



Evolution in Risk Reporting: What's Next?

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The process of measuring, monitoring, and reporting risk has taken on increased importance during the past decade. In particular, the financial crisis of 2008–2009 highlighted the need for portfolio-level and firm-level risk management and hastened the pace of adoption of a formal risk management infrastructure for investment management firms.

In recent years, a big shift has occurred in how the investment management industry deals with risk. Everyone is more aware of the role that risk plays in investment decisions. In part, the focus on risk is related to recent market crises and the desire to minimize the impact of the next one. This rise in the importance of risk is often being manifested in the newly created role of chief risk officer. But for some firms, it is an ad hoc role that an individual must perform in addition to other duties. Regardless of the approach taken, most firms recognize the critical need to elicit information from all areas within the firm to accurately assess not only portfolio risk but also firm risk.

In this presentation, I will discuss investor demands regarding risk management and transparency in reporting, the risks related to alternative investments, traditional and innovative risk measures, and an overall framework for risk management.

Investor Demands

Historically, risk had been the purview of the investment management team, but gradually, the risk management responsibility has been broadened to include others within the investment firm. Regulatory pressures, partly the result of growing investor pressures, are one driver forcing the risk management function to become a strongly integrated process that incorporates all aspects of the investment management business.

Everyone—investors, managers, and regulators—is recognizing the need for increased investment analysis with robust risk measurement and monitoring capabilities. The successful risk management process must take a broader look across all asset types, perform deeper analysis on the details behind

investments, and provide more frequent analysis and reporting. And because investors are demanding greater transparency and exposure reporting, such reporting must entail meaningful information across asset classes, especially for alternative investments, such as hedge funds. Better reporting is also needed to showcase where exposures are across countries, issuers, and other risk factors.

As a result, risk management today has more resources dedicated to measuring, reporting, and managing risk than in the past. For example, there is more in-house reporting to investment teams and boards that are dedicated to the risk management process. And there is a growing need for standardized functions to fulfill regulatory requirements for risk management.

Increased transparency and risk control are being sought from asset managers. For instance, many investors are giving strict guidelines to managers to manage assets and control exposures and are demanding specific reporting requirements to monitor risk. Instead of risk management being a quarterly or annual process, it is in many cases now a daily process. In the past, there was often comfort in trusting without verifying, but the trend now is definitely to trust only what can be verified. Controls play a big role in verification.

Investors are also focused more today than in the past on investment risk analysis. They are asking for more frequent and more granular performance and attribution analysis. Exposure reporting is also in high demand. Investors are seeking timely information on their full exposure to, for example, the impacts of issuer and counterparty quality on any derivative securities held in their portfolios.

Another important element of risk management is proactive risk measurement, management, and budgeting that manifests itself in forward-looking stress tests and scenario analysis. Liabilities and liquidity on both a firm and portfolio level are getting much more scrutiny. Transparency has become

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a concern as investments have become more complicated because complex investments can be viewed as a way to hide risks or a way to slice and dice risks so that they are difficult to assess. All of this demand for additional ways to analyze risk leads to the need for a data management infrastructure that is flexible in combining and recombining different levels of exposure information.

Alternative Investments

With the significant increase during the past decade in investment allocations to alternative investments—on the part of institutional investors in particular—have come numerous challenges. Investors are no longer content to take managers at their word or to view an asset class in a vacuum.

A tension has emerged in the industry between the recognition of the need for more due diligence and more transparency, especially with the current large allocations that are being made to illiquid assets, and the ability of managers to deliver a higher level of transparency. The tension is particularly acute in alternative investments, which, by and large, are not very transparent and often do not have much readily available information. This situation is improving to some extent, but investors, investment managers, and regulators are all under a lot of pressure to get a better understanding of the risks embedded in the various types of alternative investments.

At BNY Mellon Asset Servicing, we recently asked some of our clients who invest in alternative investments what they perceive to be the greatest challenges in overseeing their alternative allocations. This group consisted of asset owners (corporate, government, and not-for-profit entities) and asset managers (financial institutions). The response of asset owners was the ability, first, to do due diligence and monitoring and, second, to get underlying investment transparency. Asset managers, however, were more concerned about transparency than due diligence. The need for transparency cuts across the board. Everybody needs to understand what they are invested in.

We asked the same two groups of our clients—asset owners and asset managers—what they perceived to be the main barriers to effective risk management. The two groups, again, had different responses. The asset owners responded that the biggest barrier to effective risk management is insufficient data, which is similar to the desire for greater transparency. In contrast, the asset managers, or financial institutions, viewed uncertainty about the nature of future regulation as the main barrier to effective risk management.

Other potential barriers named by asset owners were uncertainty about future regulation, inadequate real-time risk management, and inadequate long-term risk management tools. Asset managers named insufficient expertise or knowledge in the organization as the second greatest concern, followed by a lack of transparency or insufficient data.

Risk Measures

In the industry today, many of the statistics commonly used to measure risk are volatility based: standard deviation, the Sharpe ratio, tracking error, and the information ratio. They measure the variability of portfolio returns relative to a benchmark, a risk-free rate, or a required return. The information ratio has grown in popularity in recent years, although the standard deviation of returns remains a very popular risk metric.

Those few statistics, however, are not the only risk measures currently being used in the industry. It seems like new risk measures are being created every day. Two of my favorites are the “pain index” and the “ulcer index,” which help to illustrate the point that risk is scary. People do not feel comfortable dealing with risk; measuring risk is difficult enough, but understanding what to do with the information is even more challenging.

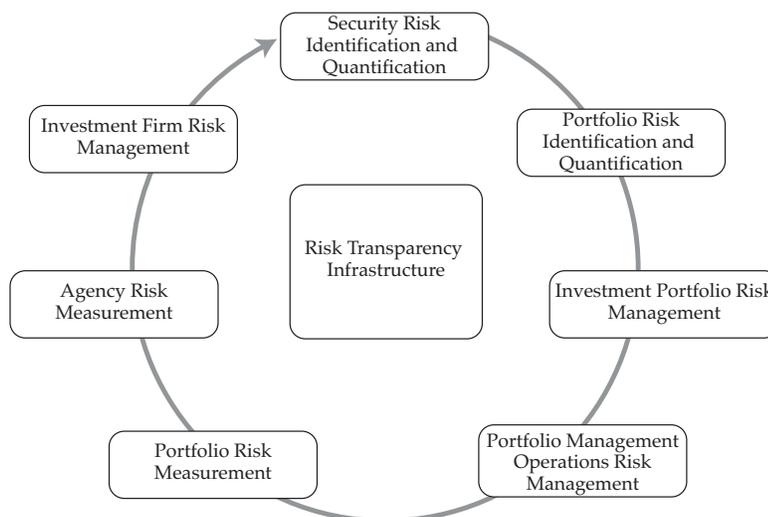
A Global Investor/ISF survey conducted in September 2010 asked investment managers to name the types of risks they were most concerned about, the areas in which risk monitoring has improved, and the areas in which they plan to make improvements in their ability to monitor risk. The answers were segregated into the following risk categories: market, regulatory, counterparty, operational, valuation, credit, litigation, and concentration. To me, this is not the most useful way of thinking about risk. Risk is a continual process, and many categories overlap. Each firm needs to define for itself the most pertinent risks it faces, not just from a quantitative portfolio perspective but in terms of overall qualitative risk.

Framework

A typical risk management framework is illustrated in **Figure 1**, but each firm can personalize the chart to conform to its risk management priorities. Risk is a component of portfolio construction—that is, security risk identification and quantification. The questions that need to be asked are, What are the risks associated with the individual securities in the portfolio, and what are the risks associated with the portfolio as a whole? The next issues to consider are investment portfolio risk management



Figure 1. Risk Management Framework



and operations risk management at the portfolio level. Other risks emerge in terms of client retention, partner retention, and agents. All firm relationships incur risk, so how are such risks minimized in terms of impact on the overall firm? Regulatory and legal risks could also be added to this framework, and certainly there are more risks to consider. The point is that risk management is a process with many overlapping parts, which is why the role of a chief risk officer can be so important. Having somebody responsible for the overall risk process in the firm who is thinking about which risks are appropriate to monitor and how to use the information collected can be invaluable.

Some of the categories of risk that investors and managers consider are portfolio risk, fundamental risk characteristics, leverage risk, *ex ante* risk, concentration risk, liquidity risk, asset/liability mismatch risk, operational risk, client retention risk, and business risk. (Note that this list is not comprehensive.)

Portfolio Risk. The theoretical underpinning of most common risk statistics is the assumption that risk equals the variability of historical returns. Higher risk demands the reward of higher returns in the form of a risk premium. This concept is the basis of the capital asset pricing model. Downside risk measures focus on the risk of losing money, but most investors and managers focus on volatility-based measures. The GIPS standards have begun to address portfolio risk by reporting standard deviations, but many investors use other measures to evaluate managers. Given the industry focus on

risk, portfolio risk is an area where the GIPS standards might continue to develop.

Fundamental Risk Characteristics. Portfolio-level risk rolls up from security-level risk. Security-level risk can be analyzed by using fundamental risk characteristics that are specific to asset classes or general across asset classes. The traditional characteristics that are asset class specific include the price-to-earnings ratio, return on equity, price-to-book ratio, fundamental beta, and EPS growth for equity, and for bonds, they include duration, convexity, yield, maturity, and quality. These characteristics may at times cut across the traditional definitions of asset classes. For example, credit quality is of interest both to issuers of common stock and to issuers of debt. Other characteristics that apply across asset classes are geographical and sector exposures.

Fundamental portfolio analysis compares the structure and risk characteristics of a portfolio or composite with a benchmark or another portfolio across time. Fundamental analysis of a fixed-income portfolio, for example, includes numerous dimensions of and interactions among the risks embedded in the portfolio. The analysis may look at leverage, credit quality, interest rate sensitivity, and yield. And it might break the analysis into such sectors as Treasuries and sovereigns, government related, corporates, securitized, and interest rate swaps.

The benefit of this type of risk analysis is that it highlights that risk is not just the market value exposure of a portfolio but is multidimensional and interrelated, which can wreak havoc not only at the portfolio level but also at the firm level.



Leverage Risk. Portfolio leverage is defined as the creation of exposure to losses greater in magnitude than the capital invested. Leverage is created through borrowing, through investing the proceeds from short sales, or through using derivative instruments. When Nassim Nicholas Taleb, author of *The Black Swan*, testified before the U.S. Congress, he discussed the use of hard, nonprobabilistic measures, such as leverage, as helpful because such measures do not change with the changes in a risk model's assumptions. For example, if a risk model is built on daily volatility observed over a period of time and that period of time happens to be a normal period with low volatility, then the model may indicate that it is appropriate to increase the risk in order to earn a higher return. In such a case, if leverage is not being monitored, a significant portfolio risk is being ignored. Thus, if the volatility breaks from the norm, the leverage in the portfolio can dramatically change the risk equation in a non-normal environment.

Ex Ante Risk Analytics. In fundamental portfolio risk analytics, beta refers to the sensitivity of returns to the market, with the market usually defined as a broad market index. More generally, beta can refer to the risk factors in a multifactor risk model. Like most risk factors, no one measure tells the whole story. The calculation of beta assumes a straight-line relationship between the data and the variable. My personal belief is that beta should not be viewed in a vacuum and that it is also necessary to pay attention to the R^2 , which indicates the goodness of the fit of the relationship between the data and the variable.

Principal components analysis (PCA) is just one type of multifactor beta analysis. PCA can pinpoint which factors are explaining most of the returns in a particular series of observed returns. Other types of risk analytics include custom models, goodness-of-fit analysis, value at risk (VaR) backtesting, historical scenarios, and market stress analysis. Looking at the same measures over time to determine how the calculated numbers change and how the pictures they create change can often lead to some very helpful insights. When the model ceases to explain the observed returns, it raises a number of important questions: What has changed—strategy, market volatility, a manager's style? This kind of analysis requires frequent monitoring in order to understand it and be able to use it effectively.

VaR is a very easy statistic to misuse. Mathematically, VaR organizes a series of returns into order from highest to lowest. For example, a 95 percent VaR means that the portfolio is expected to lose less than the VaR amount 95 percent of the time. In practice, that means that about once a month, the portfolio

should be losing more than the calculated VaR. VaR is often misinterpreted as meaning the most a portfolio is ever going to lose. Making that kind of mistake is dangerous because it can lead to decisions that are out of line with the actual risk appetite.

VaR, stress testing, and other forms of *ex ante* risk analytics are gaining the attention of regulators. The U.S. SEC now requires stress testing for money market funds, and European regulators are also beginning to mandate stress testing. *Ex ante* risk is also used for other purposes, including risk-based asset allocation and risk budgeting. This type of analysis requires a fairly sophisticated audience to be able to act on the information.

Risk Transparency. Transparency is not as much a type of risk as a process to obtain relevant data to input into other risk analyses. The puzzle of risk transparency has many pieces. Transparency is most often associated with an understanding of the underlying exposures in a portfolio—found by looking across all assets and through fund vehicles. Another goal of greater transparency is to gain a broader understanding of the investment through qualitative data—for example, knowing when an investment is valued and what the investment's fee structure and costs are. Therefore, transparency of risk exposures has significant data management implications. Even data not inside a particular investment structure, such as information in the contract about fees, gates, or lockups, are helpful and informative to capture.

Concentration Risk. If it is possible to obtain information on the underlying investments in a fund, a thorough risk analysis should attempt to drill down to identify the direct and ultimate issuer, guarantor, and obligor, as well as the exposure to each. With the continuing pace of mergers and acquisitions, however, it is a challenge to roll up all of the issuers into the actual ultimate risk. It calls for a system of data management and quality control that tracks all of the firm's relationships to ascertain the ultimate risk. Counterparty concentration and hierarchy mapping have become much more of a concern since the financial crisis of 2008–2009.

Liquidity Risk. Liquidity risk became visible to many investors only about two or three years ago during the financial crisis. Liquidity risk refers to the fact that the market value of an asset, as it has been most recently recorded on the books of the seller, might not be obtained. Thus, to sell an asset in an illiquid market will result in a price impact or a delay in completing the transaction. And the possibility of never completing the transaction also exists.



For a publicly traded equity security, liquidity risk is relatively easy to calculate using a days-to-cash metric or the average trading volume over the outstanding shares.

For alternative investments, such as private equity, hedge funds, and derivatives, liquidity is definitely a cost associated with the higher return expectations of those types of assets. The relevant liquidity risk measure is not a days-to-cash calculation but a months- or years- or never-to-cash calculation. When the markets are as volatile as they have been in the past few years, having a significant portion of assets tied up in an illiquid asset really restricts the ability to effectively manage operations.

Private equity capital calls are a very real drain on liquidity. A recent study showed that when the public markets are up, the private equity general partners (GPs) are more likely to distribute capital and that when the public markets are down, the private equity GPs are more likely to call capital.

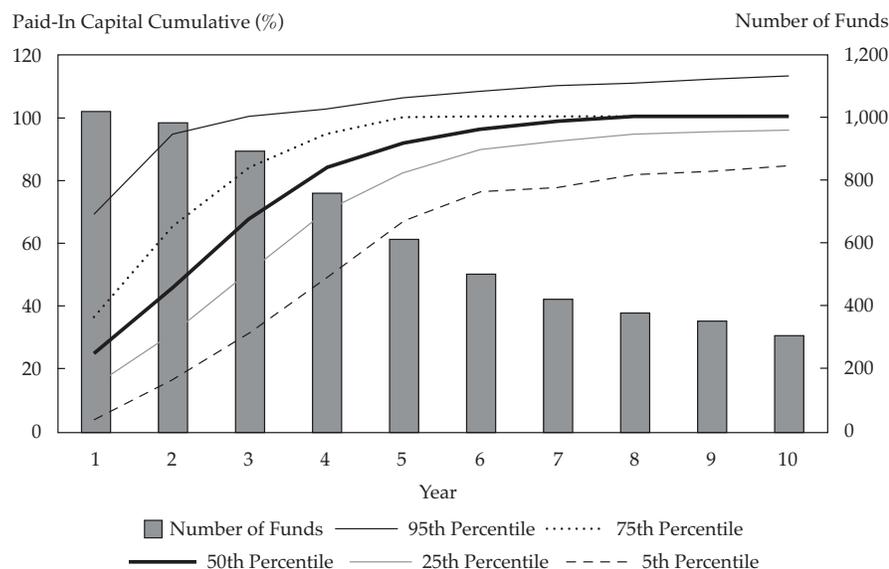
Figure 2 shows the range of capital calls, or paid-in capital, over time for a particular group of buyout funds across vintage years. The dark line is the median, which shows that most funds have drawn down all of their capital by Year 9, with the fastest-drawing funds drawn down by Year 3. This profile can be used to set some expectations around the range of funding that might be required to meet capital calls.

The trend over the past 10 or 15 years has been an increase in commitments to illiquid assets. That trend may be peaking now. Investors are starting to weigh the benefits against the risks of the illiquidity premium. Some investors are making the active decision that, over time, they will be winding down their allocation to illiquid assets. Liquidity risk, however, is not isolated in the illiquid assets; it spreads to the other, more liquid asset classes when they are forced to pick up the slack in meeting all of the liquidity demands of the portfolio.

Asset/Liability Mismatch Risk. Benchmark discount rates for valuing future pension liabilities, often reflected through a corporate bond index, have dropped steadily in 2011. As a result, more assets are now needed to pay for the expected value of future liabilities. The widening asset and liability mismatch is now a top concern of corporate plan sponsors and a growing concern for public pension plans. This risk is also sometimes referred to as "surplus risk."

Corporate pension plan sponsors are under a tremendous amount of pressure to manage their funding ratio, which is the plan's ratio of assets to liabilities. One approach to this problem is to move to a full liability-driven investment (LDI) strategy or at least to find some way to lock in the funding ratio if it is adequate. If the funding ratio is not adequate and the corporation wants to minimize the

Figure 2. Cumulative Paid-In Capital



Source: Based on information from the Burgiss Group, Private iQ, 2011.



need for large contributions to the pension, another potential solution is to position the plan to grow its way out of the problem. In order to analyze the risk of a possible change in funding status, some plans are using *ex ante* risk measures to gauge the relative sensitivity of plan assets and liabilities to changes in certain economic conditions or specific historical scenarios. This kind of analysis illustrates the effect of historical periods of significant volatility, if they were to happen again, not just on plan assets and liabilities but on the funding ratio as well. It is also possible to design one's own custom nightmare scenario of specific risk factor movements to estimate the potential impact on assets and liabilities. This kind of analysis is also relevant to insurance companies and other firms that manage assets to support specific liabilities.

Operational Risk. All firms have operational risk, which is the risk incurred in the day-to-day operations required to manage portfolios. Convergence of the investment managers' and investment owners' interests is happening throughout the risk management function, and operational risk is no exception. Because asset owners are often managing money themselves, directly or in a fund-of-funds approach, they are becoming more aware of operational risk as another dimension of risk that they need to be on top of.

The approach many people are using to assess operational risk is a dashboard. That is, they figure out what they can measure and then how they can measure it. For example, a trade status dashboard monitors the life cycle of a trade and identifies trends in trading. Other dashboards might show the status of custodian reconciliations, collateral management, the number of portfolios or composites that are finalized, and other metrics.

Client Retention Risk. Client retention risk can be managed through a framework for monitoring client objectives. This framework is a way of thinking about qualitative risks and could be expanded to cover partner risk or agency risk. The monitoring aspect begins with knowing your client's objectives and establishing ongoing monitoring to remain in compliance with these objectives and other guidelines, such as concentration limits and security restrictions. Client servicing, such as having a client communications plan and offering sophisticated client risk reporting, is also very important. The goal is to lower the risk of losing a client to another manager. With that in mind, the risk of losing the revenue associated with the client can be mitigated.

Compliance monitoring of investment objectives and guidelines is being expanded to encompass more of an exposure to regulatory requirements. We are also seeing a greater interest in socially responsible investing (SRI) guidelines, particularly for public funds and for endowments and foundations. Monitoring SRI guidelines is another risk management function that cuts across asset classes.

Business Risk. A business—or firm enterprise—risk management framework defines a firm's accountability and responsibility for risk. The risks that a firm should seek to manage include regulatory risk, firm operation risk, ethics risk, litigation risk, headline risk, and long-term firm viability risk. A governance framework for the firm should have an issue escalation process, a risk management group, a risk management culture, and a risk education and training function.

The key in regulatory risk management is keeping up with new regulation, although compliance with current regulation is already a big job. A regulation that is associated with one particular type of institution today may also be deemed relevant to your type of institution tomorrow.

Risk Monitoring Infrastructure. The risk monitoring and risk transparency infrastructure supports firmwide risk management. The key feature in the design of an appropriate infrastructure is that it monitor and control the risk measures that are relevant for the firm. The risks need to be considered thoroughly in advance of the event that triggers the risk because thinking about the firm's risk priorities in the midst of a panic is too late.

Monitoring risk is obviously a big job. It is complex and has many moving parts. But risk is also good. Upside risk is part of the puzzle, but it has to be managed too.

Conclusion

In any market environment, robust performance and risk analysis remain critical for asset owners and managers. Not only are performance, risk, and compliance analyses common, but they are also best practice. Regulatory pressures on risk management are here to stay, and investor demands for more transparency will continue to grow, thus requiring more frequent and more detailed reporting. Investors are also demanding analytical tools for alternative investments and are expecting that they will have the same level of robustness and accessibility as is available with traditional investments.



Question and Answer Session

Frances Barney, CFA

Question: What is the minimum R^2 for data to be relevant?

Barney: The minimum R^2 depends on the strategy that is being managed. For example, an index fund should have a really high R^2 . For other strategies, it really depends on how you're using the beta that the R^2 is explaining. If you're looking at a hedge fund and most of the variation in the portfolio returns is explained by a public market index, you might ask yourself if the fund is taking enough active risk for the strategy.

Question: In reference to the framework for risk management, is it possible to sum all the different aspects of risk into a single number?

Barney: I'd be very uncomfortable with a single risk number. One of the important disciplines in risk management is the recognition that any risk model is flawed. Therefore, we need to understand the assumptions and the flaws in the particular model being used. And we should be looking at multiple models and multiple dimensions to increase the chances of being able to recognize when to take a different approach based on discomfort with the current risk levels.

Question: How might we overcome the barriers we face in risk analysis?

Barney: There are different approaches and solutions to the different risk issues. For example, the solution to uncertainty about future regulation is to pay attention and talk to experts to determine what is likely to happen and how to prepare for the unknown.

For risk that revolves around a lack of transparency and insufficient data, a new industry group called "OPERA" (Open Protocol Enabling Risk Aggregation) has been formed to help hedge fund investors get better risk data from hedge fund managers.

Question: What is your view on *ex ante* risk measures?

Barney: It is always a good idea to look at *ex ante* measures in conjunction with other risk measures. *Ex ante* risk measures incorporate a lot of assumptions. And an *ex ante* measure is built on *ex post* results, in that it requires observed returns of the current holdings to be extrapolated into the future. Thus, *ex ante* is based on history and contains the flaws associated with assuming that recently observed history is a good estimate of the immediate future.

Question: When calculating risk statistics, what is the minimum number of periods needed for the statistic to be meaningful?

Barney: Statistically speaking, a robust 30 observations are needed to comfortably calculate

the risk being measured. Typically, that translates into three years of monthly returns or three months of daily returns. The jury is out, however, on the efficacy of fewer observations.

Question: How is the information from risk analytics and reporting used?

Barney: The information can be used in a number of ways. One way is in risk budgeting. Say, for example, the agreed-upon risk budget is X percent, which could be defined as tracking error relative to a policy benchmark, VaR, or other measures. That decision then affects asset allocation decisions and active management decisions. If the risk budget exceeds X percent, then the active risk needs to be reined in to move closer to the policy index.

Another way to use the information is to compare a manager with the stated mandate. The possibility that the manager might deviate from the stated mandate is a risk factor. Monitoring this type of risk can also highlight another reason, such as a change in the market.

Because there are so many risk measures and different ways to use each separately and in combination, there is no single correct way of comprehensively managing risk.