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PORTFOLIO AND RISK MANAGEMENT FOR
CENTRAL BANKS & SOVEREIGN WEALTH FUNDS
World Bank, Washington DC

ALTERNATIVE INVESTMENTS IN SWF AND CENTRAL BANK PORTFOLIOS

Abstract: One of the central debates within Government Investment Funds is around the merits of investing directly or indirectly in 'Alternative' assets; real estate, private equity and hedge funds. Traditional approaches to asset allocation, portfolio construction, risk management and investor governance are inadequate for this task. This paper identifies lessons and best practices that Government Investment Funds, SWFs and Central Banks may borrow from the relatively evolved Alternative Asset management industry. New approaches, as outlined in this paper, may allow for better ways to think about Alternative investing.

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INTRODUCTION

Private equity, hedge funds and real estate, collectively referred to as ‘Alternative’ investments in this paper are evolving to become significant components of many Sovereign Wealth Fund (SWF) investor portfolios¹. They are also expected to begin to find greater acceptance with Central Banks. As allocations to Alternative investments increase these institutions confront new and complicated portfolio construction questions. Unfortunately, the investment theory and technology needed to help investors manage portfolios that include this asset class has not advanced at the same rate as asset growth; in other words, in the world of Alternative investing, traditional standard asset allocation frameworks just do not work.

Alternative investments introduce special complexities and risks for investors who may previously have invested exclusively in ‘traditional’ (bonds, equity, cash etc.) investment products. Constructing an investment portfolio that includes traditional and Alternative investments presents a formidable challenge. Given the bewildering array of Alternative investment offerings available, selecting vehicles for a Government Investment Fund portfolio requires considerable skill, a disciplined process and experienced research analysis. Not to mention, new approaches that allow for multidimensional asset allocation, which we will describe later in this paper. The complexity of Alternative investment strategies necessitates fresh new ways of looking into a series of interlocking issues, including:

- **Liquidity.** Hedge funds may hold relatively illiquid assets, and investors may commit funds subject to lengthy lockup periods.
- **Transparency.** Investors may have limited visibility into portfolio holdings, and by extension, into risks such as those from embedded leverage, correlations between investments and conflicts of interest.
- **Reporting.** Financial reports may not be provided regularly to investors, may not be independently audited and sometimes may not be produced in compliance with generally accepted accounting principles.
- **Regulatory Oversight.** Alternative investment funds are often exempt from certain regulatory requirements or constraints that usually apply to traditional investments.
- **Control.** Alternative fund managers often retain an extraordinary degree of control over when and how assets will be returned to investors, and whether all investors within a fund will be treated equally.
- **Complexity.** Increasing competition in the space is driving managers to pursue ever more intricate strategies. Complicated or illiquid asset classes, which are often harder to value, are also more challenging to support operationally.
- **Sourcing.** Unlike traditional strategies, publicly available databases are not nearly as inclusive of the universe of available fund candidates. Best ideas often come from relationships with industry contacts.

How do Central Banks and SWFs then deal with the portfolio challenges of incorporating Alternatives?

¹ SWFs have invested in a broad range of asset classes, including government bonds, asset-backed securities, corporate bonds, equities, real estate, in derivatives markets, alternative investments and foreign direct investments in individual firms and properties. Historically, their dominant mode of operation has been investment through partnerships or minority investments in companies, with the perception that these are less politically sensitive.

SWFs & CENTRAL BANKS HAVE DIFFERENT OBJECTIVES THAT INFLUENCE THE PORTFOLIO CONSTRUCTION PROCESS

SWFs

With much capital flowing into commodity-based countries in general, and oil-producing countries in particular in the past, SWFs have experienced explosive expansion. Market estimates of their size are difficult to determine but SWFs, according to the IMF, have between \$2 Tn and \$3 Tn under management. Around 8%-10%, i.e. around \$ 200-300 Bn of this amount is believed to be invested in Alternative investments. SWFs generally fall into two categories, based on the source of the foreign exchange assets:

- Commodity funds ; financed by surplus foreign exchange earnings from commodity exports owned or taxed by the government. They serve different purposes, including the stabilization of fiscal revenues, intergenerational savings, and balance of payments sterilization (that is, keeping foreign exchange inflows from stoking inflation).
- Noncommodity funds ; financed through excess foreign exchange assets accumulated as a consequence of running persistent current account surpluses, often from exports outstripping imports.

Not all SWFs are created equal. They exhibit a wide range of continuously evolving investment objectives, investment time horizons and risk appetites. Some SWFs invest purely to achieve financial returns and portfolio diversification while others have a broader economic or social agenda. Newer government-sponsored investment vehicles are proving to be among the most aggressive funds. These are typically distinct from the major SWFs and exhibit a high willingness to take on leverage, make strategic purchases and invest in Alternatives.

The initial endowment of a Sovereign Wealth Fund may often result from a foreign exchange reserves management decision. Export oriented growth strategies in many countries have been the underlying force in the accumulation of these reserves. Apart from few countries which started their SWFs with a sizeable amount, most SWFs are created with a relatively small amount of money in the first year. A procedure of annual transfer to the Fund is subsequently implemented.

SWF's may have multiple objectives. These include insulating government spending from commodity price fluctuations, inter generational wealth sharing and transfer, increasing the net returns to holding foreign exchange reserves, national development funds or providing for long term government liabilities. A simplistic approach to government investment finances may be in dividing these funds into two tranches. (i) a liquidity tranche (ii) an investment tranche

i) Liquidity tranche : This may be seen as a longer term tranche that will will grow at the rate of GDP growth ('stabilization' funds). They are used primarily by commodity exporters, to balance fluctuating revenue flows and to insulate the economy from inflows. This tranche tends to be more conservative in asset allocation² with investments in fixed income over equities and with little to no exposure to Alternative investments. Once the liquidity tranche is able to provide its stabilization role, current account surpluses often flow into the second tranche.

² Most SWFs follow a traditional allocation approach balancing liquidity needs with a drive to greater returns. Various investment funds allocate across the spectrum of asset classes from the least to the most risky asset classes. Both Asian and Gulf-based SWFs have invested in financial services, real estate, and the retail sector. In addition, these funds are increasingly considering the infrastructure sector, as the long-term profile of these investments fits with their long-term investment objectives. As the funds have continued to grow, the historical preference for US and European investments has changed in favor of more Asian investment by both Gulf-based and Asian funds. Increasingly, SWFs are evaluating investments in a manner similar to other major asset managers by choosing to invest primarily on the basis of economic opportunity, irrespective of the sector or geography. The rapid growth of the funds, the shortage of available investment targets, and the increased willingness to take risk inevitably mean that investment strategies are continually undergoing change.

(ii) Investment tranche : These seek higher returns on capital by investing in riskier assets such as public equities and Alternative investments. For the most part this tranche does not have to meet future liabilities or face redemption requests. They are therefore able to have a long-term investment horizon. It is believed that more than half of SWFs invest in illiquid private equity and around 30% of them in hedge funds.

SWFs are becoming a principal driver of the alternative investment industry. They have been actively investing in well-known private equity firms and in the past few years have focused on Leveraged Buyout (LBO) transactions. LBOs led by SWFs typically involve less leverage than typical sponsor-led transactions and also have a longer time horizon. In many cases, SWFs are more likely to be a source of capital to support sponsor-led buyouts than to lead such transactions themselves.

CENTRAL BANKS

In contrast, in a Central Banking context, the primary objective is to ensure that right levels of international reserves are available at future points of time. Foreign reserves are a buffer for global policy imbalances and a 'liquidity-at-risk' standard- similar to the 'value-at-risk' techniques used by financial institutions to manage their exposure to risk. But, determining the right level of reserves is seldom easy. Ideas about the right level of international reserves have changed with the evolution of markets and crises of the last decade. For much of the post-war period, the rule of thumb was that international reserves should cover three-to-four months of imports. With the growth of capital markets, views of reserve adequacy have naturally changed. Countries are now expected to have more reserves to protect against potentially large and disruptive capital flows, even if the exchange rate regime is floating.

The 'Guidotti Rule' that reserves should exceed short term debt is increasingly accepted as an important benchmark for assessing the adequacy of reserves – the rationale being that governments should be able to stay out of market for new financing for 'up to a year' if needed. Other factors to take into account include the exchange rate regime, the size and currency composition of the debt, trade flows, monetary aggregates and an assessment of risks and structural aspects of the market. Taking these factors into account often raises the estimate of 'optimal' reserves³.

Central Banks reserves are estimated at over \$ 8Tn, with more than 85% of this in US treasury and agencies securities. Liquidity and safety are paramount considerations for them to make currency intervention to support foreign exchange markets. They also create reserves for supporting imports as well as stabilizing and growing government revenue. As foreign-exchange reserves have grown, many monetary authorities have concluded that these reserves are well in excess of their immediate needs and offer sufficient protection against sudden capital outflows. Thus, they have opted to "ringfence" a portion of their foreign-exchange reserves for other purposes, allocating a significant share to sovereign wealth funds. New funds have been created and existing funds have been reformed, or split into multiple vehicles for a variety of purposes. At the heart of these changes is the desire to diversify the holdings of this growing capital base and to seek a higher risk-return tradeoff.

This has consequences for the Alternative investments industry. Rapid growth in reserves permit Central Banks to shift focus from liquidity and preservation of capital to total return management. In the current environment more active management of reserves, through investing in Alternatives and therefore some form of reserves partitioning is logical; i.e., investing a proportion of reserves into Alternative investments through a separately incorporated fund or in a separately managed account under proper governance, disclosure, valuation, accounting and risk management often makes sense. And naturally, the choice of assets to invest in reflects their reserve management goals, capital preservation, growth goals and liquidity support goals.

³ Overall, optimal reserve levels are not mechanically established and benefits associated with high reserve levels are hard to measure. Large countries where degree of capital market openness is extensive even if tradable sector is not large will need greater reserves. Countries with weak fiscal regimes or potential banking system problems often too establish a bigger buffer via reserves.

Given the complexities of adding Alternatives to traditional investments, a new paradigm for evaluating various tradeoffs is required – a ‘multidimensional’ approach is necessary, in contrast to the two-dimensional risk and return framework described by the founders of Modern Portfolio Theory, Markowitz and Sharpe. A multidimensional approach recognizes that investments in private equity and hedge funds generate returns from multiple sources: exposure to fundamental factors, manager skill, illiquidity and downside premiums. Individual investment choices (stocks, bonds, hedge funds, private equity, real estate, mutual funds, etc.) need not be categorized by asset classes (i.e., Equities, Fixed Income, Hedge Funds, Private Equity, etc.); rather, they should be viewed as ‘bundled’ sources of returns that may be assigned to one or more return classes. Utilizing a multidimensional approach, asset allocation and security selection became a holistic exercise, since every investment selected affects the overall return profile in a multitude of ways.

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SECTION 1 : CHALLENGES IN ASSET ALLOCATION TO ALTERNATIVE INVESTMENTS

MODERN PORTFOLIO THEORY ('MPT') AND ITS LEGACY

Central to the MPT framework is the concept that investors seeking greater returns must assume additional risk. In the standard implementation of this approach, investors formulate views on the performance of various asset classes, construct a multitude of portfolios and then identify the specific portfolio that offers the highest level of return for a given level of risk (volatility). Collectively, these optimal portfolios comprise an 'efficient frontier.' Investors then choose from among the portfolios that reside along the efficient frontier according to their individual risk tolerance.

One of the major strengths of the MPT (and, one may argue as we do here, its major weakness) is that it serves to radically simplify tradeoffs. Risk, in the MPT framework, is described entirely by the volatility of investment return. Investors simply have to decide how much additional volatility they are willing to tolerate given the incremental expected return they hope to achieve. Investors always expect to be 'paid' (earn a premium) for assuming additional risk. Absent this premium, rational investors should refuse to assume the additional risk. MPT serves investors quite well when the primary choices consist of traditional investments (stocks, bonds, cash), since these can be characterized primarily in terms of their returns and volatility. The success of standard MPT based asset allocation techniques in the context of traditional investments, however, has obscured the significant number of implicit assumptions that underlie most of these models.

These assumptions include:

- Returns and risks are measured comparably and accurately across asset classes.
- Investors possess comparable information regarding different investment choices.
- Liquidity in each asset class is roughly the same.
- Markets are efficient and new information is priced immediately.
- Volatility accurately reflects risk and investors are chiefly concerned about the variance of their returns.
- Investors will choose to invest passively at the broad asset class level.

Collectively, these assumptions present a reasonable approximation of reality in cases where investors and managers restrict themselves to traditional investment opportunities. When Alternatives are added into the mix, however, these assumptions result in a cloudy view of the 'real world.'

THE CHALLENGE OF ALTERNATIVE INVESTMENTS

Hedge funds, private equity, private real estate, structured products and managed futures have become a staple in many SWF and other government institutional portfolios. Less so for Central Banks⁴. The increasing use of Alternative investments has fundamentally challenged the utility of standard asset allocation models. The assumptions that underpin these standard models render them incapable of accounting for the complexities presented by Alternative investments. For example:

[Returns and Risks Are Not Measured Comparably and Accurately in Alternative Asset Classes.](#) Unlike traditional investments, in which market prices are observable on a virtually continuous basis, it is not possible

⁴ A number of Central Banks are expanding or considering expanding the range of assets they hold or the risks that they are prepared to accept, with the focus on interest rates and currencies. Many are adopting enhanced portfolio management techniques and considering increased allocation to "new" asset classes. Central Banks are also increasingly interested in corporate paper, with some willing to hold corporate bonds with ratings above BBB. Diversification of currencies has also become a key element of best practice. Many central banks are moving beyond core reserve currencies – US dollar and Euro – to include other highly liquid currencies such as the Yen, Pound Sterling and Swiss Franc. These exposures are achieved either directly in the cash market or through a derivative overlay. It is only a matter of time before Alternatives find their way into Central Bank portfolios as an integral asset class.

to observe market prices for many Alternative investments such as private equity or private real estate. This makes it difficult to compare risk/return profiles.

Quality of Information Regarding Different Investment Choices is Often Not Comparable. While broadly diversified traditional asset class performance has been tracked for decades, historical performance data for many Alternatives is much less robust. Further, even in cases where data is available, the evolving nature of these strategies means that, even more than is generally the case, past performance may be a particularly poor input for formulating views on future performance. It is therefore difficult to be as confident in attempting to predict the future performance of Alternative investments relative to traditional asset classes.

Liquidity in Each Asset Class is Not Same. Many Alternative investments contain significant tradability restrictions – in private equity investors may have their principal ‘locked up’ for anywhere up to 12 years.

Markets that Alternative Investment Managers Access are Not Efficient. Unlike most traditional investment managers, Alternative investment managers may seek out restricted markets so that they can identify and exploit inefficiencies. These less-efficient markets often have additional forms of risk (e.g., funding risk) that need to be accounted for.

Volatility Does Not Accurately Reflect Risk⁵. Returns for many Alternative investments are not distributed symmetrically (normally) around their mean. For this reason, the use of volatility to measure risk is insufficient. Most investors are concerned about other form of downside risks in addition to volatility. The typical volatility measure-standard deviation-may drastically understate the downside risk inherent in many Alternative investment strategies.

Practitioners use ‘Downside Risk’ to express either the likelihood of a loss, or the magnitude of a loss or some measure of the dispersion (risk) of losses that may arise from investing in Alternatives. Additionally, several risk adjusted performance ratios that incorporate downside risk have been developed over the last few years. Commonalities in the way to measure and interpret downside risk enables classification of different downside metrics into at least four groups:

- i. **Probability of Loss Metrics.** This class of downside risk metrics tries to capture the likelihood of a loss, without any consideration with regards to the size of the loss. In this category, we find the shortfall probability, which is the probability of a return outcome under a minimum acceptable return (MAR).
- ii. **Loss Metrics.** These metrics aims at capturing the magnitude of losses. This class of downside risk metrics includes:

⁵ Hedge funds differ widely. Their risks are a function of both their specific trading strategies and exogenous market and credit risk factors that these strategies are exposed to. These risks are a combination of Market Risks and Credit Risks (i) Market Risks: Market risk specifically addresses price risk which often arises from changes in exogenous factors such as interest rates, prepayment and extensions in the case of mortgages, absence of liquidity, sectoral concentrations in portfolio, currency risk and derivatives risk (ii) Interest Rate Risk: Interest rates are a very important determinant of bond prices and represent one of the most important factors in fixed income arbitrage strategies (iii) Prepayment and Extension Risk: Certain instruments, such as mortgage-backed securities are very price sensitive to interest rate movements for they may be prepaid earlier or later than expected, depending on where interest rates stand. This, in turn, potentially extends anticipated prepayments which increases the duration of securities that hedge funds hold and leads to changes in risks within their trading strategies (iii) Concentration and Liquidity Risk: A hedge fund’s portfolio of investments is subjected to concentration and liquidity risks when it is highly concentrated in a specific currency, industry, or security type. Concentrations in securities of a specific industry may expose fund investments to undiluted industry risks which could deviate significantly from general market trends. In similar manner, significant concentrations in specific security types may expose a fund to greater market price risk because of interest rate movements or other market conditions. In another case, complex securities that have very narrow markets, may trade at lower prices that reflect their lack of liquidity (iii) Currency Risk: When a fund holds securities in a currency other than its base currency, changes in the exchange rate between its base currency and the currency of its holdings may enhance or reduce its profits. The greater its exposure is to exchange rate movements, the greater its risk of price fluctuations (iv) Derivatives Risk: Derivatives risk is a very broad term that comes from the usage of derivative products such as futures, options, swaps, floating rate notes, structured notes etc. Utilization of derivative products for speculative purposes can substantially increase a fund’s risk profile (v) Credit Risks: Credit risks arise when debtor counterparty is unable or unwilling to service an obligation which may result in losses. There are many types of counterparties from individuals to sovereign governments as well as many different types of obligations from auto loans, corporate loans, to derivatives transactions. Therefore credit risk takes many forms. The manner in which credit exposure is assessed is highly dependent on the nature of the obligation.

- Value at Risk (VAR): This is used more in portfolio contexts and less for single manager Hedge Funds. It measures the minimum loss one would incur within a probability confidence (generally set from 95% to 99%) over a time interval and frequency (monthly, weekly, daily, etc.). If VAR is calculated, as it often is using skewness and kurtosis of a distribution, it is known as Modified VAR (MVAR)
- Expected Shortfall or Conditional Value at Risk (CVAR): measures the average loss if the VAR level is breached. The CVAR is always equal to or greater than the VAR
- Maximum Drawdown: The maximum drawdown is the maximum loss one can endure if one had invested at the fund's maximum Net Asset Value and sold at the minimum fund Net Asset Value subsequent to the initial investment. It is equivalent to a peak to trough calculation of fund returns.

iii. **Tail Risk Metrics.** This class of downside risk metrics captures the dispersion in returns below a threshold or minimum acceptable return (MAR). Within this class of metrics, we find Lower Partial Moments (LPM). The LPM is defined by a MAR level and an order (exponent). LPM of order 2 is analogous to the variance calculated for the distribution of returns below MAR. Under the same logic, LPMs of order 3 and 4 are akin to skewness and kurtosis of returns outcomes below the MAR. Hence, LPM is able to better capture the behavior of the distribution of losses, without penalizing gains above the minimum.

iv. **Downside Risk Performance Ratio Metrics.** Investors are often interested in the amount of risk they have, or how much they may stand to lose, but also in whether they are adequately compensated for bearing it. This interest led to the development of risk adjusted performance ratios, of which the Sharpe Ratio has become the standard in the investment industry. However, the Sharpe ratio is a function of the volatility and thus suffers from the same weaknesses as the volatility itself when applied to non-normal distributions of hedge fund returns. Nevertheless, the intuition behind the Sharpe Ratio can be translated to deal with risk metrics that focus on the downside. In such downside performance ratios, the numerator measures the potential upside and the denominator measures the potential loss. Several of these ratios exist, of which, the Calmar Ratio, the modified Sharpe Ratio, the Sortino Ratio, the Omega function and the generalized family of Kappa ratios (of which Omega and the Sortino ratio are special cases) are more popular.

INVESTOR'S DILEMMA

Given this gap between the classical assumptions underlying standard asset allocation approaches and the complexities that Alternative investments present, investors are left with a dilemma. While many government investment fund executives do believe that Alternative investments can and do add value to a portfolio, given their strict fiduciary responsibilities, they are often unable to make allocations to Alternatives. Models, processes and tools are just not commonly available that provide a systematic evaluation of the risk/return characteristics for Alternative investments. In order to solve this dilemma a new approach to portfolio allocation is required. What should this approach be? The cornerstone of this new approach may be a reframing of the traditional strategic asset allocation problem beyond binary risk-return tradeoffs to newer types of tradeoffs.

TOWARD A NEW ASSET ALLOCATION PARADIGM: FOUR CLASSES OF RETURN

Government investors, as do others, have literally scores of investment options. Every financial security, every building and every privately owned company in every country of the world is a potential investment. Despite the variety and complexity of investment options, however, for all of them, there are only a few basic drivers of return. In this section of the paper we categorize these drivers into four broad types:

Fundamentals. A primary way in which investors seek to make money is by investing in fundamentals -what is often referred to as 'beta.' These are investments in the fundamental characteristics of the economy. Economic growth, credit cycles and public debt- each of which drives more proximate performance metrics such as corporate earnings and interest rates- are some examples of fundamental factors. In practice, when investors

invest in fundamentals, they determine exposures to traditional efficient asset classes such as equity and fixed-income markets which are driven by these fundamental factors.

Skill. A second driver of investment returns is the skill of an investment manager to add value to fundamental investments. This added value is commonly referred to as ‘alpha.’ Many countries have decided on a mix of internal and external management of funds. There are real tradeoffs to be considered – no one-size-fits-all solution applies. Any choice requires effective monitoring. External⁶ active managers (that SWF’s and Central Banks may allocate to) seek to generate alpha in a number of ways: through security selection by buying undervalued securities and selling overvalued ones; through tactical investing by attempting to time entry and exit in various markets; or through control value added by actively intervening in firm governance, financial structure, strategy and/or operations.

Liquidity. A third way that investors make money is based on liquidity. When investors purchase assets that do not trade, they give up an option to trade out of these investments. Investors expect to be compensated for ‘selling’ this option. In other words, they expect to obtain a ‘tradability’ premium.

Downside Premiums. Finally, investors can also make money by assuming the risk of rare but large losses. These are referred to as ‘fat tails’ in statistics colloquial speak. In standard asset allocation models, it is assumed that the returns of an investment are symmetrically distributed around a mean return. In many Alternative investments, however, this is not the case. For example, one way insurance companies earn returns-in addition to aggregating and diversifying risk-is by assuming rare event risks. This is the low-probability, yet potentially catastrophic, risk that resides in the left tail⁷ of a probability distribution. Insurance companies demand and receive a premium in exchange for underwriting this risk.

COSTS ASSOCIATED WITH EACH RETURN CLASS

One of the primary principles of investment finance is that there is no free lunch. Any investment that generates returns also entails a potential cost. The standard two-dimensional framework uses volatility to measure this cost. While this works well for the fundamental return class, it breaks down for Alternatives. In a multi-dimensional framework, the costs vary substantially across return classes, and are as follows:

Cost of Fundamental Returns. In seeking return from fundamental sources or beta, investors hope to earn a risk premium-in excess of the cash or risk-free return-for assuming excess volatility. They face the risk that their portfolio value may fluctuate in response to general macroeconomic conditions.

Cost of Manager Skill. Investors allocate to active hedge fund and private equity investment managers because they believe that they can add skill based returns (alpha) to their portfolio. However, this alpha entails taking active risk, which stems from two sources. First, like beta, alpha itself varies from period to period. This ‘alpha volatility’ represents a unique source of active risk. Further, it is very difficult to judge ex ante whether or not a

⁶ External Manager: Benefits may include professionalism – asset managers bring breadth of experience and efficiency; transfer of knowledge; outside credibility and transparency in benchmarking returns. They however charge fees which detract from returns.

Internal Manager: Benefits include centralized control of assets, ensuring effective coordination across managers and portfolios; In-house expertise can allow additional portfolios to be managed internally and can provide financial market expertise to other Government entities, including the Central Bank, Ministry Of Finance etc.

⁷ Strong risk management of Central Banks is something that SWF’s as well as the private sector may benefit from borrowing. The complex interactions that can occur during ‘fat tail’ events uncertain types of alternative investments are difficult to model, but yet have to be considered. The increase in global volatility and recent unwinding of leveraged trades is a healthy reminder of the importance of strong risk management policies. Stress tests of major risks (‘fat tail scenarios’) such as hedge fund meltdown, as well as an understanding of the dynamic interactions among policymakers, markets, consumers and corporations, helps to anticipate trouble before it occurs. For Central Banks, reserves protect against market turbulence resulting from domestic political developments or natural disasters. Risk management in this context should encompass both direct and contingent obligations, including risks that arise from the restructuring of state owned enterprises, or restructuring and reform in the banking sector with a focus on liquidity at risk. Risk control and stress testing is an essential element of this best practice. Under the conditions of a renewed focus on returns, quantifying and controlling the risks in the Alternatives investment portfolios becomes vitally important.

particular external investment manager is capable of generating alpha⁸; in other words, they face the risk that their prediction, and therefore their selection, may be wrong. The alpha that investors strive to earn may be viewed as compensation for both components of active risk: the alpha volatility and the forecast risk that they are prepared to take.

Cost of Illiquidity. Investors who purchase non-traded assets relinquish the ability to liquidate their position. This prevents the investor from pursuing new investment opportunities, meeting unanticipated spending requirements or rebalancing their portfolio.

Cost of Downside Premiums. Investors who generate returns by providing insurance are exposed to downside risk, or the chance that a low probability outcome can adversely impact portfolio value.

INVESTMENT CLASSIFICATION IN A MULTIDIMENSIONAL FRAMEWORK

When the asset allocation challenge is viewed from a multidimensional perspective, every investment opportunity can be assigned to one or more return classes that have now been identified. While traditional investments generally involve the fundamental and skill-based return classes, Alternative investments broadly span all four - fundamental returns, manager skill, liquidity and downside risk premiums. Thinking about investment options in this cross-sectional manner as combinations of return classes is much more valuable from an asset allocation standpoint than thinking about them as asset classes as in the traditional approach. The reason is that these return classes, taken together, behave very differently within a portfolio. Treating combinations of these return classes as monolithic categories ignores these differences.

MULTIDIMENSIONAL ASSET ALLOCATION

Now that we have outlined the four broad return classes, we can address the asset allocation problem from a multidimensional (four dimensions) perspective. Rather than thinking of a risk budget as an apportionment of volatility to particular investments, a new approach would suggest that risk budgeting is the choice of how to allocate risk across and within various sources of return, independent of how those risk are bundled. In order to solve the two-step problem of determining exposures and selecting investments, we must recognize that, as in classic approaches to asset allocation:

- Portfolio construction is about linking investor objectives to portfolio choices.
- In making the connection between objectives and portfolios, investors make tradeoffs.

In the classic asset allocation approach, this was done by uncovering an investor's risk tolerance, expressed in terms of the incremental return required for tolerating additional levels of volatility. In the multidimensional approach being proposed here, the problem is slightly more challenging because each return source embeds a different cost. Investors must simultaneously express their preferences across fundamental risk, manager risk, illiquidity and rare event downside risk.

IMPLEMENTING THE NEW ASSET ALLOCATION PARADIGM

A practical question to address is how can investors implement the multidimensional framework? In broad terms, there are three steps to this:

⁸ Criteria for choosing external managers usually includes assessing (i) competence/fundamental and technical expertise (ii) resources and capabilities availability and dedication (iii) track record of risk management and performance (iv) investment philosophy (v) complexity of investment strategy (vi) assets under management and number of public sector / central banks clients (vii) costs (viii) control issues

Decompose Investments into Classes of Return. As a first step in implementing the new paradigm, individual investment opportunities may be decomposed to identify how their returns are generated. In other words, for a given investment, we must determine what proportion of return is attributable to each of the four return classes.

Measure Cost Within Each Return Class in a Comparable Manner. Critical to the success of this approach is the ability to explicitly rate costs within each category. For example, fundamental risk is measured using standard deviation. Similar metrics need to be developed and utilized across other risk classes so like-for-like comparisons can be made to better understand tradeoffs. In other words, arrive at appropriate metrics for measuring illiquidity premium, alpha, beta and downside risk consistently.

Link Characteristics of Return Classes to Investor Objectives. In a multidimensional framework, appropriate for Alternatives investing, investors need to consider their tolerance for fundamental risk, active risk, illiquidity and downside risk. This requires understanding how to trade off one return source versus another, and answer questions such as, 'If I reduce my downside risk, increase my illiquidity and increase my exposure to fundamental risk factors, while gaining exposure to more skilled external investment managers- am I indeed better off?'

SECTION SUMMARY

We conclude this section by summarizing that the popularity of Alternative investments in government sponsored entities has increased in recent years. Integrating Alternative investments into portfolios, however, has been difficult to do in a rigorous manner because the asset allocation technology that is available to many investors is ill equipped to handle the complexities that Alternatives present. A more sophisticated asset allocation paradigm must evolve to address the investor's dilemma. A new principle based paradigm advocated here is the multidimensional asset allocation approach. This approach seeks to address a richer set of returns and risk drivers than what is addressed by classical asset allocation models grounded in the tenets (and burdened by the assumptions) of Modern Portfolio Theory.

SECTION 2 : THE IMPLICATIONS OF ACTIVE MANAGEMENT IN ALTERNATIVE INVESTMENTS

Broadening the range of assets SWFs and Central Banks invest in will necessarily include alpha generating Alternative investments. Within the practitioner community there is greater acceptance that a carefully implemented expansion in the range of assets, whether across asset classes or within one particular Alternatives sub-asset class, will improve the risk-return choice available to the government over time⁹. Those considering expanding the range of assets that they hold or the risks that they are prepared to accept must implement programs supported by strong analytics and a nuanced understanding of best practice in Alternative asset management. This includes taking into account risk tolerance, duration, and a judgment of where the SWF/Central Bank (or its asset managers if external managers are used) generate value (alpha generation). While demand for skilled managers has always existed, the current focus on alpha is unprecedented, for good reason. Alpha represents a highly diversifiable return source that potentially can improve upon the low-return, high-volatility environment that plagues traditional asset classes. If properly incorporated into a portfolio, alpha can significantly improve risk-adjusted performance.

Unlocking the power of alpha, however, remains challenging. Adding alpha to a portfolio ultimately boils down to choosing skillful managers, which is not an easy task. Moreover, while there are well-developed tools for allocating to traditional asset classes, these tools do not appropriately address the specific characteristics of active managers such as limited histories, changing styles and opaque strategies. To realize alpha's full potential when building a portfolio with active Alternative investment managers, investors require forecasting and optimization tools similar to those that are widely used to determine traditional asset class allocations.

Despite the current focus on skill-based returns, surprisingly few practical guides exist for investing in active managers in an integrated and analytically rigorous fashion. Critical questions left unanswered by most approaches include:

- How much alpha should be added to a portfolio?
- What is the right combination of alpha sources (active managers)?
- How do allocations to alpha affect allocations to traditional asset classes, such as fixed income and equity?

In this section we outline a framework for active investing that may provide a bridge from theory to practice. This approach:

- More accurately assesses a manager's historical characteristics, including skill (alpha) and market exposures (beta).
- Improves forecast of future manager performance by combining historical track records with other information.
- Quantifies certain risks particular to active management.
- Constructs integrated portfolios in a way that accounts for various forms of manager risk.

⁹ Central Banks continue to manage reserves differently from future or pension funds, and the private sector, given their unique mandate. Nonetheless, Central Banks around the world are putting a focus on return, through transfer of world class portfolio management techniques to a Central Banking environment. There is increased recognition that foreign currency reserves have an opportunity cost in terms of goods and services foregone. For a country that can borrow, the cost can be measured as the spread between the yield on liquid reserves and the external cost of funds. That cost can be reduced through the active management of reserves, including a range of higher yielding assets such as investments in hedge funds as well as in illiquid private equity and real estate. The extension of duration also can improve the risk-return tradeoff. Against these costs should be weighed the range of benefits of holding reserves, including self insurance through liquidity, the boost to government credibility (including through higher credit ratings), and the ability to discourage distortive capital flows and limit the propagation of shocks through the economy. New asset management techniques can be applied to the whole stock of reserves or just to the Alternative investments portion or only to the portion above some critical level. When levels of reserves exceed targeted levels, investment in more risky assets, such as what Alternative Investments are commonly perceived to be at least on the margin, may make sense.

Identifying promising managers, performing due diligence and incorporating subjectivity into forecast remain integral to any successful Alternatives investment program. We stress that the concepts that that we are about to talk about now are not intended to replace investor judgment. Rather, we believe that experienced investors need to combine their qualitative assessments with this to extract the most value from their active Alternative investment programs.

COMPARING BETA AND ALPHA

The concept of Beta and Alpha has been alluded to in the previous section. In this section we will build upon that. It is important to understand what alpha represents and how it differs from other sources of return. Ultimately, as previously mentioned, investors can obtain returns from two primary sources¹⁰: beta and alpha. We recapitulate:

Beta. Refers to returns of asset classes and often is described as passive return. Beta typically is driven by fundamental macroeconomic factors.

Alpha. Refers to skill-based returns, or the value that a manager creates through active investment decisions. Managers can create this value, for example, by identifying undervalued/overvalued securities, successfully timing the market or taking control positions in companies and improving their strategy or operations (in some forms of private equity investing)¹¹. A manager's alpha can be positive or negative, depending on the quality of their decisions.

Beta and alpha differ across a number of dimensions. Beta is fairly reliable and, therefore, historically has formed the foundation of most investor portfolios. Since beta has tied to macroeconomic growth, as long as various economies continue to grow, investors can rely on beta to deliver positive returns over the long term. Furthermore, betas are well-studied and, therefore, are relatively predictable.

Alpha, on the other had, is much less reliable. Investors cannot depend on a manager to generate positive alpha since, in aggregate, alpha is zero. If one investor generates positive excess returns by purchasing an undervalued stock, another set of investors have necessarily generated negative excess returns by selling the same stock. Furthermore, alpha may degrade over time as the investment environment changes. There is no guarantee that managers who historically have generated alpha will be able to do so in the future.

WHY BOTHER ABOUT ALPHA?

Given the reliability of beta, why should Government Investment Funds seek to include sources of alpha in their portfolio construction process in the first place at all?

Some Managers Can Consistently Outperform. Although in aggregate alpha is zero, certain managers can consistently generate attractive alpha on a risk-adjusted basis. For investors who can access them, skilled managers may generate much higher returns per unit of risk than most relatively passive asset class managers.

¹⁰ Conceptually, as alluded to earlier, the returns of any investment can be divided into alpha and beta components. Thus, a long-only equity manager's return can be divided into the component related to the overall equity market (beta) and the component related to their stock selection (alpha). An index, by contrast, generates all of its return from beta and none from alpha.

¹¹ SWFs are increasingly involved in acquisitions and strategic transactions. Though many funds prefer to invest in debt or non-controlling equity positions, a small but growing number of funds are seeking substantial minority or even controlling equity stakes. Since SWFs are at the early stages of entering into the buyout market, they do not yet possess the full suite of management capabilities that the leading private equity firms have. Thus, they are more likely to work with existing management teams and are perhaps less prone to seek management changes if return expectations are being met. This is also reflected in purchases of second-stage buyouts after a private equity firm has completed the initial restructuring required. However, as the SWFs continue to build out their direct investment capabilities, their investment preferences may also evolve to resemble traditional private equity funds more closely.

Alpha Can Provide Diversification Benefits.

- Alphas have low correlation to one another. Alpha is the product of an individual manager's active decisions. Since these generally differ across managers, alphas typically exhibit low correlation to one another. In addition, because each manager represents a unique alpha source, investors have access to far more alpha sources than beta sources. This implies that even on a standalone basis, combining multiple alpha sources can reduce risk much more dramatically than combining multiple beta sources.
- Alphas are uncorrelated with asset class returns. Alpha, by definition, is uncorrelated with broad asset class returns. Adding alpha (or a portfolio of alphas) to traditional equity- and fixed income-oriented portfolios, therefore, can substantially improve risk-adjusted performance if an investor can identify managers ex-ante who generate positive alpha.

CHALLENGES IN ACTIVE PORTFOLIO CONSTRUCTION

While the benefits can be compelling, implementing a successful active management program is complex. Asset allocation, whether applied to passive asset classes or active managers, ultimately requires that investors answer and come to terms with two simple questions: (1) 'How will various investment choices perform?' and (2) 'How can I best meet my investment objectives given my views about future performance?' Answering the first question is known as 'forecasting,' and answering the second question is known as 'portfolio construction.' These steps are well-understood at the asset class level, and investors, for the most part, have access to tools that enable them to build portfolios of broadly diversified asset classes. Unfortunately, conventional tools often are inadequate for dealing with the unique characteristics of active Alternatives managers.

Challenges in Developing Manager Forecasts and Benchmarks. Forecasting manager performance requires that investors first understand historical performance. Unfortunately, standard performance measures such as Sharpe ratios and excess return relative to a benchmark can prove misleading. A more sophisticated benchmarking takes into account the unique set of objectives and concerns that Central Banks and SWFs face. Moving away from recognized benchmarks can achieve a better match of assets and liabilities in the case of Central Banks. Internally created benchmarks can be effective in meeting safety and liquidity requirements, measuring performance and increasing accountability. A new approach to reserve management may suggest that returns should be benchmarked with an eye to the same sort of variables that influence the judgment of the 'right' level of reserves that are available at a certain point of time; for example - in an extreme case, choosing a benchmark with potential capital outflows in mind.¹² Transparency on risk/return and data availability allows better benchmarking. The need to be able to properly quantify risks, particularly 'fat tails', that Alternative investments contain continue to present a special challenge to policymakers. The challenge of measuring performance is exacerbated when evaluating Alternative investment managers, who have significant discretion and no natural benchmark.

Characteristics of a good benchmark¹³

- **Relevance:** At a minimum the benchmark should track those markets and segments of interest
- **Comprehensiveness:** The benchmark should include opportunities realistically available while measuring the performance of new investments and existing holdings
- **Replicability:** Total returns should be replicable and must be fair to the investment managers of the Central Bank/ SWFs who are measured against it
- **Stability:** An index may change composition often, and all changes should be easily understood
- **Expenses:** In the normal course of investing, expenses related to withholding tax, safekeeping, and transactions are incurred. These expenses should be well understood and not be excessive
- **Simple and objective selection criteria:** A clear set of rules should govern inclusion of asset subtypes

¹² The currency composition of reserves should broadly reflect the composition of potential capital outflows rather than trade flows.

¹³ There are many more characteristics, but for purposes of illustrative value, only the important ones have been mentioned here

Within Alternatives, there are many benchmarks that track private equity, hedge funds and real estate. However, measuring historical performance against benchmarks is not enough. Active managers often have limited histories, making it very difficult for investors to separate luck from skill. Even managers with successful track records over long time periods may not be able to repeat that performance if competition increases or if the investment environment fundamentally changes. Alternative investors need a rigorous way to forecast performance that relies on more than just historical data.

Challenges in Constructing Portfolios. Once manager forecasts are developed, an investor needs a way to translate these views into an appropriate portfolio. As stressed earlier portfolio construction revolves around tradeoffs. Given a set of forecasts, investors must make tradeoffs across active managers, as well as between active managers and passive asset classes. Unfortunately, traditional optimizers make tradeoffs across only two dimensions: expected return and volatility. These dimensions do not fully capture other characteristics of active managers that investors care about—such as downside risk, length of track record and general confidence in the sustainability of alpha vs. beta.

CURRENT APPROACHES TO ACTIVE INVESTMENT MANAGEMENT

Although most investors are aware of the difficulties that have been enunciated earlier with investing in active managers, very few possess tools to systematically address these challenges. Instead, approaches to date have been fairly ad hoc. In contrast to strategic asset allocation, which relies heavily on rigorous statistical modeling, most manager allocation decisions depend largely on experience and judgment. There are at least three popular approaches for allocating to active managers:

Selecting Alpha on the Basis of Beta. One approach has been to divide the strategic portfolio into asset class buckets and choose managers separately within each bucket.

Core-Satellite. While ‘core-satellite’ investing can be implemented in a number of different ways, one popular approach has been to proportionally shrink the strategic benchmark, or ‘core’ portfolio, and allocate the remainder across active managers, or ‘satellites.’ This enables investors to select managers independent of the beta they bring with their alpha. Although this improves upon the approach of choosing alpha on the basis of beta, it prevents the investor from making tradeoffs across the ‘core’ and ‘satellite’ investments. It fails to recognize that the choice of ‘satellite’ investments may change the appropriate ‘core’ portfolio. For example, an investor who allocates heavily to active long/short equity managers may want to reduce the equity component of the ‘core’ more than the fixed income component instead of shrinking them proportionally.

Portable Alpha. More recently, some investors have adopted a portable alpha approach. Portable alpha allows investors to obtain alpha and beta separately. Investors allocate their capital to what they believe are the best active managers and then obtain their beta exposure synthetically through derivatives. In a portable alpha context unlike ‘core-satellite,’ investors no longer have to make tradeoffs between managers and asset classes. Instead, they can choose the best combination of alpha sources and use derivatives (futures or swaps) to obtain their desired asset class (beta) exposures. While potentially appealing, this approach does not help the investor decide how much alpha to add to the portfolio or determine a suitable combination of active managers. Finally, it requires investors to employ leverage¹⁴ and to short unwanted market exposure, actions which some investors may not want to undertake.

¹⁴ In a private equity context, unlike most financial sponsor-led buyouts, investments by SWFs do not need significant financial leverage. Thus, a SWF buyout would be a financially feasible alternative for a broader range of companies, including those not suitable for very high leverage. The financial and default risk in SWF buyouts is likely to be lower, making them more attractive options in some cases.

A NEW APPROACH TO ACTIVE INVESTING IN ALTERNATIVES

Hedge funds have long positioned themselves as 'absolute return' strategies, with the ability to generate attractive returns in a variety of market conditions. Accomplishing this ambitious goal requires significant flexibility. While this flexibility can potentially generate value for investors, it also means that hedge fund strategies may 'drift' substantially over time. This drift could occur in one of three ways:

- Drift across strategies - If a manager no longer believes that opportunity exists within a given strategy, it may shift towards another strategy.
- Drift across markets - Within a given strategy, managers may rotate across sectors or asset classes.
- Drift within a market - Depending on their views, managers may significantly change their exposure to a given market over time.

These drifts represent short to medium term shifts across asset classes, and therefore can be viewed as market timing decisions. The critical question for investors, though, is to what extent these market timing decisions add value. If hedge funds are good at market timing, investors may feel comfortable allowing them to change exposures to different markets as they see fit. On the other hand, if hedge funds are poor market timers, these tactical bets could add significant risk to investors' portfolios without a commensurate increase in returns.

Traditional asset allocation models assume that investment performance is consistent over long periods of time and that investors can fairly accurately forecast risk and return. These models are ill-equipped to deal with active managers who often have limited histories, operate in dynamic investment environments and generate return from both fundamentals and skill. Instead of trying to force compatibility between traditional models and active managers, a new framework that explicitly addresses the specific characteristics of active managers is required.

The approach outlined here recognizes that beta and alpha vary across a number of dimensions and that any forecasting and portfolio construction approach should carefully address these differences. This approach consists of four components:

Measuring Performance. We may determine the drivers of each manager's return on a historical basis. Specifically, we may measure a manager's historical alpha, alpha volatility and betas to different asset classes.

Projecting Manager Performance. Since historical data alone can be a flawed predictor of future performance, historical data may be combined with other information to generate more accurate forecasts using Bayesian Statistics approaches.

Quantifying Unique Manager Risks. Investing in active managers exposes investors to new forms of risk, including downside risk and forecast risk. Approaches that explicitly quantify these risks are useful.

Constructing Portfolios. Approaches to portfolio construction in ways that account for more forms of manager risk than seen in conventional frameworks are again useful- notably, an attempt to identify portfolios that will perform well even if the forecasts are wrong.

MEASURING PERFORMANCE

Measuring performance at the manager level is different than at the asset class level. Manager returns are often subject to reporting biases that can obscure comparisons.

Accounting for Measurement Biases. Historical data typically forms the foundation of manager selection and portfolio construction. Unfortunately, the reported returns of many Alternative investment managers are subject to biases, preventing comparison between these returns and those of other investments.

One bias is return smoothing, or serial correlation, which is the correlation of returns in one period with those in future periods. This can occur because active managers who pursue Alternative investment strategies can invest in relatively illiquid assets that are not marked-to-market. Since these instruments trade infrequently, investment managers usually do not know the current market prices. Instead, assets may be valued using either an appraised value or historical cost, both of which can artificially smooth reported returns. Return smoothing tends to understate volatility, which overstates historical risk-adjusted performance. Perhaps equally important, smoothing of returns also dampens correlations; this is particularly problematic since it means that market exposures—managers’ betas—will be underestimated and alphas potentially overestimated without correcting the problem. We recommend accounting for this problem by unsmoothing the data, attempting to recover the actual pattern of returns over time.

Separating Historical Returns into Alpha and Beta. Once historical data has been adjusted to reflect a more accurate measure of historical returns, one may use regression techniques to estimate each manager’s alpha and beta. Regression compares the movement of a manager’s return with that of asset classes. The regression analysis then splits the return into a component that is related to asset class returns (beta) and one that is independent of asset class returns and driven by manager skill (alpha). If a manager’s returns are related to more than one asset class, regression identifies multiple betas.

PROJECTING MANAGER PERFORMANCE

Projecting returns at the manager level is far more difficult than at the asset class level. Using historical data exclusively to forecast future returns often leads to poor predictions. Separating luck from skill is challenging, especially for managers with shorter track records. In addressing the forecasting challenge with limited data, we again suggest usage of Bayesian Statistics which recognizes that historical performance is only one input. This technique allows investors to combine other information—qualitative views, peer group performance and theoretical considerations—in a quantitatively rigorous fashion. By consolidating the additional information into a view (known as a prior), specifying a confidence level in the prior and blending the prior with historical data, investors can create forecasts that typically are more reliable than those based solely on historical data. One advantage of this approach is that it is fairly intuitive. For managers with long track records, the forecasts will draw primarily from historical performance. For managers with shorter track records, the forecasts will rely more on the prior.

QUANTIFYING UNIQUE MANAGER RISKS

When allocating to active managers investors face an additional risk: the risk that their forecasts can be wrong. Forecast risk is inherent to any portfolio construction exercise. However, investors are able to more safely ignore this risk at the traditional asset class level for two reasons. First, traditional asset classes are well-studied, and investors have a significant amount of data to draw upon when developing forecasts. Second, the chance that traditional asset class forecasts are incorrect is comparable across asset classes (since similar amounts of research and data exist across most traditional asset classes). As a result, forecast risk at the asset class level has relatively little impact on portfolio construction, and most optimization techniques disregard it.

A very different situation exists when forecasting the risk and return characteristics of active managers. Forecast quality is much lower. The differences in forecast quality across managers, as well as between managers and asset classes, suggest that this risk must be addressed. In order to address forecast risk at the manager level, we need a way to quantify this risk. In general, investors may forecast poorly for two reasons:

Limited Information. Intuitively, the less information about a manager, the greater the challenge in forecasting the manager’s alpha and beta characteristics. As an example, investors would feel more comfortable forecasting the performance of a manager with a ten year track record than the performance of a manager with a two year track record. This type of forecast risk is known as sampling error. Fortunately, Bayesian approaches quantify sampling error by measuring the degree of uncertainty in the alpha and beta forecasts. This uncertainty depends

both on the length of a manager's track record and on the amount of additional information an investor possesses.

Incorrect Return Generating Model. Even with significant amounts of information, investors may generate incorrect forecasts if they use the wrong model for characterizing manager returns. This type of forecast risk is known as specification error. Specification error is more subjective than sampling error; it depends on an investor's assessment of how well he or she understands the manager's return generating process. Lower confidence in the return generating model generally will lead to lower confidence in alpha forecasts relative to asset class return forecasts. We recommend that investors specify a relative confidence level that is directly proportional to the investor's tolerance for active risk (alpha risk) relative to passive risk (asset class risk).

ACCOUNTING FOR DOWNSIDE RISK

When dealing with single managers, particularly single manager hedge funds, many investors are concerned about downside risk. Downside risk refers to the chance of a significant loss. Since many asset allocation models assume that returns are normally distributed, they underestimate the chance that certain hedge fund strategies will lose money if their return profile is skewed. Not accounting for this negative skew results in allocating too much to these strategies. Investors may account for downside risk in two ways:

First, by recognizing that some managers generate downside risk from exposure to asset classes. For example, certain distressed managers exhibit significant downside risk because they have substantial exposure to the high-yield asset class. In the approach outlined in this paper, since we separate returns into alpha and beta, downside risk from market exposures will therefore not impact alpha estimates.

Second, even after accounting for a manager's asset class exposures, some managers generate downside risk through their active trading strategies. For example, certain managers may hold very concentrated positions in distressed debt, which would lead to downside risk over and above that found in the high-yield asset class. We may estimate this downside risk by comparing the shape of a manager's alpha distribution with that of a normal distribution. We may then penalize the returns of managers who generate downside risk (because their alphas are non-normally distributed) in setting portfolio optimization constraints.

CONSTRUCTING PORTFOLIOS

After developing manager forecasts, quantifying forecast risk and penalizing downside risk, optimization techniques may be used to construct portfolios. Recognizing that manager forecasts are uncertain, investors may Monte Carlo simulate thousands of possible alpha and beta values for each manager. These simulations provide a range of risk and return outcomes for each candidate manager. After generating these possibilities, investors can choose portfolios that perform well under worst-case scenarios.

Standard optimization techniques try to identify portfolios that maximize some investor objective, such as portfolio Sharpe ratio or investor utility, based on the expected forecasts. In other words, if the investor's objective is to maximize utility, standard optimization techniques will compute the utility for every candidate portfolio and choose the portfolio with the highest value. Such techniques implicitly assume that forecasts are correct, and generate portfolios that perform well if this proves to be the case. If forecasts are incorrect, however, these portfolios are likely to perform poorly.

We recommend an approach that generates a distribution of utility values for each candidate portfolio, one of each set of risk and return possibilities. In contrast to standard optimization techniques, this approach assumes that forecasts may not be correct and explicitly seeks portfolios that perform well in worst-case scenarios. Although the resulting portfolio will be slightly inefficient if forecasts are correct, the investor gains in exchange a measure of protection against forecast risk. This approach is particularly powerful because it allows investors to allocate across active managers and passive asset classes in an integrated fashion. By contrast, traditional

optimization techniques either ignore forecast risk, which leads to unrealistic allocations, or treat asset class allocations and manager allocations as separable problems.

The approach proposed here accounts for alpha and beta uncertainty. Many investors focus on forecasting a manager's alpha and worry less about beta forecasting. However, beta forecasting is equally important. A manager who generates larger than expected beta may generate unwanted risk, whereas a manager who delivers less than expected beta can create a drag on portfolio returns. This becomes particularly relevant when dealing with Alternative investment managers, many of whom have significant discretion and are exposed to betas that change over time.

ACCOUNTING FOR TRACK RECORD LENGTH IN AN ACTIVE INVESTMENT PROGRAM

Investors have long realized the value of active investment management. By finding managers who can consistently outperform a benchmark on a risk-adjusted basis—in other words, who have consistently added 'alpha,' investors can substantially enhance portfolio returns. However, many investors face an implicit handicap when trying to accomplish these goals. For example, investors may have rules that eliminate managers with shorter track records. The rationale for such policies is that the shorter the track record, the less confidence an investor has in ability to project a manager's performance. For managers with extremely short track records, investors often have difficulty separating luck from skill. We challenge this approach here:

- Although these rules seem prudent, they eliminate potentially attractive managers from consideration.
- While shorter track records may reduce an investor's confidence in a manager's ability to sustain attractive returns, this additional uncertainty simply represents one more form of risk, and this risk can be managed.
- By moving to a framework that explicitly incorporates forecast uncertainty in the manager selection process, investors can attempt to tap the benefits from allocating to the widest possible set of skilled managers - while simultaneously seeking to control the risks posed by shorter track records.

In order to attempt to create successful actively managed portfolios, investors need to:

- Find managers that have produced high alpha on a risk adjusted basis.
- Combine as many of these managers as possible into a portfolio to diversify active risk (reduce the volatility of a portfolio of alpha sources).

Newer managers may be more attractive than managers with longer track records, for two reasons. First, to the extent that recent managers employ innovative trading strategies, they will face less competition. This implies that not only can they potentially generate higher alphas, but also that these alphas are less correlated to those of other managers. Second, even if managers with longer histories do pursue innovative strategies, the best managers are often closed to new investors. All else being equal, investors may have greater access to newer managers than to more established managers.

Newer managers, however, do create unique challenges for investors. Allocating to these managers requires developing views on their future performance (which is uncertain in any event and very difficult with limited historical data) and accounting for the high uncertainty (or equivalently, low levels of investor confidence) embedded in these views. In sum, investors face a tradeoff when allocating to managers with shorter track records.

A NEW FRAMEWORK FOR MANAGER SELECTION

Investors need a framework that explicitly incorporates forecast uncertainty (which depends partially on track record length) in the manager selection process.

Most investors are used to thinking about the risk of managers in terms of variations around an average level of returns - historical standard deviation. On a projected basis investors are exposed to two forms of risk: the underlying variability of each manager's returns and the uncertainty about the true average value of each manager's returns. Forecast uncertainty increases projected return variability relative to historical return variability. All else being equal, shorter track records tend to increase forecast uncertainty, i.e., investors have less confidence in their forecasts for managers with shorter track records. Therefore, through this uncertainty, shorter track records will increase projected return variability relative to longer track records. Interesting to note, this is a fundamental result from standard statistical theory: more data allows one to project average returns with a much greater degree of confidence than less data. By linking track record length to forward looking return variability, investors can compare managers with varying track records in a like-for-like fashion.

Up until now, we have built the case for viewing short track records as another form of risk that investors can rigorously manage. However, in order to use this approach in practice, investors need to estimate their uncertainty in the forward looking views of each manager; in other words, determine how confident they are in each of their forecasts. Conceptually, this uncertainty will depend both on the manager's track record and on the investor's qualitative information about a given manager. This qualitative information could come from a variety of sources, including extensive due diligence, detailed knowledge about the manager's strategy or even a previous working relationship between the investor and manager.

If investors have strong qualitative beliefs about a given manager's ability, track record length becomes less important. Conversely, the less qualitative information an investor has for a given manager, the greater the risk posed by a short track record. One way to implement this approach is by using Bayesian analysis. Bayesian analysis generates forward looking views by blending an investor's qualitative beliefs about a manager with that manager's historical performance. Furthermore, Bayesian analysis quantifies the confidence embedded in these views. By quantifying an investor's confidence in forward looking views, Bayesian analysis allows investors to compare all managers in a like-for-like fashion, regardless of their track record length.

SECTION SUMMARY

A prerequisite for constructing any high-quality portfolio is identifying skilled managers who an investor believes can consistently generate alpha. Although investors intuitively recognize the value of alpha, they historically have lacked appropriate analytical tools required to build portfolios that include active managers. We have tried to address these challenges by suggesting a more rigorous, integrated and, perhaps most important, practical framework that can be implemented for active investing. The approach is unique in that we believe it:

- More accurately measures manager alpha and beta on a historical basis.
- Explicitly forecasts manager performance by combining historical data with other information.
- Quantifies specific risks of active managers.
- Accounts for these specific risks when constructing portfolios.

Successful active investment management requires finding and combining multiple sources of skill-based return. However, general rules that exclude newer managers can be counterproductive. They limit the sources of skill-based return and potentially exclude some of the most promising investment strategies. Shorter track records do present additional forms of risk by reducing an investor's confidence in forward looking views. However, by managing this risk intelligently, investors can still incorporate these managers into their portfolios in a rigorous fashion and potentially improve overall performance.

While the details of this approach might require advanced analytical tools, we have tried to summarize the general principals in this section, which we hope will benefit investors even if they use a more qualitative portfolio construction technique.

SECTION 3 : HEDGE FUNDS & PRIVATE EQUITY

INTRODUCTION: ASSET ALLOCATION ISSUES WITH HEDGE FUNDS

The emergence of hedge funds as an important investment option raises a number of questions from a portfolio perspective. For example, should these vehicles be accessed via a diversified fund of funds, through single managers, or a mixture of the two? Or, alternatively, if investors believe that single managers can add value to their portfolio, how should they choose amongst the myriad options given their investment objectives?

Determining the combination of managers that may best fit a particular portfolio is more difficult to address. Indeed, as highlighted in Section 2 there are far more managers than asset classes, and the characteristics of these managers are notoriously difficult to predict. This is particularly true for hedge fund managers who often have short data histories. As a result, many investors assume that a rigorous approach to portfolio construction is infeasible, and end up choosing combinations of managers primarily on judgment. While expedient, this approach to manager selection may not necessarily lead to the best portfolios.

Notably, when taking a portfolio perspective there are at least two ways manager choices may not be appropriate. On the one hand, the chosen manager may not have the best prospects for outperforming their peers. On the other hand, the manager may have good performance in the future, but may still not fit well with the remainder of the portfolio. Given the large number of managers under consideration, choosing the best set of managers using judgment alone is a practically impossible task. Further, using a purely historical approach is also problematic, given that historical performance alone is often a poor predictor of future performance. Recognizing this problem, it is important to have a framework and principles for selecting single manager hedge funds that allows investors to do two things. First, combine both judgment and historical information in a quantitatively rigorous fashion, and select categories of managers on this basis. Second, explicitly incorporate the choice of categories of managers using two criteria: (i) their ability to meet the strategic objectives outlined in the asset allocations, and (ii) their ability to add value through active management.

WHY SINGLE MANAGER HEDGE FUNDS?

Before choosing a set of hedge fund managers, investors should understand why single manager hedge funds might be attractive within a broader portfolio. In other words, what must an investor believe about the single managers they choose in order to make investments in them? There are at least three reasons why investors may consider single manager hedge funds.

First, investors may believe that particular single manager hedge funds may offer high risk adjusted returns. Second, investors may believe that single manager hedge funds will help them diversify their portfolio. Finally, by investing in single manager hedge funds, as opposed to investing exclusively in a fund of hedge funds, investors can better control their exposure to such market sectors as equity and fixed income. Investors may also want to alter their weighting among managers and trading strategies depending on their strategic portfolios.

FUNDAMENTAL QUESTIONS AND CHALLENGES

When allocating to single manager hedge funds, investors often consider:

- How much of the portfolio should be allocated to single manager hedge funds?
- Which manager categories should be chosen and in what proportion?
- From where in the existing portfolio should single manager hedge funds be funded?

In order to answer these questions, investors need a way to make like- for- like comparisons. They have to compare the characteristics of single manager hedge funds to the asset classes already in their portfolio. They also have to compare the characteristics of one hedge fund to another. While this requirement seems obvious, in practice it is often very difficult. For example, how can an investor compare a long-short equity manager with a

3 year track record to a distressed manager with a 10 year track record? The managers may differ along many dimensions including style, volatility, liquidity, length of track record, and correlation to the investor's strategic portfolio. Even if investors are able to compare managers in a like for like fashion, they still need a way to determine whether the managers fit within their overall portfolios. Investors need to:

Consistently Measure Performance. Investors need a way to consistently compare the performance of managers across strategies. This becomes difficult since some hedge fund managers have different correlations to traditional asset classes, different levels of downside risk, and often—unlike traditional managers—no clear or appropriate benchmarks. One suggestion for measuring manager performance is to strip out all market returns, and only evaluate managers on their skill based returns. This allows a fair comparison of the value-added particular hedge fund managers achieve irrespective of their investment styles.

Consistently Project Performance. Even if a hedge fund manager has performed well historically, investors may have difficulty determining whether this performance is sustainable. As described in the previous section investors could take into account both a manager's historical performance data as well as more qualitative beliefs about that manager. For managers with longer track records, this approach attaches more weight to historical data.

Link Manager Selection To Strategic Allocation. Investors express their preferences through strategic asset allocations. However, investing in single manager hedge funds changes the characteristics of a strategic portfolio. When moving from a strategic allocation to a portfolio that includes single manager hedge funds, investors are changing the risk and return characteristics of their portfolios. In order to make this decision intelligently, investors need to understand their risk and return tradeoffs..

SUMMARY

The rise in the popularity of hedge funds has increasingly led investors to consider this asset class as an important component of their portfolios. Many investors have—with good reason—chosen to access these investments via highly diversified exposures to the asset class as a whole. In general, given the uncertainties associated with investing with a single manager, maintaining a 'core' allocation to a well-diversified portfolio of hedge fund managers, often via a fund of funds, would appear to be a sensible strategy. That said, investors also may believe that specific single managers—just like active equity or fixed income managers—have the ability to improve their portfolio performance. In this case, the investor needs to determine how to balance the risks of investing in single managers against these rewards. This subsection outlined considerations which may help investors evaluate this tradeoff as they approach allocating to single manager hedge funds.

INTRODUCTION: ASSET ALLOCATION ISSUES WITH PRIVATE EQUITY & REAL ESTATE

Private Equity and Real Estate is much less liquid than traditional securities or hedge funds. What is more, they may also carry a higher level of risk, heightened in many cases by their illiquidity. The combination of these factors can make evaluating their performance difficult. We now discuss ways for dealing with some important issues in allocating to illiquids. The performance and diversification benefits of these investments are very real, provided investors and investment managers understand and account for their unique characteristics. But therein lies the rub: given their illiquidity, these assets are very difficult to compare to traditional investments, and as a result, they have historically been poorly represented in strategic asset allocation models – or left out altogether. Because a process of allocating appropriately to these important assets has been so elusive, many investors may be holding either more or less of them than they should be. A viable approach should include:

- Consistently measuring risk in illiquid asset classes.
- Accounting for the portfolio rebalancing challenges posed by illiquid assets.
- Tailoring optimum illiquid allocation levels to an investor's individual liquidity needs.

TRADITIONAL APPROACHES TO DEALING WITH ILLIQUID ASSETS¹⁵

The issues with illiquid investments – measuring their risk, rebalancing them and adjusting their levels to individual preferences – have historically confounded attempts to include them appropriately in an overall investment strategy. Some investors have chosen to simply ignore them. Those taking this route potentially miss opportunities to participate in this asset class.

A popular approach has been to treat ‘baskets’ of liquid asset classes and illiquid asset classes as separate portfolios. The better-understood liquid portfolio is ‘hived off’ and structured using sophisticated and well-established techniques, and a separate ‘gut’ or seat-of-the-pants approach is taken to choosing illiquid assets. The problem with this approach is twofold: It ignores the question of how large each of these baskets should be, and it ignores the fact that these two portfolios interact.

Some investors take another road. Without suitably addressing any of the foregoing issues, they simply close their eyes to the allocation problems posed by illiquid asset classes and deal with the portfolio as a whole. The problems created by this approach are obvious: Liquid and illiquid classes cannot be compared to one another in traditional ways, and making inaccurate comparisons will lead investors to inaccurate conclusions about where their money should be allocated. Given this situation, the liquid-illiquid allocation issue often appears to be a quandary that cannot be resolved. As such, it leaves investors with a nagging question: “Is there any way to take advantage of the potential benefits of these illiquid asset classes without risking large investment miscues?” The answer, we believe, is ‘Yes.’ By applying new approaches to the challenges of measuring illiquid risk, rebalancing illiquid assets and tailoring portfolio allocations to individual liquidity requirements, investors can capture the benefits of these assets within an integrated asset allocation framework.

Accurately Measuring Risk In Illiquid Assets. When constructing a portfolio, investors must ensure that they are comparing ‘apples to apples.’ For illiquid asset classes, unfortunately, investors have found it difficult to measure the risk in a way that allows for comparison with liquid investments. Since illiquid asset classes are not traded on a regular basis, valuations and returns are difficult to assess. In short, the prices for these assets are not regularly observed, and therefore are not comparable to those in public markets. Instead, investment managers employ a variety of methods to report their returns. Many, for example, hold investments at the initial book value until they are revalued in the marketplace through the sale of all or part of the asset. Even in cases when privately held assets are revalued, there is a wide range of methods for doing so, meaning that reported returns may or may not reflect the true value of the investment.

We are left with a problem of comparing one set of assets that are ‘marked to market’ – or revalued frequently – to another set that of assets are valued infrequently. This often leads to an incorrect assessment of the risk level of the investments that are not regularly marked to market. The effect of these two problems – understatement of risk and understatement of correlation – is that investors can overallocate their investments to these illiquid asset classes.

How can this be addressed?

The answer is that if we had some way to truly mark to market the returns in illiquid asset classes, we could more accurately compare the risks of each of these asset classes, and their correlations to other asset classes. To attempt to accomplish this, we may develop a method that allows us to construct a marked to market estimate of the underlying risk in these less-traded securities. The process involves several steps.

We may start with the historical, and ‘inaccurate’, reported data, and then incorporate three kinds of information. First, to account for the ‘staleness’ in pricing, we may use a procedure that is sometimes referred to as ‘unsmoothing.’ This involves removing the previous period’s valuations from the current valuations, only

¹⁵ Many SWFs have a much longer time frame for managing investments than the typical private equity firm. Unlike financial sponsors, these SWFs do not have a need to exit an investment through an IPO or sale and can take an ownership position for longer than five to seven years.

looking at the unique change in investment value. Second, to appropriately capture market volatility, we incorporate information found in public market indices. Third, we include pricing information from the full set of private markets. This is an important step, for while all of these asset classes might be subject to common market risks, different types of alternatives will have very different levels of liquidity risk. In particular, variations in the level of liquidity can be very different in public and private markets, which can create unique risks that we must take into account. By using this method, investors get a much more reasonable and accurate picture of the risks and diversification opportunities available among illiquid investments.

Accounting for Portfolio Rebalancing. When choosing an investment strategy, investors implicitly make dynamic choices. Given their investment objectives, they choose an allocation at which, on average, they would like to be. In practice, of course, certain investments grow faster than others – and the portfolio drifts away from its optimal allocation. The process of ongoing review and reallocation of the portfolio is referred to as rebalancing.

When all assets are liquid, rebalancing is a straightforward exercise. However, when illiquid asset classes are added to the mix, rebalancing becomes more complicated. The complications occur because illiquidity, by definition, restricts the ability of investors to buy or to sell. As portfolios drift away from their best possible, or optimized, asset allocation strategies, they might stay there for long periods of time, and investors may be forced to bear the costs of being less than optimally allocated. This represents a constraint imposed on portfolio management, and is considered an implicit ‘cost’ of holding illiquid investments. Once the problem is conceptualized this way, however, investors can try to compensate for it in their initial allocation construction. Based on the methodologies of work by academics,¹⁶ we estimate the cost of holding illiquid assets with respect to rebalancing the portfolio ranges between 0.45% and 1.45% in returns on an annualized basis for typical investors holding characteristic portfolios. Now that these costs have been roughly estimated, we may apply a ‘tax’ on our expectations about the returns in these asset classes. What this does in practice is reduce the allocation, in most situations, to illiquid investments. The conclusion is intuitively obvious. Since investors may not be able to sell the illiquid asset classes to rebalance their portfolio, this method leads to smaller initial allocations to illiquids. As a result, as the illiquid portfolio holdings grow, they will remain, on average, at the optimal level that investors initially selected.

Accounting for Investor-Specific Liquidity Requirements. Once investors have appropriately accounted for the true risks and costs of investing in illiquid assets, they still must be paid a premium to compensate for investment lock up. One approach might be to reduce expectations of return on illiquid investments by the amount we think we are getting paid for illiquidity. In this way, we attempt to make the illiquid investments more ‘liquid-like.’ There is, however, a drawback to this approach. Every investor’s need for liquidity, just like his or her appetite for risk, is unique. Some investors need a great deal of liquidity; others do not. By treating all investors as a ‘market average,’ this approach ignores important differences between investors. A better approach is to tailor the investment strategy to the characteristics of the investor. If the market provides a premium to investors who invest in illiquid investments, those who do not need liquidity should collect the premium, while investors who anticipate needing substantial amounts of cash in the years to come will need more liquidity, and will therefore accept lower returns in exchange for the necessary access to cash. This approach emphasizes that rather than using only one dimension – risk – to classify portfolios for investors, it is also important to use a second dimension – liquidity, which is an investor-specific characteristic that is a crucial input to an asset allocation strategy.

SUMMARY

It is important to point out that this approach will continue to evolve for some time. While considerable work remains to be done, we believe that the conceptual framework outlined here for measuring risk in illiquid alternative investments is an important step in addressing investment objectives within a holistic liquids-illiquids context.

¹⁶ Browne, Milevsky and Salisbury, 2002; and Longstaff, 2001

SECTION 4 : GOVERNANCE ISSUES IN ALTERNATIVE INVESTMENTS

When viewed as a large part of the active management industry, hedge funds demand unique forms of governance with unique incentives, processes and constraints. It is not surprising that new forms of governance have emerged as alpha and beta have begun to be managed separately. While the combination of the two embedded in traditional active management structures may have justified one method, when alpha and beta are delivered separately, the old forms of governance may not be the most appropriate for each of the pieces.

CHALLENGES IN GOVERNING ALPHA GENERATION

The appropriate governance structure for alpha generation has to address a number of the issues that are embedded in the production of alpha. Interestingly, these issues are not unique to active management. The governance issues that apply in active management are typical of many businesses in which human capital (e.g., talent and skill) and intellectual capital (e.g., technology, innovation and knowledge) are a primary basis for value creation. When considering which governance structure is appropriate, important issues to consider are:

Beta Is a Commodity; Alpha is Not. Through futures, swaps, index funds and ETFs, beta replication largely is an undifferentiated, fixed cost business. In contrast, alpha generation is rare and unique, since skill is difficult to replicate. Beta, therefore, is a commoditized business, where scale is the main basis for competition, and price pressure is substantial. Alpha requires dynamically developing and protecting one's intellectual property, informational advantages and human capital.

Returns Are Volatile and Uncertain. A manager's historical performance—even with a long, consistent track record—could be the product of luck (good or bad) or skill.

Investors Cannot Perfectly Tell Who Is Skillful and Who is Not. If alpha is hard to generate, it is even harder to observe. This means there is an information asymmetry between manager and investor—what is called a problem of hidden information in organizational economics—about the type of manager with whom an investor is doing business.

Investors Cannot Perfectly Tell What Actions The Manager is Taking. In addition to the hidden information problem, active management possesses another potential informational asymmetry—commonly termed hidden action. What managers are doing also may be imperfectly observable to investors. As an example, some managers may take on downside risk—which will generate attractive returns but also expose investors to downside events.

Investors Are Less Exposed To Fund Performance Than The Fund Manager. This may seem counterintuitive, but it stems from practical considerations. Investors (usually) have a portfolio of investments so their tolerance to assume risk on any single investment or manager is made in the portfolio context. Managers, however—especially if they have their own capital largely invested in their fund—are personally less able to diversify the risk they take in their fund.

Investment Constraints Lead To Inefficiency. There is a general principle in optimization that, all else being equal, an unconstrained solution to any problem generally is as good as, if not better than, a constrained one. In the context of active management the value added of active managers is equal to their degree of skill in predicting future values, the number of independent opportunities they identify and the degree to which they can act on those opportunities.

IMPLICATIONS OF MANAGING ALPHA PRODUCTION

There is a need to develop governance models more appropriate for an 'unbundled' world. This has the following implications:

Implication 1: There is no ‘silver bullet’- governance is about tensions.

Transparency. Hidden information and hidden action require greater transparency to mitigate. However, the fact that active management is an intellectual property business implies that the ability to generate alpha will decline if information about how it is generated is made public.

Incentive Strength. Good managers may be discouraged from entering the active management industry if they are overly exposed to risk that they cannot easily diversify. An investor-with a broadly diversified portfolio-can and will assume the risk of a single investment or manager. It is much more difficult for managers to diversify since their income and their own capital are much more tied to the performance of the fund. Strong incentives only magnify this problem. In the extreme, we may have adverse selection problems where only excessively risk-seeking managers would be willing to participate in active management, shrinking the pool of skill. This suggests a weaker incentive system. On the other hand, strong incentives can enhance alpha generation. First, strong incentives help screen out weaker managers. Since those who are more skilled will generate, on average, more attractive economics when incentives are strong, they will be more willing to accept such a structure. Second, strong and explicit incentives should encourage managers to ‘invest’ in intellectual property and human capital to maintain and improve performance, again enhancing alpha generation.

Incentive Symmetry. A related problem in the design of incentives for active management is not just the strength but also the shape of symmetry of incentives from gains and losses. Again, the features of active management tend to involve a tradeoff. On the one hand, asymmetric incentives, where managers enjoy the benefits of gains with investors but do not suffer losses alongside them, encourage a particular type of moral hazard: excessive risk taking. Because managers do not internalize the costs of losses under an asymmetric structure, the expected payout of large risks is higher for the manager than the investor, meaning the manager potentially will take more risk. On the other hand, if managers are too exposed to downside risks, only those who are extremely risk-seeking may participate.

Investment Constraints. On the one hand, greater restrictions on the actions of managers may limit problems of moral hazard. On the other hand, the fact that fewer constraints create greater opportunities to add value suggests that constraints should be lower. In sum, the characteristics of active management create governance problems.

Implication 2: The hedge fund ‘format’ provides a more appropriate, albeit not perfect, governance structure for active management.

Traditional long-only active management formats solve governance tradeoffs in a particular and unbalanced way. Across every dimension, manager incentives are limited, and risk is taken almost exclusively by the investor. This limits the ability to screen out poorly skilled managers and to motivate effort. In the absence of strong incentives, constraints on actions such as regulation and inflexible investment mandates then emerge as additional ways to manage residual moral hazard problems-albeit at the cost of compromising alpha.

While the typical hedge fund incentive structure is not perfect, it strikes more of a balance. Strong incentives and created through performance fees-which may serve to screen out truly unskilled managers and motivate others to generate alpha. Similarly, the alignment of incentives is complemented by a lower degree of constraints-increasing opportunities for alpha generation.

Why do the traditional governance structures exist at all? One answer may be that traditional (long-only) active managers care relatively less about alpha generation than hedge fund managers do. Before the emergence of more sophisticated financial instruments, many investors had no choice but to bundle alpha with beta. Tracking passive investments is not about skill-but scale and cost minimization. Alpha generation requires the exact opposite-performance incentives have the potential to screen and align incentives more appropriately. In the traditional model, where alpha and beta are explicitly bundled, these two governance pressures operate in exactly the opposite direction, and it is possible that the flat-fee, regulated structure was optimal for the bundle.

It may not be surprising, therefore, that as alpha and beta have become increasingly unbundled, there has been the potential to create more efficient structures for each of the pieces.

Implication 3: Combining incentive fees and co-investment: Relaxing the governance tradeoffs further.

One of the central problems that investors encounter is that the ‘standard’ management plus incentive fee structure is too coarse. Perhaps most important, the fundamental incentive distorting behavior in hedge funds is that managers do not participate on the downside. Here, there are a number of ways that the tradeoffs may be relaxed more effectively. It may be that the simplest way that manager incentives can be effectively aligned with investors is manager participation in funds. If a manager has significant ‘skin in the game,’ there is potential to solve residual incentive problems. If properly calibrated, a mixture of standard fees and co-investment can reduce sharp governance tradeoffs for the manager. The correct level of optimal co-investment will depend principally on two factors:

RELATIVE RISK AVERSION BETWEEN MANAGER AND INVESTOR. A manager and an investor may have very different risk/return preferences, particularly given the degree of the manager's exposure to the performance of the fund. The manager's payoffs, particularly if the manager is averse to downside risk, do not need to be perfectly symmetrical. For example, if a manager is four times as averse to downside risk as upside return, a 5% participation on the downside and 20% participation on the upside may be enough to ensure that the manager and investor are incentive aligned.

COINVESTMENTS. Establishing an appropriate level of co-investment is a balancing act. At low levels of co-investment, managers may have incentives to take too much risk. Equally important, at very high levels of co-investment, the opposite may occur: Managers, who cannot as easily diversify the downside as investors, may not take enough risk. Only in the middle—in other words, ‘not too hot, not too cold, but just right’—will managers have risk-taking incentives aligned with those of their investors.

Implication 4: Governance models will converge.

Traditional active managers provide investors with both beta and alpha. In that environment, scale and cost are as important as alpha creation—cheaper provision of beta could offset underperformance on the alpha dimension. This, perhaps, is one of the reasons why expense ratios are a critical differentiator among traditional funds. The introduction of cheap and accessible passive investing has sharpened the basis on which traditional managers compete.

It is perhaps not surprising, therefore, that new governance formats have emerged that are hybrids among the standard structures. Some hedge fund managers now are packaging beta explicitly with alpha and offering a structure that effectively is the two independent pieces—and two governance structures—combined. These funds typically have a lower fixed management fee and then an incentive fee based on outperformance to the market. The key point is that the incentive characteristics are aligned to each of the pieces more appropriately. In sum, since beta and alpha now are easily decomposed, asset managers have the ability to repackage them in much more tailored structures to meet the objectives of particular investors. The key to success of these structures, however, is how well they create opportunities for alpha and how effectively they align their mix of incentives against the challenges of generating alpha.

SECTION SUMMARY

The real question for investors is which of two models of governance—the traditional active management model or the hedge fund model—is more suited for generating alpha?¹⁷ While structural features of alpha generation do

¹⁷ Historically best practices in investment governance have centered around having adequate systems and process that address: (i) written investment objectives (ii) appropriate asset allocation strategy (iii) manager evaluation and research (iv) manager search and selection (v) ongoing oversight & evaluation of investment managers (vi) performance measurement reporting (vii) ongoing asset allocation advice (viii) process documentation

involve tradeoffs, on balance, the hedge fund form is more appropriate for alpha generation. While superior to a traditional model, the hedge fund format is imperfect. Therefore, mechanisms to make the manager/investor outcomes more symmetrical (such as an appropriate level of co-investment), when combined with the current hedge fund governance structure, may further align incentives between managers and investors. In time, the governance tradeoffs should be relaxed through tailored structures.

One could foresee a range of governance structures that vary by fund size and age, managers and investor preference, and so on. The challenge for both managers and investors is to recognize the tradeoffs and agree on appropriate structures, then execute in an operationally tractable manner. This will mean a further sea change in the active management industry but one that will encourage the goal at the heart of the industry—the pursuit of alpha.

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CONCLUSION

Many SWFs and Government Investment Funds are now permitted to invest in riskier Alternative investments. While SWFs with a stabilization funds role and Central Banks tend to invest in liquid and safer instruments, future generation focused SWFs with longer term buy and hold horizons tend to invest more heavily in Alternatives. This is likely to rise further, despite the current downdraft.

Integrating Alternative investments into portfolios, however, has been difficult to do in a rigorous manner because the asset allocation technology that is available to many investors is ill equipped to handle the complexities that Alternative investments present. A more sophisticated asset allocation paradigm must evolve to address the investor's dilemma. A new principle based paradigm advocated in this paper is the multidimensional asset allocation approach. This approach seeks to address a richer set of returns and risk drivers than what is addressed by classical asset allocation models grounded in the tenets (and burdened by the assumptions) of Modern Portfolio Theory.

A prerequisite for constructing any high-quality portfolio is identifying skilled managers who can consistently generate alpha. Although investors intuitively recognize the value of alpha, they historically have lacked appropriate analytical tools required to build portfolios that include active managers. This paper addresses some of these challenges by suggesting a more rigorous, integrated and, perhaps most important, practical framework that can be implemented for active investing.

The rise in the popularity of hedge funds has increasingly led investors to consider this asset class as an important component of their portfolios. The paper outlines considerations which may help investors arrive at better approaches in allocating to single manager hedge funds. The paper also touched upon a conceptual framework for measuring risk in illiquid investments.

Alternative investments demand unique forms of governance with unique incentives, processes and constraints. This paper explores some of the new governance challenges and their implications for the active investment management industry.