MSCI

Research

Global Equity Allocation

Three papers exploring global equity allocation policies and their implementation

Dear Client,

The recent financial crisis led many institutional investors to reevaluate their asset allocation policies and explore alternative approaches to implementing them. With the increased globalization of capital markets, for example, certain leading pension plans have adopted global equity policy benchmarks, moving away from the traditional divide between domestic and international equity allocations. Clear distinctions between liability matching portfolios and return seeking portfolios have also reinforced the case for integrated global equity approaches.

Theoretically sound, a global equity allocation is the natural starting point for the equity investor. It provides access to the entire global investment opportunity set and diversification benefits from exposures to different geographical regions, market segments, sectors and currency movements.

MSCI has held extensive discussions around the world with major pension plans, asset managers, and investment consultants to understand various approaches to implementing the global equity allocation. Based on feedback from the investment community and our internal research, we published a series of research papers.

- The first paper in the series, “Globalization of Equity Policy Portfolios”, presents the arguments proposed by thought leaders in the investment industry for moving away from a partitioned domestic/non-domestic approach to equity investing to an integrated global equity investment process.
- The second publication, “The ‘New Classic’ Equity Allocation?” addresses the key considerations that should drive the choice of mandate structures and the definition of the relevant opportunity set for individual mandates. The paper also offers an implementation framework for a global equity allocation.
- The third piece, “Some Like it Hot”, examines the active management opportunity in different market segments in the context of a global equity allocation implementation. We focus on the role of very active mandates across segments in a core-satellite portfolio structure.

We hope that our research series will serve as a useful reference for those who want to understand current practices and emerging trends in the implementation of a global equity allocation. We look forward to your comments and welcome your suggestions for future research on global asset allocation topics.

Remy Briand
Managing Director,
Global Head of Index and Applied Research

Globalization of Equity Policy Portfolios

A fresh look at strategic asset allocation from a U.S. institutional investor perspective

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Summary

Globalization is an irreversible process, not an option[1]. It has been a driving force of economic and financial integration. For example, over the last decades many trade barriers and tariffs have decreased or been eliminated altogether, foreign direct investments have widely continued to increase year over year, companies are increasingly producing and selling their products abroad, a Financial Accounting Standard has been adopted across more than 100 countries, and many capital markets across the world have become more accessible and efficient for foreign and domestic investors alike.

Institutional investors are increasingly looking for broader and deeper exposure to international equities. Several consultants, recognizing the increased accessibility of international capital markets and the common underlying characteristics of U.S. and foreign equities, have started to question the asset allocation divide between domestic and international equities. Consultants now more frequently recommend a global equity policy benchmark reflecting the investable opportunities of the equity markets worldwide as the starting point for asset allocation.

However, most institutional investors worldwide, including in the U.S., have not yet gravitated towards a global approach in their equity allocation process. Instead, many maintain a strong home bias with a strategic preference for domestic equities in their equity allocation. A higher allocation to domestic equity relative to its share in the world portfolio is in essence an active investment bet on domestic equities. However, the best investment opportunities are not necessarily found in the domestic market. For example, moving from a U.S.-only equity universe to a global equity universe triples the opportunity set.

The potential benefits of global investing are grounded not only in empirical evidence, but also in modern portfolio theory -- in particular the Capital Asset Pricing Model (CAPM), which is based on the diversification benefits of investing in the broadest possible global market portfolio[2]. Globalization and improved access to equity markets around the world, including in many emerging markets, have offered empirical evidence of the potential benefits of global equity investing.

Although an integrated global approach to equity investing is not yet widespread among U.S. institutional investors, recently a number of large and leading U.S. pension plans are now considering Global Equity as a single strategic asset class leading the way to an Integrated Global Equity Investment Process.

This paper identifies trends towards global investing and certain implications for the equity investment process of institutional investors and discusses the rationale underlying an integrated global approach to equity investing by U.S. institutional asset owners.

The paper is structured as follows: Section I presents the theoretical background and evolution of a global market portfolio. Section II reviews selected data and factors illustrating greater global economic and capital markets integration and the implications on companies and equity markets. Section III reviews the evolution of allocation by U.S. institutional investors to domestic and international equities and discusses the traditional arguments for home bias. Section IV analyzes the trend towards, and discusses the potential implications and benefits of, an integrated global equity investment process. Section V offers conclusions.

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[1] Former UN Secretary General, Kofi Annan

[2] Markowitz (1952)

I. An Evolution of the Market Portfolio

In its original form, the Capital Asset Pricing Model (CAPM) suggested that all investors hold a combination of the risky market portfolio and cash, depending on their risk tolerance.[3] The market portfolio was defined as a combination of all risky assets imaginable, including equities, fixed income, human capital, etc. Clearly, such a portfolio was neither observable nor investable and therefore proxies for the market portfolio were developed.

When the CAPM was further developed, U.S. investors used the S&P 500 as an investable proxy for their market portfolio.[4] Meanwhile, a body of academic research started supporting the case for international investing and extending the domestic CAPM to an international portfolio (I-CAPM).[5] According to the I-CAPM, in an efficient and integrated world capital market, the global market portfolio would replace the domestic proxy for the market portfolio implying that domestic allocations should not exceed the relative country share in the global market portfolio. Since the mid 1970s this global market portfolio was represented by the MSCI World Index, which at that time covered approximately 60% of the market capitalization from 20 developed-market countries, including the U.S.

Beginning in the early 1970s in the U.S., a trend developed to invest in broad U.S. market portfolios, as academic research supported the case for adding small companies to institutional portfolios.[6] To facilitate changes in the investment process, the consultants at Wilshire Associates developed the Wilshire 5000 index, which includes both the large and small capitalization companies and covers close to 100% of the U.S. equity universe. This and other similar broad domestic indices started replacing the S&P 500 as the proxy for the market portfolio in policy benchmarks of U.S. asset owners.

In the late 1980s, as more investors extended their equity opportunity set beyond the developed markets and started investing in securities from emerging markets, the MSCI ACWI Index, which included 23 developed markets and 25 emerging markets countries, started replacing the MSCI World Index as the proxy for the global market portfolio. Beginning in the late 1990s, global investing underwent a further transformation as investors saw the benefits of investing in international small caps and broadening their opportunity set to the overall international market. Now investors are looking at broad global indices like the MSCI ACWI IMI index, which covers approximately 99% of the global investable opportunity set as a proxy for the global market portfolio.

Exhibit 1 compares some characteristics of the MSCI USA, MSCI USA Investable Market (IMI), MSCI World, MSCI All Country World (ACWI) and MSCI ACWI IMI indices using the Barra Global Equity Long-Term Model (GEM2L). It illustrates the increase in the investable equity universe from 2,500 securities in the U.S. to a total of more than 8,000 securities globally. Some of the consequences of such an increase in investable equities are the lower level of concentration risk and the lower risk coming from individual securities. Furthermore, the opportunities for active management improve as a larger and more dispersed universe allows for more investment choices leading to potentially vastly differing outcomes.

The MSCI USA IMI provides exhaustive coverage for the US investable universe and is representative of the U.S. equity opportunity set. As of June 1, 2009, the MSCI USA IMI had 2,507 constituents, with the

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[3] Sharpe (1964) and Linter (1965)

[4] The S&P 500 is a market capitalization weighted portfolio of the U.S.'s largest stocks and covers approximately 75% of the U.S. equity universe.

[5] Adler & Dumas, 1983; Solnik, 1977; Stulz, 1981; Wheatley, 1988.

[6] Dennis A.Tito, A new capital market index (1974)

largest 10 companies representing 16.6% of the weight of the index. The asset-selection risk accounted for 0.45% of the total forecasted risk for the MSCI USA IMI. By contrast, the MSCI ACWI IMI contained 8,531 constituents, with the largest 10 companies representing 7.4% of the index. Asset-selection risk contributed just 0.15% to the total risk for the index and thus reduced the asset-selection risk by approximately 67% relative to the MSCI USA IMI.

Exhibit 1: Risk Characteristics of Indices Using GEM2L (in USD)

	Number of assets	Weight of top 10 companies (%)	Asset selection Risk (% Std Dev)	Total Risk (% Std Dev)	Asset Selection Risk Contribution (% Total Risk)
MSCI USA	600	19.0	2.47	31.57	0.61
MSCI USA IMI	2,507	16.6	2.16	32.19	0.45
MSCI World	1,655	9.5	1.52	30.54	0.25
MSCI ACWI	2,397	8.4	1.37	30.85	0.20
MSCI ACWI IMI	8,531	7.4	1.21	31.14	0.15

Source: MSCI. Data as of June 1, 2009

The theoretical premise of I-CAPM is based on the existence of a fully-integrated capital market where the same asset pricing relationships apply in all countries, and firms use similar decision rules and evaluation criteria, regardless of their geographical location. Historically, financial market segmentation arose from restrictions on capital flows and ownership of domestic companies, and other differences in treatment between domestic and foreign investors (rights, taxation, etc.). Although some of the market inefficiencies still exist today, globalization has significantly reduced many such limitations that resulted in market segmentation in the past.

In the next section we look at empirical evidence regarding the economic and financial integration of global capital markets. Increasingly integrated and efficient markets support the case for a global approach to strategic equity allocation.

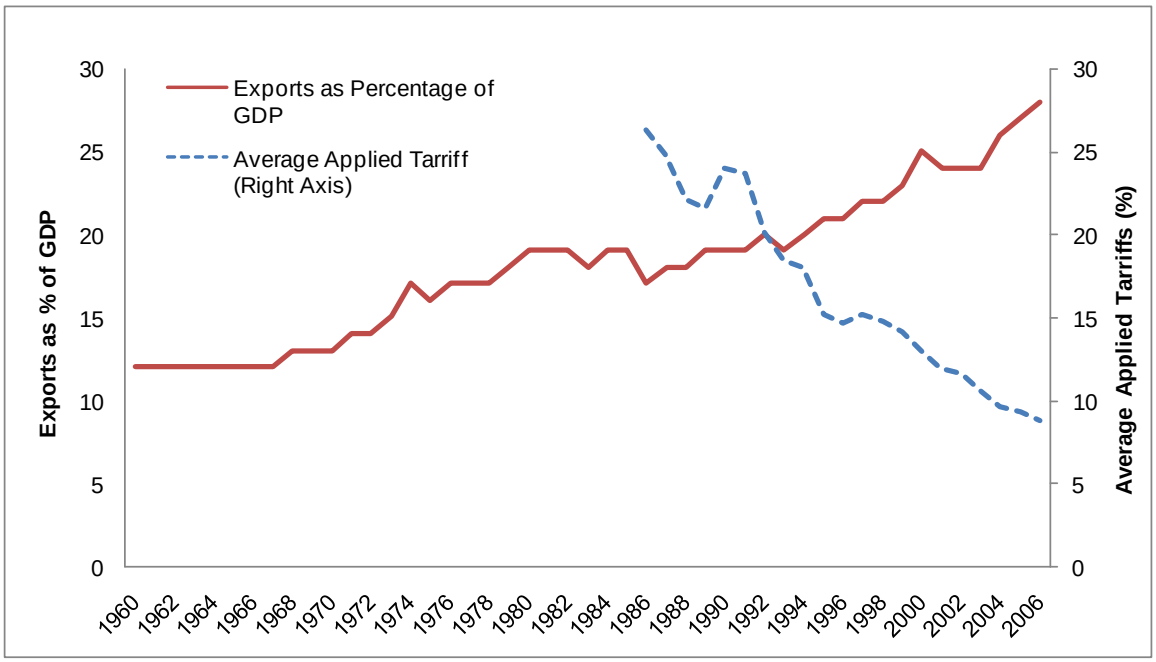
II. The Foundations of Globalization

Globalization has been transforming economies and financial markets globally. Powerful forces have been behind these changes. Structural reforms, free trade agreements and wide scale liberalization have allowed companies to compete for business and resources globally, supported by increasingly interconnected financial centers. The spectacular evolution of international trade has been a catalyst and an effect of the integration of economies around the world.

Exhibit 2 illustrates how world exports (for 142 countries) as a percentage of global GDP have nearly doubled in the last 20 years (left scale). This increase in world exports was made possible as countries removed trade barriers and opened up their economies. For example, average tariffs (right scale) in the world (for 169 countries) declined from 26.3% in 1986 to just 8.8% in 2007[7].

[7] World Bank, IMF, OECD.

Exhibit 2: World Exports as a Percentage of GDP and Average Tariffs in the World

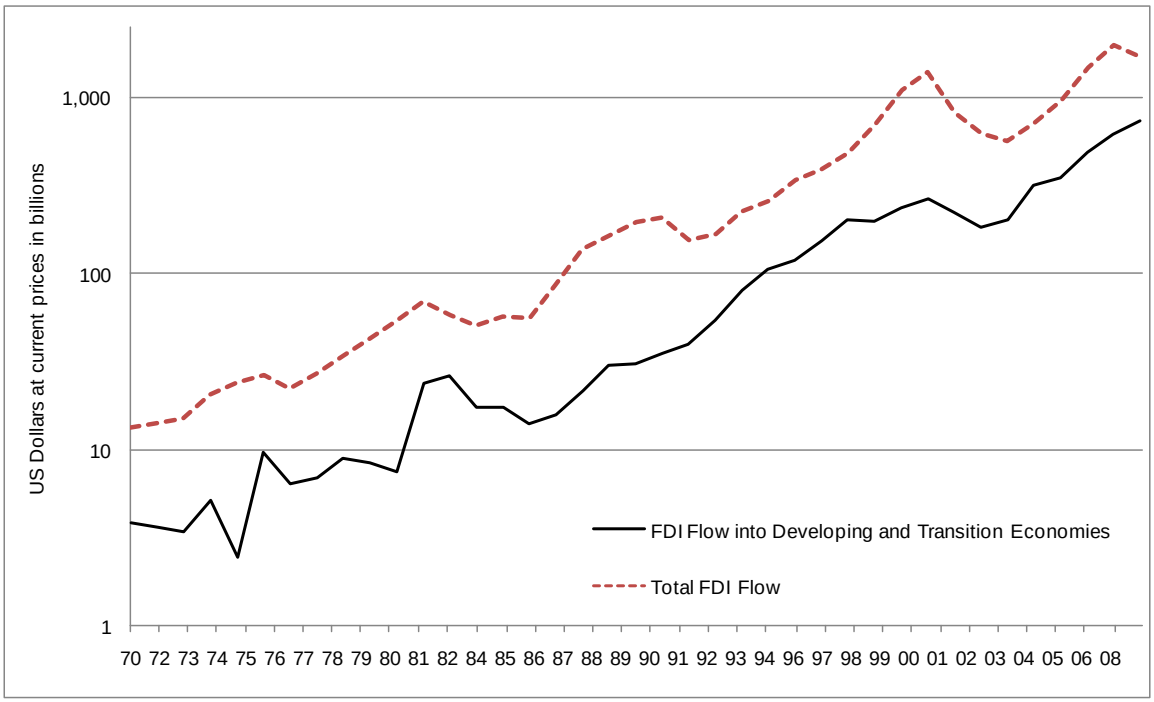


Source: World Bank.

The decline in tariffs has allowed companies to grow by selling their goods and services beyond their domestic boundaries. But, as the importance of foreign business was growing, many companies moved from being exporters to set up full-scale operations that take full advantage of opened economies. Others shifted their production sites to take advantage of lower costs, or sought access to supplies of natural resources.

This move by companies outside of their home country is illustrated by the trend in FDI (Foreign Direct Investment). Exhibit 3 shows how incoming FDI in the world, and in developing economies in particular, has been growing over the last decades, albeit subject to global investment cycles.

Exhibit 3: Foreign Direct Investment: Total Flows and Flows to Developing Economies



Source: UNCTAD.

As a result of these fundamental transformations in the world economy and in the way companies operate in it, it is today difficult to disentangle companies from their global footprint. Further, it may be perilous to assume that a company's business will always be more reflective of the economy of its country of domicile than of the economy in another part of the world.

As an illustration of the above, Exhibit 4 shows the percentage of foreign sales against total sales, as well as the percentage of foreign assets compared to countries in the MSCI World Index. By buying domestic equities in any of these countries, an investor takes on significant international exposure.

Exhibit 4: Foreign Sales and Assets as a Percent of Total Sales and Assets for MSCI World Countries

Country	Foreign Sales as Percent of Total Sales	Foreign Assets as a Percent of Total Assets
Australia	33.1%	14.1%
Austria	57.9%	21.4%
Belgium	22.9%	32.0%
Canada	36.7%	34.1%
Denmark	43.9%	7.8%
Finland	71.5%	31.7%
France	48.1%	27.8%
Germany	57.4%	9.3%
Greece	15.4%	17.0%
Hong Kong	52.9%	23.3%
Ireland	79.2%	62.3%
Italy	36.0%	18.9%
Japan	27.7%	15.9%
Netherlands	56.4%	36.0%
New Zealand	33.2%	26.9%
Norway	41.1%	30.1%
Portugal	34.9%	24.9%
Singapore	60.6%	34.6%
Spain	35.9%	30.7%
Sweden	67.9%	60.2%
Switzerland	52.2%	70.6%
United Kingdom	55.9%	33.5%
United States	32.2%	9.8%

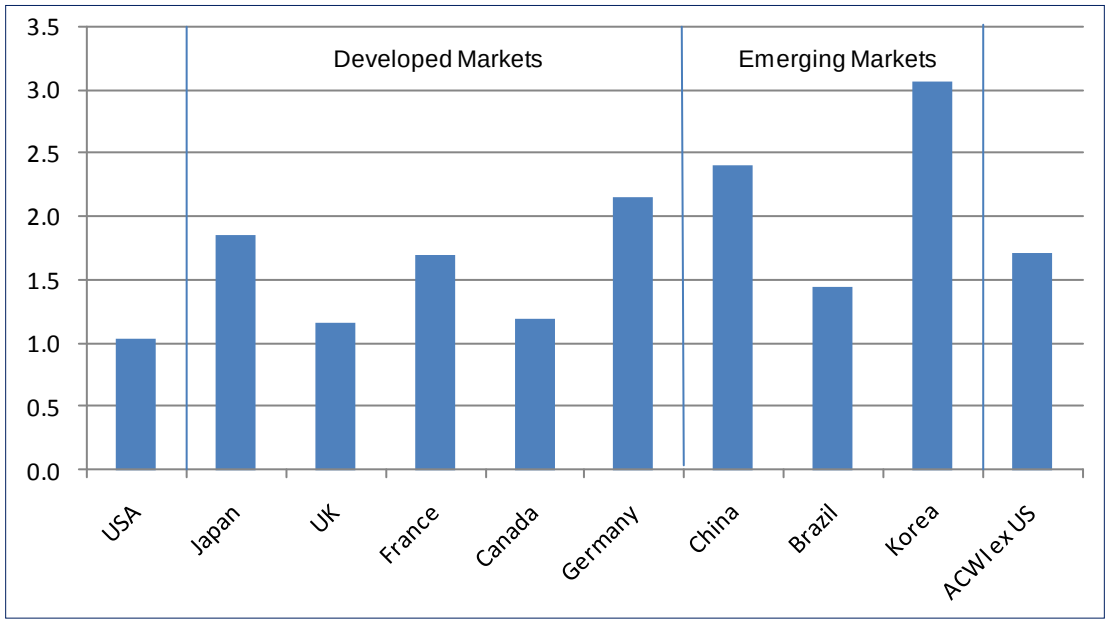
Source: MSCI, Worldscope. Data as of May 31, 2009.

Another important dimension of this global integration is the increased integration of financial markets in response to the needs of issuers and global investors. A striking example has been the move to adopt global accounting regulations.

More than 100 countries require or permit International Financial Reporting Standards (IFRS) in varying degrees, either as originally issued by the International Accounting Standards Board (IASB), or as modified and endorsed by a particular jurisdiction. Japan, Canada, Brazil, Argentina, Mexico, South Korea, and India have all set out a time line for the full adoption of IFRS. Since December 2007, the U.S. Securities and Exchange Commission (SEC) adopted rules to allow foreign private issuers to file financial statements prepared in accordance with IFRS (as issued by the IASB) without reconciliation to U.S. GAAP. In November 2008, the SEC published its proposed roadmap for the potential transition to IFRS by U.S. companies. If certain milestones are achieved, the mandated transition to IFRS could occur in stages, beginning with large accelerated filers for fiscal years ending on or after December 15, 2014.

With markets increasingly opening to international portfolio investment, technology improvements and investment in market infrastructure around the world, access to international markets has become much easier and cheaper for investors. Exhibit 5 provides the Annualized Traded Value Ratio (ATVR) for the largest developed and emerging markets. While differences still exist in bid-ask spreads (5 basis points in the U.S., versus 17 in World ex U.S. and 28 bp in EM), the Annualized Traded Value Ratio (ATVR)—a measure of relative liquidity—highlights how all large markets are now quite liquid.

Exhibit 5: Annualized Traded Value Ratio (ATVR) for Top 5 Developed and Top 3 Emerging Markets



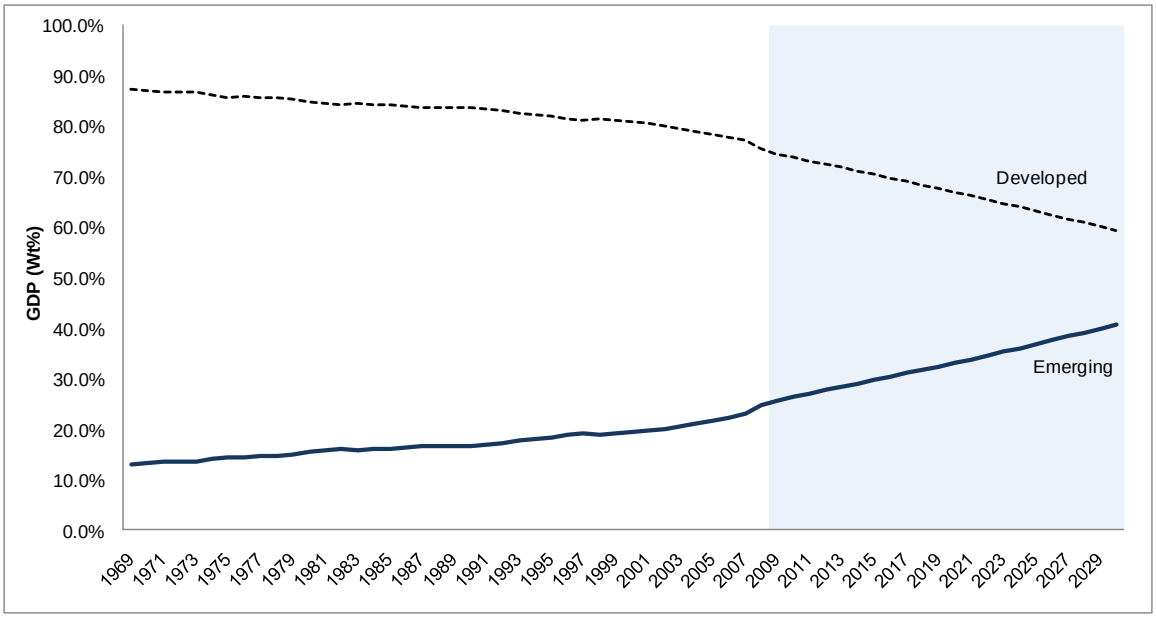
Note: The ATVR are market capitalization weighted ATVR calculated from security level information.

Finally, the increased integration of economies and markets globally has resulted in a shift in the balance of economic weights from the traditional developed economies to developing countries. This trend can be observed by the change, both past and projected, of the relative contribution to the world GDP of developed and developing economies.

Exhibit 6 highlights the historical and expected increased contribution of developing economies from 1969 to 2030.

Exhibit 7 further details this trend by focusing on the 10 largest economies. Based on USDA projections, 20 years from now all four BRIC (Brazil, Russia, India and China) countries will be in the top 10 economies as measured by their nominal GDP.

Exhibit 6: GDP Weights of Developed and Emerging Markets: 1969 – 2030 (estimated)



Note: The weights represent the cumulative GDP weights of countries included in the MSCI Developed and Emerging Market Indices based on real GDP shares. For year 2009 and beyond the weights are based on real projected GDP shares as estimated by USDA. Source: World Bank, IMF, USDA.

Exhibit 7: Top Ten GDP Weights: Past, Present and Future?

Rank	1987		2008		2030*	
	Country	GDP Wt	Country	GDP Wt	Country	GDP Wt
1	United States	30.1%	United States	26.7%	United States	22.8%
2	Japan	16.2%	Japan	9.1%	China	15.5%
3	Germany	6.6%	China	6.3%	Japan	5.2%
4	United Kingdom	4.9%	Germany	6.1%	Germany	4.3%
5	France	4.5%	United Kingdom	4.8%	India	4.2%
6	Italy	3.9%	France	4.6%	United Kingdom	3.7%
7	Canada	2.3%	Italy	3.6%	France	3.3%
8	Brazil	2.1%	Canada	2.6%	Brazil	2.6%
9	Spain	1.8%	Spain	2.5%	Russia	2.4%
10	Russia	1.7%	Brazil	2.3%	Italy	2.3%

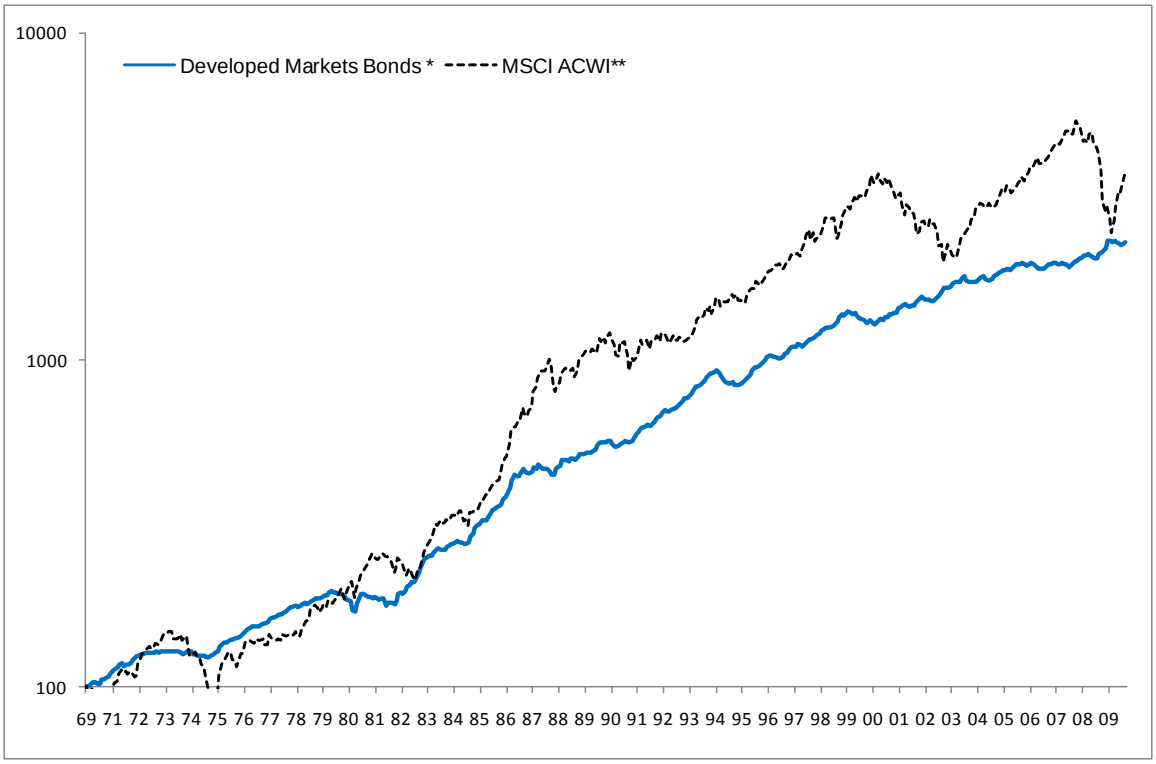
Source: World Bank, USDA. Note:* Projected

The BRIC acronym - for the four emerging market nations expected to be part of the top ten economies in 2030 - has symbolized this expected economic shift, highlighting for US institutional investors that "growth is elsewhere".

III. Current Approaches in Equity Allocation

In the context of a multi-asset class portfolio, the policy objective of the equity allocation is generally asset growth maximization. Exhibit 8 demonstrates that over the last 40 years, and in spite of two major market crises in the last 10 years, the cumulative return of equities has been higher than for a global bond portfolio, although with higher volatility.

Exhibit 8: Cumulative Returns of Global Equities and Bonds: Dec 1969 – Aug 2009



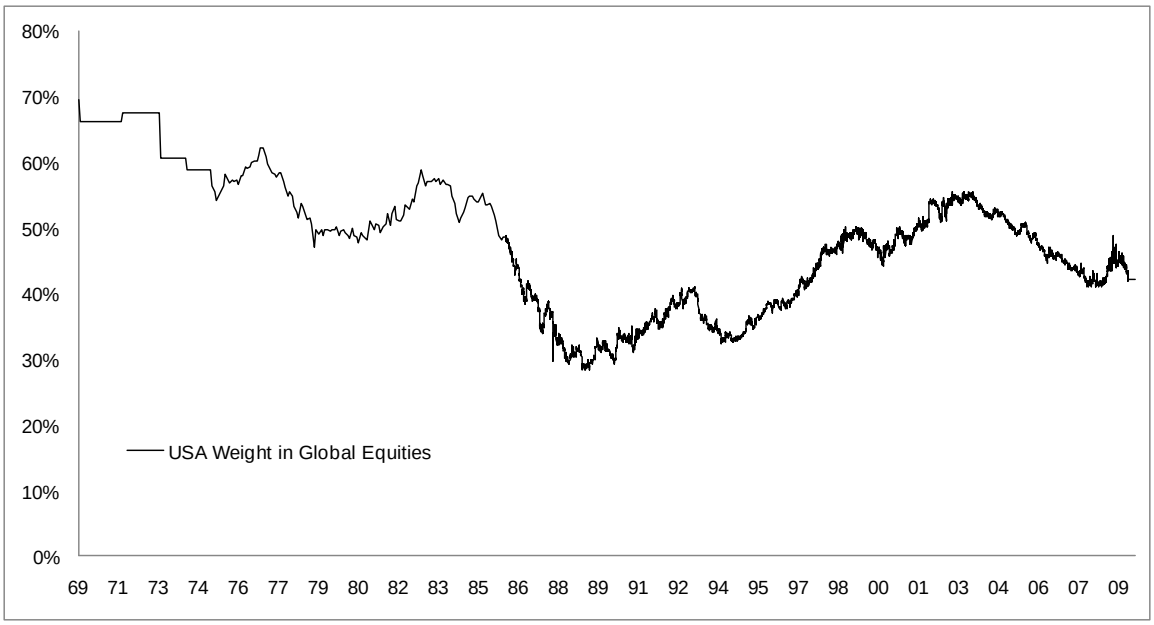
Source: MSCI.

* The cumulative returns for Developed Market bonds is constructed using long term government bond yields for 10 countries from the OECD.

** MSCI World until 1987, MSCI ACWI afterwards.

Historically, given the large weight of U.S. public equity markets in the global equity opportunity set, many U.S. institutional asset owners have traditionally allocated a higher proportion of money to U.S. public equities while investing a smaller proportion in international equities. However, the U.S. share of global equities has declined since 1970 as shown in Exhibit 9. The share of the U.S. equity market within the MSCI World Index declined from around 70% in 1970 to 48% as of August 2009 (and to 42% of MSCI ACWI).

Exhibit 9: U.S. Weight in Global Opportunity Set



Source: MSCI. The USA weight represents the market capitalization weight of the MSCI USA Index in the MSCI World Index until 1987 and its weight in the MSCI ACWI Index after 1987.

The top 200 U.S. pension plans in 2008 on average allocated 67% of their assets to U,S, equities, while U.S. equities had a market capitalization weight of 42% in the global opportunity set, as measured by MSCI ACWI. This gap implies an active bet on U.S. equities. This pattern of investment behavior, where investors allocate a smaller share of their portfolios to foreign assets relative to their actual weights in the global opportunity set is known as "home bias."

Over time more investors have started realizing that the arguments supporting home bias are less valid. A clear, albeit slow, trend has been developing for many years with institutional investors increasingly reducing the home bias in their equity allocation.

Exhibit 10 shows how the share of international equities has steadily increased within the total equity allocation for the largest 200 U.S. defined benefit pension plans. Although the allocation to domestic equities has dropped significantly the total allocation to equities still shows a considerable degree of home bias.

Exhibit 10: Top 200 U.S. Pension Plans Aggregate Allocation to U.S. and non-U.S. Equity

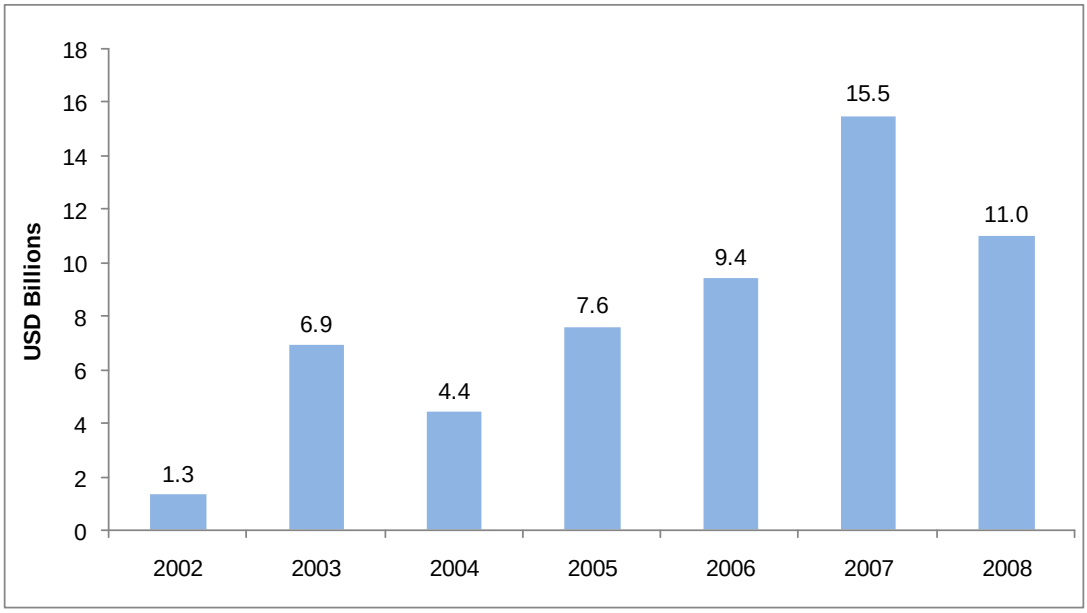
	2004	2005	2006	2007	2008
Proportion of US Equity in Global Equity	73.7%	71.7%	70.5%	66.7%	66.8%
Proportion of Non-US Equity in Global Equity	26.3%	28.3%	29.5%	33.3%	33.2%

Source: Pensions & Investments.

The reduction in home bias has taken various routes. Some pension plans have directly increased their strategic international allocation at the expense of domestic equity allocations. Others may have simply reduced their domestic equity allocation in favor of other asset classes. Finally, many plans have overlaid their domestic/ non-domestic allocation with a direct allocation to global equity. This has resulted in a

significant growth in the number of so-called "global equity mandates". Exhibit 11 highlights the growing popularity of these mandates with new global equity funding by U.S. tax-exempt institutional investors increasing from a mere USD 1.3 billion in 2002 to USD 11 billion in 2008.

Exhibit 11: Annual New Global Equity Mandate Funding



Source: Intersec.

What have been the arguments for keeping a disproportionally high allocation in domestic equities? The three most common are:

- "International markets are hard to access"
- "Domestic equities are a better match for domestic liabilities"
- "International equities are more risky due to currency risk"

With respect to the first argument, accessibility to international capital markets has generally improved. Barriers to foreign investment have been lifted or reduced in most countries and market infrastructure improvements have contributed to lower costs and lower operational risks. Most developed markets now trade at similar levels of efficiency. The consolidation of stock exchanges (for example NYSE Euronext or Nasdaq OMX) and competition within markets are likely to accelerate this trend. Similarly in emerging markets accessibility continues to improve with overall quite good levels of liquidity.

With respect to the second argument, some have maintained that a higher allocation to domestic assets provides a better hedge for domestic liabilities. Pension liabilities have many dimensions, including matching expected cash outflows, accounting for cost of living adjustments and changes in life expectancy. While equities by seeking long term growth may also provide some hedge – versus inflation for example – they are not the relevant asset class for cash flow liability matching. In the context of liability matching, domestic fixed income may be a more suitable asset class. As asset growth is the main objective of equity allocation, biasing it towards the domestic market comes with potentially huge opportunity costs. Consider the lost decade in Japan, for example. Domestic equities have demonstrated that they provide no better link to domestic pension liabilities than global equities. Exhibit 12 provides the correlations of U.S., non-U.S., and fixed income to a pension liability index. Both

U.S. and non-U.S. equities exhibited very low correlations with pension liabilities, indicating that both are equally unsuitable as a short-term hedge for growing pension liabilities.

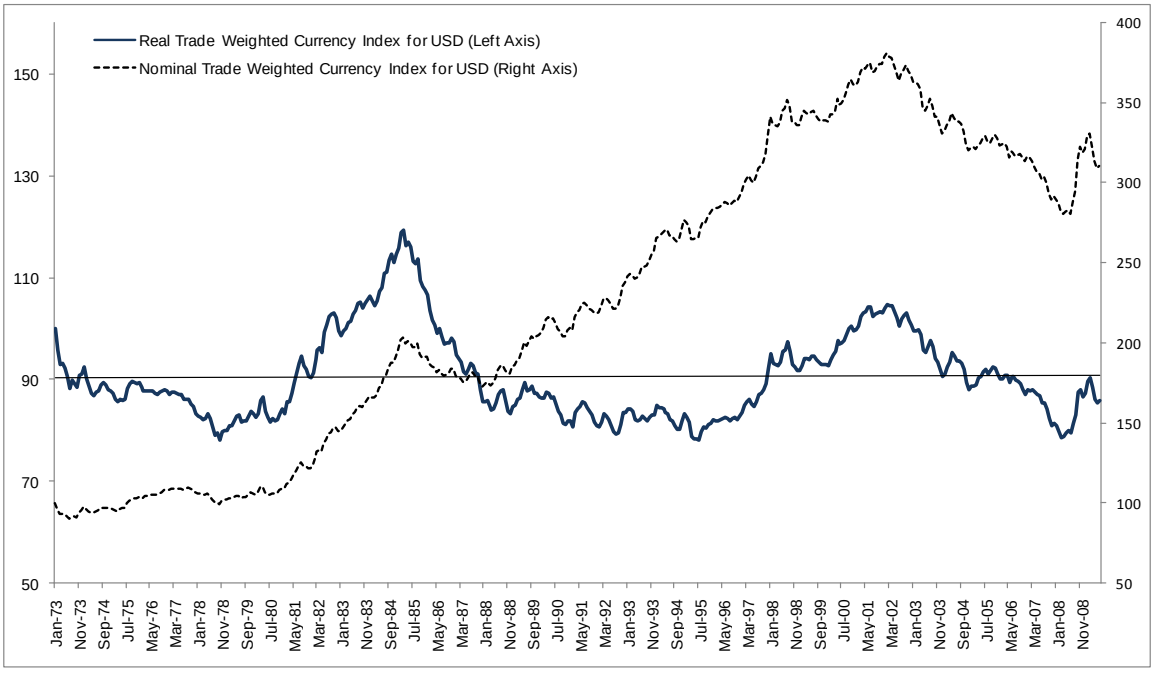
Exhibit 12: Correlations of Pension Liabilities with Equities and Bonds (January 1995 to May 2009)

	MSCI ACWI ex USA IMI Index	MSCI ACWI IMI Index	MSCI USA IMI	Citigroup US Govt. Bond 7-10 Yr.
Correlation with Pension Liability Index	0.10	0.09	0.09	0.71

Source: MSCI, Citigroup. Note: The pension liability index is represented by Citigroup Pension Liability Index.

The third argument for home bias is the supposedly higher risk of international equities due to currency movements. The currency risk for equity is time dependent. The long-term hedged and un-hedged non-U.S. equity performance for U.S. investors has been quite similar, validating the argument that prices of cross-border real assets tend to equilibrate over time. Exhibit 13 shows the performance of the broad real trade-weighted index for the U.S. dollar from January 1973 to June 2009. It highlights that while there are clear cycles, the index has not trended up or down over longer periods. The same could be seen from other major currencies, such as the Euro or the Yen.

Exhibit 13: Real versus Nominal Traded Weighted Index for U.S. Dollar



Source: U.S. Federal Reserve.

Exhibit 14 highlights over the last 40 years that replacing a US-only portfolio with a fully global equity allocation reduced volatility over the long run, even with no currency hedging at all.

Exhibit 14: Long-term return and volatility of US-only and Global portfolios

	Annualized return	Annualized volatilty
MSCI USA	9.3%	15.6%
MSCI ACWI*, unhedged	9.5%	15.1%
MSCI ACWI*, hedged	9.0%	14.3%

* MSCI World Index until December 1987. Annualized Return for the period from 1969 to August 2009.

Investors who are concerned about short-term currency volatility have traditionally implemented partial or total hedges to reduce or eliminate the source of risk. In this regard, currency markets are the most liquid markets in the world, at least for developed markets and a subset of emerging markets, and foreign exchange exposure can be hedged at relatively little cost.[8] Exhibit 15 indicates that the average cost of hedging foreign currency exposures for U.S. investors ranged from -26 bps to + 10 bps.

Exhibit 15: Average Monthly Cost of Hedging Foreign Currency Exposures for U.S. Investors (1987 to 2008)

	Annualized return	Annualized volatilty
MSCI USA	9.3%	15.6%
MSCI ACWI*, unhedged	9.5%	15.1%
MSCI ACWI*, hedged	9.0%	14.3%

Source: MSCI. Hedge impact is defined as the sum of the cost to hedge on the forward contract and the actual gain or loss on the spot FX rate change.

Most institutional investors today make a currency hedging decision once they have defined their relevant investment universe. Therefore the discussion on currency risk does not affect the decision on how to allocate between domestic and non-domestic equities

IV. Towards An Integrated Global Equity Investment Process

The increased integration of economies and markets are causing some institutional investors to view the global equity markets as the relevant Market Portfolio. A number of large and leading U.S. pension plans recently started considering Global Equity as a single strategic asset class.

An integrated equity investment process combines the domestic/ non-domestic silos at these plans and has multiple potential advantages.

First, by eliminating the need for periodic reviews at the strategic level of the domestic/ non-domestic equity allocation, it potentially removes an unnecessary step that was creating market timing risk.

[8] Cooper & Kaplanis (1994).

Second, by removing this need at the strategic level, it facilitates focusing on important strategic asset allocation issues such as liability hedging and portfolio liquidity management.

Third, from an organizational perspective, an integrated global equity structure may allow for a more efficient use of valuable investment resources, streamline the investment process and improve investment expertise. For example, having one global equity investment process may allow better integration of investment teams and reduce potential conflicts and unintended bets arising from different investment processes. It may harmonize the overall investment decision making process and ease the implementation and oversight of the equity allocations.

A global integrated equity approach that places the global market portfolio as the natural starting point for equity allocation is both theoretically sound and practically viable. It contemplates the entire global investment opportunity set to take advantage of diversification benefits from exposures to different geographical regions, market segments, sectors and currency movements. It acknowledges that deviations from market weights of regions, segments and sectors represent active decisions that need to be taken on the basis of a clear investment responsibility.

A key potential benefit of such an integrated global investment process is that it empowers the team in charge of global equity at an institutional investor to maximize returns without being impaired by domestic versus non-domestic constraints. While by itself this is not an assurance for better portfolios and better returns, its proponents suggest that it is a better process to strive to achieve these results. This higher degree of freedom may be used in various ways, depending on the approach chosen based on the skill set available and investment beliefs, including through:

- Internal or external mandates
- Regional or global mandates
- Passively or actively managed mandates

For a passive approach, a global equity policy benchmark, capturing the global opportunity set, provides the basis for efficient investment vehicles to capture the global market beta.

For an active approach, global equity mandates may provide greater alpha opportunities for active managers as they can benefit from increased breadth. For example, pure bottom-up fundamental managers can extend their research insight beyond country or region boundaries into global sectors in search of best-in-class companies. Exhibit 16 highlights the broad geographical spread of the top twenty energy securities in the MSCI ACWI IMI, ranked by descending order of company market capitalization.

Global equity mandates are neither the only solution nor necessarily the best solution. Institutional investors may prefer regional mandates, for example, if they want to be in a position to make active tactical decisions by varying the exposures of the portfolio relative to the global equity universe benchmark. Regional mandates may also be preferred due to availability, or lack of, manager skill set availability or due to other factors.

Exhibit 16: Top Twenty Energy Stocks in the MSCI ACWI IMI

Name	Float Adjusted Market Cap	Company Full Market Cap	Country
Exxon Mobil Corp	333,821	333,821	USA
Petrochina Co H	23,575	328,435	China
Royal Dutch Shell A	97,056	169,450	United Kingdom
Royal Dutch Shell B	72,393	169,450	United Kingdom
Petrobras ON	45,532	163,660	Brazil
Petrobras PN	53,106	163,660	Brazil
BP	157,949	157,949	United Kingdom
Chevron Corp	137,280	137,280	USA
Total	119,841	133,156	France
China Petro & Chem H	13,452	129,939	China
Gazprom (Rub)	48,716	121,790	Russia
ENI	60,588	93,212	Italy
China Shenhua Energy H	12,872	82,238	China
Statoilhydro	24,264	69,325	Norway
Rosneft (Rub)	8,040	66,999	Russia
Schlumberger	65,695	65,695	USA
ConocoPhillips	62,140	65,411	USA
Reliance Industries	25,428	63,570	India
CNOOC	23,607	59,018	China
Occidental Petroleum	58,548	58,548	USA

All Market Caps in USD mill. Data as of Sept. 1, 2009.

Source: MSCI. Hedge impact is defined as the sum of the cost to hedge on the forward contract and the actual gain or loss on the spot FX rate change.

V. Conclusions

Globalization has brought about a major rethinking of the equity investment. Thought leaders in the industry are questioning the merit of the existing equity allocation practices and are increasingly looking towards an integrated global equity investment process. The partitioned domestic/non-domestic approach to equity investing may have been built on the grounds of segmented economies, high levels of foreign investment restrictions, and heavily domestically-focused companies but its validity is being challenged by a changing and more integrated global equity landscape. Traditional arguments supporting a home bias equity allocation are less defensible and certain leading institutional investors are realizing that the segmentation between domestic and international equities at a strategic level is a legacy that may come with important market timing risks and opportunity costs. A more integrated approach to equity investing may be the next stage in the evolution of investment processes and a natural consequence of globalization. A broad and investable global equity benchmark is an integral part of such a process.

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The "New Classic" Equity Allocation?

A discussion on implementation of global equity allocation and evolving mandate structures

October 2010

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Executive Summary

The recent financial crisis led many institutional investors to review their asset allocation policies and explore alternative approaches to implementation. MSCI recently held discussions around the world with major pension plans, asset managers, and investment consultants to understand different approaches to implementing equity allocation. Based on these consultations and our own research, this research insight provides a framework for the implementation of global equity allocation.

Investors who choose to adopt global equity allocation face the challenge of covering an opportunity set that spans developed and emerging markets and a range of market capitalizations. Defining the opportunity set of individual mandates is a critical consideration.

The continued evolution of global equity markets and investment processes calls for a review of traditional mandate structures. Traditionally, institutional investors partitioned the global investment opportunity set into geographic building blocks and allowed the corresponding manager line-up to reflect such mandate structure. More recently, investors increasingly assign global mandates based on a view that the nature of equity risk and return drivers no longer supports the partitioned equity mandate structure.

Our observation is that developed markets are driven mainly by global industry and style risk factors and less by differences across countries or regions. Compared to a domestic/international structure, global mandates enable managers to pick stocks from a global opportunity set and accommodate investment bets on global sector and style exposures.

Emerging markets, on the other hand, continue to have different risk and return dynamics, with local risk factors and country allocation as the dominant drivers. Some investors believe that managing emerging market equities requires a different investment process, and therefore may suit dedicated emerging market mandates.

Small cap stocks typically exhibit higher idiosyncratic risks than large/mid cap stocks. Thus, some investors prefer dedicated regional small cap mandates, aiming to benefit from the stock-picking skills and local knowledge of small cap specialists. Such dedicated mandates enable investors to introduce deeper and more systematic exposure to the small cap segment.

These findings indicate that the global equity allocation can be structured around three segments that suit different mandates:

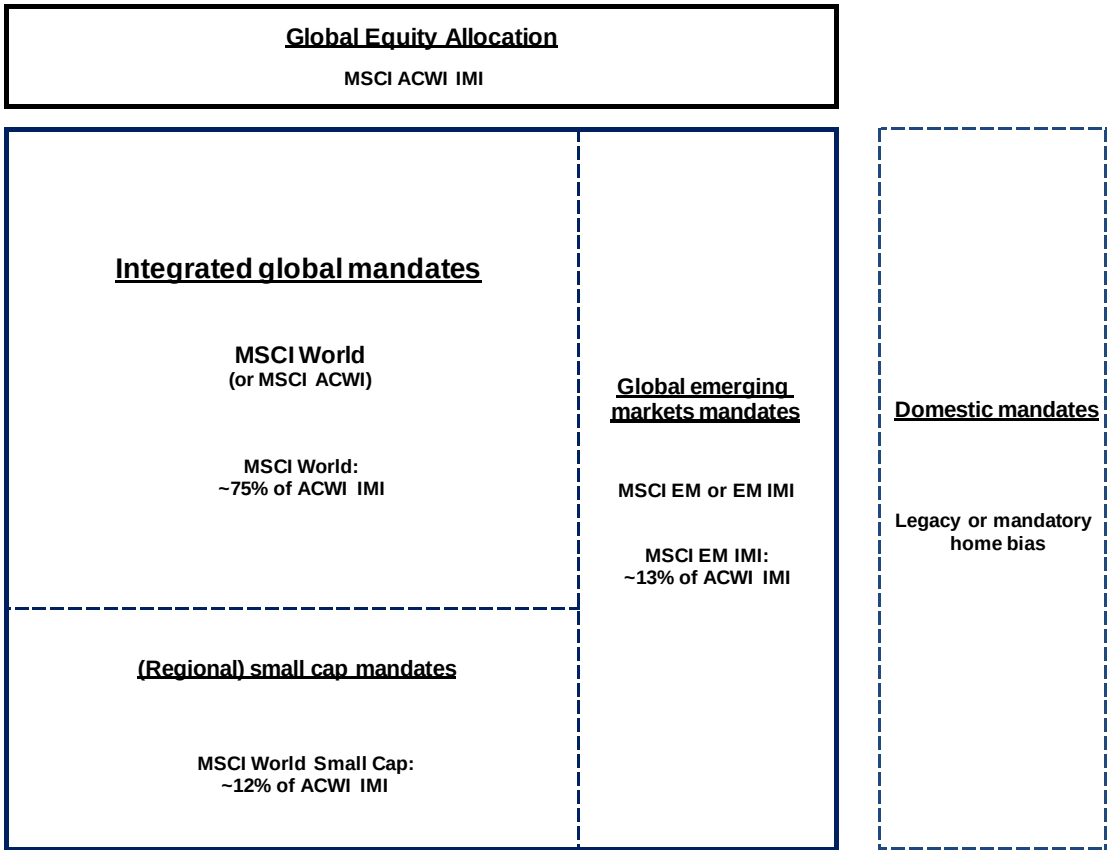
- Developed markets large/mid cap
- Developed markets small cap
- Emerging markets

While the majority of active global mandates target only developed markets, some investors have recently allocated broader global mandates that encompass both developed and emerging markets. This trend may reflect further integration across these two market segments and the realization that many large companies in emerging markets have become global players, competing with their peers in developed markets. It may also reflect investors' beliefs in the potential benefits of investing in an unconstrained and broader opportunity set.

In summary, our findings suggest that global equity mandates, often complemented by dedicated emerging market and small cap specialist mandates, may be emerging as the "new classic" structure for implementing equity allocation. Investors who need or want to maintain a certain level of home bias can manage separate, domestic portfolios alongside the global equity structure.

Such an implementation approach, as illustrated in Exhibit 1, can benefit from an integrated global equity investment process, while accommodating different risk and return drivers and investment processes in different market segments and legacy or mandatory home bias in equity allocation.

Exhibit 1: "New Classic" Equity Allocation?[1]



Note: MSCI ACWI IMI denotes the MSCI All Country World Investable Market Index that covers large, mid and small cap companies in developed and emerging markets. MSCI World covers the large and mid cap companies in developed markets. MSCI EM IMI denotes the MSCI Emerging Markets Investable Market Index that covers large, mid and small cap companies in emerging markets. The weights of MSCI World, MSCI World Small Cap and MSCI EM IMI in MSCI ACWI IMI represent their market capitalization weights as of September 2010.

This paper is the first in a series that focuses on current practices and emerging trends in the implementation of global equity allocation. Passive/active considerations are addressed and alternative approaches are explored in two forthcoming research papers.

[1] The structure illustrated here addresses active mandates. If an investor decides to go passive across the whole global equity allocation, then the mandate structure is a less critical consideration.

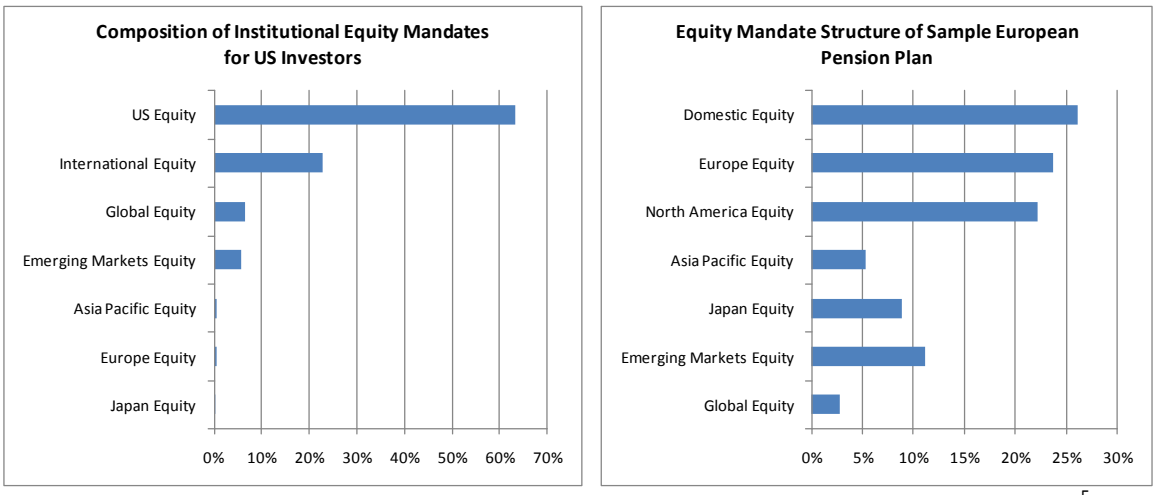
I. The Case for Global Equity Mandates[2]

Many institutional investors have chosen to adopt a global equity allocation. At the policy level, the investment opportunity set encompasses the global equity universe. Often, the policy allocation is represented by a global equity index, such as the MSCI All Country World Investable Market Index ("MSCI ACWI IMI"), that covers large, mid, and small cap companies in developed and emerging markets. However, the structure of mandates and the definition of the relevant opportunity set for individual mandates are critical decisions that require further consideration.

Institutional Trends toward Global Equity Markets

Traditionally, most investors viewed the global equity market as a set of geographic building blocks and defined the opportunity set of individual mandates accordingly. Exhibit 2 illustrates that US investors implemented their equity allocation using US and international mandates[3], while European investors often adopted a more fragmented mandate structure. One may question the investment rationale behind the different structures, given that the underlying global equity opportunity set is the same for all investors.

Exhibit 2: Traditional Equity Mandate Structure of US and European Investors



Source: eVestment Alliance[4], public websites of sample pension funds, MSCI. International equity mandates include the EAFE[5], EAFE Plus, and ACWI ex US mandates; global equity mandates include the World and ACWI mandates.

Under the traditional mandate structure, the focus of equity implementation has been to select skilled managers within relatively narrow building blocks, and allow the manager line-up to reflect the mandate structure. While investors can potentially benefit from managers' local/regional expertise, the downside

[2] Note that in this section and the rest of the paper, we have sometimes used US information in our analysis on the institutional equity market as well as the historical manager performance, due to the better availability of relevant US data.

[3] A similar practice is observed in Japan, where most of the equity mandates have traditionally been structured along domestic and non-domestic (Kokusai) portfolios.

[4] eVestment Alliance provides a database that covers a global sample of investment products, including more than 6,000 equity products.

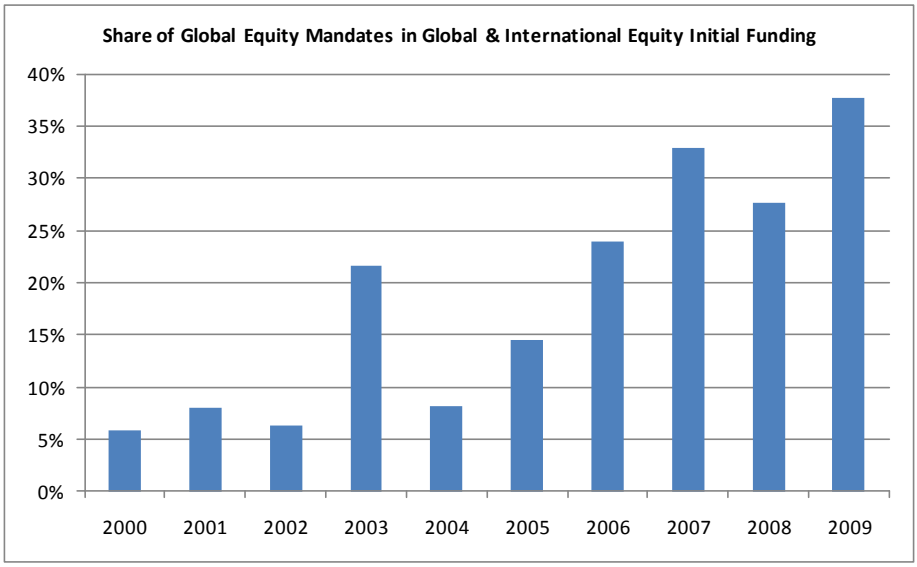
[5] EAFE stands for Europe, Australasia, and Far East – i.e. all developed markets ex the US and Canada of the MSCI World country coverage.

is that managers are limited to their segment and have to forgo investment opportunities within the broader equity universe.

With the globalization of equity markets, institutional investors increasingly realize that the partitioning of the investment opportunity set into domestic/international or regional blocks is becoming artificial. In comparison, global equity mandates give managers a higher degree of freedom in making investment decisions. For instance, managers can apply their sector expertise or insights to select the best stocks in global sectors, regardless of the domicile of the companies.

Many institutional investors and investment consultants have identified the move toward global mandates as a trend. Exhibit 3 shows the strong increase in the initial funding of global equity mandates: from a mere 6% in 2000, it has grown to represent 38% of all global and international equity initial funding in 2009[6].

Exhibit 3: Growth in Global Equity Mandate Initial Funding



Source: Intersec.

While many institutional investors have a certain degree of home bias in their equity allocation[7], it is important to note that such home bias does not necessarily prevent investors from adopting global equity allocation or global equity mandates. In fact, some pension plans have moved toward a global equity allocation by isolating the home bias into a separate domestic allocation, alongside a global allocation that no longer treats domestic and international equities as separate asset classes.

For instance, Exhibit 4 shows the equity allocation of a large US public pension plan. Alongside the market-cap weighted global equity allocation, it isolates the home bias into separate US large/small cap allocations, similar to its overweight in emerging markets[8]. Such a portfolio structure may enable

[6] As the growth in the initial funding of global equity mandates is a relatively recent trend, global equity mandates still represent a smaller proportion of total institutional equity assets compared to international mandates. See Exhibit 1, for instance.

[7] Subramanian, Nielsen, and Fachinotti (2009), Kang and Melas (2010), and Chia (2009) discussed the inherent risks of home-biased equity allocation in institutional portfolios and identified an increasing adoption of a global approach to equity allocation.

[8] Note that the adoption of a global equity allocation permits global mandates, but it does not necessarily lead to the adoption of a global mandate. For instance, some investors may use US and international mandates to implement a global equity allocation.

investors to benefit from the merits of a global investment process and to manage home bias according to their specific investment objectives.

Exhibit 4: Global Equity Structure with Separate Domestic Mandates

Public Equity Asset Class	Benchmark	Target
Global Equity	MSCI All Country World Index	66%
US Large Cap	MSCI USA Large Cap Index	12%
US Small Cap	MSCI USA Small Cap Index	10%
Emerging Markets	MSCI Emerging Markets Index	12%

Source: A major US pension plan's public website.

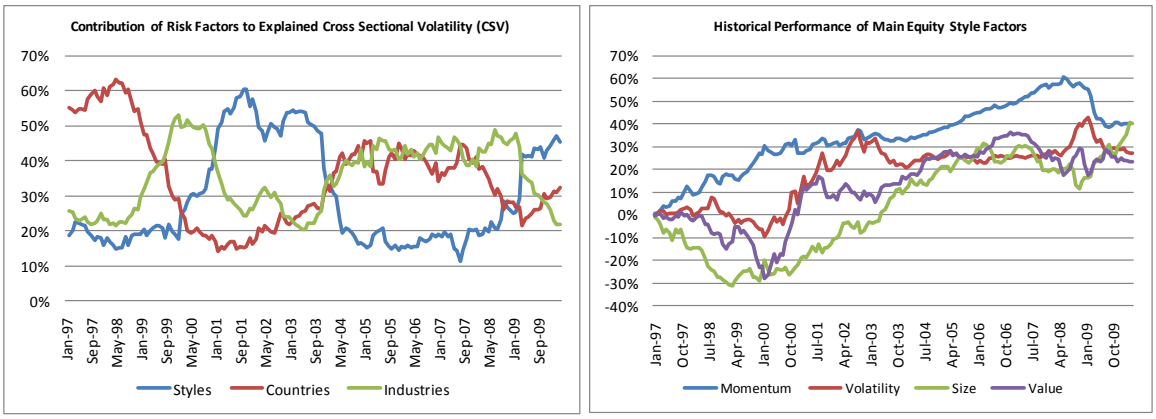
Developed Market Equities as an Integrated Block

Proponents of a global investment process argue that developed market equities should be managed using global mandates. The global nature of economies and companies increasingly requires managers to value the companies versus their peers globally and to identify the best investment opportunities on a global basis.

In addition, it is well documented that global sectors/industries now play a very significant role in driving the cross-section of security returns in developed markets. Exhibit 5 confirms that, while country factors dominated industry factors in the late 1990s, industry factors have become equal or even more important drivers of developed market stock returns than country factors over the last decade. This highlights the increased importance of global sector allocation decisions relative to country allocation decisions in developed markets.

Fundamental style factors such as momentum, volatility, size, and value also represent important sources of global equity portfolio risk and return (Exhibit 5 shows the historical performance of the main fundamental factors). As illustrated in Exhibit 5, during certain periods of high systematic market risk (i.e., around the 2001 IT bubble and the recent financial crisis), style factors became so dominant that they explained about 40-60% of the cross-sectional stock return dispersion. The implication is that the decision to tilt the global equity portfolio toward certain fundamental styles can be critical to portfolio performance during certain periods of market turmoil.

Exhibit 5: Importance of Global Sector and Style Factors in Developed Markets



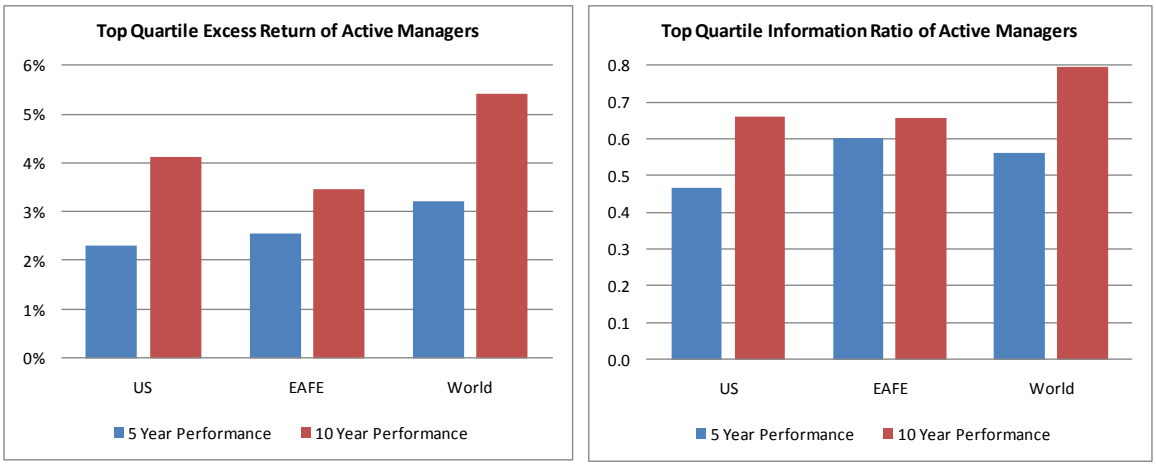
Source: MSCI. The contribution of risk factors to explained Cross-Sectional Volatility (CSV) indicates the relative importance of the country, industry, and style factors in driving cross-sectional volatility. See the Appendix for technical details on CSV analysis. The performance of Momentum and Volatility represents the Momentum factor return and the inverted Volatility factor return from the Barra Global Equity Model (GEM2), respectively; the performance of the Size factor is the performance of the MSCI World Small Cap Index relative to the MSCI World Large Cap Index; the performance of the Value factor is the performance of the MSCI World Value Index relative to the MSCI World Growth Index.

While domestic/international or regional mandates enable investors to implement their allocation decisions along such lines, they cannot effectively accommodate global sector and style exposure targets, which recently have dominated the performance of developed market equity portfolios. For instance, allocating investments across a number of regional mandates may make it difficult for plan sponsors to implement strategic sector positions or to manage effectively the portfolio's style exposures. The aggregated global sector/style exposure may become byproducts of the often "bottom-up" investment processes of individual regional mandates, resulting in unintended bets on global sectors or styles.

In comparison, global mandates enable plan sponsors and managers more effectively to implement and monitor strategic or tactical positions in global sectors and styles. Plan sponsors may set explicit sector and style policies on global mandates, in addition to regional exposure guidelines, and may permit managers to tactically deviate from these policies/guidelines within certain active limits. For instance, a plan sponsor who wants strategically to overweight the Energy and Materials sectors can more effectively implement and monitor such positions in global mandates instead of multiple regional mandates.

The higher degree of freedom for managers to pick stocks globally and manage global sector and style exposures offers more potential to add value. Exhibit 6 shows that the top quartile active global managers (benchmarked to MSCI World) have indeed outperformed the top quartile US and EAFE managers over the last 5 and 10 years.

Exhibit 6: Historical Performance of Top Quartile US, EAFE, and World Mandates[9]



Source: MSCI, eVestment Alliance. Data as of March 2010. The performance analysis is before adjustments for selection bias, survival bias, and management fees. Excess return is the active return relative to the benchmark. EAFE stands for Europe, Australasia, and Far East – i.e. all developed markets ex the US and Canada of the MSCI World country coverage. Past performance is not indicative of future results.

The Breadth of Equity Mandates

Though institutional investors seem to agree that the large/mid cap segment of developed market equities may be managed globally, there is less consensus as to whether global mandates should also cover emerging markets and small caps. Exhibit 7 shows that the majority of global equity products targets only developed markets, and there are also a significant number of dedicated emerging market mandates. While there is a deep pool of US small cap products, the number of international, global, and emerging market small cap products is limited.

Exhibit 7: Number of Equity Products with a Significant Asset Base

Segment	# Products	Segment	# Products
US Mandates		**Emerging Markets Mandates**	
US Large/Mid/All Cap	1420	Emerging Markets	151
US Small Cap	568	Emerging Markets Small Cap	7
International Mandates		**Global Mandates**	
EAFE / World ex US	272	World	184
ACWI ex US	68	ACWI	52
International Small Cap	50	Global Small Cap	12

Source: MSCI, eVestment Alliance. Data as of March 2010. The performance analysis is before adjustments for selection bias, survival bias, and management fees. Excess return is the active return relative to the benchmark. EAFE stands for Europe, Australasia, and Far East – i.e. all developed markets ex the US and Canada of the MSCI World country coverage. Past performance is not indicative of future results.

Over the last few years, investors started to allocate investments to global mandates that target both developed and emerging markets (MSCI ACWI). More recently, some investors have given out even broader mandates targeting the whole global equity universe (MSCI ACWI IMI)[10].

[9] The historical performance data of managers is sourced from eVestment Alliance. Note that manager performance databases may be subject to potential biases such as selection bias, survivorship bias.

While this may indicate an institutional trend to move toward broader and more global mandates, it does not imply that targeting all segments of the global equity universe in one global mandate is the preferred structure.

Instead, when deciding the coverage of equity mandates, careful consideration may be given to the characteristics of various market segments. For instance, investors may examine whether different market segments are driven by different risk and return factors, and whether they require different investment processes. In addition, the choice of mandate structure may have significant implications for manager selection. For instance, Exhibit 7 indicates that investors who implement global equity allocation through developed market and dedicated emerging market mandates face a deeper manager pool than investors who allocate to ACWI mandates.

In addition, only managers with global research and portfolio management capacity can capitalize on the increased breadth of the broader opportunity set[11]. Exhibit 8 shows that the global equity universe (measured by MSCI ACWI IMI) includes more than eight thousand securities across developed and emerging markets, as well as large, mid, and small cap segments.

Exhibit 8: Coverage and Composition of the Global Equity Universe

	No. of Securities			Weight in ACWI IMI		
	Large/Mid Cap	Small Cap	All Cap	Large/Mid Cap	Small Cap	All Cap
Develope Markets: MSCI World IMI	1659	4517	6176	75.4%	11.4%	86.8%
Emerging Markets: MSCI EM IMI	756	1892	2648	11.5%	1.7%	13.2%
All Country World: MSCI ACWI IMI	2415	6409	8824	86.9%	13.1%	100.0%

Source: MSCI. Data as of 2 August 2010.

II. Implementing Emerging Market Equities

Institutional investors generally use two different approaches to introduce emerging market exposures. The first is through broad international or global mandates that include emerging markets (such as ACWI ex US or ACWI mandates). The second is through dedicated emerging market mandates.

Some investors prefer dedicated emerging market mandates as a way to implement a certain level of strategic exposure to this segment. For instance, a strategic overweight in emerging markets can be implemented using dedicated emerging market mandates. In comparison, the emerging market exposure in international/global mandates may vary across different managers and over time.

Most emerging markets differ from developed markets in the level of economic development and market accessibility[12]. More important, many investors consider emerging markets to have different risk and return drivers from developed markets. Such characteristics may suggest that emerging markets

[10] See Intersec (2009).

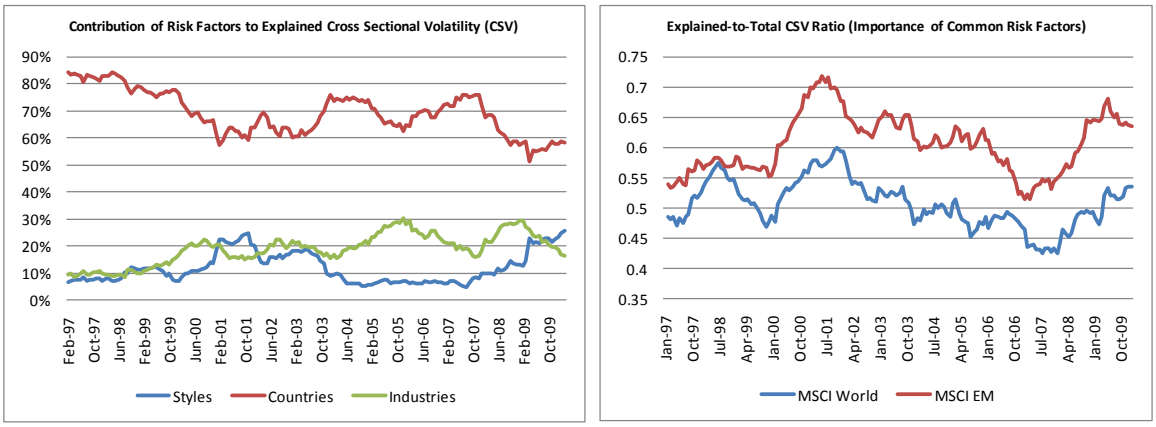
[11] Per the Fundamental Law of Active Management (Grinold and Kahn, 1999), the manager's information ratio depends not only on the breadth (the number of independent forecasts that the manager can make), but also on the information coefficient (the quality of the forecasts). Broader global mandates certainly give managers increased breadth, but only managers with truly global capacity can maintain a sufficiently high information coefficient to benefit from the increased breadth. Thorley, Clarke, and Silva (2002) discuss the role of constraints, as active portfolio management typically is conducted within constraints that do not permit managers to exploit fully their ability to forecast returns.

[12] For instance, the MSCI Market Classification Framework uses three criteria to classify countries in either developed, emerging, or frontier markets: economic development, size and liquidity, and market accessibility.

require a different investment process, and investors may value the emerging market managers' specialization and track record.

While institutional investors increasingly view developed markets as an integrated block driven by global risk factors, emerging markets continue to represent a heterogeneous investment universe with countries at different stages of economic and equity market development. Local factors such as economic, political, and regulatory risks are often dominant drivers in emerging market equities.

Exhibit 9: Risk and Return Drivers in Emerging Markets



Source: MSCI. The contribution of risk factors to explained Cross-Sectional Volatility (CSV) indicates the relative importance of the country, industry, and style factors in driving cross-sectional volatility. The explained-to-total CSV ratio indicates the importance of common risk factors (as opposed to stock specific risks) in driving cross-sectional volatility: a higher ratio indicates a higher importance of common factors. See the Appendix for technical details on CSV analysis.

Exhibit 9 confirms that country factors in emerging markets are still more important return drivers than industry and style factors. This is in stark contrast to developed markets, in which global industry and style factors dominate. The implication is that, while global sector allocation and style exposures are important for developed markets, country allocation and local expertise may be more important skills for managing emerging market mandates.

Exhibit 9 also illustrates that the explained-to-total Cross-Sectional Volatility (CSV) ratio of emerging markets has been higher than for developed markets. This ratio indicates the importance of common risk factors, as opposed to company-specific risks. It implies that a top-down investment process that focuses on systematic factors is more important for emerging markets[13].

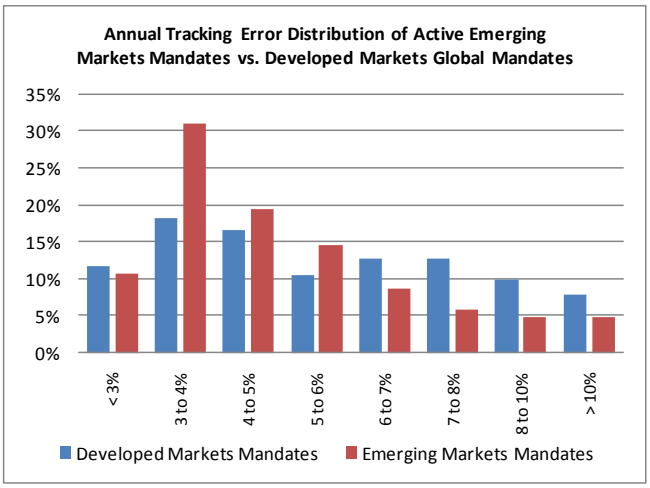
The importance of a top-down investment process with a focus on country allocation implies that emerging market managers may have more potential to add value in a global emerging market mandate, as opposed to regional/country emerging market mandates. Exhibit 10 confirms that the vast majority of emerging market mandates (94.5% by AUM) are global mandates. In contrast, investors who choose regional emerging market mandates would likely need the skills to make their own country allocation decisions and allocate their mandates accordingly.

[13] Morck, Yeung, and Yu (2000) suggest that one explanation could be that emerging markets, compared with developed markets, are more efficient in incorporating marketwide information (systematic factors) and less efficient in reflecting private information (idiosyncratic factors).

Exhibit 10 also shows that emerging market mandates typically target core exposures instead of value/growth styles, which is consistent with the finding that style factors play a less important role in emerging markets. Another observation is that all-cap mandates already represent 14.3% of emerging market mandates. This is a recent development and indication that investors opt for all-cap mandates to get the deeper exposure to emerging markets.

Exhibit 10: Characteristics and Tracking Error Distribution of Emerging Market Mandates

Characteristics of Emerging Markets Mandates	% by AUM
Geographic Region	
Diversified Emerging Markets	94.5%
Regional/Country	5.5%
Primary Style	
Core	87.5%
Value	7.3%
Growth	5.2%
Capitalization	
Large/Mid Cap	85.1%
All Cap	14.3%
Small Cap	0.6%



Source: MSCI, eVestment Alliance. The geographic/style/capitalization distribution is calculated based on the benchmarks of the emerging market mandates. The data is as of March 2010.

In addition, Exhibit 10 shows that the majority (61%) of emerging market mandates have a modest tracking error of below 5%, compared to 46% of developed market mandates. This is somewhat surprising, as one might expect the tracking error of emerging markets to be higher than that of developed market mandates, given that emerging markets have been more volatile than developed markets. This observation may confirm that many emerging market mandates are structured to get the diversified beta exposure to the segment.

III. Implementing Small Cap Allocation

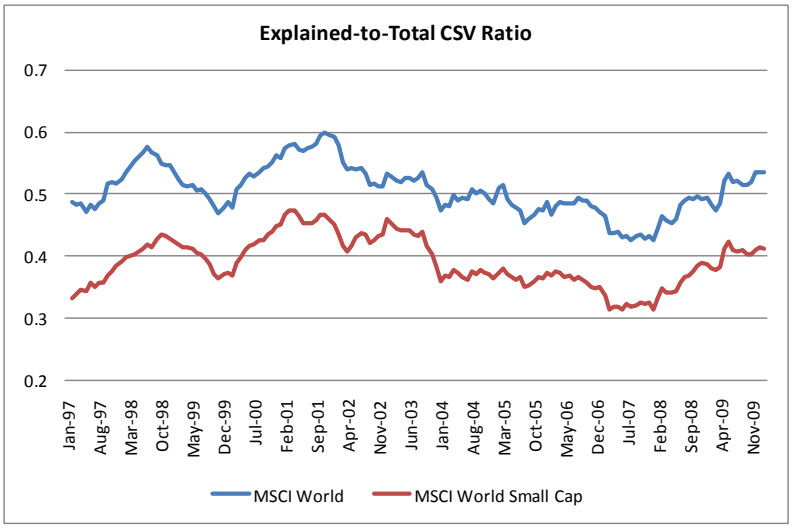
Investors can implement small cap allocation either through all-cap or specialist small cap mandates. Currently, very few investors allocate money to dedicated emerging market small cap managers. Exhibit 10 shows that small cap products represent only 0.6% of emerging market mandates.

However, in developed markets, there is a much deeper pool of specialist small cap managers. While using all-cap mandates reduces the number of mandates, specialist small cap mandates are often considered one way to introduce a more systematic exposure to the small cap segment.

In addition, investors who prefer specialist small cap mandates typically consider small cap as a different segment from large and mid cap. For instance, the small cap segment is often considered less efficient, due to the relatively poor information flow compared with the large cap segment. The relatively illiquid nature of small cap stocks also makes capacity constraint an important consideration when constructing small cap portfolios or selecting small cap managers. In addition, there is a higher degree of manager selection risk than in the large/mid cap segment, due to the higher return dispersion of small cap managers.

While large cap stocks tend to be driven more by systematic risk factors (global industry, style, and country factors), small cap stocks are more heavily affected by company-specific characteristics. Exhibit 11 confirms that systematic risk factors explain a smaller proportion of the cross-sectional volatility in small cap stocks compared to large/mid cap stocks. An investment implication is that a bottom-up stock-picking investment process may be critical for actively managed small cap portfolios. Another implication is that separate small cap mandates, compared to all-cap mandates, may give investors more flexibility in using both passive and active investment approaches. For instance, some investors tend to employ more passive mandates for the large/mid cap segment, while using active management for the small cap segment.

Exhibit 11: Higher Company-Specific Risks in Small Cap Segment



Source: MSCI. The explained-to-total CSV ratio indicates the importance of common risk factors (as opposed to stock-specific risks) in driving cross-sectional volatility: a higher ratio indicates a higher importance of common factors. See the Appendix for technical details on CSV analysis.

Due to the higher company-specific risks and the less global nature of small cap companies, some investors may opt for regional mandates to benefit from a manager's stock-picking skills and local knowledge. Indeed, some investors consider global small cap to be a relatively difficult mandate to execute successfully, given the challenge for a manager to possess a significant amount of local company specific knowledge spread over a vast number of small cap stocks across countries and regions.

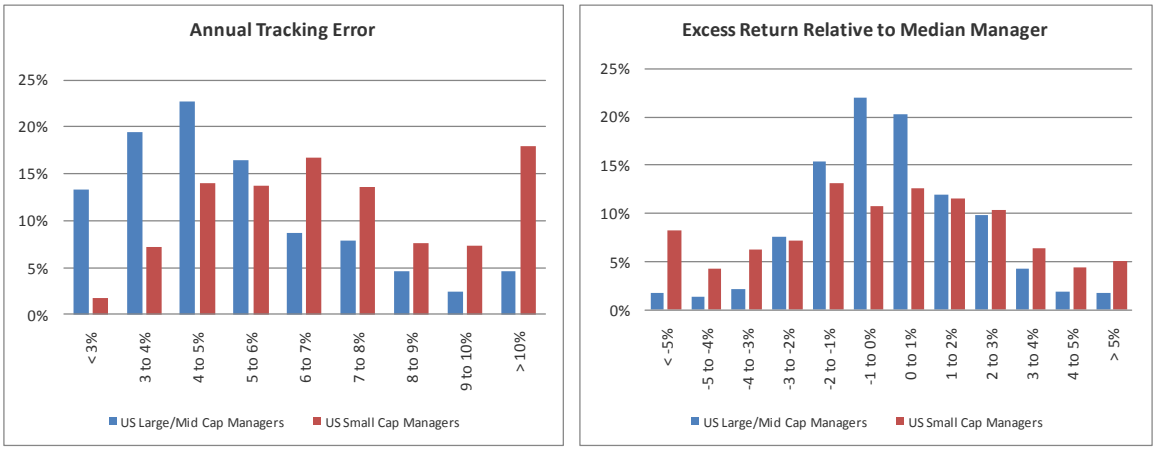
Manager Selection Risk

The performance dispersion of individual small cap managers has been higher than for large cap managers, and it represents both a challenge and an opportunity for plan sponsors who aim to select top managers. As the small cap universe contains thousands of relatively small stocks with high company-specific risks, individual small cap managers can hold portfolios of different risk profiles, which can result in higher manager return dispersion. Small cap managers also tend to incur higher tracking errors relative to the benchmark.

Exhibit 12 illustrates that the tracking error distribution of US small cap managers is significantly skewed to the right (i.e., higher tracking error) compared to US large/mid cap managers. It also shows the distribution of managers' excess return relative to the median performance of the peer group. A larger proportion of large/mid cap managers delivered similar performance to their median peer, compared to

small cap managers. More notably, the excess return distribution of small cap managers has a fatter left tail: about 19% of small cap managers underperformed their median peer by more than 3%, while merely 5% of large/mid cap managers delivered such underperformance.

Exhibit 12: Tracking Error and Return Dispersion of US Large/Mid Cap vs. Small Cap Managers



Source: MSCI, eVestment Alliance. 5 Years to March 2010.

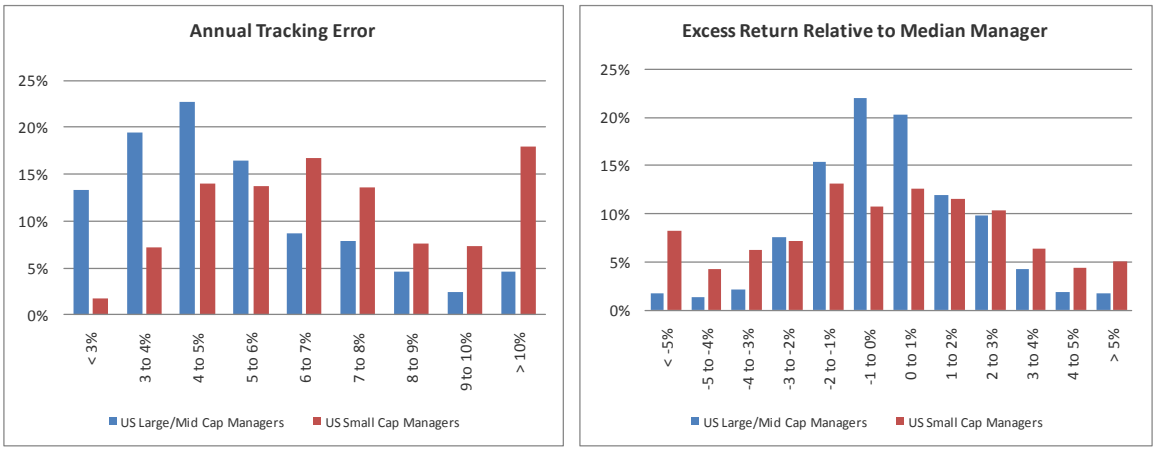
The higher tracking error and return dispersion of small cap managers imply a higher manager selection risk. One approach that is used often by pension plans to diversify the manager selection risk is to adopt multiple mandates in each market segment. While multiple small cap mandates mitigate the manager selection risk, it requires resources to select and monitor multiple managers.

Capacity Constraint Considerations

Another challenge in managing small cap portfolios is the capacity constraint caused by the relatively illiquid nature of this segment. Zeiler and Allen (2004) discuss the capacity constraint of small cap managers and suggest that most managers estimate the capacity for a product to be somewhere between USD1 and USD3 billion. Capacity constraint arises when limited stock liquidity narrows down the universe of small cap stocks about which managers can implement a strong view within a short time. We can obtain a more intuitive picture of the capacity constraint of small cap products by examining a numerical example.

Exhibit 13 examines the proportion of small cap stocks that may pose a liquidity challenge in different segments of the small cap universe, and it illustrates how the liquidity challenge rises with portfolio size. We imagine a case in which a manager wants to implement a strong view on a stock by either establishing or liquidating a 1% position of a small cap portfolio on this stock. If it takes more than 10 trading days to implement such position without exceeding 20% of the average daily trading volume on each day, a stock is considered to have a potential liquidity issue. Exhibit 13 shows that, for a USD1 billion US small cap product, 78% of stocks (represent 49.6% of the market capitalization of the universe) in the US small cap universe may have such a potential liquidity issue. Not surprisingly, the proportion of international and emerging markets small cap stocks that may face such liquidity challenges is even more significant. Another observation is that the liquidity challenge rises quickly when the portfolio size rises from USD500 million to USD2 billion.

Exhibit 13: Capacity Constraint Illustration — Proportion of Small Cap Stocks with Potential Liquidity Issue under Different Portfolio Sizes



Source: MSCI. Data as of July 2010.

One way to mitigate the capacity constraint in small caps is to increase the number of holdings. For instance, for a USD1 billion portfolio, holding 200 stocks instead of 100 stocks would reduce the average position from USD10 million to USD5 million, significantly mitigating the liquidity challenges. Exhibit 14 shows that the median US small cap mandates hold about 100 stocks across different AUM categories. Interestingly, the median international small cap mandates hold 190 stocks, which may partly reflect more significant liquidity challenges in the international small cap segment.

Exhibit 14: AUM & Holdings Statistics of Small Cap Products with a Significant Asset Base (above USD250M AUM)

US Small Cap Mandates

AUM Category	% of AUM	Median No. of Holdings
250 - 500M	27.5%	88
500M - 1Bn	34.0%	95
1 - 2 Bn	21.7%	100
> 2Bn	16.8%	107
All Mandates	**100%**	**99**

International Small Cap Mandates

AUM Category	% of AUM	Median No. of Holdings
250 - 500M	34.7%	119
500M - 1Bn	16.3%	126
1 - 2 Bn	24.5%	261
> 2Bn	24.5%	243
All Mandates	**100%**	**190**

Source: MSCI. Data as of July 2010.

These observations highlight that the portfolio size, number of stock holdings, and small cap segment (US vs. international or emerging markets) all affect the liquidity challenges a small cap product may face, and thus they should be taken into account when evaluating the capacity of the small cap allocation. One implication may be that investors who have a sizable small cap allocation may need to assign multiple small cap mandates to mitigate the potential challenges of capacity constraint.

IV Conclusions and Future Research

Traditionally, institutional investors partitioned the global investment opportunity set to geographic building blocks. As a result of the continued evolution of global equity markets, institutional investors are increasingly adopting a more integrated global equity investment processes.

Our research suggests that global equity mandates, together with dedicated emerging market mandates and small cap mandates, may be emerging as the "new classic" structure for implementing equity allocation. Investors who need to maintain a home bias can manage the domestic portfolio separately. Such a more top-down mandate structure not only accrues benefits from the potential merits of an integrated global investment process, but it also accommodates segment-specific considerations on manager selection, legacy or mandatory home bias in equity allocation, and different risk and return drivers and investment processes in various equity market segments.

We intentionally avoided a discussion on active vs. passive implementation of the global equity allocation, as that question is part of our ongoing research efforts and will be addressed in an upcoming research paper.

We plan to explore further other recent equity allocation trends. For instance, some investors implement an equity allocation using a passive core portfolio with active decisions implemented through overlays; and some pension plans consider capturing the risk premia associated with various equity risk factors in a systematic fashion through factor-based asset allocation. We will examine alternative approaches for implementing an equity allocation in a separate research paper.

Appendix: Cross-Sectional Volatility Analysis

Cross-sectional volatility (CSV) measures the dispersion of stock returns over a period and is a gauge of the opportunity for active portfolio management. The CSV analysis in this paper is based on a monthly calculation and smoothed using a 12-month rolling average. The Barra Global Equity Model, GEM2 (see Menchero, Morozov, and Shepard 2008), is used to examine the drivers of cross-sectional volatility. The equity factor set in GEM2 includes a World factor (*w*), countries (*c*), industries (*i*), and styles (*s*). The excess return of stock *n* is expressed as:

$$r_n = f_{common(n)} + u_n = f_w + \sum_c X_{nc} f_c + \sum_i X_{ni} f_i + \sum_s X_{ns} f_s + u_n \ ,$$

where f_{common} is the return that can be attributed to common factors (World, countries, industries, and styles), and u_n is the stock specific return not explained by the common factors. For convenience, we denote $f_{country(n)} = \sum_c X_{nc} f_c$, $f_{industry(n)} = \sum_i X_{ni} f_i$, and $f_{style(n)} = \sum_s X_{ns} f_s$,

For each month, the Total CSV can be calculated as:

$$\sigma(r) = \sqrt{\sum_n w_n \left(r_n - \overline{r}\right)^2} \ ,$$

where w_n is the market-cap weight of stock *n*, and $\overline{r}$ is the average return of all stocks. The cross-sectional variance is the square of CSV, $\sigma^2(r)$.

The Total CSV can be decomposed into Explained CSV and Specific CSV, where Explained CSV can be calculated similarly as:

$$\sigma\left(f_{common}\right) = \sqrt{\sum_n w_n \left(f_{common(n)} - \overline{f}_{common}\right)^2} \ ,$$

The ratio of Explained CSV to Total CSV indicates the importance of common factors in driving total cross-sectional volatility, and it can be calculated as[14]:

$$\text{Explained-to-Total CSV Ratio} = \sigma\left(f_{common}\right) / \sigma(r) \ .$$

As Explained CSV is driven by country, industry, and style factors[15], we can infer the relative importance of country, industry, and style factors by examining the relative magnitude of their contribution to cross-sectional variance:

$$\text{Contribution of Countries} = \sigma^2\left(f_{country}\right) / \left(\sigma^2\left(f_{country}\right) + \sigma^2\left(f_{industry}\right) + \sigma^2\left(f_{style}\right)\right),$$

$$\text{Contribution of Industries} = \sigma^2\left(f_{industry}\right) / \left(\sigma^2\left(f_{country}\right) + \sigma^2\left(f_{industry}\right) + \sigma^2\left(f_{style}\right)\right),$$

$$\text{Contribution of Styles} = \sigma^2\left(f_{style}\right) / \left(\sigma^2\left(f_{country}\right) + \sigma^2\left(f_{industry}\right) + \sigma^2\left(f_{style}\right)\right).$$

[14] Note that the square of Explained-to-Total CSV Ratio is the Relative R-Squared.

[15] The World factor does not affect CSV, as every stock has the same exposure of 1 to this factor.

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Some Like It Hot

On the role of very active mandates across equity segments in a core-satellite structure

January 2011

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Introduction

Since the beginning of indexing in the early 1980s, active versus passive investing has been a much-debated subject of investment management. Today, plan sponsors have the option to implement their global equity allocation through either active or passive mandates.

In many instances, the active versus passive decision reflects both the philosophical beliefs and practical considerations of institutional investors. While there are institutional investors with strong convictions in each camp, more are increasingly pragmatic and combine passive and active mandates when implementing the global equity allocation.

The recent MSCI Research Insight "The New Classic Equity Allocation?" (Kang, Nielsen, and Fachinotti, 2010) discusses the evolving mandate structures and provides a framework for the implementation of global equity allocation[1]. As part of the MSCI Research series on global equity implementation, this paper reviews the active management opportunity in different equity market segments, and discusses the role of very active mandates across segments in a core-satellite portfolio structure.

Active Management in Different Equity Market Segments

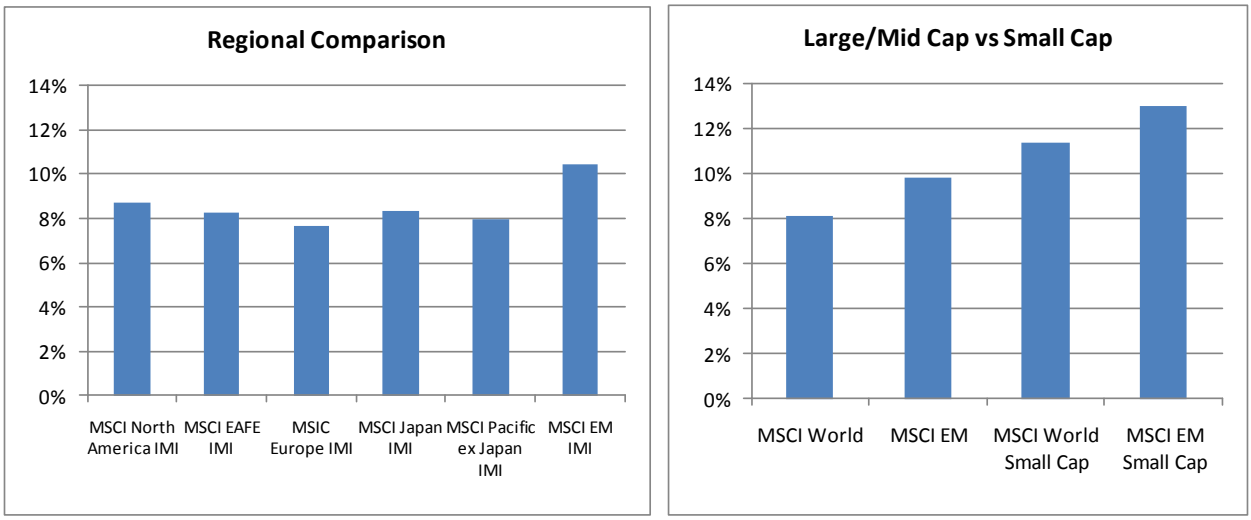
It is worthwhile revisiting a few basics that are accepted by the proponents of active and passive management. First, when taking the market as a whole, active management is a zero-sum game, and a negative-sum game after transaction costs and fees. Secondly, it is notoriously difficult for managers to consistently deliver alpha on a risk-adjusted basis. Lastly, skillful active managers do exist, but institutional investors need to have the relevant skills and resources to identify such managers on a consistent basis. Thus, the decision to go active or passive often reflects cost considerations and resource constraints. However, there are other important dimensions.

Institutional investors often rely on the relative efficiency of markets to gauge the level of opportunities for active management. For instance, emerging markets and the small cap segment are perceived to be relatively less efficient than developed markets and the large cap segment. Consequently, active management is generally thought to be more promising for emerging markets and small cap mandates.

An indication of the potential for active management is the level of return dispersion. Exhibit 1 shows that, as measured by the MSCI indices, emerging markets exhibited a higher level of return dispersion than various developed market regions. The comparison across size segments also confirms that small caps had significantly higher return dispersion than large caps in both developed and emerging markets. These observations indicate the higher potential for active managers to add value in emerging markets and the small cap size segment.

[1] Please refer to Appendix 1 for the "New Classic" Equity Allocation.

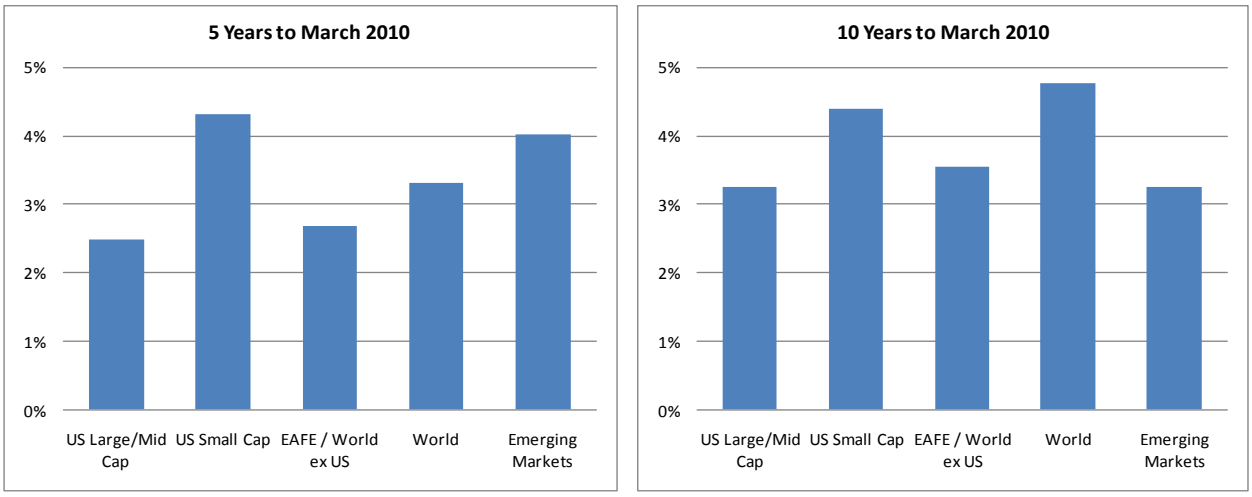
Exhibit 1: Stock Return Dispersion in Different Equity Market Segments



Source: MSCI. 10 Years to 31 March 2010. "IMI" denotes "Investable Market Index" and covers large, mid and small cap stocks.

For institutional investors who implement their equity allocation through external mandates, the manager return dispersion may be a more relevant measure of the potential for active management. Exhibit 2 reports the gap between the performance of top and bottom quartile managers across different equity segments. It shows that the manager performance dispersion is higher in US small cap than US large/mid caps, a result consistent with the higher stock return dispersions in small caps. On the other hand, over the 10 years ending March 2010, emerging market managers have demonstrated lower performance dispersion than global developed market managers, contradicting the results one might expect based on the higher security return dispersion in emerging markets.

Exhibit 2: Annualized Performance Dispersion between Top and Bottom Quartile Managers[2]



Source: MSCI, eVestment Alliance. 10 Years to 31 March 2010. Manager performance dispersion is measured as the gap between the excess returns of top quartile and bottom quartile managers. Excess return is the active return relative to the benchmark.

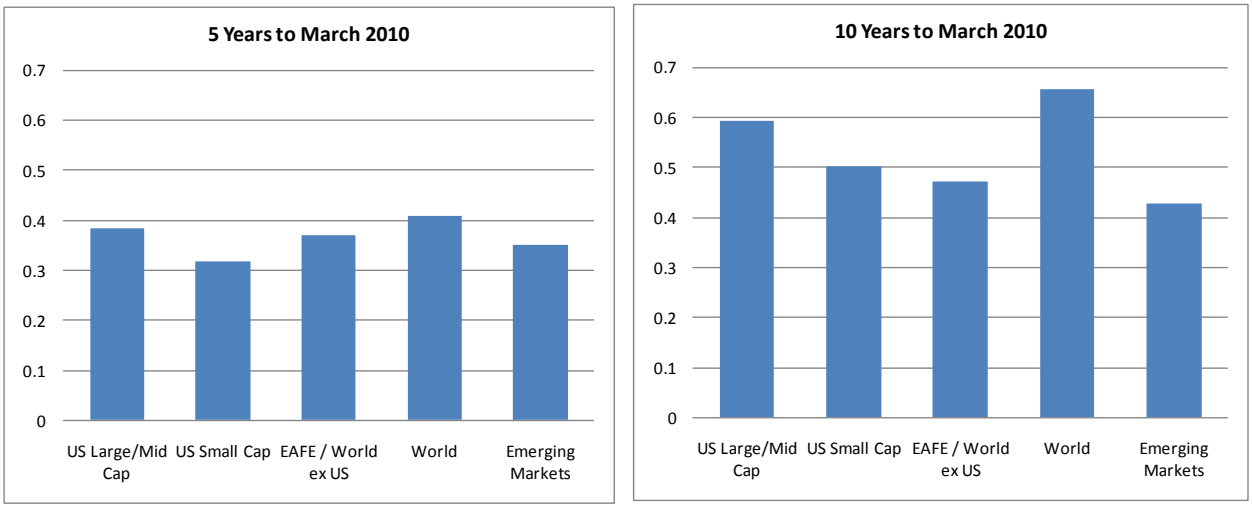
[2] In this paper, our data for international equity, global developed markets, and emerging markets includes large/mid cap mandates. Small cap managers in these segments are not analyzed separately due to the relatively small size of the sample.

Kang, Nielsen, and Fachinotti (2010) suggest that some emerging market mandates may be structured to obtain just the broad exposure to the segment through tracking their respective benchmarks. This could have contributed to the modest performance dispersion amongst emerging market mandates, despite the higher stock return dispersion and market volatility. Another potential explanation may be that some developed market mandates allow for a certain maximum exposure to emerging markets that is not captured by their benchmark. Such exposure may inflate the dispersion in the excess return of developed markets mandates.

Another question is whether there are active managers in less efficient segments, such as emerging markets and small cap, who can consistently add value beyond their respective benchmarks. Empirical studies show mixed results. Some earlier studies[3] find consistent and significant active management premium in US small cap. However, Davis, Sheay, Tokat, and Wicas (2007) find that small-cap outperformance is overstated and fragile with regard to benchmark selection, time periods, and relative performance measures. In emerging markets, Knutzen (2010) observes that dedicated emerging markets managers have historically shown an ability to add value versus the benchmark over 5-year rolling periods. Eling and Faust (2010) report that some emerging market hedge funds generated significant positive alpha, whereas the median emerging market mutual funds underperformed traditional benchmarks during the period from 1996 to 2008.

Exhibit 3 shows that, net of management fee, the top quartile US small cap and emerging market managers have added less risk-adjusted active return than their respective counterparts in US large cap and global developed markets during the recent 5- and 10-year periods ending March 2010. Another notable observation is that across all segments the 5-year information ratios were lower than the 10-year ratios. This may reflect the existence of survivorship bias in longer-term manager performance data and the challenges faced by many active managers during the 2007-2009 financial crisis.

Exhibit 3: Information Ratio (Risk-Adjusted Active Return) of Top Quartile Active Managers[4]



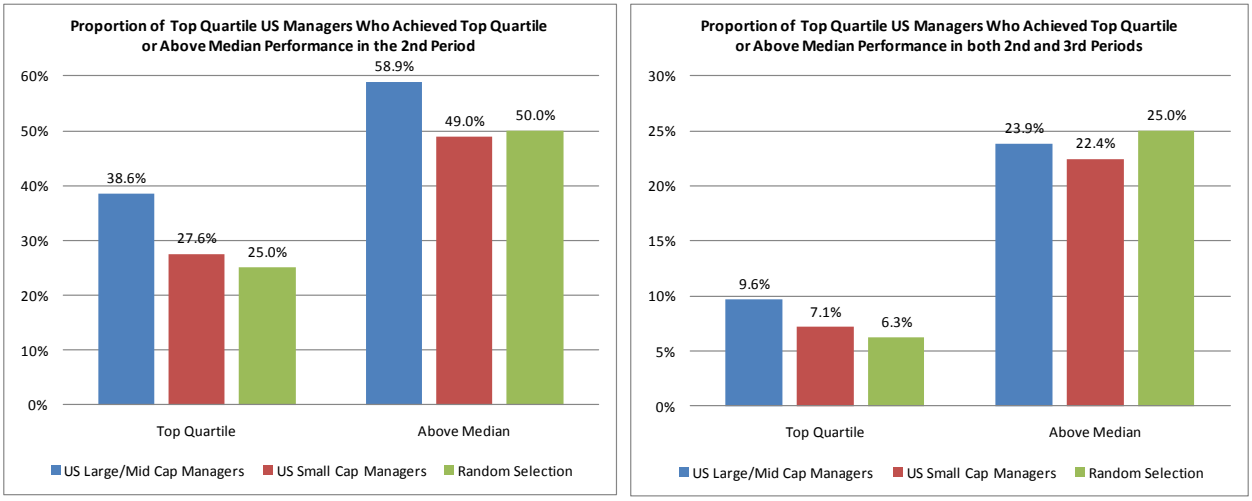
Source: MSCI, eVestment Alliance. 10 Years to 31 March 2010. "International" denotes EAFE and World ex US mandates. The management fee by peer group published by eVestment Alliance as of March 2010 was used. Manager performance data has not been adjusted for potential biases such as survivorship bias and selection bias.

[3] For instance, see Allen (2005).

[4] The top quartile information ratio here corresponds to the value at the 75th percentile in each segment.

Exhibit 4 shows the proportion of active US managers who were top quartile managers in the first three-year period, continuing to achieve top quartile or above median performance over the second and third three-year periods. It shows that top US small cap managers have not demonstrated stronger performance persistency than the top US large/mid cap managers. In fact, only about 7.1% of top quartile US small cap managers (compared with 9.6% of top quartile US large/mid cap managers) in the first period continued to rank in the top quartile over the following two periods, a probability that was close to random selection.

Exhibit 4: Performance Persistency of Top Quartile US Managers over Three 3-Year Periods



Source: MSCI, eVestment Alliance. Analysis is based on manager performance in the 9 Years ending 31 March 2010, which is divided into three 3-year periods. Manager performance data has not been adjusted for potential biases, such as survivorship and selection bias.

A potential explanation for the lack of performance persistency is that the manager outperformance may be attributed to a combination of skill and luck. Urwin (2000) suggests that due to high noise-to-signal ratio in active manager returns, the performance may reflect the influence of chance more than the influence of investment skills. Fama and French (2010) use bootstrap simulations to study the role of luck versus skill in the cross-section of mutual fund returns, finding that some managers do have sufficient skill to cover costs, although such managers are few.

Note that manager performance studies are often time-period dependent and subject to many potential biases[5], making further analysis over longer periods necessary to obtain more conclusive findings. Nevertheless, the empirical literature and our limited analysis suggest that there is no empirical evidence suggesting that perceivably less efficient markets may be associated with ”easier” alpha.

For instance, higher costs in portfolio management and trading as well as potential regulatory and information barriers may dampen the perceived higher opportunities for active management in emerging markets. Similarly, compared with the large cap segment, small cap managers may face higher implementation costs due to limited information flow, lower liquidity, and constraints on capacity.

[5] Such biases may include survivorship bias, selection bias, and backfilling bias.

Given such results, it may be legitimate for institutional investors to examine both active and passive implementation options across all segments of the global equity universe. The choice of active versus passive depends foremost on an institutional investor's beliefs and skills in selecting active managers.

Combining Active and Passive Management: A Fresh Look at the Core-Satellite Structure[6]

Many institutional investors consider active and passive management as two complementary (rather than mutually exclusive) approaches for implementing their equity allocation. While passive mandates offer the diversified market exposure at low cost, active mandates offer the alpha potential for institutional investors who have the resources and capacity for active management or manager selection.

Due to different levels of market efficiency, some institutional investors traditionally believe that developed market large cap equities should be mainly managed passively, while emerging markets and small cap equities should be managed actively. Under such beliefs, institutional investors often structure a core-satellite equity portfolio, using a passive core of developed market large cap mandates combined with active satellite mandates that target emerging markets and small caps. As our earlier discussion suggests, contrary to traditional beliefs, both active and passive management may be utilized across all equity market segments. We investigate below the application of a core-satellite structure that combines active and passive mandates across market segments, with a focus on the role of very active mandates.

For plan sponsors who employ active management, there are a few important factors determining the potential magnitude of excess returns:

- The level of manager skills
- The sponsor's ability to identify above-average managers ex ante
- The level of active risk the sponsor is willing to take.

Exhibit 5 presents the tracking error distribution of active equity funds. It shows in each equity market segment that there is a wide spectrum of active risk profiles among active managers. An important consideration for institutional investors is the allocation between passive and active mandates and the resulting aggregate active risk or tracking error. One can target the same overall active risk but achieve it with very different allocations between active and passive investments. One extreme is to go 100% active, but with very tight tracking error and active exposure controls for individual mandates, resulting in a well-controlled tracking error at the aggregate level. The potential downside is that this may introduce the risk of "closet indexing."

[6] Note that our discussion focuses on the application of core satellite structure (sometimes known as "barbell structure") in implementing the equity allocation. Market participants also refer to core satellite as an asset allocation approach for multi-asset class portfolios, but that is not the focus of this paper.

Exhibit 5: Tracking Error Statistics of Active Equity Funds

Median Tracking Error	US Large/Mid Cap	US Small Cap	EAFE / World ex US	World	Emerging Markets
Low Active Risk Manager Universe	3.1	5.5	3.3	3.6	3.3
Whole Manager Universe	4.5	8.1	4.6	6.1	4.8
High Active Risk Manager Universe	8.2	11.7	7.2	10.0	7.7

Source: MSCI, eVestment Alliance. 10 Years ending 31 March 2010. We define the low and high active risk manager universes as the two groups of managers whose have a bottom quartile / top quartile tracking error, respectively.

At the other end of the spectrum, one can adopt passive mandates with the majority of equity investments while allocating the remaining assets to high active risk mandates. The relative allocation between passive and high active risk mandates may vary, depending on the investor's target level of active risk, as well as the desire to be in a position to make asset allocation decisions without hurting the active management process. Exhibit 6 illustrates that across different equity market segments, allocating 60% of the investments to passive mandates and 40% to high active risk managers led to an active risk level similar to that of low active risk managers. By comparison, an 80/20 allocation exhibits less active risk.

Exhibit 6: Active Risk Profile of Different Combinations of Passive and High Active Risk Mandates

Median Tracking Error of Different Combinations	US Large/Mid Cap	US Small Cap	EAFE / World ex US	World	Emerging Markets
40 Passive / 60 High Active Risk	4.9	7.0	4.3	6.0	4.6
60 Passive / 40 High Active Risk	3.3	4.7	2.9	4.0	3.1
80 Passive / 20 High Active Risk	1.6	2.3	1.4	2.0	1.5

Source: MSCI. 10 Years ending 31 March 2010.

Exhibit 7 shows the simulated historical performance of high vs. low active risk managers in the 10 years ending March 2010. Across all segments, high active risk managers achieved higher excess returns and information ratios. While some of this outperformance may be linked to survivor or selection bias, it may reflect links between higher manager skill, higher investment conviction, and/or fewer constraints. The gap between the information ratios of high and low active risk managers has been the most significant among global managers and emerging markets managers. As a result, these combinations of passive and very active managers achieved higher information ratios in each market segment.

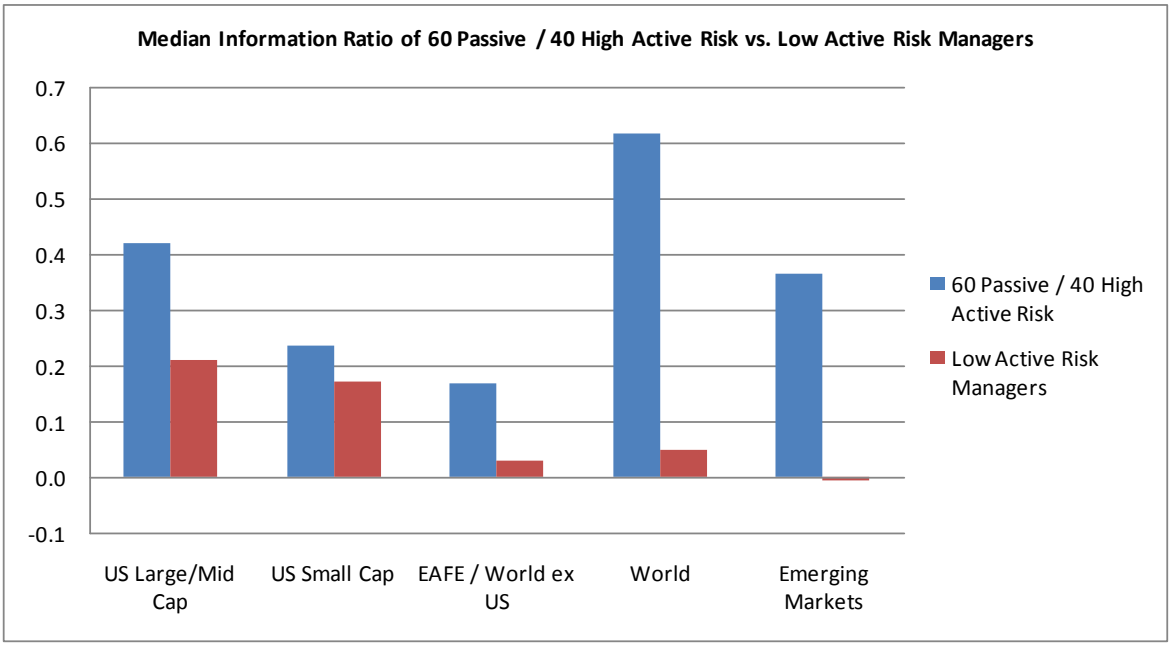
We also include a similar 5-year simulation in the Appendix. The results are consistent with the 10-year simulation. As we noted earlier, manager performance analysis can be dependent on the specific time periods and database used, thus the observations here may not be generalized and historical results may not reflect future performance.

Exhibit 7: Historical Performance of Different Combinations of Passive and High Active Risk Mandates (10 Years)

Median Excess Return	US Large/Mid Cap	US Small Cap	EAFE / World ex US	World	Emerging Markets
Low Active Risk Manager Universe	0.77	0.86	0.06	0.20	-0.02
High Active Risk Manager Universe	4.04	3.09	1.27	5.47	3.07

Median Information Ratio	US Large/Mid Cap	US Small Cap	EAFE / World ex US	World	Emerging Markets
Low Active Risk Manager Universe	0.21	0.17	0.03	0.05	-0.01
High Active Risk Manager Universe	0.44	0.26	0.21	0.64	0.41

Median Information Ratio of Different Combinations	US Large/Mid Cap	US Small Cap	EAFE / World ex US	World	Emerging Markets
40 Passive / 60 High Active Risk	0.43	0.25	0.18	0.63	0.38
60 Passive / 40 High Active Risk	0.42	0.24	0.17	0.62	0.37
80 Passive / 20 High Active Risk	0.42	0.23	0.16	0.61	0.35



Source: MSCI, eVestment Alliance. 10 Years ending 31 March 2010. Managers' historical performance was net of management fee, and has not been adjusted for potential biases such as survivorship bias and selection bias. The management fee by peer group published by eVestment Alliance as of March 2010 was used for active products, and the management fee for passive products was assumed to be one-quarter of the active management fee.

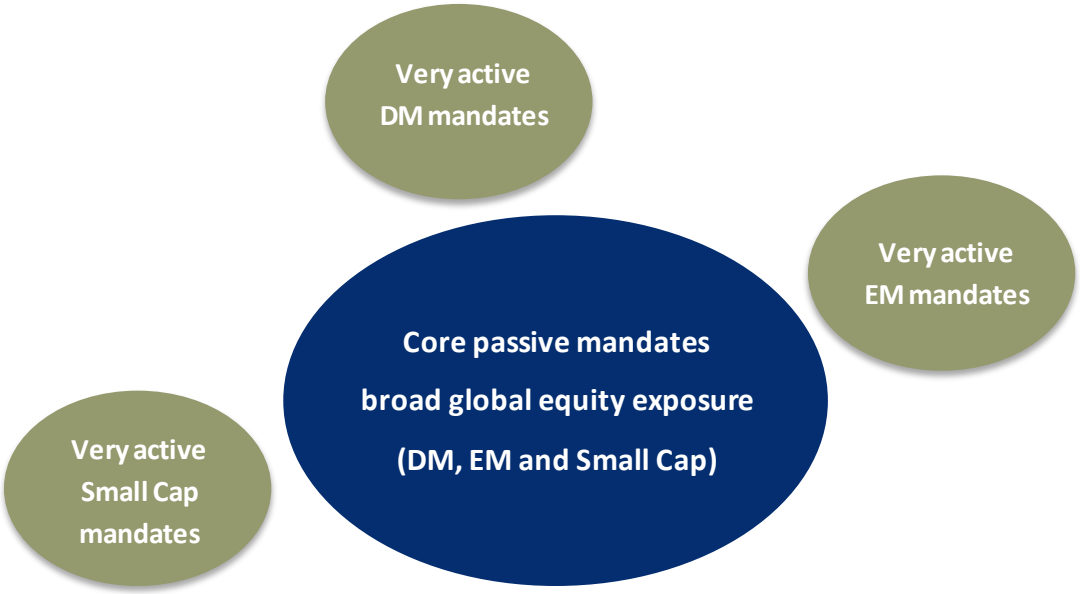
For a global equity allocation that spans across developed markets, emerging markets and small cap, a potential core-satellite structure would combine passive and very active mandates in each of these equity market segments, where the core passive mandates offers broad global equity exposure, and the very active mandates reflect the investor's conviction in active management and skills in selecting active managers.

One potential benefit of such core-satellite structure is that it allows institutional investors to manage more flexibly the beta exposure and the alpha component across equity market segments[7]. For instance, changes to the asset allocation can be implemented through passive mandates, without impacting the alpha decisions made by the satellite managers. Furthermore, it may allow both passive and active managers to focus on their core competencies.

In addition, the core-satellite structure would allow institutional investors to utilize high active risk mandates, even with a modest aggregated active risk budget. High active risk mandates usually come with fewer constraints, therefore allowing managers to enter into active positions that reflect their convictions more strongly. Such mandates would also be less restricted by their respective benchmarks. For instance, Cremers and Patajisto (2009) find that funds with the highest Active Share (another measure of active risk) significantly outperform their benchmarks after expenses, exhibiting strong performance persistency. Lin et al (2009) find that global equity managers with larger active bets achieved higher information ratio than their peers with smaller active bets.

There are different ways of structuring the satellite active mandates. Traditionally investors allocated mandates according to geographic building blocks such as domestic/international. More recently some institutional investors have moved towards a more integrated global equity structure, focusing on global developed markets mandates, dedicated emerging markets mandates and specialist regional small cap mandates to implement the global equity allocation (Kang, Nielsen, and Fachinotti, 2010). Exhibit 8 illustrates a potential core-satellite structure under such integrated global equity framework.

Exhibit 8: Illustration of a Potential Implementation Option using Core-Satellite Structure



[7] Siegel et al (2009) discuss why institutional investors should make alpha and beta decisions separately. For instance: beta is not conditional on skill while alpha is only conditional on having above average skill; the reward for taking beta risk differs from taking alpha risk; and the criteria for deciding how much beta risk to take differs from deciding whether to take alpha risk.

Conclusion

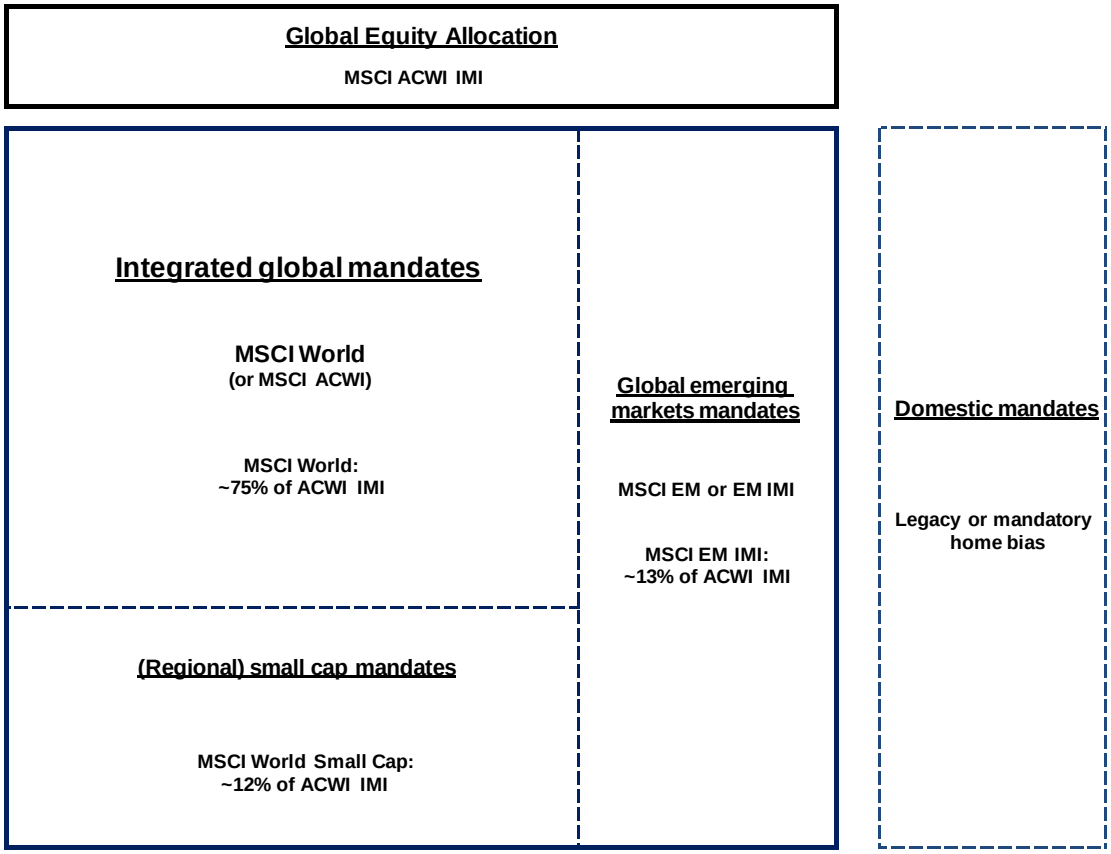
We reviewed whether different segments of the global equity universe exhibit different opportunities for active management. Both the degree of market efficiency and the level of stock return dispersion suggest that emerging and small cap markets may offer higher active management potential. However, these segments are more costly to implement. In fact, the empirical literature and our analysis seem to indicate that there is little evidence that average managers operating in these markets have produced higher or more persistent risk-adjusted returns relative to their developed markets large and mid cap peers.

As a result, and against the traditional belief that passive management suits developed markets large cap and active management suits emerging markets and small cap, institutional investors may consider active and passive management as complementary strategies across these different equity segments.

The core-satellite structure has been revived as alpha-beta separation over recent years. It is supported by the wide availability of low-cost passive vehicles and an increasing number of very active or benchmark agnostic managers. We examined a core-satellite structure that combines passive and very active mandates across different equity market segments. Due to the outperformance of high active risk mandates during the analyzed period, simulated combinations of passive and very active mandates achieved higher information ratios than low active risk mandates across segments. Depending on investment beliefs, institutional investors might explore a core-satellite structure where the active-passive split extends to each equity market segment to implement the global equity allocation.

Appendix 1

Exhibit 9: "New Classic" Equity Allocation?[8]



Note: MSCI ACWI IMI denotes the MSCI All Country World Investable Market Index that covers large, mid, and small cap companies in developed and emerging markets. MSCI World covers the large and mid cap companies in developed markets. MSCI EM IMI denotes the MSCI Emerging Markets Investable Market Index that covers large, mid, and small cap companies in emerging markets. The weights of MSCI World, MSCI World Small Cap and MSCI EM IMI in MSCI ACWI IMI represent their market capitalization weights as of September 2010.

[8] Taken from Kang, Nielsen, and Fachinotti, 2010.The structure illustrated here addresses active mandates. If an investor decides to go passive across the whole global equity allocation, then the mandate structure is a less critical consideration.

Appendix 2

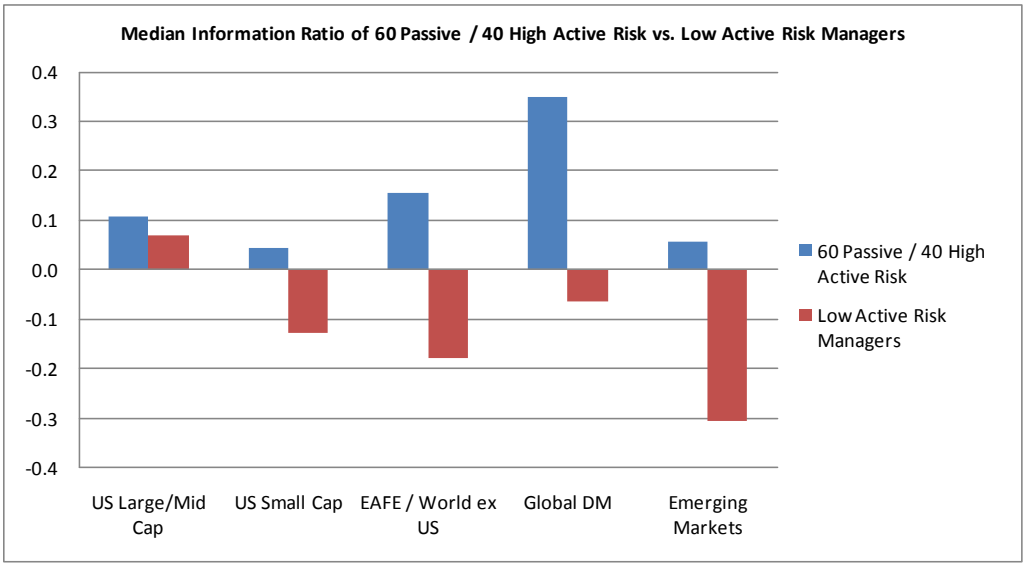
Exhibit 10: Historical Performance of Different Combinations of Passive and High Active Risk Mandates (5 Years)

Median Excess Return	US Large/Mid Cap	US Small Cap	EAFE / World ex US	World	Emerging Markets
Low Active Risk Manager Universe	0.17	-0.51	-0.50	-0.15	-1.08
High Active Risk Manager Universe	1.03	0.95	1.24	3.76	1.01

Median Information Ratio	US Large/Mid Cap	US Small Cap	EAFE / World ex US	World	Emerging Markets
Low Active Risk Manager Universe	0.07	-0.13	-0.18	-0.06	-0.31
High Active Risk Manager Universe	0.13	0.07	0.19	0.38	0.10

Median Tracking Error of Different Combinations	US Large/Mid Cap	US Small Cap	EAFE / World ex US	World	Emerging Markets
40 Passive / 60 High Active Risk	4.7	6.5	4.3	5.1	4.6
60 Passive / 40 High Active Risk	3.1	4.3	2.9	3.4	3.0
80 Passive / 20 High Active Risk	1.6	2.2	1.4	1.7	1.5

Median Information Ratio of Different Combinations	US Large/Mid Cap	US Small Cap	EAFE / World ex US	World	Emerging Markets
40 Passive / 60 High Active Risk	0.12	0.05	0.17	0.36	0.07
60 Passive / 40 High Active Risk	0.11	0.04	0.16	0.35	0.06
80 Passive / 20 High Active Risk	0.10	0.03	0.14	0.34	0.04



Source: MSCI, eVestment Alliance. 5 Years ending 31 March 2010. Managers' historical performance was net of management fee, and has not been adjusted for potential biases such as survivorship bias and selection bias. The management fee by peer group published by eVestment Alliance as of March 2010 was used for active products, and the management fee for passive products was assumed to be one-quarter of the active management fee.

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