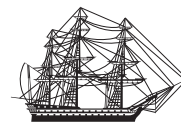


International Equity: Considerations and Recommendations

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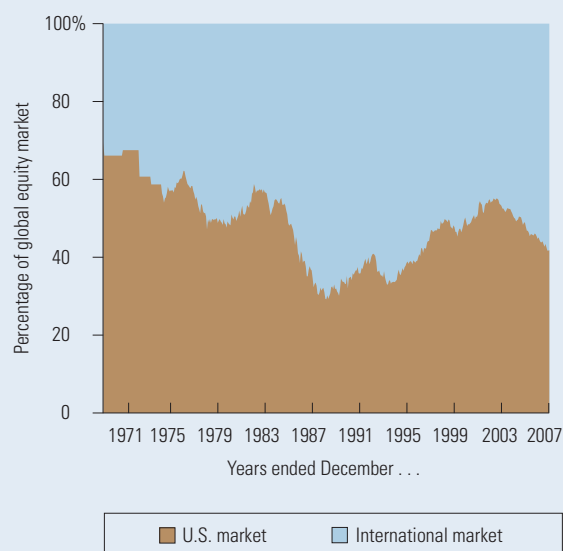
Executive summary. Non-U.S. equities currently account for more than 50% of global market capitalization, representing a significant opportunity for U.S. investors beyond their borders. In addition, the portfolio of an investor who combined non-U.S. equities (hereafter “international”) with U.S. equities over the past several decades would have experienced lower average volatility—despite similar realized returns and volatilities in each region. U.S. investors who recognize this opportunity for diversification are increasingly investing abroad. According to data from the Investment Company Institute, international equity funds constitute 23% of the total equity allocation of U.S. mutual fund investors (2007 Factbook). While most recommendations call for approximately 20% of an investor’s equity portfolio to be allocated to international equities, little evidence is typically provided to support the 20% recommendation. In this brief, we weigh the short-term and long-term impact of currency, correlations, cost, and expected risks and returns and conclude that:

- International stocks should be considered for inclusion in a domestic portfolio.
- Empirical and practical issues suggest a starting allocation to international stocks of 20%, with an upper limit based on the proportion of the global market they represent.
- The exact allocation to international equities will depend on the investor’s view regarding the short- and long-term tradeoffs.

Author

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Figure 1. Historical breakdown of market values between U.S. stocks and international stocks



Notes: International market represented by MSCI All Country World Index ex USA. U.S. market represented by MSCI USA Index. Data as of December 31, 2007.
Sources: Thomson Datastream and MSCI.

U.S. investors *should* consider investing in foreign stocks

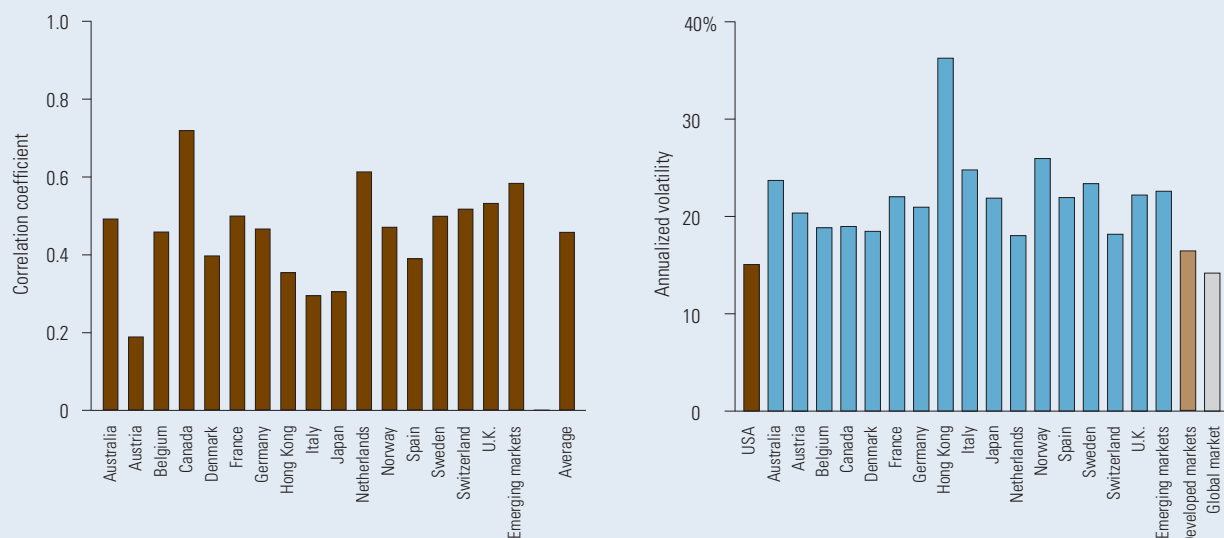
As of December 31, 2007, U.S. equities accounted for 42% of the global equity market. International equities, including those of developed countries such as Germany, Japan, and the United Kingdom, plus those of emerging countries such as Brazil, India, and China, accounted for the remaining 58%. As shown in **Figure 1**, the 2007 U.S. market capitalization is below the recent high of 55% of the global equity market, reached in March 2003, but remains significantly above the all-time low of 29%, reached at the peak of the Japanese stock market run in the late 1980s. A portfolio investing solely within the U.S. stock market automatically excludes well over half of the global opportunity set.

Beyond the opportunity to invest across a broader market, international equities have also historically diversified the returns of U.S. equities. The rationale for diversification is clear—U.S. stocks are exposed to U.S. economic and market forces, while international stocks offer exposure to a wider array of economic and market forces. These differing economies and markets produce returns that can vary significantly from those of U.S. stocks. The left panel of **Figure 2** shows that, all else being equal, a U.S. investor should realize a diversification benefit from investing globally because the equity markets of other developed economies are less-than-perfectly correlated with the U.S. equity market.

At a high level, we can see the benefit of global diversification by comparing the volatility of a global index to indexes focused on either the U.S. market or international markets in isolation. The right panel of **Figure 2** illustrates this argument. The benefit of international diversification is clear when developed countries such as Germany and Australia are combined in a diversified index—the volatility of the MSCI All Country World Index ex USA has been less than that of any individual country. And while the United States has experienced return volatility significantly less than that of other developed countries, and less even than the diversified international developed markets index, the broadest global index—representing the union of the MSCI USA Index, the developed markets index, and the emerging markets index—has realized the lowest average volatility since 1970.

Notes on risk: Diversification does not ensure a profit or protect against a loss in a declining market. Foreign investing involves additional risks, including currency fluctuations and political uncertainty. Stocks of companies in emerging markets are generally more risky than stocks of companies in developed countries. Past performance is no guarantee of future results.

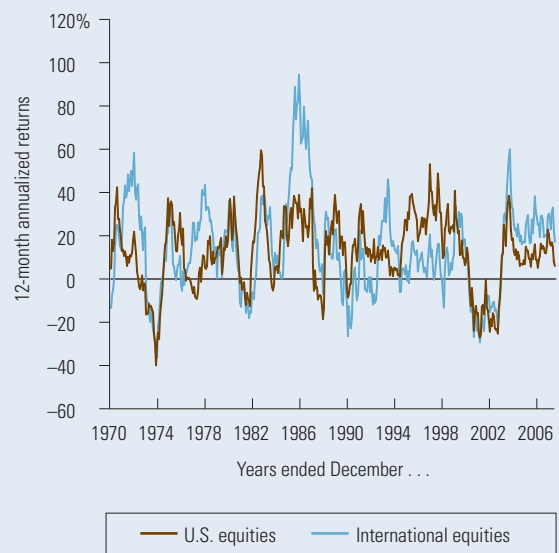
Figure 2. Correlations of foreign equity markets with U.S. equity markets; volatility of country and regional indexes



Notes: Country returns represented by MSCI country indexes. Emerging markets represented by MSCI Emerging Markets Index. Developed markets represented by MSCI All Country World Index ex USA. Global market, including both developed and emerging, represented by MSCI All Country World Index. Emerging market data begin in 1988. Data through December 31, 2007.
Sources: Thomson Datastream and MSCI.

While lower average portfolio volatility would be expected over the long term, a near-term benefit of global diversification is the opportunity to participate in whichever regional market is outperforming. For example, while the United States may lead over some periods, another country or market will lead at other points. **Figure 3** shows the near-term benefits of global diversification. By including both broadly diversified U.S. and international equities in a portfolio, the investor will always fall between the U.S. market and the international market—never leading, but more importantly, never trailing. For example, in the mid-1980s, exposure to diversified international equities would have allowed a U.S. investor to participate in the outperformance of those markets. On the other hand, while exposure to diversified international equities would have pushed the returns for a global investor below that of the United States in the mid-1990s, the investor would have again benefited in the 2000s, when international equities again outperformed.

Figure 3. Short-term returns can be different for U.S. and international portfolios



Notes: U.S. equities represented by MSCI USA Index; international equities represented by MSCI World Index ex USA from 1970 through 1987 and MSCI All Country World Index ex USA thereafter. Data through December 31, 2007.
Sources: Thomson Datastream and MSCI.

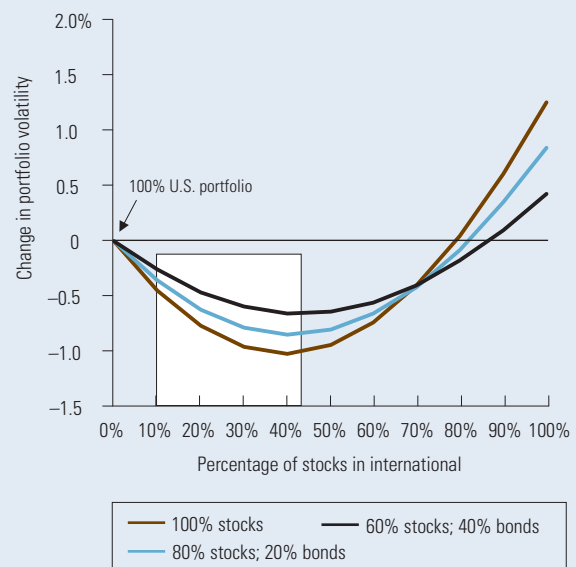
This near-term benefit of broad diversification is particularly relevant in light of the extensive literature on the ineffectiveness of investors who try to time the markets by moving back and forth between U.S. stocks and international stocks, based on which one they believe will outperform in the future. Such market-timing is costly, and most investors invariably fail to accurately time the moves, missing a large portion of the outperformance. A vastly expanded opportunity set combined with the expected long-term benefits of volatility reduction and the short-term expected benefits of return diversification suggests that *an allocation to international stocks should be considered for inclusion in a domestic portfolio.*

Given global exposure, how much?

The decision to invest globally is only the first step. The next step is to determine an appropriate allocation to international equities. The standard financial-theory approach, whether for allocating globally or within a specific country or market, is to invest proportionally according to market capitalization. This method assumes that markets are reasonably efficient and that stock prices reflect all the available information, analyses, and expectations of the investing community. However, historically, U.S. equities have constituted from as little as 30% (during the heyday of the Japanese market) to as much as 70% (in the early 1970s) of the global market, so the volatility of the allocations themselves has been quite high. As we see from Figure 1, U.S. equities currently make up approximately 42% of the global market. According to theory then, U.S. investors should currently have 58% of their equity portfolio in non-U.S. equities. However, few investors follow this approach to the letter, instead choosing a set allocation, such as 20% or 40%, and then periodically rebalancing to that amount. In fact, when we examine the pros and cons of a market-weighted global portfolio we find several legitimate reasons for an investor to start at an allocation below that suggested by current global market capitalization.

Figure 4. Equity allocations of up to 40% to international stocks have historically reduced the volatility of a U.S. portfolio

Annualized change in portfolio volatility when combining U.S. and international equities



Notes: U.S. equities represented by MSCI USA Index; international equities represented by MSCI World Index ex USA from 1970 through 1987 and MSCI All Country World Index ex USA thereafter. Bond data represented by the Salomon High Grade Index from 1970 through 1972, the Lehman LT AA Corporate Index from 1973 through 1975, and Lehman Brothers U.S. Aggregate Bond Index thereafter. Data through December 31, 2007.

Sources: Thomson Datastream, Vanguard, and MSCI.

Mean-variance analysis

Conducting a simple historical mean-variance exercise, as described in Figure 4, shows that a range of allocations between international and U.S. stocks (and bonds) has historically resulted in incrementally greater levels of diversification in the form of reduced portfolio volatility. What's striking, however, is that U.S. investors have obtained substantial diversification benefits from relatively modest international allocations. Looking at the brown line, representing a portfolio

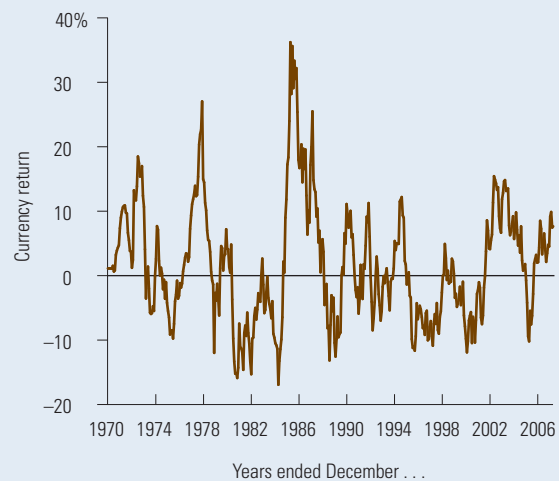
composed entirely of equities, a 10% allocation to international stocks historically reduced the volatility of a U.S.-only equity portfolio (represented by the x-axis) by 50 basis points, while a 40% allocation has historically reduced volatility by 114 basis points. In other words, a 10% allocation would have delivered 43% of the maximum benefit of 114 basis points. Allocating 20% to international would have reduced average portfolio volatility by 86 basis points, or 75% of the maximum benefit. So while mean-variance analysis suggests that an investor would have been best off in terms of lowest average volatility by allocating 40% of an equity portfolio to foreign stocks, a significant portion of the benefit can be achieved through lower allocations.

One significant weakness of this analysis is that mean-variance optimization is backward-looking and particularly dependent on the time period examined. For example, at different observation dates, the “optimal” allocation to international stocks has been as low as 20% or as high as 70%. As recently as 2005, the bottom of the “U” pattern in Figure 4 fell between 40% and 50%; now we clearly see the curve bottoming at 40%.

There are also other, perhaps more tangible reasons an investor may rationally choose to start at a lower allocation than one based on current market capitalization. Empirical considerations, such as currency volatility and potentially higher future correlations than history would suggest, combined with practical considerations, such as higher costs, suggest that somewhat less exposure to international equities may be warranted by those investors who are more risk-averse.

Figure 5. Currency movements affect returns in the short term

Annualized contribution of U.S. dollar to international equity returns



Notes: Contribution of the U.S. dollar calculated by subtracting the returns of international stocks denominated in local currency from international stocks denominated in U.S. dollars. International equities represented by MSCI World Index ex USA from 1970 through 1987 and MSCI All Country World Index ex USA thereafter. Data through December 31, 2007.

Sources: Thomson Datastream and MSCI.

Exposure to currency risk

Investments in foreign markets are exposed to fluctuations in foreign exchange rates. In the long term, currency movements should have no impact on the returns of a foreign portfolio.¹ In the short term, however, these fluctuations can significantly impact both portfolio volatility and returns. **Figure 5** illustrates that currency fluctuations have periodically added to or subtracted from the return of international investments. For example, currency movements subtracted 17% from the 12-month returns of international stocks in 1984 and then added 35% in 1986.

¹ Purchasing power parity states that real returns will be the same across countries, as exchange rate movements and inflation differentials should be identical. Interest rate parity is based on the notion that the interest rate differential between the home and foreign markets will determine the change in the exchange rate. While there is considerable empirical support for these theories in the long run, substantial research documents significant departures from a currency's “fair value” in the short run.

Although currency movements tend to be unpredictable and are often large, they have historically been uncorrelated to movements in both foreign and U.S. stock prices. As a result, over time, currency movements have helped to reduce the correlation between international equities and U.S. equities, thus contributing to the diversification benefits of foreign holdings. However, currency movements also increased the volatility of international equities by approximately 2.2 percentage points from 1970 through 2007 (from 14.37% to 16.54%). The potential for higher volatility and decreased returns in the short term can reduce the relative attractiveness of foreign portfolios, creating one potential argument for lower allocations to international equities than recommended by current market capitalization.

Higher global correlations

A second critical question for potential international equity investors is whether the average risk, return, and correlation statistics that we have observed historically can reasonably be expected to hold true going forward. Because developed markets tend to have similar levels of competitiveness, transparency, liquidity, participants, and opportunities, it is reasonable to assume that the long-term returns and volatility of international and U.S. stocks will also be similar going forward—an expectation consistent with the long-term record. However, global correlations could become higher because of trends toward greater global economic, financial, and institutional integration that appear to have accelerated in the 1990s.

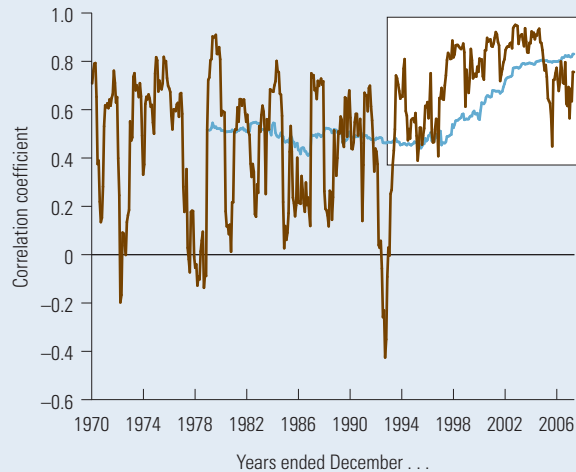
Looking ahead, if an investor were to assume that the future long-term returns and volatility of U.S. stocks and international stocks will be similar, then the long-term strategic case for international equity investing hinges on the correlations that exist among different international markets. Under identical return and variance assumptions, an increase in global correlations could make international investing less attractive than it has been over the long term from a purely empirical standpoint.

The left panel of **Figure 6** shows that the correlation of U.S. stocks and international stocks has increased over time, and notably so since the mid-1990s. In fact, while longer-term correlations were stable through the 1980s and early 1990s, recent years have shown a significant upward trend. One significant driver for the increased correlation has been the steady decline in the importance of the Pacific region over the last 20 years. Historically, European markets have been more closely correlated to U.S. markets than Pacific markets have been to U.S. markets. In other words, Pacific markets, and especially Japan, have historically been a significant source of diversification for global portfolios. But, since the 1980s, Europe's market capitalization has doubled, at the expense of the Pacific region. As a result, the strong diversifying effect of the Pacific region has been muted in the last 10 years.

A second driver is the incremental increase in correlations *among* global markets. As shown in the right panel of **Figure 6**, correlations across individual countries have also increased significantly, from approximately 0.35 in the 1980s to 0.67 as of 2007. Whether these trends continue is open for debate; however, increasing correlations have significant implications for global investors.

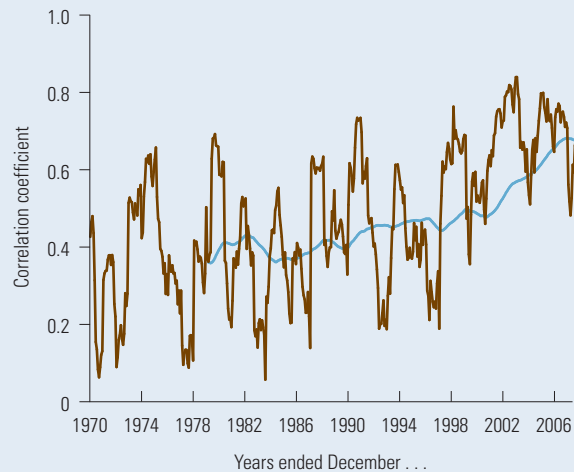
Figure 6. Increasing correlations mean less diversification benefit for a global portfolio

Rolling correlations between U.S. and international stocks



— 12-month rolling correlations
— 10-year rolling correlations

Rolling median correlations across countries



— Median global cross-correlations
— Rolling 10-year median cross-correlations

Notes: Country returns represented by MSCI country indexes. Emerging markets represented by MSCI Emerging Markets Index. Emerging market data begin in 1988. Data through December 31, 2007.

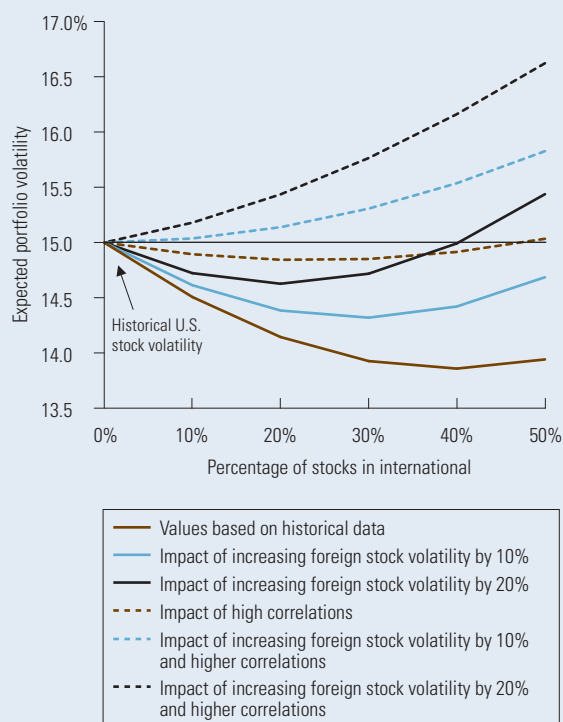
Sources: Thomson Datastream and MSCI.

When all these factors are taken together, it is not unreasonable to anticipate that the future correlation between international equities and U.S. equities will more closely resemble that of the recent past, rather than the 1970s and 1980s, particularly given that correlation trends are slow to shift.² In addition to the possibility that future correlations may remain elevated, it is conceivable that the volatility in

international equities could increase, further reducing the incentive to invest internationally. Increased volatility could result from foreign market bubbles or from regional economic slumps such as that experienced by the Pacific Rim countries in the late 1990s.

² That said, international equity correlations should remain less than perfect. Consider, for instance, that several studies (e.g., Stock and Watson, 2003) have found minimal evidence of increased international synchronization of business cycles, despite increases in international trade flows, developed market integration, and the introduction of the euro.

Figure 7. Hypothetical change in portfolio volatility given alternate future expectations



Notes: U.S. equities represented by MSCI USA Index; international equities represented by MSCI World Index ex USA from 1970 through 1987 and MSCI All Country World Index ex USA thereafter. Data through December 31, 2007.
Sources: Thomson Datastream, Vanguard, and MSCI.

Correlations and volatility: Scenario analysis

In Figure 7, we consider how alternative expectations for the characteristics of a portfolio containing international equities would alter a strategic asset allocation recommendation. As we demonstrated in Figure 4, adding an allocation to international equities has historically helped to reduce the overall volatility of a domestic equity portfolio (represented in Figure 7 by the solid brown line). All else being equal, with higher volatility or higher correlations (relative to historic averages), international equities continue to provide long-

term diversification benefits, but at a reduced rate. For example, the brown dashed line represents a scenario in which future correlations remain at current levels (but higher than the historical average). In this scenario, international stocks continue to help reduce the average volatility of a portfolio, but to a far lesser degree.

Under rather extreme assumptions, represented by the black dashed line, in which the future volatility of international stocks increases significantly and the average return correlation between U.S. and international stocks increases, the theoretical benefit from exposure to international equities is eliminated. But overall, Figure 7 demonstrates that in most scenarios, foreign stocks would continue to provide a diversification benefit, although a reduced one. Of course, should correlations fall instead, perhaps due to a “decoupling” of U.S. and international markets, we would expect the diversification benefit to increase. Such a scenario analysis can help investors quantify future expectations and assess the potential impact that a range of allocations to international equities would have on their portfolios.

Qualitative considerations

Real-world considerations may further support a lower allocation to international equities than that recommended by market proportions or a pure optimization analysis. Broadly, such considerations involve barriers to investment, such as limitations on the repatriation of investment income and higher transaction and friction costs.

While barriers to cross-border investment have been falling over time, transaction and investment costs generally remain proportionally higher in foreign markets than in domestic markets. This is primarily a result of liquidity differences and relatively lower market participation. For example, bid-ask spreads tend to be wider, and management fees and friction costs (such as commissions, opportunity costs, and market-impact costs) tend to be higher for foreign investments than for similar U.S. portfolios.

The role of emerging markets

Emerging markets are economies or markets that are just entering the global arena or do not meet criteria to be considered developed economies. For example, the World Bank classifies emerging markets as economies below the high-income threshold.³ Many countries meet this criteria, with China, India, Brazil, and Russia among the better-known ones. Those that successfully develop (such as the United States from the 1800s through the 1900s) would be expected to enjoy strong long-term returns. However, those that do not develop may see their financial markets languish. Therefore, the risk of investing in individual countries is extremely high, but the risk of investing across all emerging markets is much less. As a result, investors interested in emerging markets should diversify their exposure across emerging markets.

The unique development patterns of these emerging markets help them to diversify the returns of developed international markets and U.S. markets—correlations between developed markets and emerging markets have averaged 0.55 since 1985. And emerging markets have delivered higher average returns—with commensurately higher volatility—than developed markets. Since 1985, emerging markets have produced an average annual return of 16.5% with a volatility of 23%, versus average annual returns for developed markets over the same period of 12.4% with volatility of 16.3%. This result would be expected, given the characteristics of an emerging economy or market.

The combination of higher expected returns, higher expected volatility, and moderate correlations suggests a modest allocation to emerging markets is warranted. Throughout this analysis we have evaluated international equities as a single market, combining developed markets and emerging markets at their historical market weights in the MSCI All Country World Index ex USA. But traditionally, many have viewed these two markets as separate asset classes and have assigned specific allocations to them accordingly. For example, a recommendation may be for 80% of a portfolio to be in U.S. stocks, 15% in international developed markets, and 5% in international emerging markets. However given the significant short-term risks of emerging markets, a separate allocation that provides transparency and the freedom to react to short-term news may not always be appropriate. As a result, blending exposure to emerging markets with developed markets in a total market solution can be a better approach. Such an allocation would ensure constant investment at the market weight, and would help to insulate investors from the potentially wild swings in performance.

³ Economies are divided according to 2006 Gross National Income Per Capita, calculated using the World Bank Atlas method. The groups are: low income, \$905 or less; lower middle income, \$906–\$3,595; upper middle income, \$3,596–\$11,115; and high income, \$11,116 or more.

Finally, our empirical analysis relies on monthly return data for developed markets that extend back to only 1970 and data for emerging markets that extend back to 1985. A longer return time series, if it existed, would provide more robust empirical results because it would span more financial, economic, and political cycles.

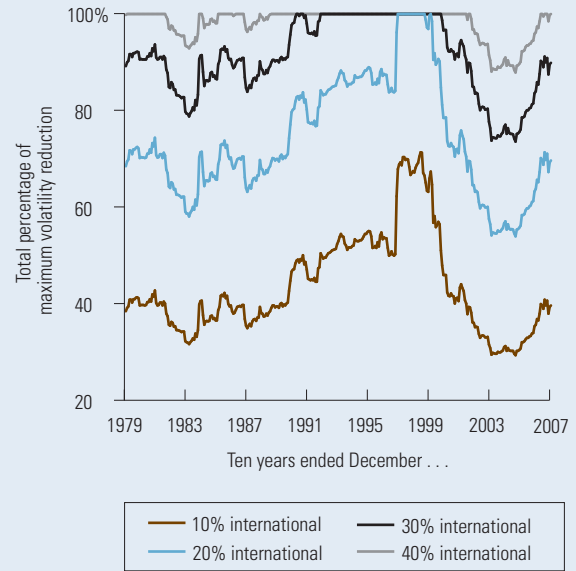
Diminishing marginal benefits of higher allocations

When weighing currency risk, higher correlations, and practical concerns against the range of diversification opportunities represented by the outlined box in Figure 4, it is reasonable to ask whether investors can capture a significant portion of the maximum expected diversification benefit by allocating less than the market-proportional weight to international equities. The astute observer will notice that the slopes of the lines plotted in Figures 4 and 7 flatten as the allocation to foreign stocks increases (in Figure 4, up to the inflection point at the bottom of the “U”). This suggests that the incremental benefit of boosting a portfolio’s allocation to international equities decreases as the size of that allocation increases.

For example, moving from an allocation of 0% international equities to 10% international equities would have provided the largest incremental benefit to the average volatility of a portfolio (a reduction of 50 basis points in volatility for a 100%-stock portfolio in Figure 4). Moving from 10% to 20% international equities would further reduce realized volatility, but at a slower rate (an additional 35 basis points). As the “U” flattens at 40% international equities, the additional diversification achieved by moving from 40% to 50% would have actually increased volatility by 8 basis points (from 1.14% lower volatility at a 40% allocation to international equities to 1.06% lower volatility at a 50% international equities allocation). In fact, while Figure 4 represents the long-term average from 1970 through 2007, a 40% allocation to international equities has not always

Figure 8: Most of the diversification benefit has been achieved by allocating between 20% and 30% of a portfolio to international equities

Proportion of maximum historical volatility reduction achieved by including international stocks



Notes: U.S. equities represented by MSCI USA Index, international equities represented by MSCI World Index ex USA from 1970 through 1987 and MSCI All Country World Index ex USA thereafter. Data through December 31, 2007. Sources: Thomson Datastream, Vanguard, and MSCI.

provided the maximum diversification benefit. **Figure 8** examines the diversification benefit achieved at different levels of international exposure over rolling ten-year holding periods. Specifically, it shows the percentage of the maximum possible diversification benefit achieved over the previous ten years at each allocation to international equities. For example, over the ten years ended December 1979, a 10% allocation to international equities would have provided 38.5% of the maximum possible diversification benefit. A 30% allocation to international equities would have provided 90% of the maximum diversification benefit.

Interestingly, during several periods one or more of the lines bump up against the top of the chart—at the 100% limit. Over these periods, investors with higher allocations would have been better off holding a lower allocation (assuming lower average volatility was their primary motivation for holding international equities). For example, over the ten years ended December 31, 1997, a 20% allocation to international equities would have provided the maximum diversification benefit, meaning those investors who hold international allocations greater than 20% would have found themselves on the backside of the “U” in Figure 4—still lower average volatility than a portfolio of 100% U.S. equities, but greater volatility than that of a portfolio with a 20% allocation to international equities. On the other hand, a 40% international equities allocation would have provided around 90% of the maximum volatility reduction in the early 2000s, but a 60% allocation to international equities would have been required to reap the maximum benefit.

While there is significant disparity in the incremental benefit delivered by international allocations over time, Figure 8 does show that, on average, an allocation of 20% of a domestic portfolio to international equities has provided at least 50% of the maximum diversification benefit. An investor who allocated 30% to international equities has captured at least 70% of the maximum diversification benefit, on average. These results indicate that investors can benefit substantially from exposure to international equities while remaining sensitive to the potentially higher risks of a portfolio whose allocations are based on global market capitalization.

Conclusion

In light of quantitative analysis and qualitative considerations, we have demonstrated that domestic investors should consider allocating part of their portfolios to international securities and that a 20% allocation is a reasonable starting point. While finance theory dictates that an upper limit should be based on the global market capitalization for international equities (currently approximately 55%), we have demonstrated that international allocations exceeding 40% have not historically added significant additional diversification benefits, particularly as costs are accounted for. For most investors, an allocation that falls between 20% and 40% should be considered reasonable, given the historical benefits of diversification. Allocations closer to 40% may be suitable for those investors seeking to be closer to a market-proportional weighting or for those who are seeking potentially greater diversification benefits and are less concerned with the potential risks and higher costs. On the other hand, allocations closer to 20% may be viewed as offering a greater balance among the benefits of diversification, the risks of currency volatility and higher correlations, investor preferences, and costs.

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