

## RESEARCH

# Building Global Portfolios

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Key issues to consider when determining a suitable asset allocation include the broad split between equities and fixed income as well as the specific characteristics within those allocations. The diverse needs and objectives among investors require a systematic approach that carefully examines the tradeoffs involved. The structure of Dimensional's global portfolios shows how these decisions can be addressed.

Determining an appropriate asset allocation is a critical step to help investors achieve their long-term investment goals. However, there is no single right answer when it comes to asset allocation. A set of model portfolios could have very different asset allocations yet be appropriate for different investor cohorts depending on their needs, sensitivities, and risk tolerances. Some general guidelines are useful. Portfolios should be appropriately diversified given their goals, should apply robust empirical research to maximize return potential for a given level of risk, and should be cost effective.<sup>1</sup> Using Dimensional's global portfolios as case studies, this paper examines tradeoffs investors should consider when making asset allocation decisions.

## DIMENSIONAL'S GLOBAL PORTFOLIOS

Dimensional offers global portfolios designed to help investors with different risk tolerances achieve their long-term investment goals. **Exhibit 1** shows four example portfolios, each drawing from numerous underlying funds that cover a wide range of asset classes. These underlying funds

are combined using a thoughtful, disciplined approach to asset allocation.

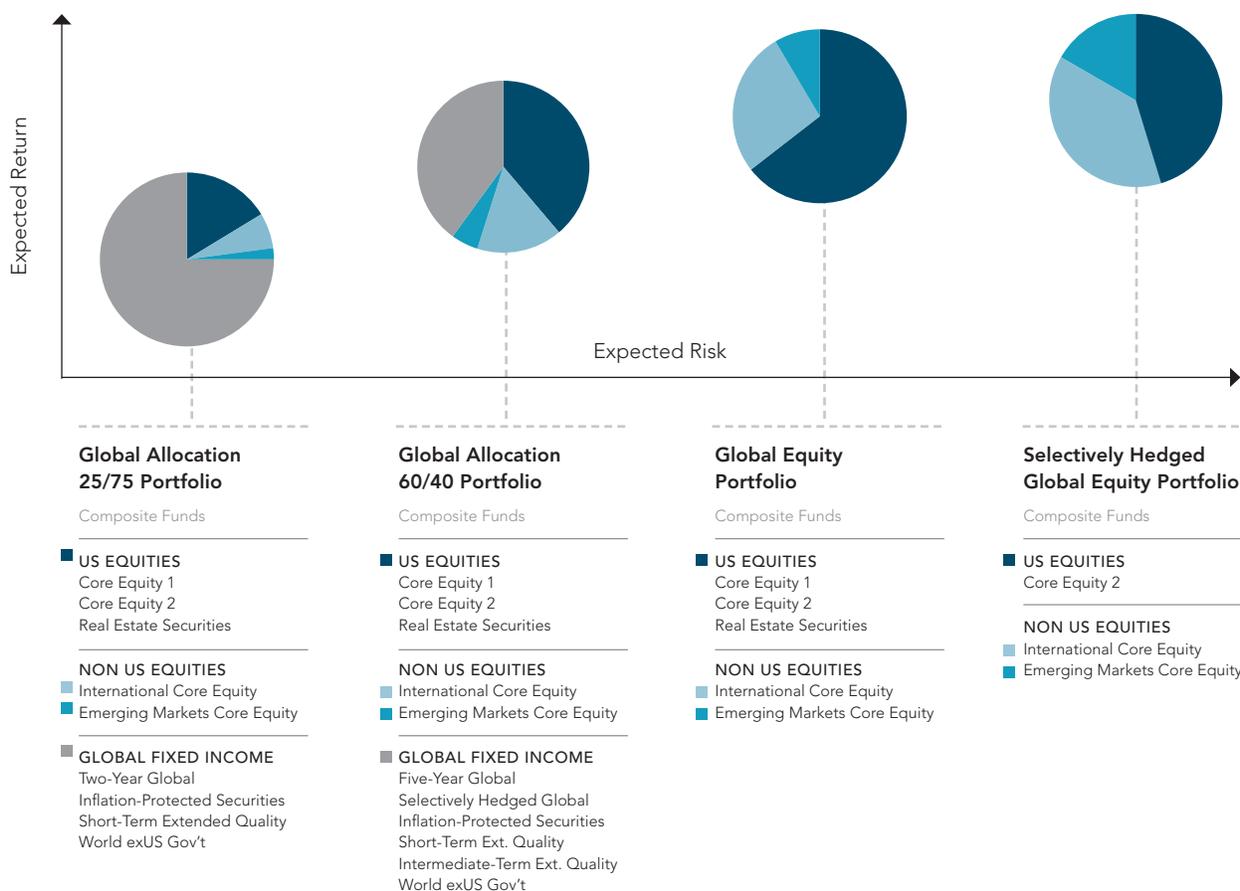
**Allocating between Equities and Fixed Income**

The split between equities and fixed income is one of the most effective tools an investor can use to balance expected risk and return. Dimensional offers global portfolios with target allocations of 25%, 60%, and 100% in global equities. **Exhibit 2** shows the historical average real return and volatility of portfolios that combine one-month Treasury bills and global equities from 1970 to 2013. Equities are represented by the MSCI World Index until 1987 and the MSCI All

Country World Index (ACWI) from 1988 to 2013 (to include emerging markets when the data became available).

Different investors may hold portfolios that fall anywhere along this spectrum of equity allocations. Standard investment advice instructs investors to hold mostly equities when young, then to gradually shift toward more stable fixed income as they age. For most investors, this is sound advice that is supported by research in lifecycle consumption and investing. Households have two primary sources of wealth: financial wealth and human capital. Financial wealth is savings available for investment in

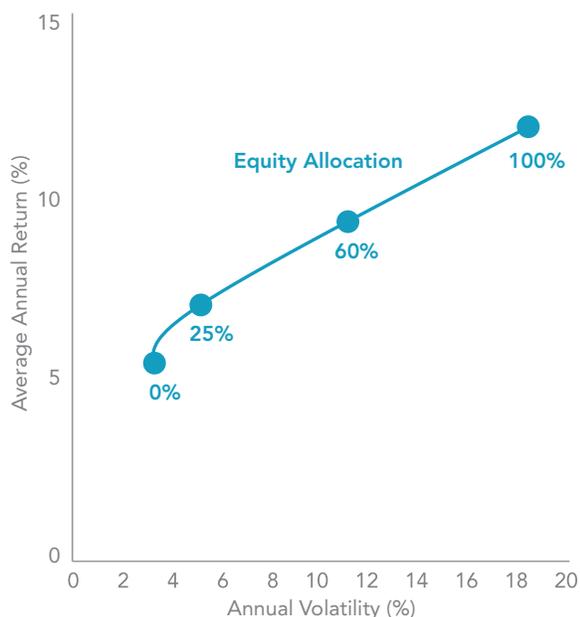
**Exhibit 1 GLOBAL PORTFOLIO ALLOCATIONS**



As of June 30, 2014.

1. Risk can be measured many ways, and investors may have different sensitivities to different sources of risk. A partial list includes volatility, financial distress, sensitivity to interest rates, sensitivity to macroeconomic issues, cyclical, cash flow uncertainty, and regulatory risk.

**Exhibit 2 AVERAGE ANNUAL RETURN AND VOLATILITY OF PORTFOLIOS CONTAINING ONE-MONTH US TREASURY BILLS AND GLOBAL EQUITIES, 1970—2013**



Equities are represented by the MSCI World Index until 1987 and the MSCI All Country World Index from 1988 to 2013. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio. Past performance is not a guarantee of future results. Source: MSCI data © MSCI 2014, all rights reserved.

capital markets. Human capital is the ability to earn and save in the future. Investors should take into account the balance between these two sources of wealth when deciding how to invest their financial assets.

The bulk of young investors’ wealth is typically in human capital. Although they have not had long to accumulate financial wealth, young workers have many years ahead of them to save. For many workers, this stream of future savings functions like fixed income because it tends to have much lower risk than equities. With the majority of their wealth in conservative human capital, young investors can take more risks in their financial portfolios.

As investors progress through their careers, human capital is depleted and needs to be replaced with other low-risk assets in order to maintain a similar overall risk profile. This de-risking of financial assets as one nears retirement is consistent with recommendations by many financial advisors and industry standards.

The basic economic principles underlying lifecycle investing also provide a guide for how to tailor allocations to individual circumstances. Some investors may have human capital that is more equity-like in terms of potential volatility and risk, for example, some small business owners or those working in the financial services industry. For those with more risky human capital, it may make sense to save more and take less risk with their financial wealth even at a relatively young age.

Investors with pension benefits provide a contrasting example. A reliable income stream in retirement can function as a safe asset in the total portfolio, allowing these investors to take more risk even as they near or enter retirement.

Dimensional’s global portfolios are designed to satisfy the asset allocation needs for many broad investor cohorts. The Selectively Hedged Global Equity Portfolio and the Global Equity Portfolio seek long-term capital appreciation by focusing on equities with higher expected returns. These all-equity portfolios may be appropriate for young investors for whom financial capital is low and human capital is at its peak and most flexible.

As wealth shifts from human capital to financial capital, investors may prefer to dampen some of the volatility in their financial assets by incorporating fixed income. The Global Allocation 60/40 Portfolio (henceforth referred to as the “60/40 Portfolio”) seeks total return consisting of capital appreciation and current income.

For many retirees who have depleted their human capital, asset allocation should seek first and foremost the preservation of capital, followed by preservation of purchasing power, and finally some asset growth. The target 25% equity allocation in our Global Allocation 25/75 Portfolio (henceforth referred to as the “25/75 Portfolio”) seeks to constrain the potential losses in the event of poor equity market performance to what we believe is a manageable level that is in line with the risk aversion of many conservative investors.

These four global portfolios can be blended together or with other funds to tailor allocations that address the needs and sensitivities of many investor cohorts. For example, investors may combine the Global Equity Portfolio with the

60/40 Portfolio in order to target equity allocations between 60% and 100% or blend the 60/40 Portfolio with the 25/75 Portfolio to target equity allocations between 25% and 60%. In addition to customizing the equity versus fixed income split, investors may have needs or preferences for specific types of equities or fixed income. The global portfolios can be combined with individual funds to tailor the asset allocation within equities and fixed income.

**EQUITY ALLOCATION**

Asset allocation decisions should extend beyond the broad split between equities and fixed income. Within equities, investors can target different levels of expected return by applying robust empirical research to asset allocation decisions. The framework for these decisions can be illustrated by comparing the global market portfolio to the Global Equity Portfolio and the Selectively Hedged Global Equity Portfolio.

**Home Bias**

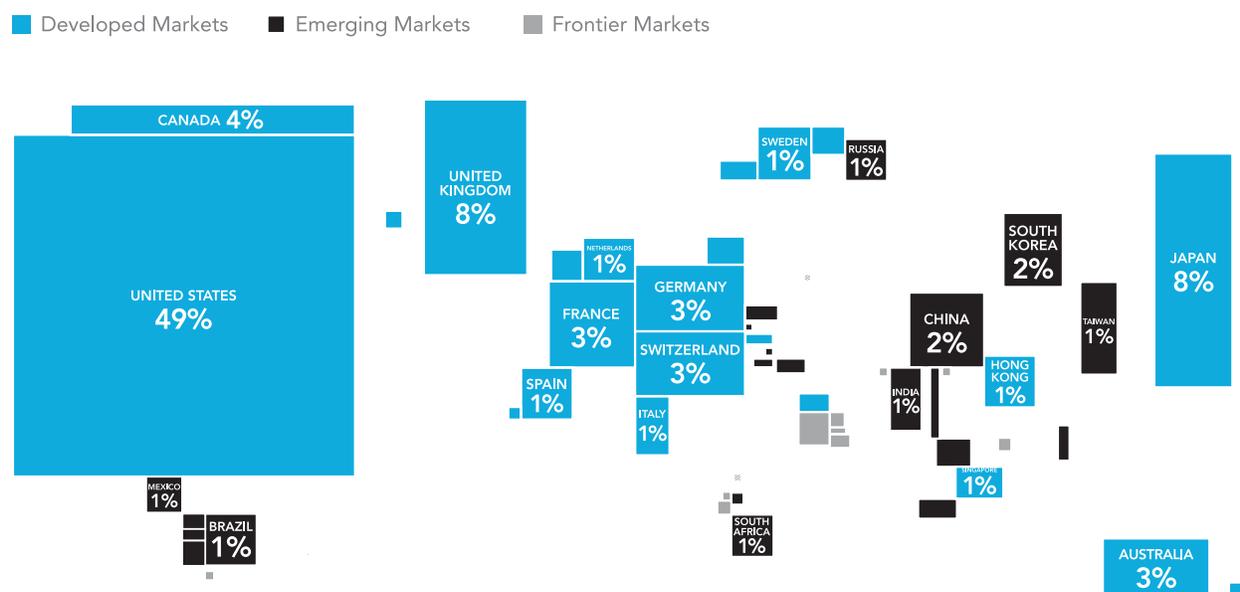
Financial theory suggests that the global market portfolio is a logical starting point for an equity investor. The market portfolio holds all securities, and therefore all countries,

according to their market capitalization weights. It is well diversified and incorporates the aggregate forward-looking expectations of all market participants.

**Exhibit 3** shows the country weights as of the end of 2013 in the global market portfolio. Investors all around the world tend to overweight their home markets in their portfolios relative to the market-cap weights. Market frictions associated with investing abroad mean that some level of home bias may make sense. For example, foreign dividend tax withholdings can create a performance drag on international investments for tax-deferred investors.

The Global Equity Portfolio incorporates some home bias while maintaining broad global diversification across more than 40 countries. US equities are overweighted in the portfolio relative to the US weight in the world market, and this allocation will evolve over time as the US market cap weight changes in order to maintain a relative, rather than absolute, level of home bias.<sup>2</sup> The allocation to US equities was 64.6% as of December 31, 2013, which is an overweight relative to its 49.2% market cap weight.<sup>3</sup>

**Exhibit 3 WORLD EQUITY MARKET CAPITALIZATION**



As of December 31, 2013. Market cap data is free-float adjusted from Bloomberg securities data. Many nations not displayed. Total may not equal 100% due to rounding. For educational purposes; should not be used as investment advice. China market capitalization excludes A-shares, which are generally only available to mainland China investors.

2. Dimensional also offers the World Core Equity Portfolio, which does not incorporate a US home bias.  
 3. Measured using the MSCI All Country World Investable Market Index.

**Developed vs. Emerging Markets**

Countries are classified as developed or emerging markets based on multiple criteria including economic development, the size and liquidity of the market, and capital mobility. Compared to developed markets, emerging markets have been more volatile and have had higher market betas, as measured by the covariance with the global market portfolio.

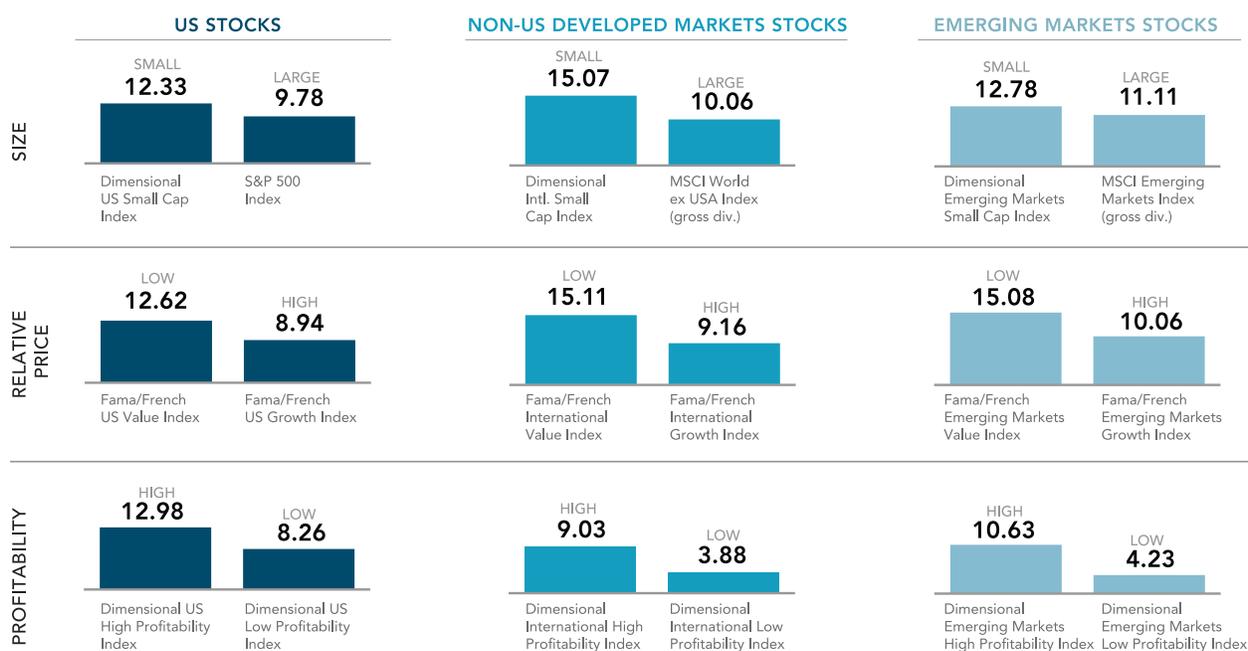
Many studies suggest political risk commands a risk premium.<sup>4</sup> In general, emerging markets have weaker investor protections and are more exposed to political risk. It is reasonable that investors demand higher returns to bear the additional risks in emerging markets equities. Investors who are willing to bear this additional risk in order to seek higher expected returns could overweight emerging markets relative to developed markets as is done in the Selectively

Hedged Global Equity Portfolio. This portfolio overweights emerging markets relative to its global market cap weights and may adjust as the market cap weights in emerging markets evolve over time. As of December 31, 2013, the portfolio held 17.5% in emerging markets, compared to 10.8% in the MSCI All Country World Investable Market Index (ACWI IMI).

**Focus on Securities with Higher Expected Returns**

Decades of rigorous empirical research have provided investors today with more clarity on the dimensions of expected stock returns than ever before. **Exhibit 4** shows that in markets around the world, stocks with low market cap, low relative price, and high profitability have had higher average returns. Well-structured portfolios that target these securities offer higher expected returns than the market portfolio.

**Exhibit 4 DIMENSIONS OF EXPECTED RETURNS, ANNUALIZED COMPOUND RETURNS (%)**



Profitability is measured as operating income before depreciation and amortization minus interest expense scaled by book. Indices are not available for direct investment. Their performance does not reflect the expenses associated with the management of an actual portfolio. **Past performance is not a guarantee of future results.** Index returns are not representative of actual portfolios and do not reflect costs and fees associated with an actual investment. Actual returns may be lower. See "Index Descriptions" for descriptions of Dimensional and Fama/French index data. The S&P data are provided by Standard & Poor's Index Services Group. MSCI data © MSCI 2014, all rights reserved.

4. Examples: Bansal and Dahlquist (2002) argue that expropriation risk is an important determinant of risk premiums in emerging markets. Chen, Lu, and Yang (2012) find the emerging markets are more sensitive to global political uncertainty and that this systemic risk is priced in equity markets. Kelly, Pastor, and Veronesi (2014) find that put options are more expensive if they span a political event.

**Exhibit 5 ANNUAL STANDARD DEVIATIONS**

US: 1980–2013	
Russell 3000 Index	17.28
Russell 3000 Value Index	15.82
Russell 2000 Index	19.25
Russell 2000 Value Index	18.46
Global: 1995–2013	
MSCI ACWI IMI	20.29
MSCI ACWI IMI Value	17.86
MSCI ACWI Small Cap	22.85
MSCI ACWI Small Cap Value	20.86

Russell data © Russell Investment Group 1995–2014, all rights reserved.  
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How much one should focus on securities with higher expected returns is a matter of preference. Although small cap, low relative price, and high profitability stocks have higher expected returns, investors must balance market premiums with their tolerance for deviations from market cap weights.

Portfolio volatility is a common risk metric. As shown in **Exhibit 5**, the volatility of a well-diversified small cap or value portfolio need not be much higher than the overall market portfolio. For example, the annual volatility of the MSCI ACWI Small Cap Value was 20.9% from 1995 to 2013, versus 20.3% for the MSCI ACWI IMI.

Another important risk to consider is the risk that size, value, and profitability premiums will not materialize over the relevant investment period. Although these market premiums appear on average in historical data, there have also been long periods of underperformance. For example, from June 1994 to March 1999, the MSCI ACWI Small Cap returned 17%, while the MSCI ACWI IMI returned 78%. From April 1997 to February 2000, the MSCI ACWI Value returned 27% versus 68% for MSCI ACWI IMI. Moderate tilts and focusing on multiple dimensions of expected returns can help mitigate these risks.

Investors have different risk tolerances, so there is no single correct answer for how much to focus on securities with

higher expected returns. Regardless of whether one chooses to tilt mildly, aggressively, or not at all, portfolios should have broad diversification to manage risks and allow for efficient execution.

Dimensional’s global equity portfolios focus on securities with higher expected returns while managing risks through broad diversification in over 12,000 securities and over 40 countries as of December 31, 2013. The underlying equity funds use Dimensional’s core equity approach to investing within the US, international developed markets, and emerging markets. As shown in **Exhibit 6**, the core equity strategies are total market solutions that are designed to put greater emphasis on securities with higher expected returns. The integrated core approach is particularly well suited for investing outside the US, where trading costs can be higher. By integrating different size, relative price, and profitability stocks into one portfolio rather than separate component portfolios, this fluid structure should reduce turnover (and consequently, implementation costs) because there is no need to fully sell securities that migrate from asset class to asset class. Turnover is also reduced by the ability to use dividends or other cash flows from one asset class to rebalance the overall portfolio or fill needs in other asset classes, even ones that did not produce the cash flows.

**FIXED INCOME ALLOCATION**

Fixed income solutions can be customized to meet a wide range of investor goals. Customizing a fixed income portfolio is easier than equity portfolios as needs are more easily defined and risks are easier to control.

One common use for fixed income is for customizing overall portfolio volatility. Investors can tailor their fixed income solution to pursue term and credit premiums, while staying consistent with a desired portfolio risk profile. Portfolios with large allocations to equities can typically afford larger exposures to term and credit risk without significantly impacting the volatility of the portfolio. More risk-averse investors can reduce their equity allocations and take a more conservative approach within fixed income.

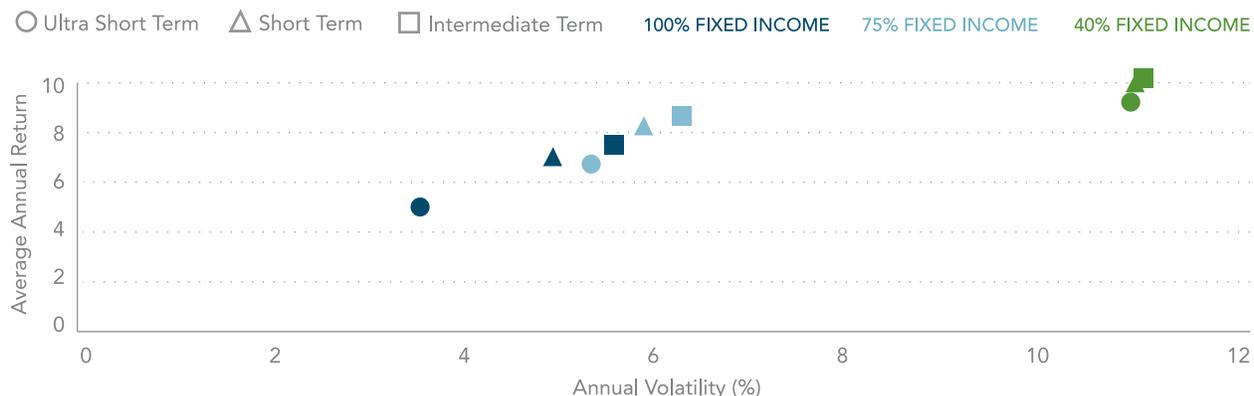
**Exhibit 7** illustrates the impact of additional term and credit risk on overall portfolio return and volatility. Portfolios in dark blue are invested 100% in fixed income. Light blue and green represent portfolios that are invested 75% and 40% in fixed income, respectively, with the remainder

**Exhibit 6 GLOBAL EQUITY PORTFOLIO VS. MSCI WORLD INDEX WEIGHTS**

	Value		Neutral		Growth		Total	
Large Cap	<b>17%</b>	20%	<b>23%</b>	41%	<b>6%</b>	19%	<b>46%</b>	80%
Mid Cap	<b>11%</b>	6%	<b>15%</b>	9%	<b>4%</b>	5%	<b>30%</b>	20%
Small Cap	<b>11%</b>	0%	<b>10%</b>	0%	<b>3%</b>	0%	<b>24%</b>	0%
Total	<b>39%</b>	26%	<b>48%</b>	50%	<b>13%</b>	24%	<b>100%</b>	100%

As of December 31, 2013. Numbers may not total 100% due to rounding. The size breaks are large (over \$10BB), mid (\$1.5-\$10BB), and small (\$0-\$1.5BB). The value breaks are value (top 30%), neutral (mid 40%), and growth (bottom 30%). Global Equity Portfolio weights are rescaled for cash holdings. MSCI data © MSCI 2014, all rights reserved.

**Exhibit 7 IMPACT OF TERM AND CREDIT ON PORTFOLIOS CONTAINING 100%, 75% AND 40% FIXED INCOME, 1976—2013**



Equities are represented by the MSCI World Index until 1987 and the MSCI All Country World Index from 1988 to 2013. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio. Past performance is not a guarantee of future results. Source: Barclays indices © Barclays 2014. Ultra Short Term is one-month US Treasury bills. Data provided by Morningstar, Inc. Short Term is the Barclays US Government/Credit Index 1-5 Years. Intermediate Term is the Barclays US Government/Credit Bond Index Intermediate. Barclays indices copyright Barclays 2014.

in global equities. The fixed income portion of the portfolio is invested in either one-month US Treasury Bills (circles), Barclays US Government/Credit Bond Index 1-5 Years (triangle), or Barclays US Government/Credit Bond Index Intermediate (square).

Riskier fixed income can have a large impact on volatility when fixed income is evaluated in isolation or in portfolios

with large allocations to fixed income. For example, intermediate government/credit is more than 50% more volatile than one-month US Treasury bills (5.5% versus 3.5%, annually). However, the volatility impact diminishes substantially in portfolios with larger allocations to equities. In the 60/40 Portfolio, volatility increased from 10.8% to 10.9% when one-month T-bills were replaced by intermediate government/credit. Average annual return

increased by about 1% (t-stat = 3.25) from 9.4% to 10.5%. A 0.1% increase in volatility for a 1% increase in return potential might be an appealing tradeoff for investors who are already bearing meaningful volatility risk from equities.

Dimensional’s 25/75 Portfolio and 60/40 Portfolio illustrate how investors might customize their fixed income allocations depending on their goals. Both portfolios employ broad diversification as they seek to increase the reliability of outcomes, add flexibility to improve execution, and help reduce single-issuer risk. Both employ a dynamic, market-based approach to target term and credit premiums when it makes sense to do so. However, the portfolios seek different levels of term and credit risk.

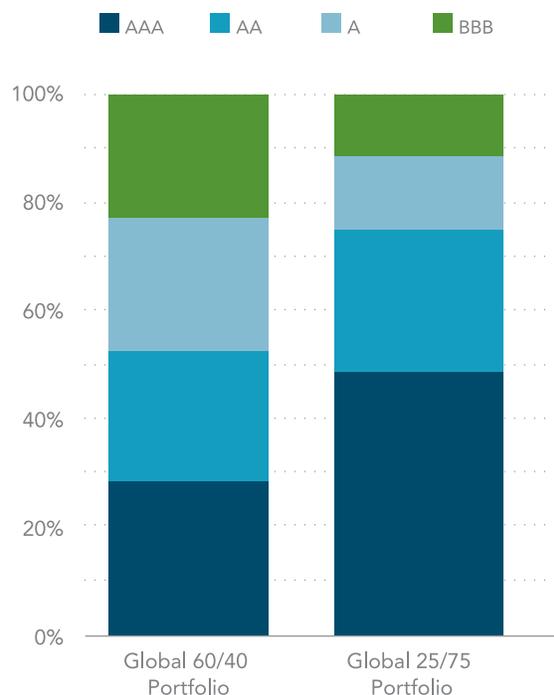
The 25/75 Portfolio is designed to meet the needs of a more conservative investor who may have an overall goal of capital and purchasing power preservation, with some capital appreciation. Given these goals, the portfolio targets an appropriate level of risk by focusing on higher credit quality and by constraining the portfolio’s duration. The portfolio also includes an allocation to inflation-sensitive securities to help protect against the corrosive effects of inflation.

In comparison, the 60/40 Portfolio is designed for investors seeking more capital appreciation, commensurate with a moderate level of risk. Consistent with this goal, fixed income in the 60/40 Portfolio has a longer duration and a greater allocation to the lower credit quality securities with investment grade than the 25/75 Portfolio, as shown in **Exhibit 8**. This gives the 60/40 Portfolio greater flexibility to target term and credit premiums in both short- and intermediate-term investment grade fixed income.

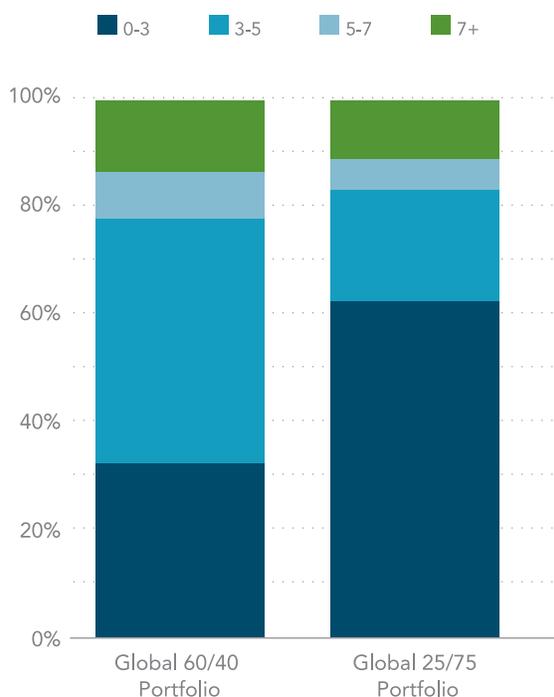
Within the universe of appropriate bonds, both portfolios have flexibility to incorporate market-based information when targeting term and credit premiums in search of moderately higher expected returns. Investors who do not have a clearly defined duration to their liabilities should be willing to vary the duration of their fixed income portfolio to increase expected returns. Similarly, if an investor’s liabilities are not tied to any particular yield curve, a global fixed income opportunity set can diversify term structure risk and provide opportunities to seek higher expected returns across multiple yield curves.

These examples illustrate how the targeting of term and

**Exhibit 8a** FIXED INCOME ALLOCATIONS BY CREDIT RATING AS OF DECEMBER 31, 2013



**Exhibit 8b** FIXED INCOME ALLOCATIONS BY EFFECTIVE DURATION AS OF DECEMBER 31, 2013



credit premiums can be tailored for investors who want to customize the overall volatility of their portfolios. However, investors may have other goals for fixed income that may lead to different fixed income allocations. For example, short-term, high quality fixed income can help investors meet capital preservation goals. Investors with tax sensitivities may prefer to hold municipal bond securities, which can motivate a home bias in fixed income. Investors who want to manage specific future liabilities may need a solution that matches the duration of their liabilities. Asset allocation in fixed income should consider the overall investment objective in order to best position investors to meet their goals, on expectation.

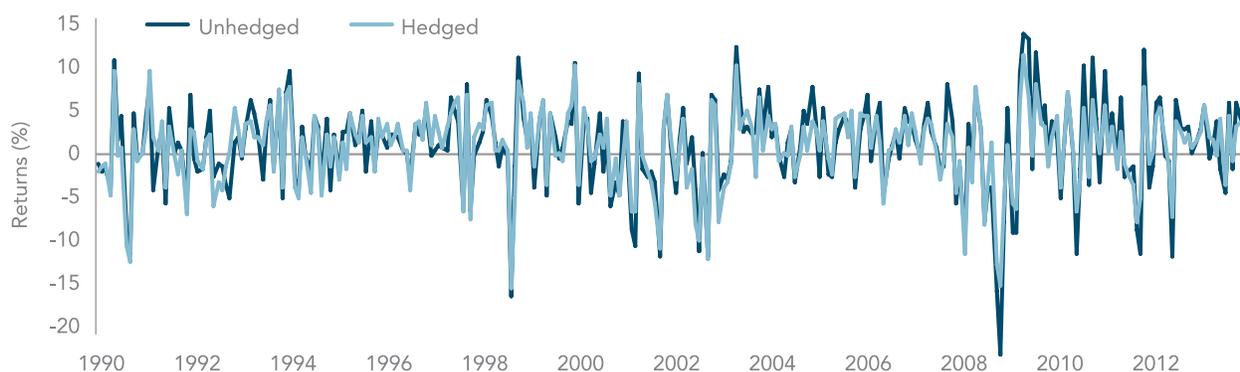
**Currency and Hedging Decisions**

The return on global portfolios depends both on the return of the asset and on the return of the currency.

Unfortunately, despite decades of research, exchange rate models have shown little success in predicting currency movements. Without the ability to forecast exchange rates, how should investors decide if and when to hedge their currency exposure?

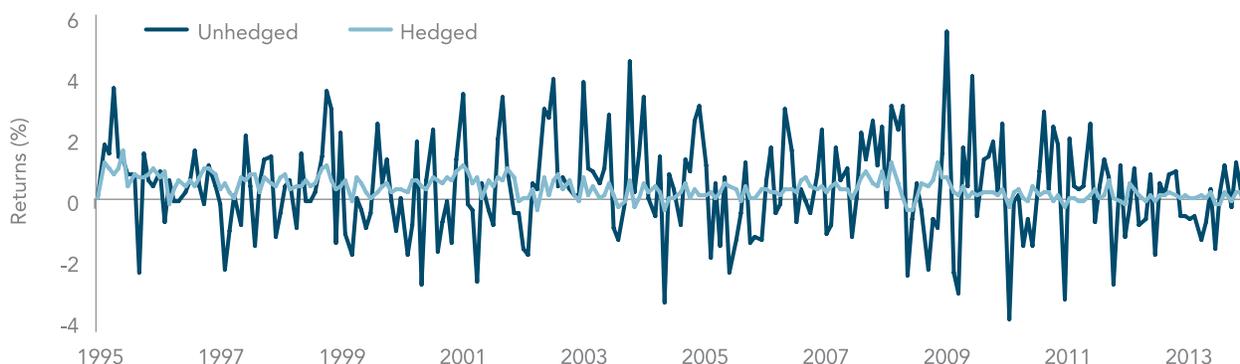
One important consideration for the hedging decision is the impact of currency volatility on overall portfolio volatility. The standard deviation of an unhedged equity portfolio is primarily driven by the volatility of equity; thus, unhedged and hedged equity portfolios have similar standard deviations. Conversely, the standard deviation of unhedged fixed income is dominated by currency volatility. Therefore, hedging currencies can greatly reduce the volatility in fixed income portfolios. The following exhibits illustrate this result using monthly returns of hedged and unhedged equities (**Exhibit 9a**) and fixed income (**Exhibit 9b**).

**Exhibit 9a HEDGED VERSUS UNHEDGED STOCK RETURNS**



Stock returns measured as an equal-weighted portfolio of nine country indices. Sample includes Australia, Canada, Germany, Japan, Norway, Sweden, Switzerland, the United Kingdom, and the United States. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio. Past performance is not a guarantee of future results. Source: Dimensional calculations using data from Bloomberg.

**Exhibit 9b HEDGED VERSUS UNHEDGED BOND RETURNS**



Bond returns are measured using Citigroup World Government Bond Index 1-3 Years. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio. Past performance is not a guarantee of future results. Source: Citigroup bond indices © 2014 by Citigroup.

Investors can also use currency hedging decisions to improve the expected return of a global portfolio. Because future exchange rate movements are unpredictable in the short to medium term, forward currency premiums<sup>5</sup> help predict differences between hedged and unhedged returns. For example, hedging into currencies where the forward currency premium is high can increase expected return without having much impact on the volatility of portfolios dominated by equities. However, this type of currency exposure may not be appropriate for conservative investor cohorts where controlling volatility is a greater concern.

Dimensional uses currency hedging decisions to manage total portfolio volatility and, when appropriate for the goal of a portfolio, to increase expected return potential. The primary goal of the 25/75 Portfolio is to provide capital preservation, and therefore the currency exposure of the fixed income allocation is hedged in order to reduce the volatility of the overall portfolio. The volatility of the 60/40 Portfolio is largely driven by the equity allocation, so some additional volatility in the fixed income component of the portfolio does not have a large impact on the overall portfolio volatility. In keeping with the goal of providing moderate growth, a portion of the fixed income allocation is allowed to seek higher expected returns through hedging decisions. The Selectively Hedged Global Equity Portfolio will also opportunistically hedge into currencies with high forward currency premiums in order to increase expected returns, which is consistent with the objective of the portfolio to aggressively seek higher expected returns.<sup>6</sup>

## CONCLUSION

Using Dimensional's global portfolios as examples, this paper highlights a number of the key issues to consider when determining an asset allocation suitable for an individual investor's goals. Along with the broad split between equities and fixed income, it is important to consider the specific characteristics *within* the equity and fixed income allocations—such as exposure to expected return dimensions. Investors have different risk tolerances, sensitivities, and time horizons, all of which need to be taken into account.

The design of Dimensional's global portfolios—and the

underlying component funds—reflect decades of research into the financial markets. Each portfolio is broadly diversified, efficiently targeting a level of expected return while managing sources of risk that are not expected to add value. The underlying funds are managed to minimize excess turnover, thus lowering transaction costs. While no portfolio is appropriate for every investor, Dimensional's global portfolios are effective solutions that can help many investors pursue their investment goals.

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5. The forward currency premium is measured as the ratio of the current forward exchange rate to the current spot rate.

6. The portfolio may hedge some or the majority of currency exposure of foreign securities by entering into foreign forward currency contracts, futures, or other derivatives. These risks are described in the Principal Risks section of the prospectus.

## INDEX DESCRIPTIONS

**Dimensional US Small Cap Index** was created by Dimensional in March 2007 and is compiled by Dimensional. It represents a market-capitalization-weighted index of securities of the smallest US companies whose market capitalization falls in the lowest 8% of the total market capitalization of the Eligible Market. The Eligible Market is composed of securities of US companies traded on the NYSE, NYSE MKT (formerly AMEX), and Nasdaq Global Market. Exclusions: Non-US companies, REITs, UITs, and Investment Companies. From January 1975 to the present, the index also excludes companies with the lowest profitability and highest relative price within the small cap universe. Profitability is measured as Operating Income before Depreciation and Amortization minus Interest Expense scaled by Book. Source: CRSP and Compustat. The index monthly returns are computed as the simple average of the monthly returns of 12 sub-indices, each one reconstituted once a year at the end of a different month of the year. The calculation methodology for the Dimensional US Small Cap Index was amended on January 1, 2014, to include profitability as a factor in selecting securities for inclusion in the index.

**Dimensional US High Profitability Index** was created by Dimensional in January 2014 and represents an index consisting of US companies. It is compiled by Dimensional. Dimensional sorts stocks into three profitability groups from high to low. Each group represents one-third of the market capitalization. Similarly, stocks are sorted into three relative price groups. The intersections of the three profitability groups and the three relative price groups yield nine subgroups formed on profitability and relative price. The index represents the average return of the three high-profitability subgroups. It is rebalanced twice per year. Profitability is measured as Operating Income before Depreciation and Amortization minus Interest Expense scaled by Book. Source: CRSP and Compustat.

**Dimensional US Low Profitability Index** was created by Dimensional in January 2014 and represents an index consisting of US companies. It is compiled by Dimensional. Dimensional sorts stocks into three profitability groups from high to low. Each group represents one-third of the market capitalization. Similarly, stocks are sorted into three relative price groups. The intersections of the three profitability groups and the three relative price groups

yield nine subgroups formed on profitability and relative price. The index represents the average return of the three low-profitability subgroups. It is rebalanced twice per year. Profitability is measured as Operating Income before Depreciation and Amortization minus Interest Expense scaled by Book. Source: CRSP and Compustat.

**Dimensional International Small Cap Index** was created by Dimensional in April 2008 and is compiled by Dimensional. July 1981 - December 1993: it Includes non-US developed securities in the bottom 10% of market capitalization in each eligible country. All securities are market capitalization weighted. Each country is capped at 50%. Rebalanced semiannually. January 1994 - Present: Market-capitalization-weighted index of small company securities in the eligible markets excluding those with the lowest profitability and highest relative price within the small cap universe. Profitability is measured as operating income before depreciation and amortization minus interest expense scaled by book. The index monthly returns are computed as the simple average of the monthly returns of four sub-indices, each one reconstituted once a year at the end of a different quarter of the year. Prior to July 1981, the index is 50% UK and 50% Japan. The calculation methodology for the Dimensional International Small Cap Index was amended on January 1, 2014, to include profitability as a factor in selecting securities for inclusion in the index.

**Dimensional International Low Profitability Index** was created by Dimensional in January 2013 and represents an index consisting of non-US Developed companies. It is compiled by Dimensional. Dimensional sorts stocks into three profitability groups from high to low. Each group represents one-third of the market capitalization of each eligible country. Similarly, stocks are sorted into three relative price groups. The intersections of the three profitability groups and the three relative price groups yield nine subgroups formed on profitability and relative price. The index represents the average return of the three low-profitability subgroups. The index is rebalanced twice per year. Profitability is measured as Operating Income before Depreciation and Amortization minus Interest Expense scaled by Book. Source: Bloomberg.

**Dimensional International High Profitability Index** was created by Dimensional in January 2013 and represents

an index consisting of non-US Developed companies. It is compiled by Dimensional. Dimensional sorts stocks into three profitability groups from high to low. Each group represents one-third of the market capitalization of each eligible country. Similarly, stocks are sorted into three relative price groups. The intersections of the three profitability groups and the three relative price groups yield nine subgroups formed on profitability and relative price. The index represents the average return of the three high-profitability subgroups. The index is rebalanced twice per year. Profitability is measured as Operating Income before Depreciation and Amortization minus Interest Expense scaled by Book. Source: Bloomberg.

**Dimensional Emerging Markets Low Profitability Index** was created by Dimensional in April 2013 and represents an index consisting of emerging markets companies and is compiled by Dimensional. Dimensional sorts stocks into three profitability groups from high to low. Each group represents one-third of the market capitalization of each eligible country. Similarly, stocks are sorted into three relative price groups. The intersections of the three profitability groups and the three relative price groups yield nine subgroups formed on profitability and relative price. The index represents the average return of the three low-profitability subgroups. The index is rebalanced twice per year. Profitability is measured as Operating Income before Depreciation and Amortization minus Interest Expense scaled by Book. Source: Bloomberg.

**Dimensional Emerging Markets High Profitability Index** was created by Dimensional in April 2013 and represents an index consisting of emerging markets companies and is compiled by Dimensional. Dimensional sorts stocks into three profitability groups from high to low. Each group represents one-third of the market capitalization of each eligible country. Similarly, stocks are sorted into three relative price groups. The intersections of the three profitability groups and the three relative price groups yield nine subgroups formed on profitability and relative price. The index represents the average return of the three high-profitability subgroups. The index is rebalanced twice per year. Profitability is measured as Operating Income before Depreciation and Amortization minus Interest Expense scaled by Book. Source: Bloomberg.

**Dimensional Emerging Markets Small Cap Index** was created by Dimensional in April 2008 and is compiled by Dimensional. January 1989 - December 1993: Fama/French Emerging Markets Small Cap Index. January 1994 - Present: Dimensional Emerging Markets Small Index Composition: Market-capitalization-weighted index of small company securities in the eligible markets excluding those with the lowest profitability and highest relative price within the small cap universe. Profitability is measured as operating income before depreciation and amortization minus interest expense scaled by book. The index monthly returns are computed as the simple average of the monthly returns of four sub-indices, each one reconstituted once a year at the end of a different quarter of the year. Source: Bloomberg. The calculation methodology for the Dimensional Emerging Markets Small Cap Index was amended on January 1, 2014, to include profitability as a factor in selecting securities for inclusion in the index.

**Fama/French US Value Index** Provided by Fama/French from CRSP securities data. Includes the lower 30% in price-to-book of NYSE securities (plus NYSE Amex equivalents since July 1962 and Nasdaq equivalents since 1973).

**Fama/French US Growth Index** Provided by Fama/French from CRSP securities data. Includes the higher 30% in price-to-book of NYSE securities (plus NYSE Amex equivalents since July 1962 and Nasdaq equivalents since 1973).

**Fama/French International Value Index, 2008–present** Provided by Fama/French from Bloomberg securities data. Simulated strategy of MSCI EAFE countries in the lower 30% price-to-book range. 1975–2007: Provided by Fama/French from MSCI securities data.

**Fama/French International Growth Index, 2008–present** Provided by Fama/French from Bloomberg securities data. Simulated strategy of MSCI EAFE countries in the higher 30% price-to-book range. 1975–2007: Provided by Fama/French from MSCI securities data.

**Fama/French Emerging Markets Value Index, 2009–present** Provided by Fama/French from Bloomberg securities data. Simulated strategy using IFC investable universe countries. Companies in the lower 30% price-to-book range; companies weighted by float-adjusted market cap; countries weighted by country float-adjusted market

cap; rebalanced monthly. 1989–2008: Provided by Fama/French from IFC securities data. IFC data provided by International Finance Corporation.

**Fama/French Emerging Markets Growth Index, 2009–present** Provided by Fama/French from Bloomberg securities data. Simulated strategy using IFC investable universe countries. Companies in the higher 30% price-to-book range; companies weighted by float-adjusted market cap; countries weighted by country float-adjusted market cap; rebalanced monthly. 1989–2008: Provided by Fama/French from IFC securities data. IFC data provided by International Finance Corporation.

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**Consider the investment objectives, risks, and charges and expenses of the Dimensional funds carefully before investing. For this and other information about the Dimensional funds, please read the prospectus carefully before investing. Prospectuses are available by calling Dimensional Fund Advisors collect at (512) 306-7400 or at [www.dimensionalfund.com](http://www.dimensionalfund.com). Dimensional funds are distributed by DFA Securities LLC.**

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