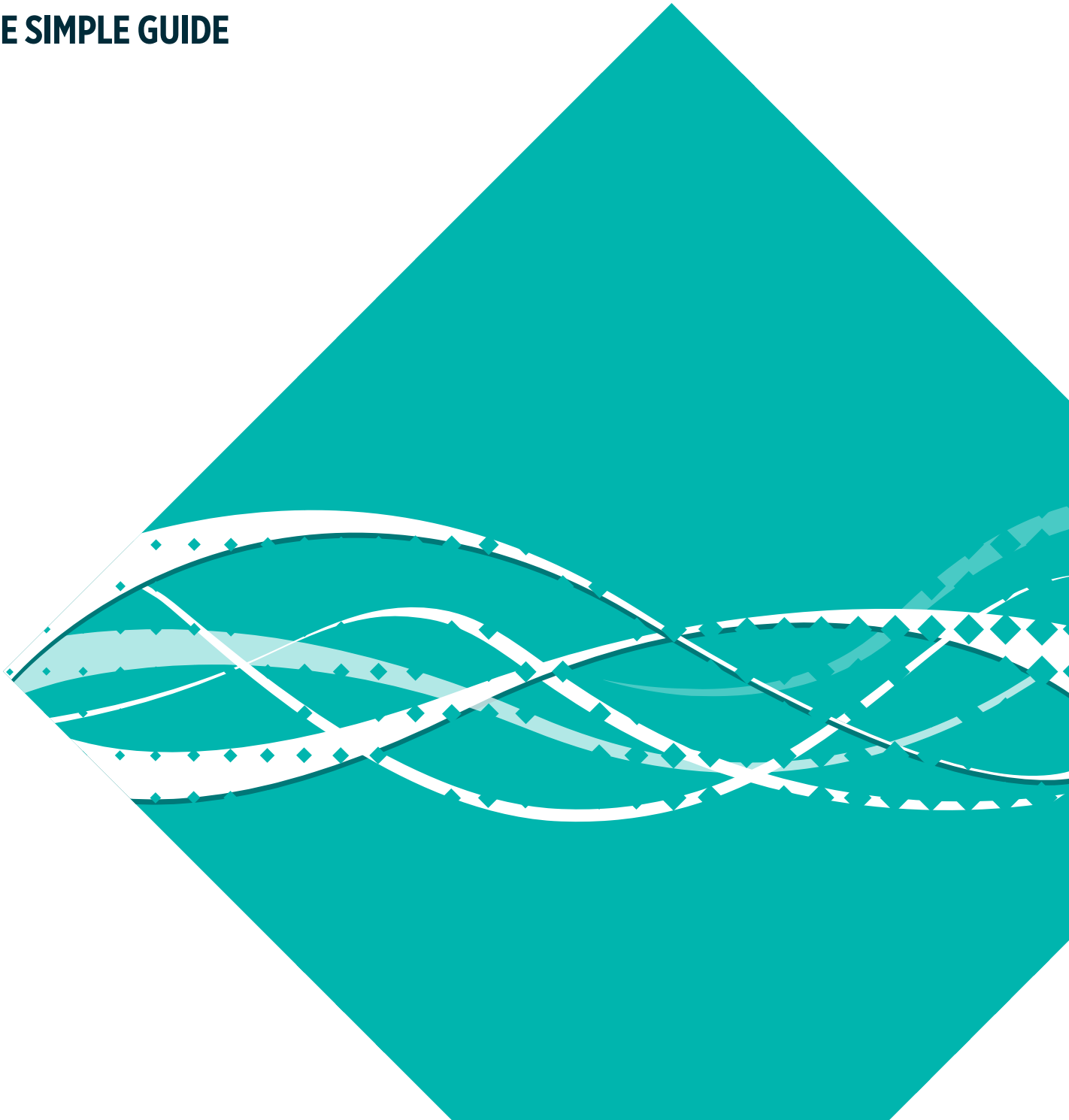
PENSIONS AND
LIFETIME SAVINGS
ASSOCIATION

October 2016

LOW VOLATILITY EQUITY INVESTING

MADE SIMPLE GUIDE



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It is not investment advice.

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1 INTRODUCTION

LOW-VOLATILITY EQUITY INVESTING, HOW IT CAN CONTRIBUTE TO A PENSION FUND'S ASSET ALLOCATION, AND CONSIDERATIONS ALONG THE WAY.

The majority of UK defined benefit (DB) schemes are in deficit, many heavily so. Companies are under increasing pressure from regulators, unions, employees, and even from within their own company, to address the funding gap. This gap has been driven by investment returns failing to keep pace with anticipated liabilities; over the last decade, equity returns have been volatile, bond yields have fallen, and life expectancies have increased.

In this context, defined contribution (DC) pension schemes are increasingly becoming the norm. But like DB schemes, DC schemes require a well-thought-out investment strategy, typically involving a range of appropriate asset classes with the goal of providing adequate investment returns.

This guide aims to explain what low-volatility investing is, what practical implementation considerations are important, and how it fits within both DB and DC pension plans. We look at the basic elements of low-volatility equity investing, with emphasis on three elements in particular:

1. Core beliefs underpinning the basic investment idea;
2. The unexpected risks embedded in simplified approaches; and
3. The most suitable applications of low-volatility equity strategies to meet the needs of DB and DC pension plans.

The terms "low-volatility" and "managed-volatility" are used interchangeably within the industry and as such both will be referenced within this guide. Similarly, the terms "risk" and "volatility," when used in the context of this guide, are used interchangeably too.

COMPANIES ARE UNDER INCREASING PRESSURE TO ADDRESS THE FUNDING GAP

2
A PERSISTENT MISPRICING

A BASIC TENET OF TRADITIONAL FINANCIAL THEORY HOLDS THAT HIGHER-RISK INVESTMENTS ARE REWARDED WITH HIGHER AVERAGE RETURNS.

At the asset class level, there is historical support for this theory of reward for risk: over a long history, stock returns have been more uncertain, but generally higher, than bond returns. Within the universe of stocks, however, the expected relationship between risk and return appears to break down. In fact, it may surprise investors to learn that over the past 40 years, US portfolios comprised of low-risk stocks have earned similar or higher returns than portfolios of higher-risk stocks.

Since the beginning of the Great Depression in 1929, higher-risk stocks have enjoyed only two transitory periods of outperformance: the first was during the post-World War II equity boom of the 1950s, and the second during the technology bubble ending in early 2000. In all other periods, a low-volatility portfolio built in the US can be shown to have similar or higher returns than the S&P 500, with substantially lower volatility (see chart 3). This represents a persistent mispricing of risk in the cross section of equity returns.

Acadian Asset Management was not the first to note this effect, but in 2011, members of the Acadian investment team, published a seminal paper on the topic, "Benchmarks as Limits to Arbitrage: Understanding the Low-Volatility Anomaly" in the Financial Analysts Journal. The paper cites two reasons for the mispricing of risk:

- Many investors exhibit an irrational preference for riskier stocks, possibly due to these stocks' lottery-like payoffs; and
- More sophisticated investors are disinclined to exploit the resulting underpricing of lower-risk stocks, due to the deeply embedded nature of cap-weighted indexes as benchmarks for institutional portfolios.

In the following chart we group stocks by a simple measure of risk, total volatility, and show the annualised returns of each grouping. The highest-risk grouping, on the right, has realised the lowest returns, not the lowest-risk group. If all groupings realised the same return, you could conclude that investors in the highest-risk grouping were undercompensated for the risk of their holdings, but that appears to be even more the case given the diminished returns of the highest-volatility group. As an additional robustness test, we repeated the test for the top 1,000 stocks by market capitalisation, and we found the same result. We conclude this mispricing is not unique to stocks of lower market capitalisation or liquidity.

Low volatility has performed as well as high volatility in the US market 1968-2015

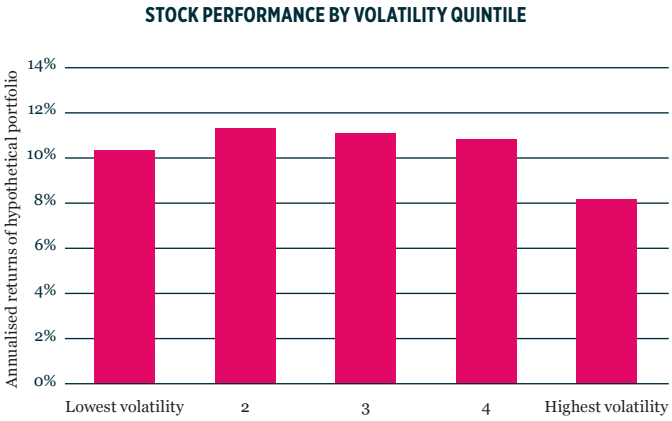


Chart 1

Source: Acadian Asset Management LLC, CRSP®, Center for Research in Security Prices. Graduate School of Business, The University of Chicago

The conclusion: a portfolio built primarily of lower-risk stocks may be able to exploit the mispricing of risk and realise returns similar to the aggregate equity market, despite having materially lower total volatility and drawdowns.

This phenomenon is not limited to just the US market, although US data have the longest and one of the most reliable histories. Similar analyses focused on UK and international markets have shown similar results (see figure below: cap-weighted benchmarks in grey, compared to simulated low-volatility equity portfolios – in this case "minimum-variance" portfolios – in blue)[1]. Evidence that high-risk stocks fail to earn higher long-term average returns, regardless of market capitalisation or geography, makes a compelling investment thesis for low-risk equity strategies.

1 A "minimum variance" portfolio, which looks beyond measurements of individual stock risk, by incorporating correlations (the degree to which individual stocks move together) among securities. Such a portfolio has the lowest levels of expected portfolio risk.

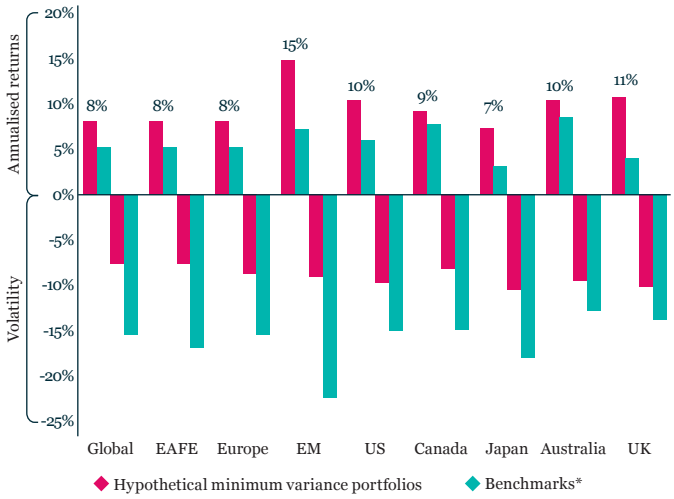


Chart 2

Source: Acadian Asset Management LLC, *MSCI World, MSCI EAFE, MSCI Europe, MSCI EM, MSCI US, MSCI Canada, MSCI Japan, and MSCI Australia
***See end of document for disclaimer**

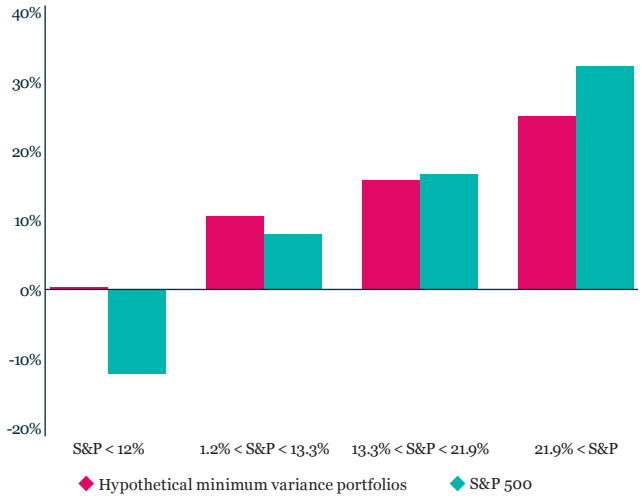


Chart 3

Source: Acadian Asset Management LLC, CRSP®, Center for Research in Security Prices. Graduate School of Business, The University of Chicago

Chart 2 examines returns realised in both down and up markets. This figure presents returns for four different market environments: the worst quartile of 12-month returns on the left, the best quartile of 12-month returns on the right, and two quartiles of more gently rising markets in the middle. The typical drawdown protection of low-volatility equity strategies is evident on the left, while the substantial, but typically incomplete, upside capture in the strongest markets is evident on the right. In the gently rising markets in the middle, low-volatility strategies tend to keep pace, while retaining all their low-volatility features.

3
LOWER VOLATILITY AND COMPOUNDING

DATA SUGGESTS THAT A LOW-VOLATILITY EQUITY PORTFOLIO MAY OFFER MORE STABLE RETURNS AND DIMINISHED DRAWDOWNS DURING TIMES OF MARKET CRISIS – TWO ADVANTAGES WE NOW WILL EXPLORE IN GREATER DETAIL.

The graph below demonstrates the significantly lower volatility achieved via investing in a low-volatility equity portfolio, versus the S&P 500, from 1968 to 2015.

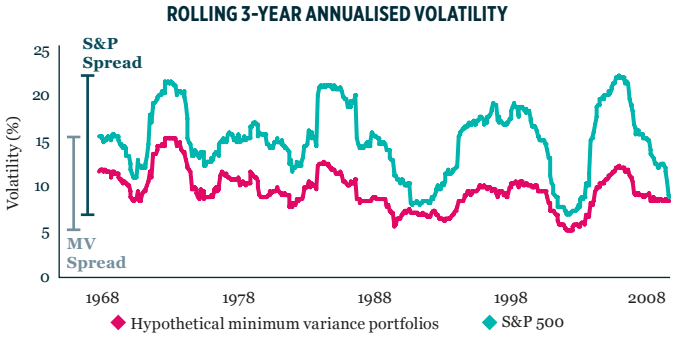


Chart 4

Source: Acadian Asset Management LLC, CRSP®, Center for Research in Security Prices. Graduate School of Business, The University of Chicago.

A low-volatility strategy also may provide meaningful drawdown protection, as the graph below demonstrates. Chart 5 shows the length and severity of drawdowns experienced by the simulated US low-volatility portfolio, versus the S&P 500, between 1968 and 2015.

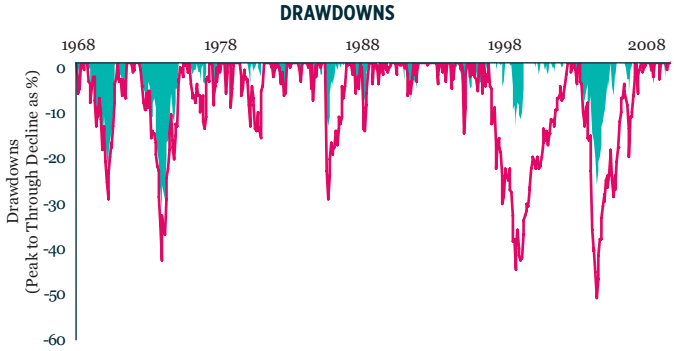


Chart 5

Source: Acadian Asset Management LLC, CRSP®, Center for Research in Security Prices. Graduate School of Business, The University of Chicago.

Investors often fail to appreciate the impact that large drawdowns have on investment outcomes. For example, a 50 per cent market loss requires a subsequent 100 per cent return to recover the investor's original capital. The drawdown protection of a low-volatility strategy reduces the need for such ambitious return targets, both by limiting losses during down markets and allowing the investor time to benefit from the effects of compounding.

The effect of compounding, and the associated additional added return, are critical considerations. For two return series that have the same arithmetic average return, the return series with lower variance provides a greater buy-and-hold (geometric average) return for the investor who remains invested for the full period.

Consider the following illustrative example: over a two-period window a low-risk stock has a return of 5% in both periods, while the high-risk stock has a return of -3% in the first period and a return of 13% in the second period. The simple (arithmetic) average return for both stocks is 5%. However, the cumulative return of the first stock, which has zero variance of returns, is (1+5%)(1+5%)-1=10.25%, while the cumulative return of the second, which has positive variance of returns, is only (1-3%)(1+13%)-1=9.61%. Of course, the 13% return is a high return, but it compounds off a lower base, since it follows the -3% return. This simple example conveys a fundamental fact of investing: for the same arithmetic average returns, a lower-volatility asset cumulates returns faster, for a buy-and-hold investor. This faster compounding of returns is an additional benefit of low-volatility portfolios.

PRACTICAL IMPLEMENTATION OF MANAGED-VOLATILITY PORTFOLIOS

With increasing interest in low-volatility strategies, there is valid concern that the mispricing may weaken. In order for the anomaly to be arbitraged away, however, the benchmark-focused nature of institutional investing would have to change radically. This seems unlikely to happen soon, as benchmarks serve a useful purpose in assessing the performance of investment managers. Additionally, the recent flow of assets into low-volatility strategies is still a tiny fraction of what currently is managed in benchmark-sensitive and purely passive benchmark replication portfolios. Still, naïve, or passive, approaches to low-volatility investing may not fully

capture the benefits of such a dramatic mispricing. Worse, they may expose investors to unwanted risks.

As introduced above in the discussion of minimum-variance portfolios, low-risk portfolios can be built to have low total portfolio risk, rather than simply a portfolio of low-risk stocks. The primary difference between a low-risk portfolio and a portfolio of low-risk stocks is that the correlation structure matters in the buy and sell decisions of the former, but not the latter. Considering correlations is important as it helps mitigate the possibility of creating a portfolio of low-risk stocks which, despite on their own appearing to be low-risk, may perform similarly to one another, resulting in the portfolio having higher risks than the underlying stock components would suggest.

While low-risk/low-beta stocks and portfolios produce lower absolute annual volatility compared with the cap-weighted index return, many pension schemes are conscious of volatility or tracking error versus a typical cap-weighted benchmark rather than in absolute terms, as this is what is regularly assessed and reported upon. It should be understood that a low-volatility portfolio's tracking error versus the cap-weighted index, and also against more traditional cap-weighted benchmark-focused active managers, is likely to be higher. Of course, lower absolute volatility should provide comfort for pension schemes by providing reduced volatility of a scheme's funding status, however higher tracking error is a real consideration if measuring against a cap-weighted benchmark.

4
HIDDEN RISKS AND UNEXPECTED OUTCOMES

WE NOW TURN TO SOME OF THE HIDDEN RISKS OF MORE NAÏVE APPROACHES. IT IS IMPORTANT TO ENSURE INVESTORS DON'T SIMPLY MAKE AN EXCHANGE OF RISKS, FOR INSTANCE OF EQUITY RISK FOR VALUATION RISK OR INTEREST RATE RISK.

Regarding valuation risk, inflows into low-volatility products have led some to question whether corresponding stocks have become expensive. The chart below plots valuations of low-beta stocks and high-beta stocks over a period of nearly 75 years. The most striking observation is the stability of valuations within the low-beta segment of the market versus the high-beta segment. The valuations of high-beta stocks fluctuate far more than those of low-beta securities. This is in line with what we would expect given findings that lower beta or volatility stocks have more stable earnings and price returns, and lower historical drawdowns and absolute risk.

MEDIAN P/B OF LOW-BETA STOCKS AND HIGH-BETA STOCKS, U.S. 1930 – 2015

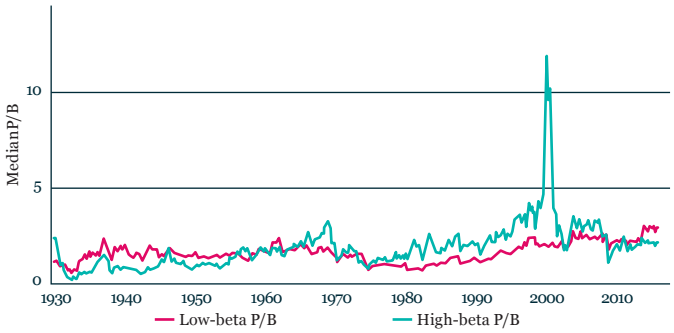


Chart 6

At the beginning of each month, U.S. common stocks in the intersection of the Center for Research in Securities Prices (CRSP) database and the Compustat database are sorted into five quintiles based on the stocks' CAPM betas estimated over the previous sixty (minimum twenty-four) months. Quintile breakpoints are set so that each quintile has equal total market equity (capitalisation). For each quintile, price-to-book is calculated as the root-cap-weighted median of constituent stocks' price-to-book ratios. Chart 6 plots median P/B of the lowest-beta quintile (green line and median P/B of the highest-beta quintile (grey line).

However, it is the case that current valuations of low-beta stocks are higher than their long-term average. Nevertheless, the spread of valuations within low-beta stocks is wide and presents ample opportunity for stock-picking for valuation-sensitive investors. Chart 7 plots the breakpoints of the least expensive and most expensive valuation quartiles for low-beta stocks. Rather than all parts of the low-beta universe having become more expensive, instead it has been a subset of the low-volatility segment that has experienced rising valuations. Today in fact, low-beta stocks in the least expensive part of the market have valuations which are similar to those they have held in the past. Although valuations on average within the low-volatility sector have risen recently, there is still a sizeable portion of the sector that remains highly attractive from a valuations perspective.

Acadian's Managed Volatility portfolios contain stocks that have lower betas and more attractive valuations versus both MSCI World and MSCI Minimum Volatility indexes. This result is the consequence of using volatility and valuation information – along with other fundamental characteristics such as company quality – as inputs, to ensure portfolio constituents are appealing on characteristics other than just volatility.

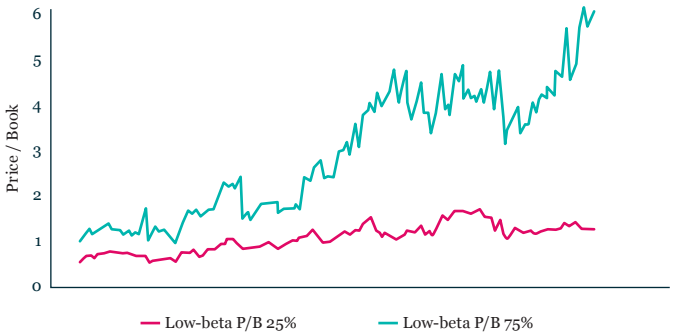


Chart 7

The chart on the next page (chart 8) plots holdings of Acadian's Global Managed Volatility strategy (dark green), MSCI's Minimum Volatility Index (red) and the MSCI World Index (light green). The valuation of each stock is plotted against its risk by using Price to Book (P/B, vertical axis) and the market beta (horizontal axis) of each security.

The red diamond represents the point of the average valuation and beta of the MSCI Minimum Volatility Index. As expected, the position of this diamond is to the left of the light green diamond, which represents the average valuation and beta of the cap-weighted index. By investing in the Minimum Volatility Index however, significantly more is being paid for these stocks on a P/B basis as demonstrated by the average P/B of the Minimum Volatility Index being higher.

Chart 8

Source: Acadian Asset Management. Data as at June 2016

Another crucial input into the investment process is to ensure the widest opportunity set possible, in terms of the numbers of stocks from which to choose, is available for selection. This can be achieved by broadening the investment universe from a cap-weighted index to include off-benchmark names. Increasing the available number of securities that can be selected can only enhance the likelihood of achieving the objective of producing a low-volatility portfolio with equity-like returns.

Regarding interest rate risk, a naive low-volatility equity portfolio may underperform when interest rates rise, because of a negative correlation between interest rates and stock returns within certain lower-volatility sectors of the market. However, this negative link between interest rates and portfolio performance is not a requirement. Indeed, it is possible to build low-volatility portfolios that are relatively neutral to interest rates, by incorporating information about interest rate sensitivity in the portfolio construction process. Such methodologies may preserve portfolios' lower-risk properties during market corrections, regardless of

contemporaneous interest rate fluctuations. In contrast, a naive low-volatility equity portfolio potentially could lose its risk-reducing and drawdown-protection properties during a market correction, depending on the corresponding changes in prevailing interest rates.

By incorporating valuations and interest rate exposures in individual stock selection and by using a broad universe of stocks, a robust, risk-controlled, low-volatility solution is possible. The optimal outcome is a portfolio of significantly reduced market risk (as measured by the portfolio's beta or volatility), a portfolio valuation similar to or cheaper than the aggregate equity market, and a neutral exposure to the future direction of interest rates. Such a portfolio is truly managed volatility, not just low volatility.

The following table summarises the risk controls that should be considered when implementing a low-volatility portfolio:

POTENTIAL RISKS	SOLUTIONS
Valuation risk Do flows into low-volatility stocks result in increased valuations?	Include valuation metrics in the stock selection process.
Limitation of the investment universe Is a suitably broad stock universe being considered for investment?	Avoid narrow, benchmark-focused universes by broadening the possible investment universe more widely, to give the greatest opportunity set.
Large region/sector risks Are there undesirable concentrations in the investment product?	Employ prudent constraints to ensure a diversified portfolio in terms of both sector/regional exposures and individual stock risks.
Interest rate sensitivity risk Is a large or unknown interest rate sensitivity being taken on?	Monitor and potentially incorporate interest rate sensitivity into the product's investment process; neutralise bond-like duration versus the broad equity market.
Correlation risk Are there significant correlations between stocks within the portfolio?	Model and consider correlations within the stock selection process to produce a low-risk portfolio, not just a collection of lower-risk stocks.

5 MANAGED VOLATILITY WITHIN DB AND DC PENSION PLANS

THERE IS CONSIDERABLE UNCERTAINTY PLAGUING THE PENSIONS WORLD. FIRST, THERE IS A SLOW WIND-DOWN OF DB PLANS, AS THE MARKET SHIFTS TOWARDS A DC STRUCTURE. ASIDE FROM THIS FUNDAMENTAL CHANGE, PENSION FUND MANAGERS – AND OTHERS INVOLVED WITH MANAGING OR ANALYSING PENSION PLANS – ALSO FACE A HOST OF OTHER CONCERNS. THESE INCLUDE EXTREME VOLATILITY IN MANY SEGMENTS OF THE MARKET, ALTERING DEMOGRAPHICS OF THEIR PENSION MEMBERS, AND UNPRECEDENTED GLOBAL AND DOMESTIC SOCIO-POLITICAL CHANGE. IT IS SAFE TO SAY PENSION PLAN MANAGERS HAVE A DIFFICULT TASK, AND EVEN THE BEST-LAID PLANS CAN BE DISRUPTED.

In this section we will highlight some of the risks pension plan managers face, and how a low-volatility strategy can be used and applied to both DB and DC plans.

FOR DB PENSION PLANS

For a pension fund that has predictable liabilities, theory dictates that allocating a material portion of pension assets to a "matching portfolio" is sound investment practice. Having a comparably-sized, duration-matched, fixed-income asset offsets much of the liabilities' discount-rate risk. However, there are many other risks, such as inflation risk or longevity risk (the risk that people live longer than actuarial forecasts anticipate), that a bond portfolio cannot hedge; and so it is also prudent to reserve part of the allocation scheme for equities. An equity allocation can help provide exposure to growth assets which deliver higher than average returns necessary for offsetting longevity risk, and for preserving some allocation to assets that are not expected to underperform when inflation is high.

A managed volatility strategy can be an important part of such an allocation for both open and closed DB plans, for four main reasons:

1. Having exposure to the equity premium (and thus the potential to achieve higher average returns that may offset longevity risk and protect against inflation surprises) with lower total volatility may permit the same or even greater exposure to equities, with less total portfolio risk than otherwise would be possible. Because of its risk-reducing properties, such a portfolio also can permit greater exposure elsewhere in the allocation to strategies such as private equity or infrastructure, where average returns may be even higher.
2. By design, managed-volatility portfolios generally seek to outperform the cap-weighted index when equity markets are falling. Such times often are challenging for pension funds and their sponsors, and it can be a great help to have equity assets that may withstand periods of low equity market returns.

   Furthermore, it is nearly impossible to predict changes in discount rates during periods of negative equity market returns. Historically there has been little discernible pattern of discount rates falling or rising when equity markets are experiencing drawdowns. Since no robust link exists, one cannot rely on a discount rate effect that coincides with low equity market returns, which makes an allocation to defensive strategies like a well-constructed low-volatility approach even more relevant.
3. As highlighted previously, high-calibre managed-volatility portfolios are built in a way which prevents them from taking too strong an exposure to interest rates (discount rates). Consequently, this methodology may preserve the portfolios' lower-risk properties during market corrections, regardless of simultaneous discount rate fluctuations. In contrast, a low-volatility equity portfolio which has heightened exposure to discount rates (in either direction) potentially could lose its risk-reducing and drawdown-protection properties during a market correction, depending on the corresponding changes in prevailing discount rates.
4. Incorporating a managed-volatility strategy offers the opportunity to reduce the volatility of a plan's funded status. In these difficult fiscal and economic times, keeping annual contributions consistent is challenging enough, without the need for obtaining additional capital for catch-up funding. Finding ways to dampen the volatility of a pension plan's funding status can be a crucial component of a plan's long-term viability. The downside protection and lower volatility of managed-volatility strategies could be a key component in a plan sponsor's allocation, allowing the plan to focus on providing long-term benefits for both the plan's beneficiaries and the sponsor, instead of potentially being distracted by short-term liquidity and solvency issues inherent in many of today's high-risk asset allocations.

We believe the segregation of pension assets into a "matching" portfolio dominated by bonds and a "growth," or "residual," portfolio dominated by other investments such as equities is sound. This strategy allows pension managers the potential to isolate and control different forms of risk. Including a managed volatility portfolio in the equity allocation can make helpful contributions both to risk management as well as returns. The strategy has the potential to provide exposure to equity markets at lower total volatility, to protect against negative equity market returns and to maintain its risk and return characteristics independent of changes in prevailing discount rates.

FOR DC PENSION PLANS

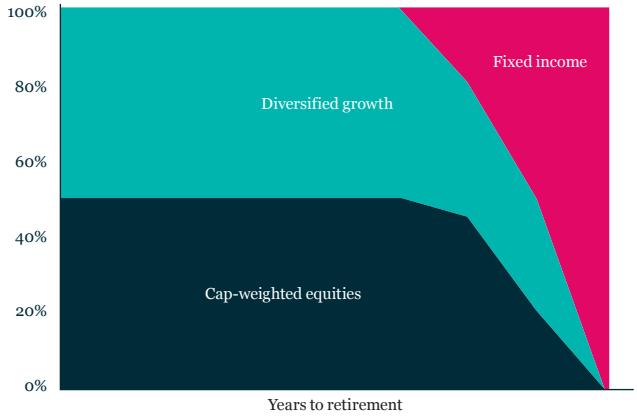
We believe low-volatility equity strategies are a good fit for a DC pension plan throughout a member's savings journey and into post-retirement. With the systemic change from DB pensions to DC pensions, the onus of saving for retirement has shifted away from employers to employees. Consequently, employees are now finding themselves faced with significant decisions related to participation in such plans, such as the amount and frequency of contributions and how to invest their contributions. It is widely recognised that the majority of employees will not make any investment decisions and will fall within the default option of their DC scheme. DC pension plan managers, in drafting these default options and offering an adequate list of self-selected fund options, are having to provide investment solutions which allow the DC members to grow their retirement pot in a steady manner while safeguarding against drawdowns.

Within an equity allocation, we believe that a low-volatility approach offers a superior risk-controlled way of building a larger retirement nest egg, as well as maintaining an exposure to return-seeking assets post-retirement. Because of the features demonstrated above – namely i) dampened volatility; ii) reduced drawdowns; and iii) the effects of compounding – low-volatility equity solutions can be used throughout a DC member's savings journey. A low-volatility solution is particularly relevant to the early and late stages of a member's savings by smoothing volatility and maintaining investor confidence early on, and allowing greater equity exposure later, towards and during retirement. Large volatility and losses can have a significant psychological impact for young investors, deterring them from investing in the future, while higher volatility for later-stage investors can directly affect their ability to retire and their post-retirement income.

DC GLIDE PATH

To further demonstrate how a low-volatility strategy is suitable in UK DC schemes we assume a typical base-case glide path for a DC plan with the following asset allocation:

Chart 9: Sample UK asset allocation timeline base case



BASE CASE	40	35	30	25	20	15	10	5	0
Annualised return	7.2%	7.2%	7.2%	7.2%	7.2%	7.2%	6.8%	6.7%	5.9%
Annualised risk	11.4%	11.4%	11.4%	11.4%	11.4%	11.4%	9.9%	6.8%	5.4%

Source: MSCI, Barclays, MercerInsight MPA and Acadian Asset Management LLC

This chart is based on historical performance over the last 25 years of the indices and peer group universe. In this typical pattern of saving, in the initial 25 years there is often an equal allocation to a multi-asset diversified growth fund and a global equity fund, which results in expected annual returns in the region of 7% and 11% volatility on average. At retirement stage, when most of the allocation is to fixed income, annual return goes to 5.9% and annual risk goes to 5.4% on average.

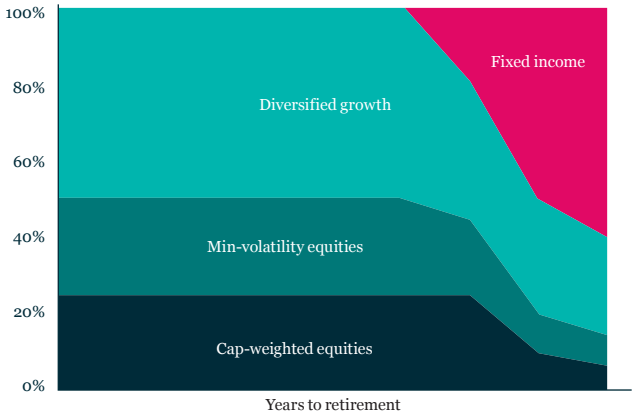
As the next step, we introduce the following features in the base case glide path:

a. Firstly, move half of the global equity allocation to a low-volatility equity allocation.

b. Secondly, keep a higher allocation to the return-seeking assets until the end of an investment journey.

THE DECREASE IN VOLATILITY LEADS TO A SMOOTHER SAVINGS ACCUMULATION PATH

Chart 10: Sample UK asset allocation timeline with minimum volatility



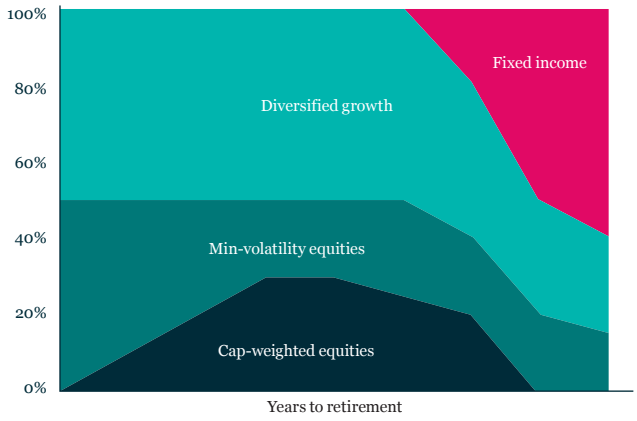
BASE CASE	40	35	30	25	20	15	10	5	0
Annualised return	7.2%	7.2%	7.2%	7.2%	7.2%	7.2%	6.8%	6.7%	5.9%
Annualised risk	11.4%	11.4%	11.4%	11.4%	11.4%	11.4%	9.9%	6.8%	5.4%
WITH MIN-VOLATILITY									
Annualised return	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.0%	6.8%	6.6%
Annualised risk	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	9.1%	6.5%	6.0%
PROBABILITY OF RETURN < -5									
Base case	14%	14%	14%	14%	14%	14%	12%	4%	2%
With min-volatility	11%	11%	11%	11%	11%	11%	9%	4%	3%

Source: MSCI, Barclays, MercerInsight MPA and Acadian Asset Management LLC

By introducing the low-volatility allocation at the beginning of a DC member's 40-year savings journey, the risk/return profile of their investment pot improves significantly. The decrease in volatility leads to a smoother savings accumulation path and thus compounds to a better nest egg.

Additionally if we define drawdown as performance of -5% or worse in any given year the probability of it happening is lower with minimum volatility in the asset allocation mix. So as to not deter young members from investing in a DC plan, it is intuitive to improve their chances of having a positive savings experience right at the beginning. When DC members start saving, the risk of this drawdown goes from 1 in 7 (14%) to 1 in 9 (11%) with the addition of the proposed allocation to a managed-volatility strategy. In the five years just prior to retirement, having an allocation to lower-volatility equities reduces risks while actually increasing likely returns and with no greater probability of a drawdown. This helps to show that an allocation to low-volatility equities is preferable throughout an investor's working life, all the way up to retirement.

Chart 11: Sample UK asset allocation timeline with an increased minimum volatility allocation



BASE CASE	40	35	30	25	20	15	10	5	0
Annualised return	7.2%	7.2%	7.2%	7.2%	7.2%	7.2%	6.8%	6.7%	5.9%
Annualised risk	11.4%	11.4%	11.4%	11.4%	11.4%	11.4%	9.9%	6.8%	5.4%
WITH MIN-VOLATILITY									
Annualised return	7.7%	7.6%	7.5%	7.4%	7.4%	7.5%	7.2%	6.9%	6.7%
Annualised risk	9.4%	9.8%	10.1%	10.5%	10.5%	10.3%	8.7%	6.2%	5.8%
PROBABILITY OF RETURN < -5									
Base case	14%	14%	14%	14%	14%	14%	12%	4%	2%
With min-volatility	9%	10%	11%	12%	12%	11%	8%	3%	2%

Source: MSCI, Barclays, MercerInsight MPA and Acadian Asset Management LLC

In this last example shown above, we increase the allocation to low-volatility equities in both the early and late stages of a member's timeline. We minimise the drawdown risk early on as well as closer to retirement by increasing the weight to low-volatility equities. In this example, as members reach retirement their return is substantially improved and the risk of drawdown is virtually unchanged. In this scenario a DC member could spend 8% more per year over a 30-year time horizon, and expect their savings pot to last an additional nine years.

POST-RETIREMENT

Plan participants continue to face important investment decisions after retirement. It is likely that, at retirement, the nest egg created will be larger than at any point during the member's life, meaning the decision about where that money is allocated continues to be vitally important. In retirement, investors may still need to take some investment risk, otherwise returns over the medium- and longer-term are unlikely to keep up with inflation.

In the past, when the typical retirement lasted about 10 years, there wasn't a huge need for an equity allocation to remain in the portfolio during retirement. However, increasing life expectancies have resulted in longer retirement periods. In the UK, men reaching 65 years of age can now, on average, expect to live a further 19 years and women can expect to live a further 21 years. Though inflation has been low recently, its potential to diminish the real value of retirement savings grows with greater longevity.

Many of the same principles that hold during a member's working life also apply during retirement, including:

- Diversification matters. To remain invested within a range of both asset classes and underlying securities within asset classes is important.
- Avoid large drawdowns. Once in retirement, given the shorter time horizon, significant drawdowns on assets should be avoided.
- Maintain at least some exposure to the equity risk premium. Stocks may outperform bonds and cash.

Given the above, an allocation to a low-volatility product continues to make sense throughout retirement, and has the potential to improve retirement savings of DC members and allow them to enjoy a higher living standard post-retirement.

6 SUMMARY

THERE IS A PERSISTENT MISPRICING OF RISK IN EQUITY MARKETS AROUND THE WORLD WHEREBY INVESTORS ARE NOT REWARDED FOR OWNING RISKIER STOCKS THE WAY THEY ARE REWARDED FOR INVESTING IN RISKIER ASSET CLASSES.

We believe this mispricing is attributable to investor behaviour and market structure, for example investors' preferences for lottery-like stocks and the industry's bias towards cap-weighted benchmarks.

There are several ways to gain exposure to this underlying mispricing. Investors must consider the various methods of investing in low-volatility equities and ensure that certain risks, which are not always obviously apparent, have been managed prudently. Passive implementations, drawn from a limited investment universe, can result in exposures to stocks that are overpriced, highly correlated with each other, and sensitive to changes in interest rates.

A well-implemented low-volatility portfolio fits well into both DB and DC pension plans and may result in both lower total plan risk and higher expected returns. In volatile markets, a low-volatility approach offers pension plans some comfort that the worst return drawdowns may be avoided. As a result, DB pension schemes may be better able to meet liabilities, while DC plans may enjoy larger and lower-risk pension pots for members during retirement.

NOTES

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