td>HFRI event driven</td>
<td>4.53%</td>
</tr>
<tr>
<td>HFRI long/short</td>
<td>4.72%</td>
</tr>
<tr>
<td>Convertibles</td>
<td>4.08%</td>
</tr>
</tbody>
</table>

Average quarterly returns during down markets [1/2000-12/2010]

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Average Quarterly Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P 500</td>
<td>-8.08%</td>
</tr>
<tr>
<td>HFRI event driven</td>
<td>-1.42%</td>
</tr>
<tr>
<td>HFRI long/short</td>
<td>-2.99%</td>
</tr>
<tr>
<td>Convertibles</td>
<td>-3.96%</td>
</tr>
</tbody>
</table>

Deliver superior risk-adjusted long-term returns by creating a more asymmetric return profile

Cumulative returns during all markets [1/2000-12/2010]

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Cumulative Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P 500</td>
<td>138.30%</td>
</tr>
<tr>
<td>HFRI event driven</td>
<td>86.59%</td>
</tr>
<tr>
<td>HFRI long/short</td>
<td>33.90%</td>
</tr>
<tr>
<td>Convertibles</td>
<td></td>
</tr>
</tbody>
</table>

Source: J.P. Morgan Asset Management. Data as of 12/31/10. 60/40 Portfolio invests 60% in S&P 500 Index and 40% Barclays Capital Aggregate Bond Index net of fees. HFRI FoF Portfolio invests the HFRI Diversified Index net of fees. The Absolute Strategy portfolio invests in an actively managed diversified absolute return strategy net of fees. Past performance is not indicative of future returns.
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Diversification does not guarantee investment returns and does not eliminate the risk of loss.

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