

Russell Research

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From buyer *beware* to buyer *aware*

Evaluating guaranteed income solutions in DC plans

In-plan guaranteed income solutions can help defined contribution (DC) plan participants mitigate their longevity risk. Yet because the available solutions can differ on several dimensions, they are hard to compare. We hear statements such as “XYZ is illiquid, but ABC is not; XYZ offers higher initial payouts, but ABC has the potential for payout increases,” etc. From a plan sponsor’s perspective, the choice of one guaranteed income solution over another can feel ambiguous, because it is difficult to properly value the features of each. It is little wonder that plan sponsors have taken a cautious “buyer beware” approach to adopting guaranteed income solutions.

In this paper we present guidance that plan sponsors can use to help overcome this selection ambiguity and move from buyer *beware* to buyer *aware*. We focus on how to quantify and compare alternative solutions in terms that matter to participants – *income* terms – in order to better align the selection process with what participants want.

This paper has two parts. Part one is background: we discuss the appeal of guaranteed income solutions and describe two available product types. Part two presents an income framework for comparing guaranteed income solutions, including a “case study” analysis.

Part one: Background

WHY MIGHT A PLAN SPONSOR WANT TO OFFER A GUARANTEED RETIREMENT INCOME SOLUTION?

To be “aware” of guaranteed income solutions, we need first to establish their benefits. Simply put, guaranteed income products enable plan participants to help insure their retirement income against longevity risk – the risk that they will outlive their retirement assets. Here, we address (1) a participant’s chance of avoiding financial ruin when withdrawing the same annual amount from his retirement savings that he could obtain from

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a guaranteed income solution and (2) the maximum income a participant could receive from retirement savings while still maintaining the same odds of success as offered by a guaranteed solution.

Exhibit 1: For 65-year-old retiree with \$100,000 in retirement savings: probability of avoiding financial ruin

Initial annual withdrawal (from retirement savings)	Allocation to stocks					
	0%	20%	40%	60%	80%	100%
\$ 1,000	100.0%	100.0%	100.0%	100.0%	99.9%	99.6%
\$ 2,000	100.0%	100.0%	99.7%	98.9%	97.9%	96.0%
\$ 3,000	91.2%	94.7%	94.6%	93.2%	90.5%	88.0%
\$ 4,000	66.4%	75.1%	79.3%	80.0%	79.2%	77.8%
\$ 5,000	50.2%	54.5%	60.2%	64.4%	65.7%	66.0%
\$ 6,000	38.5%	41.5%	45.8%	49.8%	52.9%	54.5%
\$ 7,000	28.3%	32.3%	35.3%	39.3%	42.9%	44.8%
\$ 8,000	25.3%	26.2%	28.1%	31.5%	34.8%	37.3%
\$ 9,000	19.9%	22.2%	23.6%	25.2%	27.9%	30.9%
\$10,000	17.7%	19.2%	20.2%	21.5%	23.2%	25.7%

Source: Russell. Includes a 6.1% assumed average stock return, 2.1% assumed bond return and 2.5% annual income raises. Example provided for illustration only. Not meant to represent any actual results.

To do so, we assume that a plan participant, Bill, retires at age 65 with \$100,000 in savings. Bill allocates his retirement savings to a fixed mix of stocks and bonds. The assumed net bond return is a constant 2.1%. Stocks have an assumed average net return of 6.1%, with 18% volatility. Bill has a life expectancy of 20 years, but of course he could live for a longer or shorter length of time. Both the stock returns and age of death are independently randomized. For Bill, success is funding his withdrawals (which include an annual 2.5% cost-of-living adjustment, or COLA) and still having assets left over upon his death. Exhibit 1 shows the probability of Bill having a positive balance at death for different income levels and fixed asset allocations.

If Bill were to buy a fixed annuity with a 2.5% interest rate and 2.5% COLA, he might be able to receive an initial annual payout of around \$4,836.¹ If he were to allocate 80% of his assets to stocks but annually withdraw the same \$4,836 with the 2.5% COLA, he would have slightly better than a two in three chance of avoiding financial ruin based on the assumptions used in Exhibit 1.

Alternatively, to have a similar chance of sustaining his payouts, he could have with the annuity (call it 99% or better), Bill could initially spend only about \$2,500 a year² – barely half of what he could get with the annuity.

¹ Source: Russell calculations. Based on a assumptions stated on this page.

² Based on a 20% weight to stocks.

Exhibit 1 may understate two notable participant behavior issues.³ Some participants may not be aware of the longevity risk they face and spend too much, too soon. In a recent survey, more than a third of responding participants thought they could spend 10% or more of their starting wealth each year in retirement (e.g., for Bill, \$10,000) and not run out of money.⁴ Further, there is an assumption that a participant, such as Bill, understands his income needs and has the willpower to stick to the plan. “Normal”, i.e. human, participants will have greater difficulties executing this plan.

In light of our analysis of longevity risk and these observations of participant behavior, it is understandable why recent survey results indicate that plan sponsors lack confidence in typical participants’ ability to successfully manage their retirement income.⁵

OVERVIEW OF PRODUCT TYPES

Plan sponsors have the ability to help participants, like Bill, navigate retirement income management by offering an in-plan option designed to hedge longevity risk: a guaranteed income option.

Two types of in-plan guaranteed income product types currently available are (1) variable annuities with guaranteed lifetime withdrawal benefits and (2) fixed life annuities. Fixed life annuities with payouts that begin late in retirement, or “longevity annuities,” are being developed for the in-plan market. We did not consider them here, since they were not finalized and readily available at the time of this writing. However, we would advise plan sponsors that are considering in-plan income solutions to include longevity annuities in their search.

Variable annuity with guaranteed lifetime withdrawal benefits (GLWBs)

GLWBs (which may appear in different guises – e.g., guaranteed minimum withdrawal benefits) allow participants to invest in a portfolio of stocks and bonds (for example, a static 60/40 stocks/bonds mix) with a withdrawal guarantee. Upon retirement, a participant may withdraw a contractually defined amount for life, regardless of market performance. This amount is linked to the GLWB’s benefit base, a notional account value tied to the high-water mark of the participant’s GLWB account balance (a notional value is simply a number that determines the payment received from a financial instrument). On an anniversary date, if

REGULATORY SUPPORT FOR GUARANTEED RETIREMENT INCOME OPTIONS IN DC PLANS

As in-plan guaranteed income solutions garner more interest from plan sponsors, we have seen increasing concern about the fiduciary obligations in selecting a provider. What is Washington doing to support the uptake of these options?

In October 2008, the Department of Labor (DoL) issued final regulations that provide for a safe harbor “for satisfying the fiduciary duties...in selecting an annuity provider and contract for benefit distributions from an individual account plan.”^{*} While the regulations do not provide specific selection requirements, they do offer guidance on the process plan fiduciaries should follow to avail themselves of the safe harbor provisions.

Subsequently, in February 2010, the DoL and the Treasury Department (Treasury) jointly issued a Request for Information (RFI) on lifetime income options. The RFI solicited input on incorporating these options into a DC plan and on how to educate plan participants about them. The two departments continue to research how they can support DC plan sponsors in making lifetime income solutions available to their plan participants. Proposed guidance on communications regarding participants’ accounts balances as lifetime income streams is one initiative in the works.^{**}

In February 2012, Treasury’s Proposed Guidance Package on Lifetime Income aimed to make it easier to offer longevity protection within DC plans.^{***} This notable step provides additional evidence that both the DoL and the Treasury are focused on alleviating plan sponsors’ concerns about offering lifetime income solutions to their plan participants.

^{*} U.S. Department of Labor, Employee Benefits Security Administration 29 CFR § 2550.404a-4, October 7, 2008. <http://tinyurl.com/aqjgrgb>

^{**} Waddell, Melanie, “Treasury Set to Issue Lifetime Income Guidance; DOL to Follow,” *AdvisorOne* (October 6, 2011). <http://tinyurl.com/a8sj9ul>

^{***} U.S. Department of the Treasury, “U.S. Treasury, Labor Departments Act to Enhance Retirement Security for an America Built to Last,” 2 February 2012. <http://tinyurl.com/7k5bgwh>

³ While we deem two other factors less important than those discussed in the body, we cite them here. The return assumptions would change if interest rates change and Bill could further improve his odds by using a different asset allocation strategy.

⁴ AllianceBernstein, “Assessing the State of Defined Contribution Plans Today: Inside the Minds of Plan Participants and Sponsors” (p. 7), available at <http://tinyurl.com/a465amk>. Accessed 14 November 2012.

⁵ AONHewitt, “Hot Topics in Retirement 2012.” More than 500 plan sponsors ranked their confidence levels (on a 1 to 6 scale, with 1 being “very confident”) on “employees’ ability to manage their retirement income to last for the rest of their lifetime.” Only 18% reported a 1 or 2 confidence level.

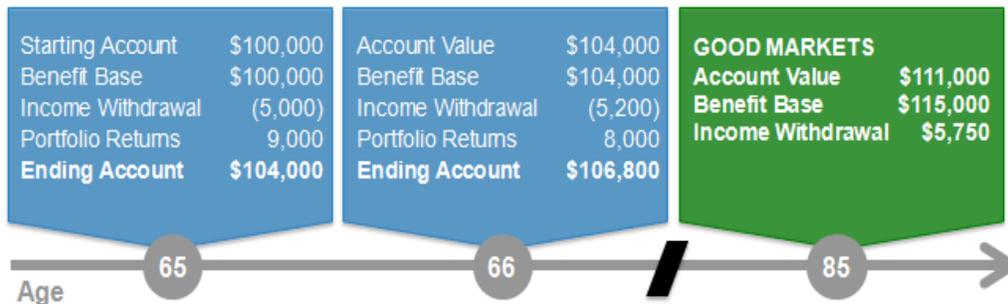
the participant's GLWB account value grows higher than the GLWB benefit base, the benefit base gets "stepped up" to equal the account value. However, if participants experience poor market performance, their annual income amount stagnates and inflation may erode their purchasing power. Upon a participant's death, any remaining value in the GLWB passes to heirs. Payouts depend on the solvency of the insurer.

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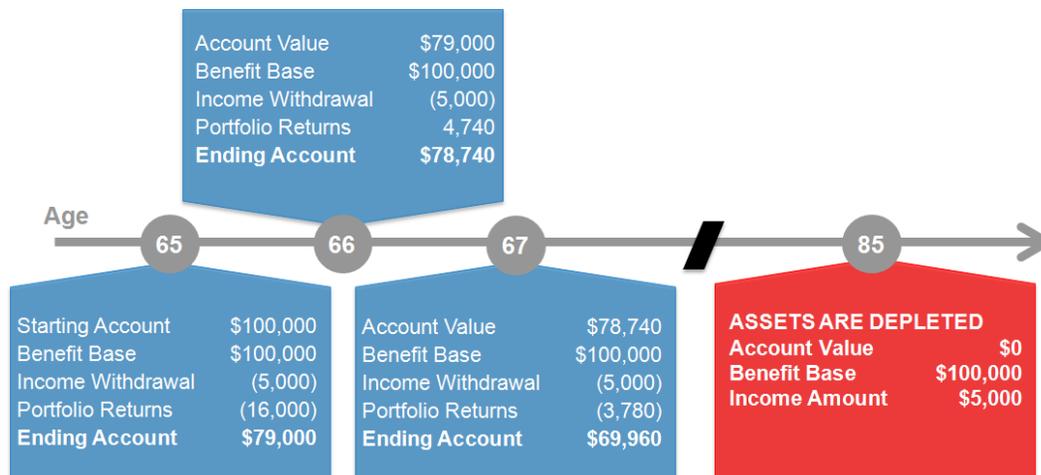
In Exhibits 2 and 3, we look at what might happen if 65-year-old Bill allocated his \$100,000 to a GLWB with a 5% guaranteed lifetime withdrawal rate. The high-water mark of his GLWB assets is the same as his current assets value – \$100,000 – and so the benefit base is \$100,000. This benefit base entitles him to 5% of \$100,000, or \$5,000, in lifetime annual retirement income. In Exhibit 2, positive stock market performance in the first two years increases his portfolio value, which in turn increases his annual income. We assume that stock market performance tends to be positive over the next several years, and by age 85, Bill's benefit base has increased to \$115,000, which provides an annual income withdrawal of \$5,750 (\$115,000 times 5%). Further, Bill still has an \$111,000 account value to tap into for withdrawals or to pass on to beneficiaries. In Exhibit 3, Bill's account value, eroded both by poor market performances and annual withdrawals, depletes by age 85. Yet, because of the GLWB contract, the guarantee feature kicks in, and he continues to receive \$5,000 a year for life (although his purchasing power likely erodes over time, given inflation).

Exhibit 2: Hypothetical illustration of how GLWB works in good markets



Source: Russell. Example provided for illustration only. Not meant to represent any actual results.

Exhibit 3: Hypothetical illustration of how GLWB works in bad markets



Source: Russell. Example provided for illustration only. Not meant to represent any actual results.

Fixed immediate annuities/fixed deferred annuities

Fixed annuities allow participants to exchange their retirement assets for a defined periodic payment (typically monthly in frequency) starting now (a fixed *immediate* annuity) or at a future date (a fixed *deferred* annuity, or FDA). With a fixed annuity, the level of income received for one’s nest egg directly relates to interest rates: the higher rates are at the time of purchase, the more income received. In addition, due to interest compounding, a longer deferral period raises the income received for fixed deferred annuities. As with the GLWB, payouts for fixed annuities depend on the solvency of the insurance company providing the contract.

A participant may choose from several different types of annuities with different payout structures. For instance, while not a true inflation adjustment, a cost-of-living adjustment (COLA) feature may be available to help maintain the participant’s standard of living throughout retirement.⁶ However, the COLA feature comes with the trade-off of a lower initial income amount.

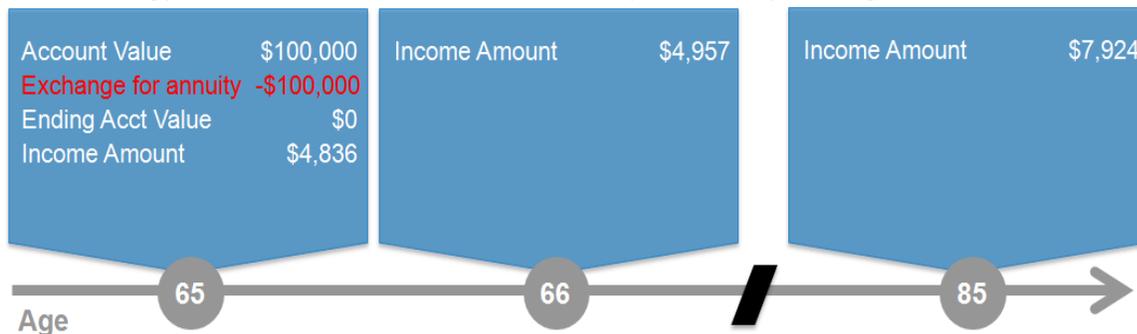
Here’s the appeal of fixed annuities: because the participant exchanges retirement assets for a lifetime income stream, that income stream tends to be more generous than that of the GLWB. With the fixed immediate annuity or the FDA, a participant gives up liquidity and any access to the account. Contrast this feature with the GLWB, where participants can access an account balance.

Bill (in our earlier example) could take his \$100,000 and receive \$5,000 in initial income from the GLWB (given a 5% payout rate) or receive about \$6,361 from the fixed immediate annuity.⁷ Alternatively, he could obtain a ~\$4,836 initial income⁸ and thereafter a 2.5% annual COLA; the GLWB lacks a COLA. In Exhibit 4, Bill exchanges his \$100,000 balance for the fixed immediate annuity with a COLA.

In the DC annuities market, participants generally have liquidity at market value up until they commence the income benefit. The price for this convenience is a small reduction in income versus a no-liquidity arrangement.

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Exhibit 4: Hypothetical illustration of how a fixed (immediate) annuity works



The account value is exchanged for lifetime income that increases annually by 2.5%.

Source: Russell. Example provided for illustration only. Not meant to represent any actual results.

⁶ COLAs linked directly to inflation – e.g., to the Consumer Price Index – are less common. Given a lack of inflation-hedging financial instruments, inflation-linked annuities tend to offer a lower initial payout than annuities with a 2% to 3% COLA.

⁷ Source: Russell calculations.

⁸ Ibid.

Part two: Guidance on comparing guaranteed income solutions

A good way for plan sponsors to become “aware” of guaranteed income solutions is to distill them to their most important feature: the income potential they can support. The case for doing so is straightforward: to better align participants’ needs with plan sponsors’ fiduciary due diligence responsibilities.

As fiduciaries, plan sponsors must act in the best interest of participants. Their selection of a guaranteed income solution is no different. We believe participants want, more than anything, an adequate and reliable retirement income stream from their DC assets. Multiple recent surveys corroborate our belief.⁹

However, the available options can vary on several dimensions, making it difficult for plan sponsors to understand how their selection impacts participants’ retirement income. Imagine a cost-conscious car shopper who decides between two cars without calculating either the difference in periodic fuel costs, maintenance costs, insurance premiums, etc. over time or the future resale values of the two vehicles. It would be a strange way to choose a car, if the buyer never directly compares the alternatives on the dimension that matters most to her – in this case, cost savings. Similarly, it would be odd for a plan sponsor to select a guaranteed income solution for participants without quantifying the income benefits of different alternatives. To effectively do their job as fiduciaries, plan sponsors need to be armed with the appropriate information. In the case of guaranteed income options, the appropriate information is the amount of income the available solutions can support.

The level of income available to participants from a guaranteed income option has two dimensions: account value and ongoing income potential. A sound due diligence process for selecting a guaranteed income solution must not only consider, but also quantify, the ongoing retirement income and account balance potential of guaranteed income solutions. We consider the participant’s account value a dimension of income, since it reflects what is available for an unexpectedly big expense or for the participant’s beneficiaries. The other dimension is the level of sustainable ongoing retirement income a participant’s assets can support. The sustainable ongoing income amount likely will be different for each guaranteed income solution, and it may change over time.

The available guaranteed income solutions have many different features, so to fully evaluate these solutions, plan sponsors may consider partnering with a firm that has expertise in how they work.

CASE STUDY SET-UP

Let’s apply our approach to a hypothetical case study that shows how plan sponsors can “shine a light” on the income benefits of the guaranteed income solutions they are considering. It features the two types of lifetime income solutions highlighted earlier – GLWB and FDA. We have two disclaimers before continuing:

1. Case study results are based on the specific assumptions we elected, but outcomes may change for other choices. We briefly discuss this topic after the results.
2. Many of the solutions can be customized, so our case study merely represents one out of many implementation options. In particular, using multiple product types together may be attractive.

⁹ Examples include AllianceBernstein, “Inside the Minds of Plan Participants and Sponsors” (p. 5), available at <http://tinyurl.com/a465amk>, and State Street, “Knowledge Is Power: Participant Survey Results 2012” (p. 8), available at <http://tinyurl.com/arc9ntv>. Accessed 13 November 2012.

Despite these limitations, we believe it is nonetheless valuable to present these results. Bringing the framework to life spurs more specific discussion on the trade-offs between guaranteed income solutions.

Our assumptions for the case study come from a combination of May 2012 market conditions and a subjective assessment of reasonable assumptions for a participant's situation, including his age, balance, contributions and asset allocation. We provide the crucial details below and leave the rest to the Appendix.

Our case study centers on a model participant, Ted, who turned 55 today and has \$100,000 saved in a simple target date fund whose allocation is based on the Morningstar Moderate Lifetime Allocation Index. Ted makes \$50,000 a year and receives annual raises of 2.5% (in nominal terms). With his employer match, he contributes a total of 10% of his income to his 401(k) each year. The target date fund has a 64% allocation to stocks today, 48% stocks at age 65 and 38% at age 80. For convenience, Ted lives in a world where the structure of interest rates does not change – we assume a fixed 2.1% return on bonds and constant GLWB and FDA pricing. Stocks have an assumed average return of 6.1% and a volatility of 18%. If Ted makes it to retirement at age 65, he expects to live to be 85 years old. From here, Ted takes one of three paths:

1. **“GLWB path”**: Starting now, Ted gradually reallocates his retirement savings, including contributions, to a GLWB at a rate of 10% per year (i.e., 10% of assets in the GLWB in year 1, 20% in year 2, etc.). The GLWB allocates to an underlying portfolio of 60% stocks and 40% bonds. By age 64, all of Ted's account balance is invested in the GLWB. At age 65, he begins to take annual withdrawals of 5% of his “benefit base,” which will vary depending on pre-retirement market performance; 5% represents the guaranteed lifetime withdrawal benefit. The withdrawal amount can increase given sufficiently positive post-retirement investment performance. We assess two annual fees: a 0.3% fee on all assets and a 1% insurance fee on the GLWB's account value.
2. **“FDA path”**: Starting now, Ted gradually reallocates his retirement savings, including contributions, to a FDA at a rate of 10% per year (like the GLWB). The FDA's associated account value behaves like a bond. Annually, we assess a 0.3% fee on assets still in the target date fund. By age 64, all of Ted's account balance is invested in the FDA. At age 65, Ted annuitizes and begins to receive annual income from the insurance provider according to his accrued income benefit. We assume that the benefit will be about 4.84% of the market value of his assets at retirement, which will vary depending on pre-retirement market performance.¹⁰ The FDA includes a 2.5% COLA to help support Ted's spending if prices increase.
3. **“Self-managed path”**: Ted sends contributions to the target date fund for 10 years. At age 65, he retires and initiates annual withdrawals of 5% of his age 65 account value, in line with both the GLWB and the FDA. This amount is increased by 2.5% each year, in line with the FDA. Ted does not have longevity insurance, and he can run out of money in this third case. Annually, we assess a 0.3% fee on all assets.

¹⁰ Outside of this case study, the benefit as a percentage of a participant's assets at retirement could be lower or higher, depending on interest rates. Changing interest rates impact the market value of these assets as well.

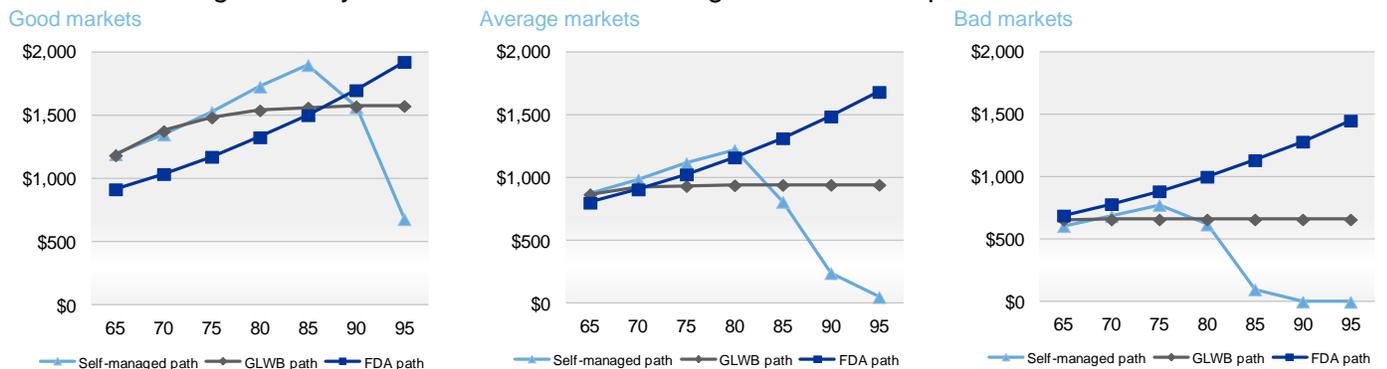
CASE STUDY RESULTS

To frame the conversation, we classify the results of the different solutions into three buckets: “good markets,” “average markets” and “bad markets.” This approach has the major benefit of being intuitive: it appeals to a universally understood idea (good vs. bad). As we have established, participants care about their retirement income potential, and so should plan sponsors. Thus, what constitutes “good markets,” “bad markets” and “poor markets” is based on retirement income, and not just investment performance.¹¹ In particular, we sort the results according to the raw cumulative retirement income from the self-managed path through age 94, or a 30-year retirement period.¹² We identify the top 10% of cumulative retirement income results as “good markets,” the middle 80% as “average markets” and the bottom 10% as “bad markets.” We note that the income amounts are nominal, and that an inflation expectation has not been incorporated in our analysis.

Monthly and cumulative retirement income results

In Exhibit 5, we show the average monthly income from the three strategies at different ages from 65 to 95. The triangles correspond to the self-managed path, diamonds to the GLWB path and squares to the FDA path.

Exhibit 5: Average monthly income at several retiree ages for the three paths



Source: Russell. Example provided for illustration only. Not meant to represent any actual results.

Ted should not expect to be able to maintain his income with the self-managed path should he live beyond his expected 85 years. Choosing one of the other paths would shield his income from longevity risk. In Exhibit 6, we discuss how the choice between the GLWB path and the FDA path impacts his retirement income in good, average and bad markets.

¹¹ Indeed, the two measures may conflict. The presence of sequential risk, or the risk of a bad return at a bad time (e.g., just as one enters retirement), suggests that some periods of performance matter more than others. So a measure of “good markets” and “bad markets” tied to retirement income has more meaning to participants than one tied purely to investment performance.

¹² This metric has the benefit of being simple, and it suits this simplified “case study” example. However, it implies that participants value consumption equally each year in retirement – a convenient but likely flawed premise. See “It Is Optimal for Retirees to Plan for Reduced Spending with Age” at retirement planning researcher Wade Pfau’s website: <http://tinyurl.com/all3t27>.

Exhibit 6: Discussion of hypothetical average monthly income at several ages for the three paths

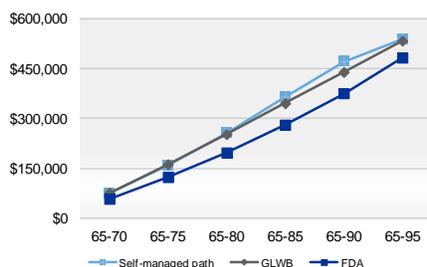
Markets	FDA Path	GLWB Path
Good	Initially, the FDA path's average income does not fare as well as that delivered by either the GLWB path or the self-managed path. The FDA path's lower stock exposure and the assumed low interest rate environment drives the result. Yet the income from the FDA path increases by 2.5% per year, and by age 90 it surpasses the average income of both the GLWB path and the self-managed path.	The GLWB path and the self-managed path tend to provide Ted similar age-65 income amounts. Two offsetting effects – the GLWB path's relatively aggressive portfolio and the assumed 1% insurance fee – drive the result. From age 65 to age 75, average income grows by 25.2% total, which is enough to keep pace with the self-managed path's income increase of 28.0% over the same time frame. Beyond then, the GLWB path's income tends to decline relative to the self-managed path's, only to increase again as the self-managed path encounters more cases of asset depletion.
Average	The FDA's average initial income is about 8% less than the alternatives shown. Again, its lower stock market exposure and low interest rates explain why. By age 75, the contractual pay raises tend to increase Ted's income past what he would get from the GLWB path.	Again, the GLWB path and the self-managed path tend to provide Ted similar income amounts. From age 65 to age 75, the GLWB path's average income amount increases by just 7.6% total, as opposed to 28.0% from the self-managed path. After age 80, the GLWB starts to look better, as the self-managed path faces financial ruin earlier in average markets than in good markets.
Bad	The FDA path provides the greatest amount of income in bad markets. Purchasing the FDA prior to retirement locks in participants' income amount, so they are protected from downside stock market risk but have reduced participation in market upside.	Notably, when compared to the self-managed path, the GLWB path allows Ted to protect his initial retirement income (at age 65) from bad market performance. Given the greater stock exposure and the higher fees associated with the GLWB path, one might expect the GLWB path to offer a lower initial payout (at age 65) than the self-managed path in bad markets. However, the average guaranteed income from the GLWB path is about 8% higher than the self-managed path's average withdrawal. Ted would likely experience minimal income increases afterward, as the average income increase from age 65 to age 75 is just 0.5% total.

Source: Russell. Example provided for illustration only. Not meant to represent any actual results.

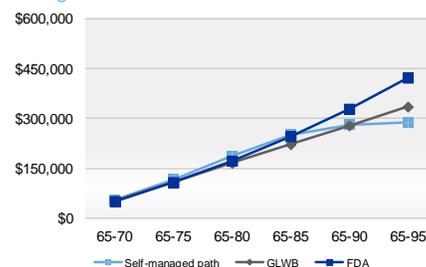
Let's recap our discussion of retirement income by reviewing the average total, nominal, undiscounted retirement income from Ted's three paths over several periods: age 65 to 70 (5 years), age 65 to 75 (10 years), etc., up to age 65 to 95 (30 years). The points of the line graphs in Exhibit 8 represent the total retirement income for each time period.

Exhibit 7: Total income for age 65–95 period for three strategies

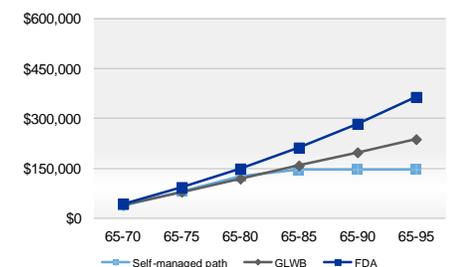
Good markets



Average markets



Bad markets



Source: Russell. Example provided for illustration only. Not meant to represent any actual results.

Clearly, the GLWB path tends to provide Ted more cumulative retirement income in good markets, while the FDA path tends to provide more in average and bad markets.

Potential for assets with the GLWB path

Ted may want to maintain access to his retirement assets, for two primary reasons: to be able to tap into those assets for emergent needs in retirement (e.g., to meet medical expenses), and to be able to leave the remaining assets to his beneficiaries. What level of assets may be available with the GLWB path at different ages? Ted should expect the value of his assets to decrease with age over a lengthy retirement period. Exhibit 8 presents the average balance size for the GLWB path (along with the self-managed path) at four different ages in retirement.

Exhibit 8: Balances from self-managed path and GLWB path at ages 65, 75, 85 and 95

Balance (average)	Age 65		Age 75		Age 85		Age 95	
	Self-managed	GLWB	Self-managed	GLWB	Self-managed	GLWB	Self-managed	GLWB
Good markets	\$285,961	\$281,042	\$293,385	\$298,718	\$175,290	\$210,897	\$27,425	\$86,840
Average markets	\$209,128	\$201,392	\$145,178	\$133,361	\$ 36,262	\$ 51,484	\$ 2,474	\$11,658
Bad markets	\$145,346	\$136,472	\$ 61,453	\$ 40,589	\$ 1,567	\$ 330	\$ 0	\$ 0
Overall median balance	\$203,361	\$195,519	\$138,608	\$125,063	\$16,715	\$ 33,169	\$ 0	\$ 0

Source: Russell. Example provided for illustration only. Not meant to represent any actual results.

The GLWB offers Ted access to a significant account value early in retirement or when markets are good, but this does not mean he should expect to have access to a large retirement account in all cases. Nor should he expect to be able to leave a large bequest given his life expectancy of 20 years at age 65. The 5% withdrawal amount and the 1.3% investment and insurance fees tend to erode his account value as he ages. The combined 6.3%+ outflows exceed the underlying portfolio's expected return.

ROBUSTNESS OF RESULTS

Readers will reasonably ask, "Can we generalize anything from the case study? Are the results particularly sensitive to any of the parameters?" With products and strategies as complex as those we are considering, it is difficult to draw general conclusions. However, our research prompts the following four observations.

1. We examined a "late case," where Ted transfers 100% of his assets at age 65 from the target date fund to the guaranteed income solution, and an "early case," where Ted immediately transfers all of his assets to the guaranteed income solution at age 55. Implementing the guaranteed income solution earlier narrows the range of possible outcomes and reduces both potential downside and upside.
2. Greater stock market volatility will increase the value of the GLWB, since its rules provide a hard floor on the monthly income one can receive, yet also offers lifetime income based on the high-water mark of the account value. In this way, the GLWB income benefit behaves similarly to a "protective put"¹³ – one's downside is limited but upside remains unlimited. For this reason, given equal pricing and benefits, one should consider selecting the most aggressive underlying portfolio for the GLWB.
3. This analysis takes market interest rates as of May 2012 as givens. This approach seemed the most prudent, given the uncertainty in determining the appropriate fee and guaranteed withdrawal rate of the GLWB path in different interest rate regimes.

¹³ Consists of a stock and a put option on that stock.

If rates were to rise, we would expect the analysis to reflect greater income from the FDA path and, perhaps to a lesser extent, from the GLWB path.

4. For one GLWB-type product we researched in preparation for this analysis, we learned that any “excess withdrawals” (withdrawals exceeding the guaranteed minimum) reduce the benefit base – and hence the guaranteed minimum withdrawal amount – by the ratio of the excess withdrawal to the market value of assets. In other words, the greater the difference between the benefit base and the account value, the greater the “price” one pays for the right to liquidity. Since the results of our analysis indicate that balances tend to decline over time while the benefit base never decreases, senior retirees may need to be especially careful when considering an excess withdrawal.

What should plan sponsors do with this information?

DC plan participants face significant longevity risk that comes with managing one’s own retirement money over an indefinite horizon. Plan sponsors recognize that many participants cannot manage this risk effectively on their own. In-plan guaranteed income options can help improve participants’ retirement security by transferring longevity risk to the insurer. Yet these solutions can be difficult to understand. To make an appropriate selection, plan sponsors need to focus on the participants’ retirement income. Doing so will lead to “awareness” of these solutions and more effective decision making. In this paper, we have provided guidance on how plan sponsors can evaluate guaranteed income solutions in *income* terms throughout participants’ retirement years.

To close, we offer a sample checklist of how plan sponsors may apply this guidance. It shows how expressing guaranteed income options in income terms could fit into a broader strategic initiative to select a solution.

- Take the time to understand if, and how, your plan participants could benefit from a guaranteed income solution and, where possible, what features they desire. We have made the case in this paper that they can benefit from these solutions, but the extent to which this is so will vary from organization to organization.
- Research, debate, decide on and document guidelines for retirement income–generating options to be offered to plan participants. Think of this document as an “income policy statement,” as opposed to an investment policy statement that provides guidelines for other plan offerings. The process of preparing an income policy statement may help the plan sponsor focus on what benefits they want to provide to participants by offering an income solution.
- Gather specific information on the available offerings, including their costs and income benefits, along with how they will change over time. Ask the providers the extent to which their products can be customized to better suit plan sponsors’ needs.
- Express these solutions in terms of their income benefits. An important component of this task is using up-to-date and realistic capital market assumptions.
- Evaluate these income results in the context of the income policy statement. Which approach best addresses the needs of plan participants?

If plan sponsors are uncomfortable with conducting these steps, they should seek the assistance of a third-party expert to guide them through the evaluation and due diligence process.

Appendix

Exhibit 9: Market assumptions for Exhibits 1, 5-8 (gross returns)

	Return assumptions	Volatility assumptions
Stock portfolio	6.1%	18.0%
Bond portfolio	2.1%	0.0%
Interest rate (fixed deferred annuity only)	2.5%	0.0%

Source: Russell. Assumptions based on May 2012 data. Not meant to represent any actual results¹⁴.

Exhibit 10: Participant and investment assumptions for analysis

Participant assumptions	Investment assumptions
<ul style="list-style-type: none"> We take the perspective of a 55-year-old plan participant. Age 55 represents a point where a participant may have accumulated significant savings and begun to contemplate his or her retirement. For the purposes of pricing the fixed annuity, we consider this participant to be “unisex.” This assumption is consistent with the requirement to price annuities in qualified plans using a unisex mortality table. The sex of the participant does not otherwise factor into our analysis. The participant starts with \$100,000 initial balance, simply because it is a plausible round number for a 55-year-old to have accumulated. We do not believe using another figure with more empirical basis, such as an average account balance, would add significantly to our analysis. The participant makes \$50,000 a year initially and receives a 2.5% salary COLA in each subsequent year up to retirement. Our reasoning for this selection is similar to that for the initial balance. From the participant and employer combined, total contributions equal 10% of salary. This is consistent with typical participant deferral rates and employer matching contributions in Vanguard plans in 2011.¹⁵ The participant plans to retire at age 65 and commence receiving payout from plan assets. 	<ul style="list-style-type: none"> Invest non-guaranteed assets according to a glide path based on the Morningstar Moderate Lifetime Allocation Index. The glide path invests in a decreasing percentage of stocks and an increasing percentage of bonds over time – 64% stocks at age 55, 48% stocks at age 65 – and reaches a minimum of 38% stocks at age 80. The bond return is a constant 2.12% annually (before fees). This was the interest rate for a 4- to 5-year-duration, AA credit rating fixed income asset at the time of analysis. We believe it represents both the duration and credit exposure typical of DC plan bond offerings – characteristics in line with the Barclays U.S. Aggregate Bond Index. The stock return is the bond return plus a 4% risk premium and a volatility “shock.” The risk premium was selected at the authors’ discretion and is intended to represent a global equity risk premium. The volatility of the return is 18%. 0.30% fee on the non-guaranteed assets, which consist of a stock portfolio and a bond portfolio. The fee reflects the authors’ assumption for net expenses on a passive mutual fund.

Source: Russell.

¹⁴ Please note all information shown is based on assumptions. Expected returns employ proprietary projections of the returns of each asset class. We estimate the performance of an asset class or strategy by analyzing current economic and market conditions and historical market trends. It is likely that actual returns will vary considerably from these assumptions, even for a number of years. References to future returns for either asset allocation strategies or asset classes are not promises or even estimates of actual returns a client portfolio may achieve. The assumptions do not take fees into consideration and all returns are assumed gross of fees. Asset classes are broad general categories which may or may not correspond well to specific products. For example, Russell assumptions for hedge funds are based on non-directional hedge funds and may not reflect important characteristics of directional hedge funds or other products that may fit under the broad label edge funds. Additional information regarding Russell basis for these assumptions is available upon request. Opinions and estimates offered constitute our judgment and are subject to change without notice, as are statements of financial market trends, which are based on current market conditions. This material is not intended as an offer or solicitation for the purchase or sale of any financial instrument. The views and strategies described may not be suitable for all investors.

¹⁵ Vanguard, “How America Saves 2012: A report on Vanguard 2011 defined contribution plan data.”

Exhibit 11: Description of three income approaches in case study

Self-managed path	GLWB path	FDA path
<ul style="list-style-type: none"> The participant invests according to the Morningstar glide path. Beginning at age 65, the participant takes annual withdrawals equal to the lesser of 5% of the age-65 account balance or the remaining account balance. Every 12 months, the withdrawal amount is increased by 2.5% – a cost-of-living adjustment, or COLA. 	<ul style="list-style-type: none"> The participant invests non-GLWB assets according to the Morningstar glide path. Beginning at age 55, the participant follows a glide path for allocating to the GLWB. 10% of assets are transferred to the GLWB each year. So, the strategic target is 10% in the GLWB at 55, 20% at 56, etc., and finally 100% at 64. To maintain consistency with the FDA, we do not allow the GLWB-wrapped assets to be exchanged for non-guaranteed assets. In practice, this transaction may be allowed at the participant level, though not at the sponsor level (i.e., no wholesale trades of insurer-wrapped assets). The GLWB transfers are funded pro-rata from the glide path. The GLWB invests in a portfolio of 60% stocks and 40% bonds, in line with typical offerings on the market today. The insurance fee is 1.00% of underlying assets in the GLWB.¹⁶ This is in addition to the 0.30% management fee stated above. GLWB entitles the participant to a maximum withdrawal allowance (without penalty) of 5% of the benefit base (explained below).¹⁷ For this analysis, we assume the participant takes 1/12 of the maximum withdrawal each month. Once per year, the benefit base is recalculated as the maximum of the following: current value of underlying GLWB assets, value of cumulative contributions to GLWB, or the prior year's benefit base. We assume no insurer default. 	<ul style="list-style-type: none"> The participant invests non-FDA assets according to the Morningstar glide path. Beginning at age 55, the participant follows a glide path for allocating to the FDA. 10% of assets are transferred to the FDA each year. So, the strategic target is 10% in the FDA at 55, 20% at 56, etc., and finally 100% at 64. We do not allow the FDA assets to be exchanged for non-guaranteed assets. This constraint allows the annuity provider to offer more favorable rates. In practice, this transaction may be allowed at the participant level, though not at the sponsor level (i.e., no wholesale trades of guaranteed assets). The FDA transfers are funded pro-rata from the glide path. The annuity pricing can be summarized as follows: \$194 principal at age 55 buys \$1 of monthly income beginning at age 65, and \$248 principal at age 65 buys \$1 of monthly income beginning immediately. In between, the price increases by about 2.5% each year, in line with our 2.49% interest rate assumption (see below). The monthly income includes a 2.5% annual cost-of-living adjustment. The three primary determinants of the annuity's price are (1) interest rates (2) mortality assumptions and (3) any adjustment in payments. <ol style="list-style-type: none"> We use LIBOR Swap spot rates at the time of analysis to price the deferred annuity for our 55-year-old plan participant.¹⁸ The relevant rates (10-plus-year rates) ranged from 1.9% to 2.6%. We calculated the flat rate that would produce equivalent pricing to be 2.49% and applied this rate to price all annuities. This assumption is consistent with our approach of grounding the analysis in current market conditions. We use a 50/50 blend of the Society of Actuaries' Annuity 2000 Basic Tables for Males and Females.¹⁹ We do not grant "mortality credits" prior to commencement of income at age 65.²⁰ These assumptions, along with our interest rate assumption, make our pricing very consistent with the pricing data we obtained. We grant the participant a 2.5% annual increase in his annuity income. We assume no insurer default.

Source: Russell.

¹⁶ Retail variable annuity offerings may charge this fee on the benefit base, and not on the underlying assets.

¹⁷ For the benefit of the reader, we note that any excess withdrawals reduce the benefit base proportionally. For instance, if the participant withdraws an excess amount equal to 10% of the market value of assets, then the benefit base is reduced by 10%.

¹⁸ The selection of LIBOR Swap spot rates comes from discussions with a fixed annuity carrier.

¹⁹ Available at <http://tinyurl.com/c8d86om>. Under this assumption, the participant's life expectancy is 20.3 years at age 65.

²⁰ This is consistent with our discussions with a fixed annuity carrier.

BRIEF GLOSSARY OF LIFETIME INCOME TERMS

This glossary is not intended to be exhaustive; rather, we merely want to clearly state, in one place, definitions of some key terms that may be unfamiliar to readers.

Benefit base (GLWB): A notional account value equal to the high-water mark of the GLWB account balance.

Excess withdrawal (GLWB): What occurs when the participant withdraws more than the amount guaranteed by the GLWB contract. Excess withdrawals could reduce the benefit base by the ratio of the excess withdrawal amount to the account value prior to that excess withdrawal.

Fixed deferred annuity, aka FDA: An insurance contract that guarantees the participant a fixed payment upon election of the benefit (e.g., upon retirement). The amount received depends on several factors, especially interest rates at the time of purchase and the length of the income-deferral period. Among other options, an annual cost-of-living-adjustment (COLA) may be available.

High-water mark (GLWB): The highest account value of the GLWB-wrapped portfolio as measured on a periodic basis. It is equal to the maximum of (1) the current account value, (2) the prior high-water mark and (3) the cumulative contributions into the GLWB-wrapped portfolio. Typically, the high-water mark is recalculated once per year, e.g., on the participant's birthday.

Income step-up (GLWB): Whenever the participant's account value reaches a new high-water mark, she is entitled to an increase in her guaranteed withdrawal amount.

Variable annuity with guaranteed lifetime withdrawal benefit, aka GLWB: An insurance contract that guarantees the participant a minimum payment upon election of the benefit (e.g., upon retirement). The guaranteed lifetime withdrawal benefit feature allows the participant to withdraw a certain percentage (e.g., 5%) of the annuity's benefit base for life, even if the underlying account value is depleted. Typically, the underlying account value is invested in a balanced portfolio of stocks and bonds.

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