

ASSESSING ACTIVE VS. PASSIVE STRATEGIES IN THE CURRENT ENVIRONMENT CONSIDERING THE PAST TO LOOK FORWARD

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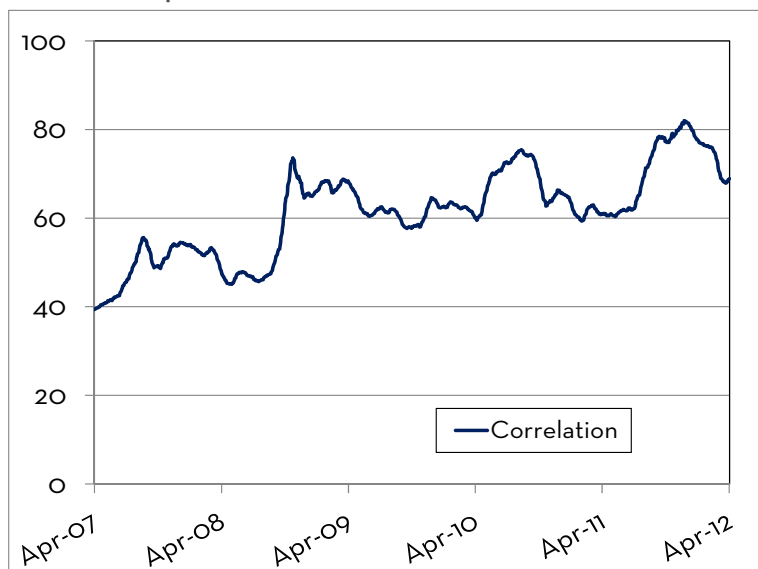
Introduction

The role of active investment strategies in long-term investment programs remains a hotly debated topic. The highly volatile markets of the last several years, often characterized as “risk on/risk off”, have created unique headwinds for active managers. Beginning with the credit crisis in 2008 and followed by the Euro-Zone debt crisis, markets have been dominated by macro events with security price movements more influenced by policy-maker actions and news headlines than fundamentals. In this environment, correlations among securities have risen to record levels (as shown by the CBOE S&P Implied Correlation Index in Exhibit 1) and markets have not followed sustained trends. As a result, active strategies ranging from traditional long-only stock and bond managers to hedge funds have struggled to add value. In response, many practitioners have sought to mine historical data series to determine whether active management has any role in long-term investment programs.

In this paper, we update our April 2010 piece addressing this topic, “Revisiting the Active Vs. Passive Decision – Moving Beyond the Data Driven Framework”. Our analyses continue to suggest that backward-looking, data-driven attempts to resolve the argument can only go so far and in some cases are misleading. Instead, we reiterate that investors should consider some straightforward intuitive hypotheses for the assessment of active vs. passive strategies and then frame the decision on an asset-class by asset-class basis in the context of their overall investment program design. Most importantly, we recommend placing the active vs. passive decision in the context of optimal allocation of investors’ scarce resources – capital, risk, fees, and time.

In laying out a basic framework for considering the active vs. passive decision, we outline the intuitive hypotheses for strategies by asset category. We take a look at historical data for traditional long-only strategies to test these hypotheses in general terms. Hedge funds are given special consideration, in light of their objective of delivering true “alpha”, e.g. significant returns independent of market movements. We also highlight the example of fixed income after 2008, when retrospective analysis could have led investors to misidentify embedded market or sector exposure (beta) as active performance (alpha), and draw the wrong conclusion at the worst time. We conclude with a roadmap for assessing active vs. passive decisions across an investment program.

Exhibit 1: Implied S & P 500 Stock Correlations



Source: CBOE

A Better Approach: Allocating Resources According to Impact

At NEPC, we believe there are opportunities to add value through active investment decision-making at each stage in the investment process. The three most commonly identified steps in this process include strategic asset allocation, dynamic portfolio allocation and structuring, and investment manager selection and monitoring. We believe that skilled investment managers can provide alpha - additional return in excess of the broad market - and that pursuit of this excess return can make a meaningful difference in an investment program over time.

Our consulting process, however, focuses on developing client-driven investment solutions. As a result, we do not believe there is one “right” answer to the active vs. passive decision. We suggest that the answer to the decision depends on an assessment of: 1) the specific attributes of an investment program including governance structure and available resources; 2) individual asset classes; and, 3) the market environment.

The first step in this process is an assessment of an investor’s appetite for taking risk relative to the least risky investment alternative. For a pension fund, this least risky position may be a bond portfolio matched to a liability stream. For an endowment or foundation this neutral-risk position may be a long-duration inflation-hedged instrument such as a Treasury Inflation Protected Security (TIPS). For other investors, the risk-free position may be cash. Most investors choose to take risk to seek a return above this risk-free rate, and as such, they must depart from their risk-free position. We believe the first and most important step in this process is to build a diversified port-

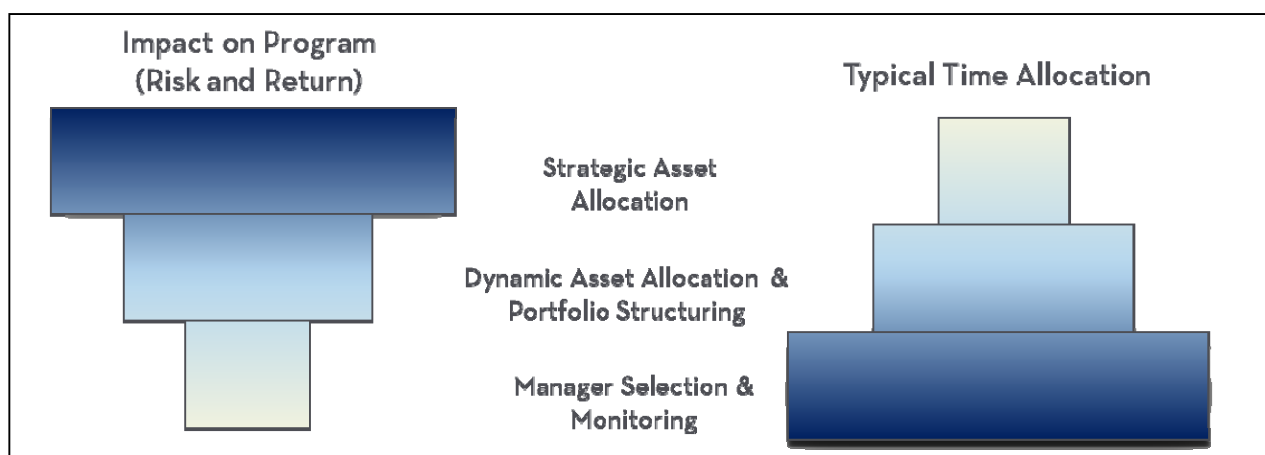
folio of risky asset-classes. Over the long-term, the majority of the difference in return between the investment program’s portfolio and the risk-free position will be driven by the strategic asset allocation (the so-called “beta” decision).

Once a strategic asset allocation is set, the investor can focus on additional decisions including dynamically adjusting exposures to take advantage of (or hedge against) macro-level opportunities (or risks), and whether to make opportunistic allocations in response to significant dislocations or imbalances in markets. (For more on

this topic, please see the NEPC white paper “Investing in Volatile Times: A Dynamic Approach to Asset Allocation” available at www.nepc.com.) Finally, investment managers are selected to gain exposure to asset classes and, potentially, to seek excess return through active management. This series of decisions can be organized into a hierarchy according to impact on a total investment program as shown on the left side of Exhibit 2.

Many investors spend a great deal of time seeking, evaluating, and monitoring investment managers, while spending relatively little time and resource on the higher value-added decisions. As a result, we often see investors’ time-commitment organized in a hierarchy more like that on the right side of the exhibit. Taken to an extreme, this can lead to an investment decision-making process where so much time is devoted to individual manager evaluation and monitoring that higher value-added decisions are neglected and overall program performance is affected. In extreme cases investors may get so bogged down in a cycle of hiring and firing traditional active managers, that they are not able to pursue attractive opportunities in less efficient (and, often, more

Exhibit 2: A Challenge of Investment Program Management



Source: NEPC



diversifying) strategies such as hedge funds, private equity, and real assets.

We recommend that investors align their decision-making process and, importantly, the allocation of their limited resources according to this value hierarchy.

In addressing the active vs. passive decision, we suggest a similar approach to resource allocation: that of focusing scarce time and resource on investment categories where the probabilities of active management success are highest and the rewards from active management are sufficient to warrant putting scarce resources at risk. For some investors, this may mean devoting time and effort to seeking active management in each component of their investment program. For others, this may mean passive investing in more efficient areas of the capital markets while committing active risk, active management fees, and oversight time to less efficient areas of the markets.

Active vs. Passive Assessment – Comparing Data Driven and Intuitive Approaches

There have been many analyses of active vs. passive strategies. These studies have typically evaluated databases of investment manager returns, comparing performance to market benchmarks to

assess the probability and magnitude of out-or under-performance after consideration of fees and expenses.



We argue that all historical analyses—including the one we will present below—need to be taken with a grain (or more) of salt. Historical data-driven analyses of active vs. passive management are subject to shortcomings associated with universe selection, time-period (or end-point) sensitivity, and survivorship bias. These analyses tend to be constructed to prove the hypothesis of a particular interested party (whether a purveyor of active or passive management services, or an academic with a particular point of view). As a result, it can appear that either side of the argument can be proved depending on: 1) how the question is framed; 2) the data set chosen; and, 3) the time period used. We think that the effort to prove empirically, beyond a reasonable doubt, one side or the other of this argument is fruitless. Importantly, overly focusing on these types of analyses risks draining critical time and resources from more significant investment decisions.

We suggest instead that investors follow a series of basic hypotheses about active vs. passive management consistent with common understandings about relative market efficiency, and allocate their resources accordingly. Simply put, the intuitive hypotheses propose that active management

has a higher probability of adding value and providing a larger margin of reward in investment categories characterized by less efficiency of information, more diverse and broader investment opportunity sets, fewer constraints, relatively less liquidity, and where there are not inexpensive index vehicles available to capture the underlying “beta” easily and efficiently. These hypotheses are summarized in Exhibit 3.

We also suggest (and the data appear to demonstrate) that there are trends in performance of active vs. passive management. This pattern is in-

Exhibit 3: Active vs. Passive – Intuitive Hypotheses

Characteristics of more efficient investment categories:	Characteristics of less efficient investment categories:
<ul style="list-style-type: none">– Smaller, more homogeneous opportunity set– Well-researched– Highly liquid– Tightly constrained– Inexpensive index vehicles and derivatives readily available	<ul style="list-style-type: none">– Larger, more heterogeneous opportunity set– Not well-researched– Poor/intermittent liquidity– Less constrained– Index vehicles and derivatives unavailable, expensive, and/or involve high tracking error
Examples: <ul style="list-style-type: none">– U.S. Large Cap Stocks– U.S. Core Bonds (particularly Treasuries & Agencies)	Examples: <ul style="list-style-type: none">– U.S. small company stocks– Non-US stocks, including Emerging Markets– High yield bonds/bank loans– Hedge funds– Private equity and real estate
	
<i>Active management less likely to add value</i>	<i>Active management more likely to add value</i>



Source: NEPC

dicative of consistent manager exposures representing embedded betas. These exposures can create the appearance that alpha is cyclical. This phenomenon can also lead to apparent performance persistence only to be followed by longer-term reversion of the trend. As an example, in a later section of this paper, we will consider the case of the recent performance of fixed income managers before, during, and after the Credit Crisis.

Testing the Intuitive Hypotheses

Despite having indicated that investors should not take data-driven historical analyses at face value, we will go ahead and perform one in order to test our hypotheses. To do so we will use the Independent Consultants Cooperative (ICC) universe of manager investment performance. This is one of the largest and most robust comparative

ACTIVE MANAGEMENT HAS A HIGHER PROBABILITY OF ADDING VALUE IN LESS EFFICIENT INVESTMENT CATEGORIES

universes of investment manager performance in the industry. At the end of 2011, it encompasses data from 939 investment programs, with 18,120 portfolios from 1,029 different investment managers representing a total of \$2.285 trillion in assets. Performance is calculated by independent consultants directly from custody statements (as opposed to manager-reported results).

In an attempt to minimize survivorship bias and end-point sensitivity bias, we performed two analyses. The first compares the median active manager to benchmark performance for rolling one, three, and five-year periods beginning as early as 1991. The second analysis ranks the performance of the benchmark in universes of active managers on a calendar year basis for the most recent twelve years. The ICC universe is calculated gross of fees, so in order to make an appropriate comparison we netted the average fee for a \$25 million mandate in the eVestment Alliance database from the median manager performance (in the first analysis) or added the fee to the benchmark performance (in the second analysis). This assumption sets a high hurdle for active management, as the actual fees that investors pay would likely be lower than this level given

that average institutional portfolio sizes are often greater than \$25 million. Furthermore, the analyses assume no cost associated with the index, whereas investors would have to pay some level of expenses to gain such exposures.

The analyses are framed to limit survivorship bias by using time periods of one, three, and five years. Over one year horizons, only a small percentage of managers will leave a typical sample through termination. Over three year horizons, the number will also be relatively small. Over a five year time period few, but some, managers may be terminated (the typical manager tenure in institutional investment programs is seven-plus years). The analyses also encompass multiple market environments including the bull markets of the 1990s and mid-2000s, and the sell-offs of 2000 - 2002 and 2007 - 2008, thereby minimizing end-point sensitivity.

We evaluated nine investment categories and styles including U.S. large cap and small cap, core, growth and value stocks, international stocks, emerging market stocks, and fixed income. The results of the analyses are shown in Exhibits 6 - 23, at the end of this paper. An overview of the results by broad investment category follows.

U.S. Large Company Stocks

To begin, we review the performance of U.S. large cap core equity managers over rolling one, three, and five-year periods since 1991 (Exhibit 6). Over this time period the median large cap core manager has outperformed the S&P 500, net of fees, in 33 of 79 rolling one year periods (42% of the time), 35 of 71 rolling three year periods (49% of the time) and 39 of 63 five-year periods (62% of the time). The margin of outperformance has varied, with a period of sizeable underperformance in the late 1990s associated with the momentum-driven and strongly directional bull market of that period, followed by significant outperformance in the ensuing crash when holding any cash and avoiding certain sectors led to a rebound for active management. On average, and during more “normal” periods, the margin of outperformance, to the extent it was observed, was relatively modest. Considering the rank of the benchmark (Exhibit 7), the S&P 500 placed below median in six of the last twelve years. We repeat the study for large cap growth and value stocks in Exhibits 8 - 11 where the data demonstrate similar patterns.

In aggregate, these analyses make a tepid, but



modestly supportive case for active management in the U.S. large company segment of the market. There also appears to be some pattern to the relative performance of active vs. passive management. This indicates to us that there are common factors or betas (e.g. capitalization-bias, momentum, etc.) that lead to performance trends, and we observe that these trends tend to mean-revert. Significantly, in recent years, the performance of large cap active managers has been poorer than more broadly across the historical time period.

In summary, we agree with the intuitive hypothesis (and common assertion) that the US large capitalization segment of the global capital markets is relatively efficient. While we believe there are managers who can add value in this space, it is a

THE SUCCESS OF ACTIVE MANAGEMENT IS EPISODIC AND CHARACTERIZED BY TRENDS AND REVERSALS

lower probability game – especially given the constraints placed on traditional long-only investment managers – and the expected rewards are modest. If a plan sponsor chooses to index one component of their program (or use derivatives to gain the exposure synthetically and “port” another, higher-probability alpha exposure onto it), U.S. large cap stocks are a good candidate.

U.S. Small Company Stocks

Over most time periods median US small company stock managers appear to have added value relative to benchmarks, as shown in Exhibits 12-17. This investment segment is more diverse than US large company stocks, with a larger universe of companies and fewer analysts following the companies. In addition, small cap stock benchmarks can be harder and more costly to replicate. This category, therefore, appears relatively inefficient and a good candidate for active management. There also appears to be strong trends to the out-performance or under-performance cycles. For example, in 2008, most small cap growth and value managers struggled to outperform the Russell 2000 benchmark (or the styled benchmarks), yet over longer time periods the median small cap manager has been able to provide value net of fees.

Non-U.S. Stocks

Median non-US stock managers have been able to demonstrate value-added over most time periods, as shown in Exhibits 18 and 19. During the 1990s, this was largely driven by the popping of the Japanese bubble and the primarily underweight position held in this market by most managers. More recently, managers have been able, on average, to outperform the most common benchmarks by a meaningful margin. We believe that the diversity of the non-U.S. equity markets and the wide array of tools available to managers for adding value (country and currency, sector, and stock decisions across a universe of 1000+ companies) provide a strong basis for active management success. This highlights a key element of seeking active management results: *The wider the universe of securities and the broader the number of decisions available to managers increases the probability of active management adding value.* Exposure to higher-performing (and out-of-benchmark) emerging markets stocks has contributed to this outperformance, but the median manager in this category also tends to outperform benchmarks with a portion of emerging markets such as the MSCI All Country World Index ex-US.

In the dedicated emerging markets equity category, the data (shown in Exhibits 20 and 21) present something of a conundrum. The shorter-term “batting average” of managers has not been high, especially in more recent years, although historically, and over five-year rolling periods, managers have shown an ability to add value versus the benchmark. The emerging markets are not viewed as highly efficient and gaining passive exposure is not cheap, although it can be done. This is an area for further research, as we are not ready to recommend passive allocations to emerging markets equities. We do observe that country allocation decisions tend to outweigh security selection decisions in these markets. As a result, consistent manager country biases relative to the index may lead to trends in relative performance, an issue to be discussed further in the review of fixed income, below.

Fixed Income

For periods ending in 2007 most fixed income managers outperformed the benchmark, providing relatively modest outperformance (see Exhibits 22 and 23). This pattern changed dramatically



in 2008, when the credit crisis caused historic spread-widening across virtually all non-Treasury sectors of the bond markets. The associated “flight to quality”, accompanied by the Fed lowering short rates to stimulate the economy, drove a remarkable rally (and decline in yields) of Treasury securities. As most active fixed income managers are consistently overweight “spread sectors” and underweight Treasuries, this predictably led to underperformance. The magnitude of the underperformance, and the degree to which one year’s results damaged long-term track records, however, was unprecedented.

This experience reversed itself in 2009 with an equally impressive rally in credit markets. We view the results of the analysis of fixed income managers as being a particularly illustrative example of the danger of mistaking embedded beta for alpha. We consider this in greater detail in a later section of this paper.

General Observations

The data, overall, appear consistent with the intuitive hypotheses: 1) U.S. large cap stock managers exhibit the lowest probability of active management outperformance while outperformance margins, on average, are relatively tight; 2) Active managers in U.S. small cap and non-U.S. stocks exhibit higher probability of outperformance and larger margins of outperformance; and 3) Fixed income managers demonstrated modest and fairly consistent outperformance until a big fall-off in

2008, and subsequent recovery in 2009.

Importantly, the data indicate that lower active management success rates in one-year periods do not preclude success over longer-term periods. While this may indicate some modest survivorship bias creeping into the data set, it may also indicate that consistent application of investment process can compound results favorably over longer periods – an incentive for investors to avoid judging managers over shorter time horizons.

Another observation from the analyses is that active management has trending characteristics. This can be the result of consistent factor-biases of active managers versus indexes. Said another way, the trending nature of active management success indicates that some alpha may actually be disguised beta. Exhibit 4 summarizes the rankings of benchmark performance over the period 2000 - 2011, with a color coded “heat map” indicating when active managers underperformed (red) and when they outperformed (green). This exhibit shows that, on average, active management in these categories has provided some value over respective benchmarks, while also highlighting the struggles of active managers in 2011. The exhibit also illustrates that success (or lack thereof) of active management is episodic and characterized by trends and reversals.

Finally, it is important to observe that these analyses cover a significant portion of the liquid global

Exhibit 4: Annual Index Rankings by Investment Category

	<div>Active Underperforms</div> <div>Active Outperforms</div>											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Large Cap Core	77	76	83	54	58	63	44	47	41	49	34	23
Large Cap Growth	94	77	73	44	86	77	31	57	39	33	47	17
Large Cap Value	77	80	57	52	50	69	12	57	34	81	35	38
Small Cap Core	100	100	91	24	71	77	40	61	57	59	40	65
Small Cap Growth	94	67	67	34	41	80	33	47	31	54	33	63
Small Cap Value	49	32	71	15	33	83	9	86	24	87	63	43
International Equity	63	73	62	33	39	57	46	55	52	53	66	43
Emerging Equity	39	27	49	53	59	45	34	33	44	32	47	43
Fixed Income	39	56	57	61	47	50	50	27	12	86	76	23
Average	70	65	68	41	54	67	33	52	37	59	49	40

Source: Independent Consultants Cooperative; NEPC
Please see Footnotes on ICC performance exhibits at end of paper.



market portfolio. The balance of the global market portfolio includes high yield bonds, bank loans, and emerging markets bonds. These categories tend to be hard to replicate, fairly inefficient, and generally pursued through active management. Illiquid components of the global investment opportunity set such as private equity and direct real estate and real assets are harder to access, and not subject to indexation. Strategies investing in these markets, therefore, need to be pursued with active managers. We consider hedge funds as a special investment category in the sidebar, “Hedge Funds—A Special Case”.

Alpha as Disguised Beta – Fixed Income Managers in 2008 - 2009

An example of the cyclical nature of active performance, and a short-coming of retrospective analysis, is illustrated by the active fixed income manager universe. As described above, for the periods ending 2007, the median core fixed income manager provided a moderate probability and modest levels of excess returns. This changed dramatically in 2008 when the credit crisis led to unprecedented spread widening of virtually all non-Treasury securities and corresponding negative absolute and relative performance. The majority of active fixed income managers were overweight these spread sectors, many significantly so. This caused not just the median manager to under-perform by a wide margin in 2008 (Exhibits 22 and 23), but also drove most managers to under-perform the benchmark on a trailing three-year and five-year trailing basis. A histogram of active manager excess returns in 2008 from eVestment Alliance (Exhibit 24), as reported by investment managers, shows the magnitude of the “tail” of severe underperformance during 2008. Over this period, 72% of managers trailed the benchmark.

As a result, an historical analysis of fixed income manager performance at the end of 2008 would have revealed a very damaging case for active management. So what are we to make of this? If the vast majority of managers under-perform – and by a significant margin—then it appears obvious that fixed income benchmarks must represent the most efficient way to gain exposure to these markets and plan sponsors would be well-advised to index their bond portfolios.

A common-sense assessment of the fixed income markets and benchmarks, however, highlights the

Hedge Funds—A Special Case

Hedge funds are a unique investment category for consideration in the active vs. passive debate. At NEPC, we do not consider hedge funds an asset class, but rather a way to structure and package investment strategies. On a total return basis, despite experiencing surprisingly negative returns in 2008 and 2011, as a category hedge funds have provided positive absolute and risk-adjusted returns over most multi-year periods¹. We acknowledge, however, that while many view hedge funds as providers of pure “alpha” or active returns, in reality hedge fund results can be broken down into a combination of “beta”, or results from market exposures, and a residual return representing manager skill. To the extent that hedge funds add value above any embedded market exposures, they serve as evidence of the ability of active managers to add value.

Two recent studies have explored the performance of hedge funds, attributing results, net of fees, to market movements (or beta) and a residual (manager skill or alpha). Ibbotson, et al, evaluated data over the 1995-2009 period and identified manager alpha of 3.00% per year². Over the time period 1994-2011, The Centre For Hedge Fund Research, London, identified annual manager alpha of 4.19%³. Although some hedge fund investors may be disappointed by the magnitude of the alpha that these studies identify, we think that they represent meaningful evidence that alpha exists, particularly in less constrained investment mandates, for those able to allocate the time and resources to pursue it.

¹ As discussed in our white paper, *Hedge Funds, Broken or Damaged?* available at www.nepc.com.

² Ibbotson, Roger G., Chen, Peng, and Zhu, Kevin, “The ABCs of Hedge Funds: Alphas, Betas, and Costs”, *Financial Analysts Journal*, January/February 2011.

³ Centre for Hedge Fund Research, “The Value of the Hedge Fund Industry to Investors, Markets, and the Broader Economy”, Imperial College, London, 2012.

potential problems with this argument. The most common broad US fixed income benchmark, the Barclays Capital Aggregate Bond Index (the “Aggregate”) is a capitalization-weighted index comprised of an extremely broad sample of investment grade dollar-denominated bond issues across Treasury, agency, mortgage-backed, asset-backed, and corporate sectors. As of December 31, 2008, most market observers agreed that Treasury bonds were at a secular extreme in over-valuation, just as most spread sectors were significantly under-valued relative to historical levels. Furthermore, the implications of U.S. monetary and fiscal authorities’ policy responses to the credit crisis included a significant expansion of the national debt in order to finance an array of stimulus programs. As a result, the government increased the issuance of Treasury bonds, notes, and bills. Likely outcomes of this activity included: 1) Treasuries increasing as a percentage of the benchmark; and 2) Treasury yields rising in order to attract buyers of the greatly increased issuance. Therefore, moving from an actively managed portfolio to an indexed strategy at the end of 2008 would have entailed selling corporate bonds and other spread sectors and buying Treasuries—a significant reallocation from under-valued to overvalued sectors.

Of course, most investors and investment managers did not make a wholesale move to indexed fixed income strategies, and Exhibit 25 shows the subsequent results. Again using the eVestment Alliance manager-reported returns for 2009, 80% of active fixed income managers outperformed the benchmark, most by a wide margin.

This example illustrates how an embedded beta – consistent overweight to higher-yielding spread sectors relative to the benchmark – masqueraded as alpha for years of modestly positive performance. In 2008, this bet relative to the benchmark led to disastrously negative results, followed in 2009 by a rebound that was nearly as dramatic. This experience also highlights how the active vs. passive decision should be evaluated not purely through a retrospective data-driven process, but must be considered in the overall context of underlying manager exposures and market dynamics.

As an aside, we suggest that the 2008 - 2009 fixed income results highlight the shortcomings of the BarCap Aggregate index as a benchmark for the fixed income portion of a portfolio of risky assets. The Aggregate represents a combination of interest rate exposure, corporate credit, and other potential “betas” including convexity and

Exhibit 5: Active vs. Passive – A Road Map by Asset Category

Asset Class	Market Efficiency	Diversity of Opportunity Set	Active Constraints	Excess Return Expectation	Ease of Indexing	Comments/Recommendation
US Large Cap Stocks	High	Low	High	Low	High	Most obvious choice for indexing (and /or portable alpha)
US Small Cap Stocks	Moderate	Moderate	Moderate	Moderate	Moderate	In general seek active; can index core exposure
Non-US Developed Market Stocks	Moderate	Moderate	High	Moderate	Moderate	In general seek active; can index core exposure
Emerging Market Stocks	Moderate	Moderate	Moderate	Moderate	Moderate	In general seek active; can index core exposure
Core Bonds (Gov’t/Credit)	High/Moderate	Low/Moderate	High	Low / Moderate	Moderate	Evaluate index components; potentially seek active in less efficient sectors
Emerging Market Bonds	Moderate	Moderate	Moderate	Moderate	Low	Seek active
High Yield/Bank Loans	Low	High	Moderate	Moderate	Low	Seek active
Hedge Funds	Low	High	Low	High	Low	Hedge funds are active investment strategies
Private Equity	Low	High	Low	High	N/A	Must use active
Real Estate	Low	High	Low	High	N/A	Must use active



Source: NEPC

liquidity. We recommend that investors consider dis-aggregating (as it were) their fixed income exposures into representative factors and build their portfolio according to the bond asset allocation process we described in our recent white paper, “The Case for Dis-Aggregating Core Fixed Income”, available at www.nepc.com.

Conclusion – A Roadmap for Investors

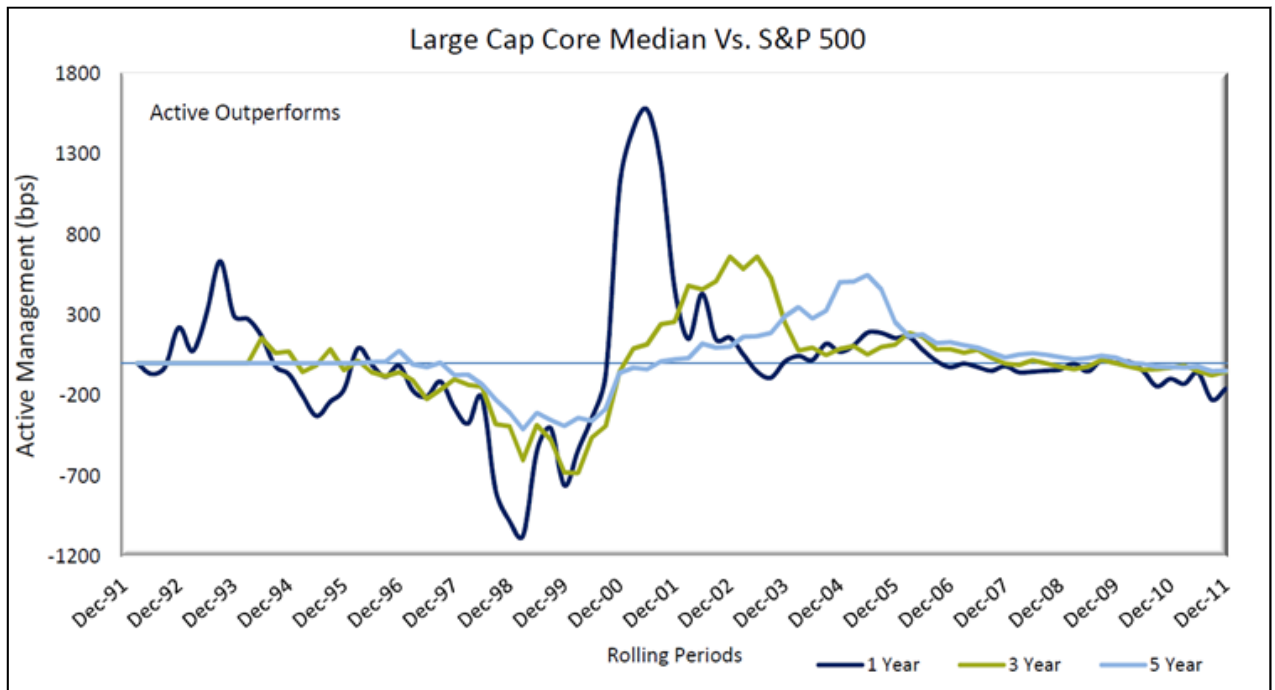
As we work with investors to assess the active vs. passive decision for their investment programs, we apply the basic intuitive hypotheses described above to each of the investment categories in their program. This can provide a roadmap for how best to apply scarce resources to build and oversee an investment program, and is summarized in Exhibit 5. We include recommendations and comments for investment categories ranging from traditional to alternatives. How each investor chooses to apply this roadmap depends on: 1) their governance structure and ability to apply limited resources of capital, risk budget, fees, and time to seeking active strategies; 2) the characteristics of individual asset classes; and, 3) the market environment.

We agree with, and the data appear to support, the generalized hypotheses that active management is more likely to add value in less efficient and less liquid markets, and that exposures to more efficient areas of the market may be better suited for passive management or financially-engineered exposures such as portable alpha. Finally, the cyclical nature of active vs. passive management reminds us that oversight of investment programs is a dynamic process involving assessments that transcend narrow data-driven historic analyses. We believe investors need to apply patience to the pursuit of active strategies when they incorporate them into their programs. As active managers have struggled in recent years due to the “risk on/risk off” nature of markets, it is likely that the cycle will turn and active management will be rewarded once again. We also observe that the alphas of different active strategies often are relatively uncorrelated, indicating that a diversified portfolio of alpha sources can provide higher return per unit of active risk taken than individual sources of alpha. (For more on this topic, please see NEPC’s white paper “Applying a Risk Budgeting Approach to Active Portfolio Construction” available at www.nepc.com.)

As markets become increasingly complex, placing growing demands on investor’s limited resources, it is critical to ensure alignment of those resources with the decisions that will have the greatest impact on overall investment outcomes. Finally, in the current environment of low expected returns for the major investment categories, for those investors with appropriate resources and governance structure. We believe that active management can represent an important source of additional returns for long-term investment programs.



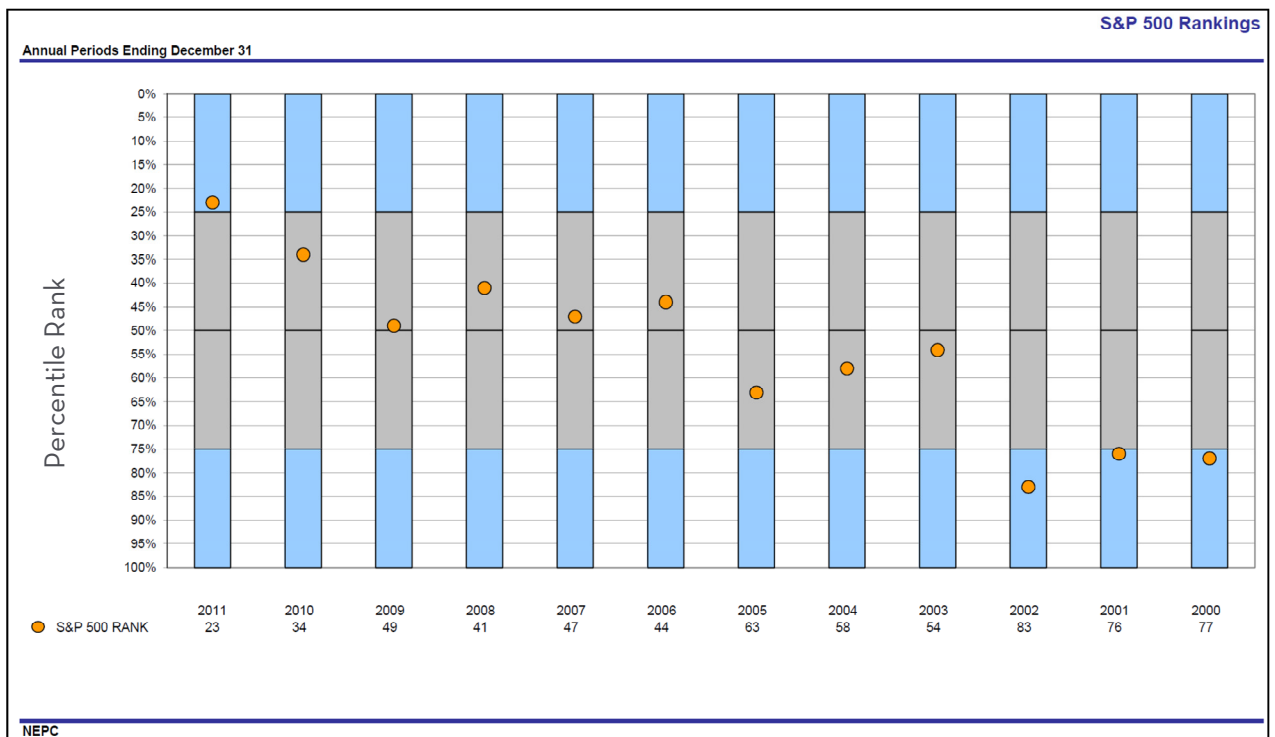
Exhibit 6: U.S. Large Cap Core Equity - Rolling Periods



The median large cap core equity manager has outperformed the S&P 500, net of fees, in:

- 33 of 79 rolling one-year periods (or, 42% of the time)
- 35 of 71 rolling three-year periods (or, 49% of the time)
- 39 of 63 rolling five-year periods (or, 62% of the time)

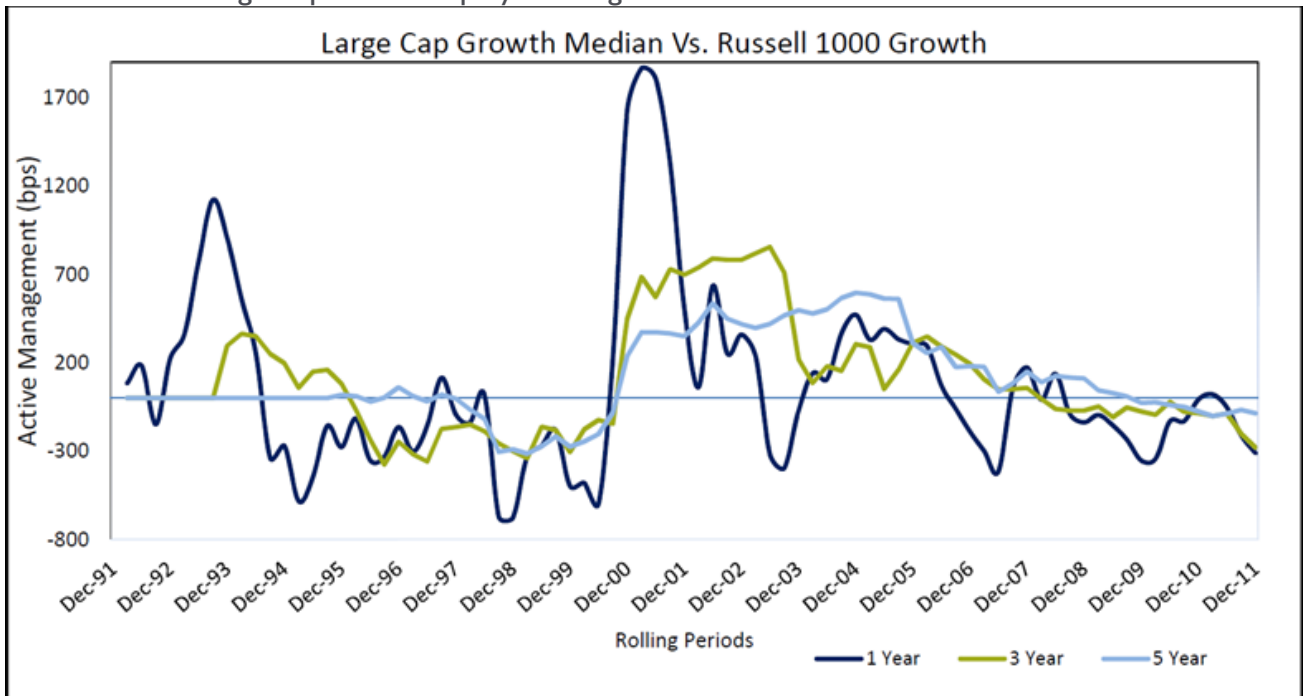
Exhibit 7: U.S. Large Cap Core Equity - Benchmark Rank



The S&P 500 ranked below median 6 out of the last 12 years



Exhibit 8: U.S. Large Cap Growth Equity – Rolling Periods



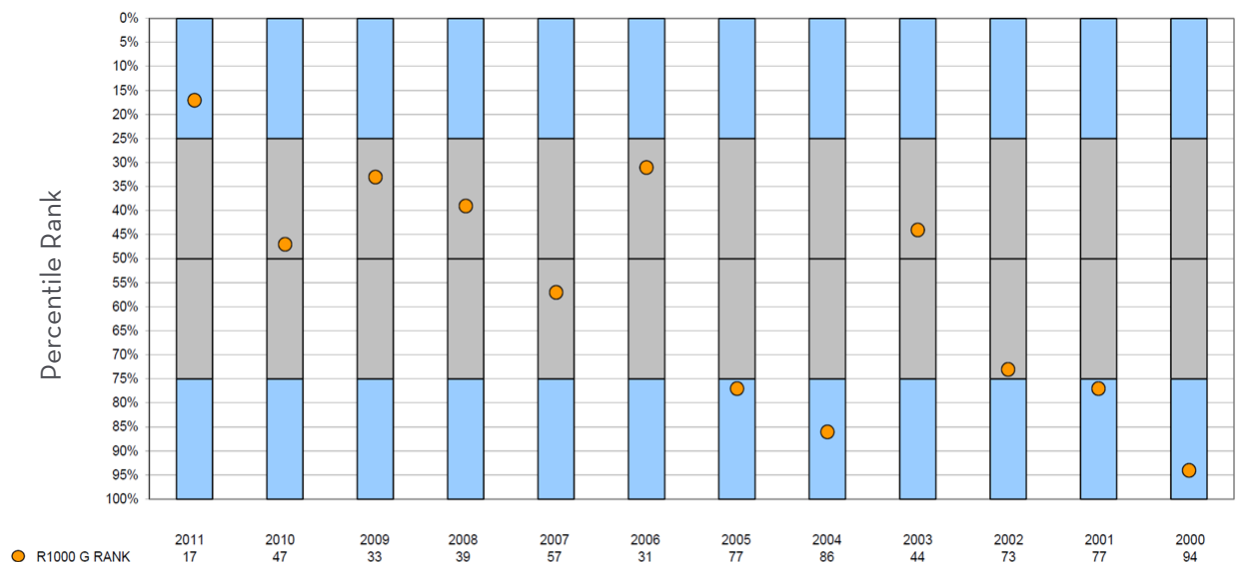
The median large cap growth equity manager has outperformed the Russell 1000 Growth, net of fees, in:

- 36 of 80 rolling one-year periods (or, 43% of the time)
- 38 of 73 rolling three-year periods (or, 52% of the time)
- 42 of 65 rolling five-year periods (or, 65% of the time)

Exhibit 9: U.S. Large Cap Growth Equity – Benchmark Rank

Russell 1000 Growth Rankings

Annual Periods Ending December 31

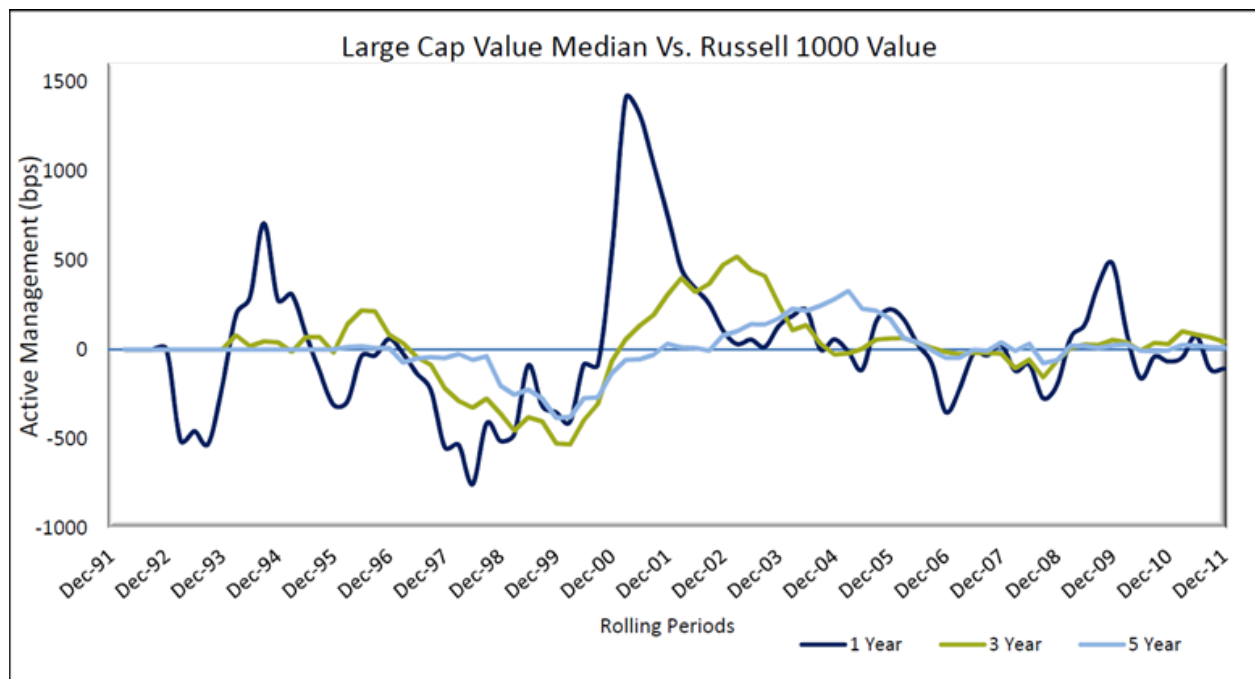


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The Russell 1000 Growth ranked below median 6 out of the last 12 years



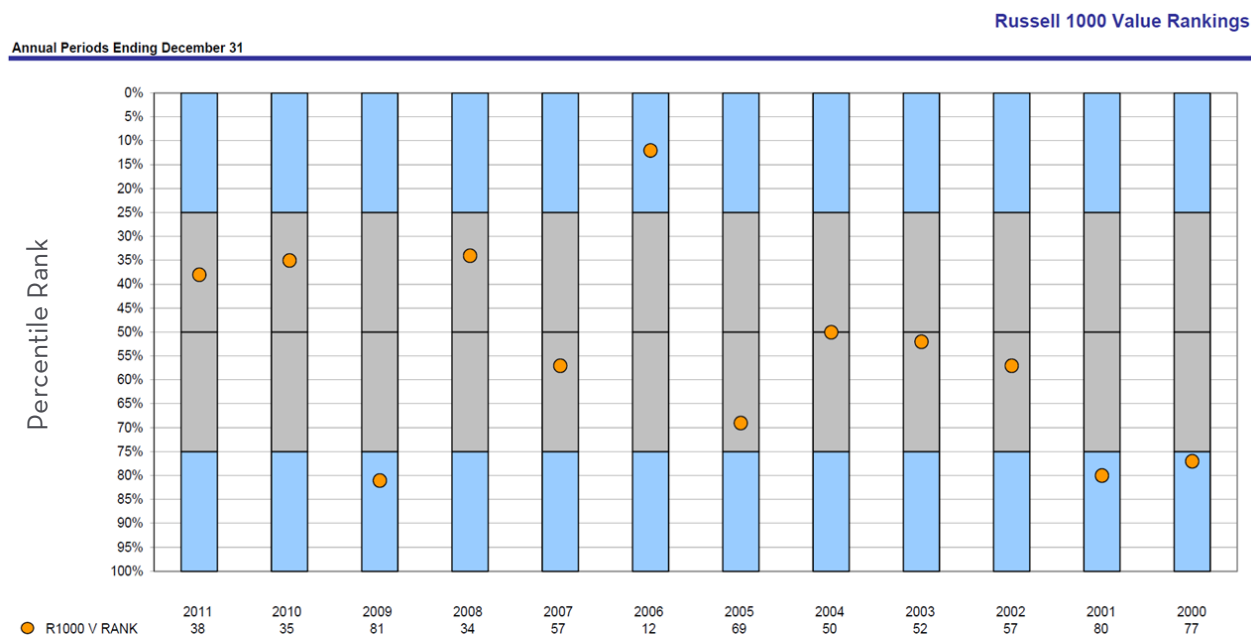
Exhibit 10: U.S. Large Cap Value Equity - Rolling Periods



The median large cap value equity manager has outperformed the Russell 1000 Value, net of fees, in:

- 34 of 76 rolling one-year periods (or, 45% of the time)
- 43 of 72 rolling three-year periods (or, 60% of the time)
- 33 of 64 rolling five-year periods (or, 52% of the time)

Exhibit 11: U.S. Large Cap Value Equity - Benchmark Rank

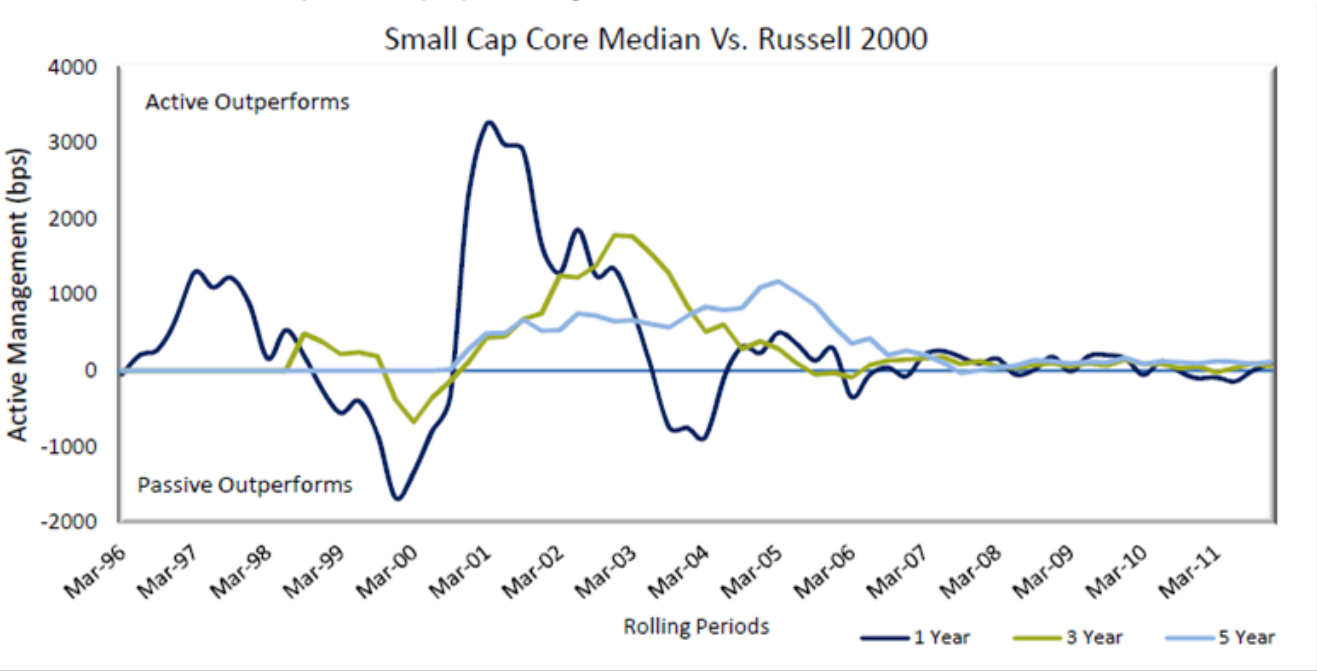


NEPC

The Russell 1000 Value ranked at or below median 8 out of the last 12 years



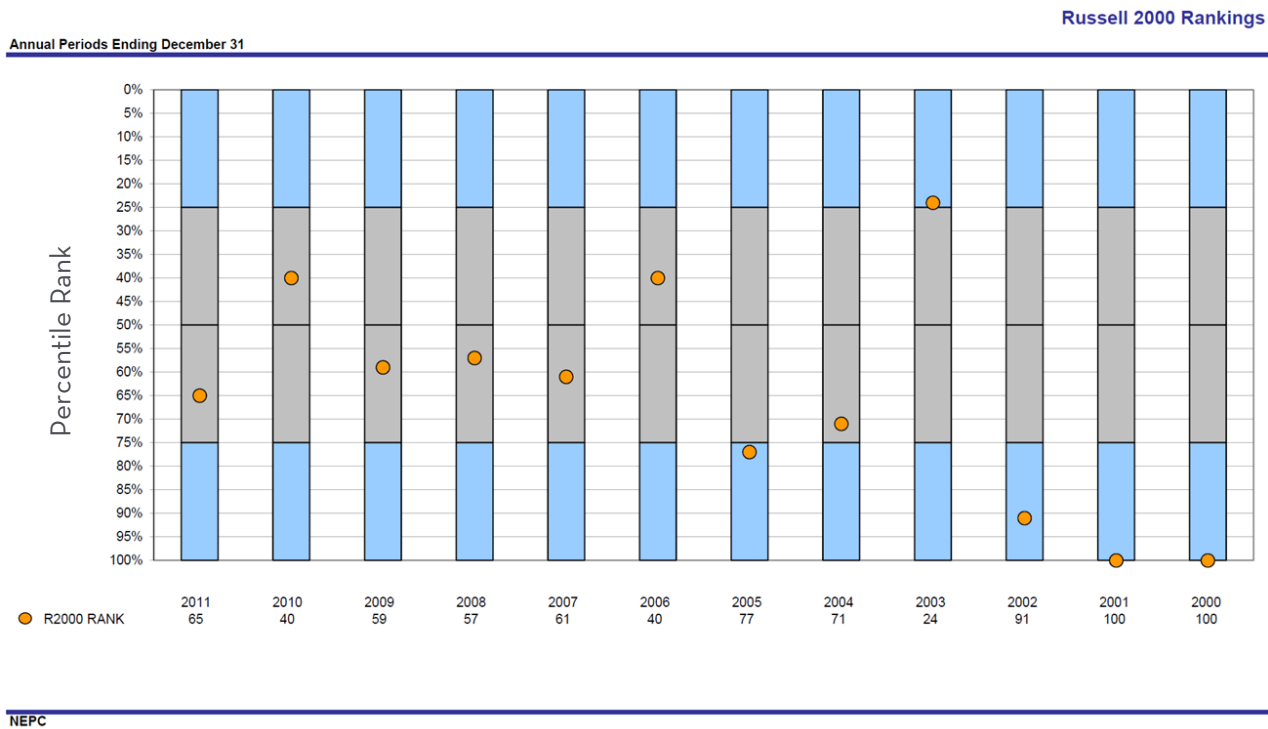
Exhibit 12: U.S. Small Cap Core Equity - Rolling Periods



The median small cap core equity manager has outperformed the Russell 2000, net of fees, in:

- 41 of 64 rolling one-year periods (or, 64% of the time)
- 46 of 54 rolling three-year periods (or, 85% of the time)
- 45 of 46 rolling five-year periods (or, 98% of the time)

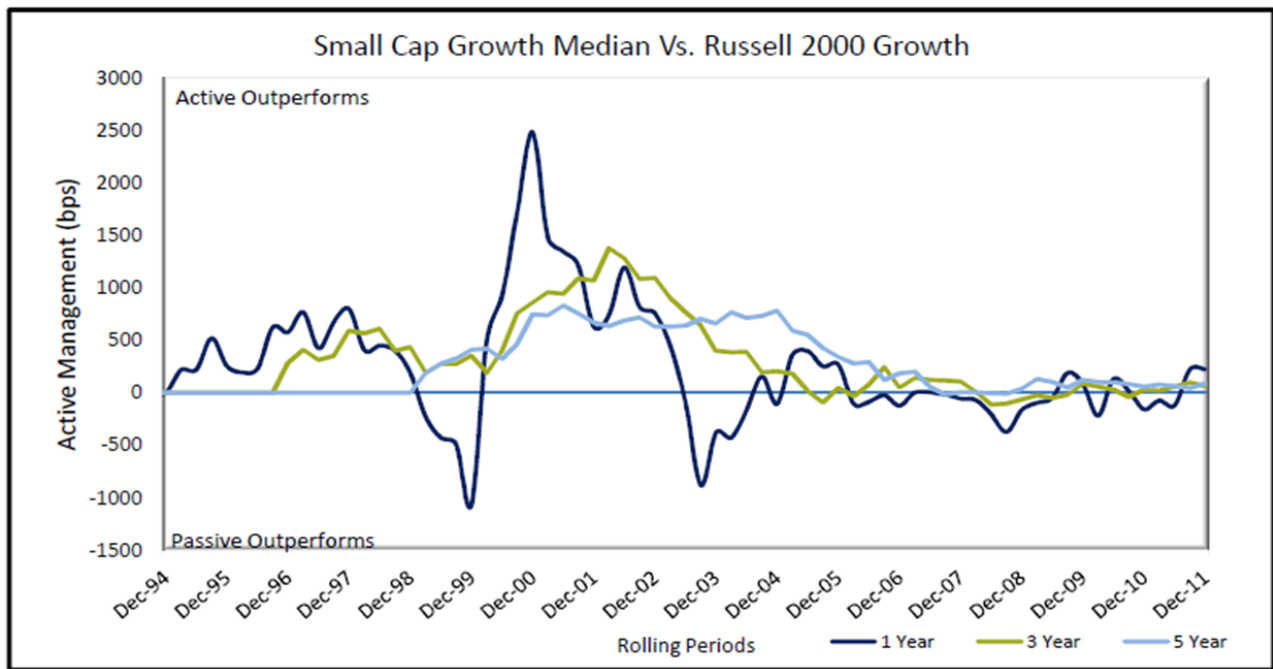
Exhibit 13: U.S. Small Cap Core Equity - Benchmark Rank



The Russell 2000 ranked below median 9 out of the last 12 years



Exhibit 14: U.S. Small Cap Growth Equity - Rolling Periods



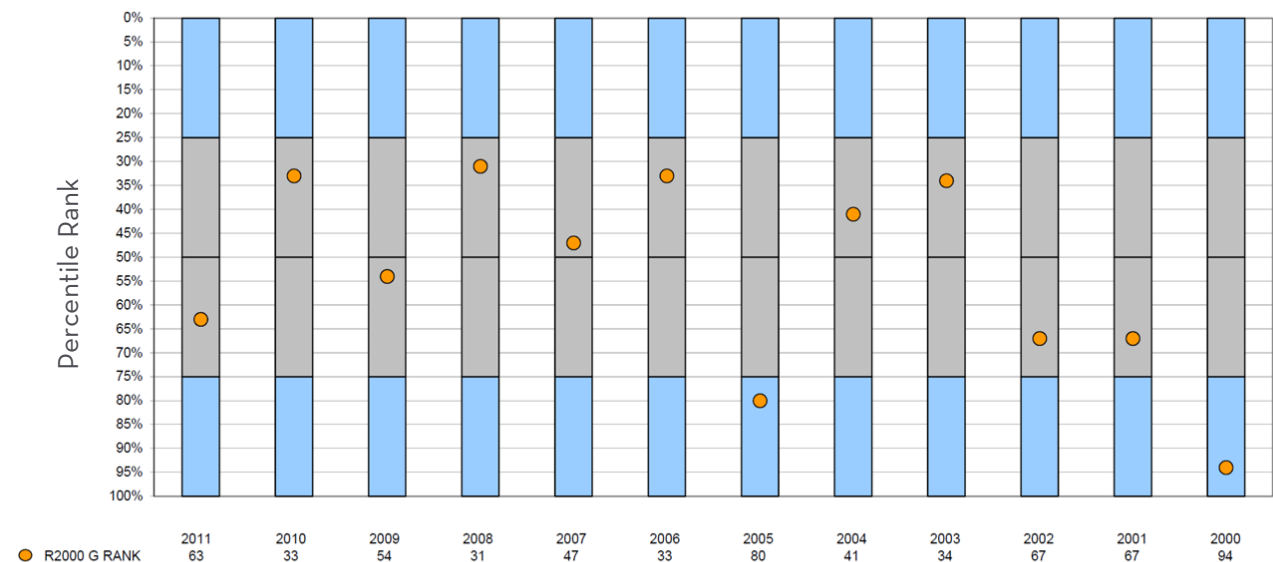
The median small cap growth equity manager has outperformed the Russell 2000 Growth, net of fees, in:

- 43 of 69 rolling one-year periods (or, 62% of the time)
- 52 of 61 rolling three-year periods (or, 85% of the time)
- 49 of 52 rolling five-year periods (or, 94% of the time)

Exhibit 15: U.S. Small Cap Growth Equity - Benchmark Rank

Russell 2000 Growth Rankings

Annual Periods Ending December 31

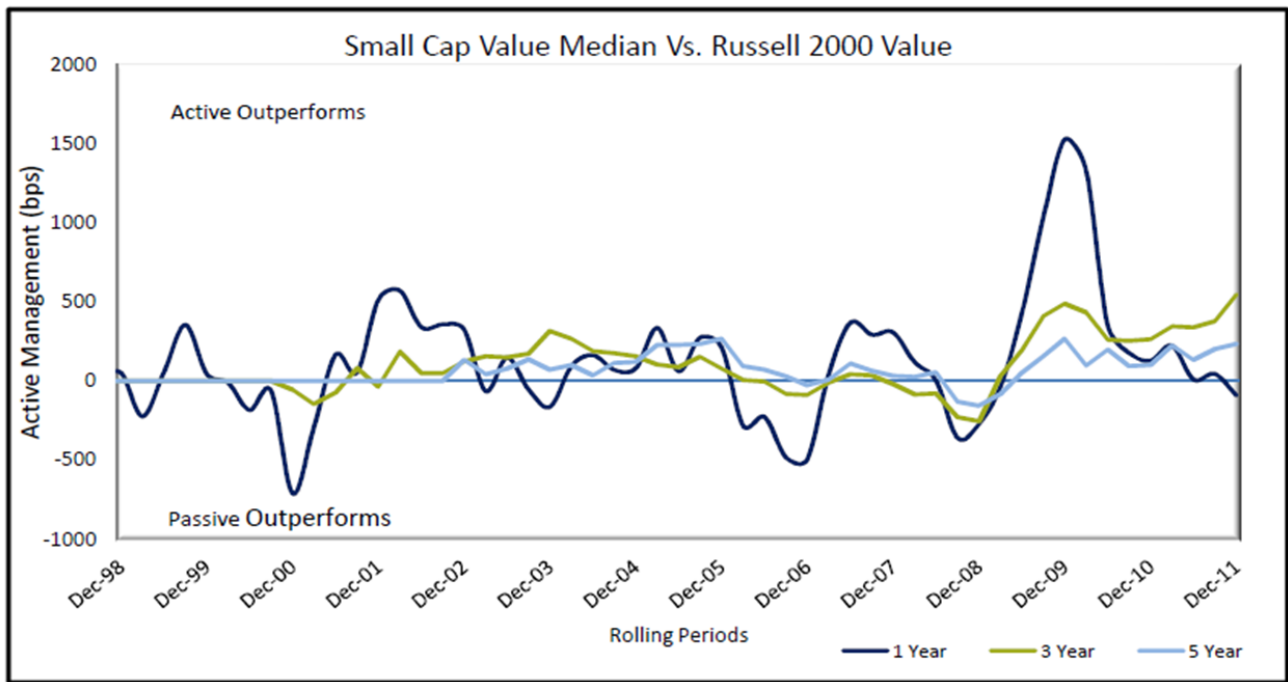


NEPC

The Russell 2000 Growth ranked below median 6 out of the last 12 years



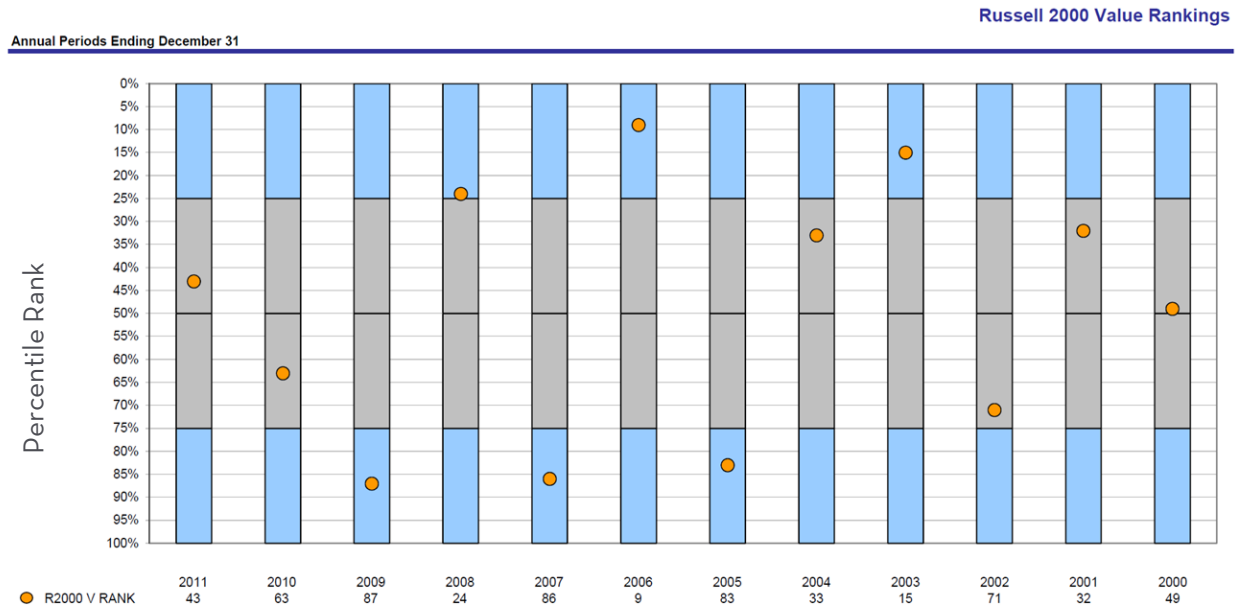
Exhibit 16: U.S. Small Cap Value Equity - Rolling Periods



The median small cap value equity manager has outperformed the Russell 2000 Value, net of fees, in:

- 36 of 53 rolling one-year periods (or, 68% of the time)
- 32 of 45 rolling three-year periods (or, 71% of the time)
- 33 of 37 rolling five-year periods (or, 89% of the time)

Exhibit 17: U.S. Small Cap Value Equity - Benchmark Rank

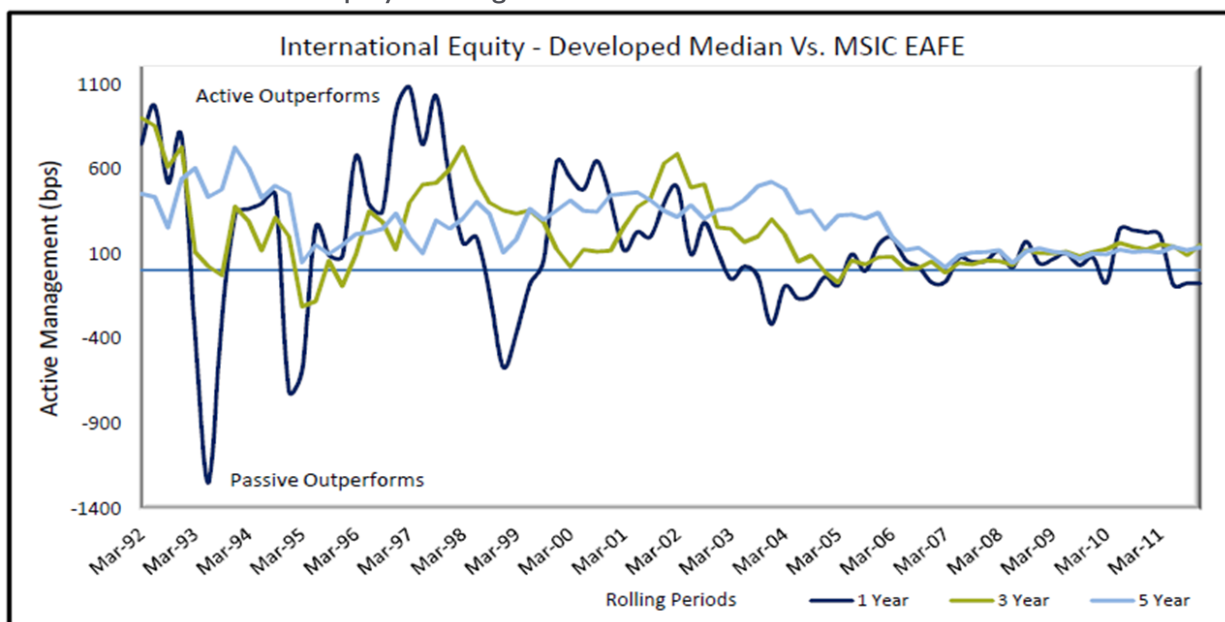


NEPC

The Russell 2000 Value ranked below median 5 out of the last 12 years



Exhibit 18: International Equity - Rolling Periods



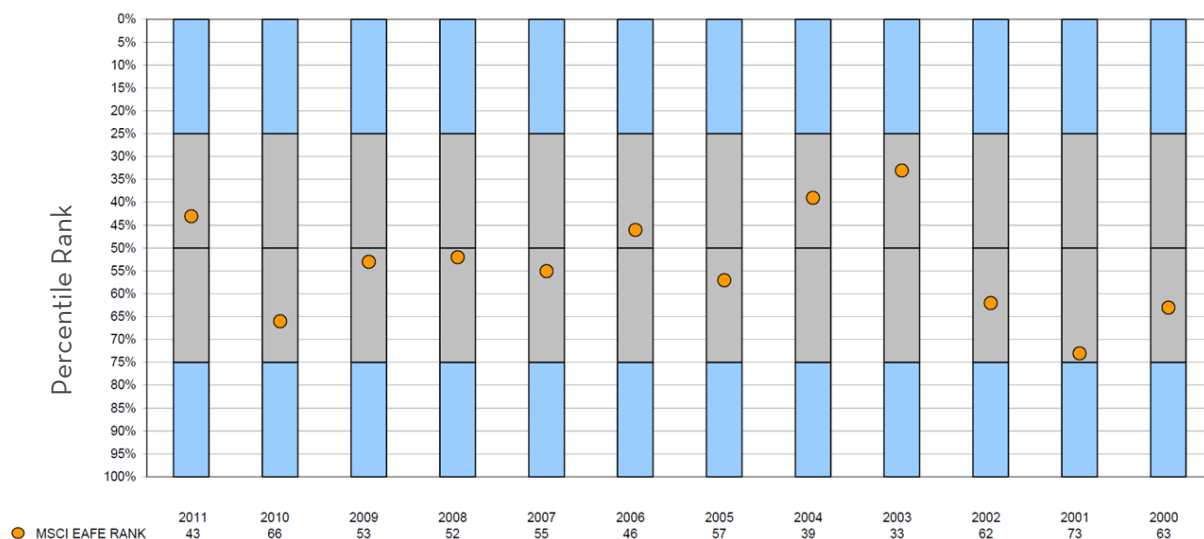
The median international equity developed manager has outperformed the MSCI EAFE, net of fees, in:

- 56 of 80 rolling one-year periods (or, 70% of the time)
- 73 of 80 rolling three-year periods (or, 91% of the time)
- 80 of 80 rolling five-year periods (or, 100% of the time)

Exhibit 19: International Equity - Benchmark Rank

MSCI EAFE Rankings

Annual Periods Ending December 31

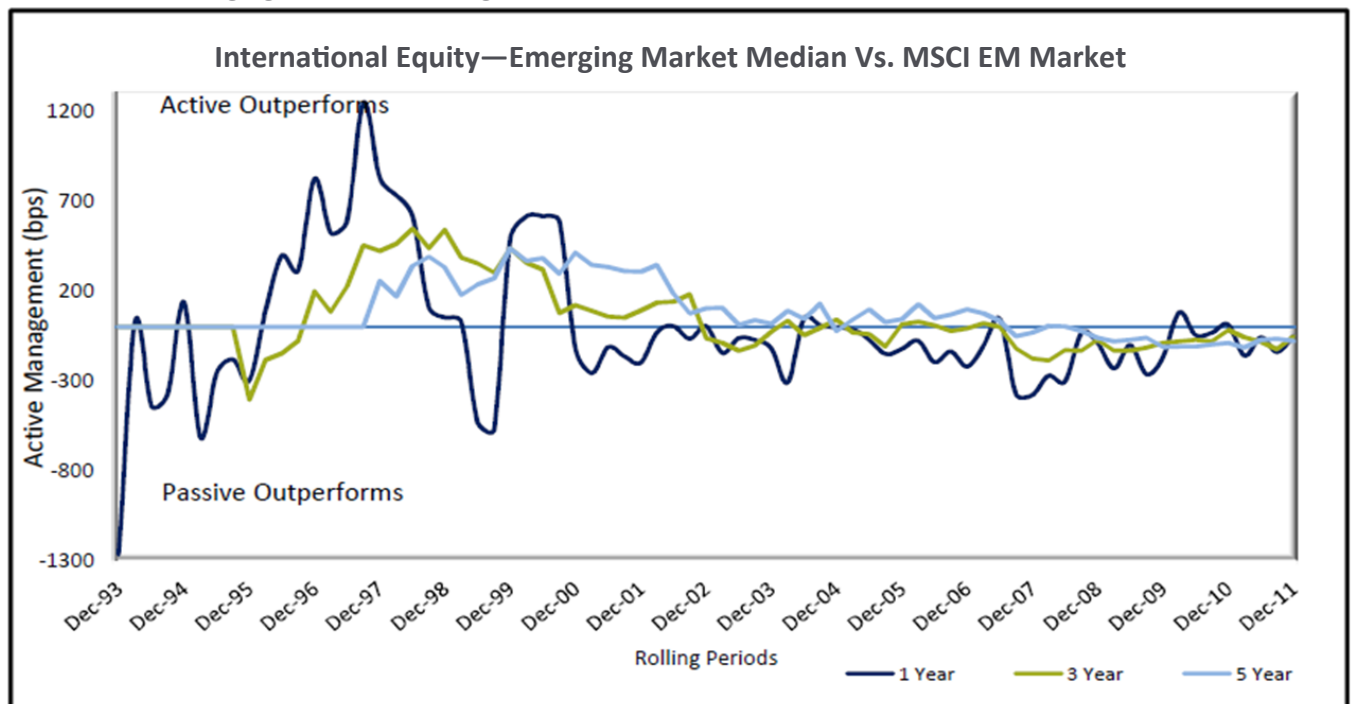


NEPC

MSCI EAFE ranked below median 8 out of the last 12 years



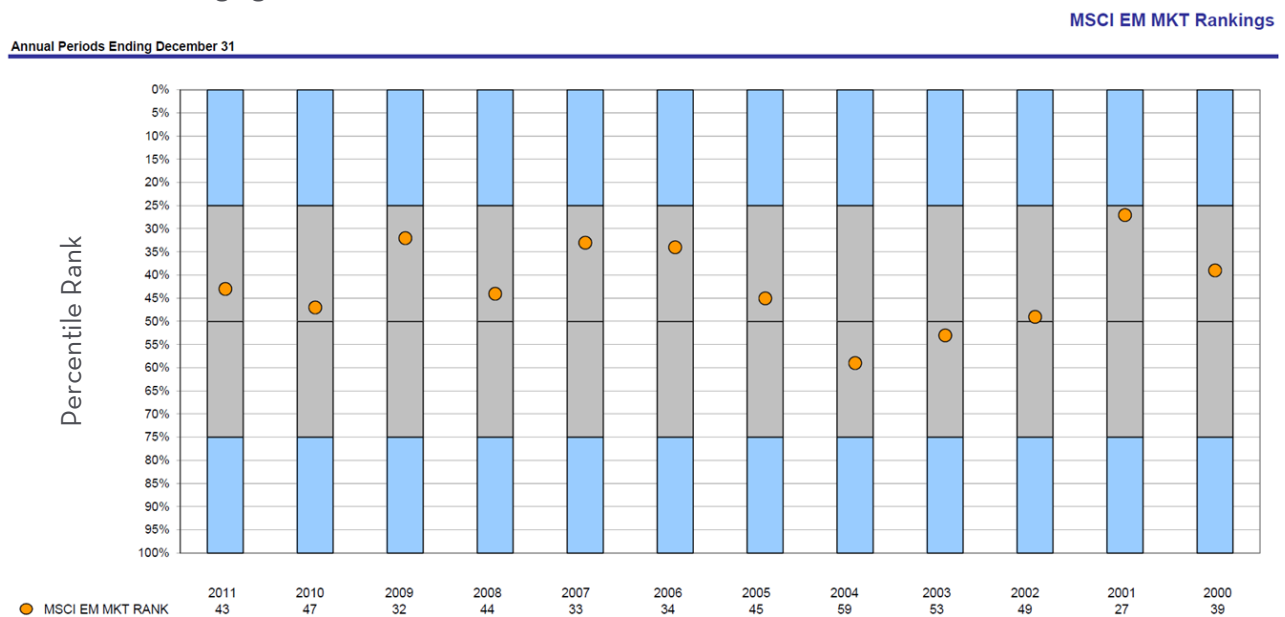
Exhibit 20: Emerging Markets – Rolling Periods



The median international equity emerging manager has outperformed the MSCI EM Market, net of fees, in:

- 26 of 73 rolling one-year periods (or, 34% of the time)
- 30 of 65 rolling three-year periods (or, 46% of the time)
- 40 of 57 rolling five-year periods (or, 70% of the time)

Exhibit 21: Emerging Markets – Benchmark Rank

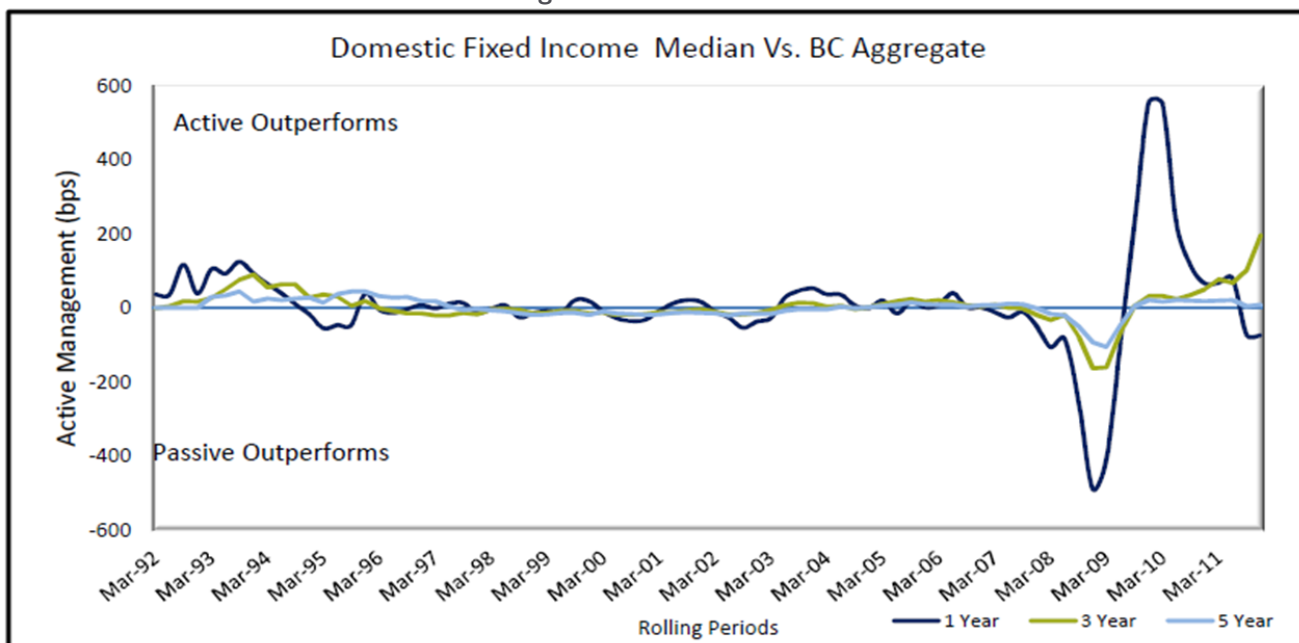


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MSCI EM Index ranked below median 2 out of the last 12 years



Exhibit 22: Domestic Fixed Income - Rolling Periods



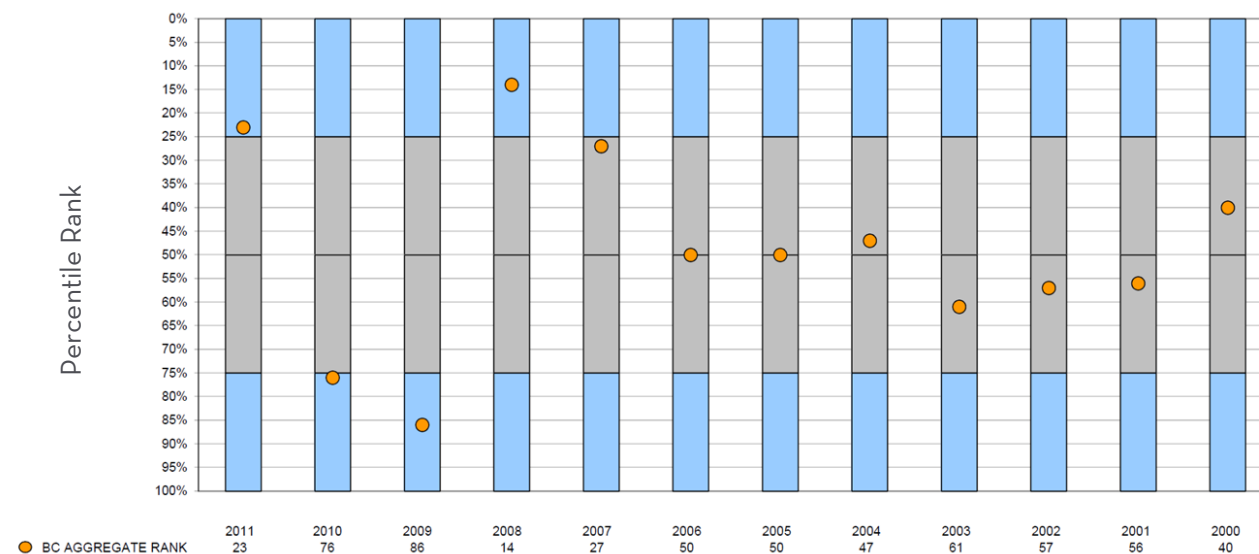
The median domestic fixed income manager has outperformed the BC Aggregate, net of fees, in:

- 42 of 80 rolling one-year periods (or, 53% of the time)
- 41 of 80 rolling three-year periods (or, 51% of the time)
- 41 of 76 rolling five-year periods (or, 54% of the time)

Exhibit 23: Domestic Fixed Income - Benchmark Rank

BC AGGREGATE Rankings

Annual Periods Ending December 31

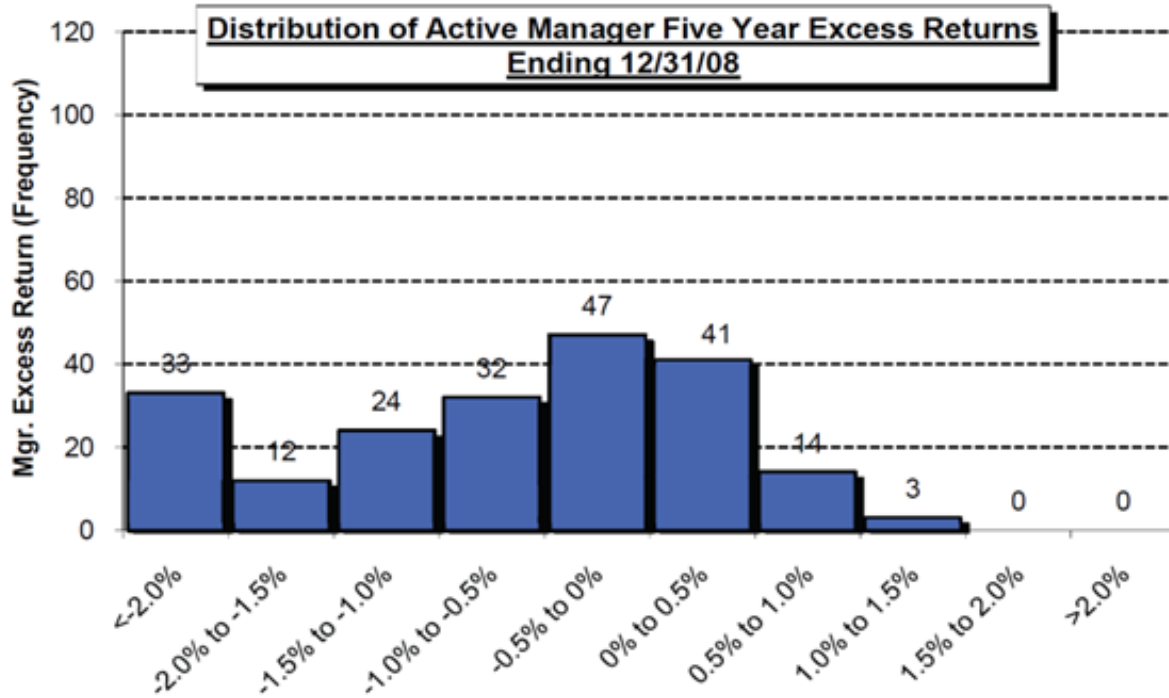


NEPC

BC Aggregate ranked at or below median 7 out of the last 12 years

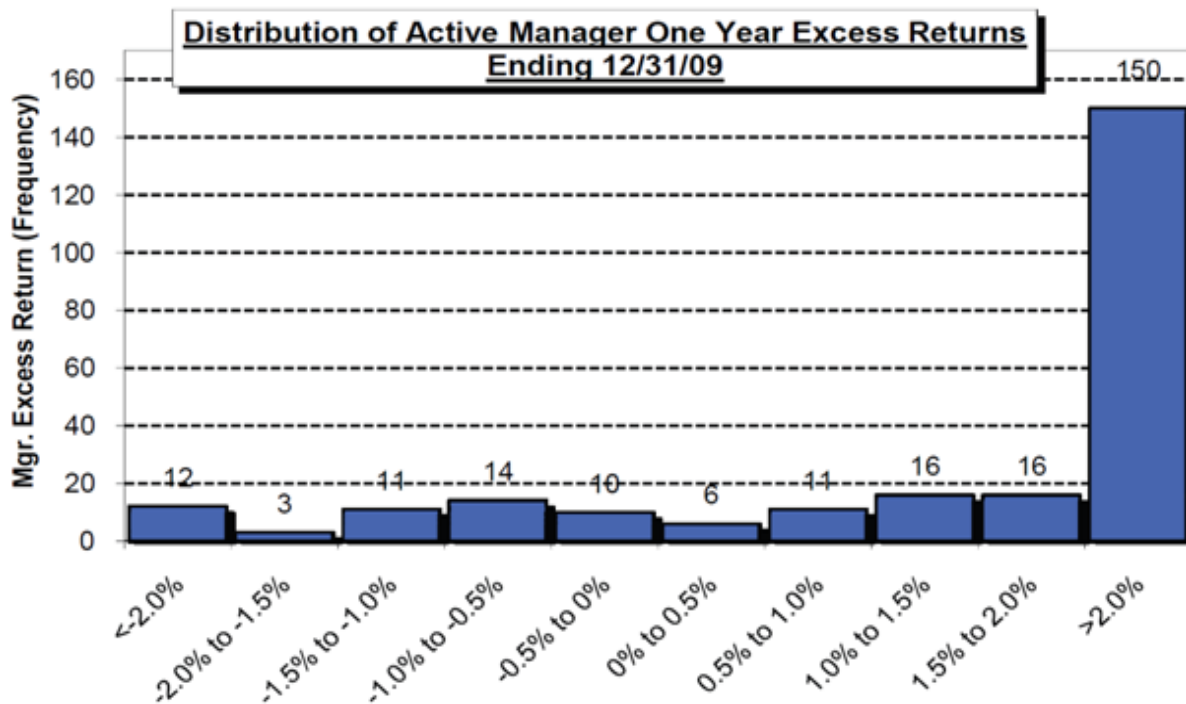


Exhibit 24: Domestic Fixed Income Active Manager Returns - 5 Years
Ending 12/31/2008



Source : eVestment Alliance

Exhibit 25: Domestic Fixed Income Active Manager Returns - 1 Year Endings 12/31/2009



Source : eVestment Alliance



...only to be followed by strong excess returns in 2009.

Notes on ICC Performance Exhibits

- Annualized net-of-fee results are calculated by subtracting the average manager fee, respective of asset class and style, from the ICC gross-of-fee performance. The average manager fees used prior to 2009 were obtained from the 2008 eVestment Alliance manager fee study. For periods after 2008, the 2009 eVestment Alliance manager fee study was used.
- The ICC universe data shown includes only actively managed portfolios. The minimum sample size used for each time period is 20 portfolios.
- Benchmark rankings are relative to the respective ICC actively managed gross-of-fee universe. Rankings reflect the gross-of-fee results of the benchmark. For periods prior to 2009 results were calculated by adding the respective asset class and style annual fee as obtained from the 2008 eVestment Alliance manager fee study to the annual benchmark return. For periods after 2008, the 2009 eVestment Alliance manager fee study was used.



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THE CASE FOR DISAGGREGATING CORE FIXED INCOME

Joel M. Paula, CAIA
Research Consultant

Introduction

Developments in fixed income markets over the past several years have intensified the need to re-examine core fixed income portfolios. A confluence of significant events – the subprime crisis in the summer of 2007, the failure of several important US financial institutions in 2008, and the subsequent Federal Government response – set the stage for a challenging market environment. As a result, some fixed income sectors experienced unprecedented and uncharacteristic volatility in 2008 and 2009, as investors faced poor active manager performance, the failure of diversification among bond markets, and severe illiquidity.

Although we could spend pages analyzing these events and their impact on fixed income, in this paper we look ahead to a new investment framework. In doing so, we question traditional investment techniques and embrace an objectives-based approach to bond investing that moves away from a focus on benchmarks in favor of disaggregating the components of core bonds.

Fixed income instruments are essential to institutional portfolios. Through an objectives-based approach, they can play a role in each step of the asset allocation and investment process. We believe that a focus on the roles that different fixed income instruments can provide in a portfolio will enable investors to build more effective investment programs.

Key topics in this paper:

- The history of bond investing, and the approach that many investors currently use
- Shortcomings of traditional core and core-plus fixed income strategies
- The disaggregation of fixed income return and risk into key components: identifying duration, convexity and credit as the primary betas
- An asset allocation approach to fixed income investing that seeks to address portfolio objectives, meet alpha expectations, and provide diversification in different market environments

Too often, bonds have become an overlooked part of investment portfolios. We believe that opportunities exist for bonds to work harder in all types of investment programs including defined benefit, endowment/foundation, and defined contribution portfolios. These opportunities include

construction of more specific, objective-driven beta exposures as well as unconstrained alpha-seeking strategies. We recognize that this may cause investors' portfolios to look unconventional and unfamiliar. However, the need for a new approach to fixed income has existed for several years, and the recent crisis has both intensified this need and created an opportunity for change.

A BRIEF HISTORY OF BOND INVESTING

Bonds have been a core component of institutional investment portfolios for a long time. During and after World War II, pension plans became popular as a way to increase employee benefits and compensation, and early pension funds invested mostly in fixed income securities or annuity contracts. The growth in the pension system coincided with the growth of insurance company portfolios and endowment funds, with government and corporate bonds serving as a core portfolio component.

The evolution of institutional investing through the 1960s and 1970s was driven in part by the development and testing of the concepts of Modern Portfolio Theory (MPT). In defining portfolio investing, this approach established an efficient frontier and portfolio optimization based on asset class risk, return, and correlation inputs (with risk defined as volatility or standard deviation of returns). The application of MPT to institutional investment programs became more widespread in the late 1970s and 1980s, resulting in balanced portfolios of stocks, bonds, and cash. In this context, bonds were used to provide income and to dampen the volatility associated with equity markets. Thus, the classic 60/40 stock/bond allocation for institutional portfolios became the benchmark for many investors.

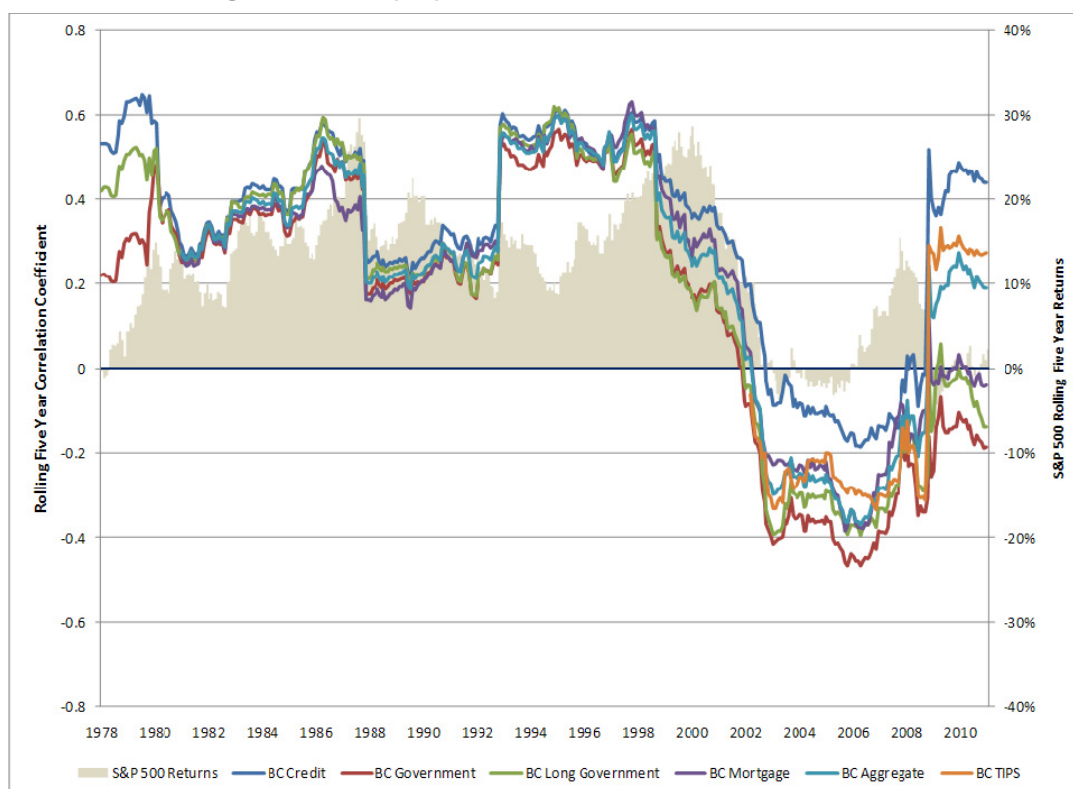
The strategy of investing in bonds to balance equity risk persisted through the 1980s and 1990s, and worked relatively well for most investment portfolios. Equity markets experienced a secular bull market while inflation and interest rates gradually subsided, providing stability and a tailwind to the bond market. Capital flooded financial markets and risk premia decreased, while investment programs became increasingly return-seeking. Investment markets broadened and efficient frontiers expanded with the addition of diversifying asset classes. However, even with the expansion of equity markets into small cap, international, and emerging markets, and the addition of alter-

native investment strategies, the overwhelming risk factor in investment portfolios continued to be broad equity exposure.

Exhibit 1 displays the rolling return correlations of investment grade bond sectors versus the S&P 500. For most of the 1980s and 1990s, equities and bonds experienced strong returns, which explains the positive correlation between the asset classes. In the early 2000s, however, equities experienced a protracted period of poor performance and bonds helped diversify these risks, although the relationship between investment grade bond sectors and equities became increasingly frayed. The chart clearly shows that, in the past few years, not all sectors of investment grade bonds diversified equity risks. The various “bond betas” – the return drivers for fixed income market segments – diverged dramatically. During the most recent credit crisis, the kind of investment grade bond exposure an investor had grew in significance. Investment grade credit, in particular, became more correlated with equities during a period of negative equity returns, while nominal government bonds performed exceedingly well.

The composition of fixed income markets has also changed over the years. In the 1970s and 1980s, expansion of public fixed income markets beyond Treasuries and corporate bonds began with mortgage-backed securities. The 1980s witnessed the birth of the high yield bond market and the

Exhibit 1 – Rolling bond and equity return correlations



Source: eVestment Alliance

growth of global fixed income. Emerging markets debt – and later asset-backed securities, commercial mortgage-backed securities, and inflation-linked bond markets – became more main-stream in the 1990s and 2000s.

In the past decade, the use of derivative instruments in bond portfolios increased, with Treasury futures, interest rate futures or swaps, mortgage derivatives, and credit default swaps growing more common as alternatives to owning physical securities. The growth of leveraged finance, off-balance sheet finance, and securitization fueled a growth in bank loans and an explosion of products such as Collateralized Debt Obligations (CDOs) and Collateralized Loan Obligations (CLOs) in structured credit markets. As a result, bond markets have become deeper and more complex as technological and financial innovations have supported more sophisticated and more complex fixed income instruments.

Today, all of these securities are part of the global investment portfolio. While they present substantial opportunities, they also pose challenges: how to best invest in them, which benchmarks should be used, and what objectives they should address in institutional portfolios.

SHORTCOMINGS OF TRADITIONAL FIXED INCOME STRATEGIES

The Barclays Capital (formerly Lehman) Aggregate Bond Index (BC Aggregate) is a widely used index that approximates the capitalization and performance of the US public investment grade bond market. However, it has inherent limitations that present problems for today's fixed income investors.

NEARLY 80% OF THE SECURITIES IN THE BC AGGREGATE INDEX ARE GOVERNMENT ISSUED OR SUPPORTED

About the BC Aggregate

The Index was launched in 1986, with performance history back-dated to 1976, and now includes Treasury bonds (excluding TIPS), government-related debentures, agency mortgage-backed securities, investment grade corporate bonds, and to a lesser extent asset-backed and commercial mortgage-backed securities. The index is capitalization weighted, with inclusion rules governing minimum issue size, maturity, fixed rate coupons, and liquidity. Only SEC registered or Rule 144A securities with registration rights are included.

The industry has long used the index to benchmark core bond or core-plus bond mandates, which represent the most common means by which investors have gained exposure to the broad bond market. Following from the balanced-portfolio mentality of the 1980s and 1990s, selecting managers to actively invest against the BC Aggregate was an easy and relatively low-cost way to gain exposure to investment grade bonds. The index, however, has become increasingly difficult for managers to consistently outperform and, because of the recent extreme volatility in some fixed income markets, active manager performance may not have met expectations.¹

Before suggesting a new framework for fixed income investing, we should first address some of the specific reasons that the BC Aggregate fails to address some important portfolio objectives:

Index Constraints – The index is designed to capture the general performance of the public investment grade bond market, and follows the tradition of using indexes to define investment opportunities. Index constraints such as credit quality, issuer size, fixed rate coupons, and maturity create segments in a market that should otherwise be viewed as more fluid. Market indexes also do not capture derivatives, which have become a growing component of fixed income portfolios.

The Index is Not Investable – Unlike the S&P 500 or other well known equity indices, the BC Aggregate is non-replicable and difficult to gain exposure to synthetically. Indexing is an option, but bond index funds cannot completely replicate the market because bonds trade over the counter, and not on an exchange. Index funds must create “sample” portfolios of certain segments of the bond market to attempt to capture overall performance.

Mismatch with Objectives – Perhaps most important, the index does not address some important portfolio objectives. By targeting duration, bonds may be used to hedge or defease fixed liabilities. However, BC Aggregate exposure, with a duration of around 4.5 years, is unlikely to approximate a portfolio's associated liability stream. In addition to addressing asset/liability mismatches, securities such as inflation-linked bonds may also be used in cases where inflation is a concern. Core and core-plus bond portfolios also may not be a reliable deflation hedge, since active managers tend to underweight high-quality government bonds in favor of spread (non-

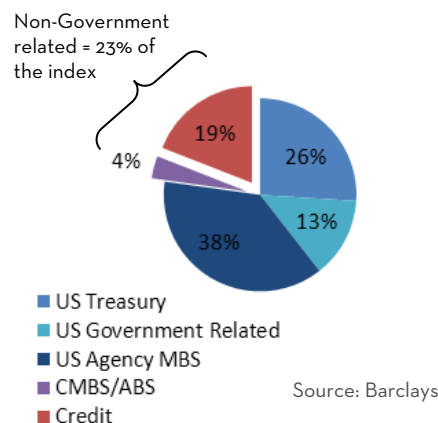
¹ For a detailed discussion and analysis of active manager performance, please see NEPC's paper: “Revisiting the Active Vs. Passive Decision – Moving Beyond The Data-Driven Framework” April 5, 2010, available at www.nepc.com

treasury) sectors.

Index Composition – Because the index is capitalization weighted, the largest issuers in the index tend to be those with the greatest debt burdens. This contrasts with equity market indices, in which market capitalization is the result of positive growth and increased market share. In the most recent time period, the federal government intervened in many fixed income markets, with government-issued and government-backed securities (including the implicitly guaranteed Government Sponsored Entities (GSEs) Fannie Mae and Freddie Mac) comprising nearly 80% of the overall index composition (Exhibit 2).

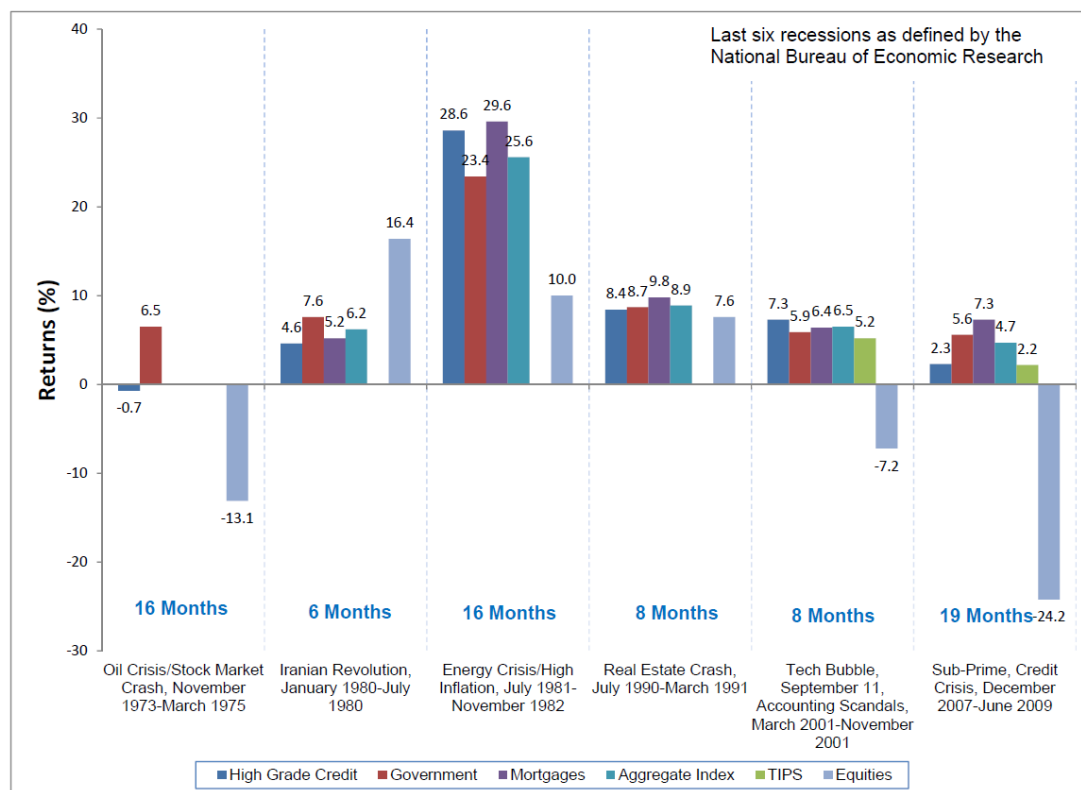
Problems with Active Management – Core-plus mandates have not effectively addressed some of the reasons that the BC Aggregate is an unattractive opportunity for many investors. By loosening some constraints on credit quality, currency, and risk exposures, and by allowing more out-of-benchmark investing, managers have a greater tool set to work with to beat the index. However, core-plus strategies still use tracking error constraints to the index. Recent performance among fixed income managers also raises questions of whether managers have delivered alpha, or have instead taken large beta positions.

Exhibit 2 – BC Aggregate Sectors



It is not the components of the BC Aggregate that make it an unsuitable benchmark, but rather it is the way that these components are packaged together. We believe that investment grade bonds have a place in every investor's portfolio because they provide a relatively well-known stream of future cash flows along with diversification benefits, particularly during flights to quality that occur early in recessionary periods. This is evident in Exhibit 3, which shows investment grade bond

Exhibit 3 – Recessions and Capital Market Performance



Source: National Bureau of Economic Research, Barclays

and equity performance during recent recessions. In five of the last six recessions, investment grade bonds outperformed equities, offsetting the negative returns associated with equities during economic retrenchment. In the end, the optimal approach to gaining exposure to investment grade bonds, and fixed income instruments in general, becomes a portfolio-specific solution requiring further analysis.

THE PRIMARY FIXED INCOME RETURN AND RISK COMPONENTS

Before examining fixed income asset allocation, we must first identify the components of risk and return in fixed income. For the purposes of this paper and analysis, we identify three primary and distinct betas, or market-risk exposures, in fixed income instruments: interest rate exposure/duration (scalable through the term structure of rates), convexity (which is usually related to prepayment or call/optionality risk), and credit. There are other important return drivers such as inflation, volatility, and liquidity, but these risks may be associated with, or even components of, the three primary risk exposures.

The Capital Asset Pricing Model (CAPM) tells us that systematic risks, or betas, are the risks that cannot be diversified away by holding a portfolio of similar assets. A beta is a primary market risk for which investors seek compensation. We believe that fixed income betas earn a risk premium, as evidenced by positive Sharpe Ratios over long-term periods; however, excess returns in fixed income have been cyclical, with periods of negative Sharpe Ratios.

Duration: Government bonds such as Treasuries bear duration risk through the term structure of interest rates. Historically, the slope of the Treasury yield curve has been positive, suggesting that investors are compensated for lengthening the duration of the portfolio by investing in longer-dated bonds that pay higher coupon rates. Investors may also choose to hold Treasuries to hedge certain economic outcomes, as nominal government bonds perform well in deflationary environments and during recessions.

Convexity: Agency mortgage-backed securities (MBS) are the most common examples of convexity risk. MBS convexity risk (negative convexity) is categorized by the uncertainty of prepayment speeds on the underlying mortgages. Whether cash flows of principal or interest payments are faster or slower than anticipated, this uncertainty affects the price of the security given a movement in market interest rates. Prepayments on MBS accelerate as interest rates fall, thus causing the negative convexity and reinvestment risk that is usually associated with agency MBS. Paydowns

are received at par value while the prices of bonds are rising due to lower interest rates, creating an upper boundary on MBS prices when rates are falling. At the same time, bonds with call options may have greater convexity risk than those without call options. Because of negative convexity, investors demand a return premium to compensate for the uncertainty of future cash flows. Even though Agency MBS are high quality securities implicitly backed by the federal government (low credit risk), yields tend to be higher than Treasuries because of convexity risk.

Conversely, positive convexity is generally a good characteristic for fixed income instruments. Corporate bonds with put options and even plain vanilla coupon bonds may exhibit favorable price movements in both rising and falling interest rate environments. The value of a put option to its holder increases as interest rates rise, providing some protection against falling bond prices. Whether a security exhibits positive or negative convexity, it is an important concept in the price rationalization of fixed income securities.

Credit: All bonds bear some degree of credit risk, which is defined as the risk that a borrower will default on either interest payments or return of principal. In the case of corporate bonds, this risk depends on the creditworthiness of the borrower and the seniority of the security in the capital structure. Credit risk is strongly correlated to equity risk because, in the event of default, a lender essentially assumes an equity position in a borrower through bankruptcy or insolvency. The mispricing of credit in non-agency MBS over the past few years is a good example of how markets can sometimes completely misunderstand credit. Non-agency MBS are not supported by the major government mortgage agencies and thus bear the credit risk of the individual borrowers in the pool. The most recent housing market decline was marked by a reduction in the collateral backing many of the loans (in this case, home equity), which added to the financial burden on home owners and increased defaults and losses. Some non-agency MBS quickly became distressed and highly illiquid as markets moved to re-price.

Credit is a beta that is highly correlated to equities and the general risk appetites of capital markets. Disaggregating bond portfolios should focus on separating credit risk or, at the very least, clearly defining performance expectations for strategies that bear credit risk. Separating credit risk from the other primary fixed income return drivers is probably most beneficial to investors, as we will discuss later in this paper.

Fixed Income Alpha

While these three primary beta factors are often



the dominant drivers of fixed income returns, we believe that alpha can be an important component of returns as well. In credit-related fixed income instruments, returns are asymmetric: the upside is limited simply because the expectation is that a bond will pay back par plus its coupon, but downside returns can be skewed by downgrade, default, or impairment. Alpha can become a larger component of fixed income returns in several market segments:

- More credit-intensive asset classes
- Issues with complex structures
- Less-liquid private markets
- Mandates where leverage, derivative, long-only, and other benchmark-related constraints are loosened

Exhibit 4 displays our assessment of alpha potentials in major fixed income market segments.

NEPC models fixed income portfolios using specific factors similar to those previously identified, which may be scaled accordingly to portfolios. Our move away from modeling investment grade bonds as the BC Aggregate is consistent with our goal to be less benchmark-centric (particularly with a benchmark that may be sub-optimal for many clients) and better able to incorporate the large amount of fixed income product innovation that has recently occurred. We start with a building-blocks approach that allows us to recreate the BC Aggregate by using its component parts, providing us with the ability to develop customized benchmarks/portfolios with varying degrees of duration and credit exposure to meet the specific needs of our clients.

OUR APPROACH TO BOND INVESTING IS DRIVEN BY CLIENT GOALS AND OBJECTIVES

For long-only investment grade bonds, beta exposure should be the primary decision driver, with the assumption that there may be some alpha to be earned, but that it may be ephemeral and not cost effective. In more credit-intensive asset classes such as high yield bonds, leveraged loans, mortgage-related credit, and emerging markets, long-only active managers have demonstrated more consistent excess returns.

A TIME TO RETHINK FIXED INCOME INVESTING

Identifying the factors that contribute to fixed income returns and risk is the first step in an objective-based approach to asset allocation. We

Exhibit 4 – Alpha Potential

Fixed Income Market	Alpha Potential (Net of Fees)
Nominal Sovereign Bonds	Low
Inflation Linked Bonds	Low
Agency MBS	Low
CMBS	Moderate
ABS	Moderate
Investment Grade Credit	Moderate
High Yield	Moderate
Leveraged Loans	Moderate
Emerging Markets Debt	High
Mortgage Credit	High
Distressed	High
Private Markets	High

recommend an approach to bond investing that's driven by specific client goals and objectives. To identify these goals, we begin with big-picture thinking. Institutional pools of money exist for a purpose: pension funds pay benefits, endowments and foundations fund operating budgets or long-term capital expenditures, and other pools exist to preserve or increase wealth. Plan sponsors should begin by identifying the least risky portfolio that addresses the purpose of the investment pool. For a pension fund, this may be a cash-matched LDI portfolio, or a portfolio of long-dated government bonds. For other portfolios in which liabilities are unknown, inflation may be a primary concern, and preserving purchasing power through T-Bills or TIPS may be the best low-risk approach.

Fixed Income Advice for Pension Funds

For many pension funds, the least risky portfolio is not an attractive option due to low return potential. Pension funds, depending on their sponsors, operate in various regulatory environments with different accounting rules governing corporate, public, and Taft-Hartley plans. Regardless of the plan sponsor, the fundamental risks of the "Pension Promise" remain the same.

Earning an attractive rate of return on pension assets can help maintain benefit levels for participants while mitigating contribution levels. These goals need to be balanced, however, with maintaining the stability of plan-funded status, since an asset/liability mismatch may represent the greatest financial risk for the plan. While the concept of Liability Driven Investments (LDI) has been in

practice by some plan types for quite some time, in general the US pension system has not completely addressed asset/liability mismatches. Since these mismatches may be mitigated by extending the duration of bonds in the asset portfolio, pension funds should first approach investment grade bonds in the context of offsetting the duration risk of future liabilities. NEPC has published several white papers that highlight the benefits of LDI for pension funds and provide much greater depth on this important concept.²

Fixed Income in an Asset Allocation Framework

Investors may choose to depart from the least risky portfolio in order to seek higher expected returns based on their specific circumstances and risk tolerances.

In this case, investors should accept risk in their portfolios only if they can afford to earn worse than the least risky alternative.

Investors hold high-grade nominal bonds to protect portfolios from poor equity performance during recessions and for deflationary environments. Treasuries perform best in this environment, while TIPS and inflation-linked bonds perform well in times of stagflation. In general, however, fixed income portfolios – especially those that are benchmarked against the BC Aggregate – are not invested with these objectives. Therefore, in structuring investment portfolios, particularly fixed income portfolios, we believe that it's critical to keep in mind the potential for these economic environments. Bonds are relied upon during times of market stress, and bond portfolios managed against the BarCap Aggregate may not completely address some of these environments because the various betas are bundled together and may not meet specific plan objectives.

We believe that using fixed income in an asset allocation framework begins with a building-blocks approach that's based on the three key betas identified earlier. High-grade nominal fixed income – including government bonds (both US and foreign developed), securitized bonds, and high-grade corporate credit – are the most price-sensitive to changes in interest rates. High-grade nominal bonds, particularly Treasuries, perform well in a deflationary environment, since the real value of nominal coupons and principal will in-

crease as prices fall in the economy. In determining high-grade duration exposure, we believe that it's important to separate credit beta from this portion of the portfolio. Credit cannot be relied upon to perform well in recessionary and/or deflationary periods because of its correlation to equities.

The duration of high-grade bonds also determines price sensitivity to interest rates: long-duration bonds provide a greater deflation hedge than short-duration bonds. When considering high-grade nominal exposure, portfolio duration should be scaled to the tenor of liabilities and/or volatility tolerances.

Looking back to Exhibit 1, the type of nominal fixed income exposure in your portfolio was critical in the most recent recession, because some parts of the market became highly correlated with equities as the credit crisis deepened and price deflation worsened. If very-high-quality and highly liquid nominal fixed income exposure is an important portfolio objective, then deconstructing the bond portfolio is beneficial in gaining exposure to high-quality assets that diversify equity risk and provide a better deflation hedge. Keep in mind, however, that liquidity in the form of cash or Treasuries is generally expensive, as investors earn lower rates of return from such investments over long-term periods. We recommend that investors perform a liquidity study and consider stress-case scenarios on the entire investment program to help determine how much high-grade fixed income (particularly government bond) exposure is necessary to balance other risk exposures and to help service liquidity needs, particularly during periods of market stress.

Possible solutions include allocating to high-quality global fixed income or indexing Treasuries and agency MBS. High-quality core-aggregate bond allocations may make sense for some plan sponsors, but re-evaluating bond benchmarks and revisiting performance expectations is probably a good idea to get a better sense for deflation protection. Real returns in the form of inflation-linked bonds (TIPS or global inflation-linked bonds) may also be considered if inflation is a concern or if inflation hedging is cheap (when break-even inflation is priced attractively).

In deconstructing high-grade fixed income, investors can create a “bar-belled” approach to the portfolio: high-quality government-related debt as a deflation hedge and source of liquidity (TIPS or nominal sovereign bonds, currency, agency MBS, agency debentures) in separately benchmarked portfolios. Credit, in this framework, is not relied on as an “anchor to windward,” but rather as a discrete beta allocation and a source of excess return provided by manager skill. Credit investments perform well during economic recoveries,

² “LDI Product Types and Implementation Strategies” February 2, 2010

“Understanding Duration Risk in Pension Plans: The Case for LDI” February 2, 2010

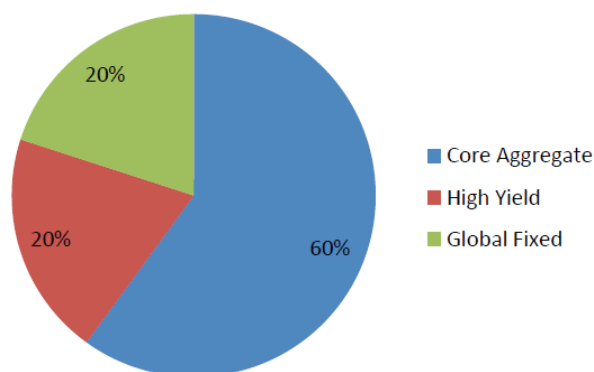
“Risk Budgeting: A Focus on a Pension Plan’s Biggest Risks” February 2, 2010

All are available at www.nepc.com



Exhibit 5 - Portfolio Examples

Traditional Fixed Income Program



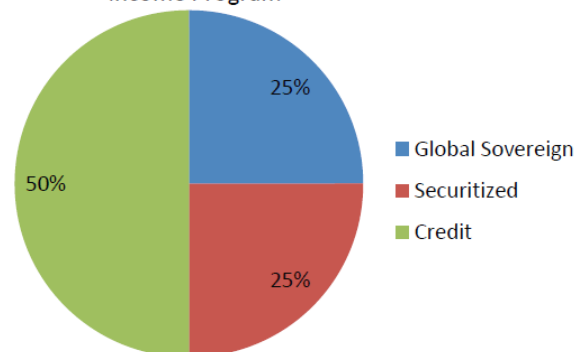
and increase the yield of the bond portfolio. Separating credit beta from high-grade duration beta achieves the goal of better aligning high-quality fixed income exposure with asset allocation objectives. A mix of active or passive managers would be appropriate in a deconstructed bond portfolio, given our views on the ability of managers to outperform in certain fixed income market segments, as highlighted in Exhibit 4.

Related to scaling portfolio risks, the diversification benefits of fixed income may be magnified through a “risk parity” approach to asset allocation. In a typical portfolio, equity risks dominate the overall portfolio risk, even if equities are diversified across markets. Returns for the portfolio thus become highly correlated to equities. A risk-parity approach seeks to match the contribution to risk of each asset class by leveraging or deleveraging capital allocations to the various asset classes. A resulting risk parity portfolio would typically leverage high-quality fixed income (nominal government bonds and TIPS) to a level that matches the contribution to risk of equities, thus maximizing the diversification benefits of bonds in the portfolio. For a more detailed description of risk parity, please refer to NEPC’s white paper on the topic.³

Portfolio Example

In Exhibit 5, an investment portfolio of BC Aggregate, high yield bonds, and global fixed income (labeled “Traditional Fixed Income Program”) is deconstructed into its key beta components and re-allocated (labeled “Deconstructed and Re-Allocated Fixed Income Program”). In this exam-

Deconstructed and Re-allocated Fixed Income Program



ple, removing benchmarks and mandates allows us to see the expected sector allocations. Notably, the credit component of the deconstructed portfolio is defined as 50%, recognizing that core and core-plus managers could, at times, have high allocations to credit.

In better defining expectations for managers and allocations, the 25% allocated to global sovereign bonds in the deconstructed portfolio serves as the high-quality strategic allocation to intermediate-term duration. This is the very-high-quality interest-rate-sensitive portion of the portfolio that should perform well in a recessionary and/or deflationary environment, and also be a reliable source of liquidity in most market environments. The securitized portion may also fit this mandate, with an added return component coming from the addition of convexity risk. Agency MBS are high-quality securities backed by the major GSEs, and have historically been relatively liquid in most market environments. ABS and CMBS may be an additional component to the securitized bond portfolio, however these instruments may be more credit sensitive and have different liquidity profiles than agency MBS.

Credit has been combined into one mandate that may include investment grade, high yield, and dollar-denominated emerging markets debt. Finding a manager, or managers, that can invest in all of these areas – as well as other market segments such as bank loans, convertible bonds, and derivatives – makes the prospects for active management more attractive.

In this example, credit is primarily a source of return and manager skill, and only secondarily a source of liquidity and protection from recession or deflation.

Removing the BC Aggregate allows for a fresh look at investment grade bonds. An increasing

³ “Risk Parity: In the Spot Light After 50 Years” March 3, 2010

Available at www.nepc.com

number of fixed income products have been launched to address a growing interest in finding alternatives to core or core-plus strategies. In addition to deconstructing the bond portfolio into components, investors may consider evaluating managers that are skilled at managing unconstrained multi-sector fixed income portfolios. Such products invest in many fixed income sectors including investment grade, high yield, leveraged loans, emerging markets debt, and global bonds, and may have greater flexibility in using derivatives or adjusting portfolio duration. These strategies are less benchmark-centric, and more oriented toward generating positive absolute returns.

Opportunistic and unconstrained fixed income products generally maintain long-term strategic allocations to the major fixed income sectors, but have the flexibility to express relative value views across markets and adjust allocations over time. Some products may allow shorting, or use implicit leverage through the use of derivatives. Absolute return fixed income may be managed against LIBOR, or other cash-based or cash-plus benchmarks. A one-stop-shopping approach is a good solution for some clients, particularly small endowments and foundations, who may have a limited amount of resources to allocate to active long-only fixed income managers. Such strategies must, however, be distinguished from a portfolio based on discrete beta exposures. Since unconstrained portfolios have the flexibility to invest

broadly, the purpose of investing is based more upon return seeking, alpha generation, and broad diversification, and may not hedge the portfolio against certain economic conditions in the same manner as dedicated high-quality nominal bonds or TIPS.

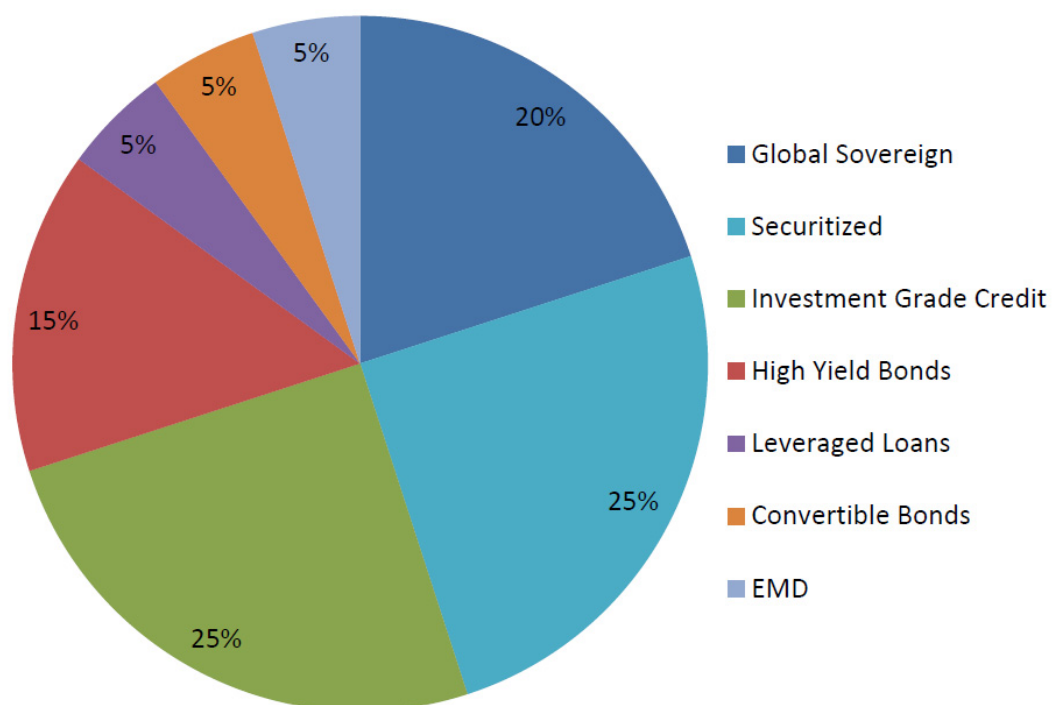
Exhibit 6 is an example of a multi-sector fixed income product. Allocations represent what the portfolio may look like at a specific point in time. Actual allocations may deviate from this representation.

Alpha opportunities in fixed income may be further enhanced by allocating active risk budgets in fixed income instruments to hedge funds or private markets investments. In 2008, NEPC advised clients to create an opportunistic investment mandate and recommended various credit strategies as a unique opportunity based on the market dislocation caused by the global credit crisis. In this example, bonds are positioned as a temporal investment.

Fixed Income in Defined Contribution Plans

It is our observation that fixed income investment options in defined contribution plans are generally underused by plan participants. In a typical DC plan, fixed income options may exist either through a money market fund, stable value fund, or core/core-plus strategy. Participants usually gravitate toward the most conservative option – probably due to a behavioral response associated

Exhibit 6 – Multi-Sector Fixed Income Example



with equity investing — and often shun other fixed income options such as core or core-plus products.

In target-date funds, fixed income is a component of the overall strategy. In funds that are focused on the accumulation stage of a participant's glide-path to retirement, equities are the dominant driver of portfolio risk and return, and fixed income is used in small amounts to offset some of the risks associated with equities. Fixed income plays a larger role as the fund nears its target date, in which preserving capital, income, and addressing inflation are more important objectives than capital growth.

The addition of TIPS or global inflation-linked bonds to savings plans achieves the objective of providing long-term real returns for participants where the primary objective is the preservation of capital and purchasing power. The addition of credit and other fixed income segments may be an interesting option for custom target-date funds, particularly in an environment where expectations for growth and equity returns are low.

Conclusion

We believe that disaggregating core fixed income portfolios is a first step in rethinking the usefulness of bonds in a portfolio. Traditional fixed income investment techniques should either be justified or abandoned in favor of a new approach that specifically aligns investments with portfolio objectives. Building a fixed income portfolio that is aware of liabilities and cash flows and appropriately addresses portfolio diversification — particularly during recession and stagflation — is the most important objective for investors to consider. Embracing a new approach to fixed income requires a few steps:

- Identify the components of fixed income return in your portfolio.
- Address key objectives such as asset/liability mismatches, inflation/deflation protection and disaggregate the portfolio, with a particular focus on separating credit exposure from other fixed income exposures.
- Decide how much Treasury Bond and high-grade sovereign exposure is needed to provide deflation protection and liquidity, while building a “bar-belled” approach to adding other fixed income exposures and active management.
- Consider multi-sector fixed income as a return-seeking alternative to a traditional core/core-plus strategy, but only after addressing the role of dedicated Treasuries or TIPS.
- Setting expectations for fixed income managers is also important. We are generally supportive of relaxing constraints on managers. However, where investments are relied upon for a specific purpose — such as deflation or inflation hedging — portfolio objectives should be aligned with that purpose rather than focused on beating a benchmark.



INVESTING IN VOLATILE TIMES: A DYNAMIC APPROACH TO ASSET ALLOCATION

Erik Knutzen, CFA, CAIA
Chief Investment Officer

Introduction

Setting an asset allocation policy is, for most investors, the central decision when building a long-term investment program. The recent experience of extreme volatility in markets, however, has raised significant questions about the best way to pursue asset allocation.

The precipitous market drop during the Credit Crisis of 2008 and the equally dramatic subsequent rebound exposed the shortcomings of static, equity-centric asset allocation policies such as the traditional 60/40 stock/bond mix and the private equity-focused “endowment model”. First, as correlations of risky assets converged portfolios dominated by equity (both liquid and illiquid) and other growth-oriented assets such as credit and commodities (including hedge funds with embedded exposures to those markets, or “beta”), showed that they were “one-bet portfolios”. Second, in the midst of highly volatile markets, many plan sponsors found themselves unable to adjust portfolio positioning, initially to mitigate fast-rising risks and then to take advantage of once-in-a-generation opportunities for excess return available in severely dislocated market segments such as credit.

As we assess the current prospective environment of low expected asset returns and amplified risks, we believe it is important for investors to consider a more dynamic approach to asset allocation. Such an effort should be undertaken seeking both to manage risks as well as to generate additional return. In this paper, we lay out a framework for dynamic asset allocation, one we have used at NEPC for a number of years. The key components of this process include: 1) More frequent review and adjustment of asset allocation

using market-driven assumptions; 2) Incorporating an Opportunistic component into asset allocation policy; and, 3) Delegating a portion of assets to flexible strategies such as global asset allocation and global macro.

A DYNAMIC APPROACH TO ASSET ALLOCATION REPRESENTS AN OPPORTUNITY FOR LONG-TERM INVESTMENT PROGRAMS TO INCREASE RETURN AND MANAGE RISK MORE EFFECTIVELY

The Importance of Dynamic Asset Allocation

At NEPC we believe there are opportunities to add value to investment programs at every step in the investment process. By focusing on a more dynamic approach to asset allocation, investors can more closely align their scarcest resources – staff and committee time – on those decisions that will have the greatest impact on their overall program. In prior papers we have described our risk-focused approach to asset allocation, as well as our views on the most effective methods for structuring programs at the investment strategy level (please see Bibliography). Effective asset allocation, however, does not stop with the risk-budgeting process.

The traditional approach is to review asset allocation on a periodic basis, perhaps every three years, using assumptions of asset class returns, risks, and correlations derived from long-term historic averages forecast over a 10-, 20-, or even 30-year horizon. Using mean-variance analysis, a

strategic portfolio is then identified that has a median expected outcome matching the target return with the lowest associated level of risk. Once this strategic asset allocation is set, the various asset categories are filled with investment managers using a “style-box” approach to manager strategy. Allocations are periodically re-balanced to targets, often according to strict rules and within relatively tight bands. The endowment model applies a similar long-term approach to asset allocation, with heavier weightings in alternative asset strategies such as private equity, real assets, and hedge funds.

THE RECENT EXPERIENCE OF EXTREME VOLATILITY IN MARKETS HAS RAISED SIGNIFICANT QUESTIONS ABOUT THE BEST WAY TO PURSUE ASSET ALLOCATION

Such approaches to asset allocation assume that relationships among investment categories are relatively stable over time; that valuations, risks, and correlations do not change significantly. Yet the reality of markets, as the events of the last four years remind us, is quite different. In fact, the structure of the global investment landscape is changing constantly. Investors’ most recent experience highlights the rapidly shifting nature of markets and the importance of becoming more dynamic.

Incorporating Dynamism into Asset Allocation

NEPC believes that it is important to incorporate dynamic asset allocation into investment programs by: 1) More frequent review and adjustment of asset allocation using market-driven assumptions; 2) Incorporating an Opportunistic component into asset allocation policy; and, 3) Delegating a portion of assets to flexible strategies such as global asset allocation and global macro. A description of each of these approaches follows.

A More Dynamic Annual Asset Allocation Process

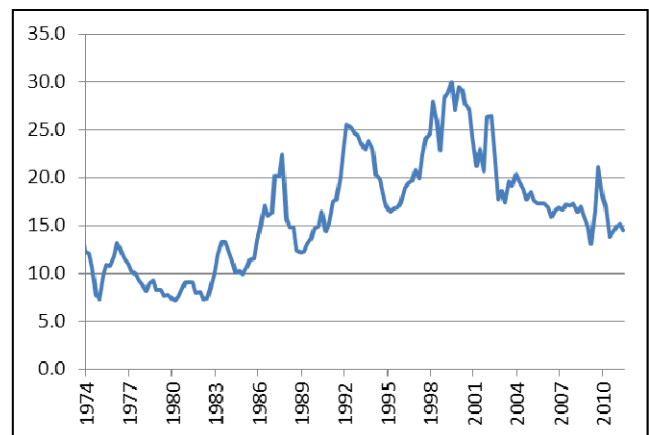
The experience of the last several years has provided ample evidence of the dynamism of markets, and serves as a constant reminder of the instability of key relationships driving asset class behavior. Below, we highlight the variability of critical inputs to the asset allocation process.

Valuation

Asset class valuations change through time as investors assess the overall economic environment and future prospects. Equity market valuations can be assessed by looking at indicators such as price-to-earnings (P/E) and price-to-book ratios, the relationship of stock market earnings and dividends to bond yields, replacement value of equities, and so forth. The valuation of bond markets can be assessed by considering indicators such as real yield over inflation and credit spreads over Treasuries. Even with an alternative asset category such as commodities, investors can gain a sense of relative value and attractiveness by comparing spot prices to forward commodity price curves.

Figure 1 shows the changing valuation of US large company stocks using the P/E ratio over the last 40 years. The significant variation in this factor over time can be explained in part by fundamentals, but also by investor fear and greed, i.e., overreaction to market environments. These changing valuation relationships should be reflected in forecasts of asset class return expectations, and should inform asset allocation decisions on a shorter time horizon than the traditional “set it and forget it” approach.

Figure 1 – S&P 500 Trailing Price/Earnings Ratio



Source: Bloomberg

Risk

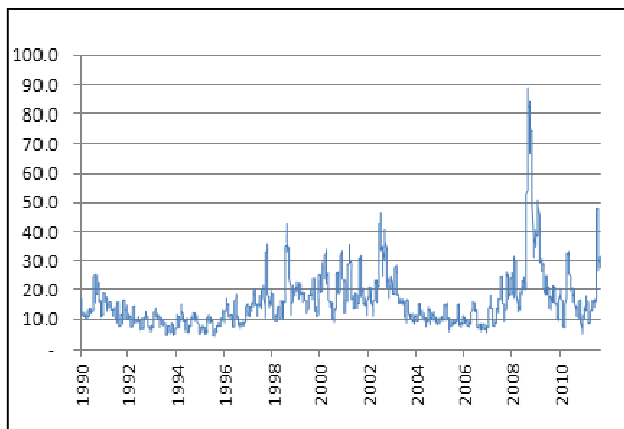
Just as market valuations vary through time, risk is not static over market cycles. There are many definitions of risk in markets – volatility, liquidity risk, counterparty risk, systemic risk, and so on.

The most commonly cited risk measure is volatility; and while this measurement has shortcomings

such as assuming normal distributions and valuing downside and upside risk equally, it is easily observable in the marketplace. Figure 2 shows annualized monthly volatility in the stock market since 1990. Over this time period, the average volatility was 16.1%, although for the five years running up to 2008 it was a docile 12.5%. Entering 2008, it was easy to underestimate the volatility of equities as part of a program's asset allocation assumptions and, as a result, allocate more heavily to risky asset classes on the eve of a major market downturn. A more dynamic approach, one that adjusted the forecasts of market volatility to incorporate higher expected risk after a low risk period and moderated projected risk after a high risk period would have led investors to reduce risk going into the crisis and then be able to seek higher risk and return assets coming out of the crisis.

It is also important to recognize that volatility is only one measure of risk. Investment program sponsors should think carefully about how to measure and forecast risk most effectively in their portfolios while monitoring multiple risk indicators to gain an understanding of how risk is changing in the current environment.

Figure 2 – S&P 500 Volatility (realized forward one month)



Source: Bloomberg

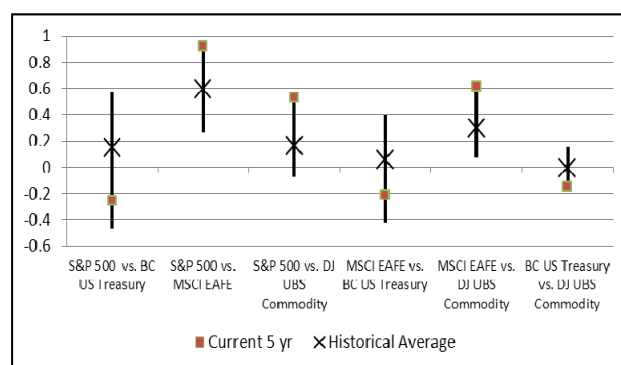
Correlation

The traditional approach to asset allocation assumes stable correlations of returns among asset classes. Just as with valuation and risk, however, correlations also change through time. Figure 3 shows the relationship of correlations among major asset classes.

This illustration highlights how these relationships can change dramatically over market cycles; often

diversification benefits are reduced at the worst time. In the Credit Crisis, for example, risky assets appeared to move in sympathy – that is, their correlations moved to the high end of the historical range. The exception to this phenomenon was US Treasuries, which experienced negative correlations with risky assets. As a result, in this highly volatile environment, a traditional portfolio turned out to be anything but diversified. Adjusting correlations to reflect current market conditions (for example, increasing expected correlations in a higher-volatility environment), rather than always assuming long-term averages, is an important component of pursuing a more dynamic asset allocation approach.

Figure 3 – Major Asset Class Correlations Over Time



Source: Bloomberg (Equities since 1975, Treasuries since 1987, Commodities since 1996)

NEPC's Annual Asset Allocation Process

At NEPC, we forecast asset class return, risk, and correlation over a five-to-seven year horizon using current and forward market pricing of key valuation relationships and drivers of returns, observed and implied risk, and expectations of correlations going forward. While long-term historical relationships inform our views, they are not the primary drivers of our forecasts. We also incorporate the informed judgment of our seasoned senior professionals in developing our projections. Our resulting annual market return forecasts tend to be more variable than those based primarily on historical relationships and forecast over longer time horizons. Importantly, we also prepare scenarios for high and low economic growth, inflation, and interest rates to help clients understand how their portfolios may behave in extreme market conditions, as well as their program's sensitivity to these key factors.

Figure 4 shows our five- to seven-year forecasted geometric returns for major asset categories from

Figure 4 – NEPC Expected Returns

Expected Return					
Asset Class	2007	2008	2009	2010	2011
Cash	4.00%	4.00%	3.00%	2.00%	2.00%
Core Bonds	5.00%	5.00%	5.50%	3.75%	3.00%
TIPS	4.75%	4.75%	6.00%	3.50%	2.25%
High-Yield Bonds	6.25%	6.75%	11.00%	8.00%	6.25%
Global Bonds (Unhedged)	4.00%	4.00%	4.25%	3.25%	1.75%
Emerging Market Debt	6.25%	6.80%	8.00%	6.50%	5.25%
U.S. Large Cap Equities	8.50%	8.50%	9.25%	7.75%	7.00%
U.S. Small/Mid Cap Equities	8.75%	8.75%	9.50%	8.00%	7.00%
Int'l Equities (Unhedged)	8.75%	9.00%	9.75%	8.00%	7.00%
Emerging Int'l Equities	9.75%	9.50%	10.50%	9.50%	9.00%
Commodities	5.00%	5.00%	5.50%	4.75%	4.50%

Source: NEPC (5-7 year forecast horizon)

2007 to 2011. An example of the importance of annual updating of forecasts based on market-driven factors can be seen in the change in expected return from US equity and high yield bonds from 2008 through 2010. In each case our forecasts progressed from muted expected returns followed by a significant increase after the Credit Crisis, and then a fall-off after the strong rally of 2009.

Our risk forecasts use current market pricing and draw on investor-driven indicators such as volatility indices (e.g., VIX) and other “fear indicators” being priced in the marketplace. At times of extreme sentiment, we also apply judgment to create more normalized risk estimates. Likewise, our assumed correlations put greater emphasis on recent experience and do not assume greater diversification than is on offer from the marketplace.

Combining these elements led us to advise clients to reduce risk in portfolios going into the Credit Crisis, followed by a re-risking of portfolios in 2009 and a moderation of that risk in 2010.

A Note on the Dynamics of the Global Market Opportunity Set

A key tenet of the capital asset pricing model is that the global market basket represents the most efficient long-term portfolio as defined by expected return per unit of risk, or Sharpe Ratio.

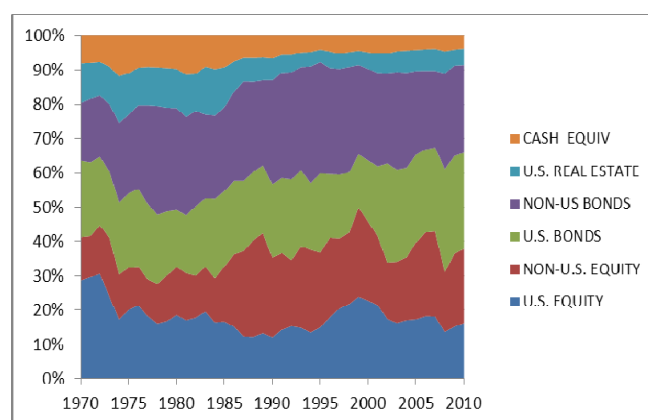
Within this model, investors’ asset allocations should deviate from that portfolio only to pursue higher return or to reduce risk. The traditional approach to asset allocation, described above, assumes that the composition of the market portfolio is static, whereas in reality it is constantly changing. Figure 5 shows the varying composition of the global market portfolio over the last 40 years. Focusing on US equity (the single largest component of most US institutional investment programs) the exhibit shows that this asset category has ranged from 30% of the global capital markets in the early 1970s to a low of 12% in 1990. In the most recent decade, US equity as a percent of the global market portfolio has ranged from the high teens to the low twenties.

A naïve approach to asset allocation following the capital asset pricing model would use these weights as a starting

point for asset allocation each year. While we believe that additional considerations of valuation, risk, and correlations should come into play when setting asset allocation, as described above, we acknowledge that it is important to be cognizant of the global market composition when establishing asset allocation targets. Maintaining a static weight to US equity, for example, while disregarding its evolving weight in the global market portfolio indicates that the investor is actually making an active but unintentional bet.¹

Furthermore, the structure of markets is constantly evolving. New investment categories regu-

Figure 5 – The Evolution of the Global Market Portfolio



Source: UBS Global Asset Management

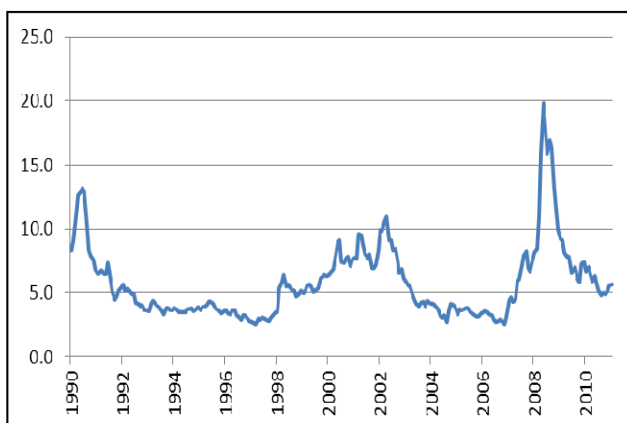
¹ Sharpe, William F., “Adaptive Asset Allocation Policies”, Financial Analysts Journal, May/June 2010

larly become available to investors through the opening of new markets, disintermediation, financial engineering, and changes in the regulatory environment. In the 1980s, US investors built portfolios primarily of domestic large-company stocks and investment grade bonds (at that time Treasuries and corporates), but by the 2000s investors were routinely incorporating global asset classes and a panoply of alternative investments. More recently, new strategies such as bank loans and local currency emerging market debt have become common tools available to institutional investors as well as important potential sources of return and/or diversification. We believe it is important to assess new market segments and strategies for inclusion in a program's investment universe on an ongoing basis, and to create the latitude to pursue these newer categories as they grow and attract assets.

Opportunistic Investing

Occasionally markets dislocate and valuation moves to extremes – away from any semblance of fair value. Examples of such dislocations include the technology bubble of the late 1990s and the credit market sell-off in 2008. As a representation of the most recent experience in the credit markets, Figure 6 shows the yield spread of below-investment-grade bonds compared to Treasuries since 1990. In late 2008, spreads blew out to record levels, more than two standard deviations from the historical average. At that point, high yield bonds were being priced as if more than half the issues in the market would default and there would be lower-than-historical recovery levels on defaulted issues – a more disastrous outcome than experienced in the Great Depression. While

Figure 6 – High Yield Bond Spread (yield-to-worst) versus Treasuries



Source: Bloomberg

it was possible that the period from 2009 and beyond could have been worse than the 1930s for buyers of credit issues, it was more likely that investors had over-reacted to the Credit Crisis. For investors with the ability to dynamically shift their asset allocation, such radical extremes in valuation, which can persist for several years, represent opportunities to reduce risk (Tech Bubble) or harvest additional return (Credit Crisis). Dislocations can also present opportunities to exploit changing market dynamics and participation. For example, the departure of traditional providers of liquidity during the Credit Crisis created potential excess returns in its aftermath for those able and willing to lock up capital in liquidity-provision strategies.

IN 2008, WE RECOMMENDED THAT CLIENTS ALLOCATE 5%-10% OF THEIR ASSETS TO CREDIT STRATEGIES, FUNDED WITH A REDUCTION IN EQUITY EXPOSURE

At NEPC, we first took advantage of such a dislocation in 2002 when we recommended that clients tactically increase allocations to high yield bonds after that sector sold-off in the wake of the bursting of the tech bubble and the Enron/WorldCom scandals. More recently, to take advantage of the Credit Crisis NEPC sent a letter in the spring of 2008 to all of our clients entitled, "When Opportunity Knocks". We recommended that clients create a new Opportunistic category in their strategic asset allocation policies to invest in the severely dislocated global credit markets, as well as in other opportunities that may present themselves in the future. We recommended that clients allocate 5%-10% of their assets to credit strategies, funded with a reduction in equity exposure. This is an example of NEPC's approach to opportunistic investing.

For most long-term portfolios, we believe that some form of opportunistic investing is appropriate, although we recognize that taking advantage of near-term opportunities can be outside the traditional asset allocation process. We also understand that outsized opportunities do not always exist in global markets. Therefore we recommend that funds establish an Opportunistic category with a maximum allocation of 10% and a target allocation of 0%. We recommend that allocations in this category be made with a time horizon of one-to-three years. They should be made



to asset classes that are large enough and at sufficient extremes in valuation that price movements can have a meaningful impact on a fund's risk and return profile. Also, the opportunity must be actionable in terms of investment vehicles and strategies, as well as within an investor's normal decision-making process.

In framing the specific opportunity arising during the Credit Crisis, we indicated to clients: 1) the likely horizon for the investment would be two-to-three years; 2) it would be hard to follow exhaustive due diligence procedures to evaluate the new credit-oriented investment strategies coming to market; 3) it would be difficult to make "apples-to-apples" comparisons of these products so diversification by strategy was important; and, 4) the opportunity may improve after the initial investment (e.g., prices may continue to fall before they rise). We identified, evaluated, and vetted an array of credit products across the liquidity and expected return spectrum from bank loan, convertible, high yield, and multi-sector liquid credit strategies to credit-oriented hedge funds and longer lock-up distressed vehicles. In Figure 7 we show the returns from mid-2008 to mid-2010 of three credit benchmarks representative of the liquid strategies pursued by clients as well as common equity benchmarks. The exhibit demonstrates that an allocation to credit strategies added value relative to stocks with less downside throughout the period.

The recovery in credit markets beginning in 2009 was remarkably rapid. Through our annual asset allocation forecasting process, as described above, by early 2010 we identified that liquid credit sectors had appreciated to nearly fair value. As a result, in the first half of 2010 we recommended that clients exit the liquid credit allocations in their Opportunistic portfolios.

Figure 7 – Credit Versus Stocks; Returns July 2008 – June 2010

Index	2nd Half 2008	2009	1st Half 2010	Total Period
Barclays US Credit	-3%	16%	6%	19%
Barclays High Yield	-25%	58%	5%	24%
S&P LSTA Lev Loan	-28%	45%	3%	12%
S&P 500	-29%	19%	-7%	-16%
MSCI EAFE	-36%	29%	-13%	-27%

Source: Bloomberg

Since 2010, the opportunity in the credit markets has evolved toward a longer-term distressed cycle. Going forward, in the increasingly complex global investing environment, we believe that it is important for investors to have an Opportunistic component of their asset allocation policy to be able to take advantage of such market dislocations.

MARKET PRICES FLUCTUATE CONSTANTLY. MOST SHORT-TERM CHANGES REPRESENT "NOISE" AND DO NOT REPRESENT RE-ALLOCATION OPPORTUNITIES FOR INSTITUTIONAL INVESTORS

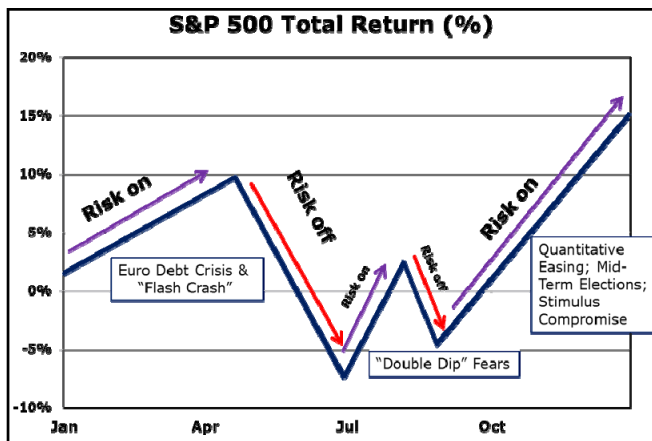
Incorporating Flexible Strategies such as Global Asset Allocation or Global Macro

Market prices fluctuate constantly. Most short-term changes represent "noise" and do not represent re-allocation opportunities for institutional investors. Often, however, markets move away from fair-value sufficiently for active managers to be able to pursue profitable trades. These trading opportunities are shorter-term in horizon and may occur in smaller market segments than what is required to pursue an allocation based on the Opportunistic approach described above; nevertheless, they can represent real chances to capture excess return or mitigate risk in an investment program.

The Macro-Driven Nature of Markets

For the last four years, markets for risky assets have tended to move in unison, driven by major macro-economic factors. Examples include the collapse of major financial institutions in 2008, the massive stimulus programs that began to take effect in 2009, and the European debt crisis and implementation of additional stimulus in the US in 2010. Figure 8 shows the ebb and flow of these events through calendar year 2010, and their impact on the US stock market. In this climate, cross-correlations among securities rose as the over-

Figure 8 – Macro-Driven Markets - 2010



Source: Bloomberg, NEPC

all flow of capital mattered more than differentiation among securities. This “risk on/risk off” market environment has continued into 2011 and, with policy-makers being forced to make politically challenging decisions to address global imbalances, appears likely to continue for some time.

When markets are being driven by such top-down forces, active managers focused exclusively on security selection struggle to add value and overall investment program performance is driven by aggregate levels of risk exposure and allocations among risky asset classes. Programs that are not positioned to adjust to changes in the overall environment, either at the total program level or by incorporating managers with the ability to adjust their portfolios across asset categories and markets, will be at a distinct disadvantage.

PROGRAMS THAT ARE NOT POSITIONED TO ADJUST TO CHANGES IN THE OVERALL ENVIRONMENT WILL BE AT A DISTINCT DISADVANTAGE

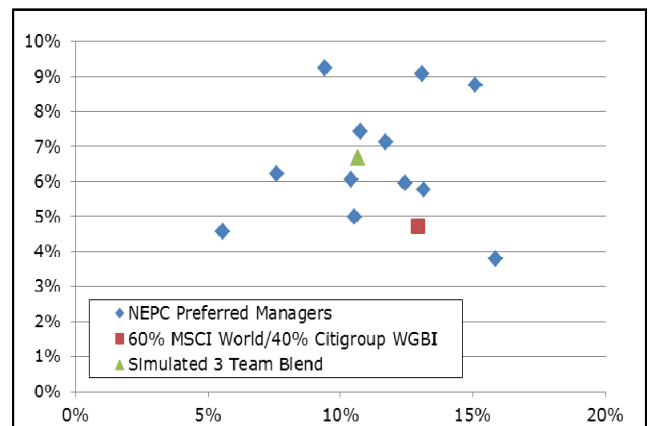
Global Asset Allocation and Global Macro Strategies

It is often said, “It’s impossible to time the market.” We agree that the vast majority of investors (including ourselves) do not have the investment experience, tools, and decision-making framework to pursue true tactical asset allocation. A small number of investment management firms, however, have been able to add value (by increasing return, reducing risk, or both) through a combination of building more efficient starting portfolios and then shifting assets among markets based on shorter-

term trading opportunities. These strategies include global asset allocation, risk parity, and global macro.

Figure 9 shows the risk and return of NEPC’s Preferred global asset allocation and risk parity strategies over the five years ending June 30, 2011. Nearly all of the managers represented (11 of 12) have provided superior performance relative to a passive 60/40 blended stock/bond benchmark. In our work with clients, we often recommend a “team” of managers in this category, each applying different approaches to these strategies. The green triangle in Figure 9 represents the median outcome of a simulation of three-manager teams. Over this time period the incorporation of such global flexible strategies has added significant value not only by increasing performance, but also by moderating risk over a passive allocation to stocks and bonds. Furthermore, these strategies, particularly those pursued by global macro managers, have historically demonstrated additional positive diversification benefits such as low or negative correlation to other risky strategies in times of market stress and positively skewed return patterns.

Figure 9 – NEPC Preferred GAA Strategies—Return and Risk



Source: NEPC (five years ending 6/30/2011)

Our recommendation that clients include a component of global flexible strategies in their investment structure is also consistent with an overall theme of loosening constraints on managers (i.e., departing from “style box” thinking) who have demonstrated strong active management skill. Such an approach can be implemented more broadly across investment programs with global equity managers, “go-anywhere” fixed income managers, and hedge fund strategies with broad opportunity sets and limited restrictions. By incorporating these types of strategies, investors can seek to take advantage of as many sources of

excess return as possible while ensuring that there are components of their program that are able to respond to global macro events to seek additional return, mitigate risk, or both.

Implementing Dynamic Asset Allocation

In order to implement a more dynamic approach to asset allocation, investment programs can take the specific steps described above. This may require some changes to program governance such as an expedited committee decision-making process, delegating specific authorities to staff, or structural changes to include opportunistic and global flexible components of the strategic asset allocation. From a rebalancing standpoint, broadening policy bands can be an important part of allowing for more dynamic asset allocation, as well as ensuring that rebalancing is less “mechanistic” and more flexible to allow for adjusting allocations based on changing market relationships.

A DYNAMIC APPROACH TO ASSET ALLOCATION REPRESENTS AN OPPORTUNITY FOR LONG-TERM INVESTMENT PROGRAMS TO INCREASE RETURN AND MANAGE RISK MORE EFFECTIVELY

In rebalancing discussions, investors should consider the impact of transaction costs compared to the relative valuation of the affected categories. For those programs that are able to employ derivatives, working with a derivatives overlay manager can provide the flexibility to implement a more dynamic approach to asset allocation quickly and efficiently while minimizing the impact on underlying portfolios. For those programs that are not able to employ a dedicated derivatives overlay manager, implementing a more dynamic approach to asset allocation can be facilitated through the use of index vehicles for a portion of the portfolio.

Applications of Dynamic Asset Allocation: Liability-Driven Investing

An important application of dynamic allocation strategies among NEPC clients is in the area of liability-driven investing (LDI) for corporate pension plans. In the last several years, many pension plans have faced low funded statuses due to bad markets combined with low interest rates as mark-to-market accounting rules were implemented

(the “perfect storm”). Restoring funded status has to result from some combination of contributions, higher interest rates, returns of risky assets, and excess returns from active management. Some programs are establishing planned stages of liability-hedging at progressive levels of funding status, or creating a “glide path” toward a fully hedged or near-fully hedged position. While a typical glide path might specify a calendar-based increase in the size of the liability-hedge (essentially dollar-cost averaging), we have worked with many clients to implement dynamic strategies that respond to market movements.

For example, increased funded status can be “captured” dynamically using rules based on the cause of any improvement, such as:

- If funded status improvement came from the performance of risky assets, reduce the allocation to risky assets along the glide path;
- If the improvement came from higher interest rates, increase liability-hedging assets;
- If the improvement came from outperformance of Treasuries in the hedging portfolio relative to the corporate credit-based liability (i.e., credit spread widening), trade into long corporates; and/or, If the improvement came from contributions, consider putting the additional assets entirely in liability-hedging assets.

By using these sorts of dynamic rules, many NEPC corporate pension clients have been able to protect funded status even as interest rates have generally declined. The high volatility environment for both interest rates and risky assets has allowed a dynamic approach to glide path management to capture short-term improvements in funded status.

Conclusion

A dynamic approach to asset allocation represents an opportunity for long-term investment programs to increase return and manage risk more effectively. We believe that by more frequently reviewing and adjusting asset allocation, incorporating opportunistic investing, and employing flexible strategies such as global asset allocation and global macro managers, investment programs can pursue these important objectives without engaging in short-term “market timing”. A



more dynamic approach to asset allocation also can serve to focus investment committees and program staff on important, but often overlooked, drivers of risk and return for investment programs.

In the challenging current global investment environment characterized by muted expected capital market returns and outsized potential risks, we believe it is critical for investors to employ every possible tool in the investment toolbox. As markets continue to evolve, we expect that dynamic asset allocation will become an increasingly important component of investment program oversight. At NEPC, we remain committed to working with our clients to add value at each step in their investment process – including a heightened focus on implementing a dynamic approach to asset allocation.

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