

# Does Your Defined Contribution Portfolio Have Bad Breadth?

FQ Insight

by Paul Goldwhite, CFA

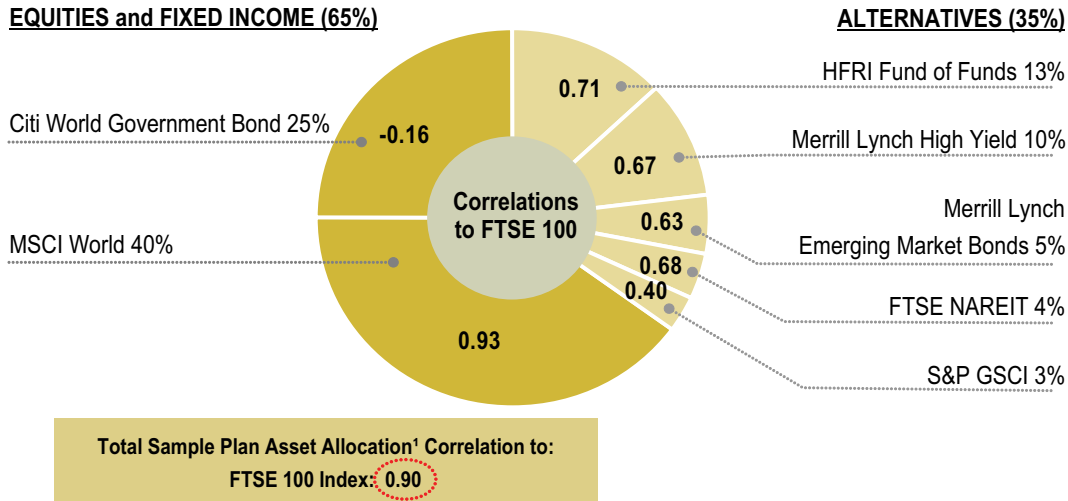
The defined contribution (DC) market in the United Kingdom is at a pivotal stage in its development. While far from new, the industry appears to be on the threshold of significant growth. It is therefore timely that new research has spurred the development of superior investment solutions for DC investors. Now is an ideal time for DC plans to reassess their investment offerings.

This paper starts by showing that traditional balanced portfolios do a poor job of satisfying the needs of DC investors. These portfolios tend to be highly correlated with equity markets – perhaps to an unanticipated degree – and with high correlations come equity-like volatility. Next, we review recent asset class and portfolio construction research of importance to DC and other investors. The key to this research is better balancing of risks within the portfolio, which leads to portfolios that deliver significant advantages over traditional DC investments, and do a much better job of meeting investor needs. These portfolios have lower correlations to equities, higher ratios of reward-to-risk, do a better job of maintaining purchasing power, and with no sacrifice of expected return.

## What's Wrong With Traditional Approaches to DC Investing?

In the earliest days of DC investing, plan members were given a list of single-asset class funds and expected on their own to construct suitable portfolios. DC sponsors soon realized that it was too much to expect individuals to do their own asset allocation, so they began to offer multi-asset class, i.e., balanced, funds along with single-asset class funds. Balanced funds often became the default option, and more recently two types of balanced funds have emerged as market leaders: Diversified Growth Portfolios (DGPs) and Target Date Portfolios (TDPs). Target Date Portfolios (TDPs) are balanced portfolios with the added feature of reducing exposure to equities while boosting cash and fixed-interest in the final years leading up to retirement.

**FIGURE 1: SAMPLE DIVERSIFIED GROWTH ASSET ALLOCATION<sup>1</sup>**  
 Correlations to FTSE 100 Index – Five Years Ending March 31, 2010



Sources: First Quadrant, LP, StyleAdvisor, Bloomberg

<sup>1</sup>Sample Diversified Growth Asset Allocation is a hypothetical portfolio used for illustrative purposes only.

A natural question to ask is whether the Diversified Growth Portfolio and Target Date Portfolio meet the needs of DC investors? Unfortunately, in our view these traditional offerings fail to deliver what investors need, and they fall well short of what the industry can provide. DC investors have two basic needs. During the accumulation phase of saving for retirement, investors usually require growth of capital in order to fund retirement at a satisfactory level. They also need investment risk to be at a manageable level, which implies that risk is predictable and consistent. Quite apart from the desire to sleep soundly at night, the pragmatic reason for risk consistency is that at some point, the lump sum saved for retirement within the DC plan – or a substantial majority of it – will be converted to an annuity, so a sharp drop in value just before planned annuitization could have severe consequences for the investor.

Let's take these two needs – for growth and predictable risk – in turn. Diversified Growth Portfolios and Target Date Portfolios do offer capital growth potential although, as we shall see shortly, growth is achieved inefficiently, meaning that investors incur greater risk than necessary to achieve a particular level of growth. Diversified Growth Portfolios and Target Date Portfolios both fall woefully short of providing investors with a predictable and consistent risk experience. Although Diversified Growth Portfolio and Target Date Portfolio are often considered to be diversified, our analysis shows that both are in fact highly correlated to equity markets.

FIGURE 1 shows the asset allocation for a typical Diversified Growth Portfolio.

Using traditional criteria, the Diversified Growth Portfolio in FIGURE 1 appears to be diversified. It has quite a few asset classes, or 'pie slices,' and a substantial 35% allocation to alternative investments such as hedge funds, high yield bonds, and so forth. The number inside each of the pie slices is the correlation of that asset class to the FTSE 100, and those numbers provide the first clue that this portfolio may not be as well diversified as expected. All of the asset classes in the 'alternatives' category have substantial positive correlations to equities, which is problematic because for many investors, a key objective of the alternatives bucket is diversification. It turns out that this portfolio as a whole has a correlation of 0.90 to the FTSE 100, which is quite high. This portfolio will experience much of the volatility of equity markets, and is not well diversified.

There are two reasons why this Diversified Growth Portfolio, with 7 different types of investments, has such a high correlation to the FTSE 100. The first reason is that the portfolio has bad breadth – it has several new asset classes that replaced part of the original gilts allocation, but the new asset classes have much higher correlations to equities.

The first balanced funds had substantial allocations to equities and gilts (and, to a lesser extent, property). Gilts reduce risk because they tend to be less volatile than equities and they act as a hedge to equities in deflationary periods. Over time, gilts were deemphasized in portfolios. One reason was that a series of positive inflation shocks,



especially in the 1970's, eroded the real value of gilts, whereas equities and property did a better job of keeping up with inflation.

Another, more recent, reason that allocations to gilts declined is that investors have reached for higher yields. This trend was pronounced in the period from the end of the technology bubble to the onset of the current financial crisis. From 2003 to the middle of 2007, financial market volatility declined, and asset class returns were generally positive but diminishing toward the end of that period. Investors responded by going further out on the risk spectrum, replacing safe but low-yielding sovereign bonds with investments in, e.g., high yield bonds and emerging market debt. This diluted the diversifying character of sovereign bonds because high yield bonds, emerging debt, hedge fund of funds and the like have higher correlations to equities than to gilts.<sup>1</sup>

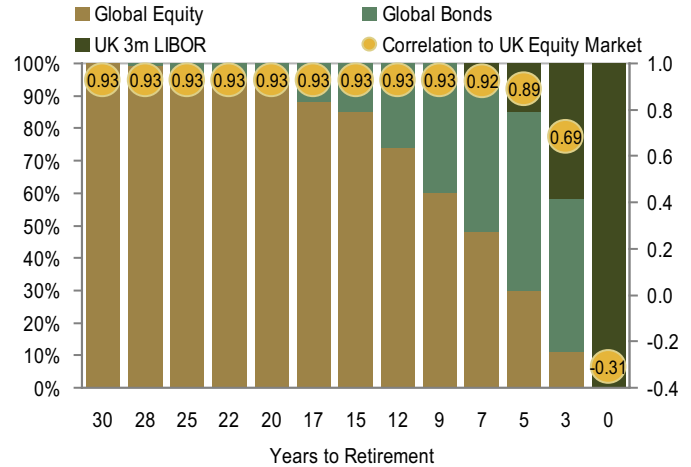
The addition of several new asset classes at the expense of gilts does increase the portfolio's expected return, but it degrades diversification, which results in higher volatility and reduces the reward-to-risk ratio. That is why we call it bad breadth. Bad breadth is one reason Diversified Growth Portfolios (DGP) are highly correlated to equities. Another reason is that equities on average are much more volatile than sovereign bonds. So the Diversified Growth Portfolio's 25% weight in sovereign bonds is overwhelmed by equities. Equities are 2 to 3 times as volatile as sovereign bonds, so a much higher weight to sovereign bonds, or much lower weight to equities, would be needed to reduce Diversified Growth Portfolio's overall correlation to equities.

Target date funds also have high correlations to equities, except until just a few years before retirement. FIGURE 2 is an example of a glide path for a UK Target Date Portfolio.

The exhibit shows how the allocations to shares, bonds and cash change over time as the investor approaches retirement in year zero. It also shows the correlation between the Target Date Portfolio and the FTSE 100, and how that changes as the investor approaches retirement. Correlations to equities are quite high until just 3 years before retirement. If investors experience a substantial loss, they may not have sufficient time to earn and save their way out of the deficit prior to planned retirement.

Target Date Portfolios may or may not have bad breadth as described for the Diversified Growth Portfolio example, but they nevertheless are dominated by equity volatility for practically all of their lifespan. The problem with Target Date Portfolios is not that the asset allocation changes over time, but rather that the allocation to risky assets, i.e., the non-cash portion, is dominated by equity risk, just like Diversified Growth Portfolio.

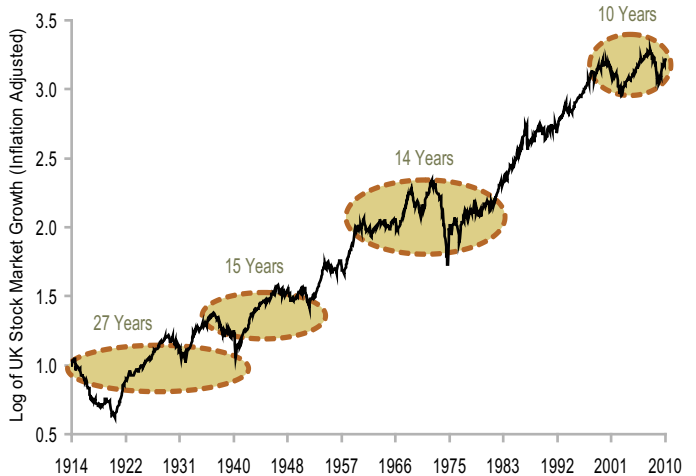
FIGURE 2: SAMPLE TARGET DATE FUND ASSET ALLOCATION  
Correlations to FTSE 100 Index – Five Years Ending March 31, 2010, Modeled Results<sup>1</sup>



Sources: Global Financial Data (GDF), Datastream, Fidelity UK  
<sup>1</sup>Sample Target Date Asset Allocation is a hypothetical portfolio used for illustrative purposes only. Each portfolio represented by "year to retirement" is an estimated combination of Global Stocks (MSCI World), Bonds (Citi WGBI) and UK Cash in proportion to allocations illustrated on the Fidelity UK website. Each allocation was rebalanced monthly and no transaction costs were assumed.

So what's wrong with a portfolio dominated by equity risk? While we believe in the equity risk premium -- that equities outperform bonds over time -- the challenge is that it can take a very long time for the returns to materialize. Investors relying mainly on equities for growth need to be exceedingly patient, and they must have the fortitude to withstand roller-coaster volatility. FIGURE 3 shows performance of the UK equity market from 1914 to 2010, in inflation-adjusted terms.

FIGURE 3: HOW LONG TO WAIT FOR 'STOCKS FOR THE LONG RUN'  
Inflation Adjusted: January 1914 – March 2010



Source: Global Financial Data (GDF)  
Stocks for the Long Run, By Jeremy J. Siegel, McGraw-Hill Companies, 4th Edition.

Equities do tend to rise over time but, as the highlighted areas on Exhibit 3 show, there can be very long periods of flat or negative returns. Shortly, we will show that portfolios can achieve sufficient levels of growth without relying so heavily on equities. Equities do not have to be the only engine of growth, and portfolios that use a more balanced combination of drivers have superior properties.

The UK DC market does not have to repeat the mistakes made in the United States. In the US, prior to the financial crisis that started in 2007, target date funds were on their way to becoming the default option for many DC plans. The large losses experienced by many of those funds in 2008, with only partial recovery in 2009, caused participants and sponsors to question whether the Target Date Portfolios were correctly designed, and whether Target Date Portfolios were the right approach after all. Participants – even those within five years of planned retirement -- experienced breathtaking volatility. UK DC sponsors have an opportunity to avoid a repetition of the US experience where plan members nearing retirement were uncomfortably exposed to equity market volatility.

To summarize, the problems with traditional DC investing are 1) excessive volatility from portfolios dominated by equity risk; and 2) inefficient portfolios. As the correlations in FIGURE 1 reveal, however, many asset classes have high correlations to equities, with sovereign bonds an important exception. A portfolio with a high allocation

to conventional sovereign bonds, however, is unlikely to provide satisfactory returns. In the next section we show how investors can overcome this dilemma.

## Building A Better DC Solution

### Risk Balancing Across Asset Classes

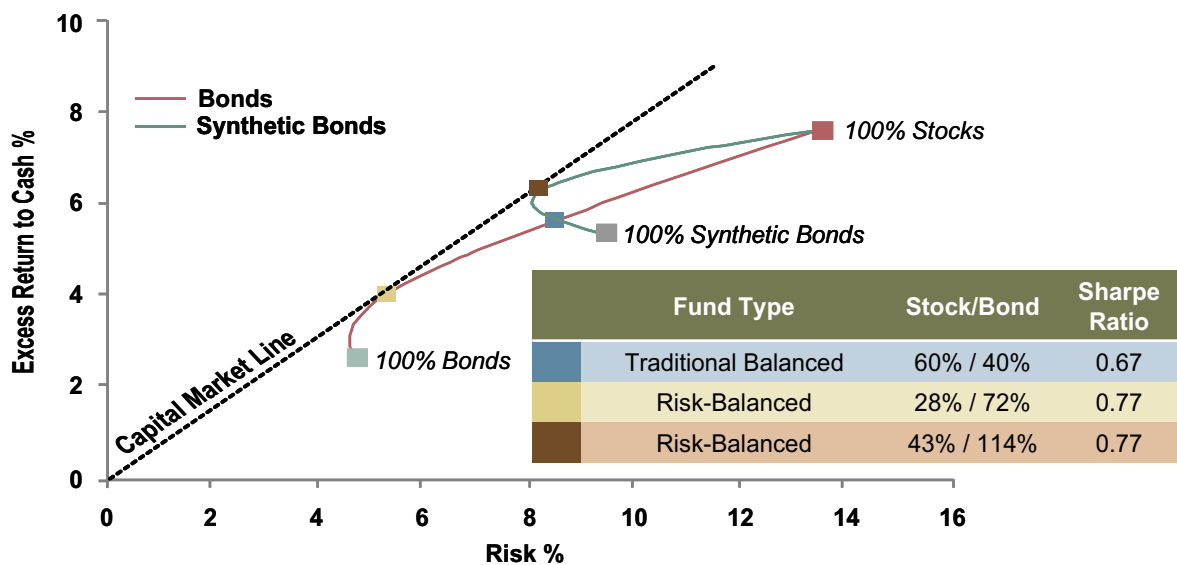
In the introduction, we mentioned that recent research has led to better DC investment solutions. That is a slight simplification, as some of the research is indeed new, and some is fairly old but has been neglected. We start by reviewing research that is central to portfolio construction but has largely been neglected by practitioners.

FIGURE 4 is a risk-return diagram, with excess return (portfolio return minus cash) on the vertical axis and risk (volatility) on the horizontal axis.

FIGURE 4 has two efficient frontiers. The first, lower frontier in red shows portfolios that consist of all combinations of two assets, sovereign bonds and global equities (at the two end-points). The capital market line (dashed diagonal) has its origin at the risk-free interest rate (cash) and its slope is determined by the point of tangency with the lower efficient frontier. The portfolio at the point of tangency (the gold square) has, by definition, the highest Sharpe ratio available among all combinations of the two assets. In this example, that portfolio has 28% stocks and 72% bonds, a Sharpe ratio of 0.77 and historical excess return (1988-2007) of 4.1% p.a.<sup>2</sup>

**FIGURE 4: BUILD A BETTER DC SOLUTION**

*Diversify Risk and Maximize Reward*



Traditional Balanced and Risk Balanced are hypothetical plans used for illustrative purposes. Stock is based on broad market index. Bond is based on broad market Long-Term Treasuries.

Synthetic Bond is 20 year synthetic treasury, zero coupon bond.



Using well-established yet often-neglected principles, investors would be best served by building the portfolio with the highest reward-to-risk ratio, regardless of expected return.<sup>3</sup> If that portfolio is too risky, they should hold the portfolio (gold square) in combination with cash to reach the desired risk level. If that portfolio has insufficient expected return, they should borrow in order to lever the portfolio until it has the desired return level. Only in this way will investors preserve the benefits of the highest reward-to-risk portfolio.

In practice, investors are more likely to hold the portfolio at the dark blue square, 60% equities and 40% bonds, because it offers a higher excess return, 5.7% vs. 4.1%, despite having a notably lower Sharpe ratio, 0.67 vs. 0.77. This inefficient portfolio violates best practice.

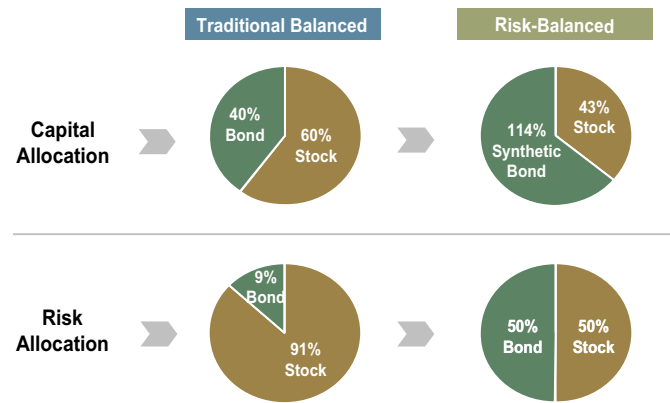
In the upper efficient frontier, we have introduced a third asset called synthetic sovereign bonds. This bond asset has twice the duration of 10-year sovereign bonds, and can be constructed with very long duration cash bonds, modestly levered futures contracts or interest rate swaps. The upper frontier in green shows all combinations of synthetic bonds and global equities. The portfolio at the point of tangency with the capital market line is the brown square. This portfolio has the same Sharpe ratio as the gold square, 0.77, but a higher expected excess return, 6.4% vs. 4.1%. The brown square portfolio has higher expected return for the same risk as the conventional 60%/40% portfolio because it has a higher Sharpe ratio.

The brown square portfolio is a modestly levered version of the gold square portfolio. It has 43% in equities and 114% in sovereign bonds.<sup>4</sup> There are two principal benefits of the higher bond allocation. First, because on average sovereign bond yield curves are upwardly sloping, the portfolio return is enhanced. Second, sovereign bonds are an effective hedge for equities, especially in deflationary environments. Because equities are much riskier than sovereign bonds, as we observed in the previous section, a higher bond allocation is needed to provide an effective hedge to equities. The brown square portfolio accomplishes this.

Another way to think about what happens in FIGURE 4 when moving from the lower frontier to the upper frontier is to compare portfolios on the basis of their capital allocation versus risk allocation. FIGURE 5 makes this comparison.

Capital allocation – weighted by the amount of capital in each asset – is a straightforward way of looking at asset allocation, but can be misleading when the portfolio is composed of assets with very different levels of risk – usually the case with balanced portfolios. Risk allocation

FIGURE 5: CAPITAL ALLOCATION VS. RISK ALLOCATION



Traditional Balanced and Risk-Balanced are hypothetical plans used for illustrative purposes. Stock is based on broad market index. Bond is based on broad market Long-Term Treasuries.

Synthetic Bond is 20 year synthetic treasury, zero coupon bond.

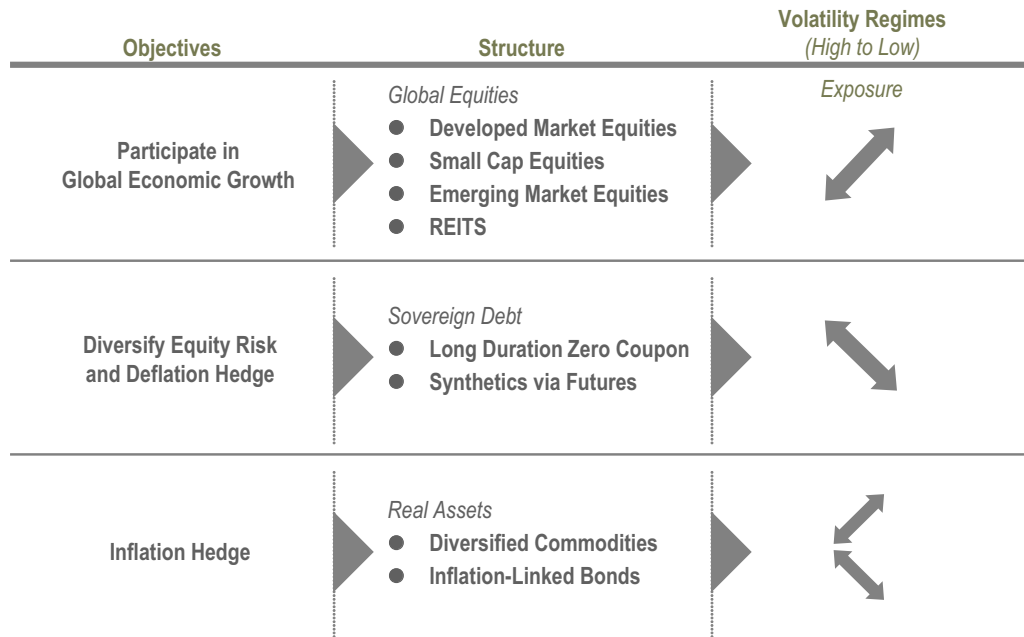
means allocating according to the proportion of risk that comes from each portfolio asset. FIGURE 5 shows that the conventional balanced portfolio has a capital allocation of 60% to equities and 40% to fixed-interest, but from a risk allocation perspective, equities generate 91% of the risk and fixed-interest only 9%, hence the equity-centric behavior of traditional DC offerings. The highest Sharpe ratio gold square portfolio, by contrast, has a capital allocation of 28% to equities and 72% to fixed-interest, which translates into a risk allocations of 50% equities / 50% fixed-interest. The balancing of risk between equities and fixed-interest in the brown and gold square portfolios is why they have the highest Sharpe ratios.

### Investing In The Essential Betas

In the previous section we used two-asset class examples in order to illustrate risk balancing. The real world is more complex, and corporations, governments and other organizations issue many different kinds of securities. How should DC investors select which asset classes to invest in? One approach is to invest in a little bit of everything. As we have seen, holding many pie slices can easily lead to poor diversification through bad breadth. A better way is to select asset classes based on solid reasons that connect investor objectives with asset class characteristics.

Our research has shown that portfolios built from 3 categories of assets are most likely to satisfy DC investor objectives. First, investors saving for retirement usually require growth of capital, and an allocation to global equities makes an important contribution to growth. Second, sovereign bonds are an effective hedge against equity risk and a hedge in deflationary periods. Third, most DC inves-

FIGURE 6: WHAT IS ESSENTIAL TO BUILD A RISK-BALANCED PORTFOLIO?



tors are concerned about maintaining purchasing power, so an allocation to real assets – inflation-linked bonds and commodities – provides inflation protection. FIGURE 6 summarizes the asset classes in our preferred DC portfolio, which we refer to as ‘risk-balanced.’

There are many asset classes that we exclude from the risk-balanced portfolio. Corporate bonds are an example. Corporate bonds can be decomposed largely into risk-free interest rate exposure and equity exposure. Both of these exposures are provided by the first two asset classes in FIGURE 6, so there is no need to duplicate them with a holding of corporate bonds. Corporate bonds may, from time to time, be attractively priced on an opportunistic basis, but here we are concerned with a long-term or strategic asset allocation.

### ***Risk Balancing Within Asset Classes***

Earlier in the paper, we introduced the idea of balancing risk across asset classes, especially between equities and sovereign bonds. Risk balancing is an extremely powerful concept, and there are two further ways of using it to improve performance. In addition to risk balancing between asset classes, large benefits are available from balancing risk within asset classes. Here we are referring to balancing risk across the individual country equity and bond markets, and across individual commodities. Risk balancing within asset classes prevents over-concentration in any single country or commodity because of an index vendor’s weighting scheme. It removes dominance due to capital-

ization or (commodity) production weights. Risk weighting reduces the portfolio’s susceptibility to price bubbles forming in specific countries, regions or commodities. It also prevents the portfolio from loading up on a country’s debt for the dubious reason that the country has issued a great deal of debt.

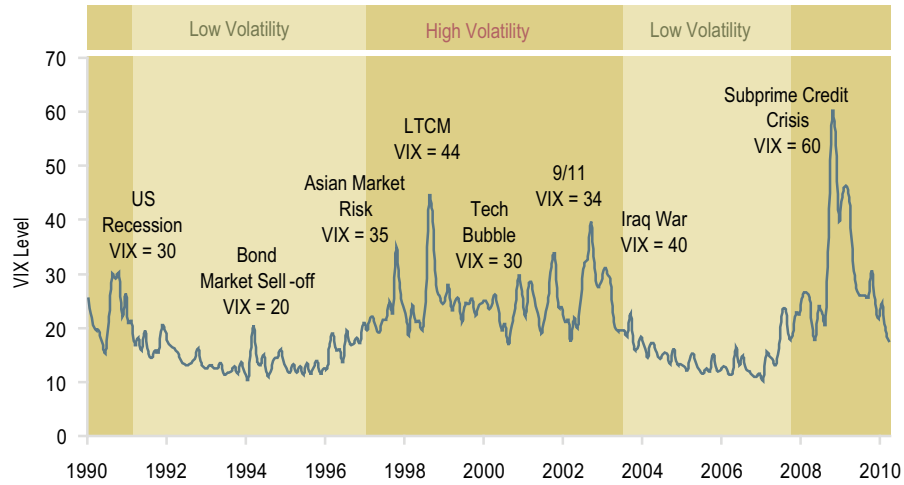
### ***Risk Balancing Across Time***

DC investors crave consistency. Like most investors, they don’t want unpleasant surprises. An important weakness of Diversified Growth Portfolios and traditional Target Date Portfolios is that when markets become more volatile, these funds become riskier right along with the markets. In times of heightened market volatility, however, investors don’t become more tolerant of risk. If anything, they become more risk averse. DC investors, we believe, would like a more reliable and consistent risk experience than what they get from Diversified Growth Portfolios and Target Date Portfolios. To address this concern, we researched how asset class behavior is related to the risk environment. We learned a number of important things. One, that periods of elevated or depressed volatility tend to be persistent – they usually last several months and often years, as shown in FIGURE 7. The FIGURE shows the historical level of the VIX, a popular indicator of market risk and sometimes referred to as the ‘fear gauge’.<sup>5</sup>

In FIGURE 7, we have divided the period from January 1990 to March 2010 into regimes of high and low volatility, which persist for years at a time.

**FIGURE 7: VOLATILITY REGIMES IMPACT ASSET ALLOCATION**

January 1990 – March 2010



Sources: Chicago Board Options Exchange, First Quadrant, LP

Another insight relates to correlations. The conventional wisdom is that in a crisis, correlations between assets go to one. While this applies between most risky assets, it does not apply to the correlation between equities and sovereign bonds. In times of heightened risk, the correlation between equities and sovereign bonds decreases and often becomes negative.

Combining these insights with the objective of providing investors with a consistent risk experience led us to develop risk balancing across time. This is achieved by changing the portfolio allocation depending on the volatility regime.<sup>6</sup> In high volatility regimes, the allocation to risky assets – equities and commodities – is reduced, and

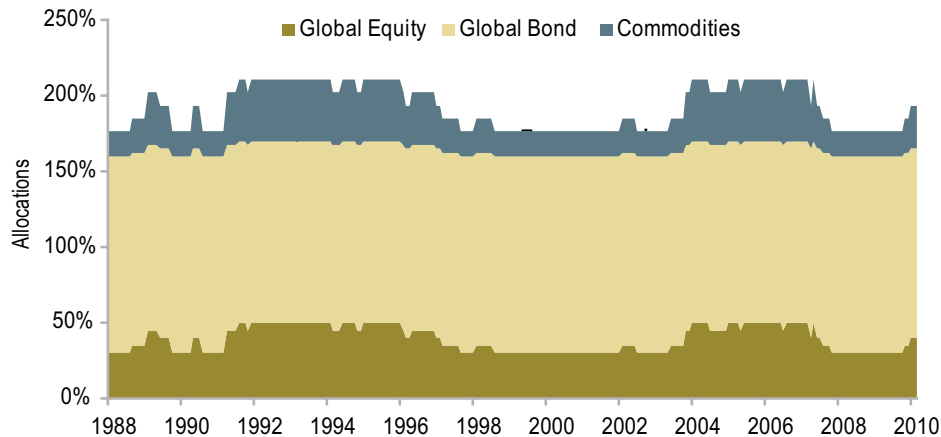
the allocation to sovereign bonds increased. Conversely, in low volatility regimes, the allocation to risky assets is increased at the expense of sovereign bonds.

FIGURE 8 is a simulation showing how the risk-balanced portfolio allocations would have changed over time as the market risk environment changed.

The result of balancing risk through time is that the portfolio has approximately the same average risk level regardless of the volatility regime, and we believe investors want better predictability, compared to the more pronounced swings experienced by Diversified Growth Portfolios and Target Date Portfolios. FIGURE 9 shows simulated results

**FIGURE 8: HISTORICAL ALLOCATIONS<sup>1</sup>**

Simulation: January 1988 – March 2010



Sources: Bloomberg, Global Financial Data (GFD)

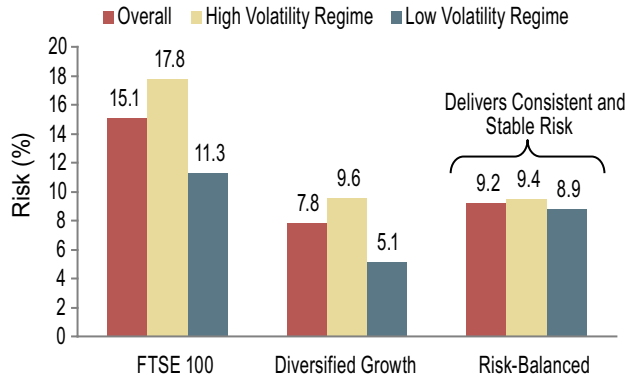
<sup>1</sup>Supplemental Information. Please see Simulation Disclosures: Essential Beta GBP – Simulated Performance and Essential Beta Strategy Composite Information and Essential Beta Strategy disclosures found at the end of this paper for information concerning this simulation.



comparing volatilities of the FTSE 100, Diversified Growth Portfolio and the risk-balanced portfolio.

FIGURE 9: RISK DIVERSIFICATION THROUGH TIME

Annualized Risk: January 1988 – December 2009, Modeled Results<sup>1</sup>



Sources: Bloomberg, Global Financial Data (GFD)

<sup>1</sup> Risk-Balanced is Supplemental Information. Please see Simulation Disclosures: Essential Beta GBP – Simulated Performance and Essential Beta Composite Information (performance used in simulation) and Essential Beta Strategy disclosures found at the end of this presentation for information concerning this simulation, the live composite, and the effect of fees on the performance. Diversified Growth is a hypothetical plan used for illustrative purposes. It is composed 40% MSCI World (local currency), 25% Citi World Government Bond Index (local currency), 10% ML High Yield Master, 5% ML Emerging Market Sovereign Plus Bonds, 4% NAREIT, 3% S&P GSCI, 13% HFRI FoF. The exposures were hedged to GBP (unless indicated as local), rebalanced monthly and no transaction costs were assumed.

The red bars show the average level of volatility of each strategy over the full time period (1988-2009); the gold bars show each strategy’s volatility during regimes of high market volatility; and the blue bars show each strategy’s

volatility during regimes of low market volatility. The risk-balanced portfolio has almost the same risk in high market volatility regimes, 9.4%, compared to 8.9% risk in low volatility regimes. This is much more stable than Diversified Growth Portfolios, where volatility almost doubles in high volatility regimes (9.6%) compared to low volatility regimes (5.1%).

Smoothing the investor’s volatility experience is highly desirable, but not at the cost of a significant reduction in the Sharpe ratio. A further research insight is that risk-balancing through time, when properly implemented, actually can improve the Sharpe ratio. FIGURE 10 shows how each of the three layers of risk balancing improves the Sharpe ratio, compared to a Diversified Growth Portfolio.

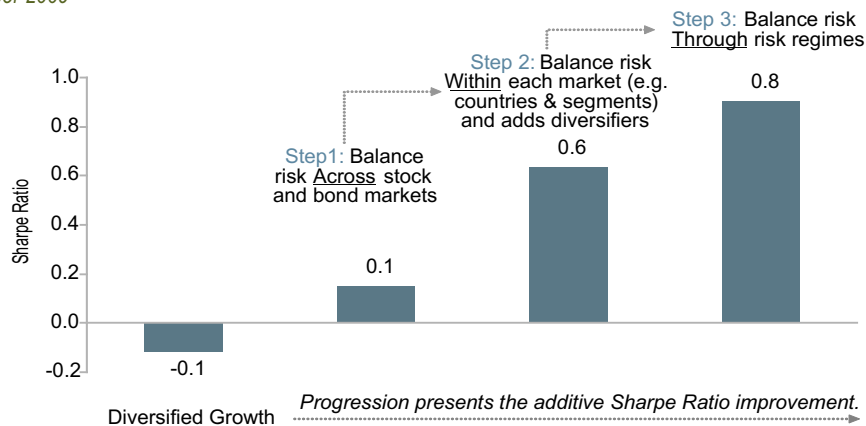
### Better Solutions For DC Investors

We have developed investment solutions for the DC market that we believe do a better job of meeting the needs of investors. One potential solution is the risk-balanced portfolio described in FIGURE 10, which has the ability to outperform traditional Diversified Growth Portfolios (DGP). FIGURE 11 compares a simulation of the risk-balanced portfolio to a simulation of Diversified Growth Portfolio using return and risk analysis for the last 22 years. The analysis shows that the risk-balanced portfolio had more than double the Sharpe ratio of Diversified Growth Portfolio, 0.6 vs. 0.3.

Another potential solution would be to use the risk-balanced portfolio as the risky asset within a target date fund. Since UK DC investors annuitize their holdings at a single

FIGURE 10: SHARPE RATIO: Step-by-step from Diversified Growth to Essential Beta (Simulated)<sup>1</sup>

10 Years, Through December 2009



Sources: Bloomberg, Global Financial Data (GFD)

<sup>1</sup> Risk-Balanced is Supplemental Information. Please see Simulation Disclosures: Essential Beta GBP – Simulated Performance and Essential Beta Composite Information (performance used in simulation) and Essential Beta Strategy disclosures found at the end of this presentation for information concerning this simulation, the live composite, and the effect of fees on the performance. Diversified Growth is a hypothetical plan used for illustrative purposes. It is composed 40% MSCI World (local currency), 25% Citi World Government Bond Index (local currency), 10% ML High Yield Master, 5% ML Emerging Market Sovereign Plus Bonds, 4% NAREIT, 3% S&P GSCI, 13% HFRI FoF. The exposures were hedged to GBP (unless indicated as local), rebalanced monthly and no transaction costs were assumed.





FIGURE 11: BETTER SOLUTIONS FOR DC INVESTORS

January 1988 – March 2010, Modeled Results<sup>1</sup>

	Risk-Balanced	Diversified Growth	FTSE 100
Return	12.5%	8.7%	10.1%
Risk	9.2%	7.8%	15.1%
Sharpe Ratio	0.6	0.3	0.2
Up Capture vs. FTSE 100	52%	47%	100%
Down Capture vs. FTSE 100	20%	35%	100%
Maximum Drawdown	-18%	-30%	-44%
Worst 12 Months	-16%	-26%	-32%

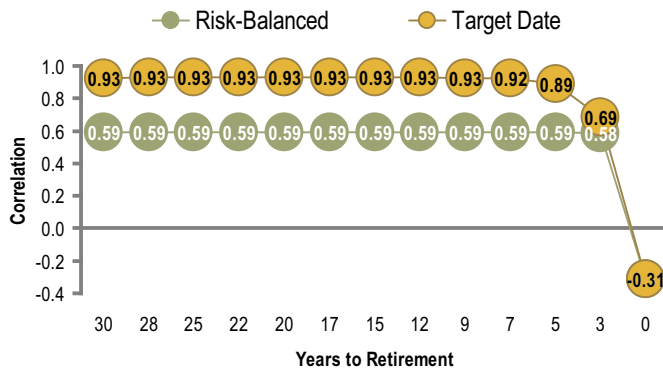
Sources: Bloomberg, Global Financial Data (GFD), StyleAdvisor.

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point in time, they are especially sensitive to portfolio risk in the period leading up to annuitization. It makes sense for the portfolio to reduce its allocation to risky assets as investors approach annuitization because this reduces the concentration of risk around a narrow window of time.

FIGURE 12: TARGET DATE – RETHINKING THE ‘RISKY’ ASSET

Correlations to FSTE 100 Index – Five Years Endina March 31, 2010. Modeled Results<sup>1</sup>



Sources: Global Financial Data (GFD), Bloomberg, Fidelity UK

<sup>1</sup>Target Date Asset Allocation is a hypothetical portfolio used for illustrative purposes only. Each portfolio represented by “year to retirement” is an estimated combination of Global Stocks (MSCI World), Bonds (Citi WGBI) and UK Cash in proportion to allocations illustrated on the Fidelity UK website. Each allocation was rebalanced monthly and no transaction costs were assumed. Risk-Balanced represents an allocation equivalent to the Global Stock and Global Bond allocation from Target Date. Risk-Balanced is supplemental information. Please see Simulation Disclosures: Essential Beta GBP – Simulated Performance and Essential Beta Composite Information (performance used in simulation) and Essential Beta Strategy disclosures found at the end of this presentation for information concerning this simulation, the live composite, and the effect of fees on the performance.

What we have been arguing in this paper is that all of the asset allocations at each point in time along the glide path for traditional Target Date Portfolios (TDP) are inefficient and result in unnecessarily high correlations to equities. If the DC sponsor wants to retain the glide path structure, the solution we propose is to replace the risky assets of the Target Date Portfolio with the risk-balanced portfolio. As retirement approaches, the allocation to the risk-balanced portfolio would be incrementally lowered and replaced with cash. This solution preserves the gradual reduction of portfolio risk that is a principal objective of Target Date Portfolios (TDP), and ensures that risk is used in the most efficient manner possible throughout the life of the program. FIGURE 12 compares a typical Target Date Portfolio – the same example used in FIGURE 2 -- to a risk-balanced Target Date Portfolio.

The risk-balanced Target Date Portfolio has a much lower correlation to equities at every point along the glide path, compared to a typical Target Date Portfolio, yet with no sacrifice of expected return.

### Conclusion

This paper started by asking if investors are getting what they need from the typical balanced DC offerings of Diversified Growth Portfolios and Target Date Portfolios. We believe the answer is no: that Diversified Growth Portfolios (DGP) and Target Date Portfolios (TDP) carry excessive levels of equity market risk, and that they are inefficient investment vehicles. We have shown that better solutions are available, based on research we have undertaken on balancing risks within portfolios.

The potential benefits of the risk-balanced solutions, compared to Diversified Growth Portfolios (DGP) and Target Date Portfolios (TDP), can be summarized as follows:

1. Higher expected reward-to-risk ratio
2. Comparable level of expected return
3. Lower vulnerability to equity shocks
4. Better maintenance of purchasing power

In the US, many DC investors in Diversified Growth Portfolios (DGP) and Target Date Portfolios (TDP) expressed dissatisfaction with the high, equity-driven, volatility they experienced during the recent, and ongoing, financial crisis. The UK DC market can avoid repeating this painful episode by providing investors with solutions that do a better job of meeting their needs.



## Footnotes

<sup>1</sup> For more on asset class correlations to equities, see 'Diversification and Risk Management: What Volatility Tells Us,' Paul Goldwhite, *Journal of Investing*, Fall 2009.

<sup>2</sup> The sterling cash return for the period was 7.1 % p.a.

<sup>3</sup> The late Nobel-prize winning economist James Tobin developed the idea of separating asset allocation from portfolio financing decisions in the 1950's.

<sup>4</sup> Some investors are uncomfortable with leverage, usually because they associate leverage with risk. In this case, a modest amount of leverage is being applied to one of the safest of underlying assets, sovereign bonds. The result of leverage here is an asset with volatility of 9.5%, much lower than many unlevered assets such as equities, which had volatility of 13.5%. The reason leverage is employed in these examples is that our analysis is based on portfolios of sovereign bonds from six major markets, and not all of the six markets issue bonds of sufficient maturity (20 years plus) on an unlevered basis. If bonds with sufficient duration, such as long duration zero coupon bonds, were available in each of the six markets, we probably wouldn't use leverage at all.

<sup>5</sup> The VIX is calculated by averaging the implied volatility of a subset of options on the S&P 500 (see Chicago Board Options Exchange white paper on their website [www.cboe.com](http://www.cboe.com) for details). Our research shows that S&P 500 volatility is highly correlated with other global equity markets' volatility.

<sup>6</sup> While the example above uses the VIX for defining market risk regimes, in practice we have found better results using a combination of market and macroeconomic factors. See First Quadrant publication 'Using Volatility Regimes: The FQ MRI (Market Risk Index)', Ed Peters, September 2009.

<sup>7</sup> Another argument sometimes used for Target Date Portfolios (TDP) is that investors can take more investment risk when they have a greater ability to shape future (non-investment) events. Investors with many working years ahead of them have more choices and greater flexibility than those who are about to retire.

## Endnote

This paper has provided an introduction to risk-balancing. We encourage readers interested in further detail to consult the following First Quadrant white papers, which we would be pleased to send upon request:

'Balancing Betas: Essential Diversification,' Ed Peters, February 2009.

'Using Volatility Regimes: The FQ MRI (Market Risk Index),' Ed Peters, September 2009.

'Best of Both Worlds – Balancing Asset Growth and Liability Hedging,' Ed Peters, June 2009.

## Simulation Disclosures: Essential Beta GBP – Simulated Performance

Unless otherwise noted, performance figures do not reflect the deduction of investment advisory fees. These fees are described below. The returns shown will be reduced by the advisory fees and any other expenses the advisor may incur in the management of an investment advisory account. **Simulated performance is no guarantee of the future results in a live portfolio using the strategy. Potential for profit is accompanied by possibility of loss.** **General Disclosures:** The simulated performance prior to March 2009 used in this presentation will differ from live performance that would have been experienced using the strategy during that time period for the following reasons: • The simulation assumes that we adjust the risk and capital allocated to each sub-strategy on a monthly basis after the close on the last day of each month, whereas the live product may not adjust the allocations exactly at that time. • The simulation assumes that the strategy and sub-strategy guidelines are constant through the life of the portfolio, whereas, the guidelines for live portfolios may have changed over the life of each portfolio. • The simulation assumes fixed transaction costs whereas live portfolio transaction costs will be variable. • The simulation uses a synthetic long duration zero coupon bond for each bond country allocation. The cash return for the synthetic bond can vary by broker. • The simulation assumes all trading takes place once a month (on the last day of the month) whereas live portfolios may trade often during the month. • Hypothetical or simulated performance results have certain inherent limitations. Unlike an actual performance record, simulated results do not represent actual trading. Also, since the trades have not actually been executed, the results may have under or over compensated for the impact, if any, of certain market factors, such as lack of liquidity or positions need to be rounded based upon contract size when futures trades are being executed. Simulated trading programs in general are also subject to the fact that they are designed with the benefit of hindsight. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. Unless otherwise noted, performance returns for one year or longer are annualized. Performance returns for periods of less than one year are for the period reported. **Disclosures Specific to Simulation:** The simulation is constructed with the goal to diversify risk in a portfolio by strategically allocating risk to several sub-strategies/asset classes including, without limitation: Developed Market Equities; US Small Cap Equities; Emerging Market Equities; Real Estate Investment Trusts ("REITS"); Diversified Commodities; US Treasury Inflation-Protected Securities ("US TIPS"), and Long Duration Zero Coupon Synthetic Bonds ("Synthetic Treasuries"). The simulation assumes Synthetic Treasuries are created by using futures on various developed country sovereign bonds. The simulation additionally attempts to balance risk relative to country and sector weightings. The simulation targets overall portfolio risk allocations based on pre-determined indicators of market risk which may change over time. Beginning with March 2009, the live performance of an Essential Beta portfolio has been used in the simulation. Simulated performance has been adjusted to account for the difference between the GBP three month LIBOR and USD three-month LIBOR. **Investment Management Fees:** Performance results presented net of investment management fees are based upon the actual average-weighted management fee charged each portfolio in the composite. All performance results presented include trading commissions. The FQ investment management asset-based fee schedule for this strategy, which is negotiable, is 0.35% of net asset value.



Essential Beta Strategy  
Composite Information

Essential Beta Strategy	Total Return Net	Number of Portfolios <sup>1</sup>	Composite Dispersion (%)	Total Composite Assets <sup>1</sup> (Millions USD)	% of Firm Assets <sup>1</sup>	Total Firm Assets <sup>1</sup> (Millions USD)	*Actively Managed AUM <sup>1,2</sup> (Millions USD)	*Total Firm Assets (Including Notional Values) <sup>1,3</sup> (Millions USD)
2009 (Mar-Dec)	+23.3%	<5	–	6	0.1	7,867	17,342	17,427
2010 (Jan-Apr)**	+5.1%	<5	–	104	1.3	7,883	17,419	17,511

See Additional Disclosures for important information concerning this composite and the effect of fees. \*Supplemental Information. \*\*All performance and AUM data is preliminary. <sup>1</sup>At End of Period Reported. <sup>2</sup>Includes market values for fully funded portfolios and the notional values for margin funded portfolios, all actively managed by First Quadrant and non-discretionary portfolios managed by joint venture partners using First Quadrant, L.P. investment signals. First Quadrant is defined in this context as the combination of all discretionary portfolios of First Quadrant, L.P. and its joint venture partners, but only wherein FQ has full investment discretion over the portfolios. <sup>3</sup>Includes market values for fully funded portfolios and the notional values for margin funded portfolios managed by First Quadrant and non-discretionary portfolios managed by joint venture partners using First Quadrant, L.P. investment signals. First Quadrant is defined in this context as the combination of all discretionary portfolios of First Quadrant, L.P. and its joint venture partners, but only wherein FQ has full investment discretion over the portfolios.

Essential Beta Strategy

*Past performance is no guarantee of future results. Potential for profit is accompanied by possibility of loss.* **GENERAL DISCLOSURES:** First Quadrant, L.P. has prepared and presented this report in compliance with the Global Investment Performance Standards (“GIPS®”). First Quadrant (“FQ” or the “Firm”) is defined as the combination of all discretionary portfolios of First Quadrant, L.P. and its joint venture partners, but only wherein FQ has full investment discretion over the portfolios. First Quadrant L.P. is a registered investment adviser and is an affiliate of Affiliated Managers Group, Inc. A complete list and description of the Firm’s composites is available upon request. **COMPOSITE DETAILS: Composite Description:** (Creation Date: March 2010) The portfolios in this composite invest in the Essential Beta strategy. The strategy seeks to provide long-term market returns through exposure to essential markets in order to participate in global economic growth. The strategy includes exposure to global equity, global sovereign bonds, and commodities primarily through futures contracts, and may also use Exchange Traded Funds (ETFs) and physical securities when liquid futures contracts are not available or are illiquid. The strategy will also include exposure to commodities and Treasury Inflation Protected securities (TIPS) to hedge against inflation. Portfolios in the composite have a target risk level of between 8% and 10%, which is balanced among the asset classes. Portfolios in the composite are not managed against any specific universe and hence the composite performance reflects total return. **Portfolio Criteria:** There is no minimum balance requirement for a portfolio to be included in a composite. The returns presented do not reflect leverage. **Calculation Methodology:** Valuations and returns are computed and stated in U.S. dollars. One portfolio within the composite (March 2009 through March 2010) used the daily valuation method to calculate the time-weighted monthly portfolio return while the other portfolio (February 2010 to present) uses a dollar-weighted rate of return formula to calculate the monthly return. Annual portfolio returns are calculated by linking the monthly returns. The dispersion of a composite is calculated using the asset weighted standard deviation formula. Only portfolios managed for the full calendar year are included in the dispersion calculation. Where a composite contains five or fewer portfolios, a measure of dispersion is not statistically representative and is therefore not shown. Additional information regarding the Firm’s policies and procedures for calculating and reporting performance returns is available upon request. **Derivatives:** The underlying investment process composing this composite uses derivative instruments to achieve desired returns. Derivatives are financial instruments whose value is derived from another security, an index or a currency. Futures contracts are derivatives that specify a purchase or sale of an asset at a specified price on a specified date in the future. Forward contracts are derivatives that allow the purchase or sale of currency in the future at a currently agreed-upon rate of exchange. There is a risk that a derivative may not perform as expected, thereby causing a loss or amplifying a gain or loss for a portfolio. With some derivatives there is also the risk that the counterparty may fail to honor its contract terms causing a loss for a portfolio. **Investment Management Fees** Performance results presented net of investment management fees are based upon the actual average-weighted management fee charged each portfolio in the composite. These net of fee results also reflect the effect of any negotiated fee arrangements, which are lower than FQ’s fee schedule. All performance results presented include trading commissions. The FQ investment management asset-based fee schedule for this strategy, which is negotiable, is as follows: \$0–\$100, 0.50%; \$100–\$350, 0.30%; and more than \$350, 0.15%. Asset-based fees are charged incrementally. For example, a \$200 million dollar portfolio will be charged .50% for the first \$100 million, 0.30% for the next \$100 million.

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