

# GRI Product Allocations in a QDIA Framework

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## The margin of safety retirement savers need for peace of mind

**Abstract** | In this paper, we review the characteristics and benefits of Guaranteed Retirement Income (GRI) products in light of empirical evidence regarding investor reaction to negative market returns. We present new corroborating evidence from fund flows around the recent volatile market events in 2020, that indicates a rising loss aversion just as asset levels become significant with investors approaching retirement. We surmise that recent trading activity implies an aggregate investor preference for Target Date Fund (TDF) portfolios within a 20-year time horizon with a volatility profile that is potentially too conservative for requisite savings in later years due to the concomitant lower portfolio return potential combined with the aggregate under-saving problem. This extant mismatch in investor preferences is compounded by a reactionary tactical investor trading strategy that essentially buys high and sells low.

We propose that the rising investor loss aversion problem can be mitigated by including GRI products in the asset mix in a QDIA setting that provides for the desired downside risk protection against extreme events. GRI solutions have the potential to meaningfully address the serious measured return drag of 1.5% to 2.0% from investor return-chasing behavior, with the potential benefits outweighing the additional cost of protection. Moreover, this solution may help to address the under-saving problem by enabling more aggressive and higher return potential asset mixes than might otherwise be tolerated.

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## Introduction

Target Date Funds (TDFs) have been utilized since the Pension Protection Act (PPA) of 2006 in a QDIA setting as a means of providing retirement savers with a one-stop solution suited to their age and, in some cases, risk-tolerance level. This framework with TDFs is meant to provide a comprehensive, but generalized, asset mix solution appropriate for most retirement investors. The associated asset mix glide path typically decreases in portfolio risk level over a person's lifecycle. The academic foundation of this lifecycle approach is, in large part, Human Capital Theory, that was first posited by Jacob Mincer and Nobel economist Gary Becker, in the late 1950s and early 1960s. Later extensions of this work, oriented toward lifetime savings strategies, posited that as the relative weight of the current financial value of the portfolio increases relative to the present value of future human capital, the ability to weather volatility shocks declines.

Empirical work by behavioral economists had demonstrated that, in practice, savers' investment allocation choices in the absence of QDIA options tended to follow more haphazard construction approaches, such as equally allocating among investment options, otherwise known as the 1/n heuristic.<sup>1</sup> The systemic response to problems identified by behavioral economists resulted in a system comprised of stimulants and stabilizers designed to address historical behavioral shortcomings in investor retirement savings behavior, including automatic enrollment, automatic contribution rate escalation and the use of QDIAs. Mounting empirical evidence, however, indicates that serious behavioral deficits that deserve plan sponsor attention persist. In particular, the tactical investor behavior of "chasing returns" can work to subvert the benefits of the TDF glide path framework.

In this paper, we review evidence of investor reaction to negative market returns. We present new corroborating evidence from fund flows around the recent volatile market events in 2020, that indicates a rising loss aversion just as asset levels become significant with investors approaching retirement. TDF glide paths are meant to address rising loss aversion with less volatile portfolios for shorter time horizons, but these portfolios can't adequately provide the downside risk protection desired in the case of extreme events. Moreover, the empirical research indicates that tactical investor behavior of "chasing returns" presents a serious return drag. We surmise that recent trading activity

implies an aggregate investor preference for TDF portfolios within a 20-year time horizon with a volatility profile that is potentially too conservative for requisite savings in later years due to the concomitant lower portfolio return potential combined with the aggregate under-saving problem. This extant mismatch in investor preferences is compounded by a reactionary tactical investor trading strategy that essentially buys high and sells low.

We propose that the rising investor loss aversion problem can be mitigated by including Guaranteed Retirement Income (GRI) products in the asset mix in a QDIA setting that provides for the desired downside risk protection against extreme events. This approach entails increased costs, but we view the benefits to outweigh these costs for most investors, particularly in terms of offsetting the potentially serious return drag that exists in their absence. A portfolio asset mix with a GRI allocation offers superior downside risk characteristics that will better allow queasy investors to stay the course. Moreover, a portfolio mix with a GRI allocation with a higher equity allocation may offer similar downside risk characteristics to a lower equity mix portfolio on a standalone basis, offering the potential of higher average return at a given risk tolerance level.

## Retirement income solutions and literature review

A key component of most retirement income strategies is some element that is comprised of guaranteed income. In fact, many holistic approaches are designed around segmenting decumulation spending into fixed and discretionary pools of spending, with concomitant differences in risk levels for related assets to fund those needs. The fixed expense segment is often targeted with guaranteed sources of income of one type or another, which could range from the purchase of traditional out-of-plan annuities to insurance wrappers on balanced portfolios that provide an income floor. In this category, Social Security is often a central plank. Social Security may be the most successful guaranteed retirement income strategy ever created, providing a guaranteed lifetime income floor and benefits that are indexed to cost of living increases. The widespread popularity of the program effectively has made it the "third rail" of American politics, with surveys routinely showing that three quarters of Americans are of the opinion that the benefits should not be reduced in any way and likewise, should be preserved for future generations, even if it means increasing Social Security taxes.<sup>2</sup>

The popularity of Social Security can largely be attributed to one key defining feature—it provides a roughly set amount of income for life. Per the 2019 *EBRI/Greenwald Retirement Confidence Survey*, 74% of workers and 65% of retirees believe that, with respect to financial priorities in retirement, having a set amount of income for life is more important than maintaining wealth.<sup>3</sup> While workers and retirees continue to see income stability as a key objective, the potential for achieving income stability has become less certain.

The Gallup survey from April of 2019 showed that 57% of retirees view Social Security as their primary source of income, surpassing by far the second and third sources—retirement accounts and pension plans.<sup>4</sup> Moreover, in previous decades, there has been a sharp decline in defined benefit plans, for which investment risks fall on the shoulders of plan sponsors, as these covered only 16% of private industry workers in 2019 according to BLS.<sup>5</sup> In their place have emerged defined contribution plans, for which investment risks fall on the shoulders of workers and retirees. Defined benefit plans provide fixed income, whereas defined contribution plans do not. Furthermore, there is substantial insecurity among Americans regarding Social Security prospects, which is the only remaining guaranteed income provision for many potential retirees. In fact, a majority of non-retired Americans believe that they will not receive a benefit when they are eligible to receive it.<sup>6</sup>

GRI products have emerged to help bridge this gap between income and the traditional sources of income, such as Social Security, and hopefully, increasing the likelihood of meeting overall retirement goals. When used in-plan, most GRI products can also protect retirement account balances near and during retirement. Numerous direct or indirect benefits of annuities in a retirement income context have been posited, including:

- Deferred annuities can help participants save more and defer taxes for a longer period of time. In addition, contribution limits and required minimum distribution requirements may not apply to some annuity products regardless of the income level.
- Annuities can help participants better prepare for retirement by protecting long-term savings from market gyrations.
- They can provide risk-averse participants with peace of mind through a life-long source of income.

- Annuities can provide a wide range of options: either a stated rate of return for a specified period of time (fixed annuities) or a variety of investment portfolios with market participation.
- Death benefit features can create a better outcome for designated beneficiaries which would not be available in other retirement products (passing through probate).

Per the research conducted by Georgetown University Center for Retirement Initiatives, in conjunction with WillisTowersWatson (WTW), in 2019, “lifetime income solutions can narrow the distribution of outcomes by directly limiting downside risk for retirees—a critical need in DC plans today.”<sup>7</sup>

### The “Annuitization Puzzle” | Low usage rates of GRI products

While anecdotal and perceived benefits of retirement income products abound, there is a low usage rate on a voluntary basis in terms of allocations by participants in retirement plans. According to a report prepared for the DOL: “Annuities may play a role in DC plans through at least three avenues: (1) plans may offer a deferred annuity among their investment options, (2) plans may offer the option to annuitize the account balance (invested in any type of security) upon retirement, and (3) DC plan participants may roll over their account balance into an IRA and subsequently purchase an annuity. Almost all DC plan participants have access to annuities via the third avenue.”<sup>8</sup>

In that earlier study from 2011, “Just 1% of plan sponsors offered an in-plan deferred annuity as an investment option to its participants.”<sup>9</sup> That has improved in succeeding years, but remains very low, as 10% of 401(k) plans currently offer annuities to workers, according to the Plan Sponsor Council of America. Prior to the Secure Act, plan sponsors worried they could be held legally responsible in a lawsuit if an insurer defaulted on the promised annuity to investors. Over 60% of plan sponsors cited this risk as a reason that they did not offer annuities, according to a survey conducted by consulting firm Willis Towers Watson.<sup>10</sup>

When there is the option to annuitize, however, the ultimate utilization rate by retirees is still remarkably low. Brien and Constajin note, “In sum, approximately 6.1% of DC plans owned by newly retiring workers were annuitized within about one year. The magnitude of annuitizations of IRAs

suggests that the fraction of plans that are eventually annuitized is well above 6.1%, though data limitations prevent an accurate estimate. Also, IRAs tend to be converted more often into deferred annuities than into immediate annuities.<sup>11</sup> There may be some correlation between interest rates and annuitization decisions. Prior to 1989, most TIAA participants were required to purchase an annuity. Utilizing TIAA data over time, Brown, Poterba and Richardson, look at trends when retirees choose to make their first income draw. In 2000, 54% of retirees made their first withdrawal in the form of a single or joint life annuity. In 2017, only 19% of retirees chose an annuity. Conversely, RMDs were selected by 9% of retirees in 2000 and by 58 percent in 2017. The authors conclude that falling rates played a key role in this decision.<sup>12</sup>

Regardless of the context, however, there is a notably low usage rate of annuities overall. This has been labeled as the “Annuitization Puzzle” among behavioral economists, as the clear benefits of GRI products have not been matched by investor uptake to this point. This topic was highlighted by Franco Modigliani in his Nobel Prize acceptance speech in 1985. Shlomo Benartzi and Nobel-economist Richard Thaler note that “Adding some behavioral factors only deepens the puzzle because annuities have the potential to solve some complex problems with which individuals struggle, like when to retire and how much they can spend each year in retirement...”<sup>13</sup> Additionally, they note that while life expectancy has risen, so too has the variation in life expectancy, both of which should increase the demand for annuities as a hedge against longevity risk.<sup>14</sup> While behavioral economists are puzzled by the low usage of annuities, classical economists fair no better in providing an explanation. Menachim Yaari noted back in 1965 that, in the absence of bequests, rational individuals should convert all wealth into an annuity at retirement.<sup>15</sup> Most likely, the low utilization rate is due to the perceived complexity of the products to the majority of retirement savers and the tendency towards inertia and simplistic heuristics that have been well noted by behavioral economists. The likely solution to greater usage is utilization of GRI products in a QDIA framework with a default allocation.

## Survey of extant QDIA solutions that include a GRI component

In recent work, Keith Gustafson and Christopher O’Neill identify a framework for valuing the benefits of certain annuity products consistent with the mandates of the SECURE Act.<sup>16</sup> Accompanying empirical analyses of existing products generally found that many GRI products are justified as an allocation in a glide path framework for the average participant, as the benefits outweigh the typical costs relative to a benchmark balanced portfolio in the absence of the GRI product. As well as the obvious longevity risk hedge, GRI products can also provide hedges against market risk and sequence of return risk. With the passage of the SECURE Act, there is a growing list of products with a GRI component, many of which have unique features that warrant some comparison and contrast for elucidation.

### HYBRID SOLUTIONS: GRI PRODUCTS INTEGRATED INTO THE QDIA

We define hybrid solutions to be asset allocation strategies that combine traditional investments with GRI products that are not designed to fulfill QDIA requirements on their own as individual in-plan investment options, but together produce a QDIA-eligible solution with a lifetime income component. Such solutions offer participants the option, but not the obligation, to take secure guaranteed income in retirement, at levels that may exceed what they can safely achieve on their own through other approaches. The integration is typically within a Target Date (TD) structure or a Participant Managed Account (PMA) service, and often features a transition from zero or low allocation to the GRI product early in the accumulation period to an increasing allocation approaching retirement: a “runway” period, during which the GRI product accrues benefits that justify a larger fraction of overall strategy assets.

A variation on this theme, in which a QDIA-eligible traditional investment strategy includes a sleeve earmarked for the purchase of a GRI product at retirement, is discussed later in the section *Hybrid Solutions: QDIA with sleeve to fund GRI Purchase at Retirement*.

### DEFERRED FIXED ANNUITIES

Because of their risk and return characteristic during accumulation, Deferred Fixed Annuities (DFAs) are usually implemented as a portion of the fixed income sleeve of the overall QDIA-eligible product structure.

## Generic DFAs

Many insurance company general account Stable Value (SV) products are “written on annuity paper,” meaning that they are structured as group annuity contracts and are thus convertible directly into lifetime income. Generic DFAs have no special features during accumulation, but do offer principal protection, some with minimum guaranteed crediting rate greater than zero. As spread products, in-plan DFAs generally offer higher crediting rates than more transparent single insurance company (single-wrapped) separate account SV products, or multi-manager and multi-insurer wrapped products structured as CITs. Mesirow’s research has demonstrated the value of the principal protection feature of such products as bond alternatives in providing superior risk-adjusted returns in a TD setting, even without factoring in the potential for annuitization at retirement.<sup>17</sup>

Since the generation of lifetime income for DFAs requires annuitization, they are subject to point-in-time interest rate risk based on the rate environment at the time a participant retires. However, our research has demonstrated the value of the cumulative impact of principal protection combined with fixed annuitization when sufficient “runway” within accumulation is provided. For example, Mesirow’s quantitative fiduciary analysis compares generic DFAs favorably relative to strategies comprised of traditional investments subject to systematic withdrawals, across a range of participant scenarios, using proprietary absolute and risk-adjusted RI performance metrics focused on downside risk protection.<sup>18</sup>

We are not aware of any current scalable, mass market offerings that integrate generic in-plan DFAs within a TD structure, but Mesirow’s related research on GRI product allocation using such products as a portion of the bond sleeve within TD glide paths has demonstrated the viability of this simple and easy to understand approach in creating an effective hybrid GRI solution. Generic DFAs are also natural investment options to use in PMA services that can support GRI products.

## DFAs with Special Features

Several in-plan products are designed to dollar-cost average the purchase of lifetime income across interest rate environments throughout accumulation, or otherwise offer incentives for the purchase of lifetime income within accumulation. These products differ from single-premium products, such as Single Premium Immediate Annuities

(SPIAs) and Deferred Income Annuities (DIAs) that can also be made available as in-plan payout options at retirement, in that they can receive ongoing participant contributions and are liquid investment options that meet the definition of a Designated Investment Alternative within a retirement plan lineup. The methods for determining the account value and any minimum guaranteed rate features vary across the products. Current product designs include the following:

- Mutual of Omaha Lifetime Guaranteed Income Account
- Principal Life Insurance Principal Pension Builder
- TIAA Traditional / TIAA Secure Income Account

With the exception of the TIAA product, each participant contribution buys a future guaranteed income stream. This guaranteed amount is based upon contribution amount, annuity purchase rate, age at contribution, and age at income start date. Purchase rates vary by age and actuarial assumptions, and either are calculated based on current interest rates or a static set of interest rate assumptions. The default death benefit features associated with the income guarantees also differ across the products. The purchase of a known guaranteed income amount with each contribution provides participants the ability to dollar-cost average the accumulation of lifetime income across different interest rate and capital market environments, which mitigates the point-in-time risk associated with the purchase of an immediate fixed annuity priced based on market conditions when a participant chooses to retire.

The TIAA product is included among the DFAs with special features because it has a unique vintage structure within accumulation. It offers comparable age-based incentives for participants to contribute throughout accumulation, and potential payout increases during retirement. The guaranteed income it provides has historically been competitive with that offered by the other products with explicit guaranteed income amounts for each contribution. Through the return of unused contingency reserves originally set aside to protect participants’ benefits, both additional lifetime income based on how long contributions have been invested and non-guaranteed periodic increases in annuity payments are possible at the insurer’s discretion.

Among the DFAs with special features, only TIAA Traditional is currently integrated into a QDIA-eligible structure via the custom default solutions capability available on the TIAA recordkeeping platform. Either through a TD glide path-based asset allocation model service or through a fully



customizable custom portfolios service, plan sponsors can offer their participants a custom QDIA that can include both TIAA Traditional and variable annuity investment options with lifetime income guarantees.

A recent high-profile example of a large plan sponsor utilizing this capability is Yale University's Target-Date Plus program. The TIAA Secure Income Account is a recent Defined Contribution Investment Only (DCIO) version of TIAA Traditional available to plan sponsors on non-proprietary recordkeeping platforms. These are exclusively for use in custom model portfolio services and PMA services, in which the plan sponsor designates the service as the plan's QDIA.

### DEFERRED VARIABLE ANNUITIES

While variable annuities with living benefits riders have proliferated in defined contribution plans over the past few decades, generic "plain-vanilla" deferred variable annuities (DVAs) have been available to plans sponsors over a much longer period, and also offer lifetime income benefits that can warrant their inclusion in QDIA-eligible hybrid solutions wherever they are available.

Participant contributions in DVAs purchase accumulation units, which are analogous to shares purchased at daily Net Asset Value (NAV) within mutual funds. To generate lifetime income through variable annuitization, accumulation units are converted to annuity units. Once lifetime income has commenced, the participant's number of annuity units remains constant, but the payments fluctuate based on the underlying change in annuity unit value, which is driven by both investment performance and contract expenses during the most recent payout period, versus an assumed interest rate.

During accumulation, DVAs can be thought of as very similar to mutual funds, but with additional insurance and administrative expenses that support their ability to be directly converted into variable lifetime income. As such, they can be used in both fixed income and equity asset classes in place of their mutual fund counterparts, or across asset classes for multi-asset class DVA strategies. Although fully liquid like mutual funds, DVAs can benefit from the fact that participants invest in them with long-term retirement goals in mind, which can have a positive impact on performance that may help compensate for additional annuity-related expenses. DVAs are less likely than ordinary mutual funds, which have a mix of both retail and retirement investors, to be subject to mass redemptions during times of market stress, and thus are less prone to the performance drag such

short-term investor behavior can precipitate, as we highlight in this paper. For these reasons, institutionally-priced DVAs should be considered competitive with mutual funds with similar management expenses within the same asset classes for use within QDIA-eligible hybrid solutions.

Similar to generic DFAs, we are not aware of any current scalable solutions that explicitly integrate generic DVAs into QDIAs, but the custom default solutions capability available on the TIAA recordkeeping platform can access the more than \$250 billion<sup>19</sup> in broadly utilized TIAA and CREF DVAs to complement the use of TIAA Traditional as GRI components in custom QDIA portfolios. Mesirow's research on GRI product allocation using DVAs within TD glide paths also has demonstrated their efficacy within hybrid GRI solutions, either through a "ramp-up" approach, in which they gradually replace traditional investments approaching retirement, or throughout accumulation when overall product expenses are competitive with ordinary mutual funds within a plan lineup.

### HYBRID SOLUTIONS: QDIA WITH SLEEVE TO FUND GRI PURCHASE AT RETIREMENT

Thus far, the hybrid QDIA strategies discussed have been designed to utilize GRI products that are liquid investment options meeting the definition of a Designated Investment Alternative and which can receive ongoing contributions (flexible premium annuities). In other words, their status as annuity products does not make them appear qualitatively distinct from traditional investment options within a retirement plan lineup. Another class of products that can be accessed as part of QDIA-eligible strategies are single premium products: SPIAs and DIAs. The common feature of such strategies is that they are comprised of traditional investments, but a portion of assets are earmarked for the purchase of single premium products at retirement.

Access to GRI products to implement this flavor of hybrid QDIA strategy can be achieved in several ways. Retirement plan documents can explicitly authorize SPIAs or DIAs as payout options for participants at retirement, or plan sponsors can make them available through retail annuity bidding services or institutional annuity platforms, in which multiple insurers compete to offer institutionally priced annuities.

While SPIAs have been available as GRI products for many years, DIAs are relatively recent innovations. Consequently, the list of institutional in-plan products is currently short, but

it should grow in the wake of the SECURE Act. DIA products currently available are the following:

- AIG IncomEdge®
- MetLife Retirement Income Insurance® QLAC

These products are offered only as in-plan distribution options and are also known as “longevity insurance.” The AIG product is also available as a Qualifying Longevity Annuity Contract (QLAC), while the MetLife product is exclusively offered as a QLAC. For each product, participants’ purchase amounts buy a future guaranteed income stream. The guaranteed income amounts are based on purchase amount, annuity purchase rate, age at contribution, and age at income start date. Annuity purchase rates vary by age, current interest rates and actuarial assumptions.

The main attraction of QLACs is their exemption from required minimum distribution (RMD) rules until payouts commence at the income start date, thus deferring taxes on the RMD income. Under the provisions of the SECURE Act 2.0, the RMD age will increase over time beyond the current age 72 revised upward by the SECURE Act, and thus lessen the potential tax deferral benefits of QLACs. However, the increase in the maximum allowed lifetime contributions from \$135,000 to \$200,000 and the repeal of the limit that no more than 25% of a participant’s account balance can fund QLAC purchases makes the SECURE Act 2.0 a net win for QLACs, if it becomes law in its current form. In any case, Mesirow anticipates growing usage of DIAs/QLACs in QDIAs going forward.

For hybrid QDIA-eligible strategies designed to purchase SPIAs or DIAs, the residual strategy assets are typically managed to complement the guaranteed lifetime income generated by the GRI product and function as a potential source of additional non-guaranteed income post retirement. Because of the fixed income character of the annuities purchased, the sleeve funding the purchase is typically managed as a fixed income hedging strategy (such as a Liability Driven Investing (LDI) strategy) with the cost of fixed annuity lifetime income in mind. The size of the hedging sleeve increases approaching retirement, analogous to the increasing allocations to in-plan GRI products during the “runway” period in which they accrue lifetime income benefits warranting the increase.

Recent examples of hybrid QDIA-eligible solutions that fund the purchase of GRI products include the following:

- BlackRock LifePath Paycheck™
- Wells Fargo Retirement Income Solution

The BlackRock solution is a TD structure designed to purchase SPIAs, currently from insurers Equitable and Brighthouse Financial, and is paired with a digital participant experience designed to be integrated with the recordkeeping platform. The Wells Fargo solution is offered through Wells Fargo Asset Management (WFAM) and combines a TD CIT with the option to purchase QLACs starting at age 65, with an alternate version funding the purchase through a balanced strategy. These scalable solutions come in the wake of a recent high-profile custom mega-plan QDIA example: the State Street Global Advisors (SSGA) solution for the University of California, *IncomeWise™*, which like the Wells Fargo solution, is designed to fund the purchase of QLACs.

#### **STANDALONE SOLUTIONS: GRI PRODUCTS DESIGNED TO BE QDIA-ELIGIBLE**

With the exception of a new product design just coming to market at the time of writing, which is based on a Fixed Indexed Annuity (FIA) embedded within a TD CIT structure, standalone solutions that are designed to be QDIA-eligible are exclusively based on a variable annuity chassis to provide lifetime income guarantees. While the details of the FIA-based product structure are not yet fully transparent, we provide a high-level overview after describing the more prevalent variable product designs.

Although standalone GRI solutions are designed to function on their own as QDIAs, they can also be integrated into hybrid solutions that include traditional investments through a PMA service, either on the insurance provider’s proprietary recordkeeping platform, or in an open-architecture setting if the GRI product structure allows for that degree of portability (e.g., a CIT). Also, some are available as “partially wrapped” solutions, in which only a portion of assets are earmarked for the support of guaranteed lifetime income and incur the related GRI fees to support the guarantees.

For these reasons, the lines distinguishing standalone and hybrid solutions can become blurred in practice. We include standalone solutions within the broader discussion of a GRI component of the QDIA, and its promise for helping mitigate self-destructive participant behavior in traditional TDF strategies, even though they are often designed to be “fully wrapped” insurance solutions incurring the commensurate costs, rather than a mix of traditional investments and GRI products.

## VARIABLE ANNUITY WITH GUARANTEED LIFETIME WITHDRAWAL BENEFIT

A variable annuity with a Guaranteed Lifetime Withdrawal Benefit (GLWB) rider is an insurance product that offers guaranteed lifetime income through systematic withdrawals, rather than requiring annuitization to provide lifetime income. In addition to the ordinary market value of the underlying investments, such products track an account value that can protect against market value declines nearing and through retirement. This alternate account value, often called the “income base” or “benefit base,” tracks the highest account value over a specified period (typically annually) and is used to calculate the annual guaranteed lifetime withdrawal amount. Both the income base and the lifetime withdrawal amount can only increase based on favorable investment performance, subject to annuity contract-specific provisions, which is also known as a guarantee “ratchet” feature.

GLWB products are fully liquid both during accumulation and retirement, but any outflows other than the lifetime withdrawal amount during retirement can incur penalties, adjustments, or loss of future guarantees. To pay for the lifetime income guarantees, an insurance rider fee is assessed periodically during accumulation and throughout retirement. Lifetime income payments continue even after the market value of the underlying investments is exhausted through cumulative market performance and systematic withdrawals.

For all current in-plan variable annuity with GLWB products, the underlying investments consist of either target date portfolios, a single balanced/moderate risk asset allocation portfolio, a set of risk-based asset allocation portfolios from which participants can select, or some combination of the above. All are asset allocation portfolios, with the opportunity to achieve a conservative to higher levels of risk, and all such products require systematic withdrawals to fund the vehicle producing guaranteed lifetime income. Examples include the following:

- Alliance Bernstein (AB) Lifetime Income Strategy
- American Century Income America™ 5ForLife
- Great-West Secure Foundation
- John Hancock Guaranteed Income for Life Select
- Lincoln PathBuilder Income
- Prudential IncomeFlex Target
- Transamerica SecurePath for Life

Most of the above products are only available on an insurer’s proprietary recordkeeper platform. Notable long-tenured exceptions include the AB solution and Prudential IncomeFlex. The AB Lifetime Income Strategy is a custom large and mega plan multi-insurer solution available on most major recordkeeping platforms; an early high-profile implementation was for United Technologies Corporation in 2011. Prudential offers a white-labeled CIT version of its solution for ICMA-RC called VT Retirement IncomeAdvantage, custom implementations to large and mega plan sponsors, and acts as one of the insurers for the AB solution. A notable newcomer exception is the American Century product, which is also structured as a CIT, but unlike the ICMA-RC product is intended to be marketed as an open architecture GLWB solution.

## FIXED INDEXED ANNUITY WITH GUARANTEED LIFETIME WITHDRAWAL BENEFIT

While fixed indexed annuities have been a mainstay for retail investors for over two decades, they are new to the retirement space, and the GLWB feature of the first-to-market in-plan product design makes them a potentially attractive alternative to their variable annuity with GLWB cousins.

Fixed indexed annuities, originally known as equity indexed annuities, typically have features of both deferred fixed and variable annuities. Fixed indexed annuities pay an interest rate based on the performance of a specified underlying market index, usually the S&P 500 or an index derived from it, but subject to floors that provide principal protection, caps that limit the upside potential, and possibly a “participation rate” that limits the maximum interest to a specified percentage of the gain in the underlying index. A variety of methods are applied to measure performance of the index to fulfill contract provisions, including the year-over-year gain and the average monthly gain over a 12-month period.

The first in-plan product design is offered by Annexus Retirement Solutions and is known as Lifetime Income Builder (LIB). The design is flexible in the sense that it provides product co-manufacturing opportunities, with both insurance companies to back the annuity guarantees and asset managers to provide a target date glide path and implement the non-annuity portion with traditional underlying funds. LIB is a fixed indexed annuity sleeve in an overall target date structure, in conjunction with several key product features, including the transition at or near age 50 to the purchase of LIB growing to a 65% allocation at age 65,



with 35% remaining in equities. This “to retirement” structure provides a targeted income amount of 6% on the entire account balance, with 4.5% of GLWB income guaranteed from the LIB sleeve and 1.5% targeted from the equity sleeve in retirement. If the total account value is exhausted, meaning the entire equity sleeve is spent down, LIB continues to pay 4.5% for life.

The first implementation of this product design is a TDF in a CIT structure, which is slated to be launched by Nationwide as part of a series of five in-plan products during 2021.<sup>20</sup> Because of the flexibility for co-manufacturing opportunities, as well as the portability of the CIT structure, we expect more new products in this class to be launched in the near term.

### **Tactical self-destruction through chasing returns: buy high and sell low**

There is a plethora of available GRI options with a variety of features. One commonality is that they all offer some form of guaranteed income, which in turn, provides some downside risk protection in an asset allocation framework. While the benefits of an allocation to GRI products in a QDIA framework are clear, this paper focuses on the ability of GRI products to address specific behavioral problems displayed by investors. In particular, these solutions can provide a return buffer that reduces investor trading activity following large negative market events, which create a measurable impact through portfolio return drag. Similarly, by hedging the impact of tail risk, they allow investors to maintain allocations to higher returning equity-allocation portfolios that can result in higher financial savings.

A companion paper, *The appropriate age for transition to managed accounts in a QDIA framework—It might be earlier than you think*, looks at the positive role that managed advice in a QDIA framework can play in addressing these issues. Access to managed advice and the use of GRI products often go hand in hand, but this need not be the case. GRI products in a QDIA framework can certainly stand alone in terms of the benefits that they convey.

The tendency of investors to market time by “chasing returns” has been well documented and the evidence is clear that it results in a serious portfolio return drag. Moreover, this behavior in the context of extreme downside return events can have a meaningful impact on subsequent retirement savings balances, as the tendency to react is higher for those participants with shorter time horizons and

higher extant balances. There is evidence, as well, that larger and more persistent downside market regimes can have a long-term impact on participant asset allocation preferences.

Benartzi and Thaler note that while new participants dramatically increased their equity allocations between 1992 and 2000 from 58% to 74%, in the succeeding two years following the 2000 market crash, this allocation fell back to 54%. As they note, “The market timing of new participants in their exposure to equities was exactly wrong. They bought high and sold low.”<sup>21</sup> They note an accompanying phenomenon regarding allocations of participants to a technology fund investment option during the same period, as “Again participants were buying into the technology fund most aggressively at the peak.”<sup>22</sup>

There is substantial evidence that investors are strongly influenced by past returns in their investment allocations and trading behavior, which implements a substantial portfolio cost burden. Greenwood and Shleifer find that investor return expectations are highly correlated with past market returns and market level.<sup>23</sup> Fed research economist YiLi Chien using ICI data from 2000 to 2012 measured the correlation between equity mutual fund flows and past quarter returns, which was a remarkably high 0.49. Much like Benartzi and Thaler, Chien notes that “in the long run, the tendency to buy high and sell low when exhibiting return-chasing behavior could eventually reduce part of their profits.”

In fact, the cost in terms of return drag to investors is quite high. Comparing the actual realized return of the return-chasing to a buy and hold approach, “chasing returns caused the average US mutual fund investor to miss around 2% return per year, which is very significant.”<sup>24</sup> This work echoes the earlier findings of Geoffrey Friesen and Travis Sapp who find a 1.56% return drag using mutual fund cash flow data from 1991-2004.<sup>25</sup>

TDF glide paths were meant to address this investor timing issue by locking participants into an asset allocation that could be used as a “set it and forget it” framework with automatic rebalancing around such market events. We look at the recent behavior of TDF flow data during the negative return months from early 2020 based on Target Date groupings and find distinct patterns that echo other researchers findings on return-chasing behavior, along with interesting differences by date grouping. These findings raise serious concerns about the potential impact on some groups of retirement savers.

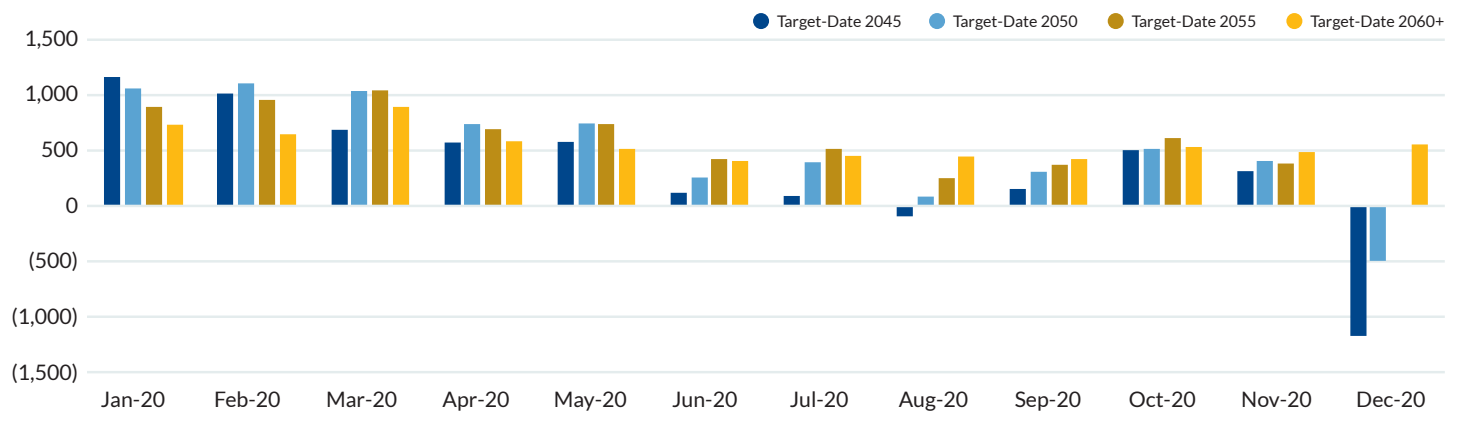
The worst monthly return in 2020 was March, at -12.35%, which followed February's -8.23%. The worst return month, however, was followed by the best return month of the year in April, with a 12.82% showing. This is quite typical of markets, where extreme positive tail returns follow within a short time frame after negative tail returns. Trading around these events creates risk if that tendency is to chase returns, reducing balances even further before market rebounds. Removing the best 10 or 20 months from stock return series over extremely long horizons of 50 years or more reduces the return to something similar to that of T-Bills. Despite opening 2020 with three successive months of negative returns that drew the market down into near-bear market territory of almost 20%, the S&P 500 managed to produce a well above average annual return of over 18%.

Not surprisingly, we see heightened trading activity around the early months of 2020. Vanguard notes that among DC participants, "In the first half of 2020, the range of equity allocations widened further, particularly to the downside. The effect was most notable among generation Xers and older millennials, where the 25th percentile equity allocation dropped between 4 and 8 percentage points."<sup>26</sup> The trading activity in March 2020 was more than double the average monthly trading volume. We highlight the specific flow data by Target Date cohort and examine the implications in this paper.

The good news is that TDFs with time horizons of 20 years or more tended to show positive flows throughout 2020. The highest positive flows were during the negative returning months of January to March. Positive fund flows are often highest in the first few months of the year, just as they tend to be negative in the last month of the year in terms of calendar effects. There may be some evidence, however, that younger investors experiencing an extended bull market have been conditioned to 'buy the dips'. Figure 1 below shows the monthly flow data for these age cohorts.

TDFs tend to be constructed and aggregated into 5-year increments. Give the specific target date years represented, an assumed retirement age of 67, and a starting measurement date of 2020, we assume that the Target Date 2040 portfolio may be interpreted as having an age interpretation of roughly 45, with approximately 20 years to retirement. Similarly, the Target Date 2045 may be roughly associated with a rounding age of 40 and a 25-year time horizon. The flow data in Figure 1 does show a noticeable difference between the Target Date 2045 group and others, particularly in the months of March 2020 and December 2020.

FIGURE 1: TDFs GREATER THAN 20 YEAR HORIZON | 2020 MONTHLY FLOWS

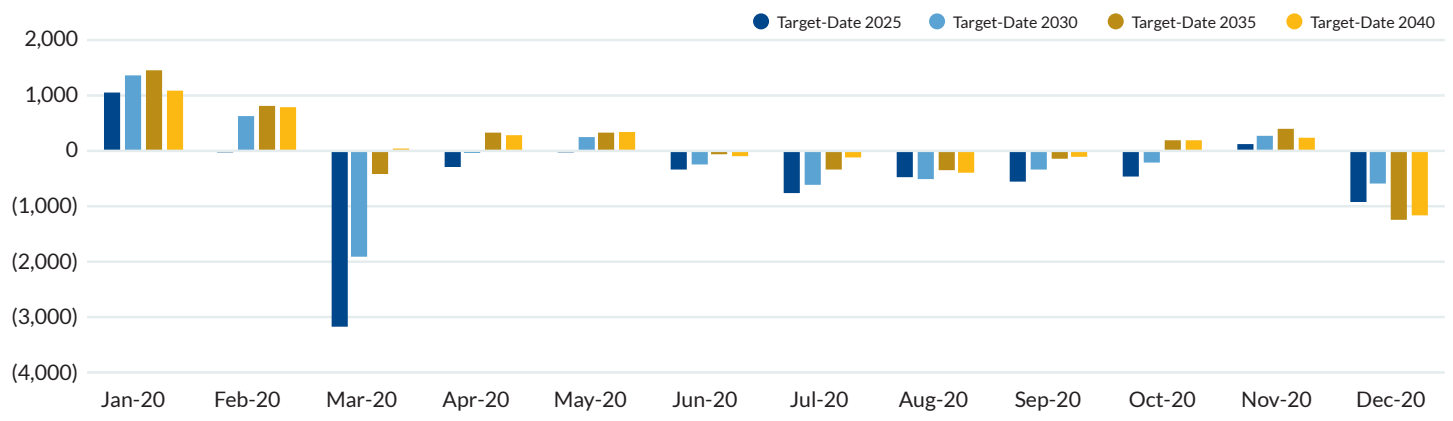


Source: Morningstar Asset Flow Data

The monthly TDF flow data in Figure 2 below shows exactly the type of return-chasing behavior that has been highlighted by earlier research work. There were clear outflows in the month of March in the worst returning month. Not surprisingly, these negative flows were the highest for the age cohort closest to retirement with the largest extant balances, with less distinct differences in other months of the year. Comparing just the months of February and March between the two charts, we can see distinct differences

in investor behavior. The shorter the time horizon and the larger the financial savings balance, the more concerned that investors are with downside market risk. The TDF glide path accounts for this rising loss aversion with age but can't fully provide either the downside protection from dampened volatility or the discipline of a fixed portfolio allocation strategy, sufficient to address the aggregate behavioral problems that are evidenced.

FIGURE 2: TDFs WITHIN 20 YEAR HORIZON | 2020 MONTHLY FLOWS



Source: Morningstar Asset Flow Data

Unfortunately, by drawing down balances after negative returns and having fewer dollars at work in the portfolio, investors experienced an obvious return drag by missing the substantial market rebound in April and succeeding months. The effects in 2020 were measurable, but likely were mitigated by the very quick market rebound. Negative returns that are bigger and longer lasting will have a bigger impact on investor trading behavior. It is only a matter of time, however, before retirement savers experience another extended bear market event. Our research here clearly indicates what the impact of such a period would be for savers.

The data in Figure 3 show the behavior in 2020 versus prior 5-year averages for specific target date cohorts, associated with ages 40 and 45. We know that as the horizon shortens and financial balances grow, retirement savers start to change their behavior and loss aversion grows. It makes sense to address the behavior through increased allocation to GRI products before any real damage is done. It's better to shut the barn door before the horse escapes and not after. Allocations are often recommended by age 55 to allow for appropriate runway to purchase, but the behavior of substantially younger ages, as highlighted here, argue for the logic of allocations to such products earlier in life, as well.

FIGURE 3  
"AGE 45"

Target-date 2040	January	February	March	April
2015	1,026	917	1,055	755
2016	788	941	1,155	954
2017	1,164	1,272	1,484	701
2018	1,067	711	1,119	648
2019	1,252	1,120	944	655
5-year average	1,059	992	1,151	743
2020	1,092	796	43	292
Change	3.08%	-19.77%	-96.27%	-60.68%

Source: Morningstar Asset Flow Data

"AGE 40"

Target-date 2045	January	February	March	April
2015	635	752	897	704
2016	739	934	1,011	1,013
2017	1,019	1,111	1,359	796
2018	1,240	881	1,243	903
2019	1,431	1,126	990	929
5-year average	1,013	961	1,100	869
2020	1,166	1,017	688	573
Change	15.13%	5.85%	-37.45%	-34.06%

Source: Morningstar Asset Flow Data

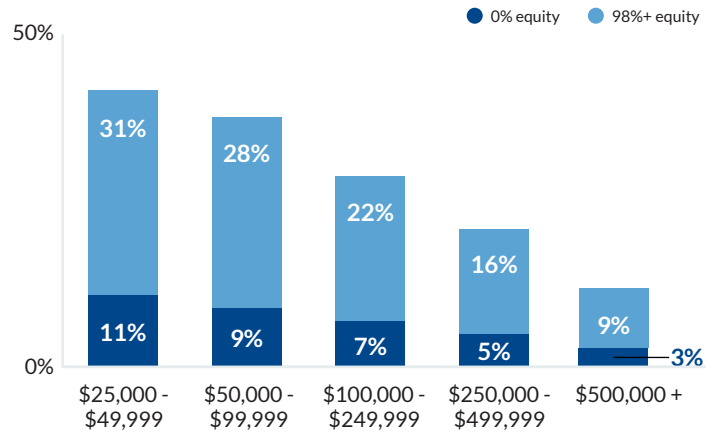
## The role of GRI products in balancing return and risk

GRI products that were offered Safe Harbor by the SECURE Act are one obvious solution to offering downside protection for investors and allow them to maintain the comfort with market downturns and maintain portfolio allocation discipline. One of the potential benefits of the GRI products is the ability to either maintain more aggressive allocations than investors would otherwise be willing to endure in extreme downside return environments, or else, to enable higher allocations to equity given average risk tolerance. The optionality embedded may change the risk and return payoff for many investors. Prospect Theory, developed by Nobel economist Daniel Kahneman and Amos Tversky, imply loss aversion of roughly 2:1 on average, which means that a dollar of loss counts towards utility in a negative way as much as one dollar of gains counts toward positive utility. There is much evidence to suggest that this loss aversion increases as the time horizon shortens, particularly related to marquee events that reduce financial flexibility, such as retirement, even though the theoretical time horizon for such assets remains long in terms of the liability duration. Sequence of return risk likely plays a role in this rising loss aversion. Moreover, financial balance level is a contributing factor.

This latter point can be inferred from Figure 4, which looks at the prevalence of extreme allocations by financial balance. The extreme allocation to equities appears to be strongly affected by rising financial balances, as the allocation drops sharply. This fact is evident despite the noted counter-tendency to be more aggressive with “house money” in a

gambler’s mentality, than with contributed funds,<sup>27</sup> as one can assume that the higher balances would correspond with higher capital gains relative to contributions as a percentage of total account value.

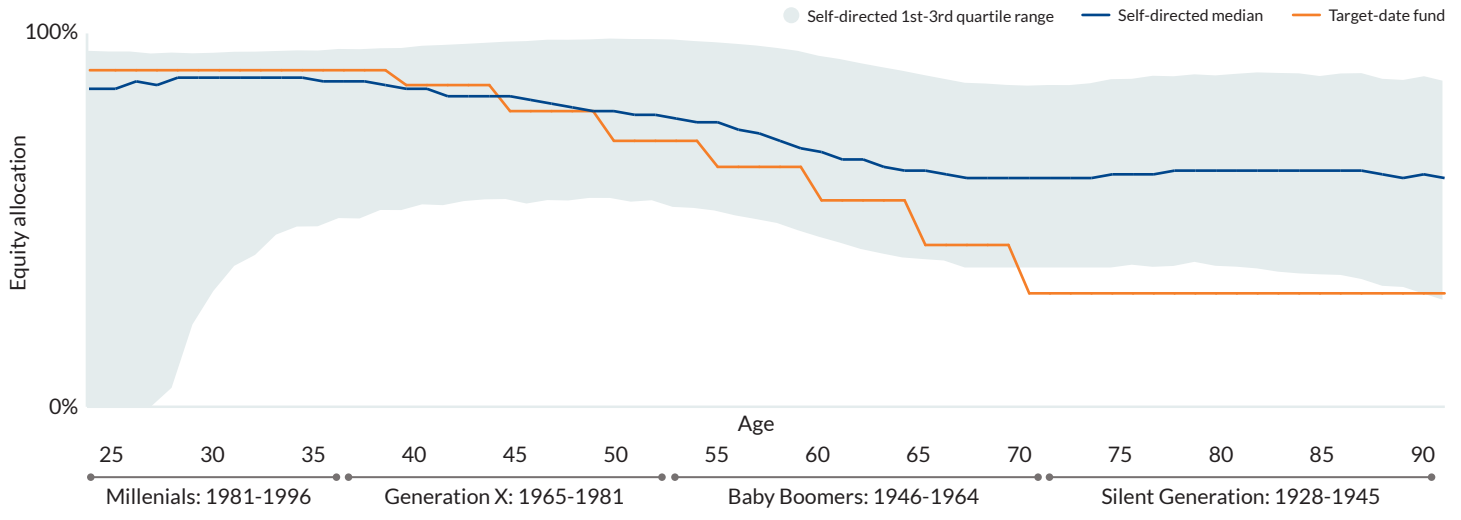
**FIGURE 4: PREVALENCE OF EXTREME EQUITY ALLOCATIONS BY FINANCIAL BALANCE**



Source: Vanguard How America Invests

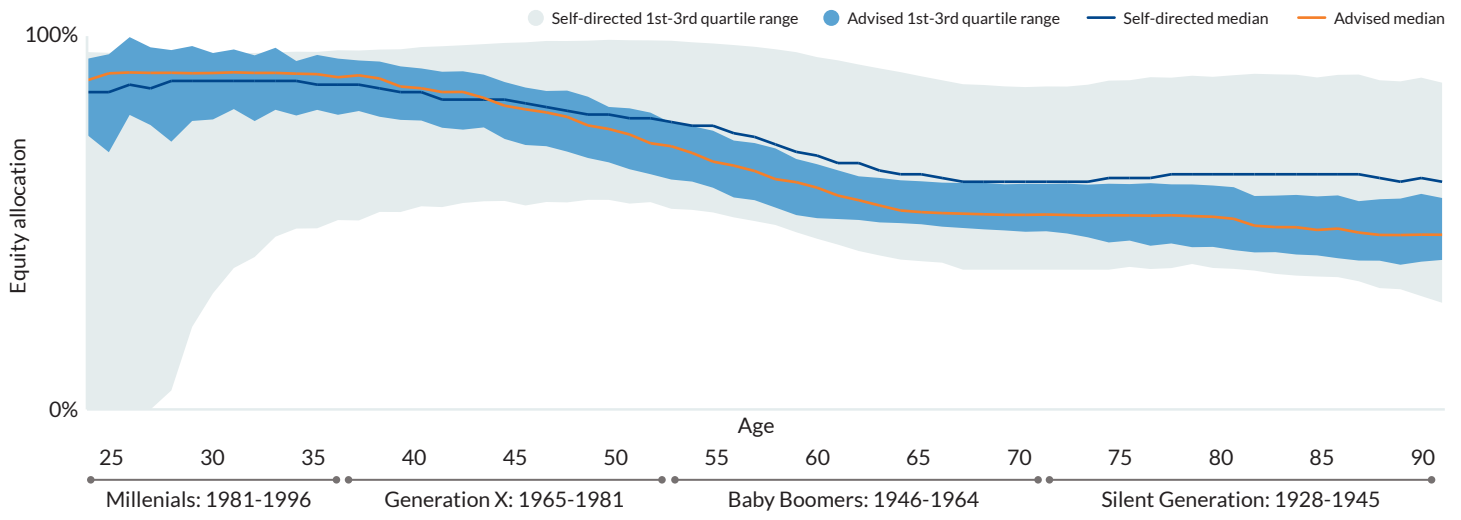
Products, such as GRI Solutions, that can cut off the left tail of portfolio distribution return outcomes can certainly change the math of this loss aversion in contributing toward a portfolio risk-level decision. Obviously, this has limits due to the fact that insurers are unlikely to wrap portfolios integrated with GRI features above a 70% equity threshold and most not above 60% equity. Nevertheless, whether wrapped or not, the inclusion of GRI features can lead to higher equity allocations for longer than is representative of the typical TDF glide path, or managed advice allocation, as shown in Figures 5 and Figure 6, respectively.

FIGURE 5: VANGUARD RETAIL HOUSEHOLDS (TAXABLE ACCOUNTS AND/OR IRAs) as of 12.31.2019



Source: Vanguard, 2020

FIGURE 6: VANGUARD RETAIL HOUSEHOLDS (TAXABLE ACCOUNTS AND/OR IRAs) as of 12.31.2019



Source: Vanguard, 2020

In particular, it is noteworthy that the self-directed equity allocation medians are substantially higher than the professionally constructed TDF portfolios, or managed advice portfolios, in later years closer to retirement. Interestingly, the TDF portfolios are also substantially lower than the managed advice portfolios and even outside of the interquartile range shown for the self-directed allocations. The higher equity allocations may be evidence of higher risk tolerance from an extended bull market, or alternatively, a desire for higher financial balances through higher returns without higher contributions on the part of participants. The higher

equity allocations among self-directed portfolios is most likely reflective of a “return-driven” portfolio construction strategy. As we note, during periods of extreme downside risk events—particularly those that are prolonged—this type of approach is likely to result in sharp participant adjustments in asset mixes in response, particularly for those with higher balances and shorter time horizons.

There is a notable retirement under-saving problem, with financial balances too low relative to retirement needs for most retirement investors, as well as for the system as a whole.<sup>28</sup> Most investors that are under-saving are



aware that they are under-saving. Undoubtedly, the lower equity allocations in managed advice, and especially, TDF glide paths, are constructed to maintain an appropriate level of volatility with shorter time horizons. In this sense, volatility profiles are the primary driver, rather than return considerations. The evidence shown earlier of the reactionary, return-chasing behavior of investors shows this “risk-based” portfolio construction approach to be largely appropriate and conservative. The investor loss aversion issue and accompanying return-chasing behavior, along with a desire for higher potential return allocations, can be addressed in tandem, to an extent, with the inclusion of GRI products. GRI allocations can help to close the gap between a needs-driven, return-oriented approach with a volatility-driven, risk tolerance approach that is meant to ensure adherence to an investment policy in the presence of extreme downside risk events.

### Product analysis: Generic DFA integrated into a QDIA

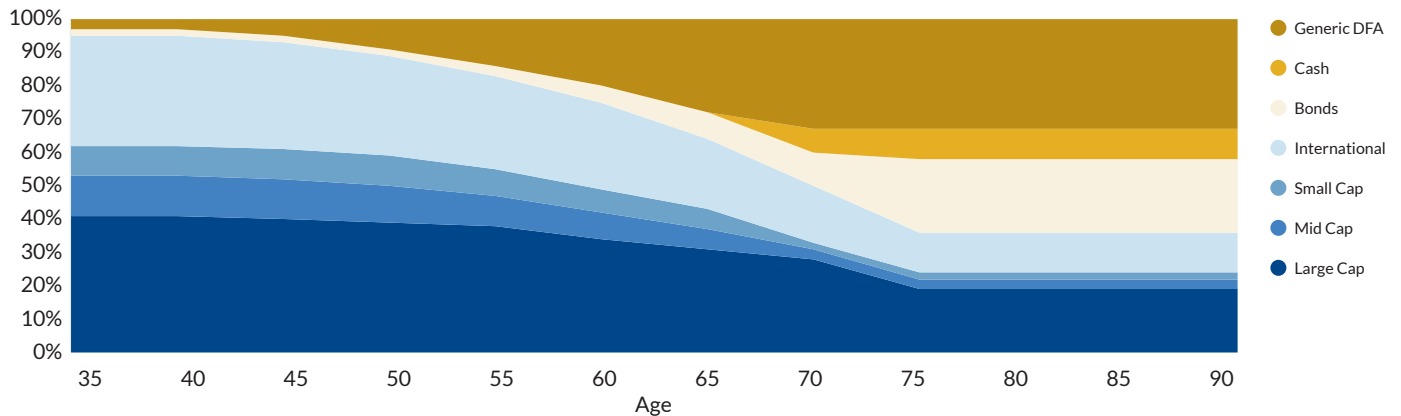
To demonstrate these concepts, we have modeled the integration of a generic DFA into two different TDF glide paths, comparing both a high equity and a medium equity glide path with and without a DFA. A generic DFA without any special features is among the least competitive GRI products available. Therefore, a hybrid QDIA solution that includes this type of product represents an effective lower bound illustration of the efficacy of GRI products in providing superior retirement outcomes relative to QDIAs including only traditional investments. This analysis is conducted using a simulation-based retirement income optimization framework. The high equity glide path with a generic DFA scenario represents an optimal product and asset allocation mix produced by that framework. The allocation of traditional bonds and the generic DFA—constrained such that the total allocation to bonds matches the target allocation for the high equity glide path—corresponds to the global maximum of a proprietary risk-adjusted RI Score performance metric used for both glide path construction with GRI products and their fiduciary evaluation.

The comparison of these investment options demonstrates that the longevity risk protection provided by an asset mix with a DFA is more attractive at the average and median outcomes than traditional investment glide paths in their absence. Therefore, even average risk tolerance investors should be incented to assume higher equity allocations for longer period of time than without the DFA because a hybrid QDIA with a generic DFA can help mitigate the retirement under-saving problem discussed earlier for moderate- and lower-risk tolerance investors through the longevity risk mitigation provided by the GRI product.

Our model of the generic DFA assumes an underlying aggregate bond portfolio, but with a principal protected floor of zero return and an implicit expense (“haircut”) imposed for offering that principal protection, commensurate with typical insurance company general account SV products. The allocation to the DFA along the high equity glide path shown in Figure 7 follows an approach<sup>29</sup> of including a buffer of approximately 20% to comparable traditional investments (in this case, ordinary bonds), so that the GRI allocation can be non-decreasing even under rebalancing during significant market downturns. The allocation to the generic DFA increases monotonically, with an increasing fixed income allocation approaching and through retirement, plateauing at age 70, in order to avoid excess annuity balances as the longevity risk benefits decrease for investors who choose not to annuitize until later ages. The allocations shown at some points along the glide path are slightly below the 80% approximate maximum allocations, based on the optimization results. The high equity glide path without the DFA is identical to that shown below, except that the DFA allocation is rolled up into the aggregate allocation to bonds. The medium equity glide path without the generic DFA is provided in Figure 8 as a comparison for a glide path without the DFA, where the allocation is rolled up into the bond sleeve.

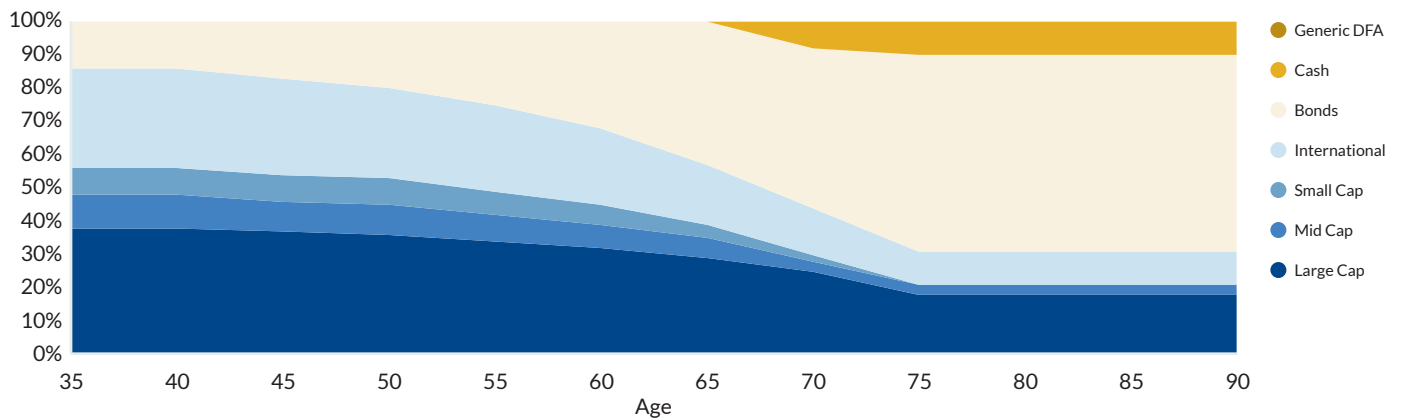
Over the span of the glide paths, the equity allocations range from 95% to 36% over the targeted time horizon portfolios for the high equity glide path and 85% to 31% for medium equity glide paths, while the generic DFA allocation ranges from 3% to a maximum of 33% at age 70 and older.

FIGURE 7: HIGH EQUITY GLIDE PATH WITH GENERIC DFA



Source: Mesirow

FIGURE 8: MEDIUM EQUITY GLIDE PATH WITHOUT GENERIC DFA

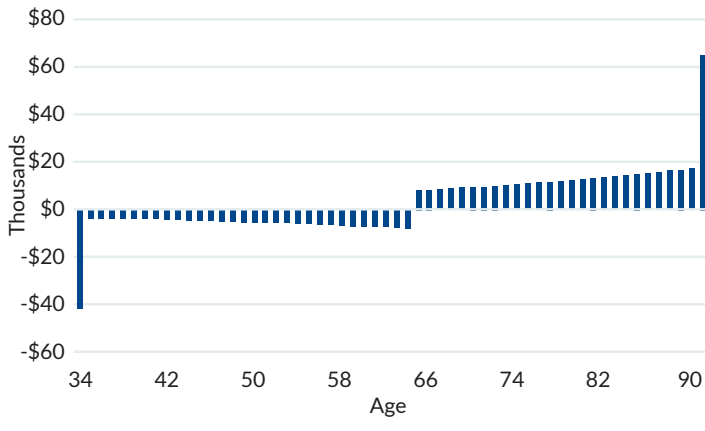


Source: Mesirow

The lifecycle investing scenario selected for the analysis is based on a participant savings model throughout accumulation that targets both a minimum desired sustainable income stream and a modest bequest/ending wealth goal at an above-average life expectancy (derived from standard mortality tables). The definition of “minimum sustainable income” is derived from the determination of the inflation-adjusted income target starting at age 65, such that the high equity glide path with the generic DFA achieves the combination of income and bequest goals approximately 85% of the time. This threshold corresponds to tolerating an approximate one standard deviation of downside outcomes, meaning failure to meet the targeted income and bequest goals, based on normal distribution statistics. The modeling further assumes the generic DFA is fully annuitized at retirement age 65.

The cash flow profile for the full lifecycle investing scenario studied is displayed in Figure 9. To perform the comparative analysis, we evaluated the high and medium equity glide paths without the generic DFA allocation utilizing the identical lifecycle investing scenario. In effect, the analysis provides an apples-to-apples comparison by subjecting the various alternative investment strategies to the same requirement to generate a specific targeted retirement income stream and ending wealth goal at an above-average life expectancy. We then evaluate the relative performance of the strategies through a simulation-based, retirement income optimization framework in order to draw conclusions about the expected economic utility of each approach.

**FIGURE 9: LIFECYCLE INVESTING SCENARIO CASH FLOW ASSUMPTIONS**



Source: Mesirow

Among the various metrics analyzed, one of the most intuitive is the distribution of wealth outcomes through time. We highlight both the median and average outcomes under the lifecycle investing scenario described above among the potential percentile distribution. The average is substantially higher than the median. While it is the probability weighted expected outcome, it is heavily influenced by relatively smaller probability positive return outcomes, and therefore, the median can be a useful alternative point of comparison. Figure 10 shows the ending financial balances for a high equity risk-level asset mix over a lifecycle from age 35 through age 91, with and without the generic DFA product in the mix. Also shown is the medium equity glide path without a DFA product. This provides both a direct comparison of the high equity glide path with and without the DFA product, but it also enables a comparison of a strategy utilizing higher equity allocations with a DFA relative to the average and

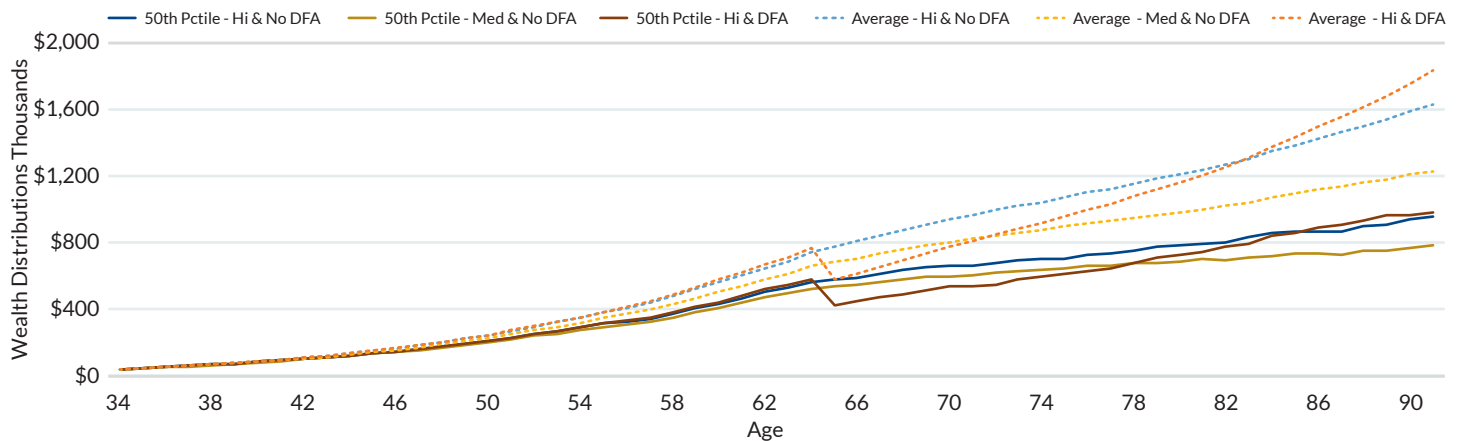
median outcome provided by a lower risk strategy without the DFA. The benefits of the longevity risk mitigation provided by the generic DFA in both cases are obvious.

A notable feature of the glide path with the generic DFA is the kink in the wealth levels at age 65. This corresponds to the annuitization of the generic DFA balance at retirement. The high and medium equity glide paths without the DFA instead show a smooth transition from accumulation to the generation of lifetime income through systematic withdrawals.

The key analytical insights to this analysis are the age cross-over points at which the median and average wealth levels with a DFA product exceed those of the equity glide paths without the product, effectively overcoming the significant wealth reduction upon the cost of annuitization at retirement. Intuitively, the reason that the remaining balance in traditional investments can grow beyond the wealth levels of the competing strategies without a generic DFA is that it supports smaller systematic withdrawals. Only the difference between the overall inflation-adjusted lifetime income target and the annuity income is needed, whereas the full income target must be met through systematic withdrawals for the competing strategies.

Relative to the high equity glide path without the DFA, these cross-over points are at ages 83 and 86 for the average and median wealth values, respectively. In effect, the longevity protection provided by the DFA manifests itself at these ages, which are close to ordinary life expectancy conditional on a participant being alive at retirement and able to annuitize the DFA. This is somewhat intuitive in terms of rational pricing—only participants who live longer than the conditional average mortality age reap the DFA benefits.

**FIGURE 10: WEALTH DISTRIBUTIONS FOR THE COMPARISON OF QDIAs WITH AND WITHOUT A GENERIC DFA**



Source: Mesirow

This is the longevity risk of outliving retirement assets that is being specifically hedged against and it is difficult to effectively hedge this risk without some type of GRI product.

The cross-over points relative to the medium equity glide path without the DFA convey an interesting and compelling insight. The cross-over ages of 72 and 78, respectively, for the average and median wealth values are below the conditional ordinary life expectancy. An interpretation of these results is that moderate risk investors, who are educated about the longevity risk protection provided by a generic DFA, can opt to assume higher equity risk over a longer period of time than they ordinarily would without the longevity protection of the DFA. In doing so, they would benefit from both the mitigation of potential retirement under-savings and be more likely to reap the benefits of longevity protection than higher risk investors.

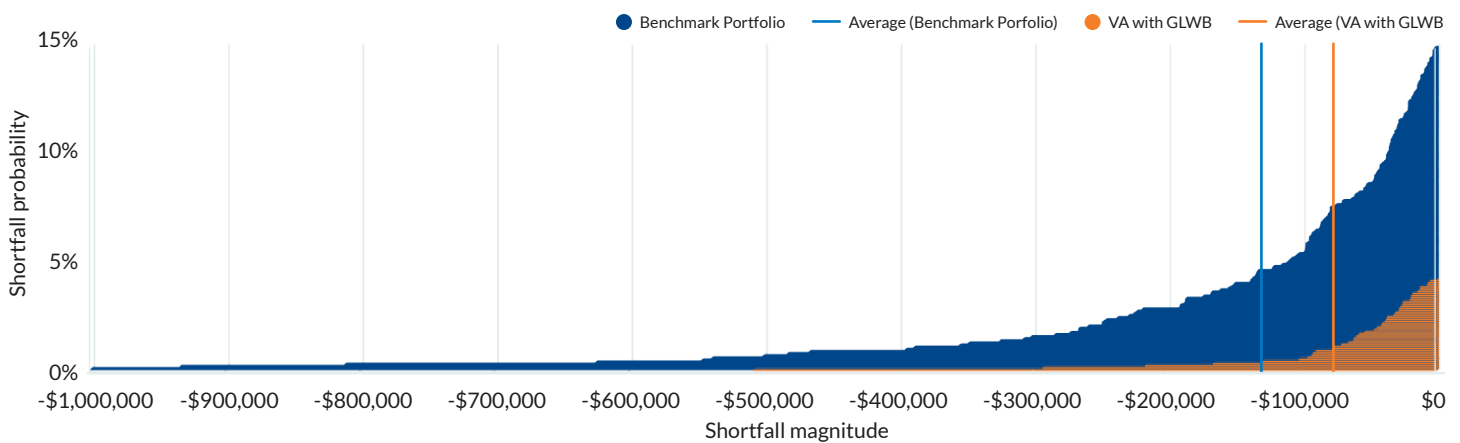
Based on the cross-over ages, moderate risk investors choosing the high equity glide path with the DFA are better off on average than in the medium equity glide path, assuming they live past age 72 rather than age 83, which is the cross-over age for high equity investors. Similarly, they have a greater than 50% chance of beating the medium equity glide path by age 78, when the median outcome of that investment option falls short, in contrast to age 86 relative to the high equity glide path without a DFA allocation. In other words, moderate risk investors benefit from the DFA without needing to live as long as the conditional average mortality age that higher risk investors must survive past to benefit from the DFA.

### Product analysis: Generic GLWB as standalone QDIA

The generic DFA is among the least competitive of the GRI products, because it provides principal protection during accumulation but without equity market upside potential, with the primary benefit being the provision of a hedge against longevity risk. Other alternative GRI products can provide additional benefits, such as downside risk protection during both accumulation and retirement along with equity market upside potential. Products such as these most clearly elucidate the potential benefits of GRI products as a hedge against downside risk, thus enabling more aggressive asset mixes with higher potential return for a given risk tolerance level. As noted earlier, a variable annuity with a Guaranteed Lifetime Withdrawal Benefit (GLWB) rider is an insurance product that offers guaranteed lifetime income through systematic withdrawals, rather than requiring annuitization to provide lifetime income. In addition to the ordinary market value of the underlying investments, such products track an account value that can protect against market value declines nearing and through retirement.

This type of product can likely help to mitigate the self-destructive behavior illustrated in TDF fund flows in 2020 and other more extended downturn periods, where retirement participants react and chase returns. By providing downside risk protection during downturns with a guarantee of retirement income, investors are likely to have the peace of mind necessary to effectively ride out market risks, as TDF glide paths were designed to achieve in the first place.

FIGURE 11: SHORTFALL DISTRIBUTIONS FOR THE COMPARISON OF GLWB WITH MODERATE RISK BENCHMARK



Source: Mesirow

In the generic DFA analysis, we highlighted simulated wealth percentiles at the average and median outcomes. Other GRI products typically will do as well or better in that regard as the generic DFA. Other metrics can elucidate outcomes at the more negative end of the simulated cumulative return distribution. The minimum sustainable withdrawal rate and bequest level in the generic DFA analysis was determined by the negative one standard deviation event that generated 15% shortfall outcome for a high equity portfolio with a DFA. Here the same process is used for a traditional 60/40 balanced portfolio, which is designated as the benchmark. The vertical axis highlights the cumulative shortfall probability, while the horizontal axis highlights the cumulative shortfall dollar value. The VA with GLWB provides a significantly lower cumulative probability of shortfall outcomes with a substantially lower average shortfall for those shortfall simulation outcomes.

This highlights the clear downside risk protection benefits that are inherent in numerous GRI product incarnations.

## Conclusion

While innovations over the last 15 years in automatic enrollments, automatic contribution escalations and QDIA utilization have helped to address the numerous behavioral flaws of investors that have been identified by economists and applied those in a retirement savings setting, more work remains. Most individuals continue to display a tendency to chase market returns with self-destructive results, undermining the implicit discipline of a TDF glide path. Similarly, investors tend to under-save for retirement, and unconstrained, tend to allocate more to equities to achieve higher probabilistic ending financial balances, most likely to compensate for lower contribution levels.

Luckily, there are extant GRI solutions that address these specific problems. Unfortunately, these solutions have a low utilization rate in a voluntary opt-in framework. Therefore, the greater use of GRI products in a QDIA framework would be appropriate for most individual participants, as well as, beneficial for the system as a whole. The analysis in this paper highlights two very different types of GRI products, highlighting the provision of a hedge against longevity risk, as well as downside risk protection to varying degrees. Focusing on two different products, including the least competitive generic DFA, allows the reader to infer the relative benefits of the myriad of products in the universe.

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- The products mentioned in this paper are for illustrative/educational purposes only and are not a recommendation or solicitation to purchase.
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