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Equity securities are more volatile than bonds and subject to greater risks. Small and mid-sized company stocks involve greater risks than those customarily associated with larger companies. Bonds are subject to interest-rate, price and credit risks. Prices tend to be inversely affected by changes in interest rates. Unlike stocks and bonds, U.S. Treasury securities are guaranteed as to payment of principal and interest if held to maturity. REITs are more susceptible to the risks generally associated with investments in real estate.

Investments in foreign markets entail special risks such as currency, political, economic and market risks. The risks of investing in emerging-market countries are greater than the risks generally associated with foreign investments.

New Dimensions in Asset Allocation

During the last 18 months, investors witnessed nearly unprecedented declines in the value of their portfolios. For example, during the 2008 calendar year, the average private pension fund declined by 26%, while the average endowment fell by 20%.[1] The losses themselves were perhaps unsurprising, since most forms of risky assets declined substantially. However, the losses proved shocking relative to expectations. Many investors assumed that a well diversified asset allocation program would prevent a 20-30% annual decline in their portfolio value, particularly since traditional asset allocation models assign almost no probability to losses of this magnitude.

Viewed in this light, many investors felt misguided. Traditional asset allocation models did not properly account for the actual risks embedded in portfolios. These risks include liquidity shocks, correlations that change over time, and uncertain cash flow requirements. The mismatch between investor expectations and actual portfolio risks is evidence that many investors ended up with portfolios that did not meet their objectives. As a result, investors have started to question the validity of traditional asset allocation models, and their ability to appropriately reflect portfolio risk.

While no model is perfect, AIP sympathizes with investor frustrations regarding traditional asset allocation. Historically, asset allocation models have suffered from two flaws. First, these models treat all asset classes in similar fashion. Unfortunately, the types of risks investors face differ significantly across asset classes. Private equity, for example, exposes investors to liquidity risk, whereas public large-cap equity does not. Investors need a way to account for these differences when constructing portfolios. Second, traditional

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[1] Source: National Association of College and University Business Officers; Milliman 2009 Pension Funding Study; Watson Wyatt

models do not account for the evolution of a portfolio's characteristics over time. They assume, for example, that investors can continuously rebalance portfolios, and ignore an investor's cash flow requirements. While traditional models may accurately reflect a portfolio's *average* characteristics, the portfolio's *actual* characteristics may vary significantly from the average. These changes may lead to additional risk in any given period.

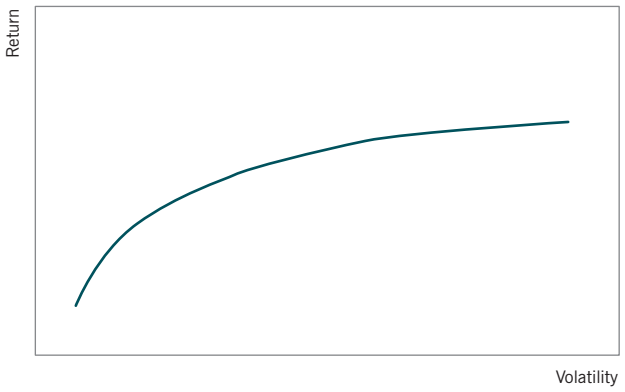
Put differently, conventional asset allocation suffers from a lack of nuance. By assuming that return volatility alone captures investment risk and that portfolios are static, it fails to provide investors a realistic picture of portfolio behavior. In an attempt to overcome these limitations, AIP provides a new asset allocation framework that extends traditional models in two dimensions: across sources of return, and across time. These changes lead to a framework that may help investors better understand the risks they are taking, as well as how these risks may evolve.[2] While the application of such a framework would not have circumvented losses in 2008, it should help investors choose a portfolio that more closely matches their objectives and perhaps more effectively manage risk.

The remainder of this publication follows three sections. It first provides more detail on the limitations of traditional models, and the need for a new asset allocation approach. It then introduces AIP's asset allocation framework, both at a theoretical and practical level. Finally, it uses several examples to highlight the differences between traditional models and AIP's framework.

Limitations of Traditional Asset Allocation

Most traditional asset allocation models follow some variant of mean variance optimization, pioneered by Harry Markowitz in the 1950s.[3] Mean variance optimization characterizes assets according to their expected return, volatility, and correlation to one another.[4] Based on these estimates, as well as an investor's risk target, mean variance optimization creates an "efficient frontier," which identifies portfolios that produce the highest level of return for a given level of risk (as *Display 1* illustrates).[3]

Display 1:
Illustration of Mean Variance Optimization Approach



[2] Note that this paper focuses on risks generated by underlying investments, not on the larger set of risks that an investor faces. For example, it does not consider the risk of underperforming peers. While these risks are important, they fall beyond the scope of the paper.

[3] Source: Markowitz, H.M. Portfolio Selection. The Journal of Finance. March 1952.

[4] "Expected return" is an estimate of an investment's average future return. "Volatility" is the degree of movement around the average return. "Correlation" is the degree to which the returns of different investments move together.

Mean variance optimization has been well studied, and is relatively easy to implement. However, this technique rests on two implicit assumptions that do not hold in practice.

First, it assumes comparability across asset classes. In other words, mean variance optimization uses the same techniques to model the risk and return of equities as it does for private equity and hedge funds. Unfortunately, each of these asset classes consists of different types of returns, with very different associated risks. Treating asset classes in a similar fashion tends to mischaracterize (and potentially understate) the risks that investors face.

Second, it makes decisions myopically, without considering how the portfolio (or an investor's needs) may evolve in the future. If an investor's needs are stable, and the portfolio is fully liquid, this approach leads to reasonable solutions. If, however, investor needs vary over time or if today's decisions limit an investor's future options, a myopic approach leads to portfolios that may fail investors at particular points in time.

While these assumptions may have been reasonable in a world of stocks, bonds, and cash, they fail to capture the complexities of current investments such as emerging market equity, hedge funds, and private real estate.[5] The remainder of this section examines each limitation in more detail.

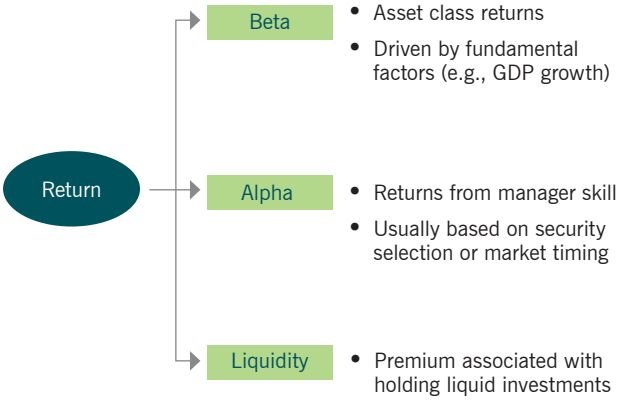
Accounting for Multiple Sources of Return

Traditional asset allocation treats all asset classes in the same fashion. It compares assets based on their expected return, volatility, and correlations. These comparisons may work across stocks, bonds, and cash, but break down when considering a larger set of investment choices. The reason is that certain investment choices have a very different risk and return profile than others. For example, consider three investments: a U.S. large cap equity ETF, a U.S. large cap equity manager, and a private equity manager. The returns from the first investment depend directly on the performance of U.S. equity markets. Performance of the second investment depends primarily on the performance of U.S. equity, but also on the investment manager's investment acumen. Finally, the performance of a private equity fund depends on three factors: U.S. equity market performance, the investment manager's acumen, and the liquidity premium generated from investing in less liquid assets. Treating these three investments in the same fashion ignores the fact that each investment generates returns in different ways, and entails very different types of risks.

Investors need a way to properly account for the risks embedded in each investment when making portfolio decisions. One option is to separately model the risk characteristics investment by investment. In practice, however, the large number of investments in most portfolios prohibits this approach. A second option, which AIP advocates, is to focus on the underlying drivers of risk and return within each asset class. While the specific characteristics of each investment option may differ significantly, all investments generate returns from one of three sources: beta, alpha, and liquidity (illustrated in *Display 2*).

[5] Even in the traditional world of stocks, bonds, and cash, mean variance optimization does suffer some limitations. In particular, the recommended allocations are very sensitive to the input assumptions, meaning that small changes in return forecasts could have a large impact on portfolio allocations.

Display 2:
Sources of Return



Beta refers to returns driven by fundamental macroeconomic factors such as GDP growth, interest rates, and inflation. These returns correspond to the returns of major asset classes, such as U.S. equity, high yield, and commodities. Since the global economy has grown over the long run, and beta returns depend on macroeconomic performance, beta has historically delivered positive returns on average.

Alpha refers to skill-based returns. These are returns generated by a manager's active decisions regarding market timing or security selection. Since each manager generates a unique alpha, investors can choose from a virtually infinite number of alphas. Unlike beta, alpha is a zero-sum game. The excess returns that one investor generates through successful stock picking or market timing comes at the expense of another investor. A well diversified portfolio of alphas will not necessarily generate positive returns, and could produce negative performance.

Liquidity refers to the returns investors generate for investing in non-traded assets. For example, investors allocating to private equity typically cannot access their capital for a multi-year period. In exchange for giving up the option to sell their position, investors expect to earn a higher rate of return over time. Like any option, the liquidity premium depends on the horizon (i.e., lockup period) and on the volatility of the underlying asset class. Therefore the liquidity premium will differ across

Risks Associated with Each Source Return

Traditional approaches only focus on one form of risk: volatility. Volatility appropriately captures risk if returns follow a normal distribution. Unfortunately, if investment returns follow non-normal distributions, volatility may significantly understate downside risk. AIP uses measures of skew and kurtosis, in addition to volatility, to capture the non-normal aspects of an investment's return distribution.[6]

Since the risk of an investment depends on its sources of return, AIP directly models the volatility, skew, and kurtosis of each return source, and then aggregates these at the investment level. *Table 1* below illustrates the distributional characteristics of each return source:

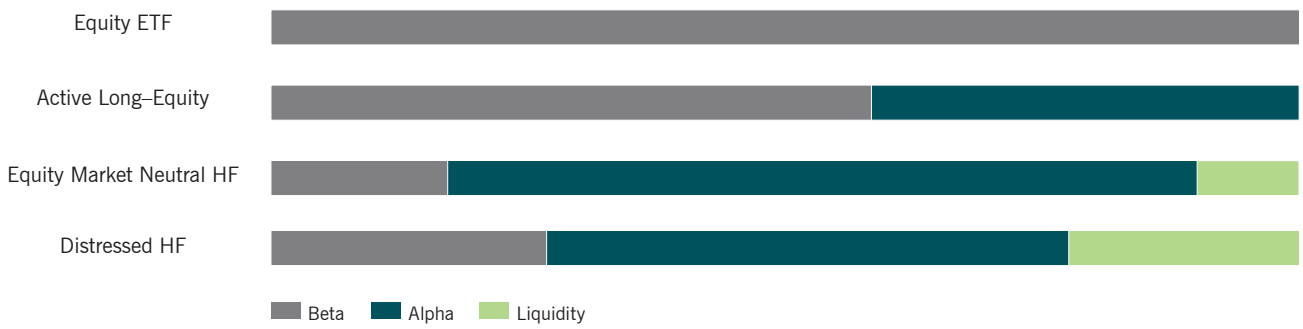
Table 1:
Distributional Characteristics of Each Return Source[7]

	Importance as a Driver of Risk		
	Volatility	**Skew**	**Kurtosis**
Beta	High	Moderate	Moderate
Alpha	High	Low	Low
Liquidity	High	High	High

[6] Skew refers to the asymmetry of a return distribution, or the extent to which it leans to one side. Kurtosis refers to the peakedness of a probability distribution. Distributions with significant kurtosis have a greater chance of producing abnormally large or small outcomes relative to normal distributions. Note that skew and kurtosis are often discussed in reference to downside risk, but can also increase upside potential. For example, some private equity strategies are particularly attractive over time because of positive skew.

[7] Source data: historical hedge fund manager data from PerTrac; private equity returns from Venture Economics; index returns from Bloomberg which include MSCI Emerging Markets Index, S&P 500, CSFB Leveraged Loan Index, Barclays Aggregate Bond Index, and Merrill Lynch Convertible Index. Data covers 1990 through 2008.

Display 3:
Sources of Return for Sample Investments[8]



asset classes (e.g., one would expect a greater liquidity premium in private equity than in private real estate, since private real estate typically has lower volatility than, and returns cash more quickly than, private equity).

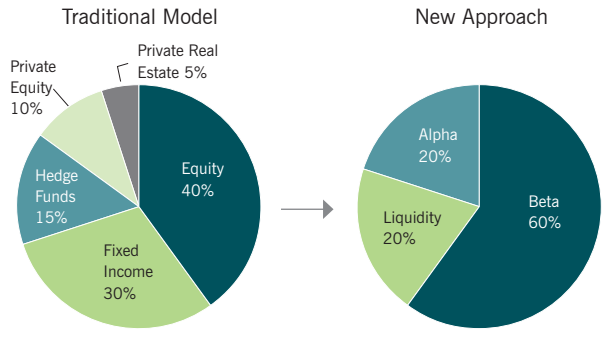
These differences lead to highly varying risk profiles across each return source. Investing in illiquid assets entails significant downside risk, since these assets may rapidly lose value during liquidity shocks. Additionally, investing in active managers entails significant forecast risk (i.e., risk that one's forecasts are incorrect) since the long run performance of alpha has been much less certain than the long run performance of beta. As one example, the callout box describes how AIP accounts for differences in return distributions for alpha, beta, and liquidity.

Each investment option generates returns from some combination of beta, alpha, and liquidity. *Display 3* illustrates this point in more detail.

As indicated in *Display 3*, an Equity ETF generates all of its return from beta. By contrast, a distressed hedge fund manager generates some return from beta, some from alpha, and some from liquidity. Understanding the sources of return embedded in each investment may help investors better understand the associated risks and may enable them to make more intelligent portfolio allocation decisions.

Instead of making allocation decisions across asset classes, AIP recommends that investors allocate across sources of return, as *Display 4* illustrates. This provides a more transparent view of portfolio risk, and helps ensure that an investor's portfolio matches the investor's risk profile.

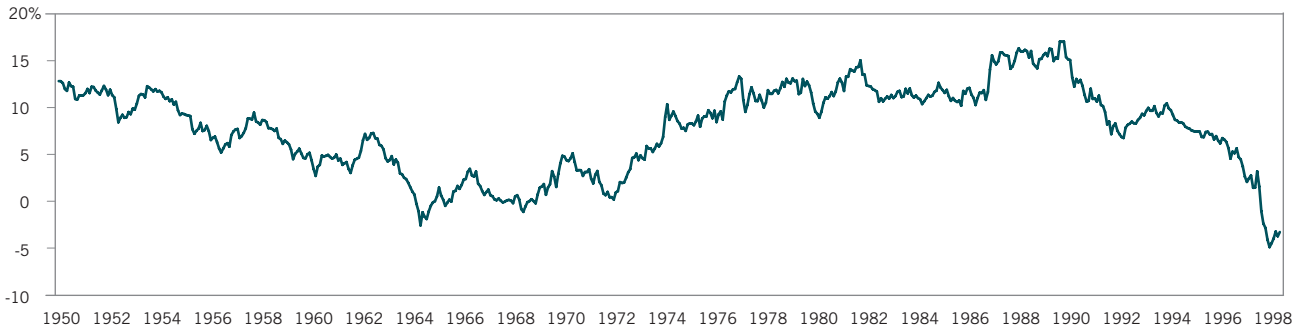
Display 4:
Comparison of Traditional Asset Allocation and a New Approach to Asset Allocation[9]



[8] Source: AIP

[9] Source: Examples of the traditional approach can be found in Secrets of the Academy: The Drivers of University Endowment Success, Harvard Business School Finance Working Paper, October 2007.

Display 5:
Annualized 10 year S&P 500 Returns (Measured Over Subsequent Years)[11]



Accounting for Portfolio Evolution

In addition to focusing on asset classes, traditional asset allocation is myopic. It makes decisions based on conditions today, without considering how those conditions may change going forward. This type of an approach ignores three important factors:

1. **Asset class characteristics change significantly over time** – Although risk and return characteristics of many investments have been stable over very long periods, they may change significantly in the short to medium term. For example, the S&P 500 volatility fell to 10% during 2007, and then spiked to well over 50% during the second half of 2008.[10] This created large losses for many investors who over-allocated to equity assuming that volatility would remain constant. Additionally, the average returns of asset classes may vary significantly across market cycles. As *Display 5* indicates, the 10-year return for U.S. equity was less than 5% for most of the 1960s, but above 10% throughout the 1980s and early 1990s.

2. **Decisions made today may affect investors' future options** – Investors who allocate to illiquid asset classes lose the ability to change these allocations in the future (at least for a several year period). This causes the actual portfolio weights to drift away from an investor's desired allocation.

3. **Investors' needs vary with time** – Investors' financial needs, such as cash flow requirements, may vary significantly over time. In addition, these needs may correlate with portfolio performance. For example, periods of market stress may limit an endowment's ability to raise money from alumni, and simultaneously lead to losses in the investment portfolio. Traditional optimization has no ability to account for these changes when choosing a portfolio.

[10] Source: Based on VIX index, which measures the implied volatility of the S&P 500 index. Implied volatility refers to the volatility level embedded in options prices, and measures investors' collective view on future volatility. VIX data obtained from Bloomberg.

[11] Source: Underlying S&P 500 total return data obtained from Bloomberg. Computation of 10-year forward returns performed by AIP. 10-year returns illustrated in Display 5 span January 1950 through July 1999 timeframe. Past performance is not indicative of future results.

AIP's Portfolio Construction Approach

AIP has designed a new framework that seeks to overcome the limitations of traditional asset allocation models. The framework extends the traditional asset allocation approach in two dimensions: across source of return, and across time.

Extensions across source of return – Instead of assuming that all asset classes behave in the same way as equity and fixed income, our framework recognizes that each investment consists of a unique combination of alpha, beta, and liquidity. When making portfolio decisions, AIP decomposes investments across these three return sources and chooses allocations across return sources instead of across asset classes.

Extensions across time – Our framework accounts for a portfolio's evolution over time. It models the characteristics of each return source over time, to capture changes in the risks, returns, and correlations across investments. It then considers these potential changes as well as an investor's needs over multiple periods when choosing an optimal portfolio. This approach may help avoid portfolios that provide attractive average characteristics, but may deviate from these characteristics significantly during any given period.

Like traditional optimization, AIP starts with the three-stage process of 1) understanding historical performance, 2) generating risk and return forecasts, and 3) running an optimization to seek to identify portfolios that best suit an investor's needs. However, our implementation differs significantly from traditional approaches. AIP applies this process across sources of return, as opposed to traditional optimization, which focuses on total return. AIP then extends each of these stages across time. *Display 6* illustrates the process, and provides a brief description of each stage.

Display 6:
AIP Asset Allocation Framework

	First Dimension: Across Return Source	Second Dimension: Across Time
Disaggregation	Splits historical returns for each investment into alpha, beta, and liquidity components	Tracks changes in these components over time
Forecasting	Projects average risk and return characteristics of each return source	Simulates how these characteristics may evolve going forward
Optimization	Incorporates multiple forms of risk into allocation decision	Chooses allocation based on changes in investor needs over time, and changes in investment characteristics over time

AIP starts by disaggregating returns for each investment into beta, alpha, and liquidity components, and tracking how these components have changed historically. For example, this allows one to estimate a long/short equity manager's historical exposure to the S&P 500, as well as track how that exposure changed over time.

AIP then generates forecasts for the average behavior of each return component, and project how these components are likely to evolve around their average. Consider a manager with an average net exposure of 0.5 historically, but whose beta varied significantly around that average. AIP may forecast a future average beta of 0.5, but also simulate deviations around the average. Our forecasts consider the possibility that in any given future period, the manager's actual beta may be significantly higher or lower than the manager's average beta.

Similar to traditional optimization, our approach chooses a portfolio that seeks to best match an investor's preferences. However, the optimization stage of our approach differs from that of traditional optimization in two ways. First, it incorporates different forms of risk. For example, investors face significant forecast risk when allocating to active

managers. Since alpha generation is highly uncertain, investors face substantial risk that their alpha forecasts are incorrect. AIP accounts for these types of risks when building portfolios.[12] Second, instead of building a portfolio that matches an investor's current needs with the current characteristics of various investments, it chooses a portfolio based on the evolution of an investor's needs over time, and the evolution of investment characteristics over time. This may lead to portfolios that perform well over an investor's entire investment horizon.

The remainder of this section illustrates our framework using a series of examples.

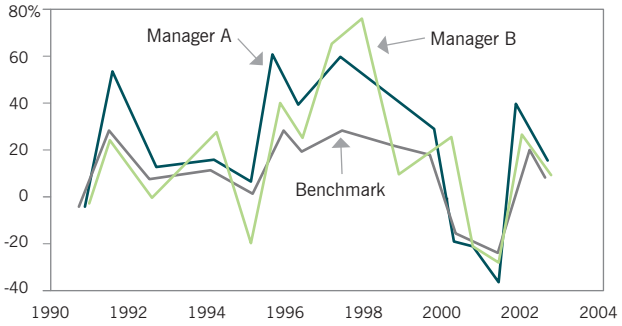
Return Disaggregation (Across Return Source)

Return disaggregation involves separating an investment's returns into the three sources described earlier: beta, alpha, and liquidity. To better understand this process, consider a mutual fund manager benchmarked against the S&P 500. Movements in the S&P 500 will explain most of this manager's performance. However, the manager's decisions regarding which stocks to overweight or underweight will also influence performance. These decisions collectively represent a manager's alpha, which is uncorrelated with the beta component of return.

Historically, investors have defined alpha as the excess of a manager's return relative to a benchmark. For example, if the manager generates a 10% return, and the S&P 500 generates a 9% return during the same period, investors would attribute 100 bps of alpha to the manager. This approach, however, fails to distinguish how the manager generated a 10% return. Consider two managers, A and B, as *Display 7* illustrates.[13]

Display 7:
Comparison of Two Long Only Equity Managers

Historical Performance of Two Large Cap Managers: Illustrative Example



	Manager A	Manager B
Total Return	17.6%	16.4%
Volatility	22.0%	21.6%
Standard Alpha	6.1%	4.9%
Beta	1.5	1.0
Skill Based Alpha	0.4%	4.9%

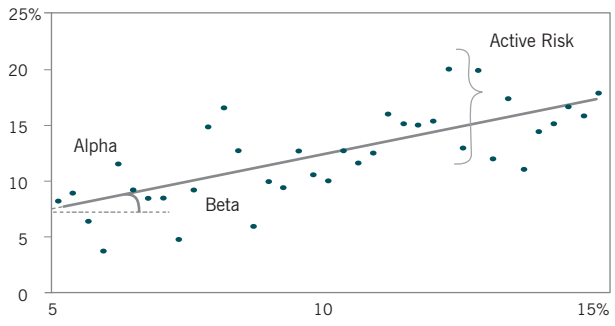
As indicated, Manager A outperforms B based on the conventional measures of alpha: between 1990 and 2009, this manager outperformed the benchmark by 6.1%, as compared to 4.9% for Manager B. Unfortunately, this type of analysis ignores how each manager outperformed the benchmark. A closer inspection reveals that Manager A's performance correlates very highly with benchmark performance. Manager A outperforms when the benchmark delivers strong performance, and underperforms when the benchmark delivers negative performance. Effectively, Manager A's outperformance comes from additional market risk, which investors could easily obtain on their own. This form of outperformance does not create any value for investors.

[12] Due to various uncertainties regarding risks, AIP makes no guarantee of being able to account for all risks for all portfolios.
[13] Example is purely hypothetical. It does not reflect the performance of any Morgan Stanley investment.

Manager B, by contrast, produces a very different return profile. While the benchmark explains some of Manager B's returns, a component also comes from the manager's unique decisions. For example, during early 2000, Manager B generated positive returns, while the benchmark produced negative returns. The excess performance that Manager B generates comes from investment skill, not from additional market risk.

Properly evaluating these managers requires an approach that accurately separates manager skill from market exposure. One way to accomplish this is through a statistical technique known as regression. Regression compares the pattern of a manager's return to that of multiple factors, and extracts the component of return corresponding to market factors. The residual return is *uncorrelated* with the market returns, and represents a manager's alpha. *Display 8* illustrates this process through a simple example.

Display 8:
Measuring the Alpha of a Long Only Equity Manager[14]



The above plots a manager's return (excess of cash) relative to the S&P 500 return (also excess of cash). The slope of the line indicates the manager's beta, which in this example is 0.5. It shows that on average, the manager's return increases by 50 bps for every 1% increase in the S&P 500. The intercept indicates the manager's alpha, or the component of the manager's return that is uncorrelated with the benchmark. Finally, the dispersion around the line indicates the *volatility* of the manager's alpha (which is also known as active risk). It shows how much risk a manager expends in generating alpha.

Isolating manager alpha helps enable investors to make fair comparisons across different types of managers. Comparing the total returns of a long short equity manager and long only mutual fund manager does not make sense, since the former will typically have much less market exposure than the latter. Comparing one manager's alpha to another, however, may help investors identify which manager is more skilled.[15] Furthermore, if investors can measure the amount of alpha and beta within each manager, they can properly account for the risks of each when building portfolios.

Return Disaggregation (Across Time)

The above approach assumes that a manager's exposure to market factors is constant. However, many managers (particularly hedge fund managers) vary their market exposures significantly over time. This variation could stem from market timing decisions, or could simply be a byproduct of their stock picking. In either case, standard factor models cannot capture these variations.

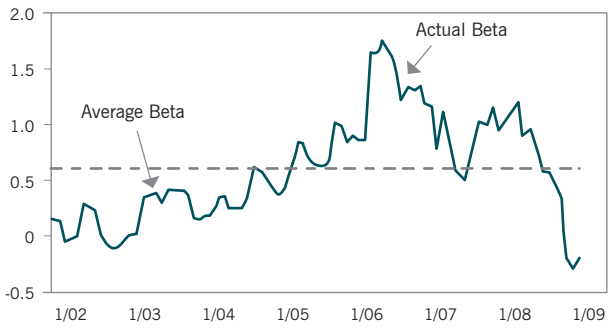
[14] The above information is purely hypothetical and for illustrative purposes only and does not represent the performance of any specific investment.

[15] In addition to evaluating managers based on their alpha, AIP compares them based on information ratio, which is the ratio of a manager's alpha to the manager's alpha volatility (the degree that a manager's alpha varies around its average value). This is a better measure of skill than alpha alone, since it measures how much alpha a manager generates per unit of risk (in other words, how efficiently a manager generates alpha).

AIP has addressed this challenge through developing dynamic factor models. Instead of assuming constant levels of market exposure, these factor models allow for variations in market exposure over time. *Display 9* illustrates the results of applying a dynamic factor model to a long short equity manager. As indicated, the manager's exposure to U.S. equity varies from a low of zero to a high of almost two. Identifying these changes is critical to accurately measuring portfolio risk, since both the manager's volatility, and correlation to the equity markets, depends on levels of market exposure.

Display 9:
Estimate of Equity Long/Short Manager's Beta Over Time[16]

Exposure of Equity Long/Short Manager Relative to S&P 500



In addition to bolstering risk management, capturing changes in beta over time may allow investors to quantify a manager's market timing ability. Market timing decisions correspond to increases or decreases in market exposure relative to the average level of market exposure. If a manager increases beta exposure as markets are rising, and reduces exposure as markets are falling, he will generate positive returns from market timing. By quantifying the changes in a manager's market exposure around its average level, dynamic factor models may enable investors to estimate market timing returns.[17]

As an example, *Table 2* decomposes the equity long/short manager's returns into three components: average beta, market timing, and security selection. As indicated, the manager generates value through both security selection and market timing. This information can help determine the appropriate role of the manager within a broader portfolio, and better evaluate manager performance over time.

Table 2:
Return Disaggregation for Long/Short Hedge Fund Manager[18]

	Return	Risk	Return/Risk
Security Selection Alpha	2.70%	8.30%	0.32
Market Timing Alpha	2.20%	7.40%	0.30
Average Beta	-2.70%	10.00%	(0.27)
Total	5.10%	13.50%	0.16

Importantly, investors should recognize that statistical estimates of alpha and beta are only approximations, and should be used in conjunction with an investor's qualitative understanding of a manager's strategy. For example, a regression model may show that a hedge fund has very strong alpha generation ability. If, however, an investor knows that several key analysts recently left the hedge fund, he may question whether the fund's alpha generation ability is sustainable. Under this scenario, the investor's qualitative knowledge of the hedge fund may be more important than the regression model results.

[16] Source: Return data for long/short equity manager obtained from PerTrac. Beta estimates based on proprietary dynamic factor model. For illustration only. Not indicative of expected return of any portfolio.

[17] The dynamic factor models are implemented using a Kalman filtering approach, which generates estimates of a manager's beta(s) at each point in time. See Kalman, R.E., "A New Approach to Linear Filtering and Prediction Problems" in JOURNAL OF BASIC ENGINEERING, No. 82, 1960.

[18] Source: Return data obtained from Pertrac. Disaggregation based on proprietary return attribution models. For illustration only. Not indicative of future performance of any strategy or manager.

Forecasting – Across Return Source

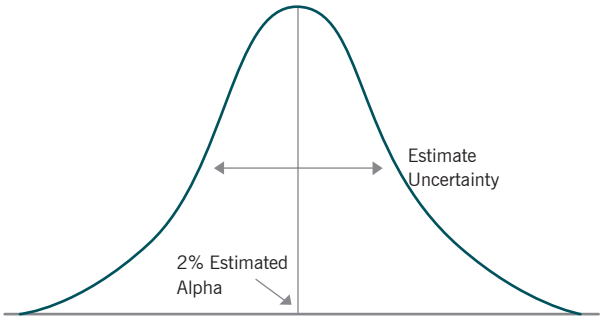
Traditional optimization forecasts performance using historical data. The problem with this approach is that historical data provide an uncertain estimate of future performance. For example, consider two investments that both provide the same average return. During any given period, one investment will outperform the other purely by chance. As a result, traditional optimization techniques favor investments that have performed best historically, *even if the outperformance occurred purely by chance.* As a result, they allocate too much to investments that have performed well historically, and too little to the investments that have performed poorly, leading to an unbalanced portfolio.

Although historical data suffer from limitations, it does provide *some* information regarding future outcomes. For example, most investors would expect equities to outperform fixed income going forward, since this relationship has held true historically. The challenge, therefore, is combining historical data with other information in a way that produces reasonable forecasts. Our approach relies on a technique known as "Bayesian Forecasting." This process allows investors to specify views regarding an investment's future returns, as well as a confidence level in those views. It then statistically combines these views with historical data to produce a consistent set of forecasts across all investment options.

This technique applies to any source of return; for illustrative purposes, however, AIP shows how to apply this technique to forecasting a manager's alpha. Consider a global macro manager who has historically generated 2% alpha. Using the historical data only, our best estimate of this manager's future alpha would also be 2%. However, since we have limited data (in this example, a 3 year track record) there is significant uncertainty around this 2% estimate. *Display 10* shows the forecast and associated uncertainty.

Display 10:

Estimated Historical Alpha, and Uncertainty Surrounding Estimate[19]

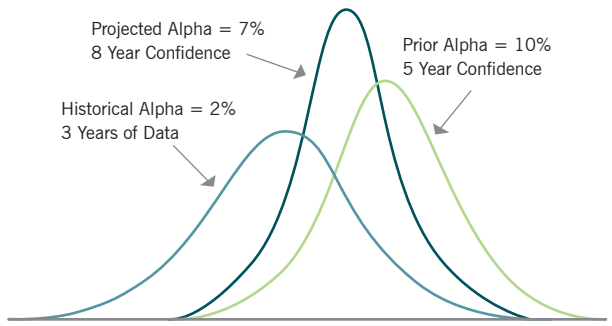


In addition to the historical data, investors may hold certain beliefs regarding this manager's ability. For example, they may know of other managers who follow similar strategies, and have generated a 10% alpha. Absent any historical data regarding this particular manager, one may assume that this manager will also generate a 10% alpha. However, like the historical data, this 10% simply represents an estimate, and contains significant uncertainty.

AIP can develop a forecast by statistically combining these two sources of information, as *Display 11* illustrates. The final forecast is a weighted average of the 2% historical estimate, and 10% prior estimate, where the weights depend on the uncertainty in each estimate. For example, if we are highly confident about the historical performance (e.g., the manager has an exceptionally long track record) we may weight the 10% estimate more heavily than the 2% estimate. In this example, we give more weight to the prior view, since the manager has a relatively short track record.

[19] The above information is purely hypothetical and for illustrative purposes only and does not represent the performance of any specific investment.

Display 11:
Example of Bayesian Forecasting Process[19]



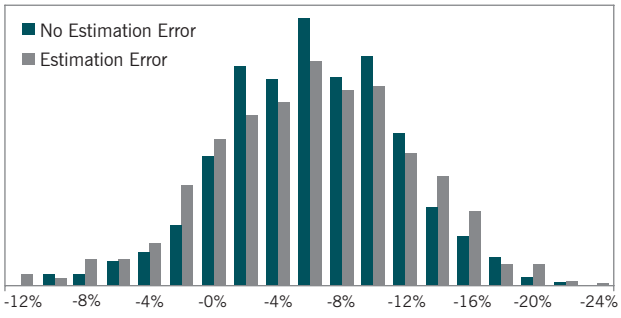
Optimization – Across Return Source

As described earlier, each return source creates different types of risks, which investors must recognize when choosing portfolios. Focusing solely on volatility, however, ignores a number of these risks. For example, one of the most significant risks that investors face, particularly when investing in alpha, is estimation error, or the risk that forecasts are wrong. The previous section alluded to this risk, noting that all forecasts are inherently uncertain. In other words, AIP may believe that U.S. equity will deliver long-term returns of 8%, but actual long term returns could differ significantly from our estimates. Unfortunately, traditional optimization ignores this risk when building portfolios. Mean variance optimization assumes that an investor's forecasts are correct, and builds a portfolio that performs well *given an investor's forecasts.* However, if actual performance deviates significantly from projections, the portfolio may not perform as expected.

To better understand this point, revisit the forecasting example in *Display 11*. AIP expects that the manager will generate a 7% alpha on average, but the forecast contains significant uncertainty. The true average alpha (which is unobservable) could fall anywhere within the center distribution. This uncertainty regarding the average return creates additional risk for investors.

Display 12 compares the distribution of future returns for a manager with a projected 5% alpha, and 0.75 beta, under two scenarios: a) the forecasts exactly match reality (as traditional optimization assumes) and b) the forecasts contain uncertainty. As indicated, estimation error widens the distribution of future returns. The wider distribution recognizes that the actual alpha could prove lower than expected, and the actual beta may be higher than expected, both of which increase the probability of loss.

Display 12:
Return Distribution With and Without Forecast Risk[20]



AIP believes that investors should directly account for forecast risk when building portfolios. Our approach is to quantify each investment's estimation error, and simulate a range of possible returns and beta exposures. We then seek to choose portfolios that may perform well across all scenarios.

[20] The above information is purely hypothetical and for illustrative purposes only and does not represent the performance of any specific investment.

Optimization – Across Time

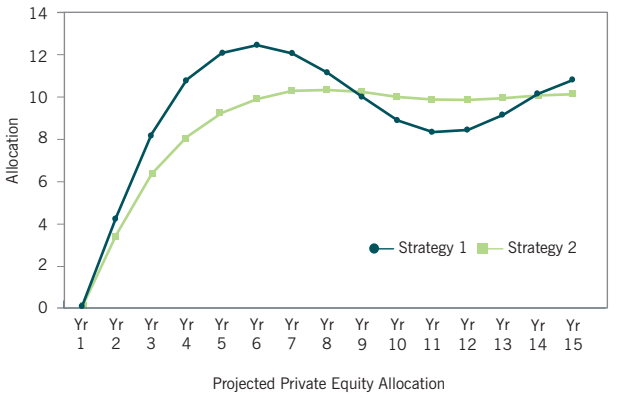
In most cases, portfolio strategy involves decision making over multiple periods. For example, investors allocating to private equity cannot simply buy an existing private equity investment.[21] Rather, they periodically commit capital to private equity funds, and gain exposure to private equity as they fund capital calls. Similarly, investors periodically rebalance their portfolios. The rebalancing frequency depends on transactions costs, and the liquidity of the underlying investments. In both scenarios, investors need to make investment decisions over time. Moreover, the decisions made in current periods may constrain an investor's future options. Overcommitments to private equity, for example, may lead to very high private equity allocations. This could limit an investor's ability to rebalance the portfolio, meet future cash flow needs, or take advantage of new (and potentially better) investment opportunities in the future.

For this reason, investors need a framework that accounts for decision making over the entire investment horizon. They need to understand the cost of today's decisions in future periods, and account for this cost when constructing a portfolio.

AIP addresses this challenge through a multi-period optimization that explicitly considers the future costs of an investor's current decisions. As an example, consider the challenge of designing a private equity commitment strategy. One simple approach has been to hold the investments, plus unfunded commitments,[22] constant. Following such a strategy (assuming a target 20% allocation) produces the allocation profile shown in *Display 13* (dark green line). As indicated, such a strategy produces significant fluctuations in private equity allocations. During early periods, investors are underallocated to private equity, and increase commitments. Eventually these commitments are drawn, leading to an overinvestment in private equity. Investors then cut back on private equity commitments, leading to an underinvestment in private equity. The allocations eventually stop oscillating, but require 20 years to stabilize. The overshoots and undershoots are caused by a myopic investment strategy.

The investor bases today's commitment decision on today's allocation and unfunded commitments, without considering the likely impact of these decisions (and previous decisions) in the future.

Display 13:
Comparison of Commitment Strategies[23]



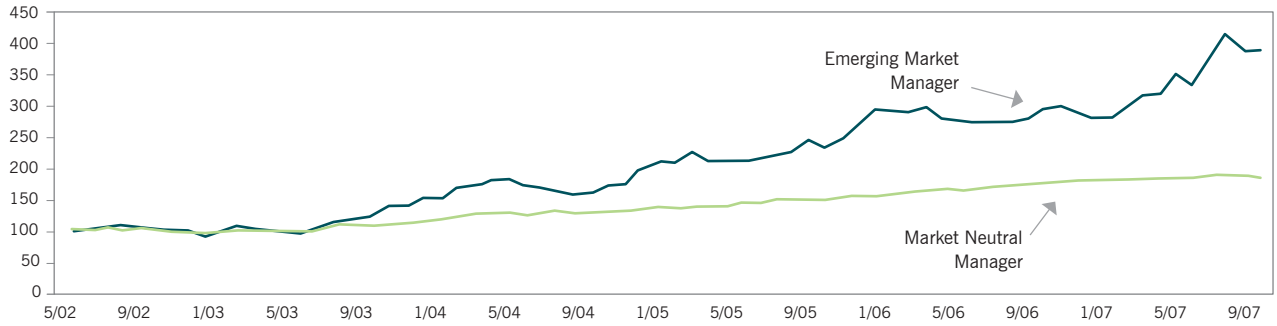
By incorporating their knowledge of the future into today's decisions, though, investors may realize better outcomes. Consider a strategy that bases commitments today not just on current private equity investment levels, but on expected future investment levels. The light green

[21] Technically, investors could access private equity investments through a secondary market. However, the attractiveness and depth of this market varies significantly over time, and investors cannot permanently rely on the secondary market as an attractive source of liquidity.

[22] Unfunded commitments are commitments that have been made but have not yet been called.

[23] The above information is purely hypothetical and for illustrative purposes only and does not represent the performance of any specific investment.

Display 14:
Comparison of Cumulative Performance of Two Managers (Assuming $100 Starting Capital)[25]



line in *Display 13* shows the allocations of such a strategy over time, which AIP developed using a proprietary multi-period allocation model. While reaching the target allocation takes more time, the allocation profile is more stable. In early periods, this strategy will recognize that capital calls are likely to increase, and therefore will not commit as much as the first strategy. Although the steady state characteristics of both strategies are the same (i.e., both reach target allocations of 20%) most investors would prefer the second strategy as it leads to less volatility along the way.[24]

For investors, the critical question is whether the AIP approach outperforms traditional asset allocation. We believe that our framework helps investors in a number of ways.

First, the attribution tools seek to help investors better understand which managers are adding value, and how that value is being created (i.e., through market timing or security selection). This can help investors filter managers who add little value, and allows investors to compare managers with very different investment styles.

Second, by making allocation decisions across return sources, AIP's framework can build a portfolio that seeks to match investor preferences across multiple forms of risk. For example, our approach can potentially limit the amount of forecast risk, or downside risk, within a portfolio.

Third, AIP's approach seeks to account for changes in both investor needs and investment characteristics when building portfolios. Traditional optimization, by contrast, assumes that investor needs and investment characteristics are fixed.

[24] When structuring a private equity program, investors should also focus on obtaining diversification across geographies and vintage years. Further, private equity consists of many underlying asset classes, such as venture capital, U.S. leveraged buyouts, and international buyouts. Investors should maintain diversification across these underlying asset classes as well.

[25] Source: Return data for long/short equity manager obtained from PerTrac. Beta estimates based on proprietary dynamic factor model. For illustration only. Not indicative of expected return or performance of any strategy or manager. Data for chart spans January 2002 through December 2007 timeframe. Past performance is not indicative of future results.

Table 3:
Manager Return Attribution[27]

	Emerging Market Manager			Market Neutral Manager		
	Return	Risk	Return/Risk	Return	Risk	Return/Risk
Alpha	1.40%	7.20%	0.19	5.50%	3.70%	1.48
Beta	21.20%	15.10%	1.41	1.50%	4.20%	0.36
Total (excl. cash)	22.60%	18.30%	1.24	7.00%	5.80%	1.20

However, investors should remember that all asset allocation approaches (including AIP's) are simplifications of reality. While AIP believes that our approach does a much better job capturing actual investment risks than traditional portfolio construction techniques, it will never capture every risk that an investor faces. For example, accurately modeling the risk of private equity and private real estate is extremely difficult since these assets are infrequently marked to market.[26] Therefore, supplementing our approach with experience and judgment is critical. In addition, during periods such as 2008, the vast majority of investments can simultaneously deliver poor performance. AIP's approach by no means can prevent significant losses during these periods. Rather, our tools should provide investors a more robust understanding of the risks that they face, and an ability to choose a portfolio that can help meet their investment objectives.

In this spirit, AIP presents two examples of our asset allocation framework, both comparing our results to those of more traditional approaches.

Evaluating Hedge Fund Manager Performance

As previously described, evaluating hedge funds using traditional metrics alone can be highly misleading, since hedge funds have very different return profiles. Properly evaluating hedge funds requires isolating each manager's alpha. Unless investors separate alpha from total return, they risk selecting managers based on their market returns, as opposed to selecting managers based on investment skill. As an example consider two equity managers: an emerging market long short equity fund, and a U.S. equity market neutral fund. *Display 14* illustrates the performance of each fund from January 2002 through December 2007.

From a total return standpoint, the emerging market manager clearly outperformed over the period, returning 25.7% as compared to 10.1% for the market neutral manager. On a risk-adjusted basis the two managers performed more comparably, but the emerging market manager delivered slightly better performance, yielding a 1.24 Sharpe ratio, compared to the market-neutral manager's 1.20 Sharpe ratio. Investors who evaluated these managers on a total return basis would likely have selected the emerging market manager over the market neutral manager.

[26] Certain modeling techniques do exist for generating better estimates of private equity and private real estate risks. For example, see How Risky are Illiquid Investments? Budhraja, Vineet and de Figueiredo, Rui. Journal of Portfolio Management. Winter 2005. However, even these techniques are only approximations of reality, and the resulting risk estimates are less accurate than those of more liquid asset classes.

[27] Source: Return data obtained from PerTrac. Disaggregation based on proprietary return attribution models. For illustration only. Not indicative of expected return or performance of any manager or strategy.

However, comparing these managers based on their alpha characteristics yields a very different picture. *Table 3* provides the return attribution for each manager. As indicated, the emerging market manager generated the majority of his returns from emerging market equity exposure, as opposed to alpha. By contrast, the market neutral manager generated the bulk of returns from security selection, and very little came from market exposure. Further, the market neutral manager generated alpha much more efficiently per unit of risk; his information ratio was 1.5, versus 0.2 for the emerging market manager.

The difference between these managers became apparent during 2008. As equity markets around the world collapsed, the emerging market equity manager suffered a 50% loss. By contrast, the market neutral manager, whose performance depends much more heavily on security selection, only lost 7%. Investors who did not understand the contribution of alpha versus beta to each manager's total return may have over allocated to the emerging market equity manager, and ended up with excess beta risk.

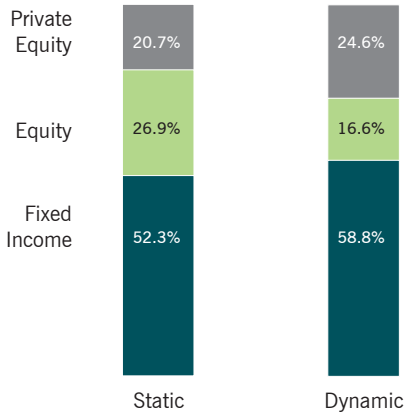
Designing a Strategic Portfolio

As discussed in Section 1, traditional optimization does not account for the cost of today's decisions in future periods. If investors are allocating to liquid assets, this cost may be minimal, because they can always change their portfolio in the future. However, when allocating to illiquid assets such as private equity, private real estate, and certain hedge fund strategies, these costs could become substantial. For example, investors with large illiquid allocations cannot easily rebalance their portfolios, face difficulty in capitalizing on new investment opportunities, and may struggle to meet unforeseen cash flow requirements. This raises two issues for investors when designing portfolios. First, traditional optimization does not account for these costs, and therefore may allocate too much to illiquid assets. Second, these costs are a function of how effectively one implements allocations to illiquid assets — the better cash flows from these assets are managed, the lower these costs.

As an example, consider an investor who is invested in traditional equity and fixed income assets and adds an allocation to private equity. This investor has a moderate risk profile, and is willing to accept a fair amount of illiquidity, but also wants to preserve capital. AIP constructed two portfolios for this hypothetical investor based on estimated characteristics of the various asset categories: one (the "static model") which uses a rule that statically allocates (or commits) to private equity, and one ("dynamic model") which dynamically optimizes allocations to private equity based on actual cash flows.

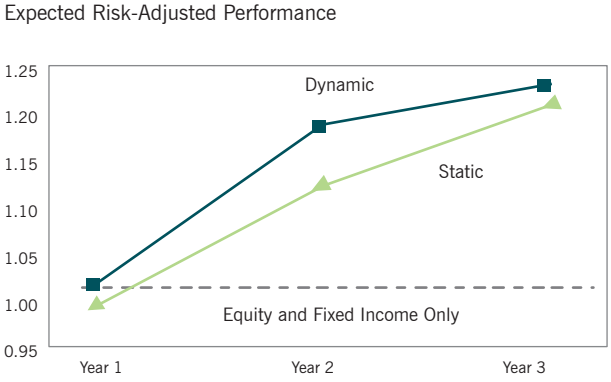
Display 15 shows the expected allocations after three years in each of these cases.[28] *Display 16* shows a measure of expected risk-adjusted performance of the static and the dynamic approaches in the first three years, based on our illustrative risk and return calculations. It compares these to a benchmark case of a portfolio optimized only with traditional equity and fixed income.[29]

Display 15:
Comparison of Strategic Portfolios[30]



Based on these results, two important conclusions about the various approaches are apparent. First, by optimizing allocations to private equity, an investor may be able to reduce the "cost" of illiquidity significantly. This is apparent in *Display 15*: allocations under the dynamic approach are higher than in the static case because the dynamic case better manages portfolio liquidity. Typically, portfolios with illiquid assets will drift away from their target allocations over time as investors cannot easily rebalance the illiquid positions. Since the dynamic approach considers the impact of today's decisions over multiple periods, it better accounts for portfolio drift, thereby reducing the cost of investing in private equity. This effect can be seen by examining the expected performance in *Display 16*: the static approach generates systematically lower risk-adjusted returns when compared to an approach which appropriately optimizes the allocations over time.

Display 16:
Illustrative Comparison of Dynamic and Static Approaches[31]



Second, the value of allocating to the illiquid asset class is potentially significant. In *Display 16*, even with the illiquidity of private equity, the investor's risk-adjusted performance is higher by including a broader range of asset categories than when the investor is constrained to allocate to only fixed income and equity.

[28] In this example, AIP uses a finite horizon of three years.

[29] For simplicity, risk-adjusted performance is measured as the expected excess-to-cash return minus a risk-aversion coefficient multiplied by the portfolio variance. The figure shows an index in which the risk-adjusted performance of the portfolio of equity and fixed income only is normalized to one.

[30] The above information is purely hypothetical and for illustrative purposes only and does not represent the performance of any specific investment.

[31] The above information is purely hypothetical and for illustrative purposes only and does not represent the performance of any specific investment.

Conclusion

Traditional asset allocation approaches rest on two key assumptions: volatility and correlations properly account for risk across all asset classes, and portfolio characteristics (as well as investor needs) remain constant over time. These assumptions unfortunately do not hold in practice, and lead to particularly poor decisions when allocating to sub-asset classes, active managers, and alternative investments.

Recognizing these limitations, AIP has developed a new asset allocation framework that extends traditional portfolio optimization in two ways: across sources of return, and across time. AIP recognizes that investment risks differ significantly by source of return (beta, alpha, and liquidity) and therefore structures portfolios around return sources instead of around asset classes. Further, we recognize that portfolios evolve over time, and account for these changes when building portfolios. This may lead to solutions that match investor requirements over their entire investment horizon.

The performance of any portfolio strategy depends heavily on the performance of underlying investment choices, and AIP's approach is no exception. For example, our approach would not have circumvented the problems that investors faced during 2008. That said, AIP's asset allocation framework may provide investors a better understanding of the investment risks they are taking, and may help investors choose portfolios that meet their long-term goals.

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CoCos: A New Asset Class

Executive Summary

Against a backdrop of increased regulation (including Basel III[1]) and the aftermath of the recent financial crisis, banks around the world are considering a variety of alternatives to reinforce their capital bases. This ongoing process has seen the development of contingent capital bonds, or CoCos, a new kind of security that combines fixed income and equity-like features. These securities are intended to provide a regulatory capital "buffer" for a financial institution in times of stress, starting out as bonds and converting into equity if a "triggering event" occurred. With a yield exceeding 7%[2] and equity-like risk characteristics, CoCos offer certain investors an attractive option.

Credit Suisse (CS) recently issued the first CoCos that are convertible into equity and also meet Basel III capital requirements.[3] The CS offering was well received, and we believe that CoCos could develop into a new asset class with a reasonably broad investor base. Furthermore, we feel there is a good possibility that CoCo indices will be created, assuming other issuers begin to issue this kind of security.

Our analysis of the CS deal has led us to conclude that the bonds are priced fairly at current levels. However, since this was only the debut offering of CoCos, several assumptions, along with some sensitivity analyses, were made when evaluating them. We discuss this below, and outline possible scenarios (and assumptions) that would indicate spreads on the CS' CoCos should be either higher or lower.

Ryan O'Connell
Executive Director
Morgan Stanley Investment Management

Tom Wills
Executive Director
Morgan Stanley Investment Management

[1] BASEL III is the third of the Basel Accords and was developed in a response to the deficiencies in financial regulation revealed by the Global Financial Crisis. It sets forth a new global regulatory standard on bank capital adequacy and liquidity agreed by the members of the Basel Committee on Banking Supervision.

[2] CS Group (Guernsey) I Limited 7.875% Tier 2 Buffer Capital Notes due 2041.

[3] Two other banks, Rabobank and Lloyds TSB, have issued capital buffer securities, which some commentators have referred to as CoCos. In November 2009, Lloyds issued a series of Enhanced Capital Notes, with various coupons and final maturity dates. In March 2010, Rabobank issued Senior Contingent Notes, the 6.875s due March 2020. However, the Rabobank securities would not convert into equity. The Lloyds securities would convert at a low trigger (5%) and, in our opinion, would not comply with Basel III requirements.

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The Credit Suisse CoCo Bonds

CS has issued $2 billion of 7.875% bonds that are "CoCos" or contingent capital bonds.[4]

The bonds were priced as follows[5]:

- 522 basis points (bp) over swaps[6]
- 320 bp behind the CS 4.7s of 2020 (USD, senior, non-callable[7])
- 455 bp behind the CS 5.375s of 2016 (USD, senior, non-callable)

As of April 21, 2011, CoCos were trading at a yield of 7.65%. In our opinion, CoCos represented fair value at that level (please see "A Framework for Pricing CoCos" beginning on page 26).

The CS CoCos are subordinated bonds that are convertible into equity upon the occurrence of certain events:

- If CS's Tier 1 common equity ratio[8] falls below 7%, or
- If the Swiss regulators decide that the bonds should be converted into equity to prevent CS from defaulting or because CS has received extraordinary public support

In essence, investors purchase a bond and sell an equity put option[9] to CS.

The conversion price for the bonds would be the higher of 1) the market price over the five days preceding a conversion event or 2) $20/20 Swiss francs (CHF) per share. The $20 per share figure is effectively a floor price for the conversion, to limit the potential dilution for equity holders and to allow some potential loss-sharing by CoCo investors. When the bonds were issued, the CS American Depository Receipt (ADR)[10] was trading at around $40, so the floor price was about 50% of the market value of the ADR.

The bonds have been issued as subordinated debt, meaning they would nominally have a debt claim in a reorganization that would be senior to Tier 1 bonds, preferred shares and common shares. However, as a practical matter, in a stress scenario, the bond investor would lose his or her debt claim and become an equity holder. In our opinion, the securities are denominated as subordinated debt for several reasons:

- Since they are "debt," the interest payments on them are tax-deductible for the issuer
- As subordinated debt with a 30-year maturity, the securities count as regulatory capital (Tier 2)
- The securities are eligible for purchase by fixed income investors, because they are not "equity" (at least initially)

[4] The official name for the securities is the CS Group (Guernsey) I Limited 7.875% Tier 2 Buffer Capital Notes due 2041.
[5] Source: Credit Suisse. Data as of February 17, 2011.
[6] A swap is a derivative in which counterparties exchange certain benefits of one party's financial instrument for those of the other party's financial instrument.
[7] A call option is a contract giving the buyer of the call option the right, but not the obligation to buy an agreed quantity of a particular security from the seller of the option at a certain time for a certain price. The seller is obligated to sell the commodity or financial instrument should the buyer so decide.
[8] The equity ratio is a financial ratio indicating the relative proportion of equity used to finance a company's assets.
[9] A put option is a contract giving the owner the right, but not the obligation, to sell a specified amount of an underlying security at a specified price within a specified time. This is the opposite of a call option.
[10] An American Depositary Receipt represents ownership in the shares of a non-U.S. company that trades in U.S. financial markets.

The legal maturity of the bonds is 2041 (30 years). However, the bonds are subject to call risk[11] after five years, when CS can redeem the bonds at its option. In this context, an important feature of the bonds is that the interest rate will reset after five years. It will reset to a fixed rate that is 522 bp over swaps (the same as in the original pricing). The interest rate will thereafter reset every five years, at the same basis over swaps.

Although there is not a step-up in the coupon,[12] we should bear in mind that 522 bp is a significant spread for a high-quality issuer like CS. Hence, CS would keep paying such a spread only if CoCos continued to be an inexpensive source of "equity" for regulatory purposes.

Unlike earlier versions of "capital securities" or "hybrids," the issuer cannot defer paying the coupon. In that respect CoCos are more "bondholder friendly," since investors do not have to try to estimate their possible extension risk. However, one should not overemphasize this benefit. If CS encountered stress, and CoCos were converted into equity, interest payments would cease.

What are the Main Risks for CoCo investors?

There are a variety of risks that one may face when investing in CoCos. We address three of the most significant possible issues below.

Risk #1:
The bonds could be converted into equity and the bondholder could suffer a higher loss of principal/lower recovery value than with more traditional fixed income securities.

The bonds are structured so that they would convert if CS's Tier 1 common equity ratio fell below 7%. Also, there would be a floor conversion price of $20. However, there may not necessarily be a correlation between the stock price and CS' Tier 1 ratio at the time when the 7% trigger is hit.

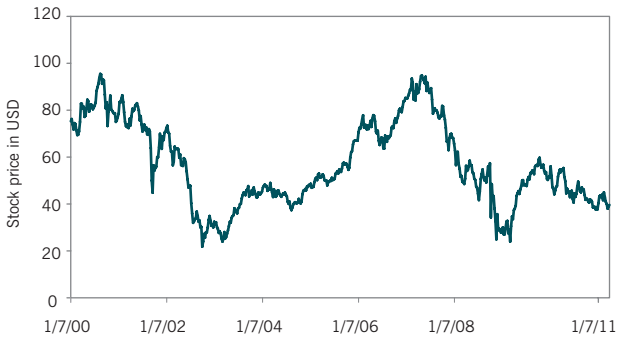
If the bonds were converted at $20, the bondholder would receive 50 shares, which could be sold on the open market. However, it is possible that CS would not hit the 7% trigger until the stock is trading below $20. In that case, the CoCo investor would suffer a capital loss, since the investor has written an equity put option[13] with a $20 strike price.[14] So, for example, if the stock were trading at $10 when the trigger was hit, the investor would incur a 50% loss of principal because of being short 50 shares when the stock price is $10 below the strike price.

The CoCo bondholder is not likely to face a great risk of principal loss down to the $20 level, assuming that the shares can be rapidly sold. However, in a distress scenario, the value of the shares might drop in a hurry, below the $20 level, and if the market was disrupted, the bondholder might not be able to quickly sell the shares.

[11] Call risk is the risk, faced by a holder of a callable bond, that a bond issuer will take advantage of the callable bond feature and redeem the issue prior to maturity.
[12] A coupon rate is the interest rate stated on a bond when it's issued.
[13] An option is a contract that offers the buyer the right, but not the obligation to buy an agreed quantity of a particular security from the seller of the option at a certain time for a certain price.
[14] The strike price is the price at which a specific derivative contract can be exercised.

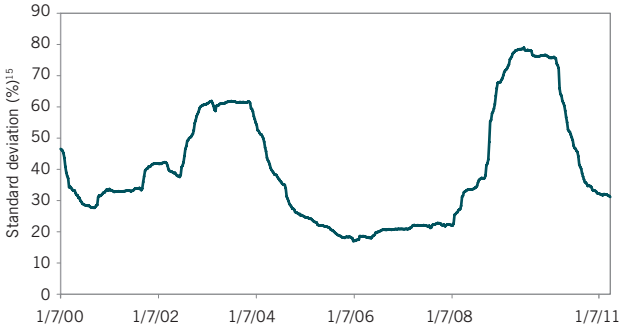
It is important to note that CS' share price declined close to the $20 level several times between 2002 and the present, most recently in 2009 (*Display 1*). We also observe that the shares are quite volatile; the actual historical volatility for CS shares has ranged widely, from 20% to 80% from 2000 to 2011 (*Display 2*).

Display 1:
Credit Suisse Stock Price



Source: Bloomberg. As of April 1, 2011
Past performance is not indicative of future results.

Display 2:
360 Day Historical Volatility on Credit Suisse Stock



Source: Bloomberg. As of April 1, 2011
Past performance is not indicative of future results.

Risk #2:
The bonds could be highly volatile in a difficult environment.

CoCos are designed to be loss-absorbing, and the equity-like features of the bonds would become more pronounced in a stress situation. In all likelihood, they would be more volatile than traditional bonds that would still have a debt claim in a restructuring and less risk that their interest payments would be curtailed if CS came under pressure.

[15] Standard deviation is measure of the dispersion of a set of data from its mean.

Risk #3:
The bonds would be subject to call risk if CS decided that they were no longer a cost-effective source of regulatory capital.

CoCos' interest rate will be reset every five years, at a fixed rate that equates to 522 bp over swaps. That is a high spread for an issuer of CS's quality to pay on a fixed income security. However, CoCos are an attractive source of "equity" for regulatory capital purposes. Since the interest payments are tax-deductible, the after-tax cost to the issuer is about 5.5%, which is less expensive than equity. Nevertheless, CS might at some point decide that CoCos are not cost-effective, if, for example, swap rates become much higher in five years. CS might also develop some alternative "equity-like" securities in the future that it would prefer to CoCos.

Factors to Consider in Option Valuation[16]

Our analysis begins with the determination of the put option that the investor would sell to CS. Our rationale for this approach is that, since the investor would purchase a bond and sell an equity put option to CS, the key to the valuation of CoCo is to assess the value of the put option to ensure this value is being paid as excess yield over comparable straight bonds.

Five main factors will determine the valuation of the put option:

- **The credit quality of the issuer:** the weaker the credit, the more likely the put will be exercised, so the higher its value
- **The level of the solvency trigger:** the higher it is set, the more likely it will be breached, so the more valuable will be the put
- **The strike price of the put:** the higher the strike price, the more downside risk to the investor, so the more valuable the option
- **The tenor of the option:** the longer-dated the option, the more value it has, as the option writer is providing more protection below the strike price for a longer period of time
- **The volatility of the stock:** the more volatile the stock, the higher the value of the put protection, as it is more likely the stock will fall below the strike price

In considering these factors, the first two are easily observed. We can find the credit quality by looking at the credit default swap (CDS)[17] market, and the solvency trigger is defined in the CoCo contract as a core Tier one ratio of 7%.

As for the strike price, we know that the investor will receive the full par value in either shares or cash, as long as the CS share price is at or above $20. Accordingly, the put option can be viewed simply as a $20-strike put, or 50% out-of-the-money (OTM),[18] versus the recent share price of around $40.

For the tenor, we elect to value the option as a 10-year put because:

- This is more conservative than the 5-year call date where we would have to allow for the possibility that CS may elect to keep these bonds outstanding; and
- For a 50% OTM option, there is not a material difference in annualized valuation between a 10-year and a 30-year tenor, since a 10-year period is sufficiently long enough to capture most probabilities for the stock price outcome.

[16] **The option information herein is provided for illustrative and informational purposes only and should not be considered a solicitation for options.**

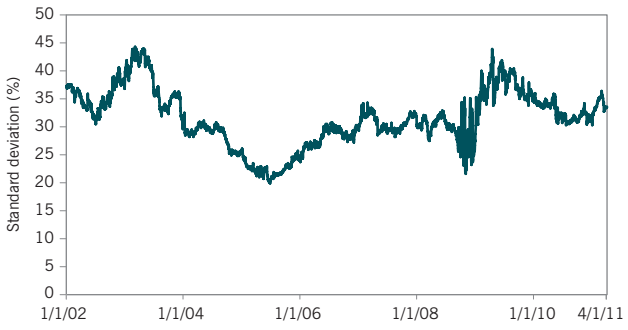
[17] A credit default swap is a swap designed to transfer the credit exposure of fixed income products between parties.

[18] A put is "put-of-the-money" when the strike price is below the market price of the underlying asset.

Finally, the volatility of the stock is widely considered the most important variable in option valuation, as varying assumptions can give vastly different answers. However, this is the most subjective of the inputs, because we do not know how much volatility the stock will actually experience in the future. For example, if we use recent unsettled history (which includes the credit crisis in 2008 to 2009), we see that CS' stock price has varied from its mean by a staggering 53% over the past 1,000 days. As a point of note, this period could be considered among the highest stress tests we could envision.

If instead, we observe the stock over the past twelve months ending December 31, 2010, when markets normalized to some extent, the realized volatility dropped closer to 30% (*Display 2*). Because this level approximates the long-term volatility we have observed in the convertible bond market, which is a very good proxy for 5 to 10-year volatility globally (*Display 3*), we elected to use 30% in our calculations.

Display 3:
UBS Global Convertible Index Implied Volatility



Source: UBS. As of April 5, 2011
Past performance is not indicative of future results.

A Framework for Pricing the CS CoCos[19]

In our opinion, the CS CoCos are trading at or around fair value, based upon recent levels. In this section, we outline a framework for evaluating the bonds, drawing on JP Morgan's fixed income research analysts' approach.[20]

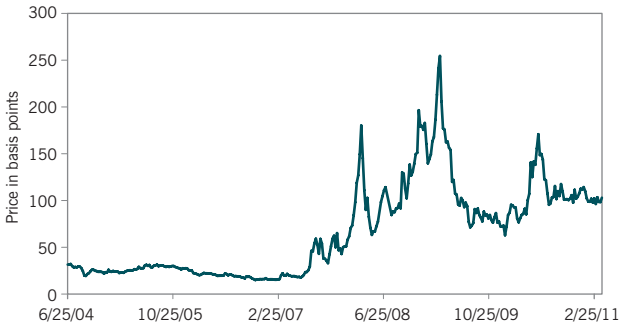
- First, we observe the credit risk of CS by looking at the 10-year senior CDS (*Display 4*). As of March 1, 2011 the CDS was priced at 113 bps and it would have cost 8.9% upfront with an assumed 40% recovery rate. We therefore extrapolated that the protection for 100% of the risk (i.e., zero recovery) was 14.8% (that is, 8.9% / 0.6).
- Following this, we attempt to link the default risk implied by the CDS to the equity option valuation by using the cost of the CDS to set a price for the put and observing the volatility that this price implies. A 10-year CS equity put with a strike of $1 (virtual default) at a cost of 14.8% implies a 29.5% volatility in the share price. Since this matches our earlier assumption that volatility would be about 30%, we take comfort that our volatility estimate is appropriate.
- 30% volatility is then used to price a 10-year "digital" option on CS stock. A digital option is one where the payoff is either a fixed amount of some asset or nothing at all. This is relevant for the CS CoCos because either the investor will get shares in the event of a solvency trigger being hit or will merely retain the extra yield. The price of this option is 45%, which roughly means that given our assumptions, there is a 45% chance that the stock will be below $20 over the life of the option.

[19] Results shown herein are hypothetical, provided for illustrative purposes only, and not intended to represent historical or predict actual yields or characteristics of the CS CoCo referenced. Any changes to assumptions and factors considered herein could have a material impact on the results set forth herein. No representation is being made that any hypothetical data provided herein will or is likely to come to pass. Actual results will depend, to a significant degree, on actual valuations, market conditions, and other contingencies.

[20] See "Making Co Cos Work", Roberto Henriques, JP Morgan Europe Credit Research, 15 February 2011.

- Next, we take the value of this option and restate it in yield terms going back to the CDS. This results in a total yield of 718 bps.
- We then need to price the option given different outcomes for the stock. If the stock stays at or above $20 when the solvency trigger is reached, the yield on the CoCo will only need to be 188 bps to match the zero-recovery equivalent of the 10-year CDS (i.e., 113 bps / 0.6). If, on the other hand, we assume that the CS stock falls to $10, then, as we described above, the investment could lose half its value. This implies a required yield of (50% * 718 bps) + (50% * 188 bps) = 453 bps.
- The final step is to add the 10-year USD swap rate (350 bps) to our required yield for the put. If we have certainty that the stock will stay above $20, the expected yield on CoCos (Best Case) should be 188 + 350 = 538 bps. If we think that there is a 50% chance that the stock could be at $10 when the solvency trigger is breached, the appropriate yield (Risk Case) should be 453+350=803 bps.
- We then compare this result to the yield of CoCos in the market. With a coupon of 7.875% and a price of 103, the bond yielded 7.65%, which reflected a market level closer to our Risk Case calculation of 803 bps.

Display 4:
Credit Suisse 10-year Senior CDS



Source: Bloomberg. As of April 1, 2011
Past performance is not indicative of future results.

Finally, we note that because of the CoCos' features, there are several factors that cannot be explicitly priced into our calculations:

- There is no quantitative way to link the strike price precisely to the solvency trigger
- The volatility assumption can vary giving very different results
- The bonds are callable in 5 years, so the tenor is also debatable
- The coupon resets at the call date and we have not modeled for that feature
- The bond is denominated in USD and references the US ADR, but most CS shares trades in CHF so the investor bears some FX risk, too

- The Swiss regulator can force a conversion of the bonds at their discretion
- There is "pin risk"[21] to the stock around the $20 strike. So, even if the stock is around $20 when the trigger is met, the investor could quickly incur a principal loss as other credit investors also look to dump unwanted shares in the market, forcing down the price below the $20 no-loss price
- Equity investors might also sell their shares, depressing the stock, if they thought that the solvency trigger could be breached and they would, therefore, be diluted
- However, if triggered, CoCos would increase CS' equity base, which would bolster the bank's viability and, therefore, would be supportive of both bond and equity values on a longer-term basis

Due to these unquantifiable factors, we estimate that these bonds should offer an additional 100 bps as compensatory yield. Therefore, in our view, the yield range should be from 6.38% (538 bps + 100 bps), as a Best Case scenario, to a yield of 9.03% (803 bps + 100 bps) for a Risk Case scenario, where the stock falls 75% from its current price to $10 when the solvency trigger is breached. This result would imply that the 7.65% yield is in the mid-point between being 127 bps cheap for Best Case-minded investors and 138 bps rich for more conservative, Risk Case-minded investors.

Conclusion

We believe that CoCos are likely to become a major new asset class for fixed income investors, because they offer intriguing opportunities for both issuers and investors.

As they are structured to convert into equity if a triggering event occurs, CoCos can offer highly rated financial institutions the opportunity to satisfy stringent regulatory capital requirements at a lower cost than by issuing common equity. For these issuers, the attractiveness of issuing CoCos will depend on the attitude of their respective regulators, as well as the additional spread that fixed income investors demand compared to more senior instruments.

Adding to the possible appeal of CoCos, Morgan Stanley's Fixed Income Research team believes it is likely that a CoCo index will eventually be developed, which could expand the universe of investors for CoCos.[22]

[21] Pin risk is a risk that the writer of an options or futures contract faces when the price of the underlying asset closes at or very near the exercise price of the contract upon expiration.

[22] See "European Banks: CoCo Compendium", Jackie Ineke, Morgan Stanley Investment Grade Credit Research, March 4, 2011.

CoCo Valuation

CS 7.875 notes

	BBG page	reference asset	result
Step 1> Value the CDS assuming zero recovery			
1a> calc the CDS level	CDSW	CS 10yr sr CDS	8.90%
2b> rebase assuming zero recovery (i.e./0.6)			14.83%
Step 2> Find the implied vol priced into the CDS for zero recovery	OV	CSGN VX equity	
2a> solve for vol using price from step 1			29.47%
for a 10yr, digital, 95% OTM put			
Step 3> Use vol from above to value put option	OV	CSGN VX equity	
3a> solve for option price using vol from step 2			45.17%
- do for 50% OTM			
Step 4> Calc spread for a bond where option has value from step 3			
4a> solve for spread using option value from step 3	CDSW	CS 10yr sr CDS	
- do for 50% OTM			7.18%
Step 5> Calc average yield			
5a> assume exercise price is at or above 20 CHF floor			
- (100%*113 bps/0.6) + (0% * 718 bps) =			188
5b> assume exercise is at 10 CHF so 10 CHF below 20 CHF floor			
- (50%*113 bps/0.6) + (50% * 718 bps) =			453
Step 6> Calc expected yield on bond			
6a> Solve for Best Case (stock stays above 20 CHF)			
Add in 350 bps for USD 10yr swp and 100 bps for liquidity assumption			
= 5a + 6a			638
6b> Solve for Worst Case (stock goes down to 10 CHF)			
Add in 350 bps for USD 10yr swp and 100 bps for liquidity assumption			
= 5a + 6a			903
Step 7> Assess cheap/rich vs current price			
7a> Current yield is:			
-7.875 cpn / 103 px			765
7b> Rich / (cheap) if exercised at 20 CHF floor			(127)*
7c> Rich / (cheap) if exercised at 10 CHF below floor			138*

*** Factors not included in pricing**

-no objective way to link strike price to solvency event
-what volatility to price the option is hard to assess
-there is a cross-currency aspect ignored here (if CHF falls, stock is worth less in USD)
-Swiss regulator can convert the bonds at any time, so can't model for that
-bond are callable in 5 yrs so assume 5 yrs? 30yrs? 10yrs?
-the coupon resets at the call date but is not modelled here
-there will be "pin" risk around the strike - i.e. credit investors who get converted into shares will sell, forcing the price down
-any conversion of these notes will materially dilute the existing equity holders
-on the other hand, the very presence of these notes supports the bank's viability so its supports the share price

Results shown herein are hypothetical, provided for illustrative purposes only, and is not intended to represent historical or predict actual yields and characteristics of the CS CoCo referenced. Any changes to assumptions and factors considered herein could have a material impact on the results set forth herein. No representation is being made that any hypothetical data provided herein will or is likely to come to pass. Actual results will depend, to a significant degree, on actual valuations, market conditions, and other contingencies.

Disclosures
The views and opinions are those of the authors as of April 21, 2011 and are subject to change at any time due to market or economic conditions and may not necessarily come to pass. The views expressed do not reflect the opinions of all portfolio managers at MSIM or the views of the firm as a whole, and may not be reflected in the strategies and products that the Firm offers.

All information provided is for informational purposes only and should not be deemed as a recommendation. The CoCo characteristics within this material does not represent the characteristics of all existing CoCos or future CoCos. The information herein does not contend to address the financial objectives, situation or specific needs of any individual investor. In addition, this material is not an offer, or a solicitation of an offer, to buy or sell any security or instrument or to participate in any trading strategy.

Charts and graphs provided herein are for illustrative purposes only. **Past performance is not indicative of future results.**

All investments involve risks, including the possible loss of principal. The prices of **equity securities** will rise and fall in response to a number of different factors. In particular, prices of equity securities will respond to events that affect entire financial markets or industries and to events that affect particular issuers. Investments in **convertible securities** are subject to the risks associated with fixed-income securities, namely credit, price and interest-rate risks. **Credit risk** refers to the ability of an issuer to make timely payments of interest and principal. **Interest-rate risk** refers to fluctuations in the value of a fixed-income security resulting from changes in the general level of interest rates. In a declining interest-rate environment, the portfolio may generate less income. In a rising interest-rate environment, bond prices fall.

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Currencies: The Asset Class for Those Who Love Alpha

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Executive Director
Morgan Stanley Investment Management

The foreign exchange market is the largest in the world, with unparalleled liquidity and trading volumes, yet most investors have limited exposure to currencies as an asset class. This discrepancy has existed largely because currency trades take place either in the highly leveraged futures market or in institution-only over-the-counter arrangements. As a result, the integration of currency into investor portfolios has been slow.

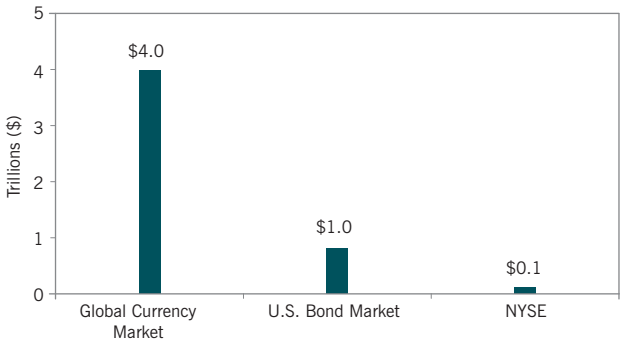
One primary reason for this disconnect is a knowledge gap. While most investors and researchers understand the role that equities, bonds and even commodities play in a portfolio, currencies remain a relative mystery. Despite the size of the market, there is limited research on the strategic role that a currency allocation can play, other than as a vehicle for hedging a portfolio's base currency exposure. We consider this to be a lost opportunity as exposure to the currency asset class can offer numerous benefits to investors' portfolios.

First, as illustrated in *Display 1*, the currency market is extremely liquid; thus, transaction costs are relatively low, even during times of financial crisis and turmoil when other asset markets can demonstrate a severe shortage of buyers or liquidity providers. Second, given the amount of daily turnover in the currency market, shown in *Display 2*, it is very difficult for an active currency management strategy to run into capacity constraints. Third, currency alpha is easily portable, as investors can add an active currency overlay to any type of portfolio.[1,2]

[1] Alpha is the excess return of a portfolio relative to the return of its benchmark index.
[2] Currency overlay is the management of the currency exposure inherent in cross-border investments.

Display 1:

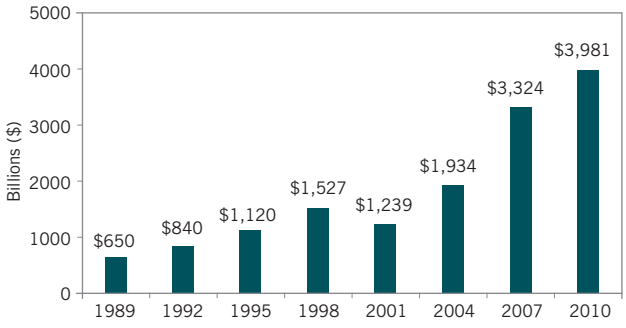
Daily Volume of Currency Markets vs. Bond and Equity Markets 2010



Source: Currency volume is based on average daily turnover of the prior 3 years as at April 2010, per Bank for International Settlements Triennial survey, U.S. bond average volume for full year 2010 per Securities Industry and Financial Markets Association (SIFMA), equity average daily volume for full year 2010 per NYSE.

Display 2:

Average Daily Turnover in the Foreign Exchange Market



Source: Triennial Survey by Bank for International Settlements released Sep 2010. Average daily turnover based on the prior three year periods ending April 30, 2010, in respective years.

Fourth, currency returns have historically had very low correlation to those of other asset classes.[3] Therefore, not only are currencies a very attractive asset class where managers may be able to add alpha, but they also make perfect sense in the context of an overall asset allocation framework.

Finally, unlike fixed income instruments, currencies do not have duration risk.[4] In an environment of rising inflation and interest rates, bonds tend to sell off as duration shrinks. Through currency derivatives, investment managers are able to capture the interest rate differential between interest rates of two countries (or carry) without the negative impact of duration in an inflationary environment.[5] Moreover, in contrast to other asset classes, the outlook for rising global inflation can be a positive factor in currency investing as global authorities allow their currencies to strengthen in order to preserve purchasing power.

This paper offers a brief outline of how the global currency market functions, and examines the major strategic drivers of currency returns. It examines the role of currency as a stand-alone asset class for strategic, as well as tactical investors, and considers how adding currency exposure to a portfolio can potentially help increase its risk-adjusted returns.

The Forex Market: How It Works

At some point, the proceeds of every international transaction must be localized to conclude a business transaction. This fact has made the currency, or foreign exchange (forex), market the largest, most liquid marketplace in the world. On average, as shown in *Display 1*, approximately $4 trillion of trades are placed every day, far exceeding the number of trades placed on the second largest exchange, the U.S. bond market, which generates $971 billion in daily volume.[6]

[3] Source: Bloomberg. Data as of March 31, 2011. Past performance is no guarantee of future results.

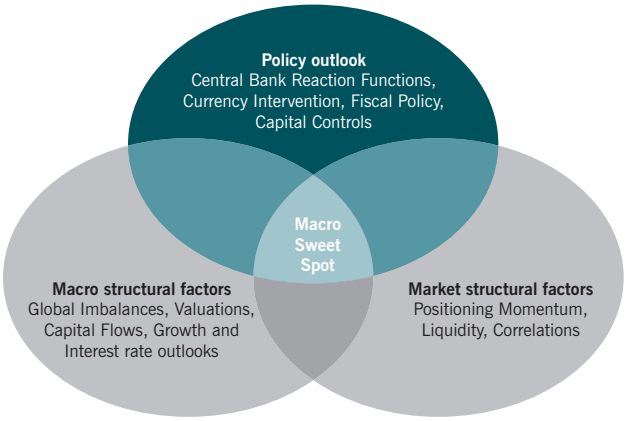
[4] Duration risk is the change in the value of a fixed income security that will result from a 1% change in interest rates.

[5] Derivatives are contracts between two or more parties in which values are determined by fluctuations in the underlying asset.

[6] Source: Bank of International Settlements. Data as of April 2010.

Currencies are a relative trade: to buy one currency, an investor must sell another currency. This is in contrast to other asset classes which tend to be conducted on an absolute trade (i.e., you decide whether or not to buy). Therefore, divergence in the macroeconomic outlooks of different countries can provide opportunities as currencies do not all follow the same trend. Each economy has unique factors that influence its sensitivity to broader macro dynamics. By trading currencies, investors can potentially profit in either bull or bear markets, as there are always some underlying macroeconomic divergences among countries. These drivers lead to the so-called "Macro Sweet Spot," captured in *Display 3*.

Display 3:
Intersection of the Various Drivers in Currency Markets



Source: MSIM

Forex trading volume is broadly distributed, taking place at global money market centers around the world, including New York, London, Frankfurt, Singapore, Hong Kong, Tokyo and Sydney. Trading occurs around the clock, five days a week. When the Asian trading day ends, the European day begins, and so on around the globe.

While more than 180 currencies exist around the world, most market interest centers on ten specific currencies: the U.S. dollar (USD); euro (EUR); British pound sterling (GBP); Japanese yen (JPY); Swiss franc (CHF); Australian dollar (AUD); Canadian dollar (CAD); Swedish krona (SEK); Norwegian krone (NOK) and, perhaps surprisingly to newcomers to currencies, New Zealand dollar (NZD). These are the so-called "G10 currencies."

In particular, three currency pairs, known as the "majors," are the most liquid and widely traded in the world and account for just over 50% of daily market trading:[7]

- EUR/USD – (Euro vs. U.S. dollar)
- USD/JPY – (U.S. dollar vs. Japanese yen)
- GBP/USD –(British pound sterling vs. U.S. dollar)

A diverse range of participants are active in foreign exchange markets. Since not all of these participants have profit as a primary motivation, this leads to persistent inefficiencies that can create opportunities for investors. For example, central banks and governments are active in forex markets for reserve management or policy reasons, such as maintaining a currency peg.[8] Multinational companies buy or sell forex in order to hedge currency risk on their future earnings or expenses. Finally, a large portion of currency trading is motivated by trade and tourism, where participants rarely time their activity based on directional currency views. Importantly, the proportion of active currency managers is dwarfed by non-profit oriented participants. Hence, while this is a very deep market, it is also inefficient. More nimble investors can take advantage of the dislocations created by other market participants.

[7] Source: Triennial Survey by Bank for International Settlements. Data as of April 2010.
[8] A currency peg is a country's or government's exchange-rate policy of fixing the central bank's rate of exchange to another country's currency.

Currencies as an Asset Class

The first characteristic investors typically examine when evaluating an asset class are correlations: Does the asset class provide a pattern of returns that is different from competing assets? Modern portfolio theory tells us that adding non-correlated returns to a portfolio can improve its risk/reward ratio, so correlations are a natural place to start.

From a correlation perspective, currencies offer significant diversification. For the five-year period ending March 31, 2011, a diversified basket of major international currencies had a low correlation to both U.S. equities and fixed income, as illustrated in *Display 4*.

It is important to note that the correlation benefit of currencies versus either global equities or the U.S. bond market actually improved during the worst of the recent financial crisis from 2008 to 2009.[9] At the same time, the correlation benefit of the traditional asset class diversifiers, such as international stocks, hedge funds and commodities, collapsed, leading many to question the benefits of a diversified portfolio altogether. In a market where investors are increasingly concerned about the prospects for the U.S. dollar and where true diversification is increasingly hard to find, currency appears to work.

Display 4:
Five-Year Correlations of Returns

	Currencies	Global Equities	Emerging Market Equity	U.S. Core Fixed Income	U.S. Credit	U.S. High Yield	Commodities	Crude Oil	REITs	Gold	Macro Funds	Cash
Currencies	**1.00**	0.03	0.13	-0.05	-0.07	-0.09	0.06	0.04	-0.05	0.20	0.28	0.03
Global Equities		**1.00**	0.89	0.15	0.47	0.78	0.55	0.51	0.77	0.05	0.08	-0.03
Emerging Market Equity			**1.00**	0.20	0.49	0.72	0.61	0.63	0.57	0.25	0.23	0.01
U.S. Core Fixed Income				**1.00**	0.83	0.26	-0.03	-0.12	0.22	0.41	0.01	0.01
U.S. Credit					**1.00**	0.62	0.21	0.14	0.41	0.36	0.07	-0.11
U.S. High Yield						**1.00**	0.45	0.44	0.75	0.14	0.02	-0.18
Commodities							**1.00**	0.95	0.32	0.34	0.27	0.01
Crude Oil								**1.00**	0.24	0.26	0.18	-0.03
REITs									**1.00**	0.03	-0.04	-0.08
Gold										**1.00**	0.49	-0.02
Macro Funds											**1.00**	0.11
Cash												**1.00**

Source: Bloomberg. Past 60 months data from April 2006 to March 2011. Currencies=Barclay Trader Indexes Currency, Global Equities=MSCI AC World, Emerging Market Equity=MSCI Emerging Markets, U.S. Core Fixed Income=BarCap U.S. Agg, U.S. Credit=BarCap U.S. Agg Credit, U.S. High Yield=BarCap U.S. Corporate High Yield, Commodities=S&P GSCI, Crude Oil=WTI Crude Oil Spot Price, REITs=FTSE NAREIT Equity REIT, Gold=Gold Spot Price, Macro Funds=HFRX Macro Index, Cash=Citigroup 3 Month Treas Bill.

[9] Past performance is no guarantee of future results.

Display 5:

Currencies Have a High Information Ratio: Annualized Average Returns and Standard Deviation

Asset Class	Average Annualized Return	Annualized Standard Deviation	Average/ Standard Deviation
U.S. Core Fixed Income	5.9%	3.6%	1.65
Currencies	2.2%	2.0%	1.11
Gold	20.0%	19.5%	1.02
U.S. Credit	6.4%	6.6%	0.98
U.S. High Yield	9.7%	13.7%	0.71
Emerging Market Equity	11.8%	21.7%	0.54
Crude Oil	15.5%	34.2%	0.45
REITS	7.2%	32.5%	0.22
Global Equities	2.9%	17.3%	0.17
Macro Funds	0.7%	9.3%	0.08
Commodities	0.5%	27.3%	0.02

Source: Bloomberg. Past performance is no guarantee of future results. Past 60 months data from April 30, 2006 to March 31, 2011.

It is also interesting to note that currencies have a relatively high information ratio.[10] Over the past five years, currency returns measured by the Barclay Trader Currency Index, had an information ratio of 1.1, higher than gold, U.S. credit, U.S. high yield, REITs equities, macro funds, and commodities. As shown in *Display 5*, the only asset class that had an information ratio higher than currencies was U.S. core fixed income. However, fixed income arguably has been in a bubble over the past five years with interest rates approaching 0% in most major economies, an event not likely to be repeated over the next decade.

Currency as a Portfolio Asset

Investors looking to put currency to work in their portfolios have a number of options.

Cash Diversification

Currency investments are, at their core, just another way to hold cash. And just as investors diversify their stock and bond portfolios overseas, they can do the same with cash investments. All the same core reasons apply: diversifying the portfolio can help lower the risk in a particular market or asset class for investors.[11]

Potential to Minimize Volatility

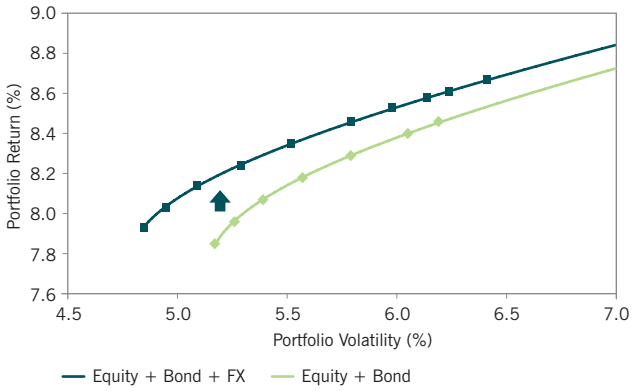
Adding currencies to a portfolio may improve overall performance while reducing volatility. Modern portfolio theory focuses on the "efficient frontier," the set of investments that maximize portfolio returns for a given risk tolerance. By adding more assets to the portfolio, an investor can reap diversification benefits and raise this "efficient frontier." We think the best way to raise the efficient frontier is to add uncorrelated assets to the portfolio mix. This concept is illustrated in *Display 6*, with currencies offering a very attractive way to accomplish that, given their low correlation with other asset classes.

[10] Information ratio is the risk-adjusted return of an asset. The higher the number, the higher the risk-adjusted return, meaning it has the highest per unit risk.

[11] Diversification does not protect you against a loss in a particular market; however it allows you to spread that risk across various asset classes.

Display 6:

Currencies Can Potentially Improve Overall Portfolio Performance While Reducing Volatility



Source: MSIM, Bloomberg. Past performance is no guarantee of future results. The percentage allocations referenced are for illustrative purposes and do not constitute, and should not be construed as, investment advice or a recommendation. The hypothetical results shown do not, and are not meant to, depict the performance or volatility of any specific investment or strategy MSIM offers. These hypothetical returns do not reflect the impact of fees that would have been incurred. Had such fees been taken into account, the returns would have been lower. No representation is being made that any portfolio with similar allocations will or is likely to achieve similar results to these being shown. FX=Barclay Trader Currency Index, Equity=MSCI AC World Index, Bonds=JPM Global Aggregate Index. Optimized period of 20 years spanning January 1988 to December 2007, constrained to 20-80% equity, 20-80% bonds, 0-30% currency.

Possible Driver of Global Equity and Bond Returns

Although few investors have stand-alone currency exposure in their portfolios, all investors who own international stocks and bonds have a critical currency aspect to their portfolios. This currency exposure is a key source of returns for international investments. As shown in *Display 7*, this currency effect directly impacts correlations as well, not just the absolute returns. For example, U.S. and Japanese equities have a slightly positive correlation (+11.8%) in their respective local markets, but adjusting for currency fluctuation, there is virtually no correlation at all (-1.6%).

Display 7:

Impact of Currency on Correlations

	Correlation of Equity Returns 2007-Current		
	Local Currency Index Correlation	USD Based Index Correlation	Difference in Correlations (FX Impact)
U.S. vs Europe	61.2%	56.4%	4.9%
U.S. vs UK	57.5%	54.4%	3.0%
U.S. vs Japan	11.8%	-1.6%	13.4%
U.S. vs EM	51.1%	50.4%	0.7%
Europe vs UK	97.3%	96.7%	0.5%
Europe vs Japan	37.4%	23.9%	13.6%
Europe vs EM	70.8%	76.3%	-5.4%
UK vs Japan	35.6%	23.0%	12.6%
UK vs EM	67.8%	74.6%	-6.8%
Japan vs EM	62.0%	46.2%	15.9%

Source: Bloomberg, MSIM. Data from January 1, 2007 to March 31, 2011. Past performance is no guarantee of future results. Local currency correlations calculated using MSCI Gross Local indices, USD correlations calculated using MSCI Gross USD indices.

Of course, currency exposure in equity and debt instruments can act as a double-edged sword unless managed appropriately, as *Display 8* shows. For instance, in 2007, U.S. investors earned 9.6% percent on their equity investments, while local currency (or fully hedged) investors earned only 5.2% percent. Conversely, European investors lost 1.2% in 2007 as the euro saw significant appreciation. In 2008, U.S. equity investors lost 40.3% percent as a strengthening U.S. dollar exacerbated the equity drawdowns for U.S. investors. In contrast, the euro weakened during that time and buffered the impact of the global equity sell-off, and European-based investors suffered a slightly less severe 37.2% decline in 2008. In the first quarter of 2011, the weaker USD augmented global equity returns for U.S.-based investors, helping to generate a nearly 5% return compared with the small loss of 0.8% suffered by European-based investors.

In the case of fixed income, currency exposure has historically had an even more significant impact on returns. As shown in *Display 9*, the most obvious impact of this implied currency exposure was in 2007 and 2009, when the falling dollar drove a strong return for U.S. investors, while returns for local currency investors fell short. On the other hand, U.S. investors took a hit on their U.S. dollar returns versus local currency returns in 2008, as the U.S. dollar appreciated broadly in currency markets during the global financial crisis.

Display 8:

From a European Investor Perspective, Global Equity Returns Were Negatively Impacted by the Stronger Euro in 2007 and 2011

	Global Equities		
Year	MSCI Daily Total Return Gross World Local	MSCI Daily Total Return World Gross EUR	MSCI Daily Total Return Gross World USD
2007	5.2%	-1.2%	9.6%
2008	-38.3%	-37.2%	-40.3%
2009	26.5%	26.7%	30.8%
2010	10.6%	20.1%	12.3%
2011-td	3.7%	-0.8%	4.9%

Source: Bloomberg, MSIM. Data from January 1, 2007 to March 31, 2011. Past performance is no guarantee of future results.

Display 9:

Impact of Currency is Most Pronounced in Emerging Market Debt

	Emerging Market Bonds		
Year	JPMorgan GBI-EM Global Composite LOC	JPMorgan GBI-EM Global Composite Unhedged USD	Difference
2007	6.4%	18.6%	12.2%
2008	10.9%	-7.9%	-18.8%
2009	8.6%	21.0%	12.4%
2010	11.1%	15.4%	4.3%
2011-td	0.3%	2.7%	2.4%

Source: Bloomberg, MSIM. Data from January 1, 2007 to March 31, 2011. Past performance is no guarantee of future results.

Understanding the critical role that currencies play in international bond and stock portfolios can offer investors a chance to gain better control over their portfolios. Investors allocating overseas may or may not want to take on the currency risk of their investments. Those who believe the euro is overvalued, for instance, but still want exposure to European equities, could consider buying the stock exposure and hedging out the currency risk with a currency product.

An Alternative: Direct Exposure?

If currency explains so much of the returns of international exposure, why not directly invest in this asset type? In fact, the data suggest that doing so can provide a meaningful impact on a portfolio's risk/return balance. Given its negative or low correlations to virtually every other asset class, one would expect currency to improve the risk/reward characteristics of a portfolio. Not surprisingly, the primary impact is to drive down risk: after all, no one expects currency returns to match or beat equity returns over the long haul. Currency is, for the most part, a relatively low-risk asset, that can generate interest income and help to diversify a portfolio.

Source of Alpha

For many investors, the primary use of currency in a portfolio is as a discrete, uncorrelated source of alpha. There are well-established currency trading strategies with strong track records of delivering non-correlated alpha.

The Carry Trade

The most popular forex trade, particularly with institutional investors, is the "carry trade," in which an investor borrows currency from a low interest rate country and uses those funds to buy the currency of a country with higher interest rates. This allows the investor to potentially profit on the interest rate differential, or "carry." Investors typically execute this trade on a leveraged basis in an attempt to earn the highest returns possible. Common carry trades often involve selling the Japanese yen, as Japanese interest rates have hovered near-zero for years, and purchasing high-yielding Australian or New Zealand dollars. Over the past six months, the U.S. dollar has been the funding currency of choice, given the Federal Reserve's shift to a near-zero interest rate and quantitative easing.

Investing in currencies, however, is not as easy as buying high carry currencies and selling lower yielding ones, as central banks have begun intervening in the currency markets using various unorthodox measures that distort the value an investor can extract using pure carry strategies. Moreover, if exchange rates fluctuate unfavorably, carry trades can backfire. When a lower interest rate currency rises in value relative to a higher one, or the higher-yielding currency depreciates, returns on the carry trade can be diminished or wiped out quickly (this is exacerbated in the highly leveraged positions common to currency investments). Carry-trade investors also need to be wary of market volatility. During times of high volatility in capital markets, whether in equities, bonds, commodities, or currencies, investors tend to abandon the carry trade, selling their high-yielding assets and seeking ones with lower interest rates as safe-haven trades. For example, as illustrated in *Display 10*, in the market crisis of 2008, investors fled to the perceived safety of the Japanese yen and the carry trade collapsed, hurting carry trade returns.

Macro Investing

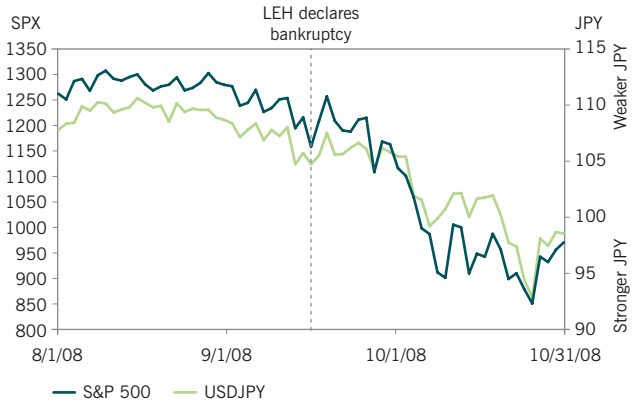
Macro investing is a top-down style that seeks to capitalize on the potential impact of fundamental developments, such as economic data or central bank decisions, that could potentially affect forex markets. Currencies have long been a cornerstone of macro investing, as they tend to offer one of the most effective ways to express a longer-term fundamental view. Typically, this is due to currency valuations, over time, reflecting expectations for growth and returns in different economies.

Additional Strategies

Momentum and valuation are other strategies used in currency investing, but these tend to be most influential when they reinforce other macro variables. Momentum and valuation alone do not typically set the stage for a durable investment strategy because investors could get whipsawed if currency market trends change quickly. In addition, while valuations are key longer-term indicators for currency markets, like other asset classes, currencies can remain under- or over-valued for long periods of time, making this only a more powerful strategy when a catalyst for correction can be identified.

Display 10:

The Unwinding of the Yen Carry Trade and the Effect on the DJIA During the Lehman Bankruptcy Crisis



Source: Bloomberg. Data from Aug 1, 2008 to October 31, 2008.

From Theory to Practice: Implementing Currency Strategies

Despite currency's attractive attributes in a portfolio, until relatively recently, only large financial institutions or corporations could engage in forex trading, due to the large minimum lot sizes and over-the-counter nature of the marketplace. Today, technological and product development advances have opened up forex markets to a new audience.

While currency exchange traded funds (ETFs) increasingly have become available to investors, these tend to be narrow in focus as either a single currency fund or single investment style. As a result, these may not be the most efficient vehicles for capturing the diversifying benefit of currency investing. Actively managed currency funds may provide a more ideal platform, as they can offer broader exposure across different currencies and low correlation to other asset classes.

Conclusion: Why Now?

Currency is playing an increasingly important role both in global markets and investor portfolios, with long-term trends suggesting this will continue. Everyone active in global investing has currency exposure whether they are aware of it or not, and it is prudent to consider how this currency exposure impacts returns.

We are living in an increasingly global world, where U.S. dominance over the global economy and the global capital markets system is becoming a thing of the past. Consider, for instance, that over the past six years, the U.S. share of total global market capitalization has fallen from an average of 57 percent in 2003 to 49 percent currently.[12] Much of this weight has swung to the so-called BRIC countries—Brazil, Russia, India and China—which now account for 7.6 percent of world market cap, putting this foursome on almost equal footing with the might of France and Germany combined. Many economists expect this trend to continue. *Display 11* shows the shift in macro fundamentals from developed to emerging countries. As a result of those trends, the U.S. share of the world's capital markets seem poised to continue shrinking. What this means for investors is that currency appears likely to play an ever more important role in their total portfolios and it will undoubtedly influence the returns of their equity and bond investments.

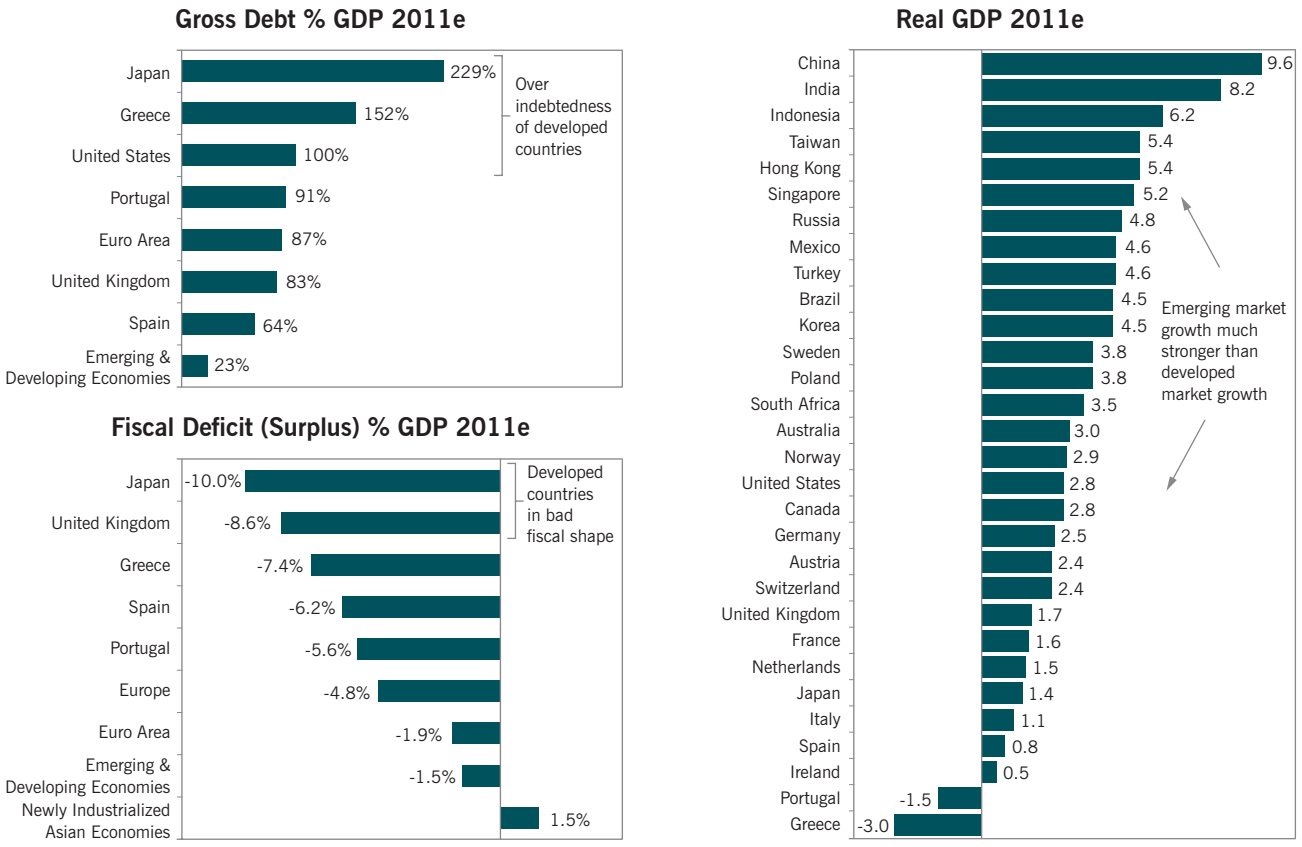
Investors will very likely want to use new tools to hedge or amplify their exposure to the currency markets. Alternatively, they may want to use well-established trading strategies to add a non-correlated alpha engine to their portfolios. Until only a few years ago, most investors did not have access to discrete currency investments. As a result, few knew the roles they could play. But, currency investing is a powerful tool, and if used appropriately, can help boost a portfolio's risk-adjusted returns.

Currency is, without question, a critically important asset class.

[12] Source: MSCI. Data as of March 31, 2011.

Display 11:

Emerging Market Fundamentals More Robust vs. Developed Countries



Sources: Haver, IMFWEO. Data as of April 2011 for all data points except Euro area debt to GDP which is from OECD as of December 2010. Information shown above reflects projections of the IMF as of April 2011.

Disclosures
The views expressed are those of the author as of April 31, 2011. The author's views are subject to change at any time due to market or economic conditions without notice to the recipients of this document. The views expressed does not reflect the opinions of all portfolio managers at MSIM, or the views of the firm as a whole, and may not be reflected in the strategies and products that the Firm offers. This document has been prepared solely for informational purposes and is not an offer, or a solicitation of an offer, to buy or sell any security or instrument or to participate in any strategy. Information in this presentation does not contend to address the financial objectives, situation or specific needs of any individual investor.

All investments involve risks, including the possible loss of principal. The value of equity investments are more volatile than the other securities; stocks are more volatile than corporate bonds, and investments in foreign markets entail special risk, such as currency, political, economic and market risks. The risks of investing in emerging market countries are greater than the risks generally associated with foreign investments.

Currencies are affected by changes in rates of exchange between currencies, which may cause the value of investments to decrease or increase. Furthermore, the value of investments may be adversely affected by fluctuations in exchange rates between the reference currency and the base currency of the investments. Real estate risks can include fluctuations in the value of underlying properties; changes in general and local economic conditions; and other economic, political or regulatory occurrences affecting the real estate industry. The commodities markets may fluctuate widely based on a variety of factors, including but not limited to changes in overall market movements, domestic and foreign political and economic events and policies, war, acts of terrorism, changes in domestic or foreign interest rates (inflation rates) and/or investor expectations concerning interest rates (inflation rates), and investment and trading activities of mutual funds, hedge funds and commodities funds. Alternative investments use of leverage, short sales, and derivative instruments, in certain circumstances, can subject them to significant losses, volatility, or both. Fixed-income securities are subject to credit and interest-rate risk. Credit risk refers to the ability of an issuer to make timely payments of interest and principal. Interest-rate risk refers to fluctuations in the value of a fixed income security resulting from changes in the general level of interest rates. In a declining interest-rate environment, the portfolio may generate less income. In a rising interest-rate environment, bond prices fall. Investments in securities rated below investment grade (commonly known as "junk bonds") present greater risk of loss to principal and interest than investment in higher-quality securities.

Past performance is no guarantee of future results. Charts and graphs provided herein are for illustrative purposes only and end dates reflect month-end, unless noted. This material has been prepared using sources of information generally believed to be reliable but no representation can be made as to its accuracy. Forecasts/estimates are based on current market conditions, subject to change, and may not necessarily come to pass. Performance of all cited indices is calculated on a total return basis with dividends reinvested, unless noted otherwise. The indices do not include any expenses, fees or charges and are unmanaged and should not be considered investments. An investor can not invest directly in any index.

Index Definitions:
Barclays Capital U.S. Aggregate Bond Index: An index made up of the Barclays Capital U.S. Government/ Corporate Bond Index, Mortgage-Backed Securities Index, and Asset-Based Securities Index, including securities that are of investment grade quality or better, have at least one year to maturity, and have an outstanding par value of at least $100 million.

Barclays Capital Currency Traders Index: An equal weighted composite of managed programs that trade currency futures and/or cash forwards in the inter bank market. In 2009 there were 124 currency programs included in the index.

Dow Jones Credit Suisse Managed Futures Index: An asset-weighted hedge fund index derived from the TASS database of more than 5,000 funds.

Hedge Fund Research Global Hedge Fund Index: An index compiled by Hedge Fund Research, Inc., comprised solely of hedge funds, and designed to be representative of the overall composition of the hedge fund universe.

JPMorgan Global Aggregate Bond Index: An index that consists of the JPM GABI U.S., a U.S. dollar denominated, investment-grade index spanning asset classes from developed to emerging markets, and the JPM GABI extends the U.S. index to also include multi-currency, investment-grade instruments.

MSCI All Country World Index: An unmanaged, free float-adjusted market capitalization weighted index composed of stocks of companies located in countries throughout the world. It is designed to measure equity market performance in global developed and emerging markets. The index includes reinvestment of dividends, net of foreign withholding taxes.

MSCI EAFE Index: A free float-adjusted market capitalization weighted index designed to measure developed market equity performance of developed markets (Europe, Australasia, Far East), excluding the U.S. & Canada. It is composed of companies representative of the market structure of developed market countries. The index includes reinvestment of dividends, net of foreign withholding taxes.

S&P 500 Index: A market capitalization weighted index of 500 widely held equity securities, designed to measure broad U.S. equity performance.

S&P GSCI Index: A composite index of commodity sector returns representing an unleveraged, long-only investment in commodity futures that is broadly diversified across the spectrum of commodities. The returns are calculated on a fully collateralized basis with full reinvestment.

U.S. Dollar Index: An index of the value of the United States dollar relative to a basket of foreign currencies. It is a weighted geometric mean of the dollar's value compared with the Euro, Pound sterling, Canadian dollar, Swedish krona, Swiss franc (CHF) and Japanese Yen.

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All that Glitters is not Gold:[1] Digging for Genuine Growth in Emerging Markets Equities

This article reflects the investment views and analysis of Ruchir Sharma, Head of Emerging Markets Equity, and team.

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Executive Director
Morgan Stanley Investment Management

The case for having significant emerging markets (EM) exposure remains well known by asset allocators and is increasingly a consensus view, regardless of such events as the inflation-induced retracement witnessed in the first quarter of 2011. The chief reasons often cited for an allocation to EM are superior economic growth rates relative to developed countries and healthier public and private balance sheets. What may be less appreciated by many investors, however, is a clear sense of the underlying source for future return drivers in the asset class. Investors often use "short cuts" and tend to consider future returns in terms of "growth" or "value", but to simplistically classify an investment approach using these fixed categories may miss the nuances of identifying winning stocks. In this paper, we seek to identify what is really meant by growth investing. We also consider whether superior economic growth necessarily leads to higher equity returns. Finally, we explain how we believe investors can attempt to successfully invest in emerging markets in 2011.

We believe successful long-term investing will come from identifying sustainable long-term growth in company fundamentals, driven by both macro and company-specific drivers. Admittedly, in the horse race between growth and value investing in EM, value—as traditionally defined—has led most loops around the track for much of the past decade. The outperformance of the value investment style in the past decade stemmed from the consequences of both the EM financial crisis in the late 1990's, and the subsequent tech bubble and collapse. Compared with where EM equities were over a decade ago, value stocks appear to have become a lot less cheap. While quality growth stocks delivered a healthy resurgence for part of 2010, value came roaring back in December and during the first quarter of 2011, largely due to the liquidity surge stemming from the Federal Reserve's second round of Quantitative Easing (QE2). Such liquidity will not be so readily available indefinitely.

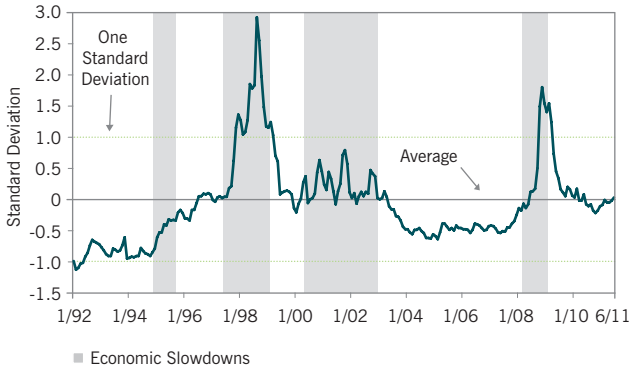
[1] From William Shakespeare's 'The Merchant of Venice' Act II, Scene 7, "All that glisters is not gold."

Additional contributions provided by Paul Psaila, Eric Carlson, Gama Blanco, Wei-Ling Liew, Amy Oldenburg, Dan Raghoonundon and Dana Wolf

As *Display 1* shows, valuation spreads are below long-term averages and have come off significantly since the crisis. When spreads are high, value tends to work as a strategy. This is because the cheapest stocks are significantly cheaper than the average market stock valuation. On the other hand, when valuation spreads compress, the case for growth investing becomes more compelling. This is because the difference in intra-stock valuation is very low. Spreads are currently at levels which are suggesting growth stock outperformance as economic cycles within EM countries diverge and the market starts distinguishing between the winners and losers.

Display 1:

Top-Quintile Emerging Markets Stocks Valuation Spreads Compared to the Market Average

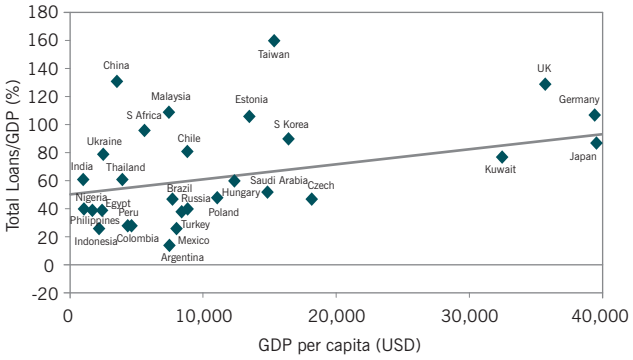


Source: Empirical Research Partners Analysis. Data as of June 2011.

In coming years, demographic changes and productivity gains mean consumption will likely represent an even larger part of EM economic growth. Consumer-related equity index weightings will likely rise gradually to reflect this trend. As a rule, consumption increases as income per capita rises, particularly on discretionary items. Another contributor to the propensity for change in consuming habits is the absence of heavy debt overhang that most EM consumers enjoy. Debt penetration is extremely low—well below 20%—in such countries as Indonesia, Colombia and Peru as *Display 2* shows. This is in sharp contrast to their consumer counterparts in developed markets like the UK and the U.S. (which is literally off the chart below). Commonplace features of life in developed countries—such as the use of credit cards and mortgages—are at incipient levels in many EM countries. Only 10% of homes in Indonesia, for example, are purchased via financing.[2]

Display 2:

Total Loan Penetration (%) vs. GDP Per Capita – Emerging Markets including Frontier Countries



Source: Central Bank Data, IIF, IMF International Financial Statistics, Regional Supranational Organizations, ML Estimates. Data as of December 31, 2009. Note: Not all frontier and developed markets are shown.

The Consumer's Comeback and Growing Contribution

In our view, earnings expectations have been unsustainably too high for cyclicals. The combined index weighting of energy and materials at more than 30% of the MSCI EM Index[3] is disproportionately represented when one considers the genuine underlying sources of future growth in EM economies. We believe these economies are far less cyclical than what is represented by their equity markets. It is important to note how the commodities sector

[2] Source: Emerging Consumer Survey, Credit Suisse Research Institute. Data as of January 2011.
[3] Source: MSCI EM Index. As of April 30, 2011.

weightings increasingly dwarfed the consumer staples and discretionary weightings over the last decade. But the EM consumer has shown resilience since the low points of the global financial crisis, as reflected in the weighting of consumer staples and discretionary (as *Display 3* illustrates). We believe this upward trend will likely continue, as we will elaborate upon.

Display 3:
Global Emerging Markets Consumer Staples and Discretionary Sector Weight

Source: MSCI. Data as of June 3, 2011.

The strong performance of growth and quality stocks for a brief period in 2010 seems like a more significant indicator of a longer-term trend. Future capital appreciation will likely be made through correct identification of the companies capable of delivering on this growth, and by aggressive portfolio positioning in anticipation of index weight changes that may come. After all, the MSCI EM Index, like all equity indexes, is by nature backward looking, as its weightings reflect what is already in the price of freely-traded stocks. Successful future investing will also require active country allocation decisions because the dynamics driving consumption patterns vary widely from country to country. Differing growth levels in GDP per capita, savings habits, access to credit and cultural preferences all matter a great deal in determining which companies in various sectors are likely to see growth in earnings as a result of such changes, as we will discuss in this paper.

Growth Versus Value—Worthy of Debate?

In the growth versus value debate, confusion comes partly from trying to categorize what constitutes a growth or value stock. It is important to remember that the definition has been fluid over time. For example, in January 2000, at the peak of the dot-com bubble—or tech, media and telecommunications (TMT) boom—telecommunications accounted for 19% of the MSCI EM Growth Index. As of April 2011, this sector represented only 5%.[4]

The argument for holding telecommunications in a global emerging markets portfolio is no longer merely, as it was in the 1990's, about capitalizing on underpenetrated wireless markets. Today, consumers in the higher income EM countries increasingly own a mobile phone or two. Mobile phone subscriber penetration levels are as high as 156% in Russia and 129% in the Czech Republic[5], where GDP per capita is now $10,000 and $18,000, respectively.[6] There is, however, material opportunity for voice growth in lower income countries, including, for example, Bangladesh and Nigeria, where subscriber penetration is only around 50%[7] and GDP per capita just $600 and $1,400, respectively.[8] But we also find compelling earnings growth opportunities in those integrated telecommunications companies that are climbing up the value chain by providing ever newer services and transmitting massive amounts of data in creative ways. A citizen of Kenya, who may not even own a bank account, is increasingly likely to bank via mobile phone—or pay utility bills on it, rather than wait in line at the post office to do so. The relatively low weighting of telecoms in the MSCI EM Growth Index, therefore, does not reflect the compelling risk/reward and growth opportunities of the sector. Investor sentiment has been most negative in regard to the integrated telecoms, but in

[4] Source: Factset. Data as of April 29, 2011.
[5] Source: Bank of America - Merrill Lynch Survey, Global Research Estimate. Data as of December 31, 2010.
[6] Source: IMF 2010 Estimates. Data as of May 24, 2011.
[7] Source: Bank of America - Merrill Lynch Survey, Global Research Estimate. Data as of December 31, 2010.
[8] Source: IMF 2010 Estimates. Data as of May 24, 2011.

our view they offer among the most compelling risk/reward opportunity, with cheap cash flow and greatest potential for improving fundamentals.

Strict designation by sector is also difficult as a particular sector can switch camps based on market circumstances and valuation metrics. Jeremy Siegel, a professor at the Wharton School at the University of Pennsylvania, noted that "growth and value designations are not inherent in the products the firms make or industries they are in. The term depends solely on the market value of the firm relative to some fundamental variable, such as earnings, book value."[9]

Generally speaking, mature industries do not offer growth stocks. However, in less mature EM economies like Indonesia and the Philippines, where economic growth rates are higher than in mature, quasi-developed markets such as Taiwan, investors can find growth opportunities in telecommunications as well as banking and consumer discretionary sectors such as automobiles. This is due to relatively low penetration levels in some of these sectors, thus providing the greatest potential for catch-up. Egypt's political upheaval in early 2011 marked a major shift in the demand for political representation in the Middle East. Less appreciated by the media is the pace of change that may very well take place in the future in a country where only 10% of the population has a bank account.[10] With GDP per capita at only US$2,800 in Egypt[11], spending on food amounts to nearly 40% of income[12], but we have observed among countries in development that consumption choices shift dramatically when income rises from such a low base. Market reforms and access to credit, if and when they occur, will help bring about such changes in countries like Egypt and other low-income countries.

Consumer staples may sometimes be viewed as defensive investments, but in many cases individual companies are becoming market leaders or are getting involved in active cross-border M&A activity. One of the biggest foodstuffs companies in Latin America, for example, was once a relatively small local seller of chickens. What was a $400 million market cap company in December 1997 is today a $16.4 billion market cap conglomerate providing chicken, beef and processed foods.[13] Its rapidly increasing market share now extends beyond Brazil to include the rest of Latin America and the Middle East—capitalizing on the growing demand for protein and processed food in countries where consumers are experiencing rising per capita income. These types of consumer companies are becoming some of the most attractive growth issuers. Many industrials also meet reasonable growth criteria even if they may face the same short-term pressures from inflation as financials generally do when interest rates rise.

It is far more important to focus on companies capable of generating higher earnings relative to the index as well as good quality earnings (at a reasonable price), than pay attention to the current MSCI designation of growth and value. The challenge for investors is to look beyond short-term cyclical noise, and instead make sensible earning projections supported by fundamentals. This can mean taking a contrarian stance when sentiment toward cyclicals reaches extremes—as was the case with energy and materials in the first quarter of 2011. One well-known fund manager survey showed dominant overweights to energy and materials, with energy expected to be the best performing sector for 2011.[14] Such overbought positions usually end up disappointing the market.

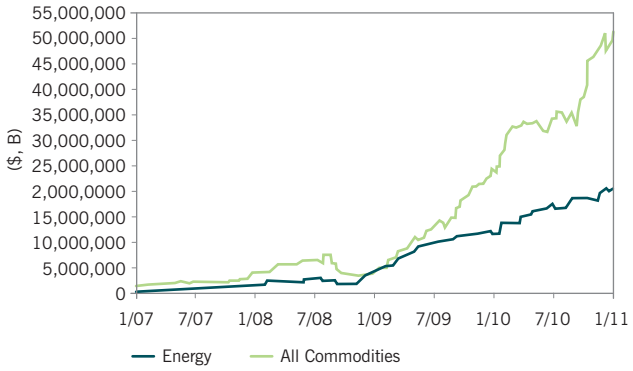
[9] Stocks for the Long Run, 4th Edition: The Definitive Guide to Financial Market Returns & Long Term Investment Strategies", Siegel, Jeremy; McGraw-Hill, 2008; New York.
[10] Source: Emerging Consumer Survey, Credit Suisse Research Institute. Data as of January 2011.
[11] Source: IMF, 2010 Estimates. Data as of May 24, 2011.
[12] Source: Emerging Consumer Survey, Credit Suisse Research Institute. Data as of January 2011.
[13] Source: Bloomberg. Data as of May 11, 2011.
[14] Source: Credit Suisse Electronic Sentiment Survey. Data as of March 2011; Bank of America - Merrill Lynch Fund Manager Survey, Data as of April 2011.

Commodity Prices — Boom Set up for Bust

In the hope we are not beating the horse metaphor to death, traditionally perceived value positions, including many cyclicals, were leading the leg around the track from December 2010 through the first quarter of 2011.[15] Commodities bulls attempted to justify oil at above $120 per barrel (Brent)[16] by citing better-than-expected economic data out of China and the U.S., the political uprisings in the Middle East and the earthquake and tsunami ravages of Japan.[17]

Based on fundamentals, we see no justification for commodities prices at such stretched levels. Historically, the price of oil has been driven primarily by spare capacity and marginal costs. Such factors would suggest a more appropriate price of oil at $85 to $90 per barrel, based on realistic spare capacity assumptions of 2.5 million barrels. We believe another $20 per barrel stemmed from Middle East risk premium and the remainder from financialization due to negative real rates globally. This is best seen in the abundant cash flows into commodities-related exchange-traded funds (ETFs) and mutual funds, as shown in *Display 4*.

Display 4:
Commodities ETF Shares Outstanding



Source: ETF Securities, Credit Suisse research. Data as on Feb 28, 2011. Excludes Options and OTC. Energy includes 45% crude oil, 11% gasoline, 11% heating oil, and 34% natural gas. All Commodities includes 33% energy, 30% agriculture, 18% industrial metals, 13% precious metals, and 5% livestock.

In addition, trading of oil futures has risen to 20 times the rate of underlying demand. Historically, that ratio has been 4 to 5 times. By comparison, that same ratio was just 15 times the rate of underlying demand when oil peaked at $144 per barrel in 2008.[18] Based on this, we firmly believe that fundamentals will eventually restore equilibrium in this market.

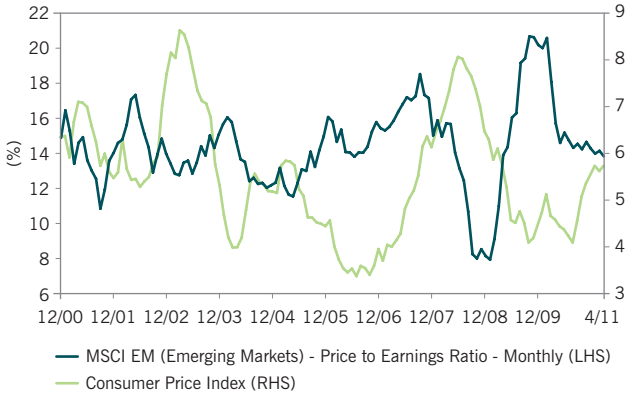
In our view, high commodities prices, especially among agricultural goods, have been sowing the seeds of their own self-destruction. We find a surreal contradiction taking place, as central bankers across most of the EM universe claim that by raising interest rates, they can contain inflationary pressures. Yet we find it surprising that most economists have not significantly reduced their growth assumptions in light of these inflationary concerns. Policymakers in China, India, Brazil, South Korea and Thailand, among others, have all been tightening monetary policy and applying macro-prudential measures including increasing bank reserve requirements. These moves are

[15] Source: MSCI EM Index, Factset. As of March 31, 2011.
[16] Source: Bloomberg, Brent Crude Oil Future. Data as of April 4, 2011.
[17] Source: Bank of America-Merrill Lynch, Credit Suisse, surveys, March and April 2011.
[18] Source: Bloomberg, Brent Crude Oil Future. Data as of July 11, 2008.

bound to slow industrial production and other output figures, though such declines may not show up until the second half of 2011. Industrial production and other macro figures for China that disappoint the market will only further damage the earnings of cyclical companies.

The massive run-up in commodities and food prices clearly imposed a short-term risk to EM equities performance in the first half of 2011. Our concern for the coming months is that closing output gaps and rising wage inflation could feed into core inflation, which could lead to a prolonged tightening bias from policy makers. As *Display 5* shows, when average EM inflation rises, trailing price-to-earnings (P/E) ratios tend to suffer.[19]

Display 5:
Inflation Woes in Emerging Markets



Source: Factset, Data as of April 30, 2011. EM Avg Inflation calculated by using Brazil, Russia, India, China, Mexico, Korea, Taiwan and South Africa.

In terms of gold, for all the many arguments gold bulls cite (including uncertainty, inflation hedging or countering a weak dollar and other currencies), our analysis concludes that the single most important factor driving its rise has been negative real interest rates[20], which lowers its opportunity cost. Gold also tends to perform well during sovereign crises. Who realized that Shakespeare's wide-ranging insights included market commentary when he wrote "all that glistens is not gold" in *The Merchant of Venice*?[21]

Extreme Market Pressure Underscores Need to Seek More Stable Sources of Growth

EM countries represent roughly one-third of global GDP in U.S. dollar terms[22], and more than 70% of the world's population; thus, their economic, political and demographic growth is increasingly driving not only their own companies' earnings but also those of developed world companies with operations in EM countries. We estimate that approximately 15% of S&P 500[23] revenues now come from EM exposure. Many multinationals derive significant portions of their revenue from operations in EM countries. Because investors in developed markets may already have some EM exposure through such companies, the asset allocation process to EM must increasingly consider the growth versus value decision.

Successful EM Investing in 2011 and Beyond Requires Active Country Allocation

It is important to stress that emerging markets are not homogeneous. There are enormous distinctions between countries and markets. To correctly capture growth opportunities, we believe investors need to make active country allocation decisions. In our own country weighting and portfolio positioning decisions, we analyze such factors as the overall global macro environment, future growth

[19] Price-to-earning ratio is a valuation ratio of a company's current share price compared to its per-share earnings.
[20] Real interest rate is approximately the nominal interest rate minus the inflation rate.
[21] As noted earlier, from Shakespeare's 'The Merchant of Venice' Act II, Scene 7, "All that glisters is not gold."
[22] Source: IMF October WEO 2010, 2010 GDP estimates.
[23] Source: UBS. As of April 2011.

versus consensus expectations, and each country's inflation management, credit and liquidity metrics, the level of penetration of mortgages and auto ownership relative to GDP per capita and the potential for policy reforms. When it comes to stock selection, the quality of companies and corporate governance issues are critical considerations. While we compare historical valuations and normalized valuations, we vigorously review earnings quality and consider the catalysts required to unlock growth. Beyond selective countries within the MSCI EM Index, we also look for opportunities in so-called "frontier markets".[24] For example, Bangladesh and Nigeria are two countries where we believe income rising from a low base offers appealing growth opportunities as consumption patterns change.

History shows that leading sectors of one decade rarely repeat in the next—and very few people are able to pick the winning horse. In our view, China's extraordinary fixed asset spending—representing half the country's GDP—was one of the dominant factors affecting equity markets over the past decade. Furthermore, this capital expenditure overwhelmingly benefited energy and materials. Russia and Brazil, whose equity markets are dominated by these two sectors, were the chief beneficiaries among the large markets as *Display 6* illustrates. Current investors should recall that even after the TMT boom and bust in 2000, telecoms in particular were a high beta[25], consensus overweight for the first couple years of the 2000's. As the table shows, telecoms ended up being one of the worst performing sectors of the last decade.

[24] Frontier markets are considered to be investable developing countries that have lower market capitalization, liquidity and are generally riskier than Emerging Markets.

[25] Beta is a measure of the volatility, or systematic risk, of a security or a portfolio in comparison to the market as a whole.

Display 6:

Investment Returns in Past Decade Shaped by the China Cap-Ex Story

MSCI EM Sector Performance (2000-2009)

	Change (%)
EM (Emerging Markets)	102
Energy	303
Materials	238
Healthcare	205
Consumer Staples	170
Utilities	154
Financials	131
Consumer Discretionary	127
Industrials	62
Telecommunication Services	33
Information Technology	(4)

MSCI EM Country Performance (2000-2009)

	Change (%)
EM (Emerging Markets)	102
Colombia	1,004
Peru	614
Czech Republic	586
Brazil	307
Russia	257
India	216
Egypt	214
Indonesia	201
Chile	182
Mexico	175
South Africa	139
Hungary	130
Korea	106
China	94
Morocco	89
Malaysia	76
Israel	76
Poland	73
Thailand	66
Turkey	15
Philippines	0
Taiwan	(25)

Source: FactSet. Past performance is no guarantee of future results. Data for period December 31, 1999 to December 31, 2009.

Does Higher EM Economic Growth Necessarily Lead to Higher Equity Returns?

Historically, higher economic growth in EM has not led to higher equity returns. The experience of China from 1990 to 2005 is a prime example of the disconnect between economic growth and equity returns that has, at times, marked the past. During that 15-year period, China's double-digit annual economic returns were not matched by similar equity returns, in part because of weaknesses in transparency, shareholder rights and corporate governance. Furthermore, a large part of China's index is comprised of government-owned companies, which by nature limits market efficiency. Since then, improvement in some of these areas, combined with ten years of membership in the World Trade Organization and a bigger seat at the table at the now expanded G-20 summit meetings, have all been important factors contributing to noticeable improvement in equity returns in China.

For much of the EM universe, equity returns in the 1990's were mixed, despite higher growth levels. In terms of macroeconomic policy, many — though certainly not all — EM countries have learned from their self-induced crises of 1997 to 1998. Some have applied more discipline to their fiscal budgets, run current account surpluses and built up foreign exchange reserves. Concurrent with this improvement at the sovereign level, regulatory agencies in some cases have improved oversight, increasing corporate governance and transparency. At the company level, one of the greatest differences from the 1990's is that more managers have come to appreciate the importance of focusing on shareholder return, with the understanding that doing so improves their own self-interest.

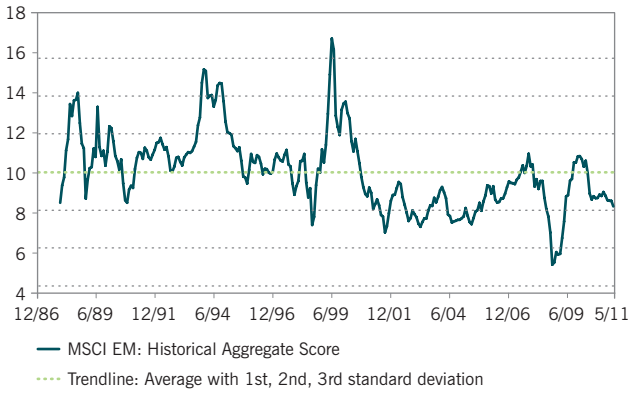
As such, for EM in aggregate over the past decade, there has been an overall reduction in the cost of equity that has accompanied the decline in risk. Improving Return on Equity (ROE)[26] has led to improving EM universe price to book ratios.[27] For example, over the last decade the cost of capital has fallen sharply in Brazil, but that has not been the case in China. Brazil's educational system lags behind several Latin American countries, which constrains the supply of human capital. Investment in research and development also has been very low. In addition, consistent with low capital accumulation, productivity growth has historically been very low in Latin America, including in Brazil. However, the potential return on capital has been high, a reflection of decades of underinvestment. By definition, the return on capital is higher where capital is scarce. Brazil fits this profile very well. An increase in capital expenditure in a falling interest rate environment led to a sharp acceleration in ROE in Brazil which has not occurred in China. Though the early year sell-off in EM led to their discount relative to developed markets, we believe strongly on a fundamental basis EM should trade at a premium to developed markets. Aggregate valuations (combining trailing PE, PBV, dividend yield and 12-month forward PE)[28] for EM equities are trading at approximately a 0.3 standard deviation *below* the average of the past 16 years as *Display 7* shows.

[26] Return on equity is the amount of net income returned as a percentage of shareholders equity.

[27] Price to book value is used to measure a stock's market value to its book value. It is calculated by dividing the current closing price of the stock by the latest quarter's book value per share.

[28] Dividend yield is a financial ratio that shows how much a company pays out in dividends each year relative to its share price. 12-month forward PE is a measure of the price-to-earnings ratio (P/E) using forecasted earnings for the P/E calculation.

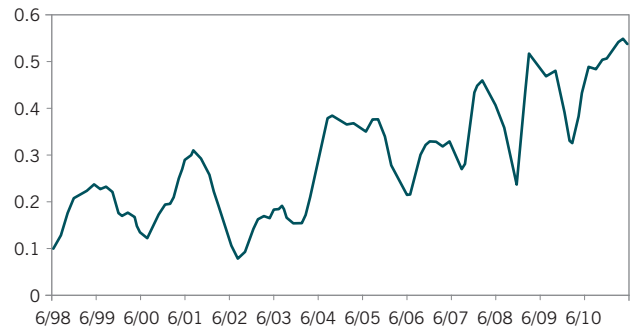
Display 7:
EM Valuations Below Long-Term Average



Source: MSCI, Factset, MSIM. Data as of March 31, 2011.

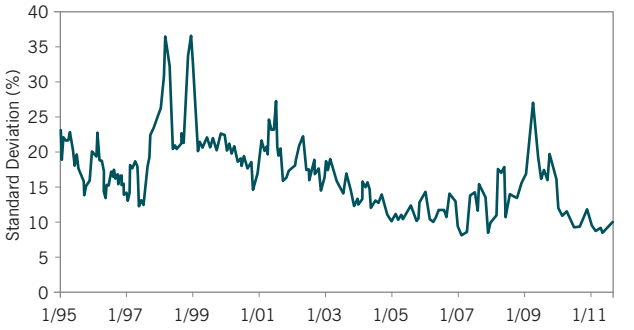
While the historic disconnect between nominal economic growth and earnings seems to have narrowed somewhat, differences in fundamentals, valuations and future prospects will be critical to future potential gains. Varying degrees of inflation and its management will be a key differentiator between countries and their likely market returns. Country allocation was a major driver contributing to successful EM investment performance returns for much of the past two decades. As shown in *Display 8*, the global financial crisis and its aftermath contributed to abnormally high cross-asset correlations across such disparate assets as copper, gold, U.S. high yield debt, EM equities and the S&P 500. This is usually a sign of stress in the system. The common driver has been abundant liquidity stemming from low real rates globally as well as QE2. *Display 9* illustrates that, even within EM, dispersion between country returns is at an all-time low. Active country allocation will likely regain its importance as a factor in generating returns over the next couple years if such abnormally high correlations trend back downward toward historic norms.

Display 8:
Cross-Asset Return Correlation



Source: Bloomberg, FactSet, MSIM. Data ending the week of March 15, 2011. 3 Month rolling pair-wise correlation on weekly returns of copper (active future contract), gold (active future contract), Barclays Capital U.S. Corporate high yield BB rating represents returns from commodity/precious metal and corporate high risk bonds, MSCI EM equities, S&P 500, Aussie Dollar and JPM EMBI+ Index.
Past performance is no guarantee of future results.

Display 9:
Dispersion of EM Country Return

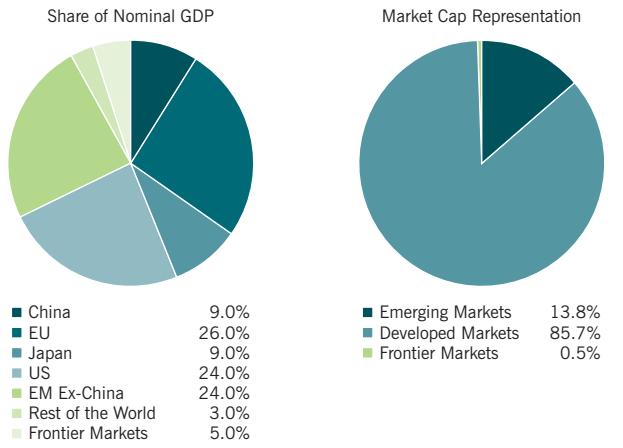


Source: MSIM Emerging Markets Research, Bloomberg. Data as of April 15, 2011 (Top 20 countries in the MSCI EM index)
Past performance is no guarantee of future results.

Looking strictly at GDP weightings shown in *Display 10*, EM countries contribute about 33% of the world's total economic output (in nominal current terms), yet EM countries account for merely 14% of the world's total market capitalization as measured by the MSCI All Country World (ACWI) index.

Growing Share of Global GDP; Market Cap Still Lags

Display 10:
Misrepresentation of Market Allocation



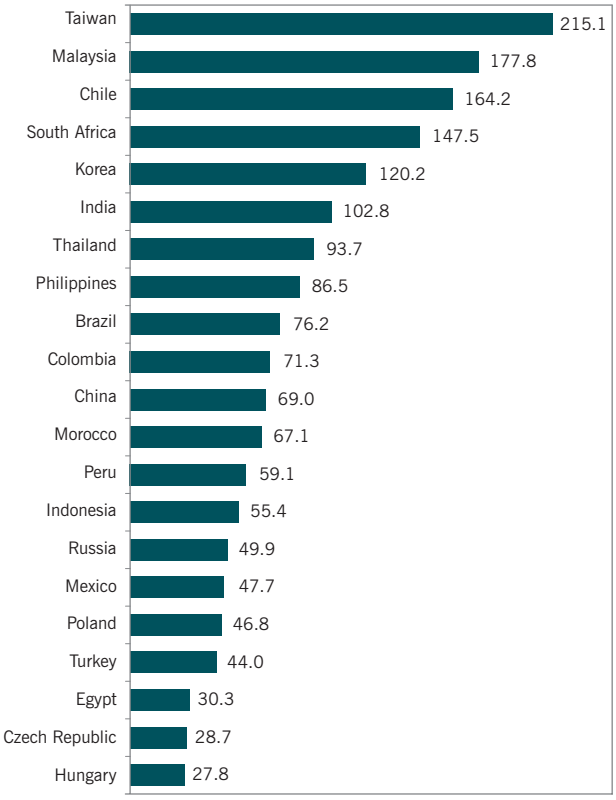
Source: IMF October WEO 2010, 2010 GDP estimates. Chart as of January 5, 2011.

Source: MSCI. Based on MSCI Indices free-float market cap. Chart as of January 5, 2011.

We think that EM market cap will rise in aggregate over time. While support will come from their strong macroeconomic growth levels, long-term success will likely be on a market-to-market basis, stemming from each individual country's fundamentals, institutions and reforms required to deliver earnings. Compared with the developed economies, even the EM aggregate slowdown to a growth rate of 5.5% that we expect in 2011 is supportive relative to the 2% projected developed world growth we expect.

The snapshot of market cap to GDP, shown in *Display 11* by country, illustrates the disparity between markets. The stock markets of Indonesia, Egypt, Poland, Turkey and Mexico do not fully reflect what their economic size implies they could grow to become, assuming reforms and improved efficiencies continue or, in some cases, begin.

Display 11:
Market Cap to GDP (%) in Emerging Markets



Source: Bloomberg, IMF. Data as of April 2011.

By contrast, the stock markets of Taiwan, Malaysia, Chile and South Africa are more mature and reflect higher valuations, relatively lower economic growth levels and already high exposures to equities, especially on the part of domestic pension funds and/or foreign investors.

Portfolio Positioning for 2011: Seeking Stable Growth While Strategically Constructive on Consumption

We advocate seeking sources of stable, even defensive growth given a global environment that continuously challenges investors with sluggish recoveries in much of the developed world, widespread pull backs of many fiscal stimulus programs and what may be a prolonged monetary tightening bias in the EM countries.

We have preferred overweighting countries such as India, Indonesia and the Philippines because of their low per capita income and strong domestic demand base. A number of constructive factors support demand growth including low household leverage, healthy savings rates, rising income and increasing access to credit. By contrast, we believe a high income country such as the Czech Republic (with GDP per capita at $18,000[29]) with its successful inflation containment policies may result in high real dividend yields paid out by selective well-managed companies. Even though China and India have similar high savings rates, lower income consumers within India have a much greater propensity to spend than their counterparts in China, where a higher dependency ratio[30] means people are much more concerned with funding their retirement.

In Brazil, where consumption accounts for almost 60% of GDP (versus 32% in China) and savings are low, consumers are taking advantage of their high GDP per capita (nearly $11,000[31]) and growing access to credit to spend.

In addition to country allocation, it is equally important to choose the stocks of companies likely to be able to deliver earnings even in the face of domestic inflation and sluggish import demand in developed markets. We believe well-managed companies that can generate good free cash flow, deploy it constructively and gain market share will be among those that will benefit from improving consumption patterns where they exist. In our view, some of the companies capable of delivering healthy earnings include select consumer staples and discretionary, telecommunications, certain industrials and prudently managed banks with reasonable loan to deposit ratios (generally below 100%).

Conclusion

In an effort to capitalize on the long-term consumption changes we expect in the emerging markets universe, we feel that EM equities with a growth bias should remain a healthy portion of any global asset allocation. While large-cap cyclicals and some value names benefited from QE2 and low real rates in the early months of 2011, liquidity is likely to be much less abundant later in the year with the conclusion of such policy and continuously rising rates in most EM countries. In our view, thoughtfully chosen growth-oriented stocks will gradually and increasingly come into favor with investors, once again benefiting from rising GDP per capita, productivity gains and increasingly competitive global brands. Investors should be able to capitalize on these changes by taking increasingly more active positions in regard to country and sector weightings as inflation-related problems are gradually resolved.

[29] Source IMF, 2010 Estimates. Data as of May 24, 2011.
[30] Dependency ratio is a measure of the portion of the population which is composed of dependents (i.e., people who are too young or too old to work).
[31] Source IMF, 2010 Estimates. Data as of May 24, 2011.

Definitions
Standard deviation is measure of the dispersion of a set of data from its mean.

MSCI EM Index: A free float-adjusted market capitalization index that is designed to measure equity market performance in the global emerging markets.

MSCI EM Growth Index: An index that measures the price of a fixed basket of market goods bought by a typical consumer.

Consumer Price Index: An index that measures the price of a fixed basket of market goods bought by a typical consumer.

JPM EMBI+ Index: A market capitalization-weighted index that tracks total returns for U.S. dollar-denominated debt instruments issued by emerging market sovereign and quasi-sovereign entities, including Brady bonds, loans and Eurobonds and local market instruments for over 30 emerging market countries.

MSCI All Country World (ACWI) Index: An unmanaged, free float-adjusted market capitalization weighted index composed of stocks of companies located in countries throughout the world. It is designed to measure equity market performance in global developed and emerging markets. The index includes reinvestment of dividends, net of foreign withholding taxes.

Disclosures:
The views expressed are those of the author as of May 12, 2011. The author's views are subject to change at any time due to market or economic conditions without notice to the recipients of this document. The views expressed does not reflect the opinions of all portfolio managers at MSIM, or the views of the firm as a whole, and may not be reflected in the strategies and products that the Firm offers. This document has been prepared solely for informational purposes and is not an offer, or a solicitation of an offer, to buy or sell any security or instrument or to participate in any strategy.

All investments involve risks, including the possible loss of principal. Investments in foreign markets entail special risk, such as currency, political, economic and market risks. The risks of investing in emerging market countries are greater than the risks generally associated with foreign investments. Stocks of small-sized companies carry special risks, such as limited product lines, markets, and financial resources, and greater market volatility than securities of larger, more-established companies.

Past performance is no guarantee of future results. Charts and graphs provided herein are for illustrative purposes only. This material has been prepared using sources of information generally believed to be reliable but no representation can be made as to its accuracy. Forecasts/estimates are based on current market conditions, subject to change, and may not necessarily come to pass.

Performance of all cited indices is calculated on a total return basis with dividends reinvested, unless noted otherwise. The indices do not include any expenses, fees or charges and are unmanaged and should not be considered investments. An investor can not invest directly in any index.

The information in this report, is for informational purposes only, and should in no way be considered a research report from Morgan Stanley Investment Management ("MSIM"), as MSIM does not create or produce research.

Liquidity and Money Markets Against a Changing Regulatory Landscape

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Morgan Stanley Investment Management

In recent years, global money markets have experienced considerable change—particularly in the context of the regulatory environment. Navigation of this still-evolving landscape can prove challenging for investors, sponsors and borrowers.

However, before we can effectively navigate what lies before us and determine how the marketplace moves forward from here, we need to first understand: how we arrived at this point; and how the money markets, and more importantly, the regulators, responded to the U.S. and global economic crises.

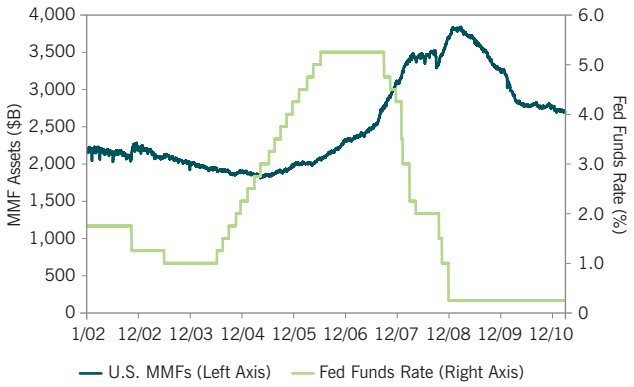
In answering these questions, we will explore the regulatory changes initiated in an attempt to mitigate risks similar to those that helped fuel the market dislocation of 2007 to 2008. We will explain how these reforms helped exacerbate an already delicate supply/demand equilibrium in the money markets. Finally, our analysis leads us to believe that, in these unsettled times, a defensive posture is the most prudent approach for money market fund investors.

A Primer on Money Market Funds

First introduced in the U.S. in the 1970s, money market funds (MMFs) represented $3.9 trillion of assets under management (AUM) in the U.S. and $4.5 trillion globally, at their peak in March 2009.[1] As shown in *Display 1*, as of March 31, 2011, U.S. MMF AUM totaled $2.7 trillion. The U.S. constitutes the largest portion of this market as global MMF AUM totaled $3.4 trillion.[2]

[1] Source: Federal Reserve, iMoneyNet. As of March 31, 2011.
[2] Source: iMoneyNet. As of March 31, 2011.

Display 1:
U.S. Institutional MMF AUM Growth and Fed Funds Rate



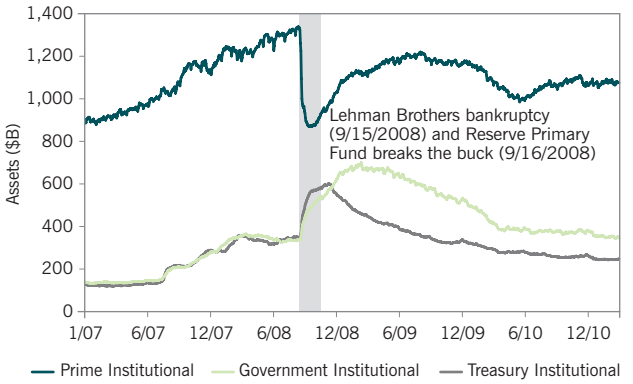
Source: Federal Reserve, iMoneyNet. As of March 31, 2011.

In the U.S., MMFs act as an important intermediary between investors and borrowers. They provide a large, relatively stable source of financing for global companies active in the wholesale funding markets, as well as the U.S. Treasury and state and local governments. The Securities and Exchange Commission (SEC) regulates U.S. MMFs under Rule 2a-7 of the Investment Company Act of 1940[3], and until the 2010 revisions to the rule, the SEC has historically focused on minimal credit standards, limits on issuer concentrations and portfolio durations.

MMFs are categorized by investor type—institutional and retail. They are further delineated based on product type, including Tax-Exempt, Prime, Treasury and Government funds. Of these, Prime MMFs have the most portfolio flexibility, as they can invest in all asset classes subject to individual prospectus limitations and, of course, Rule 2a-7 regulations.

[3] Rule 2a-7 contains numerous provisions intended to help a fund maintain a stable net asset value—these provisions seek to mitigate risks associated with economic stresses/liquidity runs and govern the credit quality, maturity and diversity of money market fund investments.

Display 2:
Institutional MMFs by Type



Source: iMoneyNet. As of March 31, 2011.
Prime Institutional includes First-tier Inst Funds on iMoneyNet; Government Institutional includes Government Securities-only and Government and Repo Funds; Treasury Institutional includes Treasury-only and Treasury and Repo Funds.

A unique core feature of MMFs is the ability to value them using amortized cost accounting, thus allowing funds to transact at a stable net asset value (NAV)[4] of US$1.00. As a result of the stringent investment framework established by SEC Rule 2a-7, this constant NAV feature is afforded to MMFs.[5]

It is important to keep in mind, MMFs are also subject to mark-to-market accounting.[6] A MMF's market-based price for its portfolio (or "shadow NAV[7]") is calculated

[4] Net Asset Value is the dollar value of a single mutual fund share, based on the value of the underlying assets of the fund minus its liabilities, divided by the number of shares outstanding. It is calculated at the end of each business day.
[5] Although a money market portfolio seeks to preserve the value of an investment at US$1.00 per share, if it is unable to do so, it is possible to lose money by investing in the portfolio.
[6] Mark-to-market or fair value accounting refers to accounting for the fair value of an asset or liability based on the current market price of the asset or liability, or for similar assets and liabilities, or based on another objectively assessed "fair" value.
[7] A fund's "shadow" net asset value is its mark-to-market net asset value, in contrast with the amortized cost net asset value used to maintain the fund's typically fixed share price of US$1.00.

using prevailing market prices for individual securities within the portfolio. This shadow NAV must not deviate by more than half a penny on either side of US$1.00 to avoid "breaking the buck," or trading at a price other than US$1.00 per share.

Given their ease of use, conservative, high credit quality and short-term investment mandates, MMFs have historically been an attractive option for risk-averse institutional cash managers and retail investors alike.

Money Market Funds and the Global Financial Crisis

With the onset of the global financial crisis, a severe dislocation occurred in the money markets, beginning with the acquisition of Bear Stearns by JP Morgan Chase & Co. in March 2008. This displacement was accelerated after the September 2008 bankruptcy of Lehman Brothers and subsequent breaking of the buck by the Reserve Management Company, Inc.'s money market fund. These events revealed risks in the short-term financing markets that made the global wholesale funding market appear to be vulnerable to a complete shutdown. The immediate and massive intervention by the U.S. government and regulators was critical in stabilizing the markets during this extreme global dislocation. *Display 3* shows the various programs implemented by U.S. monetary authorities during this period.

Display 3:
Emergency Liquidity Programs

Program Name	Authority	Purpose	Peak Utilization
Asset-Backed Commercial Paper Money Market Liquidity Facility (AMLF)	Federal Reserve	Liquidity	$145.9 Billion[8]
Temporary Guarantee Program for Money Market Mutual Funds	U.S. Treasury	Guarantee	$3,355.3 Billion[9]
Commercial Paper Funding Facility (CPFF)	Federal Reserve	Liquidity	$349.9 Billion[10]
Temporary Liquidity Guarantee Program (TLGP)	U.S. Treasury/ FDIC	Guarantee	$834.5 Billion[11]
Money Market Investor Funding Facility (MMIFF)	Federal Reserve	Liquidity	$0[12]

Source: Morgan Stanley Investment Management

The loss of confidence in the ability of the short-term funding market to function led to a surge in redemption requests from Prime MMFs. The end result of increased redemption requests and the global loss of confidence among banks effectively closed the global wholesale funding markets, as Prime MMFs remained on the sidelines to ensure ample liquidity to meet redemptions.

Long before the financial crisis, investors were attracted to the core features of MMFs, which included the ability to transact at a constant NAV and the relatively strict credit and maturity guidelines of the funds. The ability of MMFs to provide daily liquidity at par was a result of the ample, organic liquidity available in the funds, given the

[8] Total Lending: October 8, 2008 (Source: SIGTARP)
[9] Theoretical Exposure to Money Market Funds: September 29, 2008 (Source: SIGTARP)
[10] Total Facility Holdings: January 21, 2009 (Source: SIGTARP)
[11] Total Amount Guaranteed: December 31, 2009 (Source: FDIC)
[12] No loans were made under the MMIFF (Source: The Federal Reserve Board)

daily maturities of portfolio securities. If needed, a MMF could access secondary liquidity by selling securities to a willing buyer such as a dealer or a bank.

However, at the height of the crisis, organic liquidity was depleted quickly and secondary liquidity was only available for Treasuries and agencies due to the effects of the global flight to quality. Simultaneously, as MMF redemption requests accelerated, many global companies that had relied on MMFs as a funding source to refinance maturing short-term debt suddenly found themselves in a vulnerable situation. As a result of the near closure of short-term financing markets in particular, a broad array of industries and products, including financial intermediaries, banks, MMFs and asset-backed markets, were subject to significant liquidity constraints, seemingly overnight.

In light of the strains the money markets experienced, particularly during the first weeks of the crisis, regulators focused on developing and implementing new rules in an attempt to mitigate risks of future dislocations. MMFs were directly affected by these efforts, which have included revisions to Rule 2a-7 and to Federal Deposit Insurance Corporation (FDIC) rules regarding base assessments.[13] Additionally, changes in international banking standards mandated by Basel III[14] have affected MMFs and the global wholesale funding markets.

These combined changes have had a dramatic impact on the supply/demand balance in the money markets. In particular, the volatility of short-term rates has increased as the market has attempted to establish a new equilibrium. As the evolution of the regulatory environment continues to develop, we anticipate there will be additional changes that will affect various constituents in the money markets and the supply of high quality short-term securities.

[13] Changes to FDIC rules regarding base assessments stem from the Dodd–Frank Wall Street Reform and Consumer Protection Act.

Rule 2a-7 and Recent Revisions

SEC Rule 2a-7 requires MMFs to limit their underlying holdings to short-duration investments that represent minimal credit risk. To increase the resiliency of MMFs, the SEC voted to amend its Rule 2a-7 in January 2010. The revisions tightened the existing restrictions set out in the rule and introduced additional requirements. Implementation of many of the revisions has already occurred in phases over the last 18 months.

The most significant changes to Rule 2a-7 pertain to portfolio liquidity and duration. Prior to the amendments, MMFs were never required to structure portfolio maturities to meet specific one-day and seven-day liquidity drawdowns. Today, an MMF must maintain 10 percent of its portfolio in assets with overnight maturities and 30 percent in assets that mature within one week.[15] At the height of the crisis, a mandated minimum of 30 percent of a fund's assets maturing in one week or less would likely have reduced some of the pressures experienced by funds during this period of market illiquidity.

Additionally, the Rule 2a-7 revisions changed the limit for portfolio duration, reflected by a fund's weighted average maturity (WAM), reducing it from 90 days to 60 days. Different from WAM, which purely measures interest rate risk, a new metric, weighted average life (WAL), was introduced that limited the amount of spread duration a portfolio is allowed to assume. From a liquidity perspective, WAL also measures the amount of time a fund would need to hold its positions to maturity in the event that secondary market liquidity could not be relied upon to recover principal and interest. WAL is calculated using the stated, legal final maturity of all portfolio holdings, and is subject to a 120-day limit.

[14] BASEL III is a new global regulatory standard on bank capital adequacy and liquidity agreed upon by the members of the Basel Committee on Banking Supervision and will be discussed in more detail starting on page 59.

[15] The daily limit of 10% is applicable to taxable funds while the weekly limit of 30% is applicable to all MMFs.

SEC Rule 2a-7 eligible money market securities remain subject to a maximum maturity limit of 397 days. Historically, for many borrowers, one-year funding presented significant value given the depth of available financing from MMFs. In addition, one-year funding provided enough visibility to address potential liquidity dislocations, and it was always compelling from a pricing perspective relative to longer-dated or term issuance.

With the revised portfolio WAM limit of 60 days and the introduction of a portfolio WAL limit of 120 days, liquidity on the one-year part of the yield curve has become more scarce as MMFs seek out investments with shorter maturities. As a result of the new and stricter rules, the current environment allows for fewer portfolio construction options, thus creating less differentiation among competing funds. In addition, the yield curve, simply from a liquidity premium perspective, has steepened. Funds are now forced to invest in shorter maturities than they have in the past and issuers are being pressed to secure longer-term funding based on regulatory factors that we discuss in more detail later.

The "re-pricing" of the liquidity premium in the money markets has affected several market constituents. First, as already mentioned, MMFs are forced to concentrate their investments in very short maturities and, therefore, we anticipate there will be significant pressure on overnight rates and MMF yields. Second, borrowers who seek longer-term funding from a money market perspective (out to one year) face significant technical hurdles. These challenges will dramatically increase the cost of funds due to reduced amounts of cash that can be put to work for longer maturities by MMFs. Third, investors who have traditionally invested in MMFs may find the new lower yields available less appealing, forcing them to seek other investments in order to generate a higher return on cash.

The re-establishment of the supply/demand equilibrium caused by the Rule 2a-7 amendments will likely take some time. We believe the yield curve is likely to remain steep until the demand side of the equation (i.e., MMF shareholders) sources alternative cash investments or strategies, and the borrowers find other funding sources, while becoming less reliant on MMFs.

Background and Impact of Basel III

In late 2010, in response to the financial crisis, the Basel Committee on Banking Supervision introduced Basel III, the new global standard to address both firm-specific and systemic risks in the banking system. Among the issues addressed are new capital requirements, in both quality and quantity that would allow banks globally to better absorb losses, as well as minimum liquidity standards for both short-term and long-term funding. The new capital guidelines, and their extended implementation timeframe, under Basel III, have been largely accepted by the market place. However, the framework for liquidity coverage for banks and financial companies may be problematic for borrowers and investors as the possible ripple effects could be quite significant.

While many of the world's largest banks are already well positioned from a capital perspective, meeting liquidity requirements under Basel III may prove to be a challenge. As shown in *Display 4*, the two regulatory standards for liquidity risk are the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR). The LCR was designed to mitigate the short-term liquidity risks associated with acute short-term market dislocations occurring within a 30-day time horizon. It requires that high quality, liquid reserves be set aside against short-term liabilities that may be subject to rollover risk. The NSFR was designed to better match assets and liabilities in the banking industry with longer-term debt to achieve a more stable base of financing.

Display 4:
Basel III Liquidity Ratios

Liquidity Coverage Ratio

$$\frac{\text{Stock of high quality liquid assets}}{\text{Net cash outflows over a 30-day time period}} \geq 100\%$$

- Designed to ensure that a bank maintains an adequate level of unencumbered, high quality assets which may be converted to cash to meet liquidity needs over a 30-day horizon under an acute liquidity stress scenario specified by supervisors

Net Stable Funding Ratio

$$\frac{\text{Available amount of stable funding}}{\text{Required amount of stable funding}} > 100\%$$

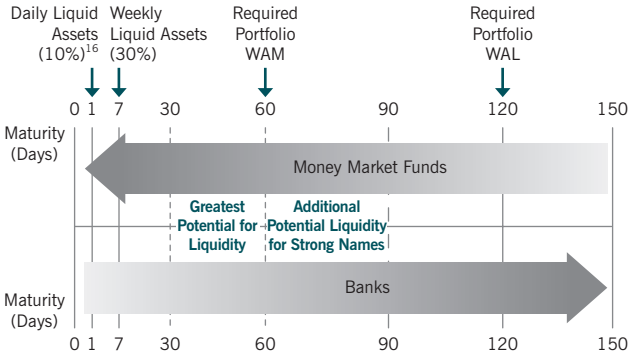
- Designed to promote medium- and long-term funding of the assets and activities of banks over a one year time horizon

Source: Morgan Stanley Research.

The most active borrowers in the global wholesale funding markets are predominantly large, high quality, non-U.S. banks. In a study conducted by the Institute of International Finance (IIF), the authors showed that at the end of 2009, the LCRs among Euro-area banks registered 27.8 percent. The IIF may be over-estimating the current level of LCRs in that its model does not seem to fully account for unfunded liabilities, like credit and liquidity backstop facilities. These unfunded liabilities will count toward the 30-day cash outflows for the LCR under Basel III. We anticipate that the cost of providing these facilities will increase going forward and the higher expense will likely be passed on to customers. A strategic step that we believe could help banks globally improve upon low LCRs is reducing committed credit and liquidity facilities. Other options include reducing the need for wholesale deposits by attracting more retail deposits, increasing the amount of secured term debt and replacing short-term debt with long-term debt.

These changes to the regulatory framework have created a paradox illustrated in *Display 5*. Rule 2a-7 stresses shorter durations and high levels of liquidity for investors, while Basel III encourages borrowers to favor longer-term financing.

Display 5:
Impact of Regulatory Reform on the Short-Term Market[16]



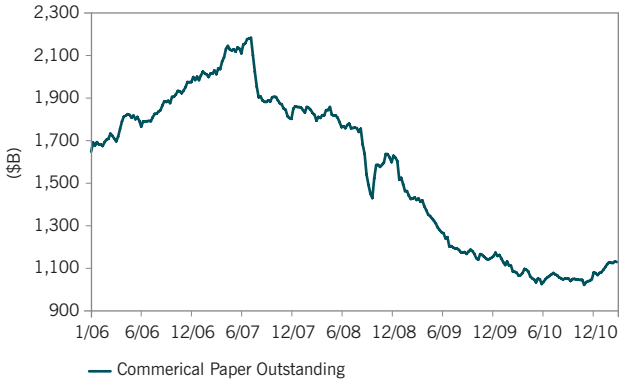
Source: Morgan Stanley Investment Management.

As mentioned above, bank customers who rely on committed credit and liquidity facilities will likely have to pay significantly more in the future. Both asset-backed and non-financial commercial paper (CP) will be negatively impacted as these facilities become scarce or available at a cost too punitive to pass on to the end borrower or commercial paper investors. *Display 6* shows that as of March 31, 2011 there was a total of $1.131 trillion of total U.S. CP outstanding, including $159.130 billion of non-financial U.S. CP outstanding and $393.036 billion of U.S. asset-backed CP outstanding. Many financial institutions already have replaced short-term debt (CP) with long-term debt, and overall CP

[16] The daily limit of 10% is applicable to taxable funds while the weekly limit of 30% is applicable to all MMFs.

outstandings are significantly off their peaks. Sourcing alternative investment options will be a challenge for taxable, non-government MMFs.

Display 6:
U.S. Commercial Paper Outstanding



Source: Federal Reserve. Weekly data as of March 31, 2011.

We anticipate that taxable government MMFs will encounter supply issues, as persistent technical pressures on government securities, predominantly Treasuries, will persist for two important reasons. First, Treasury securities have been deemed a source of daily liquidity under Rule 2a-7, thereby counting toward the 10 percent daily liquidity bucket. Second, Treasury securities are the ideal asset class to use for reserves under the LCR because of their zero-risk weighting and access to deep financing options such as repurchase agreements. Outsized demand from short-term fixed income investors, including MMFs, for an increasingly scarce supply of high quality short-term investments such as CP and T-Bills, will certainly strain short-term yields.

Lastly, as part of the Fed's unprecedented Large-Scale Asset Purchase Program (LSAP), a significant amount of the supply of Treasuries was removed from the market and absorbed by the Fed's balance sheet. Recently, there has been ongoing debate as to when and how the Fed will remove this extraordinary level of accommodation from the marketplace. One tool the Fed anticipated using was the Term Deposit Facility. However, under the Basel III framework, maintaining a high balance in term deposits at the Fed may be costly for banks, as these deposits cannot be drawn down on demand in times of stress and therefore, would not count toward the stock of high-quality liquid assets used as reserves under the LCR.

Developing a global liquidity standard is undoubtedly a complex process. Unlike the capital framework, for which extensive experience and data aided in its adoption, there is no similar track record for liquidity standards. The Basel Committee is taking a careful approach to refining the design and calibration of its liquidity ratios and will review the impact of these changes to ensure that they deliver a rigorous overall liquidity standard.

Background and Impact of Dodd-Frank and the FDIC Base Assessment

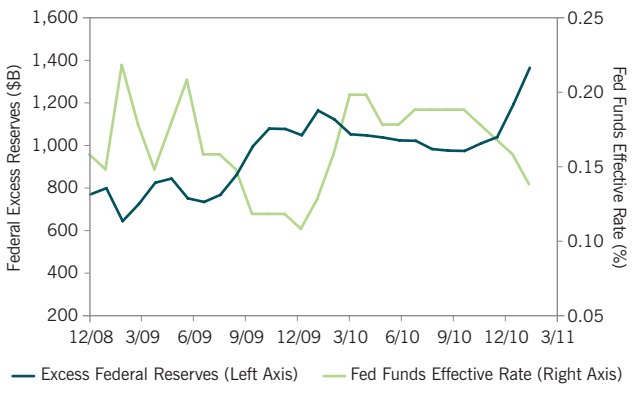
The Dodd-Frank Wall Street Reform and Consumer Protection Act, which became law in July 2010, has had far-reaching consequences. For the purpose of this discussion, we are focused on the Act's effect on the FDIC's base assessment regime.

As of April 1, 2011, the FDIC implemented a new methodology of calculating the assessment base for the required insurance premiums paid by U.S. deposit-taking financial institutions. The old methodology used U.S. deposits as the assessment base, but the new methodology will calculate the base using a firm's total assets, inclusive of the excess reserves held at the Fed, less its Tier One capital. In addition, large complex financial institutions are assessed a higher fee than smaller banks.

Since the implementation of the new methodology, the FDIC assessment regime has essentially created a disincentive for banks to rely on funding such as repurchase agreements, or repo[17], and Fed Funds, thus lowering the yield available to investors in these products.

An unintended consequence of the new FDIC assessment regime is the diminished effectiveness of the Federal Funds rate as a policy tool. Since the market dislocation in 2008, the Federal Reserve has injected historic amounts of liquidity into the system and, consequently, grew its balance sheet to record levels as illustrated in *Display 7*. In order to place a floor on overnight rates, the Fed introduced interest on excess reserves (IOER) in late 2008. The rate was set at 25 basis points and banks could opportunistically borrow in the Fed Funds market or overnight money markets at rates slightly under the rate for IOER and place the money at the Fed to earn a riskless arbitrage. Now, however, with the added costs of the new FDIC assessment regime, these new expenses must be passed on to the lender in order for this arbitrage to work, implying lower overnight rates than otherwise would have been available.

Display 7:
Federal Reserve Excess Reserves and Fed Funds Rate



Sources: U.S. Federal Reserve. As of March 31, 2011.

[17] A contract in which the seller of securities, such as Treasury Bills, agrees to buy them back at a specified time and price.

Because of this change, easier monetary policy may result as lower rates may prevail against the Fed's wishes, while weakening the impact of IOER that has been, until recently, an effective policy tool. The Fed may be able to counter this effect by withdrawing market supports in order to re-stabilize overnight rates closer to its objectives; however, more confusion and market volatility may follow as a result.

For MMF sponsors, the downward pressure on overnight rates has made it difficult to provide an attractive yield to shareholders while simultaneously covering expenses associated with operating a low-margin business. Low MMF yields may entice MMF investors to seek alternative investments in search of better returns for their cash investments. The impact of any significant asset migration away from MMFs would not be positive for MMF sponsors. Such a shift may cause the sponsors' businesses to shrink, and, in turn, would negatively impact borrowers who rely on MMFs for their funding needs.

For issuers, there are both winners and losers. Deposit-taking institutions in the U.S. are going to face higher funding costs for short-term financing under the FDIC's new base assessment methodology largely due to the additional assessment placed on them. Non-U.S. financial institutions, which are not subject to the same FDIC assessment, might benefit from lower funding costs. However, as mentioned earlier, Basel III may create a disincentive for short-term funding and counter any benefit that may present itself to non-U.S. financial institutions.

President's Working Group – MMF Reform Options

The President's Working Group (PWG) on Financial Markets, which was tasked with considering and suggesting possible reforms to mitigate systemic risks posed by dislocations in the money markets and MMFs, released its report in October 2010. The report assessed the various ideas proposed in the marketplace, while avoiding outright endorsement of any of these potential reforms.

In general, the proposed reforms were not received favorably by market participants. These included floating rate NAVs, mandatory redemptions-in-kind, and public and/or private insurance. The only idea that seemed to find support among a majority of market participants was the private emergency liquidity facility supported by the ICI. The Liquidity Exchange Facility would be an industry-funded, state-chartered bank with access to the Fed, and its sole existence is to provide emergency liquidity to Prime funds in a market crisis. All Prime money funds would be assessed a three basis point commitment fee to build up the required capital for the facility. Funds that did not participate would be required to convert to a floating rate NAV. After 10 years, the facility would be able to provide approximately $50 billion in emergency liquidity.

Potential Impact of MMF Reform Options

Fundamentally, the idea of a Liquidity Exchange Facility appears to have merit; however, in practice, there could be significant challenges in executing this mandate and overseeing such a facility from an operations perspective. One potential concern is the period of time it would take to fully fund the "bank" and its size once fully funded. Concerns would remain regarding the ability of a bank facility with $50 billion in capital to staunch a bank run similar in scope to the events of 2008, when Prime funds suffered significant redemptions. On the other hand, the mere existence of such a facility may be sufficient to stop a massive redemption event from ever occurring.

On a stand-alone basis, many of the potential reforms that the PWG identified present challenges that may preclude their consideration for final implementation. However, joint enactment of several of the highlighted reforms may have some positive impact on the money markets and MMFs.

Conclusion

We feel that regulatory reform was clearly justified, given the dislocation financial markets encountered and the subsequent recession. However, rules created by regulators to address specific areas under their respective jurisdictions, and the involvement of legislators, have created additional, unintended challenges for various constituents in the global capital markets. If the crisis and subsequent regulatory efforts have taught the market anything, the lesson is that without better coordination, the ever-changing regulatory landscape may create dramatic supply/demand disequilibriums that ultimately may do more damage than good.

One of the challenges that investors have already experienced is the lower re-pricing of short-term rates against a backdrop where issuers are incentivized to fund themselves term. This has created a supply/demand disequilibrium resulting in the volatility of clearing levels in the money markets. In addition to the challenges imposed on end users, ranging from low reinvestment opportunities for MMFs to higher funding costs for borrowers in the wholesale markets, price volatility may have an impact on policy measures imposed by regulators. Setting policy against this backdrop becomes increasingly difficult to implement.

Maintaining minimal risk is a key foundation to managing a MMF. Given the current uncertainty from both a regulatory and macroeconomic perspective, we believe the prudent strategy that best suits liquidity investors is to remain defensive until the pace of change subsides, allowing investment managers to operate in a more stable environment. We believe there are ways to capitalize on the re-pricing of liquidity and credit premiums in the capital markets, but those strategies should be a complement to investments in MMFs (rather than a substitute) if principal preservation and liquidity are paramount.

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Rethinking the Political Economy of Power

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History is replete with painful examples of the lemming-like character of economies and financial markets. Irrespective of any danger, they run together until the end. That's especially the case during booms. A deeply entrenched political economy of power — dominated by elected officials, policy makers, regulators, investors, and captains of industry — makes it exceedingly difficult to change course until it's too late. Rare is the enlightened system that does so on its own. Invariably, it takes a crisis to force the power structure to rethink the core value propositions of economic stewardship.

The Great Crisis of 2008–09 is an obvious and important case in point. It was, by far, the worst financial and economic crisis in modern history, and yet the authorities were asleep at the switch as it all unfolded. The 545-page report of the Financial Crisis Inquiry Commission — a bipartisan investigatory body empowered by the U.S. Congress to get to the bottom of this mess — puts an important part of the blame squarely on ideology. The Commission concluded that America's once-disciplined system — its financial markets as well as its economy — had been hijacked by a reckless mind-set of self-regulation. Seduced by an unprecedented boom, a broad consensus of Americans came to believe that ever-powerful markets — operating through the all-knowing invisible hand — could handle anything and everything.

Maybe not. Autopilot was, in fact, the last thing America needed as it raced toward the abyss. Yet the boom obliterated any semblance of responsible stewardship. Denial was widespread — from Wall Street, to the ratings agencies, to the alphabet soup of Washington regulators (SEC, FED, FDIC, OCC, CFTC, etc.), to the congressional oversight function, itself. The common thread that tied it all together was a culture of excess that would stop at nothing to rationalize and perpetuate a false prosperity.

Note: This essay appeared in the catalogue for a February 26 to May 26, 2011 art exhibition, "Josephine Meckseper," sponsored by the Flag Art Foundation in New York City.

It takes a crisis to force the power structure to rethink the core value propositions of economic stewardship.

Yes, in the end, that's exactly what it was — a false prosperity. U.S. economic growth rested on an increasingly shaky foundation of speculative bubbles — first dot-com stocks and then residential property. But that wasn't enough. To pull it off, America also needed a credit bubble — cheap and open-ended financing that would enable the seemingly costless extraction of capital gains from fantasy-like increases in asset values. The power structure — from Washington to Wall Street — was more than happy to comply.

In the pre-crisis boom, there was widespread support for a false prosperity – a U.S. economy that rested on an increasingly shaky foundation of asset and credit bubbles.

With the benefit of hindsight, it is easy to point fingers at those who were especially derelict in their responsibility. The Financial Crisis Inquiry Commission offers up many suspects. Wall Street, of course, is high on the list — and deservedly so. But so, too, is a long string of public officials, with former Fed Chairman Alan Greenspan leading the way. While the Maestro (aka Mr. Greenspan) certainly did play a key role in all this, I would be the first to concede that isn't the real point.

Greenspan personified the ideological tilt toward self-regulation. As an apostle of Ayn Rand, a leading laissez-faire objectivist, he believed that markets always knew best. While markets could make mistakes from time to time, Greenspan advocated a Humpty-Dumpty-like role for central banks — sweeping in after disruptions and crises and putting the broken pieces of a damaged system back together again.

Never mind that the pieces were all but vaporized in the aftermath of the Great Crisis — that the hands- off mantra of self-regulation was totally out of step with the inevitably lethal combination of complexity (i.e., financial derivatives) and interconnectedness (i.e., the cross-border linkages of globalization). The far deeper question is, Why? Why did the body politic need to lionize a Maestro and condone such excesses in the first place?

The answer can be found in the inner sanctum of America's culture of excess — the interplay between power, prosperity, and politics. It starts with politics. By definition, there is a pronounced myopia to a political system with a two-year election cycle. Election campaigns are waged on the basis of results that have been delivered — or not delivered — over a very short period of time. Meanwhile, there is a powerful inertia to the U.S. political power structure: Since 1980, fully 95 percent of all incumbents who stood for re-election in the House of Representatives have been returned to office. It follows that short- term results — in the economics sphere, next quarter's GDP and unemployment — are all that matter for reelection and maintaining a grip on power. An analogous perspective applies to equally myopic financial and corporate power brokers — next quarter's earnings are the only thing that seems to count.

As seen through that lens, the siren song of the boom becomes almost impossible to resist. When the short-term stars were in seemingly perfect alignment, as they certainly appeared to be in the four years before the Subprime Crisis, the political and financial power structure only wanted more. And it was rewarded for delivering just that. There seemed to be little or no incentive to question the rosy outcome. The hopes and dreams of the ultimate virtuous cycle had taken on a life of their own.

Aided and abetted by the ideology of self-regulation, the final phase of the boom was especially seductive. Yet in an increasingly complex and interconnected world, the lack of adult supervision was a recipe for disaster. America's bubble-dependent economy was an accident waiting to happen. When the bubbles burst—as they always do—the ensuing implosion, and the economic carnage it unleashed, did not escape the wrath of the American electorate. Just 87 percent of the incumbents who stood for reelection were returned to office in the House in the midterm elections of 2010—still an amazingly high percentage, but in fact, the lowest incumbency-return ratio since 1970 and a rejection that was strong enough to result in a stunning loss of control for the Democrats in the House of Representatives.

Notwithstanding this unusually strong message from the electorate, political myopia remains an enduring feature of the post-crisis climate. Washington not only ignored the perils of an increasingly unstable boom but it has subsequently rushed in after the fact with a classic quick fix timed to placate voters before the midterm elections of November 2010. In one of the more glaring disconnects in recent history, the U.S. Congress passed the Dodd-Frank Bill—a major re-regulation of the financial system—before it heard back from its own Financial Crisis Inquiry Commission as to what actually caused the crisis of 2008–09.

Surely there must be a better way for the power structure to exercise responsible stewardship of the American system. The short-term spoils of political and financial power have instilled a deep reluctance to take up vitally important items on the long-term agenda—challenges such as meaningful deficit reduction, competitiveness, educational reform, climate change, and retirement income security. Instead, ever-myopic and increasingly polarized U.S. politicians are far more inclined to focus on the here and now and "kick the can down the road"—leaving the heavy lifting of solving tough problems for the proverbial next generation of leaders and citizens. As America clamors more and more for instant gratification, the value proposition that has long underpinned the U.S. political system gets turned inside out. And by electing representatives with false promises, the insidious nature of this self-delusion only deepens.

The crisis of 2008-09 demonstrates that America can no longer afford to stay this reckless course. The political economy of power is in need of a fundamental realignment.

If there is one clear message from the Great Crisis, it is that America can no longer afford to stay this reckless course. The political economy of power is in need of a fundamental realignment. It wouldn't be the first time. Twice earlier during the post–World War II era the U.S. Congress enacted landmark legislation that redefined the rules of engagement for the economic and financial power structure. In both cases, each of these adjustments benefited from the political will that typically gets mustered in the aftermath of crises. In 1946, Congress passed the so-called Full Employment Act. Seared by the painful memory of an unemployment rate that hit 25 percent in the depths of the Great Depression, Washington vowed to set policy with an aim toward achieving maximal growth in employment. And in 1978, with the U.S. in the throes of a debilitating inflation, Congress enacted the Humphrey-Hawkins Act, which added price stability to Washington's policy mandate.

While this "dual mandate"—full employment and price stability—worked reasonably well for about twenty years, it obviously failed to prevent the Great Crisis. And so the mandate needs to be changed once again—this time, with an aim toward protecting financial and economic stability. Never again should a mindset of self-regulation

be allowed to condone a reckless interplay between asset and credit bubbles on the one hand and an asset- and debt-dependent real economy on the other. It will take nothing short of a new accountability of the body politic to break the daisy chain. That can only be attained by the hardwiring of a stability mandate into the legally binding compact between Congress and the policy setting mechanisms over which it has direct authority (fiscal) or oversight responsibility (monetary). Only then would the authorities have the political cover they need to address the perils of a false prosperity that can arise from ever-precarious asset and credit bubbles.

The only way to accomplish this would be through congressional enactment of a stability mandate that would contain the excesses perpetuated by undisciplined fiscal and monetary policies.

On this count, the United States may actually have a good deal to learn from China—the world's newly ascendant power, which was remarkably successful in tempering the aftershocks of the Great Crisis. China's success was due, in large part, to aggressive actions—before, during, and after the crisis—that were taken to ensure financial and economic stability. The centerpiece of this effort—a massive fiscal stimulus in late 2008—had little or none of the cumbersome implementation lags that bogged down comparable efforts in the developed world. With its economy deteriorating sharply in the immediate aftermath of the crisis, state-directed China acted first—and asked questions later.

The Chinese comparison invites an even deeper examination of the role of the state in shaping growth and prosperity. At the core of China's miracle of the past thirty years has been an export-led mercantilist development model, resting firmly on the twin pillars of industrial policy (picking the sectors that are winners and losers) and currency suppression. This, of course, is the same recipe followed by Japan—Asia's first miracle of the post–World War II era. As two "lost decades" suggest, however, the Japanese approach was deeply flawed. By focusing on stability—financial, economic, and, ultimately, social stability—China may well have learned the most important lessons of Japan's monstrous bubbles and the spectacular failure they spawned. This message should not be lost on the United States—or even on Europe, for that matter.

Putting a high priority on stability would represent a fundamental change in America's rules of the game. Significantly, it would entail a reworking of the social contract that lies at the heart of this nation's culture of power. That's because stability would require greater policy discipline during times of froth. That, in turn, raises the distinct possibility that economies and financial markets might have to forsake some portion of short-term gains as a cost for insuring longer-term sustainability. For a growth-fixated power structure, such a reprioritization could result in the ultimate comeuppance—the need to accept a growth sacrifice as a cost for maintaining stability. Yet how else can an otherwise undisciplined system avoid the temptations and risks of a false prosperity?

Stability mandates require acceptance of the "growth sacrifice" – a tough, but necessary, sell to America's political economy of power.

A deeply entrenched political system will undoubtedly resist. After all, tough medicine—and the growth sacrifice it might entail—is tantamount to incumbency risk for a nation with a two-year election cycle. For the Washington power structure, that could well be a very bitter pill to swallow. That underscores one of the most troubling aspects of the current post-crisis climate: Unlike in earlier periods of major economic and financial stress, when a sense of shared sacrifice was both understood and accepted, today's America seems to be lacking in the political will that is needed to face up to its toughest challenges.

The Great Crisis suggests it is high time for the United States to start taking its medicine. As the results of the 2010 midterm elections imply, a lingering post-crisis carnage means that incumbents finally need to confront their myopia. Otherwise, they will be confronted with a succession of ever-deepening crises. And the powerful will then become the powerless.

Mr. Roach is on the faculty at Yale University and is Non-Executive Chairman of Morgan Stanley Asia. He is the author of *The Next Asia* (Wiley 2009).

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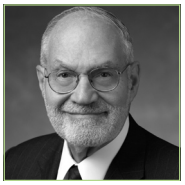
Portfolio Strategy: Multi-Asset Rebalancing



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A common strategy for multi-asset portfolios is to rebalance monthly back to (or towards) the initial percentage allocations. In earlier papers addressing a simple 60/40 portfolio, lower frequency or beta-target rebalancing was shown to have a significant advantage in terms of asset value and transaction volumes, but with a disadvantage in the form of increased tracking error.

This paper explores how these different rebalancing strategies fare when applied to more complex multi-asset portfolios over the 20-year period from 1990-2010.

In comparing annual (AR) vs. monthly (MR) rebalancing back to the initial allocation percentages, there was surprisingly little difference in asset values, although the AR approach naturally incurred lower transaction volumes. However, both strategies led to sizable drifts in the fund's beta values.

An alternative strategy proved more efficient: A portfolio can be rebalanced back to a target beta using only exchanges between U.S. stocks and U.S. bonds. Restricting the shifts to these two highly liquid assets allows for more efficient transactions. It also provides some insight into how beta rebalancing could be carried out within a portfolio having a significant percentage of illiquid assets.

Over the 1990-2010 period, beta targeting did reduce the beta drift and was able — for most of the period — to confine transactions to stock/bond exchanges. However, under some extreme conditions, the rebalancing can use up all the available equities. This scenario will occur when the beta from the "less-liquid" assets increases beyond a certain point, requiring more and more US equity to be sold to maintain the fund's beta target. In practice, long before this extreme condition is reached, the fund should be able to realign its allocation by restructuring some of its semi-liquid assets.

Summary & Conclusions

In a number of previous reports, we analyzed the various forms of periodic rebalancing through analytic techniques, Monte Carlo simulations and historical analysis. The discussion was limited to the traditional 60% equity/40% fixed income portfolio. We found that high-frequency rebalancing could prove

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beneficial in reversal-intensive markets, but would lag in trending markets. However, the overriding conclusion was that the gain or loss from rebalancing was surprisingly small.

This report examines the rebalancing effects using a more diversified multi-asset portfolio. It turns out that the basic conclusions from the 60/40 analysis also hold for this diversified portfolio.

The Diversified Portfolio

The initial portfolio consisted of 30% US equity, 25% US bonds, 25% international equity, 10% emerging market equity, and 10% US REITS. *Display 1* shows the year-by-year performance of this portfolio under the two rebalancing strategies: monthly percentage rebalancing (MR) and a more passive annual percentage rebalancing (AR). At the end of the month or year, the portfolio is rebalanced back to its original weights.

The "MR advantage" represents the added return from monthly rebalancing over the more passive strategy of rebalancing only at year-end. The MR advantage is either zero or negative in all but 3 years, with an overall -0.3% average advantage over the entire period. It should be noted that throughout this study, no cost was assigned to the transaction process, so that any MR advantage should be viewed as being somewhat overstated.

Display 1 also tracks the average 24-month rolling beta over time (since the data begins in 1990, the first measured beta occurs in 1992). In recent years, higher correlations between US equity and other assets have resulted in much higher portfolio betas, which have exceeded 0.8 from 2005-2010.

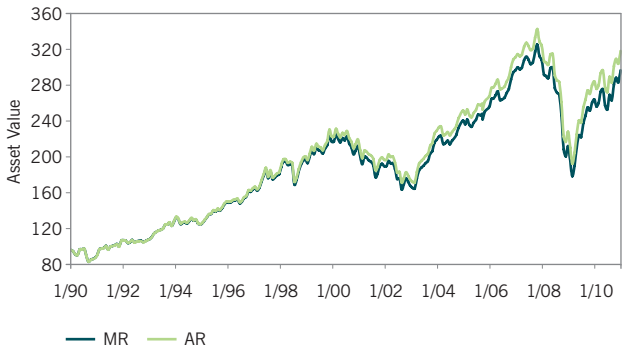
Display 1:
Annual vs. Monthly Rebalancing: 1990-2010

Year	AR	MR Adv	AR Avg Beta
1990	-12.9%	0.2%	NA
1991	22.2%	-0.2%	NA
1992	0.6%	0.0%	0.68
1993	19.7%	-0.8%	0.58
1994	-1.5%	0.2%	0.71
1995	17.1%	-0.4%	0.75
Average	7.5%	-0.2%	0.68
1996	9.9%	-0.3%	0.68
1997	11.8%	-0.4%	0.55
1998	9.7%	-0.5%	0.64
1999	15.9%	-1.0%	0.68
2000	-7.0%	-0.8%	0.62
Average	8.0%	-0.6%	0.63
2001	-7.0%	-0.2%	0.57
2002	-10.3%	-0.3%	0.56
2003	26.3%	-0.7%	0.58
2004	11.5%	0.0%	0.65
2005	6.3%	0.0%	0.81
Average	5.4%	-0.3%	0.63
2006	16.3%	-0.2%	0.87
2007	4.2%	-0.4%	0.81
2008	-29.7%	-1.5%	0.80
2009	24.7%	-0.2%	0.88
2010	11.9%	0.4%	0.85
Average	5.5%	-0.4%	0.84
Overall	6.7%	-0.3%	0.70

Source: Morgan Stanley Research

Display 2 tracks the asset value over time for the AR and MR strategies. There is some difference in results for a trending market versus a reversal-intensive one, similar to the 60/40 portfolio. For example, between 1990-1994—a period marked by market reversals—MR and AR produced virtually identical results. For trending markets such as 2003-2007 and 2009-2010, MR significantly underperformed AR.

Display 2:
MR and AR Asset Values: 1990-2010

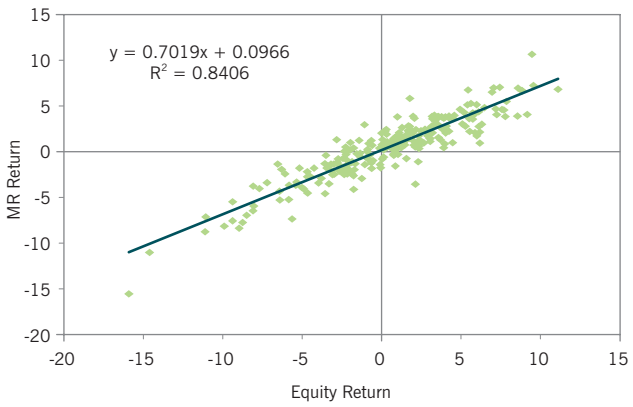


Source: Morgan Stanley Research

Beta Drift

Display 3 is a scatterplot of the MR return versus equity return. This yields a beta estimate for MR of 0.70 with an R^2 of 84%.

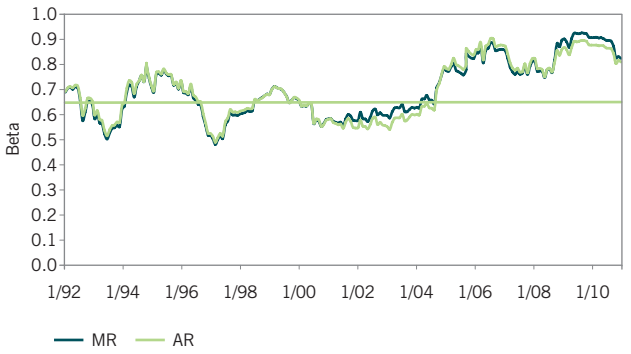
Display 3:
MR Returns vs. USE Returns



Source: Morgan Stanley Research

The results from *Display 3* suggest a tight fit around the estimated beta of 0.70. However, when examining the rolling betas over time, a different picture emerges. *Display 4* compares the AR and MR rolling betas over time. What initially stands out is that both strategies exhibit significant beta drift, especially after 2005. This is quite surprising especially for MR, since one of MR's goals is to minimize the amount of beta variability in the portfolio. Even though MR percentage rebalancing may appear to be bringing a portfolio back to its target beta, the changing nature of the beta of the non-US equity assets can lead to a significant portfolio beta departure.

Display 4:
MR and AR Betas: 1990-2010



Source: Morgan Stanley Research

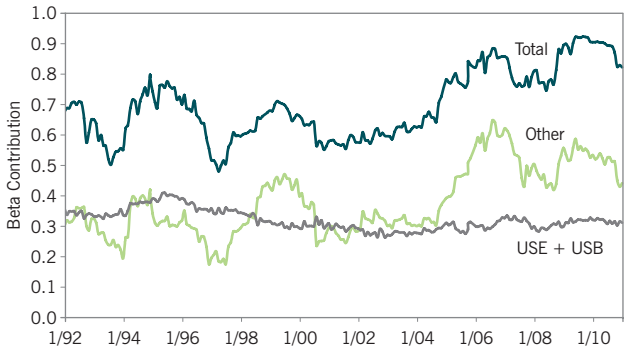
The beta differences between AR and MR help to explain the difference in performance. Between 1990 and 1994, there was very little difference in the beta values. In the down-trending markets of 2001-2003 and 2008-2009, AR's beta was lower than MR, which provided more of a cushion and drove better performance.

When most institutional portfolios are formed, there tends to be a beta contribution balance between the USE/USB subportfolio and the other assets. For example, with 50% of the portfolio in USE/USB, the contribution to

overall portfolio beta will be in the order of 0.3 (assuming a slight positive beta in USB). The remaining 50% invested in a bucket of other assets will likely have an average beta on the order of 0.6 and therefore also have a similar 0.3 beta contribution.

Display 5 tracks the USE/USB and other asset beta contributions for the MR portfolio. Prior to 2005, the beta contribution from the other assets typically ranged between 0.2 and 0.4, while the USE/USB beta contribution was more stable. Post-2005, the other asset beta contribution has ranged between 0.4 and 0.6, and the USE/USB beta contribution again remained stable. As shown in *Display 5*, the higher betas from the other assets has been the main driver of the increased portfolio beta in recent years.

Display 5:
Beta Contributions



Source: Morgan Stanley Research

Rebalancing to a Target Beta

As the individual asset components move with fluctuations in the equity market, the overall portfolio beta can deviate significantly from this target level. One possible rebalancing approach would be to reset the portfolio beta to 0.65 at the end of each month. In our examples, the assumption is that rebalancing only occurs between equities and bonds. Rebalancing between non-US equity and non-US bond assets is likely to be more costly than rebalancing between US assets. By restricting the rebalancing to US equity and US bonds, a more cost-effective approach can be pursued.

Rebalancing to a target beta requires assumptions about the betas of each of the individual asset classes. One approach could be to use betas based on covariance matrix estimates. However, these betas would be static and not reflect changing market conditions. In this study, we chose to use the rolling 24-month betas as the basis for rebalancing.

Display 6 illustrates the calculation involved in this beta target rebalancing approach. Initially. IE, EME and RE contributed 0.31 to the overall portfolio beta, while USE and USB added 0.34. After a market decline of 30%, the new weights and betas for IE, EME and RE have increased their total beta contribution to 0.36. Thus, an additional 0.29 beta contribution must be formed from the combination of USE and USB in order to reach the 0.65 target. By moving 3% from USE into USB, the portfolio can be rebalanced back to the 0.65 beta level.

Display 6:
An Example of Beta Target Rebalancing

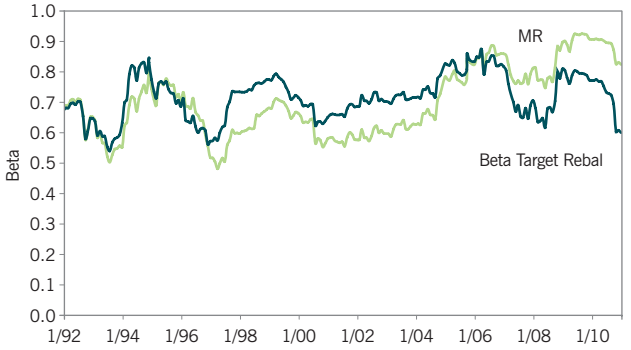
			After 30% Equity Decline			
	Beginning Weight	Beta	Ending Weight	Beta	New Weight	Beta
USE	30%	1.00	26%	1.00	23%	1.00
USB	25%	0.15	30%	0.20	33%	0.20
Subtotal	55%	0.34	56%	0.32	56%	0.29
IE	25%	0.75	24%	0.85	24%	0.85
EME	10%	0.85	9%	0.95	9%	0.95
RE	10%	0.40	11%	0.60	11%	0.60
Subtotal	45%	0.31	44%	0.36	44%	0.36
Total	100%	0.65	100%	0.68	100%	0.65

Source: Morgan Stanley Research

Display 7 compares the rolling betas from the beta target (BTR) approach versus those from MR rebalancing. With BTR, the portfolio beta is more stable than with MR, but there are still periods with some sizable variations from the 0.65 target.

The beta behavior from BTR suggests that one can simply rebalance between equity and bonds and get similar results to a monthly percentage rebalancing approach. Since only USE and USB are exchanged in the BTR strategy, the "other assets" can be treated as essentially illiquid. This has important implications for rebalancing portfolios containing both liquid and truly illiquid assets. Using only the liquid assets to reach a target beta is a generally viable option, even when the betas for the illiquid assets are changing.

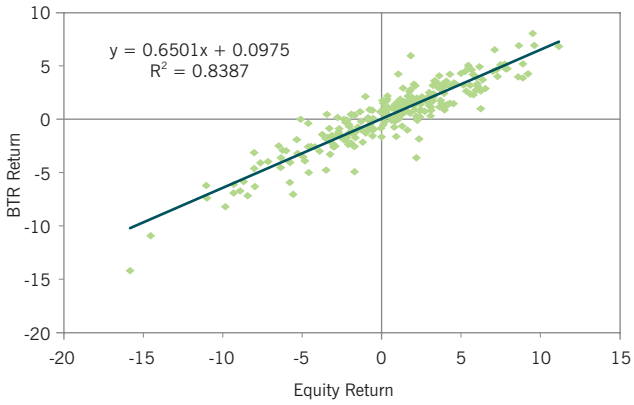
Display 7:
Beta Target Rebalancing 1990-2010



Source: Morgan Stanley Research

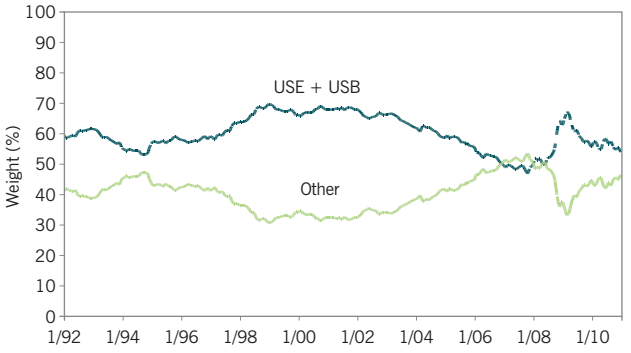
The results in *Display 7* raise the question as to why there is not more stability in beta when the portfolio is deliberately targeting a specified level. *Display 8* plots the BTR returns versus USE return in order to test how much BTR's beta deviates from the 0.65 target. A predicted beta of 0.65 and R^2 of 84% suggest that BTR's beta is reasonably close to 0.65. (It should be noted that the rolling 24-month betas are only a rough substitute for the contemporaneous betas, which would be ideal).

Display 8:
BTR Returns vs. USE Returns



Source: Morgan Stanley Research

Display 9:
BTR Weights



Source: Morgan Stanley Research

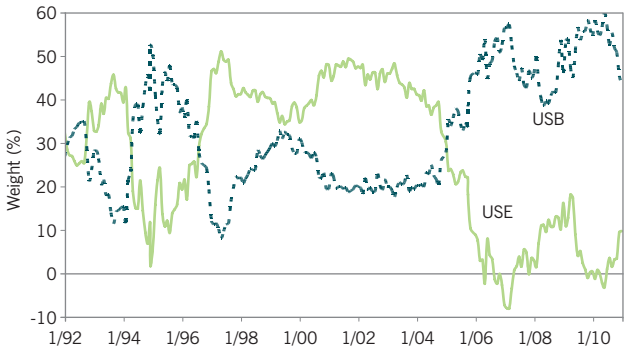
Display 9 plots the weights for the combination of USE + USB and the other assets in the BTR strategy. In the BTR strategy, rebalancing only takes place within the USE/USB component.

All other asset weights simply shift in line with their respective returns. Thus, it is rather surprising how much variation occurs between the USE/USB component and the combined weight of the other assets.

One major problem with BTR is that the USE percentage can significantly decline. This scenario will occur when the beta contribution from the "frozen other assets" increases, requiring that more and more USE be sold in order to maintain the portfolio beta target.

Display 10 indicates that a continuous BTR strategy would have encountered these severe USE weight declines in 2007 and 2010. However, this situation is likely not to occur in practice, as some of the liquid or semi-liquid assets could be sold in an effort to realign the portfolio's beta balance. Another option would be to use derivatives to offset the decline in USE weight. However, there is a risk that these derivatives overcompensate for the USE loss and lead to a higher portfolio beta than desired.

Display 10:
BTR Weights: USB and USE

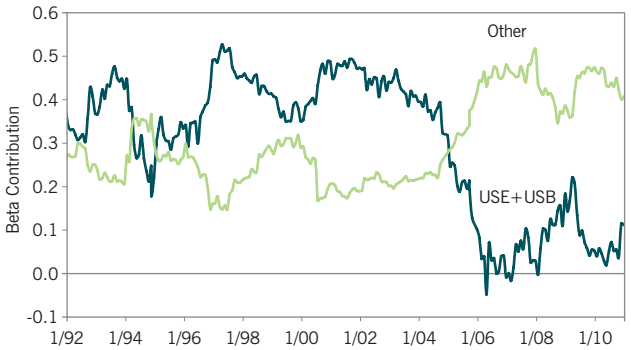


Source: Morgan Stanley Research

Display 11 compares the beta contribution from USE/USB with that from the "other assets." The USE/USB subportfolio's beta contribution has considerable volatility. Thus, while the "other" subportfolio drifts in line with its respective returns, the USE/USB subportfolio acts as a counterbalance to maintain the beta target.

This process is indicative of how a truly illiquid subcomponent would transfer the beta-balancing burden to its liquid counterpart in a highly diversified portfolio.

Display 11:
BTR Beta Contributions



Source: Morgan Stanley Research

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	Coverage Universe		Investment Banking Clients (IBC)		
Stock Rating Category	Count	% of Total	Count	% of Total IBC	% of Rating Category
Overweight/Buy	1175	41%	463	45%	39%
Equal-weight/Hold	1219	42%	439	42%	36%
Not-Rated/Hold	120	4%	23	2%	19%
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Total	2,894		1034		

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