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Investment Management Journal

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July 2015

In today's business environment, investors are increasingly seeking solutions-oriented investment managers with a wide range of products. The breadth of our firm's strategies allows us to offer clients access to world-class investment ideas and insights. Equally important, putting the needs of our clients first remains one of our core principles.

This year marks the 40th anniversary of the founding of Morgan Stanley Investment Management (MSIM). Inside this commemorative issue of the *Investment Management Journal*, you will find an essay written nearly three decades ago by MSIM's founder, Barton Biggs, illustrating the longevity of our conviction in an active approach to portfolio management. In addition, one of our portfolio managers discovers an analogy between the days of dinosaurs and the current climate in the fixed income world. In other articles, our investment professionals consider whether China's A-shares market is truly bubbling over, ask whether core real estate investors should move up the risk curve and deploy capital into secondary markets, provide a short history lesson for equities, and discuss a new asset allocation model.

As always, we think our investment professionals offer penetrating thoughts that are likely to spur additional conversations. We welcome the opportunity to continue this dialogue and help in any way we can.

Sincerely,



Gregory J. Fleming
President, Morgan Stanley Investment Management
President, Morgan Stanley Wealth Management



GREGORY J. FLEMING
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*President, Morgan Stanley
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Climate Change Revisited: Size Matters

Introduction

Back in the Cretaceous Period, the heyday of the dinosaurs was well underway. These huge creatures ruled their world and surely expected to continue to do so for a long time. Bigger was truly better. And then, largely out of the blue, they were wiped out, perhaps due to a large meteor hitting the earth and roiling their environment forever. Only the smallest animals that were the right size and could adapt faster, like birds, survived. In the investment management world, firms with the largest amount of assets may be facing a similar fate as it relates to being able to find suitable and profitable fixed income investments. The analogy here is our own, but the concern we raise is broadly shared by official institutions such as the International Monetary Fund (IMF), which has recently produced its own analysis on this topic.¹

In our June 2014 white paper, “A Climate Change for Bonds,” we discussed how the end of a 30-year secular decline in interest rates, followed by a period of low rates, would influence investor behavior. We believed that investors would seek to develop strategies to find new sources of excess returns and alpha.² From these low yield levels, bond investors may no longer be able to rely on long-term returns generated by a persistent trend toward lower yields. Our solution was to employ unconstrained strategies, when compared to a passively managed index strategy, that provide opportunities for reduced correlation, add alpha and excess returns potential, and help reduce risk.

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¹ The Asset Management Industry and Financial Stability, Chapter 3, IMF's *Global Financial Stability Report: Navigating Monetary Policy Challenges and Managing Risks*, April 2015.

² *A Climate Change for Bonds*, Caron, Jim and Spaltro, Marco. June 2014. MSIM. Alpha is a measure of performance on a risk-adjusted basis.

In this piece, we would like to focus on another secular change impacting the markets which we believe to be essential to factor into investment decisions. We are referring to the increase in the regulatory environment that seems to be leading to reduced liquidity. This represents a tectonic shift in the investment landscape that we have known for the past three decades and not solely for asset valuations but also for those who manage them.

Valuations for assets that have favorable regulatory status exceed those that do not. This will influence how liquidity providers behave and select which businesses to emphasize and which to de-emphasize, or perhaps even exit all together. It will also impact asset managers, because if they are very large, then they may have difficulty accessing a broad universe of positions, what we refer to as an investment opportunity set, needed to create an efficient frontier of risk and a diversified portfolio. Effectively, the investment opportunity set for the larger players has shrunk, thus making it more difficult to add uncorrelated risks and create alpha. Even though larger asset managers may be impacted disproportionately, no manager will escape this challenge. Those who allocate investments into fixed income must adapt to the new and prevailing market conditions when constructing portfolios, selecting assets and managing risks. The medium-sized managers, who have the analytical tools to evaluate opportunities and have demonstrated success in flexible management strategies, are at an advantage to not only survive, but thrive, in the changing climate.

As we know, the design of the new regulatory environment was borne out of the financial crisis as a way to make the financial system more secure and less likely to repeat the conditions that created the last crisis. What has been sacrificed along the way, however, is the true economic valuation of an asset whose price is independent of regulatory influence or central bank manipulation. This needs to be properly accounted for when evaluating investment opportunities and making asset management decisions in the new climate.

Our goal in this white paper is not to provide an opinion on the current regulatory environment but rather to describe how we are adapting our analytical tools and decision-making process to the challenging and changing investment climate. Let us begin.

Sizing it up

Size matters, but sometimes not for the better. When rates were trending lower, more assets under management (AUM) were arguably more desirable. Larger inventories of bonds afforded economies of scale to those who managed them and increased income as yields fell. The size of a strategy was not necessarily a risk factor to its potential performance. But the time for that scenario has since passed. When yields fall to very low levels and fail to provide a required return, or worse, if yields rise, then this process works in reverse. This is a key point of *climate change* in the fixed income market. Bigger AUM may not be better. Finding the optimal size AUM for a strategy may have a much bigger impact on its potential performance.

A paper written by the Bank of International Settlements (BIS) in November 2014 highlighted this change and the associated risks. The BIS reported that there has been extraordinary growth in AUM for investment funds since the 2008 financial crisis. They observed that worldwide growth in net assets of mutual bond funds rose by approximately \$3.1 trillion and now account for some \$7.4 trillion in total, up almost 74 percent since 2008.³

The BIS further reports that AUM in the private sector has become increasingly concentrated in a few large market players. The total net holdings of the 20 largest asset managers alone increased \$4 trillion to \$9.4 trillion from 2008 to 2012, accounting for about 40 percent of their total net assets (\$23.4 trillion). Subsequently, these large managers accounted for more than 60 percent of the AUM of the 300 largest firms in 2012.⁴

To illustrate more specific examples, according to data provided by the Securities Industry and Financial Markets Association (SIFMA) as of December 31, 2014, the U.S. corporate bond market grew by 50 percent since the crisis from \$5.2 trillion to \$7.8 trillion. Mutual funds rose to manage 21 percent of total assets from 13 percent pre-crisis.

³ Bank for International Settlements (BIS), *Market Making and Proprietary Trading: Industry Trends, Drivers and Policy Implications*, CGFS Paper No. 52, November 2014. Page 20.

⁴ Ibid. Page 20.

Display 1: An alphabet soup of regulation

Increasing regulation ripples through the financial system and detracts from a bank's capacity to provide liquidity

CET1	NSFR	SLR	LCR	STRESS TEST
		Products Affected		
<ul style="list-style-type: none"> • Electronic/agency trading • Wealth management • Asset management • Advisory • Payments • Clearing • Rates • Repo • Agency MBS • Unfunded lending commitments • Equity derivatives • Securitized products • HY credit products • Commodities • Mortgage servicing • Non-agency MBS • Higher risk loans 	<ul style="list-style-type: none"> • Retail deposit funding • Rates (Treasury, agency) • ST funding • Financial institution deposits • Non-operational corporate deposits • Equity derivatives • Prime brokerage • Repo • Non-agency MBS • Municipal markets • Credit products • Structured products 	<ul style="list-style-type: none"> • Electronic/agency trading • Wealth management • Asset management • Advisory • Payments • Clearing • High yield/distressed credits • Equity derivatives • Prime brokerage • Rates • Repo • IG credit products • Commodities financing • Unfunded lending commitments • Non-operational deposits 	<ul style="list-style-type: none"> • Retail deposit • Operational corporate deposits • Liquidity and credit facilities • Lending products to financial institutions • Non-operational corporate deposits • Financial institution deposits • Prime brokerage 	<ul style="list-style-type: none"> • Historically low loss content loan products • International lending exposure • Subprime lending

Source: Bank of America Merrill Lynch, Morgan Stanley Investment Management (MSIM). Data as of March 31, 2015.

Growth in European assets is no less remarkable. Total assets managed by euro area funds rose to €9.2 trillion as of December 2014, a near doubling since 2007. The net asset value of European bond funds stood at €2.74 trillion in 4Q 2014.⁵

The BIS, SIFMA and ESMA, along with many other official institutions, have drawn attention to the risk that investment decisions made by the largest asset managers with concentrated risks could have great impact on market liquidity conditions in the future. Additionally, this may have an adverse effect on their ability to hedge risks and their overall performance when market volatility arises.

Liquidity and regulation: A different world

There has been an onslaught of financial regulation with the intention of preventing a repeat of the events that lead to the financial crisis. The number of new regulations is too many to enumerate and goes beyond the scope of this paper. For brevity, we will restrict our focus to major financial institutions (MFIs), such as large banks, because they are a major provider of financial market liquidity. In order to reduce the complexity of the scope of regulation, we have placed these requirements into three categories, which are shown in *Display 1*. Following are various regulations and their descriptions.⁶

⁵ European Securities and Markets Authority (ESMA), *Trends, Risks, Vulnerabilities*. No. 1, March 2015.

⁶ BIS, CGFS Paper, No. 52. *The Global Bank Regulation Handbook*, Bank of America Merrill Lynch, April 1, 2015.

1. Capital & Solvency Requirements

- *Tier 1 Common Equity (CET1)*: A measure of a bank’s ability to absorb losses
- *Supplementary Leverage Ratio (SLR)*: Non-risk based measure of capital adequacy that takes into account on- and off-balance sheet exposures
- *Supervisory Stress Testing*: An annual exercise to assess whether the largest bank holding companies have sufficient capital to continue operations through times of economic and financial stress

2. Liquidity Requirements

- *Liquidity Coverage Ratio (LCR)*: Designed to ensure that banks hold sufficient high quality, liquid assets to withstand an acute stress scenario that lasts 30 days
- *Net Stable Funding Ratio (NSFR)*: Aim is to reduce bank reliance on short-term funding by requiring institutions to hold longer-term stable funding against less liquid assets

3. Resolution Requirements

- *Total Loss Absorbing Capacity (TLAC)*: Requires an institution to put in place sufficient amount of capital to absorb potential losses

While all of these regulations seem reasonable and rational in the wake of the financial crisis, what must not be overlooked is the broader market impact that they have on *providers* of liquidity. This ultimately impacts asset managers who are *takers* of liquidity, especially those with the largest AUM. Regulation and liquidity are interconnected as can be seen in *Display 1*. One can observe how this short summary of regulations is amplified across various bank businesses and detracts from their capacity to provide liquidity.

Increased capital charges have caused banks to reduce their inventories, especially for credit instruments and high risk-weighted assets that are less liquid. Instead, inventory on balance sheets has been reallocated to high quality liquid assets (HQLA). This comes at a time when the size of a less liquid credit market has ballooned since the crisis (see *Display 3*), which represents a measure of reduced liquidity, according to the Federal Reserve.

Display 2: Snapshot of corporate bond turnover

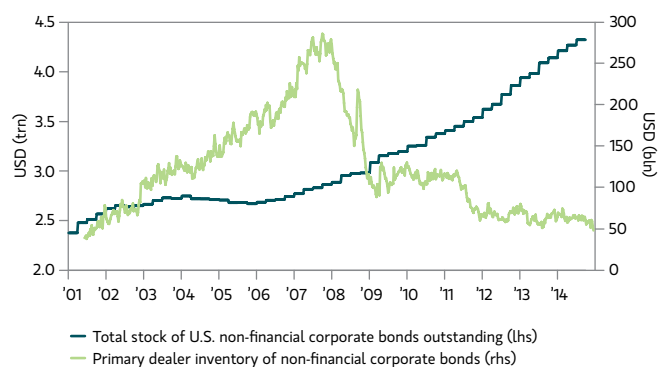
CORPORATE BOND TYPE	2005	2014
High yield	177%	98%
Investment grade	101%	66%

Source: Barclays, *The Decline in Financial Market Liquidity*. Data as of February 24, 2015.

For example, according to the TRACE reporting system, which captures all corporate bond trades in the U.S., that turnover⁷ has declined markedly as shown in *Display 2*. The Fed and SIFMA estimate that daily volume for investment grade and high yield credit trading is around \$20 billion, which means that daily trading volumes and inventory represents a very low 0.3 percent of the market.

Display 3: Liquidity: Falling down

Declining primary dealer inventories less able to support rise in stock of corporate bonds



Source: Haver Analytics, MSIM. Data as of January 7, 2015.

⁷ Turnover is a measure of liquidity represented by the volume of bonds traded versus the total amount outstanding.

Declining liquidity dynamics are not restricted to corporate bonds: U.S. Treasuries have not gone unscathed either. JP Morgan recently published a report on U.S. Treasury market liquidity and concluded that liquidity has been declining. They used measures in their analysis ranging from the depth of the market based on bid/offer spreads to declining participation rates from primary dealers at U.S. Treasury auctions.⁸ The key takeaway is that when some of the market's largest providers of liquidity indicate that liquidity is falling, market participants should listen closely.

Those who believe that using derivatives to gain exposure to physical bonds as a solution to low liquidity issues may find there are challenges to this approach. The rise in the relative cost of short-term funding, rising hedging costs and rising capital charges have disincentivized banks from using this venue to provide liquidity. These costs are passed on to the purchases of derivatives as well. Bid/offer spreads have widened along with the associated capital charges, while clearing fees from exchanges have risen. Similarly, there has been a reduction in low-margin/high-volume businesses, such as market-making in highly-rated sovereign bonds and repos. Hence, liquidity has been reduced all around.

Furthermore, we note that the unintended consequence of increasing regulations to make banks safer may have increased the risk on non-bank financial institutions, especially those asset managers with exceedingly large AUM. As a result, many investors have been forced to seek non-traditional sources of liquidity such as exchange traded funds⁹ and mutual funds. This liquidity risk transformation may prove illusory because if market conditions force a fast exit, in our opinion, these funds will surely and adversely impact the bonds that underlay the funds themselves.

This risk is exacerbated by many open-ended funds that offer daily liquidity on what seems to be an underlying asset base that is becoming less liquid. For example, about two-thirds

of European mutual funds are UCITS¹⁰, which by regulator standards must hold 90 percent of assets in liquid securities and offer daily redemptions.¹¹ The IMF highlighted this risk to financial stability in a consultation with the U.S. and warned of a growing amount of liquidity and maturity transformations taking place through mutual funds and ETFs, particularly those investing in credit instruments. The IMF further indicated that this risk is intensified by a decline in broker-dealer involvement in market-making activity, potentially hampering the functioning of markets and price discovery in times of stress.¹²

How MSIM evaluates risks and finds opportunities in an increasingly challenging climate

Liquidity and regulatory risk factors have become features of the financial system that cannot be avoided. We believe, however, that you cannot manage what you cannot measure. As a result, we have developed several models to evaluate risks stemming from regulation and liquidity. This is achieved by recognizing that these risk factors show up as risk premia; thus, we have created tools to calculate and capture this in our valuation metrics and in our asset allocation decisions.

In the current investment climate, we believe that traditional fundamental valuations, based largely on econometric data, are an incomplete description of an asset's value. Since liquidity has become a larger risk factor, we believe an illiquidity premia should be calculated and incorporated into investment decisions. We use this approach across a spectrum of assets, including interest rate products in which we use a term premia calculation. But for purposes of illustration, and since we focused mainly on the liquidity challenges facing corporate bonds in this paper, we will provide an example of our approach for credit assets.

⁸ JP Morgan, US Treasury Market Structure and Liquidity. Data as of April 2, 2015.

⁹ An exchange traded fund (ETF) is a marketable security that tracks an index, a commodity, bonds, or a basket of assets like an index fund.

¹⁰ Undertaking for the Collective Investment of Transferable Securities (UCITS) are investment funds regulated at European Union level.

¹¹ European Securities and Markets Authority (ESMA), Trends, Risks, Vulnerabilities. No. 1, March 2015.

¹² 2014 Article IV Consultation with the United States of America Concluding Statement of the IMF Mission.

Decomposing the risks and properly valuing them

We apply an approach similar to the Bank of England's structural model for credit risks.¹³ It decomposes the spread of a corporate bond into three components of risk compensation for an investor: 1) expected default loss based on observed financial market data; 2) compensation for unexpected loss from default that values the uncertainty attached to the risk of default; and 3) illiquidity premia. Illiquidity premia is a non-credit related factor that compensates an investor for bearing the risk of less liquidity than, say, a high quality government bond such as a U.S. Treasury.

The first component is straightforward and can be gotten from observable market data. The second component involves a more complex options-based calculation to capture uncertainty of default loss, for which we use the Merton model.¹⁴ The illiquidity premium, like the case for most risk premia, is the residual (*Display 4*.) We show that illiquidity premia has risen to represent a larger component of the overall spread since the start of the financial crisis. This is in direct contrast to the lower levels in the years leading up to the crisis (from 2004 to 2007) when regulation was much looser. Although we seem to be returning to 2000 to 2002 levels, one should not overlook the fact that the stock of corporate bonds has doubled since that period. Additionally, the declining trend in interest rates went a long way in supporting the market since the need for liquidity was smaller during a bull market in bonds. Once the interest rate cycle changes, the need for liquidity will most likely rise.

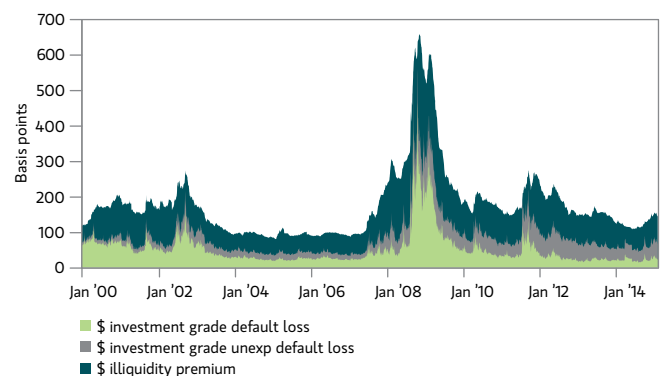
In terms of calculating the uncertainty or unexpected loss from default, we can use information from the value of a firm's equity to calculate this probability. Because equity investors are the residual claimants on the firm's asset value, they receive the same pay-off as a hypothetical investor who holds a "call option" to buy the firm's assets at a "strike price" equal to the face value of the firm's debts. The equity value of a corporate borrower can, therefore, be described using option-pricing methods.¹⁵

¹³ This is a model employed by the Bank's Systemic Risk Assessment Division. Credit risk is the risk of loss of principal or loss of a financial reward stemming from a borrower's failure to repay a loan or otherwise meet a contractual obligation.

¹⁴ Merton, R (1974), On the Pricing of Corporate Debt: The Risk Structure of Interest Rates, *Journal of Finance*, Vol. 29, pages 449–70.

¹⁵ *Ibid.*

Display 4: Illiquidity risk premia has become a larger component of risk in the post-crisis period



Source: Haver Analytics, MSIM. Data as of January 7, 2015.

For the debt holder, however, it is akin to being "short a put option," since the value of debt is equal to the difference between the firm's asset value and its equity value. Said differently, a corporate bond holder is short default risk premium, which is modeled as the premium from being short a put.

Higher payments to claimants on the firm will lead to slower asset value growth and a greater probability of default, other things being equal. But there is also uncertainty about the asset value growth rate. The greater this uncertainty, the higher the probability that the asset value of the firm will hit the default boundary over any given period. Uncertainty about the asset value growth rate means that the range of possible values for the firm's assets widens out over time.¹⁶ *Display 5* illustrates two possible paths for the firm's asset value. By referencing the equity return volatility of the corporate issuer and relating the value of the firm's equity to its asset value, one can derive a probability distribution and thus calculate the uncertainty of an unexpected loss from default. Using option-pricing methods, we can now calculate the component of the corporate bond spread that represents compensation to the holder for an unexpected loss from default.

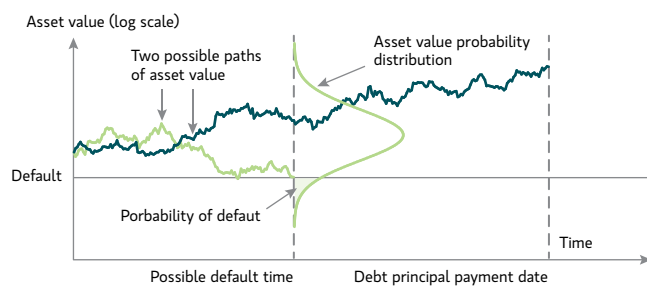
In *Display 4*, we illustrate the decomposed valuation of the spread. The risk, or illiquidity premia, is the residual between the observed market spread and the sum of the expected and unexpected loss from default.

¹⁶ *Ibid.*

Ever since the crisis, our main thesis has been that central bank policies and regulation have been dominant forces influencing asset performance. Since policies such as QE and increased regulation do not tie directly to economic growth, their design is to influence asset values by changing the associated risk premia. This is why traditional valuation models based on economic fundamentals have been suboptimal in the post-crisis recovery period, and often times misleading.

Policy makers have endeavored to make the financial system safer by introducing many regulatory changes. Among them is to disincentivize banks from providing cheap leverage and liquidity to investors with a short time horizon who rely on it, the so-called “fast-money” community. This is achieved by creating regulation that increased the cost of engaging in such transactions. The unintended consequence, however, is that market liquidity declined and the illiquidity premia component of an asset’s valuation rose, especially when we control for the increased stock of corporate debt.

Display 5: Using option pricing models to calculate the unexpected loss from default



Source: Bank of England, MSIM. Data as of March 31, 2015.

We believe many traditional value metrics will now produce incomplete results because they do not properly account for the impact that changes in regulation and liquidity have on an asset’s value. The change in the regulatory climate has added an additional dimension to market risk. In response, we have created analytics, shown in *Display 5*, to help capture and value this risk in order to properly and more fully assess value so that we can correctly incorporate it into our decision-making process.

Winners and losers

Just as the dinosaurs showed us, in any change in climate, there will be winners and losers. The former are those who have the ability to adapt best and fastest. The latter are those without the ability to adapt fast enough.

Putting this into the context of the fixed income markets, many asset managers were able to transform themselves into giant behemoths by growing their AUM. As long as the old climate of declining interest rates persisted, size was not a determining factor for performance. However, when the regulatory climate changes and it has the added impact of reducing market liquidity, then size does matter. Being too big is a limiting factor to adapting to this change in climate.

The key to succeeding in the future is going to be largely dependent upon one’s ability to interact with prevailing market liquidity conditions and in a flexible manner. Yields may remain low for an extended period before rising. Both cases require asset managers to achieve excess returns by adding alpha through more flexible, or unconstrained global strategies. This affords the opportunity for a manager to add uncorrelated risks to portfolios and add alpha to help enhance returns. The size of AUM in such a strategy is proportional to the scope of the investment opportunity set available to a manager to add uncorrelated risks and create alpha. Being too large, therefore, shrinks that universe and significantly reduces the ability to add alpha.

Flexible management of fixed income assets in unconstrained global strategies may provide a solution in the new climate. The goal of such a strategy is to reduce correlation¹⁷ risks to a portfolio of fixed income strategies while also increasing returns.

Traditionally, many investors who allocate assets into fixed income do so by selecting investment managers to oversee sleeves of specific strategies. Asset allocation decisions are enacted by shifting assets from one strategy and manager to another. This approach was sufficient in the past as interest rates consistently declined for years. One needs to recognize, though, that this approach succeeded largely because it was highly correlated to the interest rate cycle.

¹⁷ Correlation is a statistical measure of how two securities move in relation to each other.

Currently, rates are low and may not provide required returns for investors, and rates may also rise, which could have adverse effects to performance. As a result, such an approach that is highly correlated to the interest rate cycle may be insufficient and suboptimal. Unconstrained strategies offer fixed income investors an opportunity to potentially achieve higher returns while reducing correlation risks. But once again, the size of assets under management matters for this type of strategy since the ability to access a wide investment opportunity set in the face of shrinking market liquidity is essential to achieving diversification benefits and introducing uncorrelated risks when constructing a portfolio.

Conclusion

In addition to the change in the 30-year trend of declining interest rates, the change in the regulatory climate that ultimately impacts market liquidity is no less significant. The former requires a change in investment tactics to produce returns in a low to rising rate environment. The latter requires a strategic change of whom to select to manage assets when having the ability to adapt and be flexible is essential to succeeding.

Simply understanding the challenges in the current environment is necessary, but insufficient. Being able to employ the tactics of active asset management is paramount to the success of this investment strategy in the new climate. Investment managers, who are less weighed down by large AUM, yet are at the right size with scope to grow, have a global presence with expertise in many markets and can employ strong research teams, will likely have the ability to be more flexible, move faster and better adapt to changes in the investment climate.

The Paleogene Period succeeded the Cretaceous and opened the door to mammals to rapidly diversify and evolve into their own niches. We may be on the edge of a similar moment today for fixed income investment whereby the larger asset managers may be nearing a smaller universe of opportunities, while the smaller and nimbler firms potentially are able to thrive in this new world.

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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 rising interest-rate environment, bond prices fall. In a declining interest-rate environment, portfolios may generate less income. Some **U.S. government securities** are not backed by the full faith and credit of the U.S., thus these issuers may not be able to meet their future payment obligations.

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Are Chinese A-Shares in a Bubble?

Seven years after the bursting of the first A-shares bubble of this century, onshore Chinese equities are back in “melt-up” mode, breaking records along the way (at more than +140 percent, this rally represents one of the biggest one-year moves by a major market in the last fifty years).¹ After news of a change in regulation allowing mainland Chinese funds to invest in Hong Kong, offshore listed Chinese equities (H-shares traded in Hong Kong) have started catching up with onshore equities, rallying 14 percent since the end of March.² There has been a furious debate about whether this run-up is justified by fundamentals or symptomatic of another bubble. Most commentary from the sell-side and pundits argue this cannot be a bubble as the shares are still cheaply valued, China is still growing near 7 percent per year, and the authorities are vigorously easing policy to support a reacceleration in economic activity in the near future. Some go further and argue that this is the beginning of a massive reallocation by households away from bank deposits, wealth management products and property into equities, and thus the market should rally further. We disagree and see in this enormous rally all the hallmarks of a bubble, albeit with “Chinese characteristics”.

In our opinion, China’s mainland bull run appears to be supported by none of the traditional fundamental drivers of stock market performance: to the contrary, policy easing over the last 15 months has not resulted in any noticeable improvement in activity or liquidity; both corporate profitability and economic activity have deteriorated in the past year; valuations have gone from depressed to extremely overvalued; similarly, investor appetite for stocks has gone from non-existent to record levels of manic behavior. All this indicates to us that the odds are significantly against Chinese equities being

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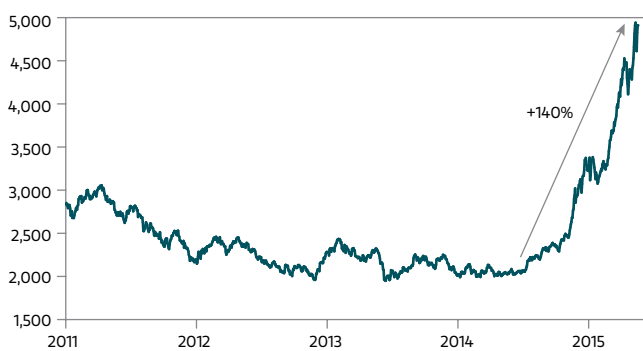
SERGEI PARMENOV
Managing Director

¹ MSIM Global Multi-Asset Team analysis; Bloomberg LP.

² Ibid. Data as of May 29, 2015.

Display 1: Chinese A-Shares Rally Over +140% in One Year

Shanghai Stock Exchange Composite Index



Past performance is not a guarantee of future performance.

Source: MSIM Global Multi-Asset Team Analysis; Bloomberg LP. Data as of June 3, 2015.

higher than today in one year or even six months from now, though nothing prevents a further blowoff in the near-term.

First, let us address the current state of, and prospects for, corporate profits and economic growth in China. In the past year, Chinese economic growth has gone from merely slow to levels equivalent to the Asian and global financial crises. Based on the least reliable of the generally unreliable Chinese economic data series, real GDP, growth in the first quarter was 5.3 percent quarter-over-quarter (seasonally adjusted annual rate or “SAAR”), down from 7 percent in 2014.³ As a reference, real GDP was growing 10 percent five years ago and 13 percent in the years immediately preceding the crisis. Growth of 5.3 percent in Q1 of 2015 is nearly as low as the 4.5 percent growth in the worst two quarters of 2008-2009, but even this substantially understates economic weakness. In nominal GDP terms (less easily manipulated than real GDP), the Chinese economy grew 5.8 percent year-over-year in the first quarter but actually shrank 0.4 percent quarter-over-quarter saar.⁴ Again, the last times this occurred were in 2008-2009 and 1998 (*Display 2*).

More granular—and likely more reliable—statistics reveal even more dire conditions: industrial production only grew by 6.4 percent in Q1, worse than the fourth quarter of 2008 and down from 9 percent in the past two years and 14-18 percent in the

³ MSIM Global Multi-Asset Team analysis; National Bureau of Statistics of China; Haver Analytics.

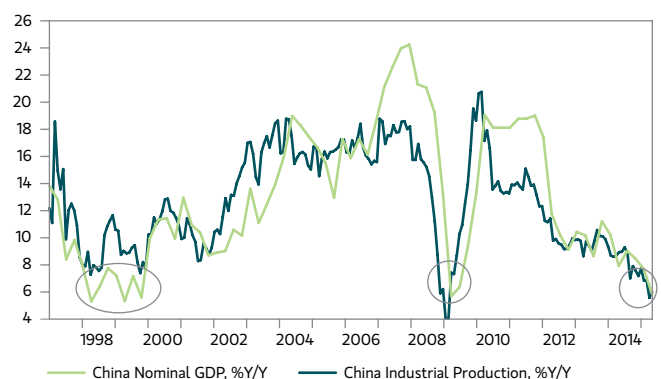
⁴ Ibid.

boom years⁵; profits of industrial enterprises fell 3 percent in the first quarter, down from 10 percent growth in 2013-2014 and 30 percent during the boom years.⁶ This bull market is clearly unlike any other, and is even unlike the 2006-2007 bubble, which was at least partially supported by 13 percent real GDP growth, 20 percent nominal GDP growth, and 30 percent profits growth.⁷ This time, economic and profits growth are falling further and further as the bull market goes on (*Display 3*).

Our medium-term assessment of Chinese economic growth is that the best potential scenario would be a temporary stabilization at current levels, as the increasing amount of stimulus only manages to offset underlying weakness driven by the hangover from the biggest debt-driven investment boom the world has ever seen. Lest these adjectives seem hyperbolic, consider that China’s total debt grew from \$5 trillion in 2007 to \$25 trillion in 2014, i.e., China added \$20 trillion of debt in seven years, more than a United States economy’s worth of debt (*Display 4*).⁸ China built and sold \$3 trillion worth of new homes in the past three years, whereas the U.S. in its own momentous housing bubble only managed \$1 trillion in its three boom

Display 2: Growth at Hard Landing Levels

China Nominal GDP and Industrial Production



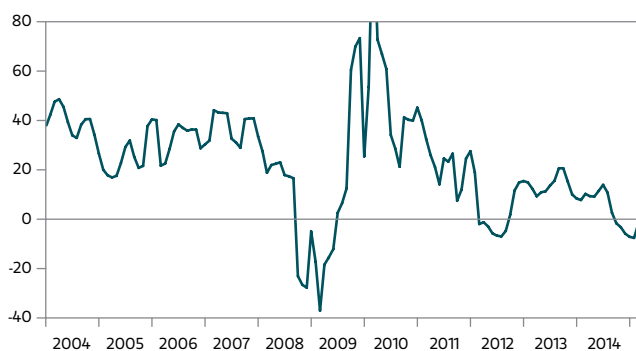
Source: MSIM Global Multi-Asset Team Analysis; National Bureau of Statistics of China; Haver Analytics. Data as of May 2015.

⁵ Ibid.

⁶ Ibid.

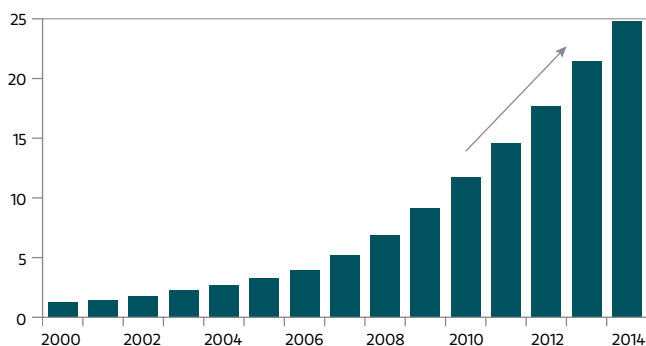
⁷ MSIM Global Multi-Asset Team analysis; MSCI; IBES.

⁸ MSIM Global Multi-Asset Team analysis; PBOC.

Display 3: Profits of Industrial Enterprises Shrinking*China Industrial Profits, Seasonally Adj. (%Y/Y, 3-Mo. Moving Avg.)*

Source: MSIM Global Multi-Asset Team Analysis; National Bureau of Statistics of China; Haver Analytics. Data as of May 2015.

years.⁹ In the past seven years, China produced as much cement as the U.S. did in the entire 20th century.¹⁰ MSIM's Global Emerging Markets Equity team's research shows that all large debt-driven booms of the past 50 years (and China is the biggest) have led to dramatic growth slowdowns, even in current account surplus countries flush with reserves, and 70 percent of the credit booms have resulted in a banking crisis within five years.¹¹

Display 4: Chinese Debt Soaring*China Total Debt (USD in Trillions)*

Source: MSIM Global Multi-Asset Team Analysis; People's Bank of China. Data as of May 2015.

⁹ MSIM Global Multi-Asset Team analysis; Bloomberg LP; U.S. Census Bureau.

¹⁰ MSIM Global Multi-Asset Team analysis; U.S. Geological Society.

¹¹ MSIM Global Emerging Markets Equity Team analysis.

Hence, our expectation is that policy can only marginally offset the downward adjustment in the economy. If our assessment of the structural issues ailing China is correct, then monetary and fiscal policy easing are unlikely to be sufficient to revive growth beyond a quarter or two. Profitability will thus likely continue to suffer. So if Chinese equities are indeed anticipating a profit upturn, as the bulls claim, these expectations will likely be disappointed.

The second argument advanced by the bulls is that, even if current growth is weak (or negative in the case of profits), more stimulus is likely to follow. In other words, the equity market was initially fuelled by the anticipation of policy easing and, now that some easing has been delivered but growth has remained weak, the market could correctly be anticipating even more easing. Indeed policymakers have not been standing still: one-year lending rates by banks (controlled by the government) have been cut by 90 basis points (bps) to 5.1 percent; interbank rates have fallen almost 300 bps to 2.35 percent; the Reserve Requirement Ratio (RRR) has been cut by 150 bps to 18.5 percent¹²; and finally, three of the major policy banks (Asian Development Bank, China Development Bank, and the Export-Import Bank of China) have recently been recapitalized to the tune of \$80 billion collectively and are expected to participate in the ballyhooed Silk Road or "One Belt, One Road" project. As one particularly acerbic China commentator recently put it, "If ever China had toyed with the possibility of giving up investment-driven growth, that debate has ended. The April 30 Politburo meeting announced plans to pave over not only the rest of China but much of the cooperating world."¹³

In spite of all this monetary easing, liquidity and credit growth continue to slow, with M1 growth recently hitting 3 percent (down from 10-30 percent for the past ten years) and incremental Total Social Financing (China's measure of new total banking and shadow banking credit) actually shrinking by 20 percent compared to last year (to be clear, credit is growing by 12 percent, but at a 20 percent slower pace than last year and, actually, what matters for the economy is not whether credit is growing or shrinking but whether it is accelerating or decelerating, i.e., the growth of the growth) (*Display 5*).¹⁴

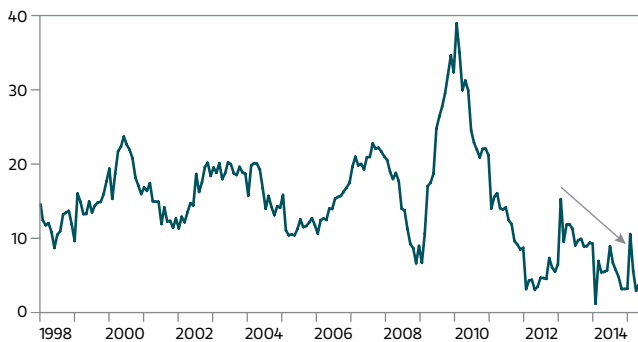
¹² MSIM Global Multi-Asset Team analysis; PBOC.

¹³ Stevenson-Yang, Anne. "Why Beijing Can't Stop." J Capital Research, May 4, 2015.

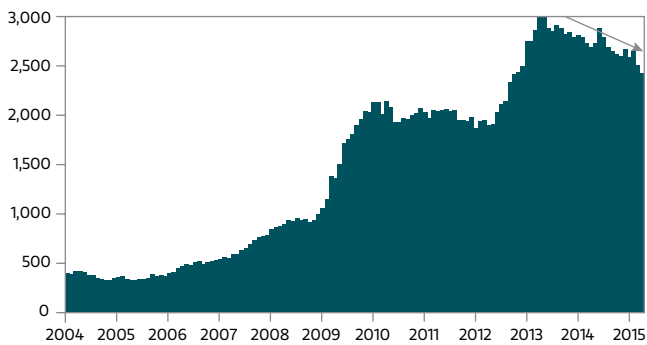
¹⁴ MSIM Global Multi-Asset Team analysis; PBOC.

Display 5: Liquidity and Credit Growth Sputtering

China M1 Growth (%Y/Y)



China New Total Social Financing (12-Month Trailing Sum in USD Bn)



Source: MSIM Global Multi-Asset Team Analysis; People's Bank of China. Data as of May 2015.

We have yet to see the impact of the late April RRR cut, and although it will likely be positive, it will unlikely be able to reverse the trend of slowing credit creation, particularly as capital outflows have become large and could potentially increase as the Fed begins to raise rates. As a local financial official in the PBOC's mouthpiece, *Chinese Financial News*, recently commented, "market liquidity is abundant, rates also [have fallen] steadily, but a key problem is that companies' effective credit demand is not very strong."¹⁵ This is what happens as a credit boom begins to unwind: overcapacity, diminishing end-demand from customers and lack of profitability lead to tightening credit standards by banks

¹⁵ Niu, Juanjuan. "A Day in the Life of M2: An Examination of Monetary Conditions on the Ground." *Chinese Financial News*, May 7, 2015. Web. <http://www.financialnews.com.cn/yw/jryw/201505/t20150507_75804.html>

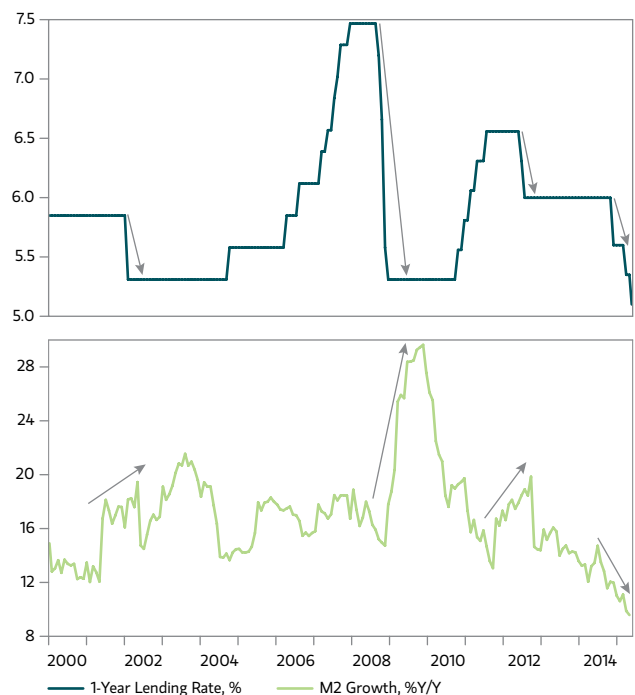
and lower credit demand by credit-worthy borrowers. In this environment, monetary easing and lower rates do not lead to higher credit availability—hence, we characterize these easing efforts as "pushing on a string" (*Display 6*).

Historically, equity markets do not anticipate profits growth more than a couple of quarters in advance, let alone one, two or three years. Any objective reading of the Chinese stock market would conclude that there has been a significant decoupling of stock prices and fundamental reality. All the rationales given to justify the run-up do not withstand scrutiny: prices are driving the investment rationales, not the other way around, and far-fetched stories are being invented to mask what is clearly a speculation of epic proportions.

Overtrading is a classic condition of speculative bubbles and here again, the mainland Chinese market is breaking records. During the last full week in May, trading turnover in Chinese

Display 6: Pushing on a String

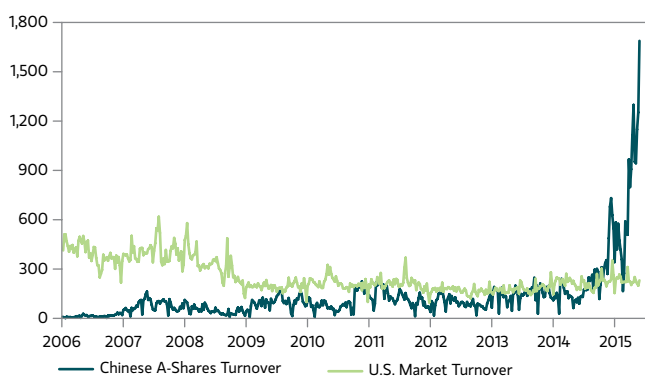
China Policy Rate vs. M2 Growth



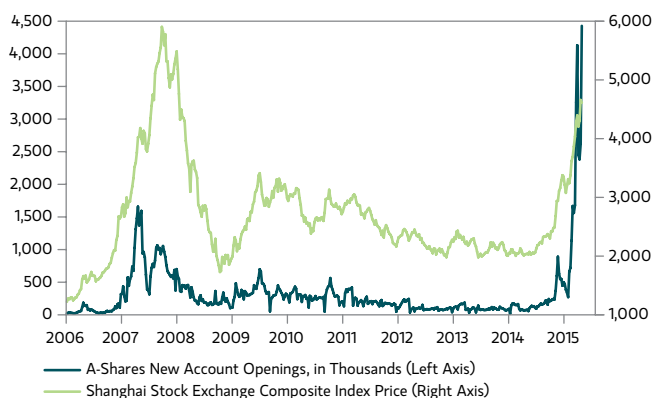
Source: MSIM Global Multi-Asset Team Analysis; People's Bank of China. Data as of May 2015.

Display 7: Trading in A-Shares Skyrocketing

Weekly Trading Turnover of Common Shares (USD in Billions)



A-Shares Account Openings (in Thousands)



Past performance is not a guarantee of future performance.

Source: MSIM Global Multi-Asset Team Analysis; Bloomberg LP. Data as of May 2015. A-shares data represents the Shanghai and Shenzhen A-shares markets. U.S. market turnover represents NYSE and NASDAQ trading volume.

A-shares reached \$1.7 trillion.¹⁶ Over those same five days, the U.S. market (2.7 times bigger) only traded \$230 billion (*Display 7*).¹⁷ Trading velocity was thus 19 times faster in China than in the U.S. Another way of looking at it is that the entire Chinese stock market's capitalization is turning over in 30 days! As a reference, in 2007, during a time period which is considered to be—with the benefit of hindsight—a bubble (though few foreign investors could participate as flows were restricted),

weekly trading turnover was only \$200 billion. Speculative activity is thus more than eight times bigger than at the prior bubble peak (*Display 7*).

This manic trading is being driven by retail investors, who are massively increasing their participation. One measure of their involvement is the number of new retail accounts being opened each week. In 2007, peak activity reached 1.6 million new accounts per week; in May, weekly new account openings reached 4.4 million.¹⁸ Moreover, an increasing amount of trading activity is being done on margin—up to 30 percent according to recent estimates. Margin lending has grown from non-existent five years ago to more than \$300 billion, or 8 percent of the free-float capitalization of the market.¹⁹ This is nearly double the level of margin activity that we see in the U.S. and in most markets. In sum, this is a market driven by performance-chasing, often leveraged investors who care little about earnings and valuations and are in for a quick profit—weak hands unlikely to provide stability when profits disappoint and monetary easing fails to heal the economy.

The last rejoinder of the bulls is that this rally cannot be a bubble because valuations are not extreme. The number most often cited is 17x forward earnings for the Shanghai A-shares market (the largest market in China and the only one accessible to foreigners). There are two issues with this statement. First, it is well known that not all bubbles are marked by excessive valuations: in October 2007, the U.S. stock market was trading at 15x forward earnings and still managed to fall 57 percent in the subsequent 17 months; in 1929, the S&P was trading at 21x trailing earnings; even in the Nifty Fifty bubble of 1972, the overall market was trading at 18x earnings (though the Nifty Fifty themselves were trading at 42x).²⁰ Many bubbles are associated with excessive valuations, as in the tech bubble in 2000 or Japan in 1989, but many more are not.

The second issue with the bulls' argument is that Chinese shares are indeed extremely overvalued! The 17x forward P/E is misleading because the forecasted earnings growth rate embedded in the calculation is above 30 percent, even though

¹⁸ Ibid.

¹⁹ MSIM Global Multi-Asset Team analysis; China Economic & Industry Data Database; Bloomberg LP. Data includes both Shanghai A-shares and Shenzhen A-shares.

²⁰ MSIM Global Multi-Asset Team analysis; IHS Global Insight; Standard & Poor's; IBES.

¹⁶ MSIM Global Multi-Asset Team analysis; Bloomberg LP.

¹⁷ Ibid.

Display 8: Extreme Multiples Across Indices

	TRAILING 12-MO. P/E	FORWARD P/E	MARKET CAP (USD BN)
Shanghai Shenzhen CSI 300 Index	20.4x	16.7x	4,855
CSI 300 Index Ex-Financials	36.0x	26.6x	3,122
Shanghai A-Shares	22.9x	17.3x	5,806
Shenzhen A-Shares	69.1x	36.9x	4,302
ChiNext Index	117.0x	66.1x	423

Source: MSIM Global Multi-Asset Team Analysis; Bloomberg LP; Shanghai Stock Exchange; Shenzhen Stock Exchange. Market indices have been defined on page 20. Data as of May 29, 2015.

earnings are currently shrinking.²¹ A more objective measure would be the trailing P/E, the multiple on the past twelve months of actual earnings. On this metric, the A-shares are trading at 23x, high but not extreme. However, that is only because Chinese banks, 18 percent of the index, are trading at 8x trailing EPS and banks, as the history of credit booms shows, go to great lengths to hide all the dud loans they have made even if they are non-performing, as long as the regulator permits (for example, Japanese non-performing loans stayed flat at 2 percent for eight years after the 1989 bubble peak before suddenly spiking up, bankrupting banks and requiring the near nationalization of the entire banking system in the early 2000s).²² As industrial companies have a harder time than banks fabricating earnings, we focus on the valuation of A-shares ex-financials (which we estimate using the CSI 300 Index, which includes A-shares stocks listed on both the Shanghai and Shenzhen Stock Exchanges): this multiple stands at 36x—while the median stock is trading at 45x trailing earnings (*Display 8*).²³ These valuations are two to three times higher than they should be given the structural downshift in Chinese economic growth and the risks inherent in investing in companies where management insiders and majority owners can act in blatant disregard for the interests of minority shareholders. Incidentally, the other markets such

²¹ MSIM Global Multi-Asset Team analysis; MSCI; IBES.

²² MSIM Global Multi-Asset Team analysis; Bloomberg LP; China Economic & Industry Data Database; Bank of Japan.

²³ MSIM Global Multi-Asset Team analysis; Bloomberg LP.

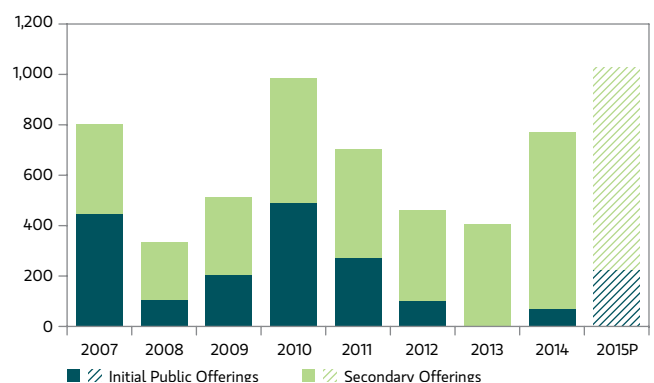
as Shenzhen and the smaller ChiNext (the Nasdaq of China) sport multiples of 69x and 117x, respectively.²⁴

In summary, Chinese economic and profits growth are at hard landing levels. Policymakers are trying desperately to revive growth but will only cushion the slowdown of this overleveraged and over-indebted economy, while manic speculative activity by retail investors has driven equity valuations to bubble levels. If our assessment is indeed correct, the question remains: what will be the catalyst for market prices to converge back down to fundamentals? As is often the case, the exact catalyst is difficult to predict but our top candidates are:

- Economic and profit disappointments make it clear that policy easing cannot prevent the inevitable structural adjustment of **China's twin excesses** (excessive investment funded by excessive debt).
- **Supply:** The number of IPOs is currently restricted by a cumbersome regulatory approval process which Premier Li has targeted for reform. But by the end of the year, the threshold for listing may be lowered to registration and meeting some basic requirements. An increase in equity supply is often one of the factors to cause a market downturn (*Display 9*).

Display 9: Equity Supply Climbing to Record Peak

Number of A-Shares IPOs and Secondary Offerings

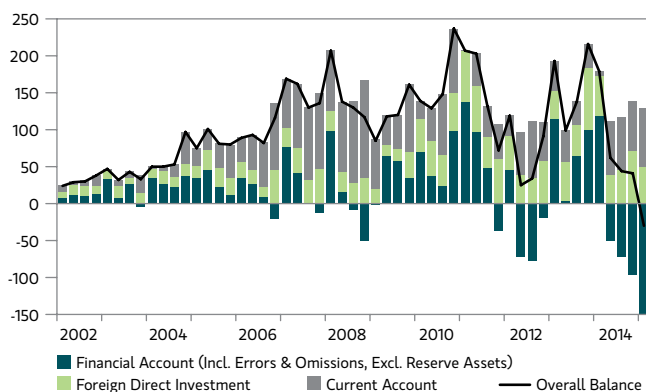


Source: MSIM Global Multi-Asset Team Analysis; Deutsche Bank Research. Data as of May 2015. Data has been projected for 2015 based on year-to-date IPOs and secondary offerings for A-shares stocks listed in both Shanghai and Shenzhen, annualized.

²⁴ Ibid.

Display 10: China Balance of Payments

(USD in Billions)



Source: MSIM Global Multi-Asset Team Analysis; China Economic & Industry Data Database. Data as of May 2015.

- **Regulatory restrictions** could cool investors' enthusiasm for speculation. Rumors of a stamp tax are circulating, or limits on margin lending, though both have been denied by authorities.
- **Exhaustion of speculative activity:** It is not possible for the number of new retail investor accounts to keep climbing every week (above 4.4 million) and for trading activity to remain at the current level of \$1.7 trillion per week.
- **Fed tightening** could cause capital outflows from China which, given the Chinese renminbi peg to the U.S. dollar, will force the authorities to allow either a depreciation of the renminbi or higher interest rates, both of which would have a severely negative impact on financial markets in China (*Display 10*).

There are of course risks that the bubble keeps inflating further as bubbles often do. Some of the scenarios supportive of this include:

- **Continued government support** for the market rally, as regulators and government officials have done recently. In March, Deng Ke, spokesman of the China Securities Regulatory Commission (CSRC), was cited as saying that the "rise in stock prices was a reflection of ample liquidity and an improvement in corporate earnings, and that healthy market development was good for economic restructuring."²⁵

²⁵ Source: MSIM Global Multi-Asset Team Analysis; Reuters.

- **More measures to allow foreign capital** into the Chinese mainland market (e.g., the Shenzhen-Hong Kong stock connect program, or the mainland-Hong-Kong joint recognition of mutual funds), which mainlanders expect to lead to a flood of global money into the domestic Chinese market. This is despite all evidence to the contrary, as an average of 90 percent of the "northbound" quota (from Hong Kong to Shanghai under the Shanghai-Hong Kong Stock Connect program) has gone unfilled every day since its inception.
- **A redoubling of government efforts** to turn the economy around, which finally succeeds in creating a rebound, even if temporary (one to three quarters), resulting in growth which validates the expectations built into the market. Some easing measures introduced by the government in recent weeks include: a forced restructuring of some local government debt (the Municipal Bond Debt Swap); the "Made in China 2015" plan announced by the State Council; the PBOC successfully forcing Shanghai Interbank Offered Rate (SHIBOR) to five-year lows; and the "One Belt, One Road" project mentioned earlier.
- And lastly, probably the only truly fundamentally bullish policy measure: if the government was to implement a full RTC-style²⁶ **takeover of the banks**. This would entail adding mostly unrecognized bad debts to the central government's balance sheet, in addition to a recapitalization of the banking system, a streamlining of local government finances, and a central government-funded public spending stimulus (geared at funding the restructuring of the *Hukou*²⁷ system rather than more infrastructure). This would require the central government to use its own balance sheet (which is relatively debt free, at least on paper) rather than pushing unfunded mandates off on local governments, state-owned enterprises and banks—as it has been doing over the past decades. All of this is unlikely, but would eventually be required for a solution, in our view.

²⁶ The Resolution Trust Corporation (RTC) was a U.S. government-owned asset management company established in 1989 in order to liquidate assets of savings and loan associations (S&Ls) that had been declared insolvent as a consequence of the S&L crisis of the 1980s.

²⁷ *Hukou* is the household registration system required by law in China. In order to meaningfully restructure the system, in our view, the government would need to provide funding for all social services, such as education and healthcare, for migrant workers and allow them to gain urban residency permits. We believe such reforms would go a long way toward reducing inequality and stimulating consumption.

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Charts and graphs provided herein are for illustrative purposes only.

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The CSI 300 Index is a free-float weighted index that consists of 300 A-shares stocks listed on the Shanghai or Shenzhen Stock Exchanges.

The Hang Seng China Enterprises Index is a free-float capitalization-weighted index comprised of H-shares listed on the Hong Kong Stock Exchange and included in the Hang Seng Mainland Composite Index.

The S&P 500 Index is an index of 500 stocks chosen for market size, liquidity and industry grouping, among other factors. The S&P 500 is designed to be a leading indicator of U.S. equities and is meant to reflect the risk/return characteristics of the large cap universe.

The Shanghai Stock Exchange Composite Index is a capitalization-weighted index. The index tracks daily price performance of all A-shares and B-shares listed on the Shanghai Stock Exchange. As of May 2015 the A-shares accounted for approximately 99.5% of the composite, and the B-shares accounted for approximately 0.5% of the composite.

The Shenzhen Stock Exchange Composite Index is a capitalization-weighted index. The index tracks daily price performance of all A-shares and B-shares listed on the Shenzhen Stock Exchange. As of May 2015, the A-shares accounted for approximately 99.4% of the composite, and the B-shares accounted for approximately 0.6% of the composite.

All indices are unmanaged and do not include any expenses, fees or sales charges. It is not possible to invest directly in an index.

The Odyssey

Navigating real estate risk and reward in a low yield world

Introduction

Once he hears to his heart's content, sails on, a wiser man.¹

While the turbulence of the Global Financial Crisis drove investors into the safety of core markets, the recent calm once again has them looking to venture away from these markets. Persistently low U.S. Treasury yields, historically low near-term volatility in commercial real estate returns, and low capitalization rates (cap rates)² in primary markets are leading investors to hear the faint sound of a beautiful song of higher yields coming from non-core markets. Thus, one of the biggest questions facing core investors today is whether they should move up the risk curve and deploy capital into secondary markets.

Homer's epic poem, *The Odyssey*, tells of the adventure of Odysseus as he attempts to return from the Trojan War to his home in Ithaca. Of the many dangers Odysseus and his crew confront, one of the most iconic is with the Sirens, who lured sailors with beautiful songs towards the rocky coastline of their islands. However, once these ships approached, tempted by the enchanting hymns, they shipwrecked on the rocks. On the advice of Circe, Odysseus has his crew plug their ears with beeswax, so they will not be tempted by the Sirens' song. Odysseus has his crew tie him to the ship's mast so he can hear, but not be tempted by the Sirens. While the Sirens are mythological creatures, today we use the phrase, "Sirens' song" which refers to something that tempts us but ultimately will cause harm. In this paper, we evaluate whether "chasing yield" in a low yield environment is a Siren's song leading investors into a rocky coastline.

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¹ Source: *Odyssey* 12.188, Fagles' translation.

² Capitalization Rate = Net Operating Income/Property Value.

We will analyze the historical track record among properties in the NCREIF National Property Index (NPI) in various markets. We will begin by analyzing institutional properties' historical appreciation returns, and then argue that the performance of apartment and retail assets is more dependent on the property than the market. Next, we will focus on the office sector, which has historically witnessed a large degree of dispersion of appreciation returns by markets. Finally, in our analysis of office markets, we will identify three defining characteristics of markets that have historically been more likely to provide appreciating property values.

Historical Perspectives

Core real estate returns come from two sources—income and appreciation. Rent is the primary source of income returns, while appreciation is driven by movements in cap rates and changes in Net Operating Income (NOI).³ While cap rate movement is difficult to predict and is largely outside the investor's control, investors have some ability to identify and project NOI growth through asset selection. Therefore, investors can influence appreciation return expectations in two ways: through market timing (cap rates) or asset selection (NOI growth).

Market timing, however, is difficult to execute consistently and is not usually part of a core strategy, which is typically characterized by a long-term investment horizon. Asset selection, on the other hand, impacts NOI growth and is an important part of any core strategy. It is important to understand how NOI growth is generated. In general, NOI growth can come from either increasing rents or occupancy, or both. Core strategies, however, generally concentrate on owning stabilized properties for the long term, with NOI growth primarily coming from market growth as opposed to large occupancy gains.

While many core strategies are focused on durability of income, investors often mistakenly ignore NOI growth and its impact on appreciation returns. Despite appreciation historically accounting for approximately 17 percent of total returns⁴, appreciation returns explain nearly all of the deviation of real estate's total return.

Furthermore, many real estate professionals subscribe to the notion that “all” real estate will appreciate when held over a long horizon. To test this notion, we analyzed the appreciation returns in 88 ten-year periods (over 1979 to 2014). We find that the NPI has positive appreciation in approximately 56 percent of these 10-year periods. Meanwhile, the ODCE index, which tracks properties held by core funds, had positive appreciation in 48 percent of the 10-year periods analyzed.⁵ Thus, these broad indices of institutional properties suggest that real estate has historically only appreciated in approximately half of all 10-year periods. However, our analysis shows that the frequency of appreciation varies dramatically by property type and market. Therefore, an opportunity does exist for skillful managers to differentiate themselves through careful asset and market selection.

Today's Market

Persistently low government bond yields since 2010 have caused investors to increase allocations to alternatives and real estate, and in particular, core real estate. With the strong inflows of capital into core real estate, cap rates have been driven to low levels while property prices have been driven up. Over the past three years appreciation has provided an annualized return of 5.4 percent which is well above the historical average of 1.6 percent.⁶ At the same time, the dispersion of returns has fallen to a historic low. With cap rates at historically low levels, many investors are fearful of rising rates. This is driving the temptation among investors to chase yield in secondary markets.

⁴ Source: NCREIF-NPI Index, 1Q 1979 – 3Q 2014.

⁵ The ODCE index, or Open End Diversified Core Equity Index, tracks properties held in core funds whereas the NPI index tracks all properties held by NCREIF member funds, 1Q 1983 – 3Q 2014.

⁶ Source: NCREIF- NPI 1Q 1979 – 3Q 2014.

³ Net Operating Income = Property Income – Operating Expenses.

We believe, however, that current market conditions warrant strict discipline for three reasons. First, as stated earlier, one must not solely focus on yield/cap rates because doing so could lead them to forget about the equally important source of returns from appreciation. Second, core is not a timing strategy but rather a long-term hold strategy. Over the longer term, cap rate movements have less influence on returns, and NOI growth becomes more important. Third, most high cap rate markets historically have not experienced strong NOI growth given more limited demand drivers and lower barriers to new supply. Thus, investors should be less focused on trying to time the market and avoid the temptation to invest in higher yielding but lower NOI growth assets. Instead, the true defense against an increase in cap rates is a long-term outlook with a high quality asset in a preferred market capable of above average growth leading to enhanced appreciation offsetting higher cap rates.

Additionally, we believe that increased discipline is necessary in the current market as volatility will eventually return to markets, and when it does investors will again want the safety and liquidity of high quality assets in core markets. As stated above, return volatility over the past three years is at an all-time low. Volatility, represented by the annualized standard deviation in total returns over the past three years, was 0.4 percent as of 3Q 2014, compared to an historical average of 4.3 percent.⁷ While we do not claim to know when or why volatility will return, we doubt, like low interest rates, that historically low volatility is here to stay. Thus, investors should be prepared for volatility when it does return, as the catalyst will likely remain unknown until it is too late. Potential causes for volatility could stem from a geo-political event, natural disaster, an equity market sell off, frothy credit markets, rising bond yields or overbuilding in the real estate sector.

Appreciation for the Long Haul

As shown above, appreciation returns are very often the difference between above- and below-average performance. Since 2000, the NPI has seen annualized appreciation returns of 2.0 percent, while NOI growth increased by 1.2 percent annually. However, despite this tendency for real estate to modestly appreciate over the long run, values do not increase in a straight upward line as conventional wisdom might expect.

In looking at the 88 ten-year periods, the NPI has historically appreciated only 56 percent of the time and in half of the 48 twenty-year periods. However, it is important to note the sharp differences in the tendency to appreciate among different property types and markets.

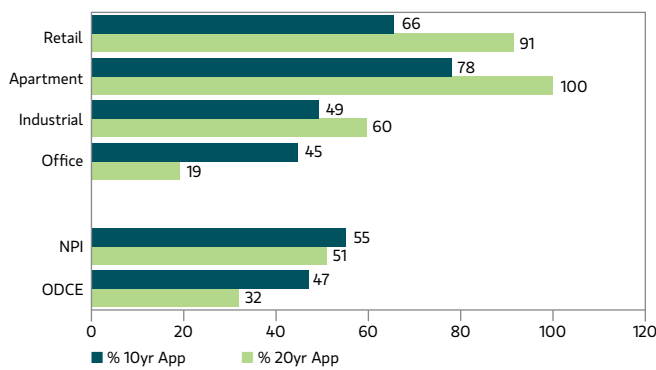
Property Types vs. Market Types

Historically, the two property types intuitively linked most closely to inflation and the consumer—retail and apartment—have shown the greatest tendency to steadily appreciate over long time frames. Since 1983, retail property has appreciated in 66 percent of 10-year periods and 92 percent of 20-year periods. Meanwhile, apartments increased in value in 78 percent of 10-year time frames and have appreciated in every 20-year period since 1983. Thus, for these two property types, property characteristics may trump market selection to some degree. Additionally, successful managers can more favorably impact value on the operational side of the retail and multifamily businesses.

As shown in *Display 1*, industrial and office properties, however, which are more closely linked to the business cycle, have shown less of a tendency towards long-term appreciation and have displayed higher volatility. Industrial properties have appreciated 50 percent of the time over ten-years, and 60 percent of the time over 20-years. Finally, office properties have depreciated more often than appreciated. Over 10-year periods, office properties have increased in value 45 percent of time, and just 21 percent of the time over 20-years.

⁷ Source: NCREIF- NPI 1Q 1979 – 3Q 2014.

Display 1: Percentage of Holding Periods with Positive Appreciation



Source: NCREIF. Data as of 3Q 2014.

Since office properties account for approximately 36 percent of the NPI⁸ and typically constitute a significant portion of institutional portfolios, the sector’s tendency towards higher return volatility is worrisome. However, as illustrated on *Display 2*, the tendency of individual office markets to appreciate is not tightly centered near the average, but rather widely dispersed. Thus, office market selection warrants a closer examination in order to be best positioned to invest successfully over the long-term.

Market Selection

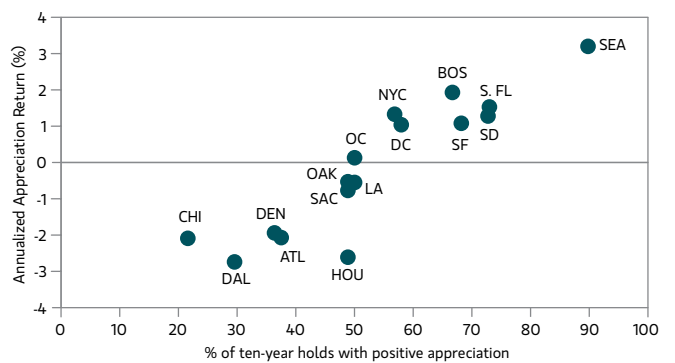
On the surface, office properties have been about 10 percentage points less likely to appreciate than the NPI index as a whole over 10 years and approximately 30 percentage points less likely over 20 years.⁹ However, the first distinction we need to make is between a central business district (CBD), or the “downtown” of a city, and suburban office. Over 10-year periods, CBD offices have appreciated 55 percent of the time,

which is roughly in line with the NPI index, while suburban offices increased in value 39 percent of the time. Furthermore, suburban offices appreciated in just 17 percent of 20-year periods compared to 38 percent for the CBDs.¹⁰

Taking this analysis further into the individual market level shown in *Display 2*, we see that many of the traditional gateway markets, such as New York, Boston and Washington DC, have all exhibited significantly higher tendencies to appreciate than the overall office and NPI index, while higher cap rate markets including Atlanta, Dallas and Houston have seen below-average tendencies to appreciate.

Armed with these insights, the next question becomes “what characterizes a market with an historical tendency to appreciate?” We propose three factors driving long-run appreciation—high liquidity, market depth and supply constraints. To evaluate these three criteria, we will next examine the 50 largest office markets in the U.S.

Display 2: Office Markets - Percentage of Ten-Year Holds with Positive Appreciation



Source: NCREIF. Data as of 3Q 2014.

⁸ Data as of 3Q 2014.

⁹ Source: NCREIF. Data as of 3Q 2014.

¹⁰ Source: NCREIF. Data as of 3Q 2014.

The Building Blocks of Appreciation

Liquidity¹¹

The first criterion that a core investor should consider is market liquidity, or how easily they can exit the market. When evaluating liquidity for a given market, core investors should stick to the markets that see high liquidity in both good times and bad. While there are many ways to evaluate this, we constructed a simple filter to analyze market liquidity. We first eliminated markets that did not meet a given level of liquidity during normal market periods. Next, however, we weighed how liquid the market remained under stressed conditions. For example, Austin and San Francisco had similar levels of liquidity over 2003 to 2006. However, in 2009, San Francisco was a significantly more liquid market, as liquidity nearly dried up in Austin. By filtering through the 50 largest markets, we can eliminate 12 that have historically proven illiquid at some point in the cycle, including Raleigh, Austin, Charlotte and Nashville.

Market Depth

Second, investors should consider how “deep the bench is” in a given market. A deep bench of potential tenants provides a core investor with some protection against significant re-leasing risk in the event a major tenant vacates. To evaluate the depth of each market, we looked at the average absorption rate,¹² in relation to market size, in each of the 38 remaining markets over the last 20 years. We use absorption to quantify the market’s depth because it provides a long-term perspective on market activity and how likely a landlord will be able to re-lease space. In order to pass this test, a market needed to record absorption above the median, which narrows down our list of potential markets to 15. Notable markets that fail this test included Miami, Portland, San Jose and Minneapolis.

It’s All About Supply

The 15 remaining markets have all shown to be liquid markets with deep tenant-demand drivers. However, a core investor must not stop here because the final criterion is equally as important as the first two in predicting appreciation returns over the long haul. In our view, supply is the greatest long term risk to appreciation, and, therefore, our final criterion is that the market has supply constraints.

While supply is responsive to increases in tenant demand, it is generally unresponsive to market declines. Thus, since excess supply is not eliminated from the market, rents must fall as landlords compete to fill their space. Therefore, we measure the tendency of a market to be subjected to overbuilding by investigating the average vacancy over the past 20 years. By evaluating average vacancy over the past 20 years, we are able to estimate how well the market has historically balanced supply and demand. Moreover, by favoring markets with low average vacancies, we focus only on office markets that will generally give an edge to landlords to push rents and grow NOI. Using this statistic, we find that the top five office markets are New York, Washington, DC, San Francisco, Boston and Seattle. These markets also happen to have historically seen the greatest tendencies to appreciate over 10 and 20 year holding periods.

Scenario Analysis

To illustrate the point further, we took 10 highly liquid markets that have traditionally been popular with institutional investors.¹³ We then imagined that three investors were each building an office portfolio. The investors would allocate an equal amount to each of the office markets they selected and buy their entire portfolio in the first quarter of 2000. Investor A believes in having a well-diversified portfolio that includes both primary and secondary markets. Investor A, therefore, invests 10 percent of her portfolio in each of the 10 markets. Investor B prefers high cap rate secondary markets and, instead, limits his portfolio to five markets, allocating 20 percent to Dallas, Houston, Phoenix, Chicago and Atlanta.

¹¹ Liquidity = transaction volume (SF) / inventory (SF) Source: Real Capital Analytics, CBRE-EA, MSREI-Strategy.

¹² Absorption rate = net absorption (SF) / inventory (SF).

¹³ Markets considered in this analysis included DC, New York, Boston, Los Angeles, San Francisco, Houston, Seattle, Chicago, Phoenix and Atlanta.

Finally, Investor C insists on investing only in primary markets that exhibit supply constraints. Investor C purchases office buildings in Washington, DC, New York, Boston, San Francisco, Seattle and Los Angeles.¹⁴

Display 3: Scenario Analysis Results

1Q 2000 - 3Q 2014

	INVESTOR A - DIVERSIFIED	INVESTOR B - GROWTH	INVESTOR C - CORE
Income	6.7	7.1	6.4
Appreciation	1.6	(0.4)	3.0
Total	8.4	6.7	9.6

Source: NCREIF. Data as of 3Q 2014.

There are three key lessons from this exercise. One, even though primary markets are more expensive up front, they provide strong appreciation returns to make up for it. Looking again at our model portfolios, Investor B, who invested in higher cap rate markets saw the value of his portfolio decline by an annualized rate of 0.4 percent, while Investor C’s core portfolio appreciated by 3.0 percent annually (see *Display 3*.) Meanwhile, Investor C’s portfolio still received an annualized income return of 6.4 percent, 70 basis points lower than the higher-yielding portfolio of Investor B. Therefore, Investor C’s portfolio essentially traded 70 basis points in income for 340 basis points of appreciation. Over the course of the entire holding period (1Q 2000 to 3Q 2014), Investor C’s appreciation growth translates into an additional 290 basis points of outperformance over Investor B.

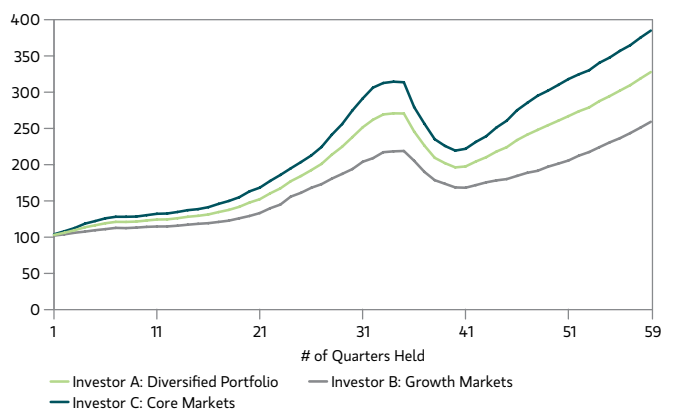
The second take-away is related to the first. The main reason Investor C’s core portfolio outperforms is that rent, and by extension net operating income, grows in core, supply-constrained markets. In contrast, most high-cap rate

markets see limited rent and income growth over the long run (however, these markets may see spikes from short-term imbalances). Remember, though, that core investing should be a long-term strategy and not based on market timing. So why would a long-term investor want to own an asset that has a high chance of declining in value over their holding period?

Three, core investors are not getting paid enough to take on the risks of entering into non-core markets. Over our analysis period, Investor C’s core portfolio returned 1.4 percent per unit of risk annually, while Investor B received returns of 1.3 percent per unit of risk. Investor B held a portfolio that exposed him to market timing risk, backfilling risk and supply risk, yet received lower returns than Investor C’s portfolio that faced less of these risks.¹⁵ However, this runs counter to the way in which we think about risk. Instead, we would expect Investor B to receive higher returns in order to compensate him for these heightened risks; once again, we wonder why a core investor would seek to “head up the risk curve” into these markets.

Display 4: Portfolio Returns over Time

Index, 100 = Quarter 0



Source: NCREIF. Data as of 3Q 2014.

¹⁴ Although Los Angeles overall does not rank highly in our final criterion, West Los Angeles, where many institutional properties are located, has historically seen an average vacancy rate that would place it into the top 5.

¹⁵ We define a unit of risk as the annualized standard deviation of total returns. Thus, this calculation is Total Return/Annualized Standard Deviation of Total Return.

So what to do when investing in core office?

With this statistical beeswax plugging your ears, should you sail closer to the alluring sounds of higher yields, or should a core investor stick to the strategy and block out the Sirens? We suggest investors chart the following course.

1. Play the odds

The bad news is that no one can accurately predict the future. The good news is that while the future will not be the same as the past, it will probably rhyme. Therefore, we can utilize the lessons of the past three decades to make educated guesses on which investments will likely provide the best returns in the future. The message is pretty clear—primary office markets have routinely shown themselves to have better odds at realizing appreciation gains over 10- and 20-year holding periods than secondary markets.

2. Focus on core for the long run

While higher cap rates may sound attractive—especially in a low yield environment—we would warn against chasing yield. In secondary markets, investors are forced to take on additional risk from market timing. As we stated earlier, market timing is difficult, and nearly impossible to do consistently. Since core strategies aim to provide steady returns, investors should put less weight on market timing in a core strategy. Instead, core investors should buckle down for the long run and take solace in the fact that over the long term, core real estate has historically not only held up, but outperformed its peers.

3. Chase appreciation, not yield

We believe today's historically low volatility will eventually come to an end. When it does, appreciation gains will cease to be driven by cap rate compression, and instead will rely entirely on NOI growth (which has historically been the main driver of asset appreciation). Thus, with expectations of NOI growth becoming increasingly important to core real estate returns, we would prefer to stick with markets that have a strong historical tendency to appreciate instead of attempting to play the market timing game.

Just like in *The Odyssey*, a core investor's journey is a long one that will undoubtedly require them to sail through an economic storm or two. We, therefore, reiterate that core investors should resist the temptation of the Sirens' song to "chase yield into secondary markets." We have already seen how this plays out, shipwrecked on the rocks. Instead, as we have shown, core investors should stay the course and chase appreciation—this has historically been the best way to protect capital and realize long-term outperformance.

The definition of a core market should not change with the whims and perceptions of market participants. Rather, core markets are characterized by three structural traits: liquidity, market depth and supply constraints. To chase yields in secondary markets by expanding one's definition of core has historically been a poor strategy. Instead, it is when market discipline is declining (and leading participants into secondary markets) that one should be most wary of deviating from strategy.

INDEX DEFINITIONS

NCREIF National Property Index. The NCREIF National Property Index is a quarterly time series composite total rate of return measure of investment performance of a very large pool of individual commercial real estate properties acquired in the private market for investment purposes only.

NCREIF Fund Index - Open End Diversified Core Equity. The NCREIF Fund Index - Open End Diversified Core Equity (NFI-ODCE) is the first of the NCREIF Fund Database products and is an index of investment returns reporting on both a historical and current basis the results of 33 open-end commingled funds pursuing a core investment strategy, some of which have performance histories dating back to the 1970s. The NFI-ODCE Index is capitalization-weighted and is reported gross of fees. Measurement is time-weighted. NCREIF will calculate the overall aggregated Index return.

IMPORTANT DISCLOSURES

The views and opinions are those of the authors as of April 2015, 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 all the strategies and products that the Firm offers.

There is no guarantee that any investment strategy will work under all market conditions, and each investor should evaluate their ability to invest for the long-term, especially during periods of downturn in the market. There are important differences in how the strategy is carried out in each of the investment vehicles. Your financial professional will be happy to discuss with you the vehicle most appropriate for you given your investment objectives, risk tolerance, and investment time horizon.

The document has been prepared solely for information purposes and does not constitute an offer or a recommendation to buy or sell any particular security or to adopt any specific investment strategy. The material contained herein has not been based on a consideration of any individual client circumstances and is not investment advice, nor should it be construed in any way as tax, accounting, legal or regulatory advice. To that end, investors should seek independent legal and financial advice, including advice as to tax consequences, before making any investment decision.

Except as otherwise indicated herein, the views and opinions expressed herein are those of Morgan Stanley Investment Management, and are based on matters as they exist as of the date of preparation and not as of any future date, and will not be updated or otherwise revised to reflect information that subsequently becomes available or circumstances existing, or changes occurring, after the date hereof.

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History Lessons

Watch someone blow up a balloon and soon they will begin to tightly close their eyes, risking explosion in pursuit of full size. While the current market has not quite reached that point yet, it has inflated and valuations are elevated. History teaches us that periods of elevated valuations are not sustainable if these valuations fail to be underpinned by progressive earnings or fundamentals. The Dutch tulip mania in the 17th century, the South Sea bubble 40 years later, the Wall Street crash of the last century or even more fresh in our minds, the two crises we have experienced in the last 15 years—the dot-com boom and the debt-fueled binge of the 2000s—all tell us that, in hindsight, paying significant prices that struggle for justification typically ends in tears.

Display 1 shows the P/E (price to earnings), the price you have to pay expressed as the multiple for the earnings, of the MSCI World Index. It peaked at 15.5x estimated earnings prior to the 2008 credit crisis, and has since risen even further.

Considering a much longer historical period, and using the Schiller P/E instead, which measures the price you have to pay for 10-year average earnings for the S&P, we are also near the summit, a full standard deviation from the mean since 1955.

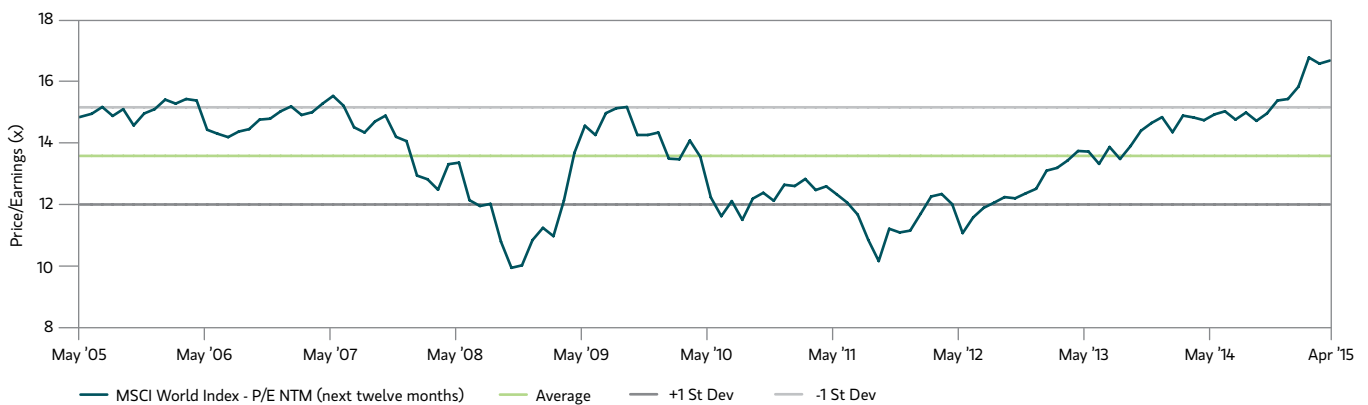
Either the estimation of earnings is too low and earnings will need to grow to justify their P/Es, or the P/E is too rich and will need to fall to better accommodate the outlook for earnings.

AUTHOR



ALISTAIR CORDEN-LLOYD
Executive Director

Display 1: P/E MSCI World Index



Source: FactSet. Data as of April 30, 2015.

Provided for illustrative purposes only. There is no guarantee that forecasts and estimates will come to pass due to changing market and economic conditions.

The permanent destruction of capital occurs when both the earnings and the multiple you pay for the earnings falls away. Truly long-term investors seek to avoid this combination, instead choosing companies whose economics and resilience can help compound their way through occasional market-reversing multiple pressure. Warren Buffet and Charlie Munger are classic examples of such patient investing. Buying quality companies at reasonable prices that consistently invest in their business over many years, driving growth to generate profits that can be reinvested to drive further growth, far outweighs the short-term benefits of buying a stock and then flipping it for a quick profit after a brief rise. Nothing beats compound interest. Albert Einstein is said to have called it the “eighth wonder of the world.”

This philosophy of patient investing in quality, dependable companies, by definition, prevents the investor being swept up by the madness of crowds driven by the prospect of short-term gains, the pursuit of themes, or the anxiety of being left behind. It is a wonder that, given such a simple investment philosophy works, it isn't something that attracts the crowd in droves.

Not only do we seem unwilling to learn from mistakes—bubbles—we also seem unwilling to learn from success. It would, however, be flippant to suggest that a long-term, high-quality investment strategy for equities is simple. “Long-term” is not just about time, it is about commitment. Additionally, quality needs definition and boundaries.

Our client tenure is a source of pride within the International Equity team. We are fortunate our clients extend to us the freedom to invest for the long term in order to allow compounding the potential time to bear fruit, focusing on a journey, not a point in time.

We look for a similar focus in the management teams that run the companies we invest in. After all, they should be managing the company for the owners—the shareholders—so their interests and those of our clients should be aligned. Executive incentive and remuneration programs can be instructive. For example, consider incentives based on earnings per share growth. This is a metric that can be manipulated for short-term gain. In this era of low interest rates and typically strong balance sheets, mergers and acquisitions (M&A) activity can buy extra earnings with little regard to price and potentially at lower returns. The company management can benefit while long-term shareholders risk suffering a lower-quality business with an impaired compounding profile. Buybacks can achieve the same short-term reward. Earnings can rise, but the company might not actually grow. In our opinion, this is pure financial engineering. Another “technique,” more typical for consumer businesses, can be cutting advertising and promotion. Again, earnings rise, but long-term, the brands that drove the earnings become weaker, resulting in the compounding engine beginning to stall.

We prefer to see management teams focus on return on capital employed ROCE. We believe this imparts discipline and fosters long-term decision making. ROCE measures the ratio of operating income (before interest and tax) to the operating capital employed (essentially the property, plant and equipment together with net working capital.) This directs management's focus to maintaining and improving the profitability in the profit and loss (P&L), while at the same time ensuring that inventory, receivables and payables are managed as efficiently as possible. It also encourages an efficient manufacturing infrastructure, owing to the required focus on property, plant and equipment. Do all of this well and the potential result is maximizing the free cash flow capacity of the business, free cash flow which can be re-invested or returned to shareholders. Indeed, capital allocation is another reason why ROCE is such a powerful tool when combined with measuring return on investment (ROI). Together these ratios help concentrate management's mind on how best to allocate capital. To maintain or improve returns, they must invest at an equal or higher rate of return than the current business, otherwise the quality of the business is impaired and the use of cash sub-optimal. If they do buy a lower-return asset, management must, over time, prove that this acquisition can become as good as, or better than, the existing business.

Display 2: **Schiller P/E**



Source: FactSet. Data as of April 30, 2015.

Schiller P/E includes S&P 500 Composite Index, Price Earnings (P/E), Ratio United States.

Provided for illustrative purposes only.

High and sustainable ROCE is a cornerstone of our definition of quality, together with robust balance sheets and limited capital intensity. Capital intensive, low-return businesses tend to struggle to both invest in their growth and throw off surplus cash at the same time. Typically, their growth requires balance sheet funding or significantly increased capital expenditure, such as a utility needing a new power plant, a telecoms company purchasing new spectrum or a gas company laying an extensive distribution network. In the process, they are less able to generate surplus free cash flow to return to shareholders or to re-invest.

Low-return companies generally have lower margins with higher depreciation charges because of their capital intensity, so investing in organic growth through the P&L is that much harder. Their ability to organically compound is relatively lower and their vulnerability in drawdowns is greater owing to lower margins and higher operating leverage.

Companies with sustainably high returns on capital employed, however, are typically able to grow and generate surplus free cash flow, rather than grow at the expense of it. Their growth is organic, a product of their relatively significant investments in advertising and promotion as well as through research and development supported by their high margins.

So in this challenging world of rising valuations across all asset classes and sectors, where the risk of draw-downs grows as multiples increase, we believe that acknowledging a little bit of history is a worthwhile lesson. Look for high-quality, high-return companies that have the potential, owing to their resilient economics and ability to compound, to ride out potential market storms. Seek out companies that are well managed with a focus on maintaining and improving sustainably high returns. Avoid those that, through their inferior economics, their short-term focus, or their poor allocation of capital, could present both multiple and earnings risk.

Looking back through time, it is easy to scoff at bubble behavior, to lament at people paying crazy prices for tulip bulbs or internet ideas, for negative or low real-yielding bonds. Humans always want things that seem hard to get, especially if everyone else seems to want them too. It is only afterwards that we stand back, shake our heads and wonder what on earth we were thinking—especially when we did not even need the benefit of hindsight to know that a proven alternative exists.

IMPORTANT INFORMATION

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There is no assurance that a portfolio will achieve its investment objective. Portfolios are subject to market risk, which is the possibility that the market values of securities owned by the portfolio will decline and that the value of portfolio shares may therefore be less than what you paid for them. Accordingly, you can lose money investing in this portfolio. Please be aware that this portfolio may be subject to certain additional risks. In general, **equities securities'** values also fluctuate in response to activities specific to a company. Investments in **foreign markets** entail special risks such as currency, political, economic, market and liquidity risks. The risks of investing in **emerging market** countries are greater than the risks generally associated with investments in foreign developed countries. Investments in **small and medium-capitalization** companies tend to be more volatile and less liquid than those of larger, more established, companies. **Derivative instruments** may disproportionately increase losses and have a significant impact on performance. They also may be subject to counterparty, liquidity, valuation, correlation and market risks. **Illiquid securities** may be more difficult to sell and value than public traded securities (liquidity risk).

All investing involves risk including the risk of loss. Past performance is no guarantee of future results.

There is no guarantee that any investment strategy will work under all market conditions, and each investor should evaluate their ability to invest for the long-term, especially during periods of downturn in the market. There are important differences in how the strategy is carried out in each of the investment vehicles. Your financial professional will be happy to discuss with you the vehicle most appropriate for you given your investment objectives, risk tolerance, and investment time horizon.

Please consider the investment objective, risks, charges and expenses of the fund carefully before investing. The prospectus contains this and other information about the fund. To obtain a prospectus, download one at morganstanley.com/im or call 1-800-548-7786. Please read the prospectus carefully before investing.

Separate accounts managed according to the Strategy include a number of securities and will not necessarily track the performance of any index. Please consider the investment objectives, risks and fees of the Strategy carefully before investing. A minimum asset level is required. For important information about the investment manager, please refer to Form ADV Part 2.

DEFINITIONS

Standard deviation (St Dev) shows how much variation or dispersion from the average exists. In finance, standard deviation is applied to the annual rate of return of an investment to measure the investment's volatility. Standard deviation is also known as historical volatility and is used by investors as a gauge for the amount of expected volatility.

MSCI World Index. The MSCI World Index captures large and mid cap representation across 23 Developed Markets (DM) countries. With 1,631 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in each country.

The cyclically adjusted price-to-earnings ratio, commonly known as CAPE, Shiller P/E, or P/E 10 ratio, is a valuation measure usually applied to the US S&P 500 equity market. It is defined as price divided by the average of 10 years of earnings (moving average), adjusted for inflation.

S&P 500 Index. The S&P 500 is an index of 500 stocks chosen for market size, liquidity and industry grouping, among other factors. The S&P 500 is designed to be a leading indicator of U.S. equities and is meant to reflect the risk/return characteristics of the large-cap universe.

New Dimensions in Asset Allocation

During the last few years, investors witnessed nearly unprecedented volatility in the value of their portfolios. For example, during the 2008 calendar year, the average private pension fund declined by 26 percent, while the average endowment fell by 20 percent.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 to 30 percent 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.

The views expressed herein are those of the Portfolio Solutions Group ("PSG") and are subject to change at any time due to changes in market and economic conditions. The views and opinions expressed herein are based on matters as they exist as of the date of preparation of this piece and not as of any future date, and will not be updated or otherwise revised to reflect information that subsequently becomes available or circumstances existing, or changes occurring, after the date hereof. The data used has been obtained from sources generally believed to be reliable. No representation is made as to its accuracy. An asset allocation strategy may not prevent a loss or guarantee a profit.

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

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Executive Director

While no model is perfect, the Portfolio Solutions Group (“PSG”) 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 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, PSG 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.

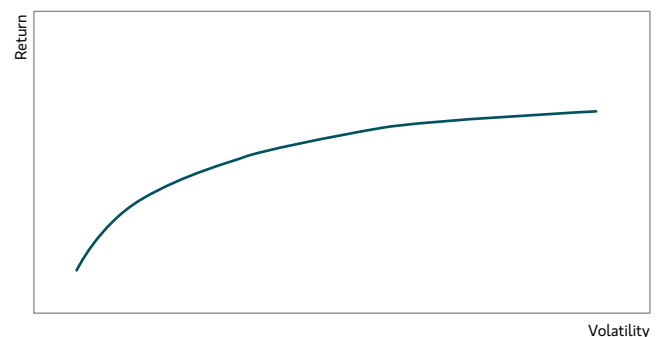
The remainder of this publication follows three sections. It first provides more detail on the limitations of traditional models, and the need for a new asset allocation approach. It then introduces PSG’s asset allocation framework, both at a theoretical and practical level. Finally, it uses several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

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.

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



This is for illustrative purposes only and is not meant to depict the performance of any specific investment.

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

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.

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.

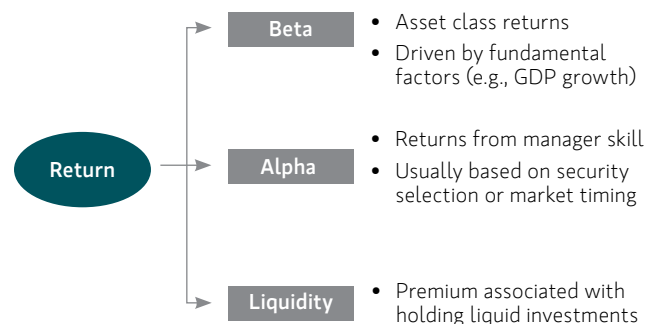
Accounting for multiple sources of return

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.

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.

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 PSG 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*).

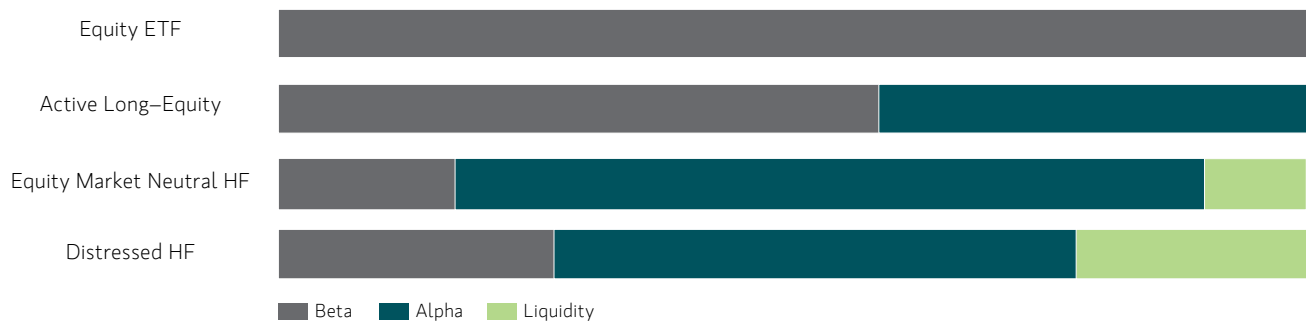
Display 2: Sources of Return



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.

Display 3: Sources of Return for Sample Investments⁷



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 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 PSG 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.

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. PSG 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, PSG 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 Source⁸

	IMPORTANCE AS A DRIVER OF RISK		
	VOLATILITY	SKEW	KURTOSIS
Beta	High	Moderate	Moderate
Alpha	High	Low	Low
Liquidity	High	High	High

Past performance is not indicative of future results. The results above are not intended to predict the performance of any specific investment.

Indices are unmanaged and their returns generally do not include sales charges or fees, which would lower performance. It is not possible to invest directly in an index.

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.

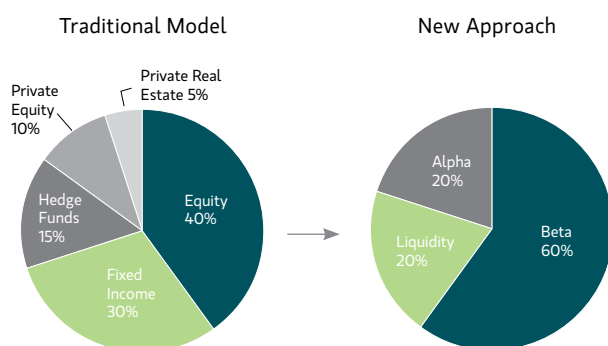
⁷ Source: PSG.

⁸ Source: 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.

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, PSG 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 Allocation⁹



The allocations are shown for illustrative purposes only.

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 percent during 2007, and then spiked to well over 50 percent 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* on the next page indicates, the 10-year return for U.S. equity was over 11 percent before the 2008 financial crisis, but below 4 percent thereafter.

- 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.

PSG's portfolio construction approach

PSG 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.

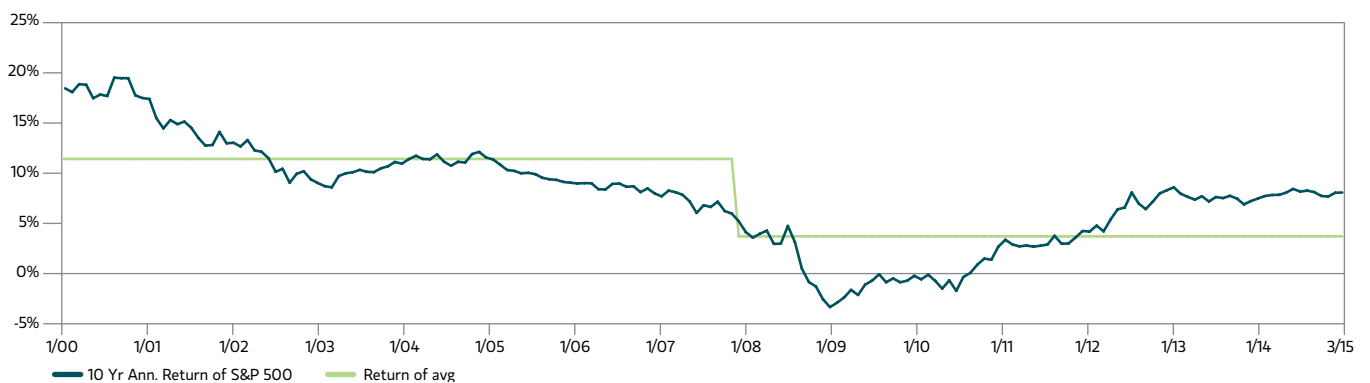
Extensions across source of return – Instead of assuming that all asset classes behave in the same way as equity and fixed income, our framework recognizes that each investment consists of a unique combination of alpha, beta, and liquidity. When making portfolio decisions, PSG decomposes investments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

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.

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.

Display 5: Annualized 10-Year S&P 500 Returns (Measured Over Subsequent Years)¹¹



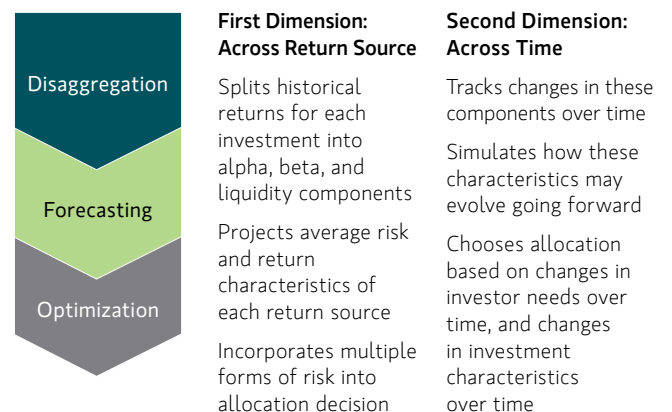
risks, returns, and correlations across investments. It then considers these potential changes as well as an investor’s needs over multiple periods when choosing an optimal portfolio. This approach may help avoid portfolios that provide attractive average characteristics, but may deviate from these characteristics significantly during any given period.

Like traditional optimization, PSG 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. PSG applies this process across sources of return, as opposed to traditional optimization, which focuses on total return. PSG then extends each of these stages across time. *Display 6* illustrates the process, and provides a brief description of each stage.

PSG 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.

PSG 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. PSG 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.

Display 6: PSG Asset Allocation Framework



¹¹ Source: Underlying S&P 500 total return data obtained from Bloomberg. Computation of 10-year forward returns performed by PSG. 10-year returns illustrated in *Display 5* span January 2000 through March 2015 timeframe. **Past performance is not indicative of future results.** The results above are not intended to predict the performance of any specific investment. It is not possible to invest directly in an index.

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. PSG 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.

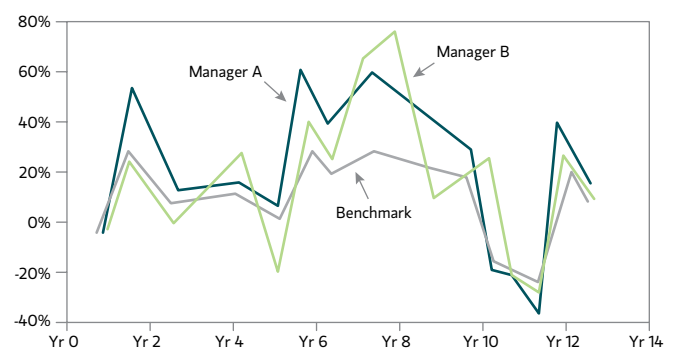
Historically, investors have defined alpha as the excess of a manager's return relative to a benchmark. For example, if the manager generates a 10 percent return, and the S&P 500 generates a 9 percent return during the same period, investors would attribute 100 bps of alpha to the manager. This approach,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

¹² Due to various uncertainties regarding risks, PSG 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. All forecasts are speculative and may not come to pass due to economic and market conditions.

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%

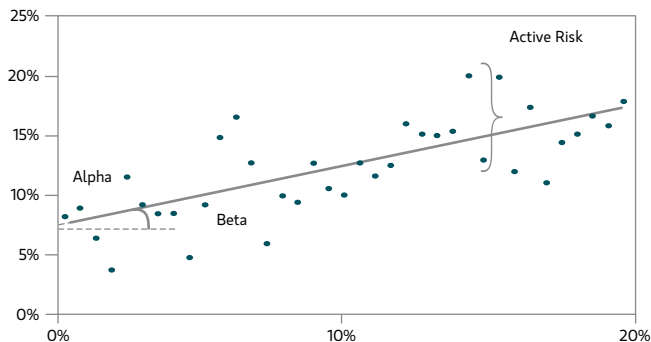
As indicated, Manager A outperforms B based on the conventional measures of alpha: over 14 years, this manager outperformed the benchmark by 6.1 percent, as compared to 4.9 percent for Manager B. Unfortunately, this type of analysis ignores how each manager outperformed the benchmark. A closer inspection 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.

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 the earlier part of Yr 10, 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 Manager¹⁴



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 percent 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.

¹⁴ The information is purely hypothetical and for illustrative purposes only and does not represent the performance of any specific investment. All forecasts are speculative and may not come to pass due to economic and market conditions.

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.

PSG 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.

¹⁵ In addition to evaluating managers based on their alpha, PSG 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).

Display 9: Estimate of Equity Long/Short Manager's Beta Over Time¹⁶

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* below 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.

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.

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.

Table 2: Return Disaggregation for Long/Short Hedge Fund Manager¹⁸

	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

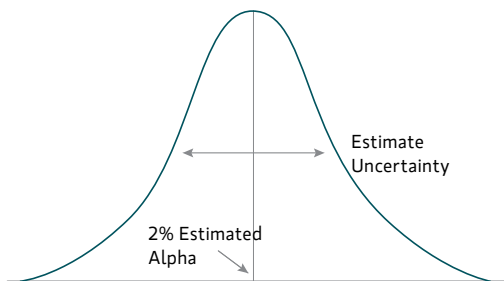
Forecasting – across return source

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.

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.

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.

Display 10: Estimated Historical Alpha and Uncertainty Surrounding Estimate¹⁹

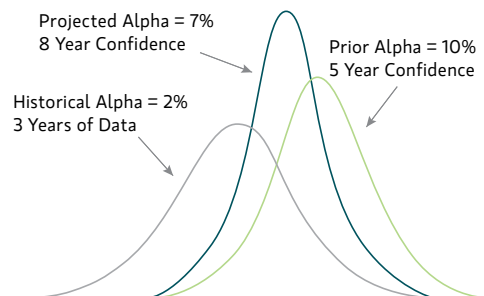


This technique applies to any source of return; for illustrative purposes, however, PSG shows how to apply this technique to forecasting a manager’s alpha. Consider a global macro manager who has historically generated 2 percent alpha. Using the historical data only, our best estimate of this manager’s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

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 percent alpha. Absent any historical

data regarding this particular manager, one may assume that this manager will also generate a 10 percent alpha. However, like the historical data, this 10 percent simply represents an estimate, and contains significant uncertainty.

Display 11: Example of Bayesian Forecasting Process²⁰



PSG 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 percent historical estimate, and 10 percent 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 percent estimate more heavily than the 2 percent estimate. In this example, we give more weight to the prior view, since the manager has a relatively short track record.

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, PSG may believe that U.S. equity will deliver long-term returns of 8 percent, but actual long-term returns could differ significantly from our

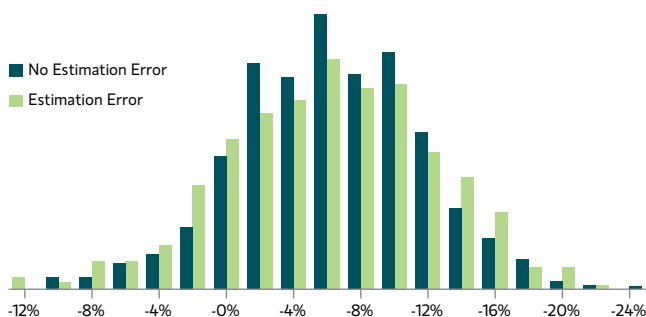
¹⁹ The information is purely hypothetical and for illustrative purposes only and does not represent the performance of any specific investment. All forecasts are speculative and may not come to pass due to economic and market conditions.

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

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*. PSG expects that the manager will generate a 7 percent 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: Return Distribution With and Without Forecast Risk²⁰



Display 12 compares the distribution of future returns for a manager with a projected 5 percent 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.

PSG 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.

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.

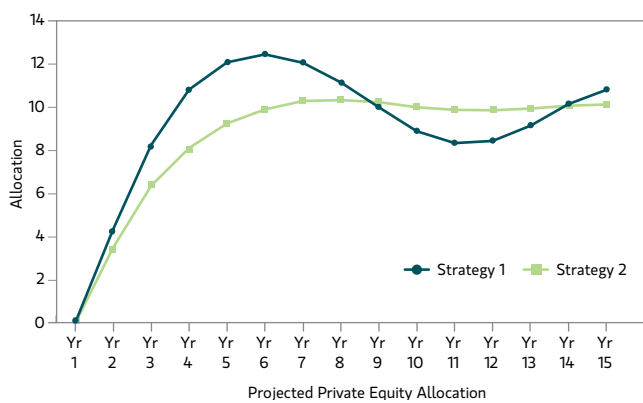
For this reason, investors need a framework that accounts for decision making over the entire investment horizon. They need to understand the cost of today's decisions in future periods, and account for this cost when constructing a portfolio.

PSG 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 percent 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.

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.

Display 13: Comparison of Commitment Strategies²³



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.

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 line in *Display 13* shows the allocations of such a strategy over time, which PSG 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 percent) most investors would prefer the second strategy as it leads to less volatility along the way.²⁴

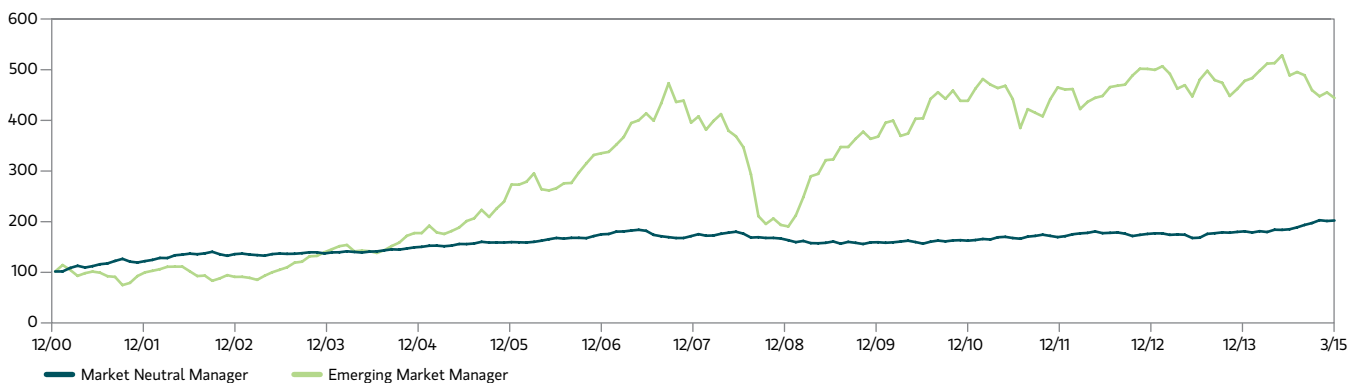
For investors, the critical question is whether the PSG approach outperforms traditional asset allocation. We believe that our framework helps investors in a number of ways.

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.

²³ The information is purely hypothetical and for illustrative purposes only and does not represent the performance of any specific investment. All forecasts are speculative and may not come to pass due to economic and market conditions.

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.

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



²⁵ Source: Return data for managers obtained from Bloomberg. For illustration only. Not indicative of expected return or performance of any strategy or manager. Data for chart spans January 2000 through March 2015 timeframe. Past performance is not indicative of future results.

Table 3: **Manager Return Attribution**²⁶

	EMERGING MARKET MANAGER			MARKET NEUTRAL MANAGER		
	RETURN	RISK	RETURN/RISK	RETURN	RISK	RETURN/RISK
Alpha	0.54%	4.74%	0.11	3.13%	5.06%	0.62
Beta	10.32%	22.73%	0.45	-0.24%	0.91%	-0.26
Total (excl. cash)	10.86%	23.10%	0.47	2.89%	6.12%	0.47

Past performance is not indicative of future results.

Second, by making allocation decisions across return sources, PSG'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, PSG'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.

However, investors should remember that all asset allocation approaches (including PSG's) are simplifications of reality. While PSG 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.²⁷

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. PSG'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.

²⁶ Source: Return data obtained from Bloomberg. Disaggregation based on proprietary return attribution models. For illustration only. Not indicative of expected return or performance of any manager or strategy.

²⁷ 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.

In this spirit, PSG 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 2000 through March 2015.

From a total return standpoint, the emerging market manager clearly outperformed over the period, returning 13.08 percent as compared to 5.11 percent for the market neutral manager. On a risk-adjusted basis the two managers performed comparably, both yielding a 0.47 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.

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 0.6, versus 0.1 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 53 percent loss. By contrast, the market neutral manager, whose performance depends much more heavily on security selection, was flat for the year. Investors who did not understand the contribution of alpha versus beta to each manager's total return may have overallocated to the emerging market equity manager, and ended up with excess beta risk.

Designing a strategic portfolio

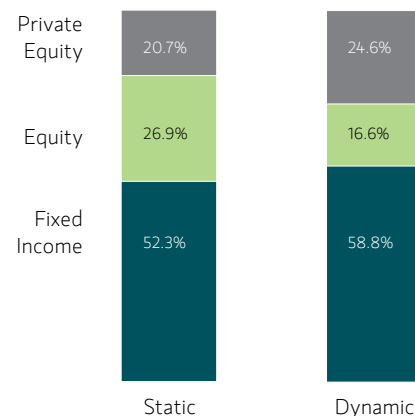
As discussed earlier, traditional optimization does not account for the cost of today's decisions in future periods. If investors are allocating to liquid assets, this cost may be minimal, because they can always change their portfolio in the future. However, when allocating to illiquid assets such as 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. PSG 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 Portfolios³⁰



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 that appropriately optimizes the allocations over time.

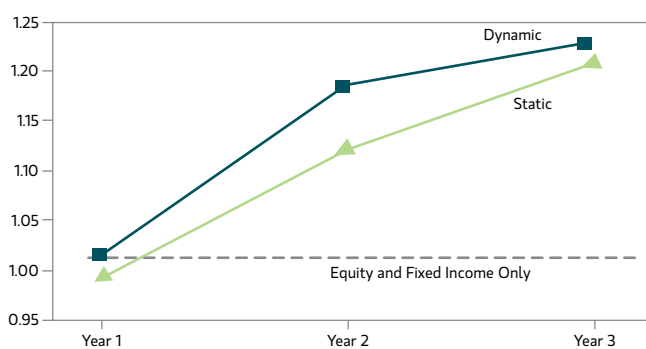
²⁸ In this example, PSG uses a finite horizon of three years.

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 information is purely hypothetical and for illustrative purposes only and does not represent the performance of any specific investment.

Display 16: Illustrative Comparison of Dynamic and Static Approaches³¹

Expected Risk-Adjusted Performance



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.

Risks of Alternative Investments

Alternative investments are speculative and include a high degree of risk. Investors could lose all, or a substantial amount, of their investment. Alternative instruments are suitable only for long-term investors willing to forgo liquidity and put capital at risk for an indefinite period of time.

Alternative investments are typically highly illiquid. Alternative investments often utilize leverage and other speculative practices that may increase volatility and risk of loss. Alternative investments typically have higher fees and expenses than other investment vehicles, and such fees and expenses will lower returns achieved by investors.

There is no assurance that the asset allocation strategies will be successful. Asset allocation and diversification do not eliminate the risk of loss. All forecasts and projections are speculative and may not come to pass due to economic and market conditions.

See the next page for important information.

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, PSG has developed a new asset allocation framework that extends traditional portfolio optimization in two ways: across sources of return, and across time. PSG 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 PSG's approach is no exception. For example, our approach would not have circumvented the problems that investors faced during 2008. That said, PSG'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.

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

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How to Lose the Winner's Game

January 14, 1986

As everyone now knows, most professional investment managers had difficulty matching the S&P 500's total return of 31.6 percent last year, with the average equity portfolio up around 28.5 percent. Furthermore, 1985 was the third straight year in which the median manager underperformed. In addition, for the second consecutive year, it was also tough to keep up with the Morgan Stanley Capital International World and EAFE Indexes. Fiduciaries, consultants, and the press are all happily disparaging professional investors as grossly overpaid underachievers, and indexing is again the cry. In fact, *Pensions & Investments Age* reports that the total of indexed assets leaped 70 percent in 1985 and projects another huge gain this year.

To add insult to injury, Charlie Ellis has written a new book (*Investment Policy: How to Win the Loser's Game*, published by Dow Jones Irwin) that is attracting a great deal of attention because it explains why managing money in an active fashion is "a loser's game." Charlie is an articulate, informed, and intelligent analyst of the investment business, but, in this case, I fault his timing and his perspective. He published his original Loser's Game article in the mid-seventies, right after the last bout of underperformance and in the midst of the previous wave of indexing. The timing was exquisitely wrong. I suspect it will be again.

AUTHOR



BARTON M. BIGGS
Former Managing Director

In his new book, Ellis argues that, as the professionals play an increasingly important role in the market, they have in effect become the market. Thus, by definition, their diligence and hard work are self-defeating, and they can't significantly outperform the popular averages or each other. "Their efforts to beat the market are no longer the most important part of the solution; they are the most important part of the problem." Furthermore, he points out that, while it is very difficult to beat the market, it is easy "while trying to do better, to do worse." The problem is compounded by size, which is the inevitable result of performance success; thus, it's a loser's game. He then goes on to discuss the crucial role of investment policy, and his thesis is sensible. It is a worthwhile book, and everyone involved in supervising or managing money should read it.

Still, I have a problem with Charlie's loser's game concept, and I think the trend toward investment socialism (which is what straight indexing is) in domestic and international equity portfolios is dead wrong. The anomalies in the indexes that have caused the professionals to fall short now will operate to produce superior relative performance by the majority of active portfolios, but that is another subject.

My point in this piece is that performance relative to the S&P 500 is cyclical and always has been. An owner of money pays a fee of 40 to 100 basis points to an investment manager to obtain over time an annual return that is a couple of hundred basis points higher than that provided by an index fund that costs 5 or 10 basis points. Compounding this extra return over long periods results in staggering wealth enhancements after payment of fees that are far greater than could be realized through mimicking the averages. Just as an example, over 31 years, John Templeton's shareholders have seen an investment of \$10,000 grow into \$632,469;

a comparable commitment in the Dow would have been worth only \$35,400. The results of some private investors are even more spectacular; for example, over 19 years, Pacific Partners achieved an average annual return of 32.9 percent overall—23.6 percent to the limited partners—versus 7.8 percent for the S&P. Over almost 16 years, Tweedy Browne's limited partners enjoyed a gain of 936 percent versus 238.5 percent for the S&P.

The fascinating thing, however, is that all of these superstars underperformed the S&P in 30 to 40 percent of the years studied. The only exception is Warren Buffett, whose partners had just one down year out of 11 when he retired from the fray in 1969. The New Horizons Fund, which admittedly has a good but not spectacular 25-year record, exceeded the S&P in only 13 of those years. Templeton underperformed about 40 percent of the time. None in the group always beat the S&P, probably because no one thought that was the primary objective. However, the underperformance in the down years was generally (but not always) small, and the positive differentials were large. Most of the lag occurred in years when the averages made big advances.

Furthermore, with only two exceptions, all of the great investors had long bouts (defined as three straight or three out of four consecutive years) of underperformance. Almost invariably, these bad periods were either preceded and/or followed by sustained bursts of spectacular returns. Obviously, to close your account after a cold spell would have been a costly mistake. By contrast, it would have been a better tactic to lighten up after four or five vintage years. Relative performance runs in three- to five-year cycles, probably related to the manager's style and the dominant themes of a particular market.

Some of the history is fascinating. An extreme example is Pacific Partners, which, after providing gains for investors of 120, 114, and 65 percent in the late sixties, had returns below those of the S&P for the next four years and in five out of six years in the early and mid-seventies. In 1976, it got back on track with a 127.8 percent rise. Charles Munger had a 5-year period in which he lagged in 4, but over a 13-year span, he achieved a compound return of 19.8 percent a year on his portfolio versus 5 percent, for the index. Tweedy Browne had a spell in which it underperformed the S&P three out of four years. The Sequoia Fund lagged the S&P for its first three-and-a-half years but has provided an annual return more than eight percentage points higher than the S&P's over its 16-year history. Templeton has had two three-year underperformance cycles and one run of nine straight years outpacing the S&P. I discussed his ranking variations in last week's *Investment Perspectives*. The New Horizons Fund underperformed for its first four full years in existence.

The returns achieved by the superstars cannot be attained by us mortals. Also, there is no question that size becomes an impediment, although at different levels for different folks. I believe that, over a five- to seven-year cycle, the average manager can provide annual returns that are two to three percentage points above those of the index. Obviously, as is true with the superstars, these satisfactory results will not follow a smooth progression; there will be both cold periods and hot spells.

Shifting from an active manager to an index fund is similar to changing managers. In the assets we supervise, we never close an account because of a bout of underperformance by a previous achiever if we are convinced that the investment management firm involved has its head intact and has not been demoralized, has kept its core people, has stuck to its style, and has generally maintained its character. In moving from a good cold manager to a good hot one, there is the risk of being whipsawed twice. In fact, we would be inclined to give the cold guys more money. Similarly, I am convinced that switching from good active managers to index funds at this time is the way to lose at what is, over time, a winner's, not a loser's, game.

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Portfolio Strategy: Spending Rebounds Under Inflation

Introduction

From 2009 to 2014, the U.S. equity market rebounded over 200 percent. In spite of this historic rally, for many “spending funds,” such as endowments and foundations, it took five years to 2014 to recover to their 2007 peak asset level. One natural question is how these funds would have fared under “normal” market returns.

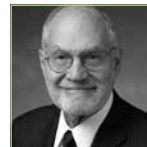
In a previous report, we developed a beta-based model that related fund performance returns to the underlying equity returns. By incorporating more standard return expectations into this model, we found that a fund’s recovery could have easily taken 10 years, i.e., more than twice as long—even in nominal terms!

The situation is even more challenging in inflation-adjusted terms, which is the ultimate concern of funds that hope to maintain their real spending power over time. Unfortunately, the combination of spending and inflation may have a highly toxic effect on the recovery process.

For example, with only 5 percent spending and no inflation, a 5 percent equity premium would be sufficient for a 10-year recovery from a market loss on the order of what happened in 2008. However, after incorporating a modest 2 percent inflation into our model, the same 10-year recovery could be achieved only by assuming an extraordinary 9 percent premium or by reducing spending to a 4 percent rule.

In general, apart from spending reductions, very high equity risk premiums or very low inflation rates were found to be necessary for recovery in real terms over reasonable time horizons.

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Thus, funds with real spending requirements on the order of 5 percent appear to have a special vulnerability to substantial market losses, a vulnerability that has largely been obscured by the exceptional market performance of the past several years.

Summary

We thank Dr. Stanley Kogelman (who is not a member of Morgan Stanley’s Research Department) for his important contributions to the development of the mathematics and the research in this report. Unless otherwise indicated, his views are his own and may differ from the views of the Morgan Stanley Research Department and from the views of others within Morgan Stanley.

From 2009 to 2014, the U.S. equity market rebounded over 200 percent. In spite of this historic rally, for many “spending funds”, such as endowments and foundations, it took five years to 2014 to recover to their 2007 peak asset level. One natural question is how these funds would have fared under “normal” market returns.

In a previous report, we developed a beta-based model that related fund performance returns to the underlying equity returns. By incorporating more standard return expectations into this model, we found that a fund’s recovery could have easily taken 10 years, i.e., more than twice as long—even in just nominal terms!

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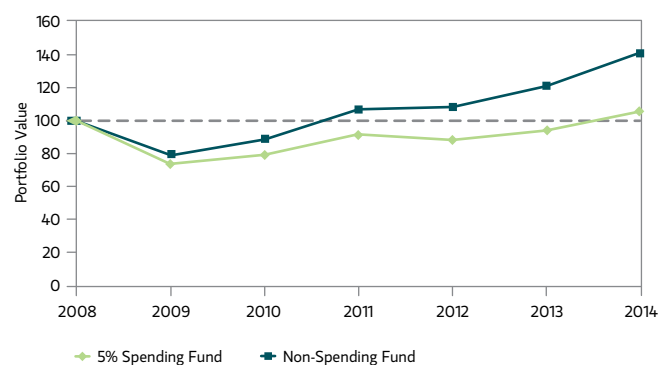
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Thus, funds with real spending requirements on the order of 5 percent appear to have a special vulnerability to substantial market losses, a vulnerability that has largely been obscured by the exceptional market performance of the past several years.

Historical Loss and Recovery for Endowment Funds vs Inflation

To study loss/recovery effects in diversified portfolios, we used the Cambridge Associates 2000 to 2014 fiscal year returns for U.S. University endowment funds with assets greater than \$1B. In *Display 1*, these fiscal year returns are compounded to generate cumulative asset values for both a hypothetical non-spending endowment and a fund with an assumed annual spend rate of 5 percent.

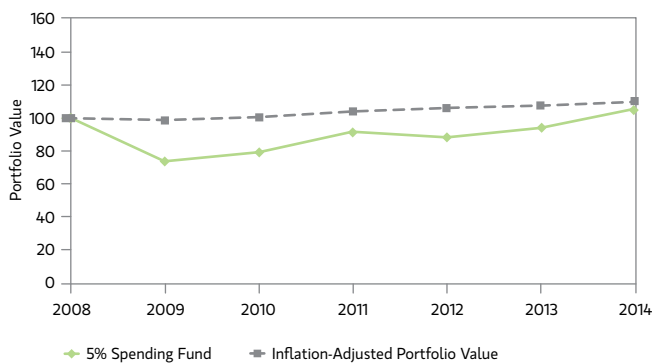
Display 1: Cumulative Asset Values for a Hypothetical Non-Spending Fund and a 5 Percent Spending Fund



Source: Endowment data as reported to Cambridge Associates LLC, Morgan Stanley Research.

The cumulative linking of the Cambridge fiscal year returns shows that a hypothetical non-spending endowment fund would have enjoyed a short three-year recovery back to its peak level following the 2008 drop. The 5 percent spending requirement increases the recovery time to seven years.

Display 2: Cumulative Asset Values for a 5 Percent Spending Fund vs an Inflation-Adjusted Portfolio



Source: Endowment data as reported to Cambridge Associates LLC, Morgan Stanley Research.

In order to see how the 5 percent spending fund recovered on a real basis, *Display 2* shows an inflation-adjusted portfolio that begins at 100 and grows with the historical CPI over this period. With the 5 percent spending requirement, the endowment fund would not have quite recovered in real dollar terms as of June 2014.

A Loss/Recovery Model for Real Asset Values

In this section, we describe our loss recovery model. This model separates equity risk premiums into a prerecovery and post-recovery period. For simplicity, the model assumes an instantaneous drop in equities followed by a recovery process of various lengths.

Once a recovery time for equities is specified, the corresponding total return can be determined and the prerecovery equity risk premium can then be found by subtracting an assumed 2 percent risk-free rate. For example, a 7.7 percent total return would be needed to achieve a 3-year equity recovery from a 20 percent loss, implying a 5.7 percent equity risk premium over the course of the recovery. After the recovery period, the equity total return is based upon three distinct assumed risk premiums: 5 percent, 7 percent and 9 percent.

Display 3 illustrates how this model works for the case of an instantaneous 20 percent equity loss followed by a 3-year recovery period. The post-recovery equity return is assumed to be 9 percent, consisting of an equity risk premium of 7 percent and a 2 percent interest rate (IR). To provide a more optimistic example for the diversified portfolio, we intentionally use a heroic set of assumptions for this illustration: a 7 percent risk premium x 0.6 beta plus a 2 percent alpha for a 8.2 percent portfolio return.

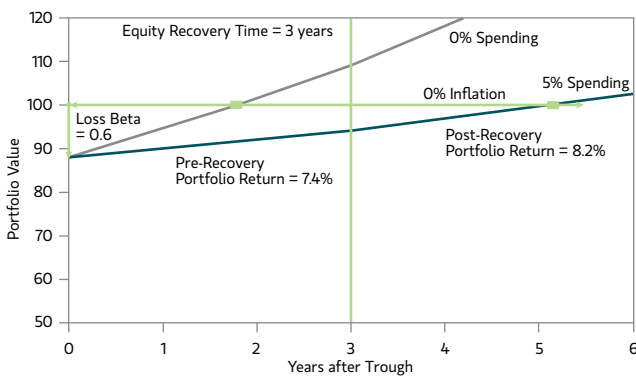
Display 3: Loss/Recovery Model

	EQUITY	PORTFOLIO
Instantaneous Loss	-20.0%	0.6 Beta x -20% = -12%
Pre-Recovery Returns		
Assuming 3-Year Recovery Time	7.7%	
Risk Premium	5.7%	0.6 Beta x 5.7% = 3.4%
IR	2.0%	2.0%
Alpha	NA	2.0%
Total Return	7.7%	7.4%
Post-Recovery Returns		
Risk Premium	7.0%	0.6 Beta x 7% = 4.2%
IR	2.0%	2.0%
Alpha	NA	2.0%
Total Return	9.0%	8.2%

Source: Morgan Stanley Research.

In order to see how quickly the portfolio recovers on a nominal basis, we analyze a zero percent inflation environment for both zero percent and 5 percent spending cases. Also, this assumption of percentage-based spending allows for reduced “dollar spending” at the lower asset values that follow the initial loss event. In the 0 percent spending case, the portfolio’s loss of 12 percent actually allows for a 2-year recovery, i.e., faster than the 3-year recovery assumed for equities. With 5 percent spending, the portfolio’s recovery time is extended to 6 years.

Display 4: Portfolio Recovery Times with Zero Percent Inflation



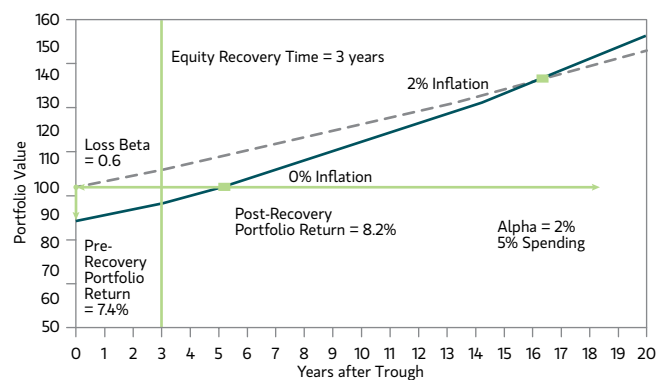
Source: Morgan Stanley Research.

Display 5: Portfolio Recovery Times with 0 Percent Inflation

EQUITY		PORTFOLIO	
Market Loss	20%	Loss Beta	0.6
Recovery Time	3 Years	Recovery Beta	0.6
IR	2%	Alpha	2%
		Inflation	0%
		Spending	
		0%	5%
Post-Recovery Risk Premium	Post-Recovery Portfolio Return		
5%	7.0%	2	7
7%	8.2%	2	6
9%	9.4%	2	5

Source: Morgan Stanley Research.

Display 6: Portfolio Recovery Times with 2 Percent Inflation



Source: Morgan Stanley Research.

Display 7: Portfolio Recovery Times with 2 Percent Inflation

EQUITY		PORTFOLIO	
Market Loss	20%	Loss Beta	0.6
Recovery Time	3 Years	Recovery Beta	0.6
IR	2%	Alpha	2%
		Inflation	2%
		Spending	
		0%	5%
Post-Recovery Risk Premium	Post-Recovery Portfolio Return		
5%	7.0%	3	-
7%	8.2%	3	16
9%	9.4%	3	9

Source: Morgan Stanley Research.

Display 5 looks at the recovery times on a nominal basis for the model portfolios for equity risk premiums of 5 percent, 7 percent and 9 percent. We will concentrate on an equity market loss of -20 percent and an equity market recovery time of 3 years. The loss beta is assumed to be 0.6 with a recovery beta of 0.6. For the zero percent spending case, with the (generous) 2 percent alpha, the portfolio is able to recover

within the initial 3-year equity recovery period and so the post-recovery risk premiums become irrelevant. However, in the 5 percent spending cases, the portfolio’s recovery stretches beyond the initial 3 years and so the higher equity premiums have an impact.

Display 6 concentrates on the 5 percent spending case but adds an inflation-adjusted portfolio value using a 2 percent inflation rate. Recovery is defined to be when the portfolio regains its initial value on an inflation-adjusted basis. With this assumed 2 percent inflation, the recovery time increases dramatically from 6 to 16 years.

It is important to note that this long recovery time occurs with the 7 percent assumed risk premium. As shown in *Display 7*, under a lower assumed risk premium of 5 percent and 2 percent inflation, the portfolio would never recover in real terms since the 7 percent portfolio return exactly matches the 5 percent spending plus the 2 percent inflation. In contrast, a 9 percent risk premium reduces the recovery time to nine years.

Loss Recovery Model with Stress Betas

Under the assumption that the hypothetical fund reflected a typical diversified portfolio, the previous example allowed a 2 percent alpha return. However, our earlier studies showed that such diversified funds would more likely incur higher loss betas (on the order of 0.8) during a stress market event. *Display 8* assumes this loss beta of 0.8 and shows the recovery times for both the zero percent and 5 percent spending cases. In the zero percent spending case, the higher loss beta does not significantly impact the recovery time. In the 5 percent spending case, the recovery time increases to 22 years for a 0.8 loss beta vs 16 years with the 0.6 loss beta. As was the case with the 0.6 loss beta, the 5 percent spending portfolio would never recover in real terms with a 5 percent risk premium.

The key point from *Display 8* is that with only a 5 percent equity premium, a 7 percent portfolio return, 5 percent spending and 2 percent inflation, the portfolio would never grow in real terms. Even a higher 7 percent risk premium (which translates into a 8.2 percent portfolio return) only enables the portfolio to recover in (a painfully long) 22 years.

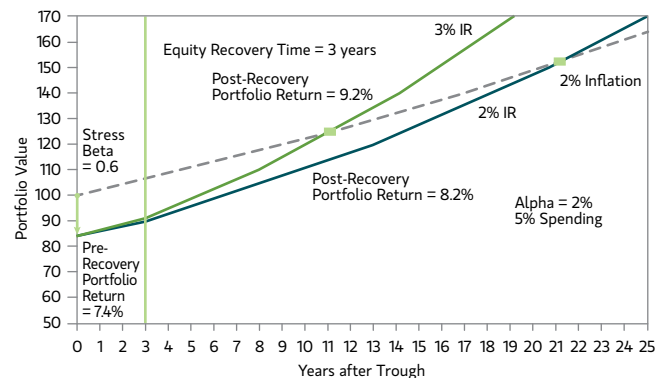
Display 8: Portfolio Recovery Times with 2 Percent Inflation and 0.8 Loss Beta

EQUITY		PORTFOLIO	
Market Loss	20%	Loss Beta	0.8
Recovery Time	3 Years	Recovery Beta	0.6
IR	2%	Alpha	2%
		Inflation	2%
		Spending	
		0%	5%
Post-Recovery Risk Premium	Post-Recovery Portfolio Return		
5%	7.0%	4	–
7%	8.2%	4	22
9%	9.4%	4	11

Source: Morgan Stanley Research.

Another key variable that will impact the recovery times is the level of interest rates. The previous examples have all assumed 2 percent interest rates. In *Display 9*, a 3 percent interest rate is compared to the 2 percent interest rate case. The 3 percent interest rate will increase the portfolio return to 9.2 percent and reduce the portfolio recovery time to 12 years.

Display 9: Portfolio Recovery Times with 3 Percent Interest Rates



Source: Morgan Stanley Research.

Display 10 compares the recovery times for the diversified portfolio with 3 percent interest rates and equity risk premiums of 5 percent, 7 percent and 9 percent. With 2 percent inflation and a 5 percent risk premium, the portfolio can now recover (although it will take an extremely long period of 25 years).

Display 10: Portfolio Recovery Times with 3 Percent Interest Rates

EQUITY		PORTFOLIO	
Market Loss	20%	Loss Beta	0.8
Recovery Time	3 Years	Recovery Beta	0.6
IR	3%	Alpha	2%
		Inflation	2%

Post-Recovery Risk Premium	Post-Recovery Portfolio Return	Spending	
		0%	5%
5%	7.0%	4	25
7%	8.2%	4	12
9%	9.4%	4	9

Source: Morgan Stanley Research.

As shown in *Display 11*, the recovery times do not appear to be highly sensitive to the level of market loss. A 30 percent market loss only slightly increases the portfolio recovery time in the 5 percent risk premium case but has minimal impact on the 7 percent and 9 percent risk premium cases.

Although 5 percent is a common level of spending, some funds may have the flexibility to go to a lower spending rate—especially in times of duress. As shown in *Display 12*, the portfolio recovery time is very sensitive to the spending rate. With a 7 percent risk premium, the recovery time is cut in half from 12 to 6 years as the spending rate declines from 5 percent to 3 percent. A 3 to 4 percent spending rule with a 5 percent risk premium allows for a recovery over a more reasonable time frame of 7 to 11 years.

Display 11: Portfolio Recovery Times with 30 Percent Market Loss

EQUITY		PORTFOLIO	
Market Loss	30%	Loss Beta	0.8
Recovery Time	3 Years	Recovery Beta	0.6
IR	3%	Alpha	2%
		Inflation	2%

Post-Recovery Risk Premium	Post-Recovery Portfolio Return	Spending	
		0%	5%
5%	8.0%	4	27
7%	9.2%	4	12
9%	10.4%	4	9

Source: Morgan Stanley Research.

Display 12: Portfolio Recovery Times with 30 Percent Market Loss and 3 Percent Spending

EQUITY		PORTFOLIO	
Market Loss	30%	Loss Beta	0.8
Recovery Time	3 Years	Recovery Beta	0.6
IR	3%	Alpha	2%
		Inflation	2%

Post-Recovery Risk Premium	Post-Recovery Portfolio Return	Spending		
		5%	4%	3%
5%	8.0%	27	11	7
7%	9.2%	12	8	6
9%	10.4%	9	7	6

Source: Morgan Stanley Research.

Conclusion

Under the assumption of normal market returns and 2 percent inflation, 5 percent spending funds would be very vulnerable to long-lasting damage from substantial market losses. For the funds to recover in real terms over a reasonable horizon, one would have to have a spending rate below 5 percent or be able to assume a very high equity risk premium and/or a low inflation rate.

Thus, funds with real spending requirements of 5 percent appear to have a special vulnerability to stress equity markets, a vulnerability that has largely been obscured by the exceptional market performance of the past several years.

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Former Managing Director

(November 26, 1932 to July 14, 2012)

Barton was a former Morgan Stanley money management executive who was renowned for accurately predicting important market moves when common wisdom said he was wrong. Barton worked at Morgan Stanley for over 38 years, having started his career at E. F. Hutton in 1962 and left three years later to help found Fairfield Partners, a hedge fund. In 1973, Barton joined Morgan Stanley. He formed the firm's research department and was its strategist. At various times he was ranked as the number one U.S. strategist by The Institutional Investor poll, and, from 1996 to 2003, was voted the top global strategist. He also formed the investment management division (MSIM) and served as its chairman until 2003. At Morgan Stanley, Barton was also a member of the five man executive committee that ran Morgan Stanley and on its board of directors until its merger with Dean Witter in 1996. In June 2003, Barton left Morgan Stanley with two colleagues to form Traxis Partners. He remained a consultant to Morgan Stanley and published *Hedge Hogging* in 2005, *Wealth War & Wisdom* in 2008, and *A Hedge Fund Tale of Reach and Grasp* in 2010. He received a degree in English from Yale in 1955 and an MBA from New York University. Barton also served in the Marine Corps.

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Managing Director

Martin is a managing director with Morgan Stanley Equity Research's global strategy team. Over the past two years, he and his associates have produced a series of studies on such topics as beta-based asset allocation, integration of active and passive alphas, and the need for greater fluidity in policy portfolios.

Prior to joining Morgan Stanley, Mr. Leibowitz was vice chairman and chief investment officer of TIAA-CREF from 1995 to 2004, with responsibility for the management of over \$300 billion in equity, fixed income, and real estate assets. Previously, he had a 26-year association with Salomon Brothers, where he became director of global research, covering both fixed income and equities, and was a member of that firm's Executive Committee.

Mr. Leibowitz received both A.B. and M.S. degrees from The University of Chicago and a Ph.D. in mathematics from the Courant Institute of New York University.

He has written over 150 articles on various financial and investment analysis topics, and has been the most frequent author published in both the *Financial Analysts Journal* as well as the *Journal of Portfolio Management*. In 1992, *Investing*, a volume of his collected writings, was published with a foreword by William F. Sharpe, the 1990 Nobel Laureate in Economics. In 1996, his book *Return Targets and Shortfall Risks* was issued by Irwin Co. In 2004, two of his books were published: a compilation of studies on equity valuation, titled *Franchise Value* (John Wiley & Co.), and a revised edition of his study on bond investment, *Inside the Yield Book* (Bloomberg Press). The first edition of *Inside the Yield Book* was published in 1972, went through 21 reprintings, and remains a standard in the field. The new edition includes a foreword by noted economist Henry Kaufman.

Ten of his articles have received the Graham and Dodd Award for excellence in financial writing. The CFA Institute (formerly the Association for Investment Management Research) singled him out to receive three of its highest and most select awards: the Nicholas Molodowsky Award in 1995, the James R. Vertin Award in 1998, and the Award for Professional Excellence in 2005. In October 1995, he received the Distinguished Public

Service Award from the Public Securities Association, and in November 1995, he became the first inductee into The Fixed Income Analyst Society's Hall of Fame. He has received special Alumni Achievement Awards from The University of Chicago and New York University, and, in 2003, was elected a Fellow of the American Academy of Arts and Sciences.

Mr. Leibowitz is a trustee and vice chairman of the Carnegie Corporation and the Institute for Advanced Study at Princeton. He is also a member of the Rockefeller University Council and the Board of Overseers of New York University's Stern School of Business. Mr. Leibowitz serves on the investment advisory committee for the Harvard Management Corporation, The University of Chicago, and the Rockefeller Foundation. He is a past chairman of the board of the New York Academy of Sciences and a former member of the investment advisory committee for the New York State Common Retirement Fund and the Phi Beta Kappa Society.

Ryan Meredith, FFA, CFA

Managing Director

Ryan is a portfolio manager for the AIP Dynamic Alternative Strategies Fund. He is a portfolio manager for Morgan Stanley's Alternative Investment Partners' Portfolio Solutions Group, responsible for quantitative research in the areas of asset allocation and risk management. He joined Morgan Stanley AIP in 2007 and has 16 years of industry experience. Prior to joining the firm, Ryan was a director in the quantitative research group at Citigroup Alternative Investments, focused on the development of leading-edge modeling and research on portfolio strategy, and a research vice president at Citigroup Asset Management. Previously, he worked in the actuarial departments of both Towers Perrin in London and Alexander Forbes Consultants and Actuaries in South Africa, conducting asset liability modeling and investment research. Ryan received a B.Sc. in mathematical statistics from the University of Witwatersrand in South Africa and a M.Sc. in mathematics of finance from the Courant Institute at New York University. He is a fellowship member of the Faculty of Actuaries in the United Kingdom and holds the Chartered Financial Analyst designation.

Cyril Moullé-Berteaux

Managing Director

Cyril is head of the Global Multi-Asset team at MSIM. He re-joined the firm in 2011 and has 23 years of financial industry experience. Before returning to Morgan Stanley Cyril was a founding partner and portfolio manager at Traxis Partners, a multi-strategy hedge fund firm. At Traxis Partners, Cyril managed absolute-return portfolios and was responsible for running the firm's quantitative and fundamental research effort. Prior to co-founding Traxis Partners, in 2003, he was a managing director at MSIM, initially running Asset Allocation Research and ultimately heading the Global Asset Allocation team. Previously, Cyril was an associate at Bankers Trust and worked there from 1991 to 1995 initially in corporate finance and eventually as a derivatives trader in the emerging markets group. He received a B.A. in economics from Harvard University.

Sergei Parmenov

Managing Director

Sergei is a senior member of the Global Multi-Asset team at MSIM. He re-joined the firm in 2011 and has 18 years of investment experience. Before returning to Morgan Stanley, Sergei was a founder and manager of Lyncean Capital Management, a macro hedge fund. Between 2003 and 2008, Sergei was an analyst and a portfolio manager at Traxis Partners, a multi-strategy hedge fund. From 2002 to 2003, Sergei was an analyst at a European mid-cap equities hedge fund at J. Rothschild Capital Management in London. Prior to this, he was a vice president in the private equity department of Deutsche Bank and from 1999 to 2001, Sergei was an associate and subsequently vice president at Whitney & Co, focusing on European private equity investments. Sergei started his career at Morgan Stanley Investment Management in 1996. He received a B.A. in economics from Columbia University.

2015 | Volume 5 | Issue 2

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