

Managing Volatility in Target Date Funds: A Better Balance between Longevity and Market Risk

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Traditional target date funds offer a simple but comprehensive solution to the retirement problem: a diversified portfolio that reduces the allocation to riskier assets as the individual approaches the retirement date. However, target date funds may still leave investors too exposed to equity market risk. While portfolio allocations in traditional target date funds change via the pre-determined glidepath, they remain fixed to their pre-set allocations to equities which are independent from the market environment. Introducing a managed volatility approach to target date funds allow investors to better navigate the tradeoff between longevity and market risk, so that investors can pursue asset growth via equity market exposure while mitigating the potential effect of market drawdowns, especially when it matters most, as individuals approach and go through their retirement date.

Traditional Target Date Funds

As defined benefits plans continue to phase out, individuals have had to (somewhat reluctantly in most cases) take on the responsibility of solving for their lifetime financial security. This is no small endeavor. Individuals planning for retirement have to structure a portfolio that will generate enough wealth to last throughout their lives (however many years that may be) and cover the broad set of potential contingencies that may arise along the way. Constructing this portfolio requires assessing and managing multiple complex risks, most notably the risks of outliving ones savings (longevity risk) and the risk of the ones assets losing substantial value (market risk), especially when it matters the most, right before or around retirement.

Traditional target date funds offer a simple but comprehensive solution to this multi-dimensional problem: a diversified portfolio that seeks to grow wealth early on in an individual's life and becomes more conservative as retirement (the "target date") approaches. Typically this implies a larger allocation to riskier assets (equities) early in life, in order to grow wealth, meet retirement savings goals, and mitigate longevity risk. As individuals approach their retirement date, target date funds reduce the allocation to equities along a glidepath in order to reduce exposure to market risk and thus mitigate potential losses from market drawdowns.

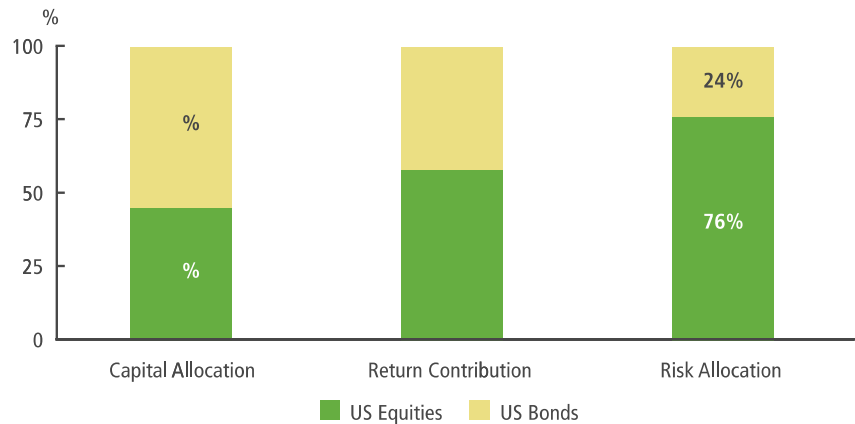
Typically at retirement (the age of 65 for the average US investor), target date funds allocate approximately 40-50% of the portfolio assets to equities. Given that, historically, equity returns have been more than double that of bonds and equity risk is more than three times bond risk, a 45% allocation to equities typically generates 58% of portfolio returns and represents 76% of portfolio risk (**Exhibit 1**).²

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² For the January 1990 to October 2018 period, the annualized returns for the S&P 500 Index were 9.6% and 5.8% for the Bloomberg Barclays US Aggregate Bond Index, while the standard deviation for the S&P 500 Index was 14.2% and 3.6% for the Bloomberg Barclays US Aggregate Bond Index.

EXHIBIT 1: THE GLIDEPATH IS NOT ENOUGH TO MITIGATE MARKET RISK
 Capital allocation, return contribution and risk allocation in a 45% US stocks and 55% US bonds portfolio, January 1990 to October 2018

A standard, fixed asset allocation schedule may offer limited protection in times of severe equity market crisis, even if the allocation to equities is lower than earlier in life.

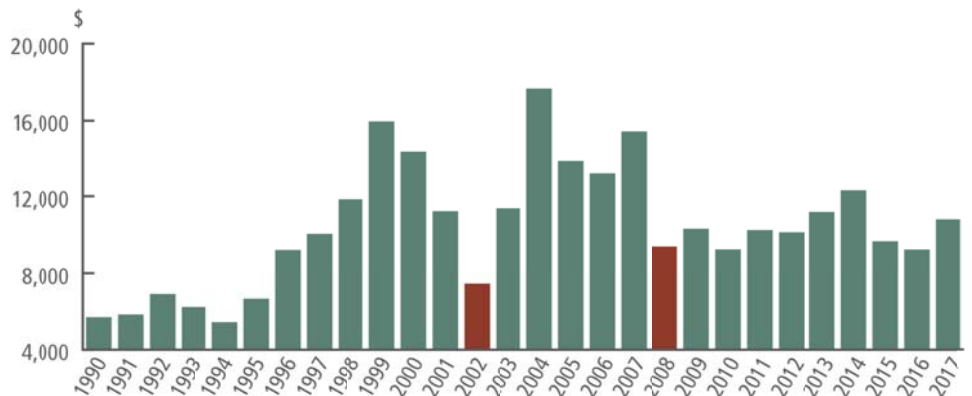


US equities are represented by the S&P 500 Index. US bonds are represented by the Bloomberg Barclays US Aggregate Bond Index.

Source: StyleAdvisor, QS Investors.

Not all individuals have the luxury of time or choosing their retirement date; individuals approaching retirement age are particularly sensitive to market risk. Market drawdowns near the retirement date have a significant impact, as there may not be enough time for the portfolio value to recover before retirement. While the glidepath does to some extent address the tradeoff between longevity and market risk, traditional target date funds leave individuals highly exposed to market risk when it matters the most. A standard, fixed asset allocation schedule may offer limited protection in times of severe equity market crisis, even if the allocation to equities is lower than earlier in life. **Exhibit 2** illustrates how dramatically different the portfolio values for two individuals starting off with \$1,000 in cash and retiring after 30 years may be. The investor retiring in 1999 accumulated almost double the capital than the investor retiring in 2002. This difference can only be attributed to luck—one investor being born three years before the other—as both individuals followed the same strategy.

EXHIBIT 2: SOME RETIREMENT DATES ARE BETTER THAN OTHERS
 Portfolio Value at Retirement by Retirement Year



Analysis assumes \$1,000 portfolio value invested in the S&P 500 30 years before retirement year.

Source: Bloomberg, QS Investors.

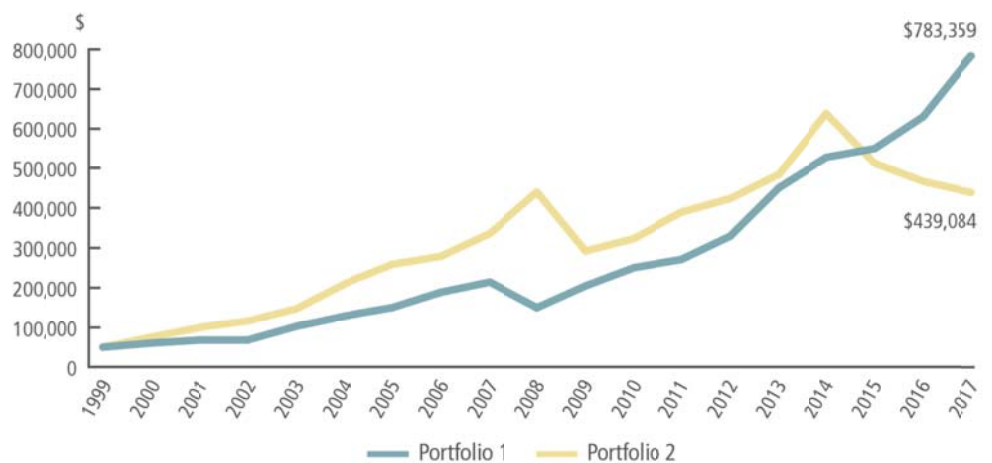
While this equity market decline was a dramatic example in financial markets history, an investor saving for retirement need only consider the possibility of experiencing another global financial crisis as retirement approaches.

This disproportionate exposure to equity risk in target date funds was amplified for individuals retiring during the 2008 Global Financial Crisis. During this period, many target date funds, even those scheduled to retire in 2010 (which had moved into their “low risk” asset allocation) still lost between 25% and 40% of their value. While the 2008 equity market decline was a dramatic example in financial markets history, an investor saving for retirement need only consider the possibility of experiencing another global financial crisis as retirement approaches. For the typical investor, this would have a devastating effect, and thus underscores the importance of managing retirement risk beyond the standard glidepath approach. Individuals experiencing such market risk may have to either delay retirement age, make higher catch-up contributions (if possible) or embrace a significantly lower standard of living than what they had anticipated. The problem is magnified post-retirement as individuals leave the workforce and a regular paycheck, and simultaneously begin withdrawing capital from their retirement account, thus reducing the base for recovery. This phenomenon is typically referred to as the sequence of returns risk.

Exhibit 3 illustrates the impact of sequence of returns risk on portfolio outcomes. That is, how two portfolios with the same initial value have a completely different outcome if experiencing the same returns but in reverse order.

EXHIBIT 3: SEQUENCE OF RETURNS RISK

Illustrative example



Analysis assumes an initial portfolio of \$50,000 starting value with an annual contribution of \$15,000. Portfolio 1 is the hypothetical portfolio value based off actual returns to the S&P 500 Index. Portfolio 2 is the hypothetical portfolio value based off reverse S&P 500 Index returns.

Source: Bloomberg, QS Investors.

The main issue is that while portfolio allocations in traditional target date funds change via the pre-determined glidepath, these are independent from the market environment, and remain fixed to their pre-set allocation to equities, regardless of the level of market risk. An allocation to equities that is more responsive to potential drawdowns may offer a better solution to the tradeoff between longevity and market risk.

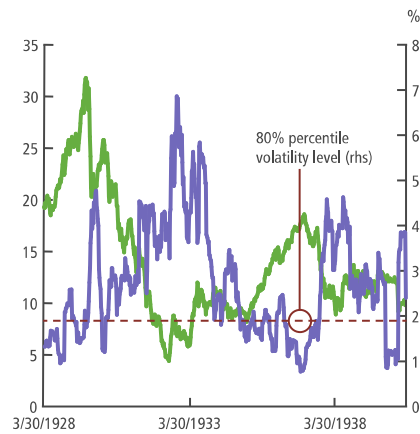
Managing Portfolio Volatility

Volatility and returns are closely intertwined. In fact, there is a significant correlation between rising volatility and declining stock market returns. This relationship is abundantly clear when looking at historically significant periods of equity market distress. In each of the four instances below (**Exhibit 4**), we focus on a well-known period of equity market decline and chart the rolling annualized volatility or risk-level of the US equity market at the same time. The US equity market's long-term median annual volatility is 12.8% and its 80th percentile level is 19.5%. In each instance below, when stock market volatility reaches this threshold, a clear and persistent downward trend in stock market value has been established.

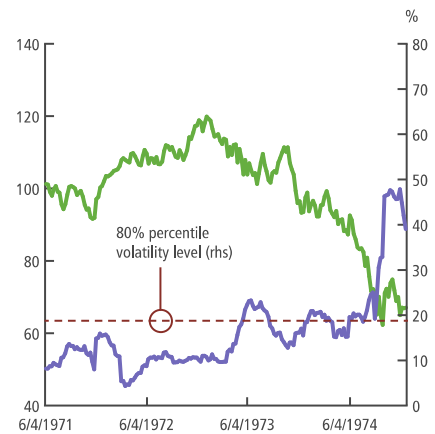
EXHIBIT 4: RISING VOLATILITY AND DECLINING STOCK MARKET RETURNS Performance and Volatility of US Equities During Selected Periods of Market Distress

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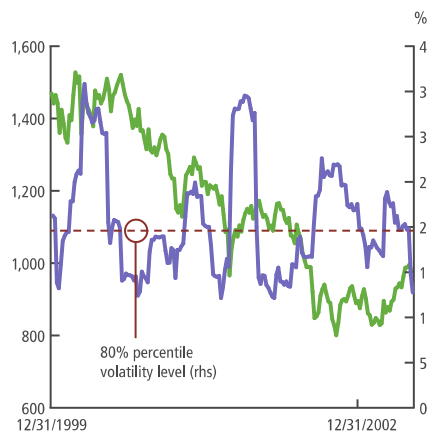
1929 STOCK MARKET CRASH



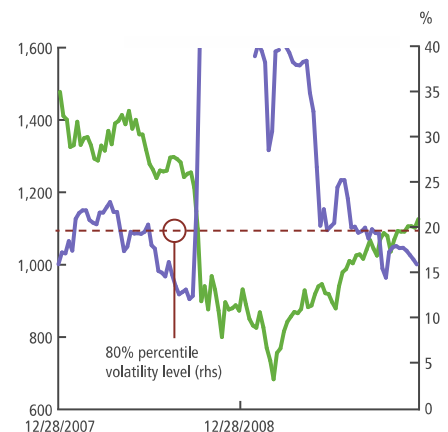
1973 OIL EMBARGO



2000 DOT COM CRISIS



2008 GLOBAL FINANCIAL CRISIS



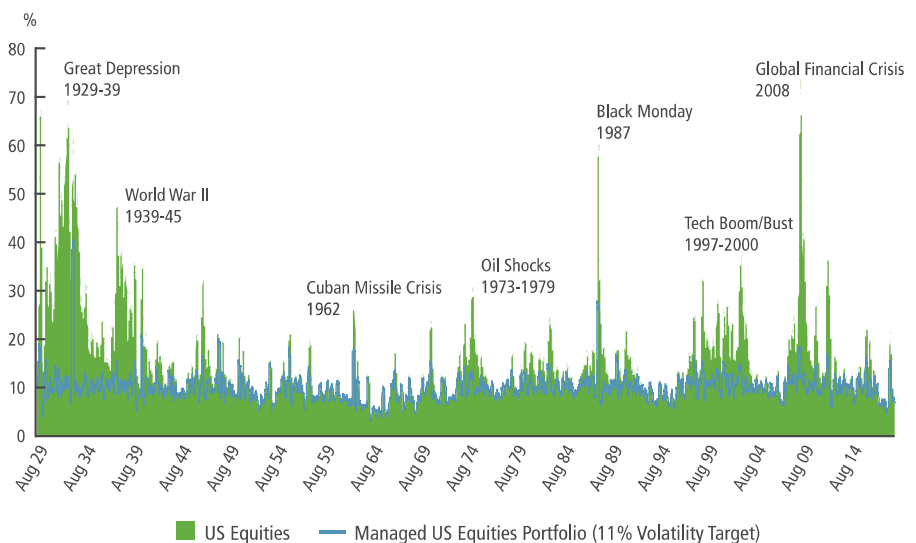
— US Equities Level — US Equities Realized Volatility

Source: Bloomberg, QS Investors.

The most immediate application of the ability to forecast risk is to stabilize realized portfolio volatility when the potential for a significant market decline is detected.

Furthermore, while past returns do not predict future returns, there is a vast body of research demonstrating that past volatility largely predicts future near-term volatility.^{3 4} The most immediate application of the ability to forecast risk is to stabilize realized portfolio volatility when the potential for a significant market decline is detected. Managed volatility strategies seek to capture broad equity market returns, as defined by the market-cap based indices, with significantly lower absolute volatility level. To this end, managed volatility strategies dynamically adjust exposure to equities in order to stabilize realized portfolio volatility through time, and produce a more efficient portfolio with a more stable stream of returns, i.e., mitigating downside risk. Managed volatility strategies target a specific volatility level, which is below traditional long-only equity strategies.⁵ For example, the standard deviation of the US equity market is 18.3%; meanwhile, the standard deviation of a Managed US Equities Portfolio, with an 11% volatility target is 10.7% for the August 1929 to October 2018 period (**Exhibit 5**).^{6 7} Managed volatility strategies accomplish this in many ways, such as selling equity positions and holding cash or maintaining the equity position by shorting (selling) futures.

EXHIBIT 5: REALIZED 60-DAY TRAILING VOLATILITY, US EQUITIES AND MANAGED US EQUITIES PORTFOLIO WITH 11% VOLATILITY TARGET August 1929 – October 2018



Source: Bloomberg, QS Investors.

³ Dreyer, Anna and Hubrich, Stefan, Tail Risk Mitigation with Managed Volatility Strategies (November 10, 2017). Available at SSRN: <https://ssrn.com/abstract=3074529> or <http://dx.doi.org/10.2139/ssrn.3074529>

⁴ While past returns do not predict future returns, past volatility does predict future near term volatility. The correlation of adjacent 60-day periods is nearly zero for return and 0.55 for standard deviation of returns.

⁵ Methodology to forecast equity risk. Step 1: calculate the S&P 500 beta of the portfolio using rolling 3 year monthly returns. Step 2: use risk model (1-month half-life and 4-month window) to get the risk estimation of S&P500. Step 3: forecasted equity risk of the portfolio is then portfolio beta (step 1) * S&P 500 risk estimation (step 2). Step 4: compare forecasted equity risk of portfolio (step3) with the equity risk cap (11%) and short S&P 500 futures to bring down the risk to the cap if the risk estimation is larger than the cap.

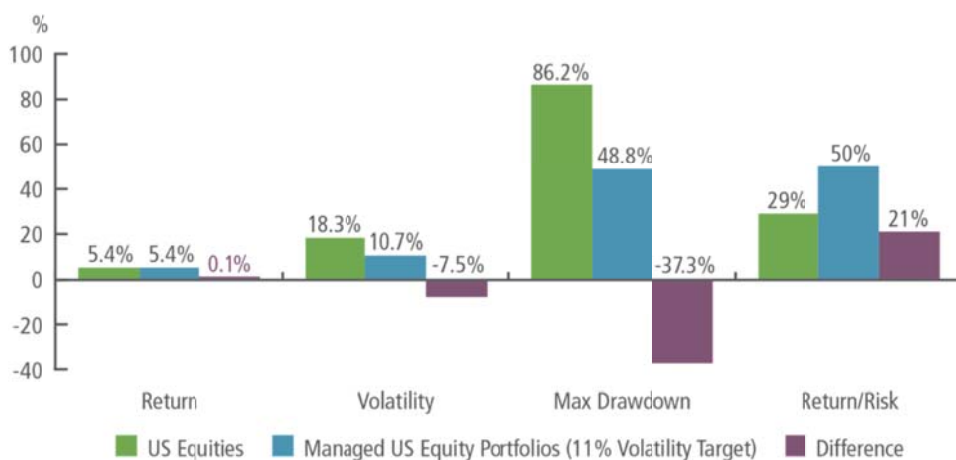
⁶ Our research shows that an 11% volatility target provides the best trade-off between return loss and volatility/drawdown reduction.

⁷ Note that the volatility level target is over a period of time, so even with volatility targeting the portfolio can and will at some point in time exceed this target.

Managing the volatility of equity exposure, as demonstrated in the analysis below, significantly enhances its risk and return profile. Reduced volatility and less downside risk are clearly important both to risk-averse investors and to all individuals who are in or near retirement or the decumulation (withdrawal) stage, when the sequence of returns can matter greatly (**Exhibit 6** and **Exhibit 7**). The managed volatility strategies limit upside capture and therefore tend to underperform the market during sharp rallies, therefore it is prudent to limit the use of this mechanism during the capital preservation stage of the investment life cycle where the risk management features it offers enhance overall outcomes.

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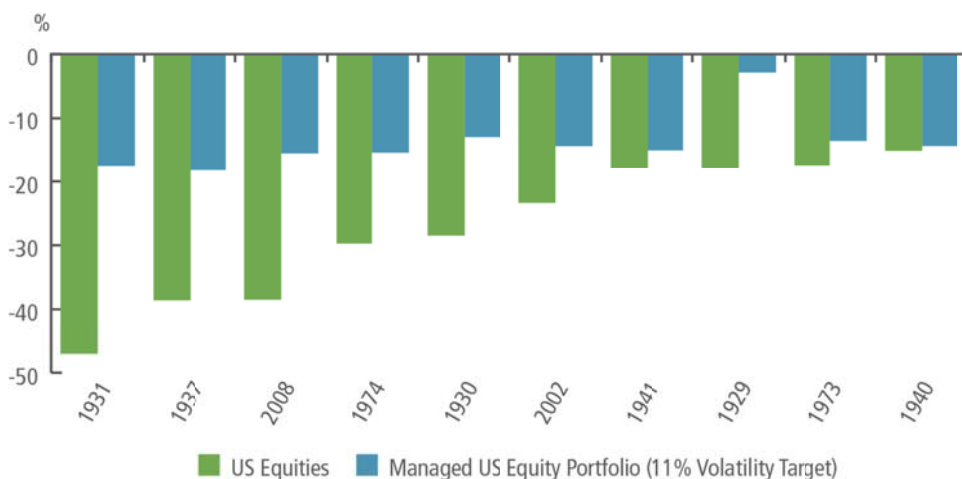
EXHIBIT 6: RETURNS AND RISK PROFILE, US EQUITIES WITH 11% VOLATILITY TARGET
August 1929 – October 2018



Source: Bloomberg, QS Investors.

Moreover, the managed volatility strategy produces robust enhancements in tail risk reduction. Reduced downside risk can also help investors prone to panicked selling, a behavioral bias (known to be detrimental to portfolio performance) which generally increases in severe bear markets.

EXHIBIT 7: RETURNS TO THE 11% VOLATILITY TARGET PORTFOLIO DURING THE 10 WORST YEARS FOR US EQUITIES, 1930 – 2017



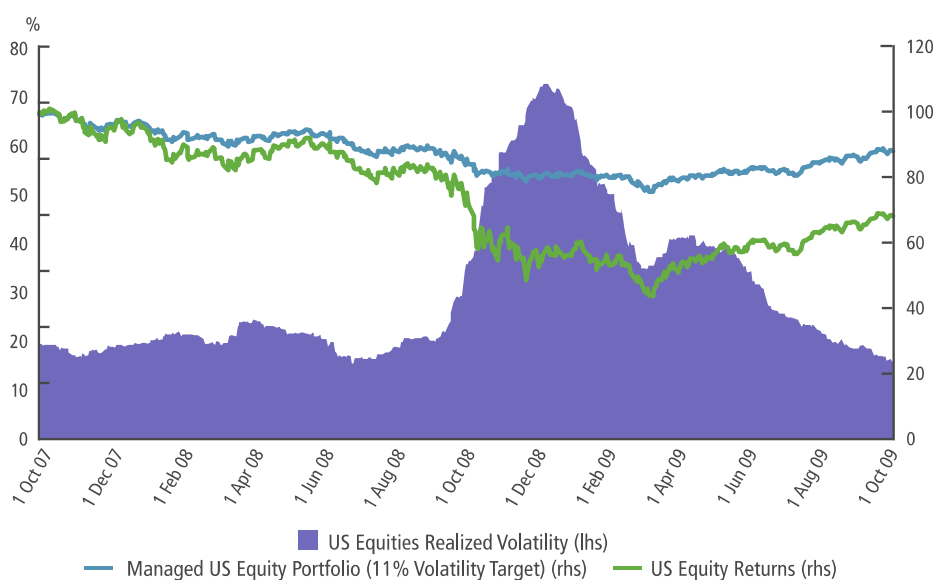
Source: Bloomberg, QS Investors.

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Managing equity volatility in the years before retirement and after retirement may mitigate market risk in target date funds by making retirement outcomes less sensitive to timing while reducing sequence of returns risk, offering a better balance between longevity and market risk than traditional target date funds. For example, the 2008 Global Financial Crisis would have had a significantly different impact on a traditional US equities allocation and the 11% managed volatility strategy. As markets became stressed in 2008, the managed volatility portfolio experienced only a small drawdown, thus mitigating the impact of the crisis (**Exhibit 8**).

In sum, managed volatility strategies allow investors to better navigate the tradeoff between longevity and market risk, so they can pursue asset growth via equity market exposure while mitigating the potential effect of market stress.

EXHIBIT 8: RETURNS TO US EQUITIES AND THE 11% VOLATILITY TARGET PORTFOLIO DURING THE GLOBAL FINANCIAL CRISIS



Source: Bloomberg, QS Investors.

In sum, managed volatility strategies allow investors to better navigate the tradeoff between longevity and market risk, so they can pursue asset growth via equity market exposure while mitigating the potential effect of market stress, especially when it matters the most. As a result, managed volatility appears to be an important addition to target date funds.

IMPORTANT INFORMATION

The strategy outlined is not currently offered and as such, no clients are invested in this strategy. It is purely hypothetical and the performance returns and other statistics were calculated by QS Investors using published data sources, which have been noted throughout this paper.

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