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RISK PRINCIPLES

FOR

ASSET MANAGERS

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Prepared by

Buy Side Risk Managers Forum
and
Capital Market Risk Advisors

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1. INTRODUCTION

The Buy Side Risk Managers Forum ("BSRMF") is composed of heads of risk management and chief risk officers from "traditional" asset management and investment advisory companies, *i.e.*, money managers offering mutual funds, managed accounts and other traditional investment products[1]. Its membership includes asset management firms operating in the U.S. and around the world focused on retail, high net worth and institutional clients. The group, which explores and attempts to define best practices for buy side firms, has prepared this document in conjunction with Capital Markets Risk Advisers for the purpose of setting out general principles of good risk management for use by its members. In so doing, BSRMF has drawn on the experience and expertise of its members as well as the extensive work done in the past by various groups with respect to risk management[2].

While these earlier works have been extremely valuable in fostering the development of sound risk management practices, BSRMF believes a new set of principles is appropriate at this time for several reasons. First, in recent years, the asset management industry's understanding of risk has continued to evolve as a result of market, economic and technological developments. Second, there is a growing appreciation among asset managers and other market participants that risk management is not only important in minimizing and controlling loss; it can also play a significant role in the portfolio construction and management process, where a better understanding of the relationship between risk and return can enhance performance. Finally, unlike earlier work which focused on risk issues primarily from the institutional investor, hedge fund and banking perspectives, these principles are primarily for the purpose of providing guidance to traditional asset management firms in developing and assessing their risk management programs and have been drafted from that perspective. Although they overlap in some respects with principles applicable to other types of financial services firms and institutional investors, they also differ in many ways.

1.1 Changing Risks Require Changes in Risk Management.

In recent years, there have been many market events and developments that changed our understanding of risk. Examples of some such occurrences include the following:

- The subprime mortgage meltdown, the asset-backed commercial paper and SIV debacle, the Asian crisis, the failure of Long Term Capital, the Russian debt crisis, the bursting of the technology bubble, the

1 While some "traditional" firms offer hedge funds in addition to other products, and some risk management principles are applicable to all investment products, including hedge funds, these principles are primarily directed at traditional (as opposed to hedge fund) managers.

2 See, for example, *Risk Standards for Institutional Investment Managers and Institutional Investors*, created by the Risk Standards Working Group (1996); *Sound Practices for Hedge Fund Managers* created by the Managed Funds Association (2005); *Sound Practices for the Management and Supervision of Operational Risk*, Basel Committee Publications No. 96 (2003).

failure of Enron and WorldCom, among other events, which changed our understanding of the interrelationship between various risks and how to measure and monitor them.

- The market timing scandal, IPO allocation cases, as well as numerous litigations involving improper valuations, misleading disclosures, undisclosed conflicts of interest and other fiduciary lapses, and the severe consequences faced by affected firms, all of which have increased awareness of the potential magnitude of reputational risk.

- The development of new instruments, including credit default swaps, CDOs, volatility and correlation swaps and other complex new instruments, which provided additional sources of liquidity and opportunity while also demonstrating the hidden costs of complexity, the perils of "marking to model," placing too much reliance on ratings, expected correlations and other assumptions, and the need for a more integrated approach to risk management.

- The development of new systems and technologies which make it easier to measure and track risk but which introduce new risks into the process.

- September 11, and various operational blow-ups, which changed asset managers' awareness of the importance of business continuity plans, disaster recovery and the management of other operational risks.

As a result of these and other events, thinking on risk management has evolved and no doubt will continue to do so. Today, there is a growing awareness that risk governance is an important aspect of risk management, that development of a risk conscious culture is itself a form of risk management, that risk management must be applied at both the enterprise and portfolio level, that operational risk management is at least as significant as investment risk management and that risk management is not strictly quantitative but also qualitative in nature. As a result of this broader understanding of risk, market participants are increasingly aware that risk management can no longer be viewed as the responsibility of one individual or one department; it is the responsibility of all.

1.2 Understanding the Relationship Between Risk and Reward Enhances All Aspects of the Asset Management Business

Although in the past risk management was thought of primarily as a mechanism for measuring, monitoring and preventing market loss, there is a growing awareness that it also serves a broader, more proactive purpose. The asset management business has two classes of risks: those that have alpha associated with them and those that are characterized strictly by the risk of loss. Unlike market risk, counterparty and operational risk have no return (alpha) associated with them and thus, should be minimized to the extent that is cost effective and practical. Market risk (including its credit spread component), on the other hand, does not need to be minimized; it needs to be optimized

in order to maximize a portfolio's risk adjusted return, which is a firm's principal investment function. Market risk is, in a sense, a strategic asset which, like all strategic assets, should be allocated in a thoughtful manner. A knowledgeable risk management team can help asset managers maximize risk-adjusted returns and budget risk to opportunities with the best investment potential while reducing operational and other non-investment risk in a cost-effective way. It is advisable for asset management companies to continually take into account the role of risk in portfolio construction, investment management, and other aspects of their business.

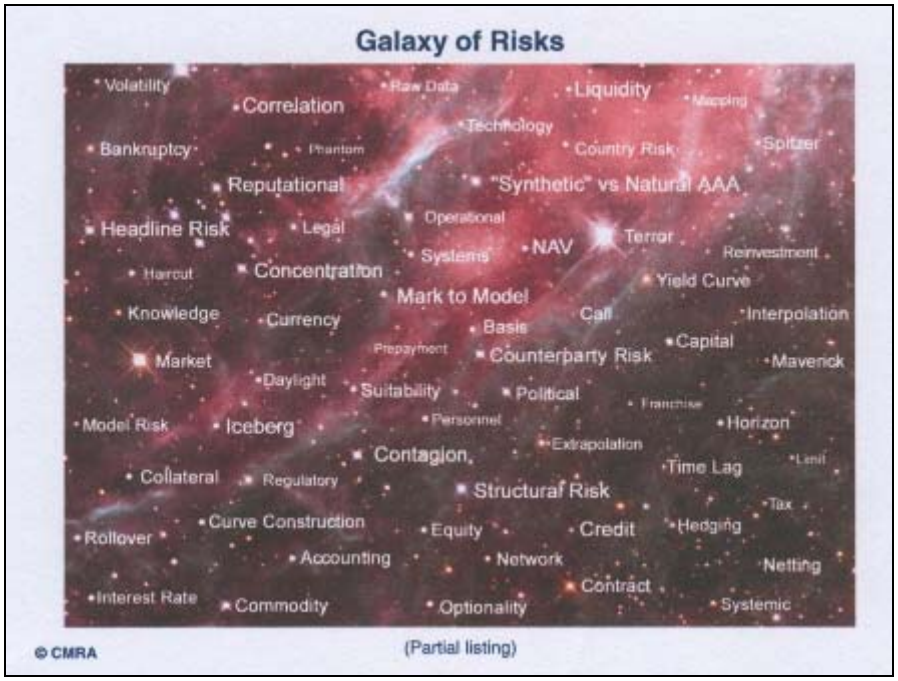
1.3 Each Asset Manager Must Consider Risk From Its Own Perspective.

While certain risks are common to all market participants, asset managers generally think about risk differently than either proprietary traders (including commercial and investment banks) or institutional investors. Unlike proprietary traders investing their own capital, traditional asset managers typically invest their clients' money according to specific investment objectives and guidelines chosen by their clients, in some cases in consultation with the managers. At the portfolio level, the major risk is not meeting client objectives. Portfolio managers need to understand how well they have performed relative to such objectives, what risk factors may lead them to deviate from these objectives, and whether the risks being taken are concomitant with the expected rewards. For portfolios designed to track a specific benchmark, there may be hard limits on deviations from the benchmark. In those cases, managers are constrained in managing portfolios. Even at the "enterprise" level, while buy side firms face comparable risks to proprietary trading firms, *i.e.*, with respect to those generic risks that are common to all trading organizations such as operational and disaster recovery risk, they also face fiduciary risk vis-à-vis their clients that proprietary trading organizations generally need not be concerned with. These include risks relating to the management of conflicts of interest between clients, fair allocations of limited opportunities, and management of operational, systems, counterparty credit, legal and reputational risks in a way that comports with the high standard of care fiduciaries are required to meet. Thus, even where a general risk management principle is applicable to all types of market participants, each asset manager must apply that principle in a way that is consistent with its own unique perspective.

The purpose of the principles set forth below is to provide a general framework reflecting the evolving understanding of risk from the buy side perspective. It is hoped that the principles will provide a useful reference for buy side firms in developing and assessing their own risk management structures and programs. Since buy side firms differ greatly one from another in terms of size, complexity, product mix, client type and legal and regulatory structures, however, what is appropriate for one firm may not be appropriate for another. These principles are in no way intended to be prescriptive. Each firm must determine whether and to what extent they make sense in light of its unique characteristics.

2. WHAT IS RISK?

Risk can be defined in many ways. In a narrow sense, risk is the possibility of loss or a bad outcome, but in a broader sense, is a neutral measure of the degree to which uncertainty exists about the outcome of an action. As shown from the picture below, buy side firms are subject to a long and constantly growing roster of risks, including but not limited to fiduciary risk, market risk, liquidity risk, counterparty and issuer credit risk, operational risk, legal risk and reputational risk.



Risk-taking is an intrinsic part of all investment businesses including the asset management business. Without risk, there would be no returns. Although risks neither can nor should be eliminated, in a well-controlled risk environment, they can generally be anticipated and managed and the adequacy of compensation received for risk-taking can be assessed, making it possible to rationalize the relationship between risk and reward.

3. WHAT IS RISK MANAGEMENT?

Risk management is the process of identifying, assessing and controlling both enterprise and portfolio risks in order to minimize unanticipated losses and uncompensated risks and optimize the reward/risk ratio. While risk management and compliance are closely related in the sense that both areas are responsible for managing various types of risks, the focus of risk management personnel generally is on market, credit and operational risk while the focus of compliance departments is on legal and regulatory risk. Additionally, a risk manager usually has a strategic role that differs from the role of the compliance officer. That said, the division of responsibilities between risk and compliance differs from firm to firm, and there is no standardized division of

responsibility. In defining risk management for purposes of these principles, the BSRMF has taken a 'holistic' rather than 'jurisdictional' approach, and, although we have not attempted to delineate all legal and compliance risks, we have addressed the major categories of risks facing asset management companies without regard to where responsibility for management of such risks is lodged.

In establishing and assessing each firm's risk management program, it is important to keep in mind that different firms face different types and levels of risks. Risk management in retail firms is different than risk management in institutional firms. Risk management for pooled investment vehicles is different than risk management for managed accounts. Firms dealing in single geographies and time zones face different risks than those operating across geographies and time zones. Firms dealing exclusively in highly liquid exchange-traded instruments face different issues than those dealing in illiquid and complex OTC instruments. Firms with a single office have different risks than multi-branch firms. Large firms have different issues than small firms. Regulated firms and firms subject to regulatory capital regimes face different issues than unregulated firms.

Even as to any single category of risk common to multiple firms, moreover, there is a broad range of acceptable risk management approaches and often no consensus as to what constitutes "best practice." Accordingly, in designing and maintaining risk management programs, it is important for buy side firms to identify the specific risks most relevant to their businesses and to monitor how those risks change over time. Equally important is the development of risk management programs that are achievable, not aspirational, in the context of a particular firm, taking into account the nature of its products and clients, as well as their size, complexity, culture and resources. The most elaborate risk management program will fail if it doesn't fit the organization or is beyond the organization's ability to implement. When it comes to buy side risk management, one size will never fit all.

4. SUMMARY OF THE RISK PRINCIPLES

The following principles address issues that are typically relevant to buy side firms. For ease of reference, they are divided into three sections:

- The Governance section contains risk principles relating to organizational structure, and oversight mechanisms. It addresses the importance of independent controls, segregation of functions, senior management involvement in risk management and oversight and adoption of appropriate policies and procedures;

- The Investment Risk section contains risk principles relating to the need for various risk controls at the portfolio level. It addresses market risk, liquidity risk, leverage, valuations and other aspects of investment risk; and

- The Operational Risk section contains risk principles relating to various types of risks that occur in the ordinary course of business and in disasters. It addresses the importance of identifying, assessing, and monitoring these risks, putting in place adequate systems and minimizing manual processes, managing counterparty credit risk, and assuring business continuity in a disaster.

These principles are offered as a guide to boards, trustees, senior managers and risk personnel who are developing and evaluating their risk management structure. The degree to which any particular principle is critical to any particular firm, however, will, as explained above, depend on many factors, and each firm is well-advised to carefully consider its particular risks and the most effective way to address them.

5. GOVERNANCE PRINCIPLES

One of the keys to effective risk management is a risk governance structure that provides appropriate senior level oversight, segregation of functions, independent control groups and organizational checks and balances within a risk conscious culture. Principles relevant to risk governance are set forth below.

5.1 Effective Risk Governance is an Important Component of Effective Risk Management.

Risk governance refers to the creation of checks and balances through organizational structure. Although risk governance structures will vary depending on the size and complexity of each organization, effective risk management generally requires:

- Establishment of organizational checks and balances, including an appropriate segregation of front/back and/or middle office functions; [3]

- Creation of a culture in which understanding and managing risk is everyone's responsibility;

- Independent control groups, including, where possible, a risk manager[4] reporting and/or having access to the CAO, CEO, Board, Executive Committee or the like;

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3 In an asset management company, portfolio management, research and trading are typically front office functions, while customer support, account opening and documentation functions are typically middle office functions (to the extent a middle office exists), and operations and systems are back office functions.

4 We note that, according to a recent survey of mutual funds conducted by the Investment Company Institute ("ICI"), "[t]he vast majority of mutual fund organizations do not appear to have established the position of CRO to oversee the organization's risks," although there is a growing trend towards creating such positions. ICI, "Chief Risk Officers in the Mutual Fund Industry: Who Are They and What is their Role Within the Organization?"

- Senior management and board level understanding of risks, definition of risk tolerances, and setting of risk management and ethical tone;

- An organizational structure in which risk management roles and responsibilities are clearly defined, including written policies and other procedures identifying the specific people within the organization who are authorized to approve various actions, make exceptions to various policies, etc.

5.2 Segregation of Functions Provides a Key Check and Balance.

Asset management companies should be organized in a manner that provides appropriate checks and balances. This necessitates the segregation of control functions from line functions as well as the segregation of front office functions from middle/back office functions to ensure independent verification of trade details, valuations, etc.

Experience has shown the importance of adequate segregation of investment and support functions. Depending on the size and complexity of the organization, as well as its culture, this may necessitate dividing responsibilities between a front, middle and back office or in the alternative, a front and back office only. From a control perspective, the existence or non-existence of a middle office is not particularly important. What is important is that the front office person responsible for bringing in new clients and/or entering into transactions, *i.e.*, the marketer, portfolio manager or trader, is not the person (or the subordinate or superior of the person) responsible for determining the acceptability of the client or counterparty from a credit perspective, or for checking and entering full trade details, confirming, comparing and settling the trade, valuing the trade initially and on an ongoing basis, monitoring the risks attributable to the transaction (consistent with the risk measurement system that has been established), and determining whether it is acceptable to exceed established limits without participation of various control groups.

Appropriate segregation of functions requires that trades be verified, confirmed, compared, valued, etc. by people other than traders and that independent checks and balances exist at every stage of the process to prevent intentional or unintentional misstatements and other errors to remain unresolved.

5.3 Understanding and Managing Risk is Everyone's Responsibility.

While designated risk management professionals play a significant role in managing and controlling risk, risk management is much more than policing and enforcing limits. Viewed in the broadest sense, risk management is the responsibility of all. Employees at every level must be cognizant of risks and willing to do their part to make sure those risks within their sphere of responsibility are managed in a manner that is consistent with the firm's policies, disclosures provided to clients as well as client guidelines. Even the most detailed and sophisticated risk management programs are unlikely to be effective in the absence of a risk conscious culture.

- Boards of Directors, trustees or other governing bodies have a responsibility to understand the major risks applicable to their firms and approve and periodically review the firm-wide risk management framework, including how risk is to be identified, assessed, monitored and controlled.

- Senior management is responsible for overseeing the establishment and implementation of a risk management framework, including policies, procedures, systems and methodologies, and for assuring they are complied with. A management that considers the risks attributable to new products and strategies before they are approved for first use and periodically thereafter, that sets risk tolerances at the enterprise level and makes sure they are adhered to, and that receives information on an ongoing basis sufficient to enable it to anticipate problems and make midcourse corrections, is a management that is less likely to encounter the types of problems, including unanticipated losses, reputational and operational blow-ups, style drift, and guideline breaches, that have caused losses to investors and buy-side firms in the past.

- Line managers are responsible for complying with applicable policies and procedures and should be evaluated on how well they do so.

- Portfolio managers are responsible for maintaining levels of portfolio risk consistent with representations made to clients and/or required by client guidelines. (Risk levels should be monitored with a view to preventing both insufficient and excessive risk-taking.)

- Operations personnel are responsible for adhering to operational policies and procedures to control risk.

- Control groups are responsible for measuring and monitoring risk and for conducting independent reviews of compliance with risk management and other policies.

5.4 Independence of Control Groups From the Line Organization is a Good Check and Balance.

Control groups play a vital function in asset management businesses. These groups, including risk management[5], credit, legal, compliance, financial control and internal audit can be centralized or decentralized, and can be structured in various ways, depending on the size and complexity of the organization and the range of products traded.

Regardless how they are structured, control groups need to have sufficient independence to be able to perform proper monitoring. This generally means that they should report outside the business lines they are charged with monitoring, and possibly to the board, the CEO or at other very senior levels to assure proper stature in the firm as well as access to key decision makers.

5.5 Independent Risk Management is an Important Control.

While a dedicated risk management staff may not be feasible or appropriate for all firms, a knowledgeable, skilled, risk manager ("CRO") reporting and/or having access to the CAO, CEO, Board, Executive Committee or the like can be an important component of effective risk management. Regardless of reporting lines, a mechanism by which the opinions of the risk manager can be freely communicated to senior management and the Board can be a valuable component of effective risk management.

Although in some firms the CRO serves primarily as a monitor and enforcer of limits, a broader, more proactive role for consideration of risk is beneficial. This might entail independent risk personnel considering risk on both an enterprise-wide and discrete basis, coordinating the periodic identification of risks by various business groups, as well as providing input into investment strategy, risk budgeting, portfolio construction, etc. on an advisory basis. Alternatively, the proactive aspects of risk could be separated from the monitoring and compliance aspects of risk management, with the former functions performed by front office personnel and the latter performed by independent risk managers. Either way, it is useful to consider whether risk is being taken intelligently and strategically with a reasonable expectation of being rewarded. The goal is not to eliminate risk, but rather to identify and understand risks being taken and insure that the risks retained are well understood and well managed.

Another role of a CRO is to identify opportunities where risk can be laid off or transformed. Some firms, for example, are more skilled at managing market risk than operational risk and might elect to outsource complex, operational intensive risk and take on direct market risk instead. Others are more skilled at managing credit risk than market risk, etc.

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5 Risk management typically includes risk monitoring and control functions as well as a strategic function. In some firms, these functions are combined in a single organizational unit; in other firms, they are separate. Thus the degree to which risk management should be considered a control group varies from firm to firm.

The CRO is also generally a key member of senior management and can add substantial value by briefing line managers on evolving practices and new tools as well as systemic risk themes as they evolve.

The CRO should oversee the creation and implementation of written risk policies that are clear and realistic rather than aspirational. While line groups and other control groups, including Legal and Compliance are involved in creation of some policies, it is usually the CRO who insures that risk policies adequately address the risk issues relevant to the particular firm, that consistent risk policies are adopted throughout the organization, and that they are followed and updated on both a periodic basis and as circumstances change (*i.e.* large market moves, crises, problems with competitors, changes in regulations, etc.). One of the most important roles of effective risk policies is to clearly identify exceptions and establish appropriate escalation procedures, and related documentation.

5.6 Acknowledging and Understanding Fiduciary Responsibilities is Crucial to Managing Risk.

Fiduciaries have a legal obligation to act in the best interest of their clients, to treat all clients fairly and to meet a very high standard of care. For buy side firms acting in a fiduciary capacity, it is important that the nature and extent of their fiduciary duties be clearly understood by employees and clients alike. To accomplish this, fiduciary obligations should be clearly spelled out in applicable investment or management agreements and other legal documentation, and understood by all relevant parties. Equally important, employees need to be cognizant of their fiduciary obligations and to consider those obligations in their ongoing decision-making. If a particular action or decision would benefit one client or class of clients over another, or other conflicts of interest exist, such action, decision or conflict should be considered from a fiduciary risk perspective and appropriately disclosed and or resolved. The incorporation of a fiduciary mindset into a firm's culture is itself a risk control.

It is also important for fiduciaries to remember that placing client money with or out-sourcing to external advisers and sub-advisers, administrators or other third party service providers does not extinguish the fiduciary obligation owed to clients. Accordingly, it is advisable that third party and outsourced relationships be reviewed and managed so as to assure that fiduciary issues are identified and fiduciary obligations are met.

5.7 Senior Management's Establishment of a Risk Conscious Culture is a Component of Effective Risk Management.

One of the most important risk controls a buy side business can have is a risk conscious culture in which risks are well-understood, tolerances are clearly defined and risk/return tradeoffs are considered. Creating a risk conscious culture requires conscious effort by senior management. In addition to determining and communicating their risk tolerances, senior managers set the ethical and fiduciary tone for the organization. Whether or not this necessitates the adoption of a formal ethics policy (as is legally required under some regulatory schemes) or a less formal but equally rigorous articulation of values, effective

risk management involves having senior management define both the risk profile and values of the organization, communicate them to employees at the outset of the employment relationship and periodically thereafter, and require that those values be adhered to at all times by themselves and their employees.

5.8 Written Policies, Procedures, Ethics Codes, Guidelines and Documentation Should be Clear, Unambiguous and Achievable. Say What You Do and Do What You Say.

Asset managers and investment advisers are in many cases legally required to adopt written policies, procedures and ethics codes. Even where not legally required, written policies and procedures and formal ethics codes have become increasingly common for asset management firms. These are useful risk management tools so long as they are realistic rather than aspirational and so long as they are actually followed. It is less risky to adopt policies and procedures that are realistic, even if flawed, than to adopt perfect policies and procedures that cannot realistically be adhered to.

In addition to written policies and procedures, asset managers must adhere to investment guidelines provided by clients or disclosed in fund or account documentation. Because of the fiduciary and legal significance of staying within the relevant guidelines and disclosures, it is important that these documents be clear and unambiguous on their face, requiring little or no interpretation on the part of the firm. In addition to a legal review, guidelines and disclosures describing investment strategies, restrictions, etc. warrant careful review by affected business areas to be sure that each affected business unit has the ability to comply with such guidelines.

5.9 Formal Exception and Escalation Procedures are Important.

In a complex business environment, operational problems, limit breaches, etc. can and do happen and exceptions from established policies and procedures are occasionally necessary. In order to limit risks attributable to such exceptions, it is helpful to identify who within an organization has exception authority, how long various exceptions can exist, who in the management chain needs to be apprised of exceptions, and what documentation needs to be kept. It is also useful to determine in advance what exceptions, particularly those involving investment guidelines should be brought to a client's attention, and the time frame within which to do so.

5.10 Reputation Risk is a Critical Factor in Asset Management Businesses and Must be Carefully Managed.

In fiduciary businesses, reputation is critical. History has shown that the harm caused by reputational risk can be grossly disproportional to the injury caused to investors by matters giving rise to that risk. Sources of "reputational" exposures are present in virtually every facet of a firm's business and every business/client relationship a firm enters into. These issues must be evaluated on a continuing basis.

To prevent problems from developing, senior management must articulate, adhere to (and require others to adhere to) clear ethical standards, and create a risk conscious culture.

Asset managers must always remember that they are fiduciaries. To the extent a written ethics statement is in place, it should address how key conflicts are handled so as to control conflicts between the interests of multiple clients and the interests of the firm and its employees.

5.11 Employee Education is Critical to a Risk Conscious Culture.

Depending on the applicable regulatory framework, many asset managers have a legal obligation to provide ongoing education to their employees with respect to ethics and compliance issues. Even where education is not legally required, it is a critical aspect of developing a risk conscious culture. Employees need to be aware of what it means to be a fiduciary, what legal, compliance, and risk management issues are relevant to particular departments and the firm, and how the firm chooses to deal with them as well as to understand the particular business issues applicable to various functions and how they change over time. The better employees understand the risks attributable to their businesses, products and functions, the more likely they are to control them.

5.12 It is Important to Determine & Track Firm Risk Tolerance.

To the extent deemed desirable, every organization should decide its risk profile and tolerance and whether or not a limit structure is appropriate. The level of aggregation for firm metrics and house limits vary by firm as do concentration limits.

Risk exists at both an 'enterprise' and portfolio level. Both are important but lend themselves to different metrics. Whether or not it is desirable to aggregate portfolio risk is a firm by firm issue. Whether to aggregate market and concentration risks at the enterprise level is a controversial issue, with no consensus on "best practice." It is generally agreed, however, that aggregating counterparty exposure across rpducts (equity, debt, securities lending, etc.) and other relationships with the lender is also a vital part of assessing overall risk.

Whatever approach is taken, risk exposures should be measured and managed and reported on a regular basis as well as when significant market moves occur.

5.13 Consideration Should be Given to The Market, Compliance, Operations, Legal and Systems Risks Posed by New Products and Strategies Prior to Launch.

The asset management world is constantly evolving and new products are being developed. Written policies regarding new product development and launch can reduce

risk. The approach that is most often used is a new product committee that typically includes representatives of the front office, operations, systems, risk management, legal, and financial control. Each member is responsible for identifying issues raised by the product within his/her area of responsibility and making sure that these issues are satisfactorily resolved in advance of approval and first use of the product. The decision whether to trade a new product and how to address whatever risk, legal, systems, operations or other issues it raises should be considered and resolved prior to launch of the product.

6. INVESTMENT RISK PRINCIPLES

In contrast to proprietary traders who establish their own risk tolerance, in asset management firms, responsibility for establishing investment guidelines and risk profiles usually is the responsibility of the client, in some cases in consultation with the manager. Moreover, for those investment portfolios that are measured versus a benchmark rather than on an absolute return basis, a key investment risk is that performance will fall short of the benchmark. Accordingly, asset managers are often judged by the variability of returns relative to the benchmark and therefore risk is also often tracked relative to the benchmark. Despite these differences, there are various risk management principles that are relevant to investment risk oversight in asset management companies.

6.1 Investment Performance Should be Measured and Monitored

Performance analysis is an important facet of investment risk management. Every portfolio should have a defined benchmark or other objective and should be monitored against that benchmark or objective. Performance attribution should be undertaken to isolate the factors that have contributed to under or over performance.

6.2 Investment Risk Should be Measured and Monitored.

Regardless whether risk tolerances have been selected by the client or asset manager, various metrics should be considered to measure and monitor investment risk. Some common metrics include standard deviation, tracking error (standard deviation of the difference of returns between a portfolio and a benchmark), expected shortfall, downside semi-standard deviation, and value at risk (VaR)[6]. While each metric is useful, none tells the entire story. Thus it is useful to employ a combination of metrics.

Measuring risk can be done on either an ex post or ex ante basis. Both can be important to a robust approach. Where back-testing is used, expected returns, risks and correlations should be updated and reassessed based on comparisons of risk and returns to what back-tests have forecast. Risk attribution should also be performed in a manner consistent with the methodology used for performance attribution.

Once a framework for measuring risk is established, some firms may find it useful to allocate a risk budget and to track performance per unit of risk budget. When VaR or other risk budgeting metrics are used, consideration should be given to tracking and setting goals based on a return to VaR or other metric chosen.

6.3 Liquidity Risk Should be Measured and Monitored.

Liquidity risk is another key element of market risk that requires significant attention. There are two key components of liquidity risk:

- The liquidity of individual instruments and the implication of such liquidity for pricing.

- Any mismatch between the liquidity of the portfolio versus the liquidity provisions offered to investors.

There have been many high profile problems recently and over time (including freezes in the asset-backed commercial paper, CDO and subprime mortgage securities markets as well as so-called "break the buck" concerns involving money market funds triggered by "Kitchen Sink bonds" in 1994 or SIV's more recently) where the need to fund redemptions and/or margin calls precipitated losses and failures at funds trading illiquid and longer dated securities. For this reason, measuring and monitoring liquidity risk is an important aspect of risk management.

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6 VaR is widely used in banks and other "sell side" firms. For example, 99% one-day VaR would be -3.5% if the distribution of one-day returns on the investment was such that 99% of the time, the return was expected to be -3.5% or more. When used by an asset manager whose objective is benchmarked, relative VaR expressing behavior versus the benchmark is used. Thus a $99 one-day relative VaR would be -3.5% if the distribution of one-day returns was such that 99% of the time, the difference between the return on the portfolio and the return on the benchmark was expected to be -3.5% or more..

6.4 Concentration Risk Needs to be Tracked and Understood

Concentration risk can affect a portfolio in several ways. A concentrated, undiversified portfolio has unique risks inherent in its structure. In addition, large concentrations in individual instruments can make liquidation at mark-to-market prices difficult if those mark-to-market prices are based on typical transaction size and do not reflect the size of the position. As a result, mark-to-market values can differ significantly from liquidation values.

In addition to concentration risk at the portfolio level, asset management firms face concentration risk across portfolios with respect to both individual investments and strategies. Excessive concentrations across portfolios and excessive exposure to particular factors (value vs. growth or vintage for example) have the potential to put a firm's franchise at risk and need to be tracked and understood.

6.5 Risks Attributable to Leverage Should be Tracked and Understood.

Leverage can be defined in a variety of ways. The most commonly used definitions involve borrowed money. However, instruments such as options have 'embedded leverage' and instruments such as futures create leverage due to the way they are margined. One common definition of leverage decomposes every instrument into its effective notional long and short components. The total value of the longs plus the total value of the shorts is then divided by the net asset value to compute leverage. In view of the many possible meanings of "leverage," it is important to define and describe to clients how a particular firm is using the term so that clients will have a clear understanding of what is being communicated.

Regardless how leverage is defined, it is important from a risk management perspective that the incremental risks to a portfolio attributable to leverage be understood, tracked and controlled.

6.6 Client Risk Tolerances and Expectations Should be Known and Monitored.

To the extent possible, every asset management firm should be aware of its clients' risk tolerances and expectations. Risk tolerances and expectations are typically derived from explicit quantitative and qualitative client guidelines as well as written and oral representations made to clients by asset managers in formal disclosure documents, marketing presentations, RFPs and the like. Guidelines and expectations warrant close scrutiny by asset managers and clients should have a clear understanding of the degree to which asset managers are or are not willing to take responsibility. Every effort should be made to ascertain whether or not asset managers have the capacity to monitor guidelines and expectations before agreeing to do so.

Whatever client tolerances and expectations are monitored, asset managers should consider tracking the lower bound of client risk expectations as well as the upper bound. For example, marketing materials that say "we expect the standard deviation to be in the range of 4-6%," can be equally concerning to a client when the portfolio is underperforming and the standard deviation is at 2% as when it is at 7%. Clear procedures should be put in place for dealing with portfolios that are approaching various tolerance parameters or guideline breaches. These might include escalating discussions with clients, senior management, and others as parameters warrant, hard or soft limits, and hedging techniques.

Just as portfolio managers generally make it clear that they cannot promise a given level of return in a risky portfolio, so too should they avoid promising a specific outcome with regard to a given risk statistic. A manager can promise to keep ex ante risk measures at certain levels, but it is necessary to have clear client communication about the possibility that ex post risk measures can vary from the desired outcome.

6.7 Valuation Methodologies Should be Fair and Consistent.

Valuation risk is a subcomponent of investment risk that is key for asset managers because inaccurate valuations result in incorrect NAVs, potentially causing unfair treatment to one set of investors versus another, and possibly inflating manager incentive compensation. Investors who buy in at inflated prices or redeem at deflated prices are unfairly disadvantaged. Fair and accurate valuations are essential.

The difference between how reasonable people choose to value complex instruments can be substantial and can actually be more significant than a 1 day VaR. New accounting and disclosure requirements will heighten awareness and scrutiny of these issues. It is important to ensure that the valuation methods used to price instruments traded are not only fair but also consistent with best practices as well as all applicable laws, regulations and accounting standards. Valuation methodologies should be consistently applied and verifiable. Valuation policies and practices should incorporate the concept of "fair value" with particular attention to firms operating across time zones and portfolios with geographic diversification.

In order to achieve fairness and consistency, asset managers often use a variety of objective third-party sources to price instruments in client portfolios. These sources include (1) market quotations if readily available and (2) various independent pricing and data base services. In the absence of such sources, valuations may be determined by using pricing models based on verified assumptions, or other techniques. Otherwise, securities and assets in a client's portfolio are valued at "fair value" as determined in good faith by designated decision makers within the organization.

A valuation committee can provide important supervisory oversight of the firm's procedures for valuing portfolio instruments. A valuation committee is often responsible for (i) approving overrides of prices, (ii) determining what valuation methodology is appropriate in the case of securities for which there are no readily available market

quotations, or for which special circumstances[7] make the use of readily available market quotations inappropriate, (iii) approving models and the assumptions to be used in connection therewith, and (iv) determining fair value for securities for which none of the methods set forth above is deemed to be appropriate.

6.8 The Use of Various Statistical Tools and Avoidance of Over-Reliance on Any Single Statistical Tool is Desirable.

No one statistic suffices to describe complex investment risk in its entirety. Each metric has its strengths and weaknesses. For example, VaR tells how much you could lose every day or every month, but is not indicative of potential cumulative loss. Standard deviations of return tell you about the past, not the future, and do not take into account the impact of liquidity, bid/offer spreads, frequencies of marks to market, etc.

A risk manager looking at a single metric can get a distorted picture of risk by focusing on a single risk element. It therefore may be advisable for asset managers to avoid over-reliance on any single statistic. They should instead use a variety of statistics that quantify different aspects of investment risk.

6.9 Stress Testing is an Important Tool in Analyzing Risk.

Whatever metrics are selected for measuring portfolio risk, stress testing is an extremely useful part of the risk measurement tool kit. Stress testing can be done in various ways, some of which are extremely quantitive and data intensive, and others of which are more approximate. Whatever method is chosen, understanding a portfolio's sensitivity to market changes is a key element of effective risk management. Even when a portfolio is constructed by bottoms up stock picking and hugs its benchmark sector weights tightly, anticipating the potential impact of trends or events such as interest rate shifts, volatility changes, correlation changes, credit spreads widening, etc. can be extremely useful. It can also be useful to stress test against various themes (*i.e.* commodity prices, China, etc.), as well as to look at historical crises.

6.10 Capacity Should Be Taken Into Consideration in Accepting New Investments and Allocating Opportunities Among Existing Investors

Many less liquid opportunities are of limited size. Accordingly, there is a limit as to how much money can profitably be invested in a limited opportunity as well as an issue as to how to allocate limited opportunities among existing investors. It is important to keep capacity issues in mind in marketing products and strategies and to equitably share limited opportunities with existing investors.

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7 "Special circumstances" might include ownership of a very large or illiquid position, or other factors that, in the reasonable judgment of the Valuation Committee, would likely make market quotations or the prices obtained from independent pricing and database services inadequate measures of the value of a position.

6.11 Issuer and Counterparty Credit Risk Should be Tracked and Managed on an Aggregate Basis

There are two types of credit risk that are relevant to asset management companies:

- Issuer credit risk is the credit risk attributable to individual securities;
- Counterparty[8] credit risk is the risk attributable to the downgrading and/or insolvency of a counterparty.

In dealing with issuer credit risk, asset managers typically rely on either rating agencies' assessments where available or their own internal rating systems based on a combination of internal and external analyses. The degree to which independent issuer credit analysis is appropriate differs from firm to firm, depending on the nature of the instruments traded, size, resources and other factors. For firms involved in evaluating the creditworthiness of unrated issuers of equity, consideration should be give to the newer equity-based credit exposure measurement tools as well as the credit default swap market. In evaluating the creditworthiness of unrated debt issuers, the type and maturity of instrument (*i.e.* 3 year bullet, 5 year inverse floater, subordinated debt, etc.) also needs to be considered.

Counterparty credit risk is the risk of loss attributable to changes in the ability of counterparties to meet their financial obligations. Exposure to individual counterparties may be present in many different parts of an organization. For example, an asset management company may trade, do repos and securities lending with, and buy debt and equity issued by, a counterparty with whom it has outstanding derivatives transactions, and who also serves as its administrator. Although it is difficult to develop a comprehensive approach to managing counterparty credit risk, consideration should be given to tracking this risk on an aggregate basis. Additionally, it should be noted that credit exposure consists not only of today's exposure but potential future exposure. A $100MM, 10 year interest swap, for example, will likely have a negligible mark-to-market at inception, but the mark-to-market can grow significantly over a 10 year period. For this reason, firms should consider including potential future exposure as well as today's exposure when assessing counterparty risk.

In addition, firms might consider whether their counterparty risk measures for collateralized transactions should include:

[8] A counterparty is an obligor on whom a firm relies to fulfill contractual or financial obligations. In the normal course of its business, a firm deals with various types of counterparties, including but not limited to distributors, custodians, trustees, administrators, prime brokers, securities dealers, derivatives counterparties, repo counterparties, securities lending counterparties, and external advisors and sub-advisors.

- The bid/offer spread in a "normal market" (assuming mid point marks are being used)

- The liquidation incremental bid/offer spread that might be incurred if they were to unwind under stress conditions.

- The type and frequency of interim collateral exchange arrangements intended to lower exposure.

- The 5-15 days that in practice it might take to deal with OTC defaults and the potential impact of market changes during that time.

7. OPERATIONAL RISK PRINCIPLES

In addition to the risks attributable to an asset manager's governance and investment risk management, there are various types of operational risk that need to be addressed. Set forth below are various principles that apply to the management of operational risk.

7.1 Operational Risk Should be Measured and Monitored.

Operational risk includes all aspects of errors and mistakes that can be made in the ordinary course of business and well as in a disaster. It is important to have adequate monitoring and tracking of all elements of back office operations that can go wrong. This includes fails, reconciliation differences, customer complaints, guideline breaches, systems issues, etc. The key to effective operational risk management is to create a process that tracks the various elements of operational risk over time, identifies trends that could be an early warning sign of trouble and to implement an exception/escalation process that ensures that problems that are significant, large, aged or growing are dealt with at increasingly higher levels of management. Manual processes are generally more likely to cause operational problems than automated ones which have been thoroughly tested. Therefore, they should receive a heightened degree of scrutiny. Likewise, transactions that need to be forced fit into a system need extra scrutiny. End user systems built in Excel or similar tools that are used for books and records and/or are official risk management/compliance tools, should receive a high level of scrutiny.

7.2 Adequate Systems, Processes and Resources are an Integral Part of Risk Management.

Advances in technology have resulted in the widespread availability of industry standard and proprietary systems for quantitative research, portfolio management, portfolio risk measurement, sales support, trading, settlement and record-keeping. The availability of such tools, while not a substitute for good risk management and oversight, enhances asset managers' ability to track and value positions, allocate trades among various clients, measure and monitor risks, improve guideline compliance, control conflicts, etc. Conversely, the lack of adequate systems and processes is often a flashing red light

indicative of major risk issues. For this reason, it is appropriate for every asset management company to review on a periodic basis the adequacy of its systems, processes and resources, taking into account the nature of its products and businesses, size, customer type and other relevant factors. End user applications (*i.e.* Excel type applications) that are used for valuation or risk management should be subjected to in-depth review and standards. It is likewise appropriate to review on a regular basis whether adequate resources have been assigned to the risk function as well as to all areas of the firm and to insure that these resources are properly utilized.

7.3 Spreadsheet and other End-User Tool Risk Should be Reduced and/or Controlled to the Greatest Extent Possible

Spreadsheet risk is the risk related to the use of spreadsheets and other end-user developed and maintained applications and data bases ("end user tools") in the trading of products and instruments that can not be processed by a firm's existing computing and accounting systems. While the proliferation of new products and instruments continues to pose challenges for existing systems, an inability to enter and track all positions in official, carefully vetted and tested systems presents a source of risk that should be eliminated to the greatest extent possible, particularly where end user tools are relied upon for information that is used in a fund's official books and records. When end user tools are necessary, however, some level of independent review and control should be considered.

7.4 Model Risk Should be Identified and Controlled.

Asset managers rely on models for investment decisions, portfolio valuations, measuring and/or guiding risk mitigation, tracking limits and guidelines, analyzing business strategies, etc. Models significantly enhance the ability of a firm to properly manage its activities. Some models are relied upon for official calculations (*i.e.* valuations, fee calculations, etc.) and some are for internal, analytical purposes only. While vetting and review can be useful for all models, it is critical for the first category. For these critical models, proper documentation and validation should be done (1) at the time a model is initially developed or used; (2) periodically over time; and (3) when market conditions change significantly from the last time the model was reviewed.

The key components of a model review include assessments of:

(A) The data and assumptions on which it is based, including any data mapping;

(B) The analytical and theoretic component, which includes the model's algorithms and functional form;

(C) The outputs of the model and how those outputs are used;

(D) An analysis of what weaknesses in the model would be exposed

(i) In different historical periods of rates, curve shape, volatility, etc; and

(ii) In stressed markets.

In reviewing models, many market participants focus on the analytical and theoretical components but the other factors listed above are just as important. Model failure is usually the result of bad input, bad assumptions embedded in the model, and/or inappropriate application of the model rather than miscoding. A governance process on ongoing maintenance and improvements/review of models is also desirable. It is important to determine that a model "fits" market data if it is being used as a component of the valuation process. It is also important to ascertain whether the model used for valuation and the model you use for risk are similar or different.

7.5 Adequate Backup and Disaster Recovery is Critical.

Major catastrophic events such as Hurricane Katrina and September 11th have heightened awareness of the importance of backup and recovery plans. Off site backup of key systems and information (preferably in a different region and definitely in a different power grid) is essential. It is also important that key employees have access to backup and disaster plans not only at their desk, but also at home, in their car and at other remote locations and ideally through an internet site, if possible. Plans should include not only what to do if your business is affected by terror, fire, water, power problems, a pandemic outbreak, acts of terrorism (*e.g.,* bomb threats), bioterrorism (*e.g.,* the discovery of anthrax), or government imposed quarantines (which the Federal Government is expecting in the case of a pandemic), etc. but also if key suppliers and service providers are also affected by a disaster (*i.e.* NYSE, administrators, custodians, etc.). In planning for such scenarios, organizations may want to assess the availability of necessary redundancies – including infrastructure redundancies as well as operational and human capital – and human-resource related issues, such as transportation, medical care, accommodating extended absences, law enforcement, and insurance issues, among others.

7.6 Effective Records Management is Becoming Increasingly Crucial

More information and records are created and stored today than ever before. As a result, it is becoming increasingly important for firms to establish and maintain an effective records management origram that addresses the creation, identification, retention, retrieval, and ultimate disposition of records. In creating and administering such programs, firms may want to consider mechanisms necessary to comply with any preservation obligations resulting from litigation or governmental examinations or inspections. Factors contributing to an effective records management program include: (1) realistic and practical policies that are tailored to the particular organization, (2) employees being aware of and trained regarding their responsibilities, (3) periodic testing of the program to ensure that it is working as intended, and (4) revising the program as necessary to adjust to changing circumstances and regulatory environment.

7.7 Effective System Security is Necessary to Protect the Interests of Employees and Clients

Asset management companies typically are in possession of confidential client, employee and other sensitive information. In addition to having a fiduciary duty to maintain the confidentiality of such information, in many instances they are also subject to privacy and secrecy laws which require not only the safeguarding of such information, but also timely notification of breaches of security. In light of the business, legal and reputational risks associated with breaches of security, maintaining effective information security is critically important. Among other things, this includes:

- Physical security – i.e. the focus on restricting access to building infrastructure & office space and the safety of personnel. General Controls include physical barriers (security guards, turnstiles, etc.) and ensuring that proper background / reference checks are performed for all personnel and third-party service providers. Application controls include door locks, surveillance cameras and environmental monitoring.

- Network security – i.e. protecting the corporate network from malicious software attacks, the mass loss of data, and unauthorized access by external parties. General controls include internet firewalls, proxy servers, content filters, anti virus, anti Spam, software patch management, remote access security and the continuous monitoring of the network perimeter. Application controls include multi-factor authentication and encryption.

- Information security – i.e. preserving the confidentiality and integrity of information as it is collected / created, stored, transported, shared / distributed, and retained or destroyed. Where feasible information and systems should be classified and access should only be granted on a need to know basis. General controls include information security policy, awareness training, disposal procedures, access and identity management, and change, problem and quality management. Application controls include encryption, event logging, and the ongoing control testing of high risk information and systems.

7.8 Risk Pertaining to Subadvisors, Custodians and Outsourced Service Providers Should be Managed.

Asset management companies often rely on third parties including subadvisors, custodians and various types of outsourced service providers who perform operational, accounting, recordkeeping and other types of services. In utilizing the services of such third parties, it is important from a risk management perspective to keep in mind that asset managers have ongoing fiduciary obligations to their customers even though they have delegated certain of their responsibilities to others. It is therefore critical to perform careful reviews of the capabilities of third parties at inception of relationships and on an ongoing basis, and to review information provided by third parties for completeness, balance and accuracy in order to be able to determine whether such third parties meet the risk management, credit, operational, legal and other relevant standards of the reviewing company with respect to the function they are performing. It is not sufficient to merely ascertain that a prospective subadvisor or provider of outsourced services has in place risk management controls; rather, a qualitative judgment as to their sufficiency needs to be made. Where feasible, on site visits to subadvisors, custodians and other key service providers should be part of the initial and ongoing due diligence.