Scott C. Goebel
Senior Vice President
General Counsel
Fidelity Management & Research Co.
245 Summer Street V10E, Boston, MA 02210
617.563.0371 SCOTT.GOEBEL@FMR.COM

June 6, 2014

Mr. Kevin M. O'Neill
Deputy Secretary
Securities and Exchange Commission
100 F Street, NE
Washington, DC 20549-1090

Re: Investment Company Advertising: Target Date Retirement Fund Name and Marketing (File No. S7-12-10)

Dear Mr. O'Neill:

Fidelity Investments ("Fidelity")[1] appreciates the opportunity to respond to the Securities and Exchange Commission's (the "SEC" or "Commission") request for comment concerning recent recommendations made by the SEC's Investor Advisory Committee ("IAC").[2] Among other items, the IAC has recommended that the Commission develop a risk based glide path illustration for target date funds that is based on a standardized measure of fund risk.[3]

As Fidelity has stated in our previous comment letters to the SEC regarding target date fund names and marketing materials,[4] we believe that information concerning investment

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[1]Fidelity is one of the world's largest providers of financial services. The firm is a leading provider of investment management, retirement planning, portfolio guidance, brokerage, benefits outsourcing and many other financial products and services to more than 20 million individuals and institutions, as well as through 5,000 financial intermediary firms. Fidelity generally agrees with the views expressed by the Investment Company Institute (ICI) in their comment letter and submits this letter to supplement the ICI letter on specific issues.

[2]*See* Securities and Exchange Commission, *Investment Company Advertising: Target Date Retirement Fund Names and Marketing*, Investment Company Release No. 29301 (April 3, 2014) 79 FR 19564 (April 9, 2014) *available at*: http://www.gpo.gov/fdsys/pkg/FR-2014-04-09/pdf/2014-07869.pdf (the "Release").

[3]*See* Recommendation of the Investor Advisory Committee Target Date Mutual Funds (Adopted April 11, 2013) *available at*: http://www.sec.gov/spotlight/investor-advisory-committee-2012/iac-recommendation-target-date-fund.pdf ("IAC Recommendations").

[4]*See* Securities and Exchange Commission, *Investment Company Advertising: Target Date Retirement Fund Names and Marketing*, Investment Company Release No. 29301 (June 16, 2010) 75 FR 35920 (June 23, 2010) *available at*: http://www.sec.gov/rules/proposed/2010/33-9126fr.pdf , Fidelity comments *available at*: http://www.sec.gov/comments/s7-12-10/s71210-37.pdf; *see also*, Securities and Exchange Commission, *Investment Company Advertising: Target Date Retirement Fund Names and Marketing*, Investment Company Release No

products is most useful when it is provided in a format and context that is understandable and actionable by the average investor. As discussed below, we believe that a standardized measure of fund risk is inappropriate for target date funds because of the nature of these products. In addition, we believe that a glide path illustration based on a standardized measure of fund risk will not be useful to the average investor and may cause investors to select funds that may not deliver an adequate level of income in retirement. We also continue to believe that investors are better served by disclosures describing how a target date fund is intended to be managed over time, not at a single point in time or benchmarked against a single factor. In addition, we urge the Commission to continue to coordinate with the Department of Labor ("DoL") on their target date fund proposals as coordinated regulatory initiatives are critical to investor understanding of target date funds.

A standardized measure of fund risk is inappropriate for target date funds.

The IAC Recommendations describe an asset allocation glide path as an unreliable proxy for risk where the asset classes are defined broadly.[5] Instead, the IAC recommends that the Commission develop a glide path illustration for target date funds that is based on a standardized measure of fund risk as either a replacement for, or supplement to, its proposed asset allocation glide path illustration. Under the IAC's Recommendations, this risk based glide path illustration would be based on the target risk level over the life of the fund using an appropriate, standardized measure of fund risk.[6]

We believe a standardized measure of fund risk is inappropriate for target date funds, given the nature of these products. Target date funds are intended as long-term investments, during which time the fund significantly shifts investments as the age and risk tolerance profile of the investor base changes. "Risk" aversion can vary based on age (or years to or from retirement). Generally speaking, an investor's capacity for risk diminishes as the investor ages because the planning horizon shortens and withdrawals increase as a percentage of total wealth. Target date funds are intended to take investors through their work years and either to or through retirement. An asset allocation based glide path that discloses fund exposure to different asset classes at a point in time, and is accompanied by disclosure that identifies the relationship of risk to changes in the glide path, reflects this variability in risk aversion. Moreover, the accompanying narrative disclosure identifies the relationship of risk to the changing glide path. We do not believe that a risk based glide path could contemplate the variability of risk aversion over time inherent in target date funds. Accordingly, we firmly believe that an asset allocation glide path is more appropriate to illustrate the changing nature of target date funds over time and better reflects an investor's exposures to varying degrees of fund risk.

30026 (April 3, 2012) 77 FR 20749 (April 6, 2012) available at: http://www.gpo.gov/fdsys/pkg/FR-2012-04-06/pdf/2012-8348.pdf, Fidelity comments available at: http://www.sec.gov/comments/s7-12-10/s71210-76.pdf.

[5]IAC Recommendations.

[6]Id.

In addition, we believe that it would be difficult to implement a standardized measure of fund risk for target date funds because measuring "risk" for target date strategies requires a specialized analysis that does not easily lend itself to standardization. In our view, risk and reward for target date funds is closely tied to an investor's income replacement objective—having sufficient inflation-adjusted income to last from the retirement date until the end of the retirement period. As such, "reward" can be defined as success in achieving the income-replacement objective. Conversely, "risk" can be defined as those outcomes when success is not achieved, and thus there is not sufficient income to last for the entire retirement period. While a standard measure of fund risk would typically measure fund risk in terms of fund performance or exposure to certain asset classes over time, we do not believe it could measure the substantial risk that an investor may not achieve his or her income replacement goals. In fact, we are concerned that assigning a standard measure of fund risk to target date funds may discourage some investors from considering their own income replacement goals and other risk factors, such as inflation risk, liquidity risk and interest rate risk, in favor of choosing an investment that has a perceived "lower" risk.[7] As discussed below, such an investor would be exposed to the risk of the investment not producing sufficient income through the retirement period. In support of this conclusion, we are appending to this comment letter an article published by Fidelity in February 2014 titled "Target Date Evolution: Enhancements to Fidelity's Strategies", which provides a deeper analysis of investor risk behavior in the context of target date strategies.

Even if we assume that standardized fund risk metrics are appropriate, it is not clear how the proposed risk based glide path would be constructed, given the breadth of potential measures of fund risk. Although the IAC's Recommendations suggest that the glide path illustration should be based on the target risk level over the life of the fund (versus a backward looking measure of historical performance), we are concerned that the level of subjectivity required to forecast risk levels over the life of a target date fund, and the complexity of any disclosures that would need to accompany such projections, will greatly add to the difficulty of creating a standardized measure of fund risk for target date funds. If the Commission decides to pursue a specific standard risk measure, we believe the Commission will need to provide additional opportunity to comment on the proposed standardized measure of fund risk and any accompanying disclosures. Moreover, in connection with such a proposal, we urge the Commission to take into account both the inevitable temporal variations in investor risk

[7] We believe this approach would exacerbate the current retirement crisis in the United States. In a recent Fidelity survey on investor retirement readiness, Fidelity found 55% of pre-retirees in only "fair" or "poor" shape to completely cover essential expenses like housing, health care, and food in their retirement years. Specifically, 40% of survey participants reported that they are currently saving less than 6% of their salary (including employer match or other workplace savings accounts). Given expectations of early retirement, increasing longevity, and sometimes overly conservative asset mixes, we believe that many of these investors are not prepared to cover their expenses in retirement. See *Fidelity Viewpoints, "Rev up your readiness to retire"* (December 3, 2013), *available at:* https://www.fidelity.com/viewpoints/retirement/americas-retirement-readiness.

tolerance as well as the demonstrable unsuitability of the current standardized risk measure models in use in other countries.[8]

A risk based glide path would not be useful to the average investor and will likely confuse many investors.

We believe that information provided to investors is most useful if it is provided in a format and context that is understandable and actionable by the average investor. To this end, we believe that adding a standard measure of fund risk to marketing materials for target date funds will produce complex disclosures that will not be useful for the average investor and will likely confuse many investors.

There is currently no standardized measure of fund risk in the United States and we do not believe that the average U.S. investor would understand the tradeoffs among various measures that might be adopted as a standard. If a standardized measure of fund risk and the risk based glide path were included in target date fund materials, we believe that extensive disclosures would be required to familiarize investors with how such risk ratings should be used to evaluate investment options and the underlying methodology for the risk level forecast. While we share the Commission's goal of increasing investor literacy, we believe that adding a standardized measure of fund risk that is both subjective and complex in nature, along with detailed disclosures describing the metric, will not contribute to investor literacy and may increase investor confusion regarding target date funds.[9]

The nature of how target date funds are sold through retirement plans compounds the disclosure challenge. Most employer sponsored retirement plans typically offer only one target date fund series to their plan participants. As a result, unlike retail investors who may choose among several different target date fund offerings, plan participants will likely only have a single target date fund series available as a plan option. A risk based glide path illustration in retirement plan communications would not be useful to participants because it could not be used as a comparison tool among the plan's investment options. Instead, a risk based glide path illustration for a target date fund will appear in isolation versus the information provided about other plan investment options. In our view, this non-standard, non-comparable presentation will

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[8]*See e.g.,* Committee of European Securities Regulations, CESR's Guidelines on the Methodology for the Calculation of the Synthetic Risk and Reward Indicator in the Key Investor Information (July 1, 2010) *available at* http://www.esma.europa.eu/system/files/10_673.pdf (measuring volatility using weekly or monthly returns covering the previous five years and assigning a risk rating ranging from 1 to 7, according to a fund's increasing level of volatility).

[9]The findings of the online survey conducted by the Staff's consultant, Siegel & Gale LLC, regarding investor understanding of target date retirement funds and marketing materials (the "Study") validates our concern. The Study found that survey respondents who reviewed target date fund marketing materials that contained no glide path illustrations were most likely to understand that target date funds are not guaranteed. *See* Investor Testing of Target Date Retirement Fund (TDF) Comprehension and Communications, Submitted to the Commission by Siegel & Gale LLC, February 15, 2012, *available at* http://www.sec.gov/comments/s7-12-10/s71210-58.pdf.

confuse participants as to why this particular type of fund warrants a standardized measure of risk, while other plan investments do not. This inconsistent approach could lead to an incorrect conclusion that target date funds are the riskiest of the plan's investment options, which is likely not the case.

Investing in a fund based on a standard measure of risk may lead investors to select funds that do not deliver an adequate level of retirement income.

As the Commission has observed, target date fund asset allocation models and strategies differ meaningfully among competing fund complexes. One key difference in the design of target date strategies is the investment manager's view on whether a glide path should reach its most conservative allocation at a specified retirement date or at some point into retirement. This translates into a strategy that either helps investors achieve their savings goal *at* the target year of retirement ("To strategy") or *through* that point and into an investor's retirement period ("Through strategy"). Generally speaking, "To strategies" tend to maintain a lower average exposure to asset types with higher historical risk (e.g. equities) during an investor's working years and at the target retirement date. Conversely, "Through strategies" tend to maintain a higher exposure to riskier assets during the savings year, at the target retirement date, and for several years through the retirement period. As such, we would expect that target date funds managed pursuant to a "To strategy" would rate lower on a standardized risk rating that measures potential for fund volatility over the life of the fund.

Fidelity provides shareholders with a target date strategy that accumulates assets that can provide inflation-adjusted income for shareholders *through* their retirement years. Our analysis shows that "Through strategies" can provide a higher level of wealth for two key reasons. First, during the working phase, an investor in a "Through strategy" maintains a higher allocation to riskier assets, like equities, which over long time periods can have higher performance than less risky asset classes, leading to greater wealth accumulation. Second, "Through strategies" more gradually reduce their exposure to riskier assets over time, versus "To strategies", which de-risk at a faster rate in the years before retirement. Therefore, a fund with a "To strategy" could realize losses if an equity market downturn were to occur during this period, while not benefiting as much as a fund with a "Through strategy" from the subsequent market recovery. As such, we believe that funds with a "Through strategy", although they may potentially rate higher on a standardized risk rating scale at points in time, have overall a higher probability of achieving an investor's income replacement goals. In support of this conclusion, we are appending to this comment letter an article published by Fidelity in May 2014 titled "Achieving Retirement Success: Do "To" or "Through" Glide Paths Lead to Higher Wealth?", which provides an in-depth comparison of "To" versus "Through" strategies.

We are concerned that a standardized risk rating could potentially steer investors toward target date funds that may not deliver an adequate level of investment returns, and therefore fall-short of the assets needed to generate sufficient income in retirement, such as funds using a "To strategy" or other funds with a similar asset allocation model. This could happen as fiduciaries,

such as retirement plan sponsors, find it difficult to justify choosing target date funds with a higher standardized risk rating compared to other funds offered in the industry. In response, fund complexes may find themselves required to alter their asset allocation glide path to maintain risk ratings that are generally within the same range and compare favorably to the potentially lower rated target date funds that utilize a "To strategy." In our view, investors and plan sponsors should be free to evaluate any investment that uses a target date strategy to determine whether the provider offers a "To" or "Through" strategy and establish how each such strategy can assist in reaching the plan's and investor's retirement goals. Any such analysis should be based on an assessment of the investor's saving practices, withdrawal behavior and income needs compared to the assumptions incorporated into the target date fund's glide path. We believe that a standardized measure of fund risk and the accompanying risk based glide path is not well suited to address these concerns and the disclosure may encourage investors to choose investments that have a lower probability of achieving their income replacement goals.

Coordinated regulatory initiatives are critical to investor understanding of target date funds.

We appreciate that the DoL has re-opened the period for public comment on proposed regulatory amendments relating to enhanced disclosure concerning target date or similar investments in light of the IAC Recommendations.[10] We remain concerned that well intentioned regulatory efforts can result in overlapping disclosure requirements on specific products, which in turn can lead to disconnected investor warnings and advisories instead of clear, simple financial education. We urge the Commission to continue to work closely with the DoL on proposed rules to enhance target date fund disclosures. Fidelity has made the same request to the DoL on its target date fund proposals.[11] Our hope is that continued coordination between the DoL and SEC can avoid piecemeal disclosure rules and help further investor understanding of target date funds.

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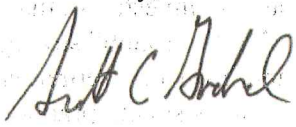
[10] *See* Department of Labor Employee Benefits Security Administration, *Target Date Disclosure*, re-opening of comment period 79 FR 31893 (June 3, 2014) *available at*: http://www.gpo.gov/fdsys/pkg/FR-2014-06-03/html/2014-12667.htm.

[11] *See* Department of Labor Employee Benefits Security Administration, *Target Date Disclosure* 75 FR 73987 (November 30, 2010) *available at*: http://webapps.dol.gov/FederalRegister/PdfDisplay.aspx?DocId=24466, Fidelity comments *available at:* http://www.dol.gov/ebsa/pdf/1210-AB38-026.pdf; *see also* Department of Labor Employee Benefits Security Administration, *Target Date Disclosure* 77 FR 30928 (May 24, 2012) *available at*: http://webapps.dol.gov/FederalRegister/HtmlDisplay.aspx?DocId=26099&AgencyId=8&DocumentType=1, Fidelity comments *available at:* http://www.dol.gov/ebsa/pdf/1210-AB38-RCP0004.pdf.

We appreciate the opportunity to comment on the Release. Fidelity would be pleased to provide any further information or respond to any questions that the Staff may have.

Sincerely,



Scott C. Goebel

cc:
The Honorable Mary Jo White, Chairman
The Honorable Luis A. Aguilar, Commissioner
The Honorable Daniel M. Gallagher, Commissioner
The Honorable Kara M. Stein, Commissioner
The Honorable Michael S. Piwowar, Commissioner

Mr. Joseph Dear, Chairman, Investor Advisory Committee
Mr. Norm Champ, Director, Division of Investment Management

Mr. Joe Canary, Director of Regulations and Interpretations, Employee Benefits Security Administration, U.S. Department of Labor

Enclosures (2)

February 2014

Target Date Evolution: Enhancements to Fidelity's Strategies

Bruce Herring, CFA
Group Chief Investment Officer

Andrew Dierdorf, CFA
Portfolio Manager

Christopher Sharpe, CFA
Portfolio Manager

Mathew R. Jensen, CFA
Director, Target Date Strategies

KEY TAKEAWAYS

- Achieving an adequate level of retirement income with a target date portfolio requires a combination of prudent savings and withdrawal behavior by investors, and prudent investment management that blends the need for capital appreciation in the savings years with income and stability in the retirement years.
- The glide path for Fidelity's target date portfolios remains focused on accumulating assets that can provide inflation-adjusted income for shareholders equal to approximately half of an investor's final preretirement salary during retirement, in keeping with assumptions of investor/participant behavior.
- Fidelity's target date portfolios are periodically refreshed to include our latest research on risk management and portfolio construction practices, demographic and retirement plan participant behavior, and our outlook for the capital markets.
- The most recent enhancements to the glide path for Fidelity's target date portfolios reflect updates to three areas of research—capital market assumptions, investor/participant behavior, and risk capacity—that inform the investment process and are used to model, evaluate, and select the most appropriate glide path for a broad population of investors.
- In constructing the glide path, our latest capital market assumptions, along with a refined risk-capacity framework focused on loss recovery and analysis of investor behavior, indicate that equity allocations should increase across most of the dated portfolios, with a proportional decrease in other asset classes, notably short-term debt.
- In general, we find that investors in our target date portfolios can meaningfully improve their probability of achieving their retirement income objectives by taking a number of steps, such as starting to save earlier in life, raising their contributions, and delaying retirement.

Since 1996, when Fidelity helped pioneer the concept of target date investing, the dynamics of the financial marketplace have changed. In the capital markets, for example, interest rates have declined to near historically low levels amid unprecedented central bank activity around the world. Meanwhile, technological innovations, combined with an increase of information about investor demographics, behavior patterns, and risk tolerances, have led to significant improvements in financial modeling capabilities within the investment management industry.

While the financial landscape is different today, the goal of Fidelity's target date strategies has remained the same: to construct a portfolio to help investors achieve retirement readiness[1] by adjusting the strategic asset allocation over time, in keeping with investors' expected retirement date. Fidelity maintains an unwavering commitment to its target date strategies, as they serve as foundational solutions to help investors achieve their retirement objectives. Over the years, this commitment has been supported by the addition of dedicated fundamental and quantitative asset-allocation research resources, regular analysis of participant behavior, and ongoing evaluation to ensure that our best thinking is being applied to the investment process.

Fidelity INVESTMENTS

The following article reveals some important enhancements to Fidelity's target date strategies. These enhancements reflect our ongoing research and modeling efforts, shifting dynamics in the marketplace, and our experience managing multi-asset-class portfolios through a range of market cycles. We view these enhancements as part of the evolutionary nature of our target date strategies, and our continuous commitment to helping improve retirement outcomes for shareholders.

Understanding the objective of Fidelity's target date strategies

The glide path (i.e., time-varying strategic asset allocation) of Fidelity's target date portfolios, a central component of the strategies, remains focused on accumulating assets that, in considering certain assumptions, seek to provide inflation-adjusted retirement income equal to approximately half the final preretirement salary of an investor. Achieving this goal requires a combination of prudent investor contribution and withdrawal behavior, and appropriate portfolio returns. In our view, the target date solution is a partnership[2] with our investors, wherein we build and manage an investment program that balances their return needs with appropriate risk management through both the savings and the retirement periods. For investors, a key determinant of success in meeting this retirement investment challenge hinges on prudent contribution and withdrawal practices (see Exhibit 1, below).

It is also important to recognize that while the target date portfolios are designed to include assets that might act as a primary source of retirement income, for many investors these assets will be combined with other complementary sources of income (e.g., Social Security, defined benefit plan benefits, and personal savings) to achieve Fidelity's overall retirement planning target of income replacement equal to 85% of final salary.[3]

The glide path is constructed to help investors achieve asset accumulation and retirement income, and is designed with a long-term orientation, balancing expected return and expected risk in an investor's time horizon. For younger investors beginning to save for retirement, the glide path is focused on capital appreciation (i.e., total return) and is constructed to generate returns that help younger investors achieve asset growth.[4] By comparison, the objective for investors who are well past their target retirement date is focused on income and capital preservation. For investors between the two extremes of the age spectrum, the glide path adjusts over time to become more conservative as an investor's time horizon to retirement becomes shorter.[5] The asset mix at each age is constructed based on Fidelity's capital market assumptions (CMAs)—both historical long-term and 20-year forward-looking—to seek returns sufficient to achieve the income-replacement goal, while maintaining a level of risk that is consistent with an investor's age, time horizon, and risk tolerance.

EXHIBIT 1: Achieving the retirement income-replacement goal of approximately half of one's preretirement salary requires prudent investment contributions and prudent withdrawal behavior by investors/participants, as well as risk-appropriate portfolio returns.

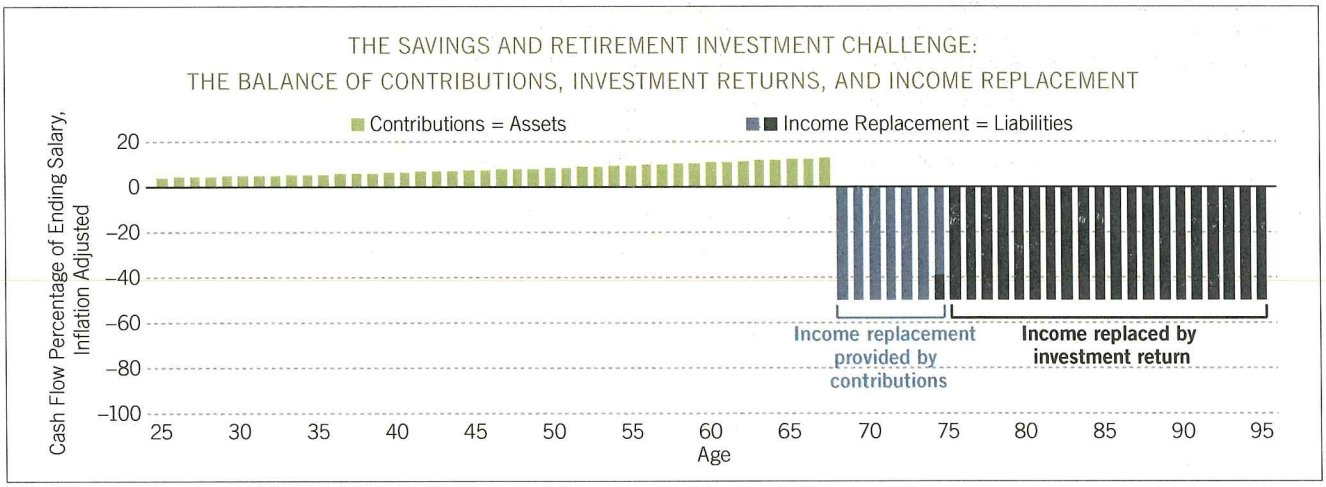


Chart is a hypothetical example based on a set of assumptions to illustrate the limits of income replacement that can be achieved through regular savings contributions alone (blue bars), and the need for an expected return on investment to achieve a desired level of income replacement over a longer retirement horizon (black bars). For the purposes of this chart, the following assumptions are presumed: investor starts contributing at age 25 through age 66, and receives annual salary increases equal to 1.5% over this period. ***Green bars*** *represent an increasing percentage of investor contributions from 8% to 13% of salary from age 25 through age 66 (includes company matching funds).* ***Blue bars*** *represent the expected income replacement provided solely by the contribution amounts, equal to approximately 50% of one's final preretirement salary through the early years of retirement.* ***Black bars*** *represent the expected income replacement needed through a target date portfolio's investment returns, equal to approximately 50% of one's final preretirement salary through age 93. A hypothetical internal rate of return (IRR) equal to approximately 4.5% in real terms is assumed (required investment return to have savings equal income replacement needs). This hypothetical illustration is not intended to predict or project the investment performance of any security or product. The IRR is a rate of return used in capital budgeting to measure and compare the profitability of investments. Past performance is no guarantee of future results. Your performance will vary, and you may have a gain or loss when you sell your shares. For many investors, these assets will be combined with other complementary sources of income (e.g., Social Security, defined benefit plan benefits, and personal savings). Source: Fidelity Investments.*

Fidelity's approach to glide-path construction combines and applies three areas of research:

- *Secular-based capital market assumptions.* The proprietary CMAs developed by our Asset Allocation Research Team (AART) incorporate a long-term historical perspective and a forward-looking perspective on expected return, risk, and correlations over a 20-year period. The CMAs influence both the risk boundary (upper limit on portfolio volatility) and, within this boundary, the asset-allocation positioning along the age spectrum.

- *Investor/participant behavior and demographics.* Through our extensive proprietary recordkeeping database, we are able to observe the characteristics and investment behavior of large populations of retirement savers, in terms of point-in-time snapshots and trends over time. These observations influence the key demographic and risk assumptions that inform the glide-path analysis.

- *A unique risk-capacity framework.* Our refined assessment of risk capacity is unique in the industry, employing a combination of quantitative loss-recovery and risk-preference analysis to develop a "risk boundary" across the age spectrum. This boundary considers both investor behavior and the market conditions experienced by investors, to manage asset longevity and stability during retirement.

This research is reviewed in detail in the following sections of the paper, with a concluding section on how this information is considered and utilized when developing Fidelity's glide path.

Key research that informs Fidelity's glide path

In our view, developing the glide path requires consideration of the following elements, which are used to model and evaluate the distribution of potential outcomes for investors: (1) capital market assumptions, (2) investor/participant behavior, and (3) risk capacity, meaning an investor's tolerance and capacity for withstanding negative returns. The investment process supporting Fidelity's target date portfolios includes multiple types of sensitivity testing[6] and scenario analysis around these assumptions, to ensure that the asset allocation and structure for the portfolios is appropriate under a range of conditions.

Capital market assumptions

Capital market assumptions provide expectations for return, risk, and correlation among asset classes over time. These expectations inform the strategic asset allocation among stocks, bonds, and short-term investments, which in turn produce the expected risk-and-return profile for portfolios at each age in the time horizon. Historically, Fidelity's modeling for its target date strategies has incorporated capital market assumptions that are consistent with the performance of asset classes over long-term periods.

Fidelity's AART has developed a time-based framework to consider capital market expectations across multiple time horizons. This framework recognizes that at any given time, asset price fluctuations are driven by a confluence of various short-term, intermediate-term, and long-term factors. For this reason, AART employs a comprehensive asset-allocation approach that analyzes underlying factors and trends across three time horizons: tactical (one to 12 months), business cycle (six months to five years), and secular (five to 30 years).

In developing the strategic asset allocation for Fidelity's target date strategies, the secular forecasts for capital market assumptions are an important consideration. AART's current secular capital market assumptions are based specifically on a 20-year time horizon, which strikes an appropriate balance that limits the impact of temporary cyclical fluctuations and the need to frequently adjust the glide path, while remaining grounded in current market fundamentals to reflect the risk-and-return conditions expected for investors today. Overall, the secular 20-year time horizon was chosen because we believe it is (1) flexible enough to capture shifts in the economic and market landscape and appropriately position the glide path for today's investors, and (2) stable enough to be aligned with the long-term nature of the glide path and target date objective.

Rather than relying on historical averages, AART's research-based approach is underpinned by fundamental analysis of the core drivers and the principal linkages between economic trends and the performance of various asset classes across all geographies. This approach emphasizes what history tells us about the drivers of asset returns to generate fundamentally dynamic and forward-looking expectations.

Findings from AART's current secular capital markets assumptions include:

- *Lower expected returns.* AART estimates that returns for the primary asset classes (U.S. equities, non-U.S. equities, investment-grade debt, and short-term debt) will be somewhat lower over the next 20 years than their long-term historical averages. This result stems from an expectation that returns for investment-grade debt will be diminished by starting from a position of low yields in the current market environment. AART expects that global equity returns will be modestly lower but roughly in line with historical results.

- *Lower volatility in foreign developed-country equity markets.* In foreign developed-country markets, AART expects lower equity market volatility relative to the group's historical average volatility, and a slightly lower correlation of equities to investment-grade debt.

In general, for a portfolio diversified across the major asset classes, our view is that returns should still be able to outpace inflation. Given the expectation for more muted gains from bonds and cash, a higher allocation to equities will be important in pursuing long-term return objectives. The lower expected volatility

of foreign developed-country equities and lower correlation with other asset classes allow for a greater allocation to equities, while maintaining a reasonable level of risk. Bonds and cash may still have much lower absolute volatility than equities, and the low correlations of their returns with equity performance will likely continue to make them key asset classes to help manage downside risk (i.e., risk of loss) within a diversified portfolio.

Investor/retirement plan participant behavior

Assumptions about participant behavior are what set the expectations for a retirement investor's role, responsibility, and behavior in achieving the income-replacement objective for a target date strategy. These assumptions include elements such as an investor's start date, contribution rate, retirement date, and retirement planning horizon (see Exhibit 2, below). For Fidelity's target date portfolios, these assumptions evolve over time, based on an assessment of investor behavior today, as well as expected trends in demographics.

Fidelity's recordkeeping database provides insight into actual investor experience, which helps to inform the assumptions for the target date strategies. As of December 31, 2012, our database includes information for approximately 19,000 workplace plans and 12 million workplace participants.[7] To obtain our assumptions, we evaluated cross-sectional analysis and cross-time analysis for millions of participants by age groups, asset levels, and other population groupings, to understand the behavior and trends of retirement savers. We balanced actual observations and directional observations, with an eye toward encouraging "ideal" behaviors for today's savers (Exhibit 2). Our analysis also considers sensitivity testing for each of the baseline assumptions.

In general, today we find that:

EXHIBIT 2: The glide path for Fidelity's target date strategies is informed by assumptions about the behavior of participants in defined contribution retirement plans from Fidelity's recordkeeping data. This glide path also considers sensitivity testing to evaluate a range around each assumption.

Retirement Investor/Plan Participant Behavior Assumptions	
Assumption	**Baseline Assumption**
Starting age	Age 25
Retirement age	65 to 67
Contribution rate	Total 8%–13%
Retirement planning horizon	Through age 93
Annual salary increase (merit rate)	1.5%

Assumptions are informed by analysis of participant behavior in defined contribution retirement plans affiliated with Fidelity Investments, as well as other data sources. Contribution rate: "8% to 13%" indicates that the deferral rate grows from 8% to 13% over the accumulation period, and includes company matching funds. Annual salary increase (merit rate): reflects a real (inflation-adjusted) growth rate. See endnote #6 for definition of sensitivity testing.

- *Investors are increasingly starting to save for retirement in their 20s.* There is a rapidly growing participation rate overall among younger investors. Specifically, Fidelity participant experience shows a 60% participation rate today for investors in the 25–29 age group.[8]

- *Investors are increasingly delaying retirement.* We have observed a shifting pattern among participants toward staying in the workforce longer, and are beginning to reflect this in our thinking with respect to our target date portfolios. In addition, government policy on Social Security benefits has changed over the years, extending the age eligibility for receiving full benefits to age 67 for those born in or after 1960.[9] Reflecting this trend, we have analyzed glide-path outcomes across a range of retirement age assumptions (which today includes the early 60s to late 60s), recognizing that participants have a range of retirement age expectations. We expect that retirement ages will increase over time, and continue to monitor this trend.

- *Investors have not meaningfully changed their savings (deferral) behavior.* Regardless of the dynamic economic/market conditions over time, a greater reliance on defined contribution versus defined benefit savings for retirement, and widespread education to encourage greater savings, we found the present range of deferral rates to be 8% for younger savers to 13% for older savers, combining individual and "company match" deferrals.

Overall, the trends in earlier and greater savings at the initial stages of the glide path, combined with expectations for additional years of employment, improve the probability of achieving inflation-adjusted income equal to approximately half the final preretirement salary of an investor. At the same time, the continued low contribution rates make the achievement of retirement success a significant challenge. *(Note: The impact that the changes to these inputs have on retirement success are reviewed later in this paper.)*

Risk-capacity framework

The development of the strategic asset allocation for our target date strategies is also informed by research that assesses an investor's ability and tolerance for withstanding portfolio volatility or losses. By accounting for the capacity for risk taking of investors at each age, this framework establishes a "risk boundary" that provides additional protection against the risk of extreme market events causing a failure to meet long-term objectives.

While it is difficult to measure risk tolerance precisely, the modeling for Fidelity's target date strategies is informed by several types of data and analysis:

Reported and actual risk behavior

To evaluate investors' capacity for risk taking, we considered both reported and actual behavior. Reported behavior includes responses

by investors who provided information to Fidelity regarding their levels of risk tolerance. This information offers insight into what investors articulate as their perceived tolerance for portfolio volatility, risk, and losses. These data serve as a reference point for consideration when establishing the strategic asset allocation in the glide path.

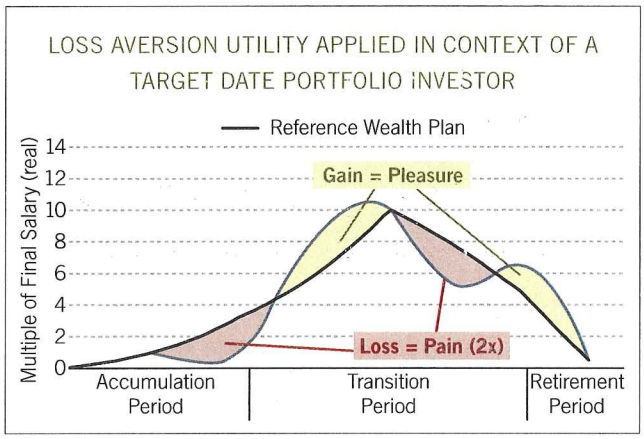
When evaluating actual investor behavior, Fidelity's recordkeeping data provide transparency into realized investor experiences by offering insight into whether the risk tolerance initially expressed by investors is consistent with the actual behavior that emerges over time. In reviewing the actual data from Fidelity's defined contribution recordkeeping platform, there is strong evidence to suggest that investors who were saving for retirement in strategies such as target date funds behaved in a disciplined, prudent manner by maintaining their contribution levels and positions during periods of market stress. For example, our recordkeeping data show that these participants did not meaningfully adjust their contribution rates during recent periods of market stress.[10] This research, along with other analysis, suggests that investors in target date strategies have a reasonable level of risk tolerance during the accumulation period,[11] and do not react emotionally by liquidating their positions during temporary periods of market volatility or losses.

Quantitative empirical risk framework

Because a target date strategy is designed to be a long-term holding that spans accumulation and distribution, it is important to consider the economic and behavioral impacts for how investors may react in times of market stress and adverse short-term outcomes. While our analysis on reported and actual behavior provides insight into the short-term risk tolerance of investors, a risk-capacity framework should also consider the impact on portfolio outcomes and behavior over time. Therefore, to evaluate investor risk capacity over longer time periods, we have refined our quantitative framework for analysis. Our refined assessment of risk capacity defines a "risk boundary" across the age spectrum, based on considerations of investor behavior and the market conditions experienced by investors, emphasizing historical periods of market stress (see *Leadership Series* paper "Target Date Evolution: How Risk-Capacity Analysis Differentiates Fidelity's Glide Path.")

The *behavioral elements of our quantitative framework* are based on the groundbreaking work on loss aversion done by behavioral economics pioneers Amos Tversky and Daniel Kahneman. Their work, which has been validated by others in separate studies, suggests that individuals feel the pain of a loss twice as acutely as they enjoy the pleasure from an equivalent gain.[12] In the context of target date investing, this result has both intuitive and quantitative appeal. When an investor's portfolio falls short of the level of assets needed to supply adequate income in retirement, the consequences can be significant, particularly during periods of market stress. Because this experience is painful both economically and behaviorally, these outcomes should ideally be avoided *more* than favorable outcomes in which the portfolio exceeds the target level of assets.

EXHIBIT 3: A quantitative value is assigned to the pain a target date fund investor experiences when an actual portfolio value falls below the wealth reference plan (expected portfolio value based on given assumptions) due to market declines. The value of this shortfall is twice as significant as the value of the pleasure that an investor experiences with an equivalent gain.

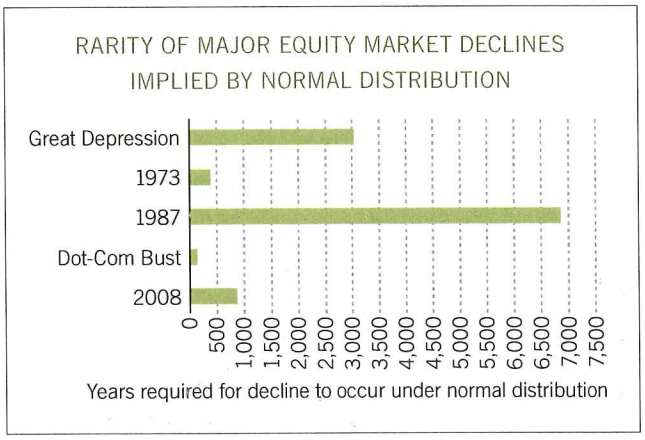


For illustrative purposes only. Based on "Prospect Theory" research of D. Kahneman and A. Tversky. Accumulation Period: Early working life. Retirement Period: Late retirement years. Transition Period: Years between Accumulation period and Retirement Period. Source: Fidelity Investments.

Applying this concept specifically to a target date portfolio, any time the wealth represented by the portfolio's value falls below its expected path—for instance, during a stock-market decline—the deviation from this wealth reference plan[13] is considered to be "more painful" to investors than the comparable wealth that may be generated from a stock market gain (see Exhibit 3, above). As a result, we can define a utility function—the satisfaction from meeting the stated investment objectives (or the dissatisfaction from failing to do so)—by considering these loss aversion assumptions, in order to develop quantitative measures of risk tolerance at each stage of the time horizon.

The *investment elements of our quantitative framework* focus on the outcomes that investors would have experienced during historical periods of significant market stress. Our framework is designed to capture an investor's experience and sensitivity to losses, both at the time of a market decline and in subsequent periods. Historically, severe market environments have occurred much more frequently than traditional quantitative models would expect. While quantitative models often assume that investment returns follow a normal, or bell-shaped, distribution, the actual frequency during which markets have produced extreme returns has been much higher (see Exhibit 4, page 6). In fact, we find that if returns were normally distributed, annualized declines greater than 30% would occur once every 60 years, with other extreme events occurring even less frequently. As Exhibit 4 shows, these types of unexpected events have occurred far more frequently in real-world experience. Therefore, as a baseline

EXHIBIT 4: Quantitative modeling techniques often underestimate the frequency of major U.S. equity market declines.



Years required for event to occur is calculated as 1/(probability of a bigger decline than the given event) where the probability is calculated based on normally distributed real equity returns (random walk with drift) with annualized mean of 7.4% and annualized standard deviation of 17.6%. Source: Fidelity Investments.

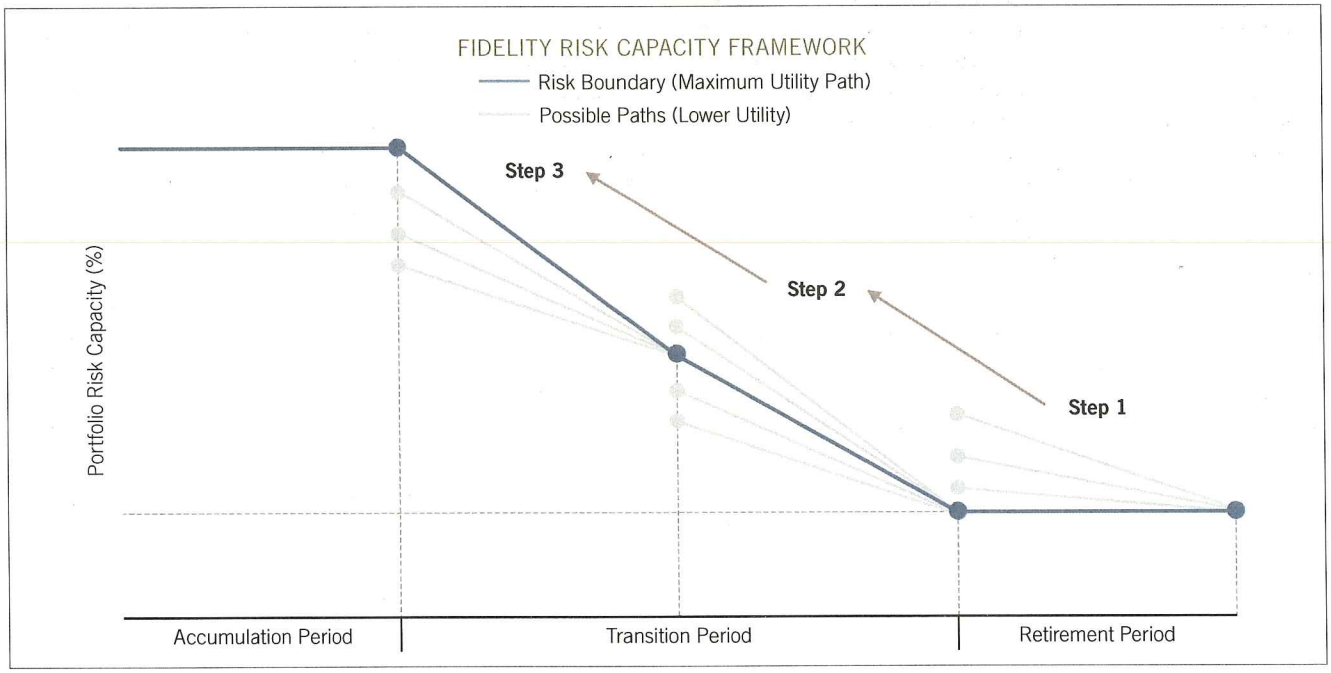
for our analysis, we have evaluated results using actual market performance from the 20 worst periods for U.S. equity returns during the past 100 years.[14]

Our quantitative framework for evaluating risk capacity combines these aforementioned behavioral and investment market elements by considering the investor experience during each of these 20 periods. For investors at various ages, we evaluate what the portfolio balance, expected cash flows, and experience would have been during a defined time horizon, using a wide range of potential asset-allocation strategies over the horizon. For each investor, we calculate the utility at the end of each year by comparing whether the portfolio's value is above or below its expected level. The overall utility, or satisfaction, for the investor's experience can be calculated by aggregating the utility values over the entire period.

For each hypothetical investor, we identify and select the asset-allocation path that maximizes the investor's average utility over all the historical periods. This asset-allocation path sets a maximum level of risk capacity, or risk boundary, that focuses on protecting the portfolio and the outcome for each investor during periods of market stress.

For example, at age 84 and the start of the retirement period, an investor has a remaining planning horizon of 10 years (see Exhibit 5, Step 1, below). Following a quantitative process known as backward induction (i.e., determining the asset allocation for investors at younger ages by using the asset allocation for investors at older ages as an end point), we evaluate a range of possible allocation paths that invest in different combinations

EXHIBIT 5: The risk-capacity framework identifies the limit on risk (i.e., portfolio volatility) for each age by selecting the allocation paths for investors of different ages that achieve the most favorable outcomes during historical periods of equity market declines.



Source: Illustrative example of how Fidelity uses the backward induction process to identify the asset allocation path with a risk-capacity limit at each age that seeks to achieve the most favorable outcome during historical periods of equity market stress. Accumulation Period: early working life; Retirement Period: late retirement years; Transition Period: years between Accumulation Period and Retirement Period. Source: Fidelity Investments.

of stocks, bonds, and short-term assets over time, finishing at a conservative portfolio allocation (i.e., 20% equities, with 4% expected volatility—standard deviation) at the assumed end of age 93. For each allocation path, the investor's utility values are calculated and evaluated, based on what the experience would have been during the 20 historical periods. We then select the allocation path that maximizes the average utility over all the periods. The risk capacity of an 84-year-old is low due to the investor's short time horizon, which results in selecting a path that maintains a conservative allocation over this entire period. For this investor, the risk-capacity framework provides a guideline that recognizes the short time horizon and protects the investor from significant market declines when losses would be most harmful.

The same process is applied for investors of different starting ages and time horizons. At the beginning of retirement, an investor has a reasonably long time horizon for planning and is starting to withdraw assets from the portfolio. For this investor, the risk-capacity framework provides an upper boundary that is consistent with a balanced portfolio that gradually becomes more conservative as the time horizon shortens. By comparison, a younger investor has a longer time horizon and continues to make contributions to the portfolio. The results of our analysis illustrate that younger investors have greater risk capacity and more time to recover from periods of market stress.

Exhibit 5 is an illustrative diagram that shows how the application of this framework at various ages leads to a guideline for risk capacity at each age in the time horizon. The capacity for risk diminishes as an investor ages, because the planning horizon shortens and withdrawals increase as a percentage of total wealth. It is important to note that this diagram is simplified to convey the process of how the risk boundary is constructed through backward induction. We evaluate the risk boundary for multiple interval age assumptions to understand the nature of the way risk capacity changes with adjustments in time horizons.

Constructing the Fidelity glide path

The analysis that supports the glide path for Fidelity's target date strategies utilizes the capital market assumptions, investor/participant behavior assumptions, and risk-capacity methodology as research components that inform the decision-making process. The analysis framework used to develop the glide path begins by focusing on the allocations for each of the end points. These two portfolios—the **accumulation portfolio**, which is focused on capital appreciation, and the **retirement portfolio**, which seeks a balance among total return, high current income (yield), and capital preservation—are developed to achieve distinct goals at opposite ends of the risk spectrum and investor time horizon. These portfolios serve as anchors for the asset allocation in the most aggressive target date portfolio (for younger investors) and the most conservative target date portfolio (for older investors).

Accumulation portfolio. The asset allocation for the accumulation portfolio focuses on capital appreciation as the primary objective. The accumulation portfolio is designed to produce high expected total return, while maintaining diversification across asset classes. Based on Fidelity's long-term capital market assumptions, combined with stochastic and empirical modeling, the strategic allocation for the accumulation portfolio includes 90% in equities and 10% in investment-grade bonds, with a long-term expected volatility of approximately 14%. This strategic allocation is expected to provide a level of risk and return that is consistent with the capital appreciation objective for investors who have a long time horizon to retirement.

Retirement portfolio. The asset allocation for the retirement portfolio focuses on seeking a balance among total return, high current income (yield), and capital preservation. Because the objectives for the retirement portfolio are more nuanced, several types of analyses are evaluated. For example, allocations that maximize total return may also expose an investor to the greatest downside risk in times of market stress, so it is necessary to evaluate the outcomes through multiple lenses.

The strategic allocation for the retirement portfolio includes 20% equities, 40% bonds, and 40% short-term investments, with a long-term expected volatility of approximately 4%. This allocation is expected to balance the objectives of the most conservative portfolio for investors who are well past the target date, providing the potential for total return, limited declines, and current income.

Applying risk capacity in the glide-path design

The analysis that supports the glide path for Fidelity's target date strategies utilizes Fidelity's capital market assumptions,[+] investor/participant behavior assumptions,[15] and risk-capacity methodology as research components that inform the decision-making process.

The outcome of this control process is an age-based asset allocation strategy that seeks to balance the need for total return and the need to limit the pain an investor experiences in the event of a market decline, all with respect to a wealth reference plan. Further, our risk-capacity analysis considered the results of sensitivity testing[16] for each of the baseline assumptions. The expected long-term volatilities of the portfolios associated with Fidelity's target date strategy provide a risk boundary along the age spectrum.

The risk boundary acts as an upper boundary on the long-term portfolio risk (measured as standard deviation) for investors at each age. In this framework, the asset allocation for the retirement portfolio[17] serves as an anchor point for an investor at the end of the planning horizon (age 93). The backward induction process is applied at multiple ages and for multiple time horizons, with the accumulation portfolio[18] providing a limit on the most aggressive allocation for younger investors (beginning at age 25). The allocation points are then linked across the different ages in the transition period to create one continuous allocation path. This asset allocation path defines the risk boundary at each age for the glide path (see Exhibit 6, below). While a more aggressive glide path may increase the likelihood for achieving successful out-

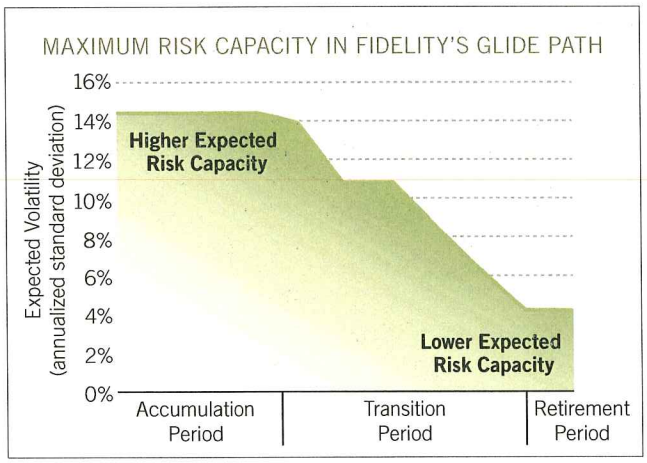
comes, the risk boundary helps to provide protection for investors at each age during periods of market stress. As a consequence of this consideration, the slope of Fidelity's risk boundary—the targeted level of portfolio volatility—becomes more gradual during the decade prior to an assumed retirement date (Exhibit 6).

Asset-liability model analysis: Testing a universe of glide paths and applying secular capital market assumptions

The final stage of the investment process applies asset-liability modeling to evaluate potential investor outcomes in the context of the overall income-replacement objective. Ideally, an investor's portfolio would have precisely enough assets to generate payments equal to the desired income-replacement level, or liability, during the planning horizon. In practice, variability in participant behavior, combined with the uncertainty and volatility of markets, creates a distribution of potential outcomes that investors may experience. Asset-liability analysis uses quantitative modeling techniques to create a distribution of outcomes that can be evaluated. From this analysis, a glide path is selected that strikes a balance between providing a high likelihood for successful outcomes while reducing the shortfall risk that would occur if success were not achieved.

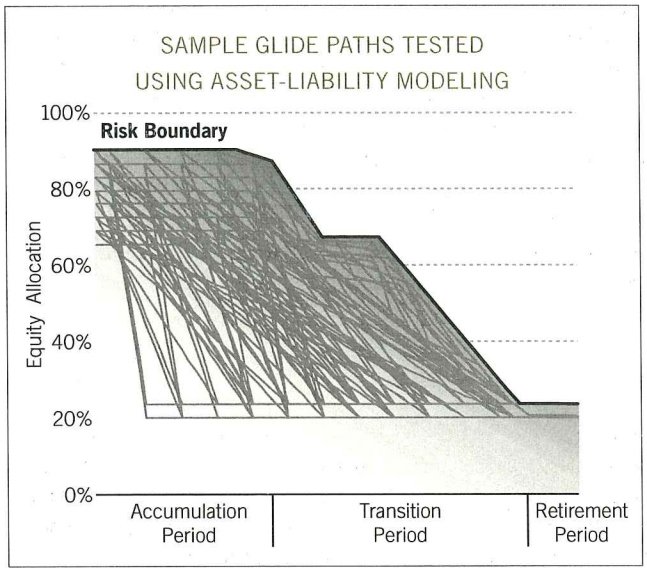
By combining the results of our risk boundary analysis and the application of the secular CMAs, a universe of glide paths can be evaluated in an asset-liability framework. The risk boundary from the quantitative empirical risk framework provides an upper boundary for the level of risk that is appropriate for investors at each age in the time horizon. Glide paths are then considered with portfolios that include varying levels of expected risk, based on Fidelity's secular capital market assumptions, that are less than or equal to the risk boundary at each age (see Exhibit 7, above).

EXHIBIT 6: The risk-capacity* analysis establishes a targeted level of portfolio volatility at each age in the life cycle.



Based on Fidelity's assumptions previously stated in this article. Expected portfolio volatility (risk capacity) is calculated using the equity rolldown that produces a high level of utility over the 20 market decline events in combination with the long-term capital market assumptions for asset return volatilities. Standard deviation: A statistical measure of spread or variability; the root mean square (RMS) deviation of the values from their arithmetic mean. Accumulation Period: Early working life. Retirement Period: Late retirement years. Transition Period: Years between Accumulation Period and Retirement Period. Source: Fidelity Investments.

EXHIBIT 7: Using asset-liability modeling based on a set of given assumptions, glide paths are evaluated with varying levels of risk that are less than or equal to the risk boundary at each age.

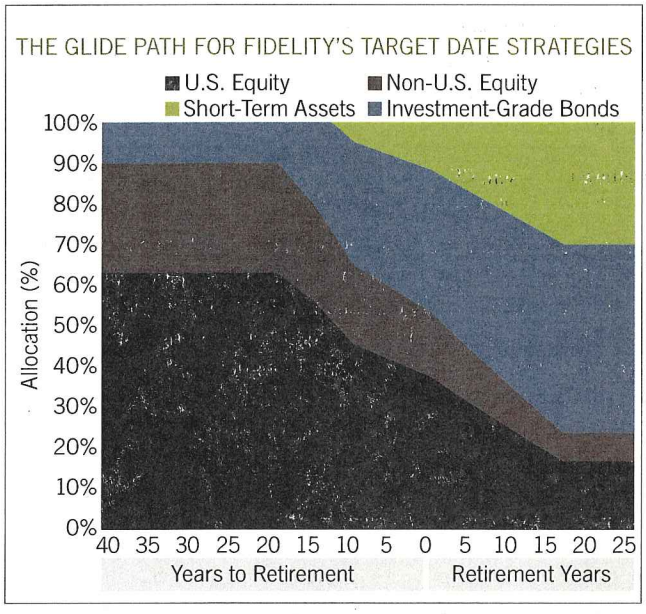


Light gray lines shown in chart are illustrative representations of many sample glide paths tested. Source: Fidelity Investments.

In combination with the demographic assumptions for investor behavior, the allocation paths produce a range of outcomes that can be evaluated to highlight the trade-offs in having a more aggressive or conservative asset-allocation approach over time. When assessing potential outcomes in a target date strategy, it is important to evaluate reward and risk relative to the income- replacement goal for investors. While the risk-and-return results for traditional mutual funds are often measured against standard market benchmarks (e.g., S&P 500 Index for equity strategies, Barclays U.S. Aggregate Bond Index for bond strategies), the asset-liability objective of a target date strategy requires a different type of measurement to evaluate risk and reward relative to a retirement liability.

In the context of the target date strategies, "reward" can be defined as success in achieving the income-replacement objective—having sufficient inflation-adjusted income to last from the retirement date until the end of the planning horizon. Fidelity's target date portfolios strive to achieve successful outcomes in a high proportion of scenarios. "Risk" can be defined as those outcomes when success is not achieved, and there is not sufficient income to last for the entire planning horizon. For measurement purposes, outcomes can be created using simulation techniques, with risk focused on the bottom 10% of scenarios. "Shortfall" can be defined as the number of

EXHIBIT 8: The outcome of Fidelity's investment process produces a glide path for Fidelity's target date strategies that can help investors achieve their retirement objectives.



See endnote 19 for additional information regarding asset allocation. Source: Fidelity Investments.

years in the planning period for which there is insufficient income. Fidelity's target date portfolios strive to achieve successful outcomes, while limiting average shortfall in the worst-case scenarios.

Our review of results from the asset-liability analysis shows that glide paths with higher equity allocations at each point in time produce a higher probability of success and lower shortfall risk relative to the results for more conservative strategies. These glide paths are preferred because of the interrelationship of investor behavior and capital market assumptions. Because current levels of investor contributions (8% to 13%) alone are not sufficient to provide inflation-protected income through the planning period, investment returns are needed over time. When evaluating potential glide paths, strategies with higher equity exposure are preferred to provide this return, in part because Fidelity's secular capital market assumptions are favorable for equities, relative to the lower expectations for fixed income and short-term asset classes. While a more aggressive glide path may increase the likelihood for achieving successful outcomes, the risk boundary helps to provide protection for investors at each age during periods of market stress.

Output: Fidelity's enhanced glide path

Through a combination of quantitative and qualitative judgment, Fidelity's glide path establishes a long-term strategic asset allocation that balances return and risk at each point in the time horizon, while striving to achieve the income-replacement objective, assuming appropriate investor behavior. Establishing a risk-capacity framework and applying Fidelity's secular CMAs in the asset-liability model for Fidelity's target date strategies produces a glide path that we believe strikes an appropriate balance for achieving a reasonable probability of success, limiting shortfall risk, and reflecting investor risk capacity over time (see Exhibit 8, left).

After applying our secular capital market assumptions, the strategic asset allocation for investors with a long time horizon to retirement remains 90% equities and 10% investment-grade bonds (accumulation period). This allocation remains consistent until investors reach their middle 40s, at which point the allocation to equities is gradually reduced (transition period). The allocation to equities continues to be reduced until age 84, at which point the portfolio allocation becomes static (retirement period). At that time, the strategic allocation, which again reflects the application of our CMAs, includes 24% in equities, 46% in bonds, and 30% in short-term assets. This allocation maintains a similar level of portfolio volatility as the risk boundary (which uses longer-term capital market assumptions), while reflecting our favorable return expectations for equities and bonds relative to short-term assets.

Final thoughts: Retirement readiness is a partnership

Retirement investors should recognize that achieving adequate income replacement throughout retirement requires a combination of investor contributions and portfolio returns. In the absence of consistent and adequate investor contributions, there is a low likelihood that an individual will have sufficient assets at retirement, regardless of the asset-allocation strategy that is implemented. According to Fidelity's analysis, investors looking to boost their probability of success have options that can be implemented. Specifically, making only modest adjustments to the following participant behaviors are some of the ways to increase the likelihood of achieving a successful outcome:

- *Increase the contribution rate*
- *Start saving/contributing earlier*
- *Delay retirement age*
- *Lower the expected income-replacement level*

Meanwhile, Fidelity continues to focus on the investment aspects of the retirement readiness partnership, and we continually evaluate opportunities to improve outcomes for investors. We believe the recent enhancements to our investment process offer shareholders of our target date strategies an investment solution that can adapt to the current market dynamics through an innovative framework (i.e., secular CMAs and investor-behavior analysis). These enhancements are part of an evolutionary process designed to help investors achieve successful retirement outcomes.

Authors

Bruce Herring, CFA
Group Chief Investment Officer

Bruce Herring is group chief investment officer of the Global Asset Allocation (GAA) division at Fidelity Investments. Mr. Herring maintains the overall responsibility for GAA's portfolio management capabilities. His responsibilities include establishing and refining investment strategies and processes; collaborating across the company to draw on capabilities in equity, bond, and money markets; overseeing open architecture solutions; and partnering with the GAA team to deliver a robust product roadmap.

Christopher Sharpe, CFA
Portfolio Manager

Christopher Sharpe is a portfolio manager for Fidelity Investments. Mr. Sharpe currently co-manages several multi-asset-class portfolios, including target date strategies. He joined Fidelity in 2002.

Andrew Dierdorf, CFA
Portfolio Manager

Andrew Dierdorf is a portfolio manager for Fidelity Investments. Mr. Dierdorf currently co-manages several multi-asset-class portfolios, including target date strategies. He joined Fidelity in 2004.

Mathew R. Jensen, CFA
Director, Target Date Strategies

Mathew Jensen is the director of target date strategies in the Global Asset Allocation (GAA) division of Fidelity Investments. Mr. Jensen leads investment strategy execution and product design and innovation across the company's target date offerings, and directs target date investment research and thought leadership.

Fidelity Thought Leadership Vice President and Associate Editor Kevin Lavelle provided editorial direction for this article.

Other contributors to this article include: Lisa Emsbo-Mattingly, Director of Research, Asset Allocation Research Team; Dirk Hofschire, CFA, Senior Vice President, Asset Allocation Research Team; Emil Iantchev, Research Analyst, Asset Allocation Research Team; Michael Tassinari, CFA, Vice President, Investment Capability Management; and Justin Ferguson, Director, Investment Capability Management.

Views expressed are as of the date indicated, based on the information available at that time, and may change based on market and other conditions. Unless otherwise noted, the opinions provided are those of the authors and not necessarily those of Fidelity Investments or its affiliates. Fidelity does not assume any duty to update any of the information.

Past performance is no guarantee of future results.

Neither asset allocation nor diversification ensures a profit or guarantees against a loss.

Investment decisions should be based on an individual's own goals, time horizon, and tolerance for risk.

Target date portfolios are designed for investors expecting to retire around the year indicated in each portfolio's name. Each portfolio is managed to gradually become more conservative over time as it approaches its target date. The investment risk of each target date portfolio changes over time as the portfolio's asset allocation changes. The portfolios are subject to the volatility of the financial markets, including that of equity and fixed income investments in the U.S. and abroad, and may be subject to risks associated with investing in high-yield, small-cap, commodity-linked, and foreign securities. Principal invested is not guaranteed at any time, including at or after the portfolios' target dates.

Target date portfolios are designed to help achieve the retirement objectives of a large percentage of individuals, but the stated objectives may not be entirely applicable to all investors due to varying individual circumstances, including retirement savings plan contribution limitations.

+ Capital market assumptions are "forward-looking statements," which are based upon certain assumptions of future events. Actual events are difficult to predict and may differ from those assumed. There can be no assurance that forward-looking statements will materialize or that actual returns or results will not be materially different than those presented.

Endnotes

[1] Retirement readiness: See "Rev Up Your Readiness to Retire," *Fidelity Viewpoints* article (Dec. 3, 2013), Fidelity.com/viewpoints/personal-finance/americas-retirement-readiness.

[2] Partnership: This term is used in general terms to describe the collaboration needed between an investor (savings contributions) and an investment manager (portfolio returns) to achieve a desired retirement income replacement objective. The use of this term in no way denotes or implies a contractual legal arrangement or agreement between two parties as joint principals.

[3] The 85% replacement rate is for a hypothetical average employee and may not factor in all anticipated future living expenses or needs, such as long-term care costs. An individual's actual replacement ratio may vary from this income-replacement rate, as each individual's experience and circumstances are different.

[4] The analysis framework used to develop Fidelity's glide path begins by focusing on the allocations for each of the end points. These two portfolios—the accumulation portfolio, which is focused on capital appreciation, and the retirement portfolio, which seeks a balance among total return, high current income (yield), and capital preservation—are developed to achieve distinct goals at opposite ends of the risk spectrum and investor time horizon. The portfolios serve as anchors for the glide path allocation in the most aggressive target date portfolio (for younger investors) and the most conservative target date portfolio (for older investors). Accumulation portfolio: Based on Fidelity's long-term capital market assumptions, combined with stochastic and empirical modeling, the strategic allocation for the accumulation portfolio includes 90% in equities and 10% in investment-grade bonds, with a long-term expected volatility of approximately 14% (expressed via standard deviation). Retirement portfolio: The strategic allocation for the retirement portfolio includes 20% equities, 40% bonds, and 40% short-term investments, with a long-term expected volatility of approximately 4% (expressed

via standard deviation). The expected volatility of these portfolios was determined based on the long-term historical volatility of three asset categories: equities, investment-grade bonds, and money market securities.

[5] See endnote #4.

[6] Sensitivity testing, or sensitivity analysis, in this context refers to evaluating outputs of a quantitative risk model by changing various assumptions (age, planning horizon, etc.) to understand the sensitivity of outcomes relative to changes in the assumptions.

[7] Data in this presentation exclude tax-exempt plans, nonqualified plans, and the FMRCo. plan. This analysis includes data from the Fidelity Advisor 401(k) Program. All data as of Dec. 31, 2012.

[8] Data based on eligible employees in Fidelity defined contribution plans (ex-tax exempt market) with nondiscrimination testing as of Dec. 31, 2012. Source: Fidelity Investments.

[9] Source: Social Security Administration, http://www.ssa.gov/pressoffice/IncRetAge.html.

[10] Source: Fidelity report, "Q1 2010 401(k) Trends," May 2010.

[11] See endnote #4.

[12] Kahneman, D., A. Tversky. "Prospect Theory: An Analysis of Decision under Risk." *Econometrica*, 47.2 (Mar. 1979): pp. 263–292.

[13] Wealth reference plan: The level or balance of expected assets at any point in the glide path based on the adherence to given assumptions.

[14] The 20 worst U.S. equity market declines referenced in the article are based on monthly data for the S&P 500 Index with Global Financial Data (GFD) extension until 1927, and the CRSP NYSE Value-Weighted Index thereafter. The 20-worst declines are represented by the following dates, starting with the first month of the downturn period: Oct. 1902, Oct. 1906, Nov. 1912, Dec. 1916, Sep. 1929, Sep. 1932, Mar. 1937, Oct. 1939, Jun. 1946, Aug. 1956, Jan. 1962, Feb. 1966, Dec. 1968, Jan. 1973, Jan. 1977, Dec. 1980, Sep. 1987, Jun. 1990, Sep. 2000, Nov. 2007.

[15] The glide path goal of Fidelity's target date strategies is based on a set of assumptions regarding an investor's total savings rate, retirement savings start date, planning horizon, and annual salary increase, among others.

[16] See endnote #6.

[17] See endnote #4.

[18] See endnote #4.

[19] Investors should allocate assets based on individual risk tolerance, investment time horizon, and personal financial situation. A particular asset allocation may be achieved by using different allocations in different accounts or by using the same allocation across multiple accounts. The glide path is not intended as a benchmark for individual investors; rather, it is a range of equity, bond, and short-term debt allocations that may be appropriate for many investors saving for retirement, based on an assumed retirement age of 65, as well as a range of expected retirement ages at or near 65. Investors should consider whether they anticipate retiring significantly earlier or later than age 65, and should select an allocation that best meets their individual circumstances and investment goals.

Reference

Tversky, A., D. Kahneman. "Advances in Prospect Theory: Cumulative Representation of Uncertainty." *Journal of Risk and Uncertainty* 5.4 (1992): pp. 297-323.

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The S&P 500 Index is a market capitalization–weighted index of 500 common stocks chosen for market size, liquidity, and industry group representation to represent U.S. equity performance. S&P 500 is a registered service mark of Standard & Poor's Financial Services LLC. It is not possible to invest directly in an index. The S&P 500 (Total Return) Index is based on Global Financial Data (GFD) calculations of total returns before 1971. These are estimates by GFD to calculate the values of the S&P Composite before 1971 and are not official values. For data from 1800 to 1870, the U.S. Stock Market Index Composite calculated by GFD is used for the price portion of the index. Because no direct information is available concerning dividends prior to 1871, Fidelity assumed that the dividend yield was equal to 1% more than the yield on the long-term bond, because our research showed that stocks had a 1% equity premium over long-term bonds over the course of the nineteenth century. Beginning in 1871, data are available for stock dividends for the S&P Composite from the Cowles Commission and from S&P itself. Fidelity used this data to calculate total returns for the S&P Composite using the S&P Composite Price Index and dividend yields through 1970, official monthly numbers from 1971 to 1987, and official daily data from 1988 on.

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May 2014

Achieving Retirement Success: Do "To" or "Through" Glide Paths Lead to Higher Wealth?

Emil Iantchev, PhD
Research Analyst

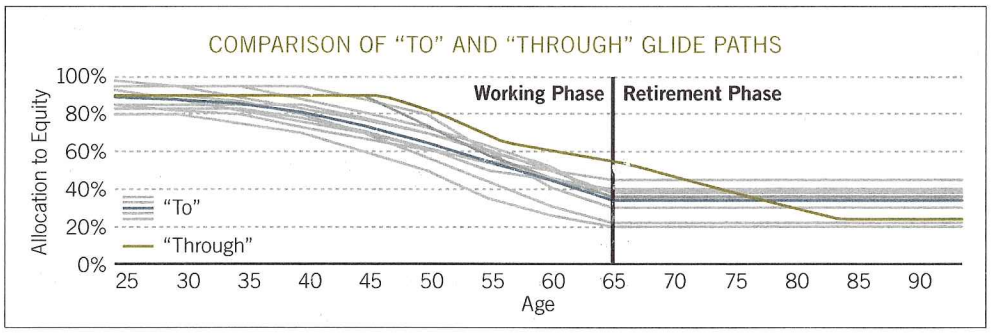
Andrew Dierdorf, CFA
Portfolio Manager

Mathew R. Jensen, CFA
Director, Target Date Strategies

KEY TAKEAWAYS

- The design of a target date strategy is often determined by an investment manager's fundamental belief as to whether a glide path should reach its most conservative allocation at a specified retirement date ("To" strategy) or at some point well into retirement ("Through" strategy).
- Our analysis shows that the wealth accumulated by a hypothetical investor at an assumed retirement age of 65 for a Through glide path was greater than the wealth for a To glide path in 90% of simulated macroeconomic scenarios (and in all but one of the actual historical scenarios), while the wealth advantage of a To glide path was modest in the other scenarios.
- Only during the most severe equity market downturns—on the order of the Great Depression—or when an investor began participating in a target date strategy very close to the expected retirement date and subsequently experienced a major equity market decline, did To glide paths perform better than Through glide paths at the retirement date.
- Neither the To nor the Through glide path provided a conclusively better hedge for annuity prices—a common support for To glide paths with their typically higher bond allocations.
- In general, whether retirees fully liquidate their target date holding around retirement or later—and what they do with the proceeds—is not relevant to the To versus Through decision.
- Any significant changes to the assumptions used in this analysis that either decrease the income replacement need or notably increase the assets available for retirement, such as increasing the lifetime contribution rate to 20% or more, were shown to reduce but not eliminate the relative advantage Through glide paths had in terms of successfully replacing income throughout retirement.

EXHIBIT 1: "To" glide paths of target date strategies reach their most conservative asset allocation at the retirement start date, while "Through" glide paths typically maintain a higher allocation to equities well into retirement.



Assumes retirement age is 65. "To" composite (in blue) is an asset-weighted average of glide paths from ACO, BlackRock, ING, JPMorgan, Manning & Napier, MFS, PIMCO, Russell, State Farm, and Wells Fargo (grey). "Through" glide path is the actual glide path for Fidelity's strategies. Source of "To" glide paths and total assets: Morningstar Target-Date Fund Series Report, Jun. 30, 2013.

Fidelity INVESTMENTS

One of the most hotly debated retirement topics among investors, investment managers, and the institutional marketplace is whether changes in the asset allocation of a target date strategy as it approaches the nominal target year (i.e., the glide path) should be constructed to help investors achieve a savings goal *at* the target year of retirement or *through* that point and well into an investor's retirement period. In simple terms, a target date strategy can thus be classified as either a "To" or a "Through" strategy.

Generally speaking, target date strategies constructed as To strategies tend to maintain a lower average exposure to asset types with higher historical risk (e.g., equities) during an investor's working phase years and at the target retirement date. Conversely, Through strategies tend to maintain a higher exposure to riskier assets during the savings years, at the target retirement date, and for several years through the retirement period (see Exhibit 1, page 1).

In the next article of an ongoing Fidelity series on target date investing, we provide a comparative analysis of both To and Through glide paths,[1] using a variety of historical economic scenarios and equity market events to help determine the potential influence of each strategy on investors' accumulation and preservation of wealth, particularly during the years around retirement—a traditional evaluation period for To glide paths.

Assessing the impact of To versus Through strategies under various market environments

Target date strategies are designed as a comprehensive retirement product in which investors start saving during their working years and follow the asset allocation of the glide path through their life cycles. A target date strategy therefore must balance the competing goals of wealth accumulation and downside protection during periods of market volatility, while at the same time reflecting an investor's changing time horizon.

Some proponents of To glide paths have argued that most target date investors withdraw their assets from the target date strategy shortly after retirement. In this case, the period between the initial investment and the target date is the effective investment horizon, and the strategy should focus on preserving wealth by reaching its most conservative allocation at the target date. In addition, they use risk measures, such as equity allocation at the target date or wealth-weighted glide path volatility[2], to quantify risk properties of To glide paths at and around this date.

In our view, such measures of glide path risk are incomplete and inappropriate, particularly near the target date, because: (1) they ignore the crucial differences in wealth levels potentially accumulated under the different glide paths, and (2) they fail to take into account the rapid de-risking—or steeper "slope"—that To glide paths require a few years ahead of the target date (see "Understanding the slope of a glide path," page 3). In other words, proponents of To glide paths typically make an assumption that To and Through glide paths generate the same asset values leading into retirement. This is highly unlikely given the different asset allocation profiles of typical To and Through glide paths. Thus, rather than looking first at short-term volatility at retirement to assess the risk profiles of To and Through glide paths, we instead start with the wealth distributions near the target date implied by each strategy during normal times and during periods of severe equity market stress, to establish just how different their wealth levels can be.

To evaluate the potential wealth accumulation of To and Through glide paths, we used a quantitative simulation method informed by the historical returns for U.S. equity and U.S. bonds in all of the following hypothetical scenarios,[3] as well as the actual history of asset

Demographic and investor behavior assumptions

Two keys to our analysis of To and Through target date strategies are the demographic assumptions regarding investor savings/withdrawal behavior, and the income replacement objective. For this article, we adopted certain assumptions, including the contribution rate and starting age (see Exhibit 2, below) that are similar to those used for the glide path of Fidelity's target date strategies, because our research and extensive retirement participant data analysis suggest these assumptions are representative of a broad group of retirement savers today (see *Leadership Series* paper, "Target Date Evolution: Investor Data and Analysis Differentiate Fidelity's Strategies," Feb. 2014). The volume and breadth of data on the practices and behavioral patterns of retirement investors are important factors in developing a target date strategy suitable for a broad base of individuals. Later in this article, we will demonstrate how changes to these key assumptions can influence the quantitative magnitudes of the results.

EXHIBIT 2: For the various assessments, our analysis reflects some investor behavior assumptions.

Retirement Investor Behavior Assumptions	
Type of Assumption	**Assumption used for analysis**
Starting age	25
Contribution rate (monthly)	Total: 8% increasing linearly to 13%
Retirement age	65
Annual salary increase (merit rate)	1.5%
Withdrawal rate (monthly)	50% of final salary (real)

Assumptions are informed by analysis of participant behavior in defined contribution retirement plans affiliated with Fidelity Investments, as well as other data sources. Contribution rate: "8% to 13%" indicates that the deferral rate grows from 8% to 13% over the accumulation period, and includes company matching funds. Annual salary increase (merit rate): reflects a real (inflation-adjusted) growth rate. Withdrawal rate reflects monthly withdrawals at an annual rate of 50% of final salary (real).

returns during and after each of the 20 largest U.S. equity market declines since 1900. Our analysis used the equity allocation in the glide path for Fidelity's target date strategies as representative of a Through approach.[4,5] For To glide paths, we used a representative allocation[6] constructed as an asset-weighted average of a variety of glide paths from self-described To target date providers. For consistency and ease of comparison, in all of the following assessments two asset classes—U.S. equity and U.S. investment-grade bonds—were used,[7] as well as the same set of assumptions about investor behavior, including: 8% contributions at age 25 increasing linearly to 13% at age 65 (retirement), 1.5% annual real salary increase, and monthly withdrawals equal to an annual rate of 50% of real final salary starting at age 65 (Exhibit 2). *[Note: In conducting our analysis, we used historical index performance to represent both U.S. equity and U.S. investment-grade bond returns. While indexes can provide insight on how asset classes have performed during historical market cycles, they do not take into account key factors such as fund expenses or portfolio manager investment decisions, and should not be considered representative of how a fund has, or will, perform.]*

The wealth buffer: Asset accumulation and stability over an extended investment horizon during various macroeconomic environments and equity market declines

Given the different allocations to equity during the working phase, it is unlikely that investors who use a Through glide path will have the same wealth level late in the working phase as investors in the To glide path. With the historically larger average equity exposure over secular horizons in a Through glide path, investors typically would have accumulated a "wealth buffer"—which is defined as the value of accumulated assets above a base assumption—in this case above those accumulated with a To glide path. This wealth buffer can provide a meaningful cushion to the impact of equity market declines around retirement. But how large and reliable is this wealth buffer? And does it offer sufficient protection if a severe equity market downturn were to occur during the years around the target date? The following two assessments provide empirical answers to these questions.

***Assessment 1:* How effective can To and Through glide paths be at accumulating wealth throughout various economic environments?**

Scenario. In this assessment, we assumed an investment or withdrawal (depending on age) of identical amounts in the Through and To glide paths starting at age 25, with withdrawals beginning at age 65. One way to quantify the difference in wealth accumulation is to consider consecutive 40-year accumulation periods using historical U.S. equity and bond returns; we evaluated market data from 1900 to 2013 to reflect a variety of economic environments. Using this approach, the accumulated wealth at retirement would have been lower with the To composite glide path than with the Through glide path in all but one instance (the years from 1902 to 1941) of the 75 accumulation periods. In fact, the difference between the two glide paths in median wealth at retirement, a measure of the typical wealth buffer, was equal to 1.5 years of one's final preretirement salary in favor of a Through glide path.

A potential criticism of the above approach is that it uses overlapping periods—in fact, there are less than three non-overlapping working phases during this analysis period. The results can thus be potentially biased against the To glide path. To address this criticism, we developed a bootstrap simulation procedure[8] that uses historical data to generate thousands of non-overlapping working phase periods (see "Understanding the Fidelity bootstrap simulation method," page 4).

Results. The simulation results are summarized in Exhibit 3, page 4. In 90% of simulated macroeconomic environments, the accumulated wealth at the target date (age 65) was higher with the Through glide path than with the To glide path. Moreover, in the severe environments where the To glide path fared relatively better, its advantage at the retirement date was small, on the order

Understanding the slope of a glide path

Glide path slope refers to the year-over-year change in the equity allocation specified in the strategic yearly asset allocation. For a target date fund, this means that mechanically the fund is reducing its equity allocation on a periodic basis, typically measured in years, by selling equities and buying another asset class, typically bonds, as the fund's investment horizon declines. A steeper slope means that the equity allocation is declining by larger amounts over a measured period. A glide path that has a steep slope is said to be "de-risking" faster than one with a more gradual slope, though it also risks locking in significant losses if a large equity market decline were to occur during the steep segments of the glide path. Balancing these two dynamics when developing the glide path is a key element of glide path design.

Because of the shorter time horizon over which To glide paths are constructed, there is less flexibility in achieving the balance of these dynamics. Due to their static asset allocation in retirement, To glide paths must make a compromise. If the equity allocation is reduced from an initially high level very gradually, the glide path may have too much equity in late retirement, thus exposing investors with short horizons to undesirably high levels of risk. On the other hand, if investors seek a level of protection in late retirement, the static asset allocation in retirement requires To glide paths to have steep slopes during the working phase, exposing investors to the risk of locking in losses during the late working phase. Through glide paths, by their nature, do not have to make this compromise.

Understanding the Fidelity bootstrap simulation method

"Bootstrapping" is a statistical method for creating a very large number of possible scenarios from a finite sample set of observations while preserving the statistical properties of the underlying empirical distribution. We classified each year from 1900 to 2013 into one of four macroeconomic states, depending on how current real GDP growth and inflation compare with their secular trends (e.g., high/low growth and high/low inflation). We used this history of macroeconomic states to estimate a transition matrix that at each point in time provides the probability of transitioning to each of the four states over the next year, given the macroeconomic state in the current year. We then used the transition matrix to simulate 100,000 asset return time series of 40 years in length. For a given time series, the asset returns over a year associated with a macroeconomic state are randomly drawn with replacement from the historical asset return distribution for that macroeconomic state. Within a time series, the state of the economy transitions from year to year according to the empirical transition matrix. In this way, the simulation uses the underlying structure of the U.S. economy to generate a large number of non-overlapping 40-year periods that have historically plausible asset return distributions.

of 0.1 years of an investor's final preretirement salary. On the other hand, in the normal to favorable macroeconomic environments, Through's advantage at the target date ranged from 1.4 to more than 11.1 years of an investor's final salary.

As importantly, this result suggests that what investors do with their money post retirement is not relevant to the "To/Through" debate. Regardless of the decision that investors make on the deployment of assets, with this analysis a Through glide path: (1) resulted in more wealth at retirement than with the To glide path in 90% of macroeconomic environments; and (2) had a wealth buffer of at least 1.4 years of final salary relative to the To glide path in 50% of macroeconomic scenarios.

If investors are solely concerned with wealth accumulation at retirement, a manager may consider increasing the equity allocation (and portfolio risk) above the Through glide path in seeking to further improve outcomes. A glide path, however, should be built to achieve an appropriate balance between the potential for wealth accumulation and downside protection during extreme equity market events, recognizing the terminal horizon for individual investors (see *Leadership Series* paper, "Target Date Evolution: How Risk-Capacity Analysis Differentiates Fidelity's Glide Path," Feb. 2014). In this view, the To glide path sacrifices too much wealth accumulation potential because it may not consider the full risk capacity—in part represented by their 20-year or more time horizons—of investors with typical levels of loss aversion at retirement. By comparison, a strategy that is overly aggressive may improve wealth accumulation results, but may expose investors to levels of loss that could exceed their behavioral and economic capacity for risk-taking. In the next assessment, we analyze the trade-off between wealth accumulation and downside protection.

EXHIBIT 3: The wealth at age 65 for Fidelity's Through strategy was greater than the wealth for a To strategy in 90% of simulated macroeconomic environments, and Through amassed a wealth buffer at age 65 of 1.4 years of final salary in the typical (median) macroeconomic environment.

Distribution (Percentiles) of Simulated Real Wealth (Multiples of Final Salary) in Various Economic Environments						
Macro environment*		Severe	Poor	Median	Good	Great
Age		5%	25%	50%	75%	95%
55	To	2	3.4	5	7.6	14.1
	Through	1.9	3.4	5.5	8.8	17.9
60	To	2.7	4.6	6.9	10.6	20.4
	Through	2.6	4.8	7.7	12.7	27.2
65	To	3.6	6.1	9.2	14.3	27.7
	Through	3.5	6.5	10.6	17.8	38.8

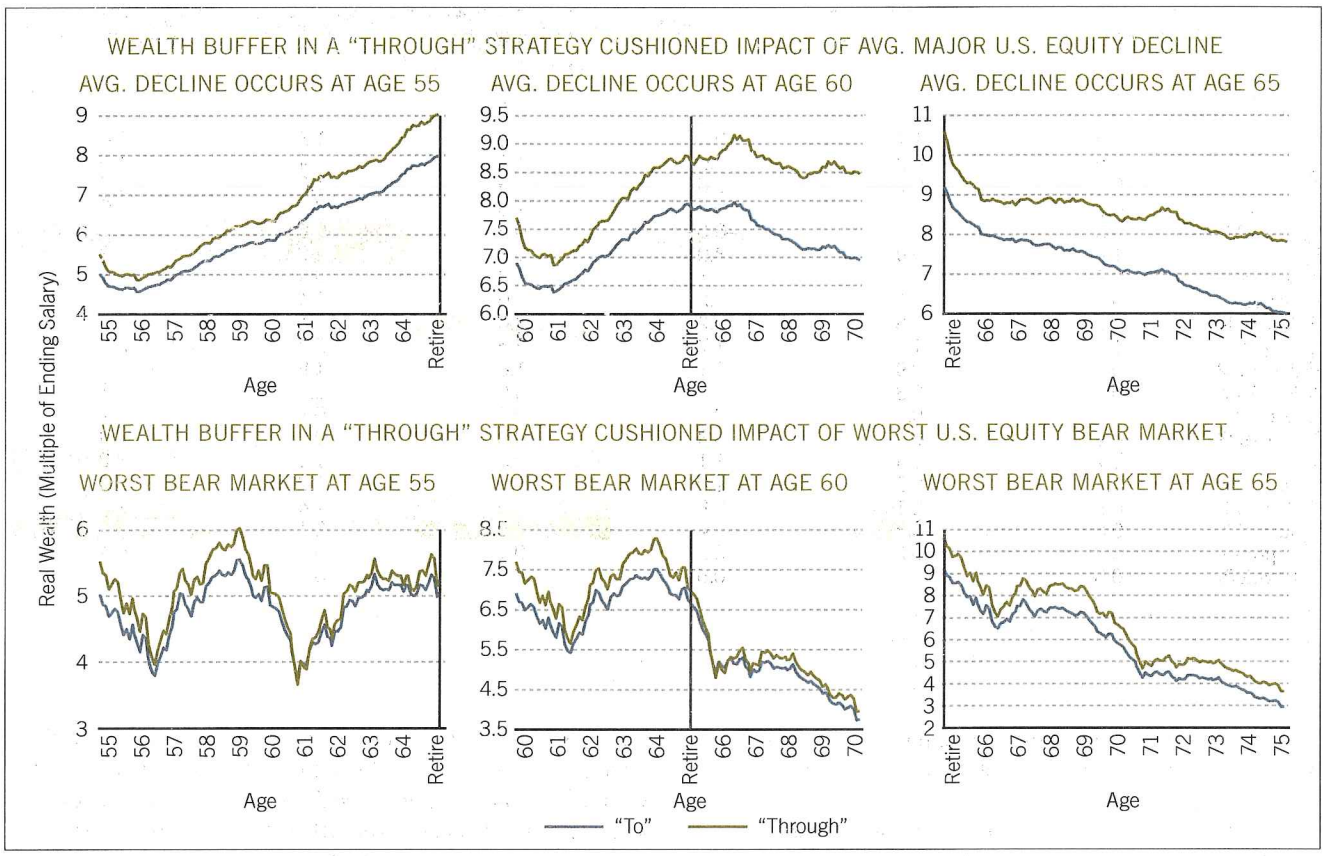
*Figures in matrix above at various ages show multiple of final salary at various ages based on given assumptions. *See endnote for definition of macro environments. Past performance is no guarantee of future results. This chart is for illustrative purposes only and does not represent actual or future performance of any investment option. Source: Fidelity Investments.*

Assessment 2: In a typical macro environment, how effective can the potential wealth buffer created by a Through glide path be at preserving capital if a major equity market decline occurred near retirement?

Scenario. In this assessment, we invested or withdrew (depending on age) identical amounts in the Through and the To glide paths starting at age 25, with withdrawals beginning at age 65. We followed the accumulation of real wealth under the typical (median) simulated macroeconomic environment[9] and observed the impact of the 20 most severe U.S. equity market declines occurring at ages 55, 60, and 65. Once the decline starts, we follow the evolution of wealth implied by the actual asset class returns over the next decade.

Results. Regardless of whether the equity market decline occurred at age 55, 60, or 65, the wealth buffer accumulated over time during the typical (median) macroeconomic environment provided a sufficient cushion against both the worst U.S. equity bear market in history (1969 to 1978) and the average of the 20 worst U.S. equity market declines[10] (see Exhibit 4, page 5). More importantly, the wealth buffer provided a sufficient cushion against every decline except the major one that occurred during the 1930s Great Depression (see Exhibit 5, page 6).

EXHIBIT 4: For a hypothetical investor beginning to participate in a target date strategy at age 25, the wealth accumulated in a Through strategy (relative to a To strategy) during a typical (median) economic environment cushioned the negative impact of the average major U.S. equity market decline and the worst secular U.S. equity bear market in history.



Retire: assumed retirement age of 65. Avg. decline shown above at age 55, 60, and 65 reflects the average of the 20 worst U.S. equity market declines in history. Worst U.S. equity bear market: 1969 to 1978. Demographic assumptions are the same as identified earlier in this article, unless otherwise noted. Only two asset classes, U.S. equity and U.S. investment-grade bonds, were used for the analysis. See endnotes for index definitions. Past performance is no guarantee of future results. This chart is for illustrative purposes only and does not represent actual or future performance of any investment option. Source: Fidelity Investments.

How can the Through glide path maintain a higher wealth level than the To glide path during the worst 10-year period for U.S. equity (the 1970s) and yet fail to do so during the Great Depression? The answer can be found in the different performance of bonds during those two periods. In the decade of the Great Depression (Sep. 1929 to Aug. 1939), the compound real return for U.S. investment-grade bonds was 91%, while during the 1970s (Dec. 1968 to Nov. 1978) the corresponding return for bonds was -9%. Thus, for the To glide path to overcome the typical wealth buffer provided by Through, it is not sufficient that the equity market experiences a secular decline. Instead, such a secular bear market needs to be accompanied by a bull market in bonds, similar to the case during the 1930s.

For all declines except the Great Depression, the advantage of the To glide path in terms of capital preservation in the years around retirement was more than offset by its disadvantage, relative to the Through glide path, in terms of wealth accumulation. Based on these results, the To glide path may be a more appropriate choice for investors in the beginning of their careers if one of their primary concerns was that an equity market shock and a bond rally as sizable as the one that occurred during the Great Depression were very likely to occur.

Evaluating the robustness of To and Through glide paths through additional scenarios and assumptions

Based on our analysis, we have established that a wealth buffer associated with a Through glide path would have historically provided a higher level of wealth, and sufficient protection against poorly timed market declines in nearly all but the most severe equity market conditions occurring at or around retirement, relative to To glide paths. In this next section, we look at three additional comparisons of To and Through glide paths: (1) late entry into a target date strategy, essentially eliminating the potential for a wealth buffer; (2) hedging of annuity risk,

EXHIBIT 5: For a hypothetical investor beginning to participate in a target date strategy at age 25, the wealth accumulated in a Through strategy (relative to a To strategy) provided a cushion against every U.S. equity market decline except the major one that occurred during the 1930s Great Depression.

Resistance of "To" and "Through" Strategies to Equity Market Declines in the Years Prior to Retirement (Multiples of Final Salary): Typical Wealth Buffer						
	U.S. Equity Market Decline Occurs at Age 55		U.S. Equity Market Decline Occurs at Age 60		U.S. Equity Market Decline Occurs at Age 65	
U.S. Equity Market Decline Event Start Date	Wealth Difference (Through – To) After 5 Years	Wealth Difference (Through – To) After 10 Years	Wealth Difference (Through – To) After 5 Years	Wealth Difference (Through – To) After 10 Years	Wealth Difference (Through – To) After 5 Years	Wealth Difference (Through – To) After 10 Years
Oct-1902	0.4	1.1	0.7	1.5	1.3	1.8
Oct-1906	0.5	0.9	0.9	1.1	1.4	1.6
Nov-1912	0.3	0.7	0.6	0.9	1.0	1.2
Dec-1916	0.2	1.3	0.4	1.5	0.8	1.6
Sep-1929	–0.3	–0.2	–0.6	–0.2	–0.8	–0.7
Sep-1932	1.8	0.9	3.0	1.8	4.0	3.2
Mar-1937	0.0	0.8	0.1	1.0	0.4	0.9
Oct-1939	0.7	1.1	1.2	1.6	1.4	1.6
Jun-1946	0.7	2.5	1.2	3.0	1.4	2.3
Aug-1956	1.1	1.7	1.7	2.5	2.4	2.9
Jan-1962	0.6	0.9	1.1	1.6	1.8	2.2
Feb-1966	0.5	0.3	0.8	0.6	1.5	1.3
Dec-1968	0.2	0.2	0.3	0.2	0.8	0.7
Jan-1973	0.2	0.6	0.3	0.8	0.7	0.9
Jan-1977	0.7	1.4	1.1	2.3	1.6	3.2
Dec-1980	0.6	0.9	1.0	1.7	1.7	2.6
Sep-1987	0.5	2.1	0.8	2.5	1.4	2.6
Jun-1990	0.8	3.3	1.4	4.4	2.1	4.3
Sep-2000	0.2	–0.2	0.3	0.1	0.5	0.4
Nov-2007	0.3		0.6		0.8	

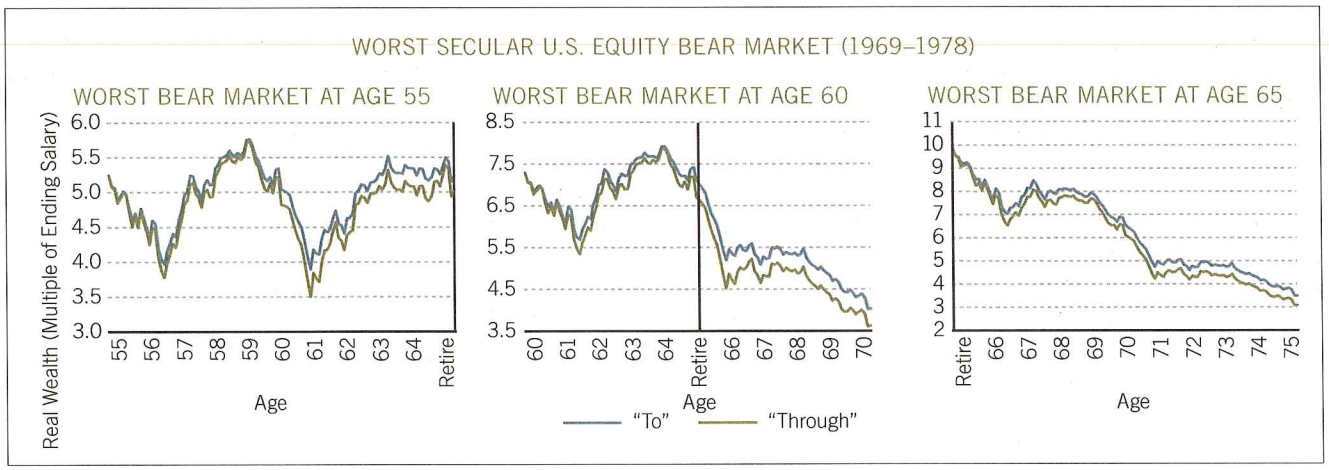
Green shading: "Through" has a higher multiple of an investor's final salary (real wealth). Red shading: "To" has a higher multiple of an investor's final salary (real wealth). Typical (median) macro environment) initial wealth (multiple of final salary): (age 55) To=5, Through=5.5; (age 60) To=6.9, Through=7.7; (age 65) To=9.2, Through=10.6; continuing contributions, constant withdrawals after age 65 = 50% of final salary (inflation adjusted). See endnotes for index definitions. Past performance is no guarantee of future results. This chart is for illustrative purposes only and does not represent actual or future performance of any investment option. Source: Fidelity Investments.

a cited benefit of To glide paths; and (3) how changes to key assumptions affect the outcomes of these assessments.

***Robustness Check 1:* How effective can To and Through glide paths be at preserving capital if an investor begins saving in them during the years closer to retirement?**

Scenario. In this assessment, we eliminated the possibility of an accumulated wealth buffer; we then assumed identical initial wealth levels, and invested or withdrew (depending on age) identical amounts in both Through and To glide paths starting at ages 55, 60, and 65 (retirement start date).[11] We then stress-tested the glide paths with the 20 worst U.S. equity market

EXHIBIT 6: Starting with the same initial wealth, a To glide path would have maintained a higher level of real wealth during the worst secular U.S. equity bear market, from 1969 to 1978.



Demographic assumptions are the same as identified earlier in this article, unless otherwise noted. Only two asset classes, U.S. equity and U.S. investment-grade bonds, were used for the analysis. See endnotes for index definitions. Past performance is no guarantee of future results. This chart is for illustrative purposes only and does not represent actual or future performance of any investment option. Source: Fidelity Investments.

declines in history[12] and followed the evolution of wealth for both types of target date glide paths during and after the declines. By eliminating the wealth buffer, we have eliminated a potential key strength of the Through glide path, and established a scenario that should more clearly favor a To glide path.

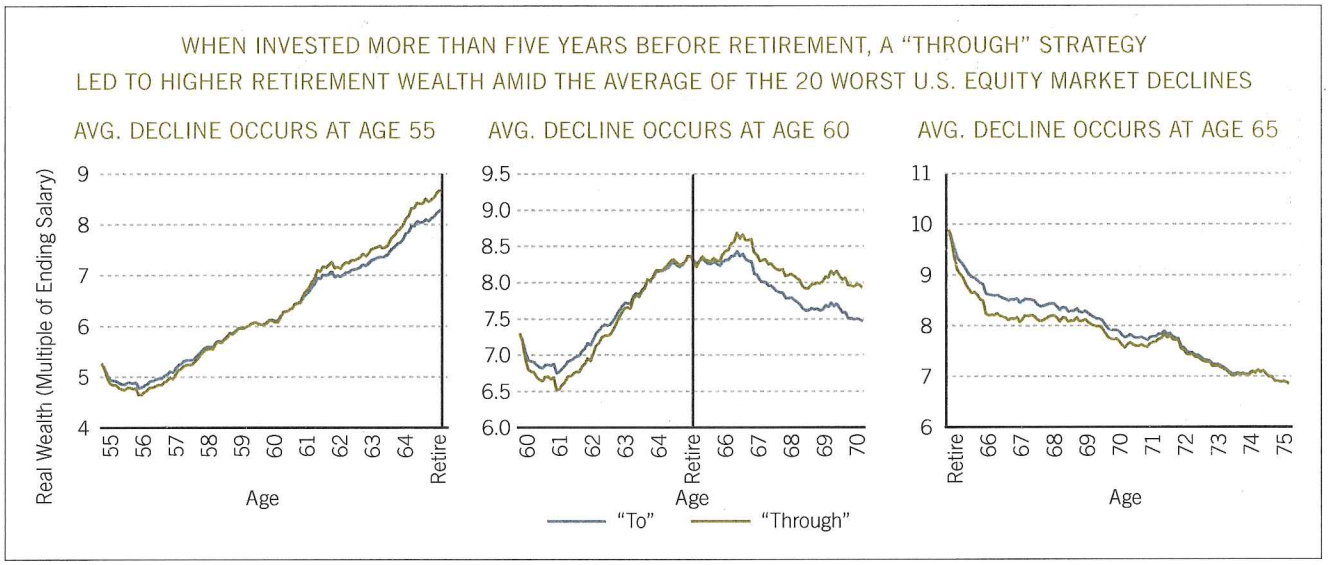
Results. While the results of the To glide path are better, the difference is not as large as might be expected, primarily due to differences in the slopes of the glide paths. The best possible outcome for the To glide path occured during a prolonged bear market in equities. Because of its lower allocation to equity, it is not surprising that with identical starting wealth, the To composite glide path performed relatively better during bear-market periods, including the worst bear market, from 1969 to 1978 (see Exhibit 6, page 6).

Impact of slope. Looking at the evolution of wealth, on average, over the 20 largest U.S. equity market declines in history, it is important to note that if an investor entered the target date strategy more than five years before retirement, the Through glide path provided relatively higher wealth both at and after the target retirement date of 65, assuming the same initial wealth (see Exhibit 7, below).

This higher wealth is due to the different slopes of the glide paths during the decade prior to retirement. The comparatively flatter slope of a Through glide path implies that in the event of a large equity market decline, smaller losses would be permanently realized. In addition, more equity would be purchased throughout the equity decline, which helps wealth recovery in the cases where the decline in the equity market is cyclical in nature. As shown in Exhibit 8 (page 8), for a 55-year-old hypothetical investor who entered the two target date strategies 10 years prior to retirement at age 65, a Through glide path provided higher wealth at the target date than the To strategy amid a majority (14 out of 19) of the worst U.S. equity market declines.

Overall, the steep slope of the To glide path during the decade prior to retirement may negate some of the risk advantage associated with the lower equity allocation measured at the target retirement date. In fact, our results suggest that given two investors with identical amounts to invest who enter a target date strategy late in their working lives—one selecting Through, the other selecting To—the Through glide path would be more likely to provide a higher level of wealth at retirement, except in two scenarios where the investors: (1) had five years or less to retirement; or (2) experienced asset returns in the next decade that resembled a severe environment for equities, such as in the 1930s or in the 1970s. Of course, as covered earlier, extending the analysis beyond the years just prior to retirement requires consideration of the wealth buffer, and these two investors are unlikely to have identical amounts to invest if they had been invested, respectively, in To and Through glide paths.

EXHIBIT 7: Starting with the same initial wealth more than five years prior to retirement (before age 60), a Through glide path would have achieved a higher level of wealth both at and after the target retirement date (left and middle charts below) if an investor experienced the average of the 20 worst U.S. equity market declines.



Demographic assumptions are the same as identified earlier in this article, unless otherwise noted. Only two asset classes, U.S. equity and U.S. investment-grade bonds, were used for the analysis. See endnotes for index definitions. Past performance is no guarantee of future results. This chart is for illustrative purposes only and does not represent actual or future performance of any investment option. Source: Fidelity Investments.

EXHIBIT 8: For a hypothetical investor who began investing in a target date strategy at age 55 (below left), Fidelity's Through glide path would have provided higher wealth at the target date than the To strategy in 74% (14 out of 19) of the worst U.S. equity market declines.

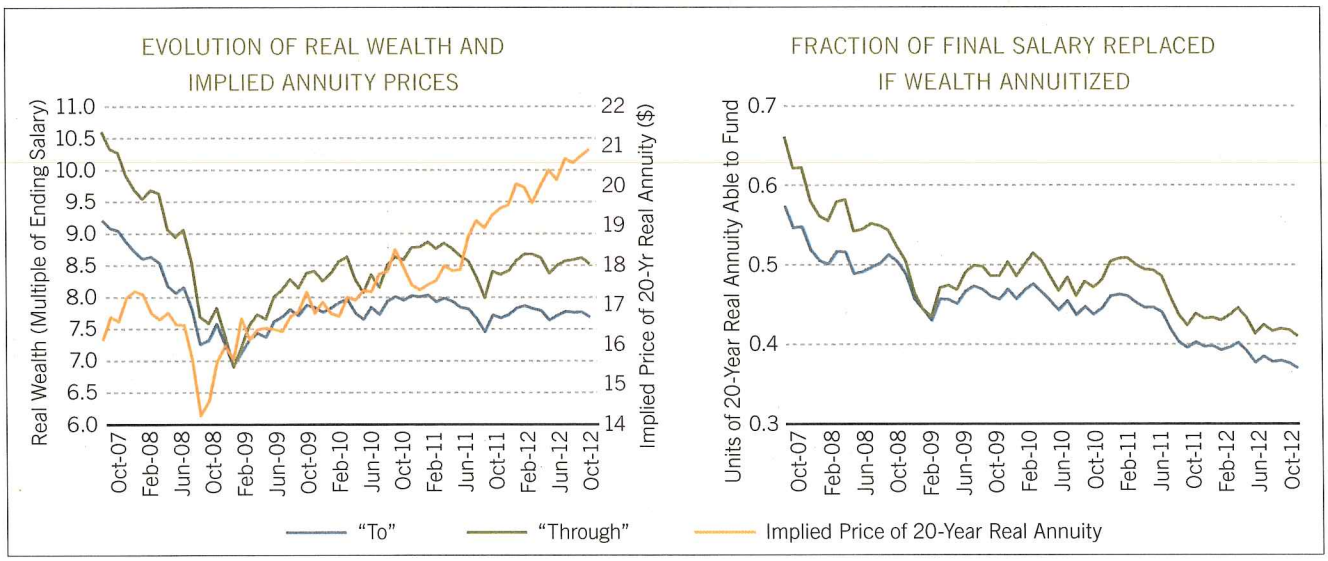
Resistance of "To" and "Through" Strategies to Equity Market Declines in the Years Prior to Retirement (Multiples of Final Salary): No Initial Wealth Buffer						
	U.S. Equity Market Decline Occurs at Age 55		U.S. Equity Market Decline Occurs at Age 60		U.S. Equity Market Decline Occurs at Age 65	
U.S. Equity Market Decline Event Start Date	Wealth Difference (Through – To) After 5 Years	Wealth Difference (Through – To) After 10 Years	Wealth Difference (Through – To) After 5 Years	Wealth Difference (Through – To) After 10 Years	Wealth Difference (Through – To) After 5 Years	Wealth Difference (Through – To) After 10 Years
Oct-1902	0.0	0.5	0.0	0.6	–0.1	0.2
Oct-1906	0.0	0.3	0.1	0.3	0.0	0.1
Nov-1912	–0.1	0.2	–0.1	0.1	–0.1	0.0
Dec-1916	–0.1	0.7	–0.2	0.5	–0.2	–0.1
Sep-1929	–0.8	–0.8	–1.4	–1.3	–2.3	–2.8
Sep-1932	0.9	0.1	1.6	0.6	1.7	1.1
Mar-1937	–0.4	0.4	–0.6	0.2	–0.8	–0.4
Oct-1939	0.2	0.5	0.3	0.8	0.0	0.2
Jun-1946	0.3	1.8	0.5	2.0	0.2	0.6
Aug-1956	0.4	0.9	0.7	1.3	0.6	0.9
Jan-1962	0.1	0.3	0.2	0.6	0.2	0.4
Feb-1966	0.0	–0.1	0.0	–0.1	0.0	0.0
Dec-1968	–0.2	–0.2	–0.4	–0.4	–0.4	–0.4
Jan-1973	–0.2	0.1	–0.3	0.1	–0.5	–0.3
Jan-1977	0.2	0.5	0.5	0.9	0.4	0.8
Dec-1980	–0.2	–0.2	–0.3	0.0	–0.5	–0.5
Sep-1987	–0.2	1.1	–0.2	0.9	–0.4	–0.1
Jun-1990	0.1	2.1	0.2	2.5	0.1	1.2
Sep-2000	–0.3	–0.7	–0.5	–0.8	–1.0	–1.2
Nov-2007	–0.2		–0.3		–0.7	

Green shading: "Through" has a higher multiple of an investor's final salary (real wealth). Red shading: "To" has a higher multiple of an investor's final salary (real wealth). Identical initial wealth (multiple of final salary) at each age is contructed to eliminate the wealth buffer by reducing the typical "Through" wealth and increasing the typical "To" wealth by the same amount: age 55=5.25; age 60=7.3; age 65=9.9; continuing contributions, constant withdrawals after age 65 = 50% of final salary (inflation adjusted). Past performance is no guarantee of future results. This chart is for illustrative purposes only and does not represent actual or future performance of any investment option. Source: Fidelity Investments.

***Robustness Check 2:* How effective can the To and Through glide paths be at hedging annuity price risk[13] at retirement, particularly during turbulent periods?**

Scenario. Since most annuities can be thought of as a "coupon only" bond, the prices of bonds and annuities typically move in the same direction and inversely with interest rates. Because

EXHIBIT 9: The wealth buffer of a "Through" strategy provided a cushion for annuity price risk.



Calculation of the 20-yr. Real Annuity Price uses the TIPS zero-coupon yields series provided by working papers in the Federal Reserve Board's Finance and Economics Discussion Series (FEDS) titled "The U.S. Treasury Yield Curve: 1961 to the Present" and "The TIPS Yield Curve and Inflation Compensation" by Refet S. Gurkaynak, Brian Sack, and Jonathan H. Wright. Past performance is no guarantee of future results. This chart is for illustrative purposes only and does not represent actual or future performance of any investment option. Source: Haver Analytics and Fidelity Investments.

of its higher allocation to fixed income, some investors have argued that the To glide path may provide a better hedge to variations in annuity prices, which can be valuable if investors want to annuitize their wealth at or near the target date. To quantify the importance of such hedging, in this assessment we invested or withdrew (depending on age) identical amounts in the Through and To glide paths starting at age 25, with withdrawals beginning at age 65. We followed the accumulation of real wealth under the typical (median) simulated macroeconomic environment introduced earlier, and assumed that the hypothetical investor turns 65 in October 2007, on the eve of the 2008 global financial crisis. In this case, the simulated wealth buffer of 1.4 years of final salary is very similar to the value of 1.42, which is obtained if we use historical asset returns from 1968 to 2007. Starting in October 2007, we followed the evolution of inflation-adjusted wealth for each strategy over the next five years, as well as the implied price of a 20-year real annuity.[14]

Results. Exhibit 9 (left, page 8) shows that the evidence in favor of the hedging argument for the To glide path is mixed. During some periods, such as October 2008 to March 2009 or January 2011 to September 2011, the To glide path provided a more effective hedge to rising annuity prices. In other periods, such as April 2009 to December 2010, the Through glide path turns out to have been the better hedge. More importantly, because of the wealth buffer, investors in the Through glide path would have been able to afford to buy more annuity units at any point except March 2009 (see Exhibit 9, left, page 8). Contrary to the argument advanced by proponents of To glide paths, the evidence shows that if investors plan to annuitize their wealth at retirement, they may be better off with a Through glide path than with a To glide path, even if at retirement their portfolios experience a shock as influential as the 2008 global financial crisis.

***Robustness Check 3:* What is the impact of changes to the key assumptions?**

Scenario/Results. As stated earlier, a glide path should reflect the income replacement need and demographic characteristics and contribution behavior representative of a broad group of retirement savers today, and we used a set of assumptions for this analysis, based on recent demographic research, outlined earlier in the paper. If the population's characteristics are different than these assumptions, then the outcomes from different glide paths should be considered in the context of the specific circumstances.

As an example, applying the previously discussed assumptions, and a 50% income replacement goal through age 93, the probability of successfully achieving the goal was higher with a Through glide path than with the To glide path. However, if the income replacement goal is reduced to 30%, with the other assumptions unchanged, the Through glide path's advantage, in terms of higher probability of successfully achieving the goal, was reduced but not eliminated (see "How Fidelity defines income replacement success," below).

Similarly, the advantage for a Through glide path may be less significant for investors who contribute a higher constant savings

How Fidelity defines income replacement success

The glide path (i.e., time-varying strategic asset allocation) of Fidelity's target date portfolios, a central component of the strategies, remains focused on accumulating assets that, in considering certain assumptions, seeks to provide inflation-adjusted retirement income equal to approximately half the final preretirement salary of an investor. While the target date portfolios are designed to include assets that might act as a primary source of retirement income, for many investors these assets will be combined with other complementary sources of income (e.g., Social Security, defined benefit plan benefits, and personal savings) in seeking to achieve Fidelity's overall retirement planning target of income replacement equal to 85% of final salary.[15]

Fidelity expresses income replacement success as a probability measure representing the likelihood (in percentage points) of achieving the glide path's income-replacement goal corresponding to a set of assumptions for savings behaviors, asset class risk, returns, and correlations. This measure is established through a Monte Carlo[16] simulation that uses thousands of scenarios, with a given set of savings and asset class assumptions. The "success" measure represents the number of instances across these simulations where the outcome is an income replacement at or above a stated goal, which we establish for our target date strategies as an income replacement goal of 50%, expressed as a fraction of the total number of simulations.

As an example, an expected success rate of 65% would imply that over a wide variety of scenarios, the particular savings and asset allocation approach was successful in achieving the income replacement goal 65% of the time. Hence, a higher number is better, all things being equal. It is important to note that while this measure is most useful when analyzing aggregate income replacement success over a long period of time, it may capture neither the frequency nor magnitude of failure over shorter time periods, nor the impact of extreme market events, which, particularly at later phases of the glide path, become more significant considerations.

rate throughout their working years. For example, given an investor who contributes a constant 20% of his or her salary throughout the working years, the probability of achieving a 50% income replacement goal was approximately the same between a Through and To glide path. It should also be noted that in this case, the wealth buffer in the typical (median) macroeconomic scenario increases to 2.9 years of final salary, which suggests a Through glide path may still be a superior option.

Finally, reducing the retirement age from 65 to 60 years had minimal impact on any of the results. Starting with the wealth buffer at the typical (median) macroeconomic scenario, the To glide path outperformed only during the period of the Great Depression, regardless of whether the U.S. equity market decline occurred at age 55 or 60 (retirement). In addition, because of its higher allocation to equity, the advantage for the Through glide path in terms of the probability of successfully achieving a 50% income replacement goal was also higher.

Therefore, for plans with populations that have a lower income replacement need (e.g., the presence of a complementary defined benefit plan), or for populations where the savings (contribution) rate is significantly higher than typical, the outcomes under this assessment of a To and Through glide path still favor a Through glide path, although not as strongly.

Investment implications

Our analysis shows that To glide paths outperformed Through glide paths measured at the retirement date only during the most severe equity market downturns—on the order of the Great Depression—or when an investor began participating in a target date strategy very close to the expected retirement date and subsequently experienced a major equity market decline. The wealth at the assumed retirement age of 65 for the Through glide path was greater than the wealth for the To glide path in 90% of simulated macroeconomic scenarios, and in all but one—the Great Depression—of the actual scenarios. In addition, there were mixed results for which glide path provides a better hedge for annuity prices—a common support for To glide paths, with their higher bond allocations. Thus, focusing on investor behavior post retirement is misguided. We also found the results to be robust under different assumptions, though significantly decreasing the income replacement target to 30% or less and increasing the lifetime contribution rate to 20% or more may make the results more comparable between a Through and To glide path.

These results suggest there are two key reasons why a Through glide path may fare better than the To glide path:

1. During the working phase, an investor in a Through glide path may amass a wealth buffer that, during the years near retirement, cushions the impact of an equity market decline.

2. The slope of a Through glide path in the decade before the target date is less likely to aggressively "lock in" losses during equity market declines that are cyclical in nature.

In our view, investors evaluating an investment that uses a target date strategy should determine whether a provider offers a To or a Through glide path, establish their income replacement goal and other savings behaviors, and consider how the key findings in this paper may help support a more informed investment decision.

Authors

Emil Iantchev, PhD
Research Analyst

Emil Iantchev is a research analyst for Fidelity Investments. He currently focuses on research projects within the Asset Allocation Research Team, a unit of the Global Asset Allocation division. He joined Fidelity in 2013.

Andrew Dierdorf, CFA
Portfolio Manager

Andrew Dierdorf is a portfolio manager for Fidelity Investments. Mr. Dierdorf currently co-manages several multi-asset-class portfolios, including target date strategies. He joined Fidelity in 2004.

Mathew R. Jensen, CFA
Director, Target Date Strategies

Mathew Jensen is the director of target date strategies in the Global Asset Allocation (GAA) division of Fidelity Investments. Mr. Jensen leads investment strategy execution and product design and innovation across the company's target date offerings, and directs target date investment research and thought leadership.

Fidelity Thought Leadership Vice President and Associate Editor Kevin Lavelle provided editorial direction for this article.

Views expressed are as of the date indicated, based on the information available at that time, and may change based on market and other conditions. Unless otherwise noted, the opinions provided are those of the authors and not necessarily those of Fidelity Investments or its affiliates. Fidelity does not assume any duty to update any of the information.

Past performance is no guarantee of future results.

Neither asset allocation nor diversification ensures a profit or guarantees against a loss.

Investment decisions should be based on an individual's own goals, time horizon, and tolerance for risk.

Target date portfolios are designed for investors expecting to retire around the year indicated in each portfolio's name. Each portfolio is managed to gradually become more conservative over time as it approaches its target date. The investment risk of each target date portfolio changes over time as the portfolio's asset allocation changes. The portfolios are subject to the volatility of the financial markets, including that of equity and fixed income investments in the U.S. and abroad, and may be subject to risks associated with investing in high-yield, small-cap, commodity-linked, and foreign securities. Principal invested is not guaranteed at any time, including at or after the portfolios' target dates.

Target date portfolios are designed to help achieve the retirement objectives of a large percentage of individuals, but the stated objectives may not be entirely applicable to all investors due to varying individual circumstances, including retirement savings plan contribution limitations.

Stock markets are volatile and can decline significantly in response to adverse issuer, political, regulatory, market, or economic developments.

In general the bond market is volatile, and fixed income securities carry interest rate risk. (As interest rates rise, bond prices usually fall, and vice versa. This effect is usually more pronounced for longer-term securities.) Fixed income securities also carry inflation risk, liquidity risk, call risk and credit and default risks for both issuers and counterparties. Unlike individual bonds, most bond funds do not have a maturity date, so avoiding losses caused by price volatility by holding them until maturity is not possible.

It is not possible to invest directly in an index.

Endnotes

* Macroeconomic environments are labeled in terms of their potential impact on asset returns and hence wealth accumulation. An example of a *severe* environment is a time series realization in which low growth and high inflation (stagflation) occur very often. As a result, both equity and bond returns were generally low, hampering wealth accumulation. On the other hand, a time series realization in which high growth and low inflation occur very often is conducive to wealth accumulation as both equity and bond returns were generally relatively high. Such an environment is thus labeled *great*.

[1] We do not address recent press coverage of "U-shaped" glide paths that increase the equity allocation into retirement. In our view, and based on our research on risk capacity, including observations on the frequency of market corrections and loss aversion, this approach subjects target date investors to increasing amounts of risk at a time when their capacity to bear such risk (due to periodic withdrawals and shrinking investment horizon) is decreasing. If investors cannot stomach the increasing volatility, they may not stick with the plan, and could exit the strategy at the wrong moment – which under an increasing equity allocation model could make outcomes even worse.

[2] Wealth-weighted glide path volatility: This measure weighs the annual return volatility of the glide path at each age by the amount of wealth at risk at the given age.

[3] All U.S. equity data and references used for analysis in this article based on the following: For the period 1900-1926, the total return series calculated by Global Financial Data, for the U.S. Common Stock Indexes published by the Cowles Commission (http://cowles.econ.yale.edu/P/cm/m03/m03-intro.pdf); after 1926, U.S. equity data is based on the value-weighted total return, obtained from CRSP, for all U.S. firms listed on the NYSE, AMEX, or NASDAQ. All U.S. investment-grade bonds data represented by Barclays U.S. Aggregate Bond Index since 1976 and the 10-year U.S. Treasury Bond prior to that date, unless otherwise noted.

[4] Fidelity's "Through" glide path may differ from those of other target date strategies, which could influence the results of this analysis.

[5] Investors should allocate assets based on individual risk tolerance, investment time horizon, and personal financial situation. A particular asset allocation may be achieved by using different allocations in different accounts or by using the same allocation across multiple accounts. The glide path is not intended as a benchmark for individual investors; rather, it is a range of equity, bond, and short-term debt allocations that may be appropriate for many investors saving for retirement, based on an assumed retirement age of 65, as well as a range of expected retirement ages at or near 65. Investors should consider whether they anticipate retiring significantly earlier or later than age 65, and should select an allocation that best meets their individual circumstances and investment goals.

[6] "To" composite benchmark is an asset-weighted composite using all "To" glide paths listed in the Morningstar Target-Date Fund Series Report, June 2013, including ACO, BlackRock, ING, JPMorgan, Manning & Napier, MFA, PIMCO, Russell, State Farm, and Wells Fargo.

[7] Individual target date strategies, including Fidelity's, may incorporate additional allocations including, but not limited to, small-cap, high yield, commodity-linked, and foreign securities. These additional allocations could provide different results than the results provided within this article.

[8] The bootstrap simulation method and the assumptions about participant behavior and demographics are used to simulate 100,000 wealth paths during the working and retirement phases. For each target date strategy, we then look at the distribution of wealth across these 100,000 wealth paths at a given age (e.g., age 55). The 50th percentile of this wealth distribution is the median wealth associated with the particular glide path (i.e., the hypothetical median wealth that occurred under a typical macroeconomic environment in which the occurrence of high and low inflation and growth states over time was balanced).

[9] See endnote 8.

[10] The 20 worst U.S. equity market declines referenced in the article are based on monthly data for the the U.S. Common Stock Indexes published by the Cowles Commission with Global Financial Data (GFD) extension until 1927; after 1926, U.S. equity data is based on the value-weighted total return, obtained from CRSP, for all U.S. firms listed on the NYSE, AMEX, or NASDAQ. The 20 worst declines are represented by the following dates, starting with the first month of downturn period: Oct. 1902, Oct. 1906, Nov. 1912, Dec. 1916, Sep. 1929, Sep. 1932, Mar. 1937, Oct. 1939, Jun. 1946, Aug. 1956, Jan. 1962, Feb. 1966, Dec. 1968, Jan. 1973, Jan. 1977, Dec. 1980, Sep. 1987, Jun. 1990, Sep. 2000, Nov. 2007. The start and end dates for the 20 worst U.S. equity declines are defined by checking the maximum real decline within each 60-month moving window from 1900 to 2012, and selecting the 20 periods with the biggest declines. The equity and bond returns corresponding to the average of the 20 worst U.S. equity market declines reflect the simple average of those returns at each point in time.

[11] In this scenario, contributions are through age 65 and withdrawals begin at age 65.

[12] See endnote 10.

[13] Annuity price risk is the volatility in the price of an annuity over a given period of time.

[14] An annuity is a contract issued by an insurance company and purchased by a consumer for long-term investing. An annuity is not a mutual fund. There are various fees and expenses associated with annuities and in certain situations, withdrawal penalties may be applicable. The implied price of a 20-year real annuity is calculated as the value of a portfolio paying $1, inflation adjusted, over 20 years. That is, it consists of $1 zero-coupon TIPS with maturities between two and 20 years. For the yield curve of zero-coupon TIPS, we use the estimates from two staff working papers in the Federal Reserve Board's Finance and Economics Discussion Series (FEDS), titled "The U.S. Treasury Yield Curve: 1961 to the Present," and "The TIPS Yield Curve and Inflation Compensation," by Refet S. Gurkaynak, Brian Sack, and Jonathan H. Wright. Data source: Fed's FEDS Web site or Haver Analytics.

[15] The income replacement rate of approximately 50% of one's final preretirement salary is for a hypothetical average employee and may not factor in all anticipated future living expenses or needs, such as long-term care costs. An individual's actual replacement ratio may vary from this income replacement rate, as each individual's experience and circumstances are different. It is also important to recognize that while the target date portfolios are designed to include assets that might act as a primary source of retirement income, for many investors these assets will be combined with other complementary sources of income (e.g., Social Security, defined benefit plan benefits, and personal savings) in seeking to achieve Fidelity's overall retirement planning target of income replacement equal to 85% of final salary. The 85% replacement rate is for a hypothetical average employee and may not factor in all anticipated future living expenses or needs, such as long-term care costs.

[16] Monte Carlo simulation: An analytical method of calculating outcomes by using a computer to run multiple scenarios (or trial runs) using random variables. The simulations are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results.

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