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A Best Practice Protocol for the Risk Measurement of a Portfolio of Hedge Funds

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In recent decades, hedge funds have constituted an increasing share of the asset allocation for institutional investors such as insurance companies, public and corporate pension funds, endowments, and fund management companies. Hedge funds offer a continually evolving array of strategies with low correlation to the traditional asset classes (i.e., equities, fixed income, and commodities) and thus provide significant diversification benefits.

The hedge fund industry is much discussed, however, for its secrecy and related challenges in obtaining transparency (Anson 2002; Muhtaseb 2009; Goltz and Schröder 2010). Managers understandably state that this opacity stems from their need to protect what they regard as their proprietary intellectual property and the source of their performance alpha, which is often derived through much investment into research and development. However, this opacity can result in investors holding aggregate portfolios whose risk profile is uncertain and may in fact not meet their own risk and return preferences or objectives. For example, investors may be exposed to concentrated exposures to specific securities, geographies, or industries and may have far greater leverage and lower liquidity than they realize. Moreover, from the hedge fund's perspective there is the opportunity cost as prospective investors pull away from investing in a "black box"

that cannot with high degree of confidence be incorporated into the investor's portfolio construction and risk management processes.

Since the global financial crisis of 2008 and a number of well-publicized cases of hedge fund frauds (Gregoriou and Lhabitant 2009; Frank et al. 2009; Driver and Evans 2009; Muhtaseb 2010), requirements on transparency and governance for hedge funds have increased. Several recent market intelligence surveys indicate that despite progress in this direction, many investors feel that they still receive too little information (BNY Mellon 2012; Bfinance 2013).

Consequently, the question that naturally arises is, "How can hedge fund investors effectively measure and thus manage their market risks while at the same time allowing hedge fund managers to protect their intellectual property?" In this article, we review and refine a potential solution to this dilemma. We discuss the need and the practicalities of the approach while illuminating the discussion with our experiences in the alternative investments space.

LIMITATIONS OF CURRENT PRACTICES

Hedge fund managers provide regular exposure reports to their investors. Although the reports may be accurate, they frequently have a number of shortcomings, particularly

for managers that have cross asset-class exposures or a large number of securities in the portfolio (e.g., over a thousand individual holdings). The shortcomings include 1) low granularity or incomplete exposures, 2) the use of nonstandard units, 3) the use of industry standard but questionable reporting practices, and 4) lack of independent verification or oversight. As a result, investors are essentially relying on the honesty of the managers that the exposures they receive are correct, but even with the received data, they are sometimes unable to perform a fully comprehensive risk assessment.

We discuss these shortcomings in manager exposure reports in more detail below.

Incomplete Exposures

Exposure reports may include, for example, top positions, net and gross exposures by asset class, and so on, which may be useful for gauging the risk of simpler portfolios (e.g., those with few holdings of cash equities), but they may not be sufficient to get a true handle on risk for more complex portfolios (i.e., those with hundreds or thousands of holdings, perhaps including derivatives).

For the more complex portfolios, the logistics of providing such information are challenging, and even if achieved, the technology required by the investor to analyze the financial data can be complex. These are perhaps sufficient reasons why the status quo has been realized. Moreover, the manager may also rightfully be trying to protect his intellectual property, which is often arrived at after much investment in research and development.

Nonstandardized Risk Measurement Units

Managers have preferred approaches for measuring and thus reporting the risks in their portfolios. An equity long-short manager may report the net exposure as a simple long minus short exposures (as a percentage of NAV), some managers may beta-adjust their exposures, and some may also delta-adjust their exposures. Similarly, fixed income managers may report the DV01 (dollar value of 1 basis point change in interest rates) of the portfolio, or exposures in 10-year or 5-year equivalents, or provide partial DV01s of the portfolio to show the exposure to different parts of the yield curve (Hull 2010; Tuckman and Serrat 2012).

In our experience, managers sometimes even cite “internal proprietary methodology” to compute risk metrics. Although it would be helpful for investors to be given transparency on these methods, this is usually resisted. Therefore such practices tend to increase opacity and have the potential to conceal risks. We thus suggest that they should be discouraged.

For an investor in these managers, the different units even within the same asset class add an extra layer of complexity in risk aggregation and consequently risk management.

Industry Standard but Questionable Reporting Practices

Managers may be using industry standard practices, which although widely accepted and used for reasons of convenience, may result in an incomplete representation of the exposures. These practices include “netting” and “M&A adjustments.”

Netting is a process by which managers can collapse the positions in their portfolio by “completely” canceling offsetting long and short positions in a given security. For example, if a multi-manager hedge fund has one portfolio manager (PM) with a 3% long position in Apple stocks and another with a 3% short position, the fund manager may apply netting to cancel the long and short positions and report zero exposure to that security in both net and gross terms. This may be a reasonable assumption when the long and short legs can easily be liquidated—as in the case of a listed and liquid security, such the Apple stock. However, for assets whose liquidation could be challenging during stressed market conditions (e.g., over the counter instruments bought and sold with different counterparties), then the netted exposures will clearly conceal these risks.

We find netting to be prominent in the fixed income arbitrage space where assets are often over the counter and netting may be applied to large long and short positions in government bonds at different points in the yield curve, thus reducing the gross (notional) exposures by an order of magnitude or more. There is much debate about whether netting hides market risk, but we believe that for strategies such as highly leveraged fixed income arbitrage managers, the substantial exposures carry operational risks that may manifest themselves as market risks during stressed periods. Therefore, for such managers we advise that the method of netting

or collapsing trades should at least adhere to some established protocol such as the Alternative Investment Fund Managers Directive (AIFMD) guidelines, and that managers report in both netted and non-netted terms.

Another widely used practice, frequently applied in the mergers and acquisitions (M&A) space, is that of M&A adjustments. Here, consider an M&A deal where a target company accepts an offer from an acquiring company for a combination of 50% cash and 50% stock. The delta-adjusted notional value (DNV) would be halved as there is a firm cash offer accepted for half the company, and this DNV is what is often reported in managers' exposure reports. However, in such deals there is always a risk that the deal breaks and the cash portion of the deal is suddenly converted into equity, and therefore the hedge fund's net equity exposure suddenly increases substantially. This occurred for example, in October 2014, with the breakup of the AbbVie takeover of Shire Plc and many supposedly market-neutral and risk arbitrage funds were impacted.

Independent Data Verification

Rarely are the data sent by managers to investors verified by a credible, reliable, and independent party. Therefore, the exposures received by the investors are taken at the word of the manager, but while managers may be regulated and monitored by various financial bodies, the data they send cannot always be assumed to be accurate.

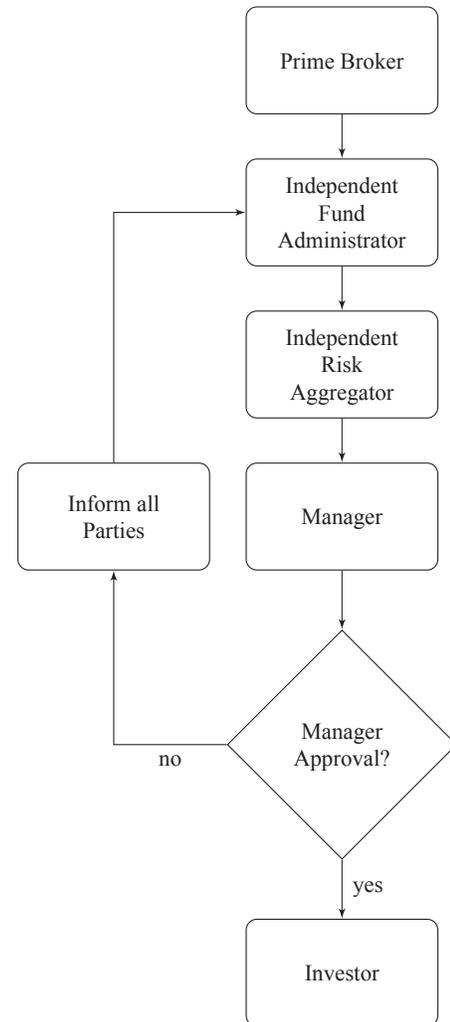
Independent or third-party fund administrators are playing an increasing role in data verification, and in our experience, although improving in their sophistication, their presence in the process is not fully utilized.

A SOLUTION

A potential template for the risk measurement, aggregation, and management of a portfolio of hedge funds is summarized by the flow chart in Exhibit 1. The approach proposes position-level data flow from the prime broker to an independent fund administrator who screens the data and then relays it onto an independent risk aggregator, who after verification and approval from the manager finally provides access to the investor. Disagreements between any of the parties involved are efficiently handled through a multi-participant discussion through, for example, a conference call. We now

EXHIBIT 1

The Core Elements of Data Flow from the Prime Broker to the Investor



elaborate further on the core elements, explaining how the approach facilitates robust risk measurement, while at the same time reducing the likelihood of dissemination of the fund manager's intellectual property.

Timely and Granular Data

Granular security level data facilitate the most complete analysis of market risk. For example, investors can determine the delta-notional exposures for equities, the exposure to yield curve flatteners or steepeners in the fixed income space, non-netted exposures, non-M&A-adjusted exposures, and so on.

Moreover, the data should be provided by the fund administrator at regular time intervals, at a time period commensurate with the holding period of the fund. This is important because the holdings within a portfolio can change significantly over a period of time. The time periods are often characterized by the hedge fund strategy and could be days for a Commodity Trading Advisor (CTA) or months for a long-biased equities fund. In order that the investor can take action to mitigate unwanted risks brought on by the manager, for example, style drift or outsized aggregate exposures, the exposures at a given time must be known.

Clearly, the larger the gap between the trading frequency and data reporting frequency, the more vulnerable any risk management process.

In some cases, fund managers feel comfortable only when they directly upload the data to the platforms. In that case, we advise that the fund administrator provide an official “stamp of approval” for each upload.

Should managers resist disclosure of granular data, then we suggest that the data be provided in standardized units by the fund administrator. Some of the increasingly adopted standards include the following:

- *options*—delta-adjusted, net exposure
- *rates*—duration-adjusted to 10-year equivalents
- *FX*—relative to US dollars

We suggest that the Open Protocol Enabling Risk Aggregation (OPERA) guidelines, recently adopted by the Hedge Fund Standards Board (HFSB), are a good starting point for reporting standardizations.

Independent Fund Administrators

A key point in this process is the trust bestowed upon the fund administrator to supply accurate data. Sophisticated risk measurement and management are dependent on having accurate and dependable data. In our experience, for the more complex portfolios, the fund administrators often require guidance from the prime broker and the manager in order to correctly interpret position-level data, thus potentially raising some doubt about their independence. Clearly, the extent to which such guidance is provided should be understood by all parties.

Independent Risk Systems or Aggregators

Third-party risk aggregation platforms are a growing area of the fintech space. Their main functions are the storage and aggregation of data from managers but also analysis tools for performance and risk modeling.

The platforms have the ability to operate independently of the manager by receiving data through a fund administrator. The platforms also have features to protect the security of the data they hold. These features include controlling both the granularity of the data and the analytics accessible to users (investors) and, for web-based interfaces, an idle-time limit after which automatic log-off occurs. As one would expect, strict and often custom non-disclosure agreements (NDAs) are signed by the aggregator, thus giving managers more comfort. Another benefit from a manager’s perspective would be that a centralized depository for their confidential data is used as opposed to the forwarding of identical data to multiple investors.

Investors can, through the risk aggregation platform, aggregate across all the managers in their portfolio and, depending on the software capabilities, perform the usual “itinerary” of risk management analytics. Typically, these include determining aggregate exposures to asset classes, sectors, geographies and portfolio sensitivities to various risk factors, such as equities, interest rates, credit spreads, performing scenario stress tests, and quantitative risk metrics (VaR, factor exposures).

Inclusion of Non-Traditional Hedge Funds

During recent years, there has been a substantial growth in hedge funds that take highly idiosyncratic risks and do not fall into the traditional hedge fund buckets. The growth in these non-traditional (often private equity-like) hedge funds is attributable to a number of factors: the search for positive returns in a low-yielding environment, structural changes in the capital markets as a result of regulation (e.g., bank deleveraging as a result of the Basel accords), as well as the familiar objectives of portfolio diversification and risk mitigation.

Examples of some of these strategies include catastrophe reinsurance, regulatory capital relief trades for banks, and direct real estate exposures. Such investments

are not in general composed of publicly listed securities but more likely illiquid assets.

The valuation of such assets is clearly fundamental to risk measurement and is ideally performed in conjunction with an independent valuation advisor.

The assets also often have very little direct historical data and are therefore not amenable to the standard risk analyses (VaR, volatility, stress tests, sensitivities) nor to third-party risk aggregation platforms. To complicate matters further, each manager has a unique way of viewing their underlying risks, and as a result, the exposure and risk reports are highly idiosyncratic. Finding a unified approach for the accurate risk measurement and aggregation is clearly a complex problem.

A step in the right direction would be a community-wide agreement upon a framework to report the core exposures and risks (e.g., asset class, sector, geographic exposures, and leverage). This has somewhat been achieved by the OPERA protocol.

The OPERA initiative was founded in 2011 by a working group comprising a number of leading financial institutions. The objectives of OPERA as stated in the user manual is to “provide standardized procedures for the calculation, conveyance, collection and collation of financial risk information.” An Excel template for the protocol can be downloaded freely from the website. The template contains worksheets for each asset class (equities, rates, credit, converts, currencies, real assets) and each has clear guidelines on how they should be reported (e.g., sovereign bonds in 10-year equivalent exposures).

The protocol has gained popularity with hedge funds, fund administrators, and investors. Third-party risk aggregators now readily accept OPERA reports as a data source. There are limitations, however, the main one being that OPERA reports are not formatted to handle position-level data and therefore can never fully provide a complete description of risk as when full positions are available.

BETTER GOVERNANCE

The proposed risk measurement and aggregation template could be further enhanced through improved governance of the underlying investments. This could be achieved through a number of vehicle structures including single investor funds (SIFs) or separately managed accounts (SMAs).

In fact, the 2009 Nobel Prize in Economics went to Elinor Ostrom and Oliver Williamson for their work in governance (Ostrom 1990; Williamson 2005). It is perhaps not a coincidence that the Nobel Committee decided to reward work in governance after the financial meltdown that occurred in 2008.

An SMA is an investment vehicle through which an investor opens an account at a prime broker or futures commission merchant (FCM) in the investor's name and provides a trading manager with limited power of attorney to trade the account on his or her behalf for a fee. An SMA gives full positional level and transactional level transparency. Consequently, the institutional investor is able to calculate the risk exposures independent of the manager, congruent to the methodology and conventions that it deems best.

Because the investor owns the assets in an SMA, the investor controls the liquidity (i.e., no lock-ups, gates, side pockets, suspension of NAV, or exit fees). The custody or control of assets also means that the hedge fund manager cannot access the cash. The SMA provides the investor with operational control and reduces the role of the hedge fund manager to trading.

The SMA would help to protect against fraud, such as the Madoff debacle. The increased oversight could also help mitigate concentration risk, strategy drift, and style drift—and thus potentially avoid a hedge fund blow-up like Amaranth (Chincarini 2007). In addition, the investor is able to select the preferred service providers, so has more ability to lower the counterparty and reputation risk.

SMAs empower the sophisticated institutional investor. As noted earlier in this article, transparency and technology go hand in hand, and effective technology is required in order to synthesize the information that is furnished to the investor. Invoking SMAs intelligently also helps to reduce the problem of fragmented information and reporting that exists in the hedge fund industry.

However, setting up an SMA requires considerable effort. Challenges to investing via an SMA include the following:

- Minimum investment is often very high
- Replication of counterparty relationships
- Some hedge fund strategies cannot be traded pari-passu

- Technology necessary to harness data to make intelligent use of the transparency (this is often underestimated)
- Operationally difficult to manage; for example, investor must perform middle- and back-office functions.

Given these challenges, the commingled fund structure will continue to be appropriate for many investments and is one that would benefit from the risk management procedures described in this work. The SMA structures would also benefit from several of the components of the proposed protocol, for example standardized risk reporting for non-traditional hedge funds and independent risk systems.

Investors can weigh the benefits against the costs of SMAs. For larger institutional investors, the benefits are very likely to exceed the costs. Smaller investors may consider investing through a fund of funds vehicle that is likely to have the capital and resources necessary to execute the proposed protocol.

ENHANCEMENTS TO PORTFOLIO RISK MANAGEMENT

The focus of this article has been on risk *measurement*, and although we believe that a robust protocol for risk measurement is fundamental to effective risk *management*, the two subjects are of course different. A comprehensive discussion of risk management is beyond the scope or intention of this article, but here we highlight a few concepts in the context of a portfolio of hedge funds, which may help to bridge the understanding between investors, managers, and other stakeholders in the space.

When considering the market risk of a portfolio of hedge funds, one can think of risk at two levels. The first level is risk with respect to the mandate for the portfolio of hedge funds, which may for example be an absolute return mandate (e.g., Libor + 300 bps) or a relative mandate (e.g., benchmarked to MSCI AC World Index). This mandate will often be accompanied by a set of guidelines that may include correlation and volatility relative to broad market indices or tracking error limits in relation to hedge fund indices. In general, the hedge fund manager's objectives (which include outperformance relative to peers of the same strategy) will be different from that of the investor. There may be other differences such as the tolerance for drawdowns, tail risk,

or exposures to specific market factors. The combination of mandate, guidelines, and unaligned objectives necessitate the formulation of the portfolio construction process for the portfolio of hedge funds, which in turn may result in risk budgets at the hedge fund strategy level. Clearly, style drift, be it in terms of unusual risk taking through greater leverage or volatility or a completely new investment strategy, could require rebalancing of the portfolio of hedge funds.

The second level is risk at the individual hedge fund level where the investor would expect that the hedge fund manager's risk personnel and processes would be sufficient. Sophisticated investors will be reassured by stringent risk processes and limits that could prevent a blow-up that may jeopardize a concentrated portfolio of hedge funds.

While the protocol described in this article would allow oversight of the risks at both levels, the data used for the risk measurement have utility beyond risk *per se*. For example, in the space of equity-focused, market-neutral funds, the investor could ascertain the fraction of risk attributable to market factors and that to idiosyncratic risk, thus demonstrating not only risk but potentially the manager's sophistication in security selection and portfolio construction, hence potentially providing a rationale for fees.

SUMMARY

We have reviewed some of the prevalent themes on the subjects of market risk measurement, aggregation, and management of a portfolio of hedge funds. We have explained why effective market risk measurement requires timely, granular, and independent data, and the application of well-thought-out risk analytics. We have suggested enhancements to the current practices that we believe will not only assist in market risk management but also assist in better operational risk management and will ultimately be beneficial to managers, investors, and the industry as a whole.

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