



Fixed Indexed Annuities: Consider the Alternative

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Abstract

- A Fixed Indexed Annuity (“FIA”) is a tax-deferred retirement savings vehicle that eliminates downside risk while allowing for the opportunity to participate in upside market returns.
- FIAs help control financial market risk and mitigate longevity risk.
- In simulation, using dynamic participation rates and uncapped index crediting designs, a generic large cap equity FIA using a large cap equity index outperformed long term bonds with similar risk characteristics and better downside protection over the period 1927-2016.
- An FIA may be an attractive alternative to traditional fixed income options like bonds to accumulate financial assets (tax-deferred) prior to retirement.

Introduction:



Roger G. Ibbotson, PhD

Much of my lifetime academic research has become conventional wisdom. Although my research, along with that of my co-authors, was new and insightful at the time it was first published, the findings have become widely accepted. Stocks have beaten bonds by a wide margin over long periods of time. When we are young, we should allocate heavily to stocks. Stocks are riskier than bonds. As we age and approach retirement, it makes sense to reduce risk in our portfolios and shift a greater allocation toward bonds. Our research has become widely accepted and applied. This is a good thing for people saving for retirement helping them to achieve better outcomes. It is also gratifying to me.

The problem is, too often, we simply accept conventional wisdom, which prevents us from considering other alternatives. Although it is prudent to de-risk portfolios approaching retirement, are bonds our best option?

Can we potentially realize a better result?

Given the current low-yield environment, bond returns for the next several years will likely be based entirely on yield. Although the lower risk may be appropriate as we age, the returns may disappoint or be insufficient to maintain necessary income in retirement.

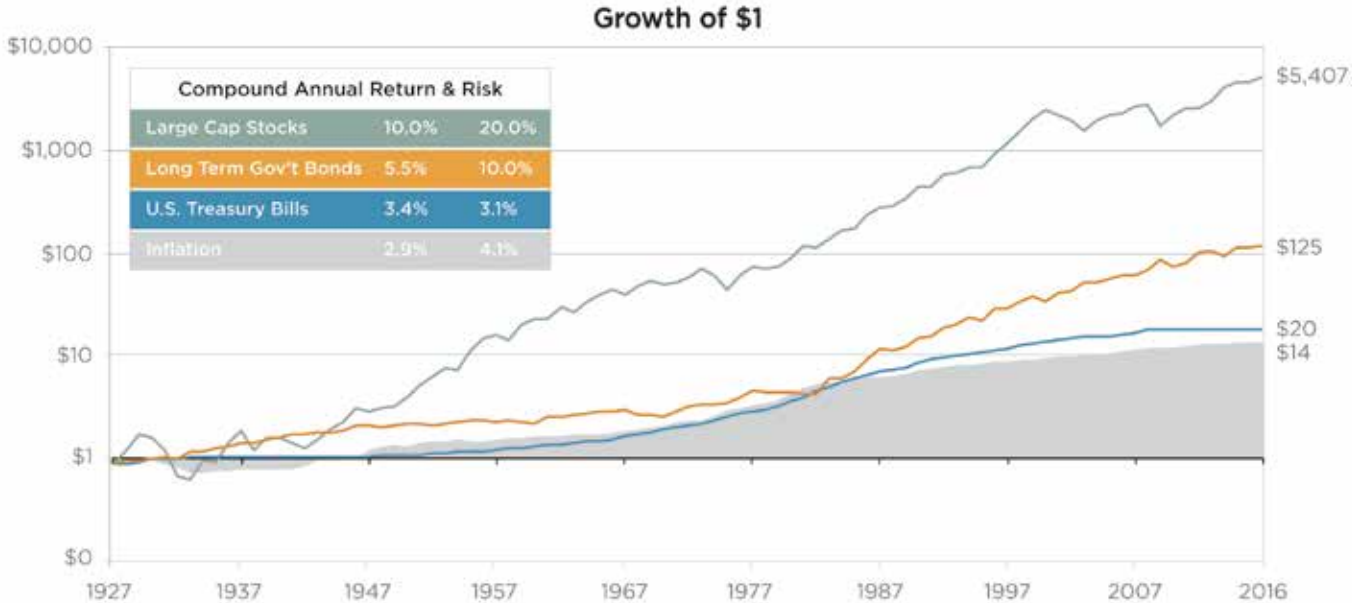
In our monograph *“Lifetime Financial Advice: Human Capital, Asset Allocation, and Insurance”* [Ibbotson, Milevsky, Chen & Zhu, The Research Foundation of CFA Institute, 2007], my co-authors and I presented the case for annuities as an important alternative to traditional fixed income options like bonds. Recent innovations in annuity product design, combined with an increasingly competitive marketplace, have given individuals preparing for or in retirement powerful and more affordable tools to not only mitigate retirement risks, but also to serve as a vehicle to increase wealth leading up to retirement.

This paper focuses on uncapped Fixed Indexed Annuities which, if structured properly, can help control financial market risk, mitigate longevity risk, and may outperform bonds over time. My colleagues and I will show that a generic FIA using a large cap equity index in simulation has bond-like risk but with returns tied to positive movements in equities, allowing for equity upside participation. For these reasons, an FIA may be an attractive alternative to consider.

A Review of Conventional Wisdom

Exhibit 1 shows the performance of large cap stocks, long term government bonds, U.S. Treasury Bills, and inflation since 1927. Over the long term, stocks beat bonds by a very wide margin. It's not even a contest. If risk were not a consideration, we would allocate solely to stocks.

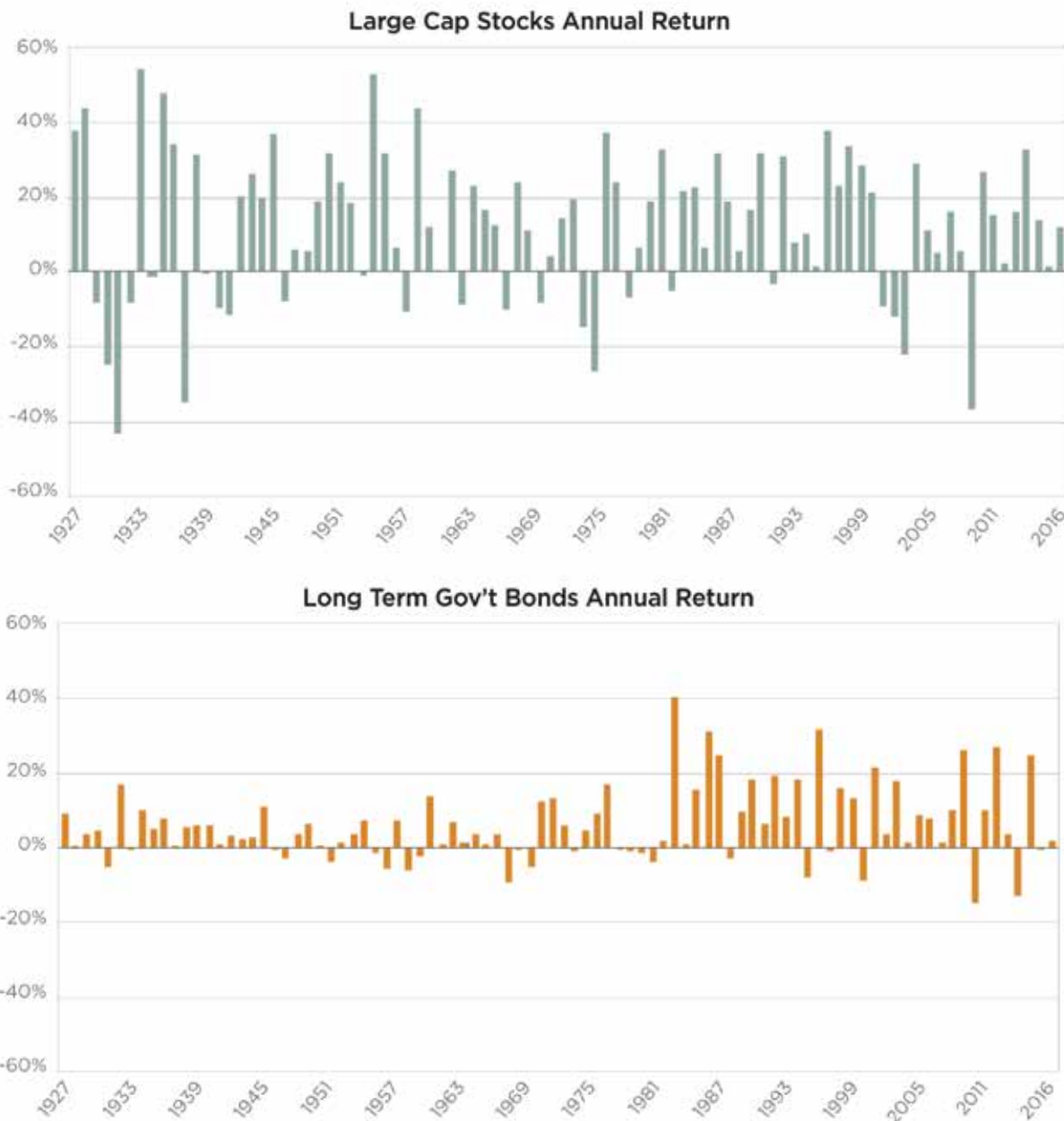
Exhibit 1: Investments in the U.S. Capital Markets (1927-2016)



Source: 2017 SBBI Yearbook, Roger G. Ibbotson, Duff & Phelps

Of course, as we age and approach retirement, risk *is* a major consideration. Risk of losses becomes a critical issue and worry. **Exhibit 2** clearly shows stocks are much riskier than bonds (although bonds have become riskier more recently). Since stocks bear much more risk, we typically de-risk our portfolios to preserve wealth and attempt to lock-in a desired lifestyle in retirement. The strategy of allocating more heavily to bonds as we approach retirement has become conventional wisdom. Though this may be sound from a risk perspective, will it meet our return expectations going forward?

Exhibit 2: Annual Returns for Large Cap Stocks and Long Term Gov't Bonds (1927-2016)



Source: 2017 SBBi Yearbook, Roger G. Ibbotson, Duff & Phelps

Where do we go from here?

As we see from **Exhibit 3**, bonds have done very well over the past 10 years, almost matching large cap stock returns (6.48% for bonds vs. 6.95% for stocks). Are bonds likely to outperform stocks over the next 10 years? Unlikely.

Exhibit 3: Investments in the U.S. Capital Markets (1927-2016)

	Large Cap Stocks		Long Term Gov't Bonds	
	Ann. Return	Risk	Ann. Return	Risk
90 Years (1927-2016)	10.02%	19.99%	5.51%	9.97%
50 Years (1967-2016)	10.17%	16.93%	7.51%	12.21%
25 Years (1992-2016)	9.15%	17.69%	7.52%	12.61%
10 Years (2007-2016)	6.95%	18.86%	6.48%	15.13%

Source: 2017 SBBi Yearbook, Roger G. Ibbotson, Duff & Phelps

To develop a simple forecast for stock and bond returns, we can look in more detail at what has happened in the past. Specifically, we can decompose stock and bond returns into capital appreciation and yield. **Exhibits 4a and 4b** break down total return for large cap stocks and long term government bonds into Income Return (yield) and Capital Gain/Appreciation. In the case of stocks, total return is driven by both capital gains and income. In the case of bonds, total return is dominated by yield or income.

Exhibits 4a and 4b: Decomposing Stock and Bond Returns (1927-2016)



Source: 2017 SBI Yearbook, Roger G. Ibbotson, Duff & Phelps

Exhibit 5 shows the decomposition of total return for large cap stocks and long term government bonds since 1927 and for the past 10 years. In the case of large cap stocks, total return is driven by *both* capital gains and income over both time frames. We also note stock returns for the past 10 years have been lower than for the past 90 years. The picture for bonds, however, is very different. Long term, total returns for bonds are dominated by income or yield. In contrast, over the past 10 years, 45% of total returns for bonds is attributable to capital gains. This is because rates declined over the past 10 years. The recent high level of capital gains for bonds is simply inconsistent with long term results. In addition, we note total returns for bonds over the past 10 years have been higher than their long-term results.

Exhibit 5: Decomposing Stock and Bond Returns (1927-2016)

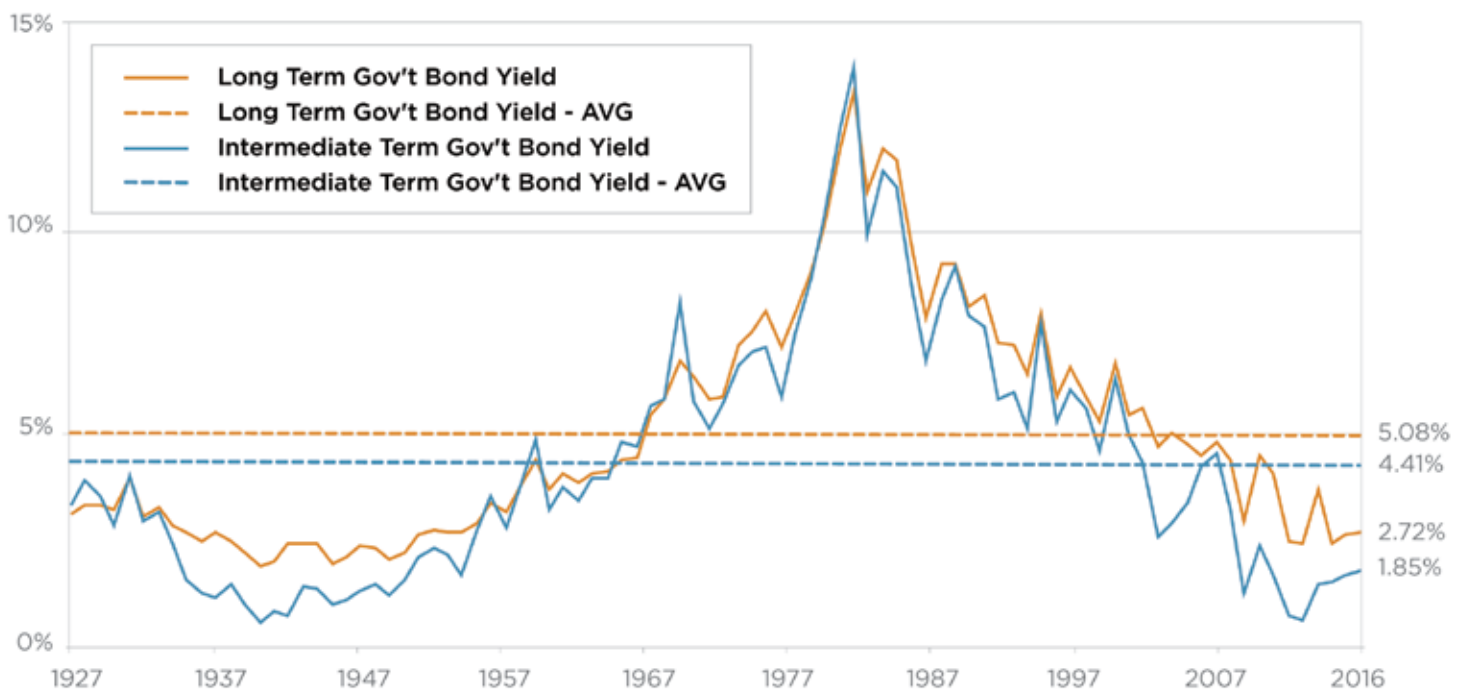
	Large Cap Stocks			Long Term Gov't Bonds		
	Capital Gain	Income	Total Return	Capital Gain	Income	Total Return
90 Years (1927-2016)	5.84%	4.18%	10.02%	0.31%	5.20%	5.51%
10 Years (2007-2016)	4.67%	2.28%	6.95%	2.89%	3.59%	6.48%

Source: 2017 SBB Yearbook, Roger G. Ibbotson, Duff & Phelps

Today, yields are near historical lows (**Exhibit 6**). At the end of 2016, the Long Term Government Bond yield was 2.72% while the Intermediate Term Government Bond yield was even lower at 1.85%. For bonds to continue to enjoy the same amount of capital gains going forward, yields would have to decline significantly. It is very unlikely bond investors will realize as high a return from capital gains in the coming 10 years as they have realized in the past 10 years. In fact, if rates rise, capital gains in the future will be negative (capital losses).

For these reasons, we expect a more “normal” spread or relationship between equity returns and bond returns in the midterm.

Exhibit 6: Long Term and Intermediate Term Government Bond Yields (1927-2016)



Source: 2017 SBBI Yearbook, Roger G. Ibbotson, Duff & Phelps

Fixed Indexed Annuities: An Alternative to Consider

An FIA is a contract issued and guaranteed by an insurance company. It is a growth and accumulation vehicle leading up to retirement with an option to convert to an annuity in retirement or take systematic withdrawals. In the accumulation phase, growth potential is based upon the positive performance typically of an equity index (e.g. S&P 500® Price Return Index) and grows tax-deferred subject to floors and participation rates which we will discuss below.

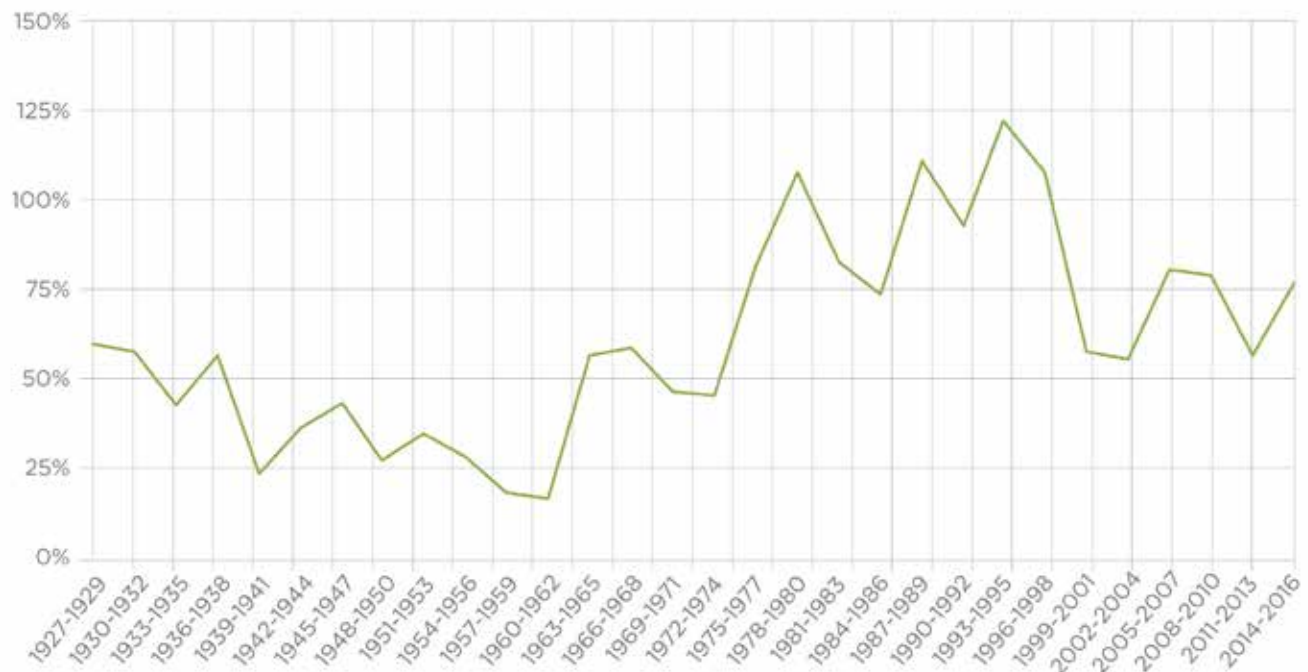
A major advantage of an FIA is the ability of the insurance provider to “transform” equity returns into a more “tailored” return/risk profile (eliminating downside risk and providing an opportunity for interest earnings based upon a portion of equity returns). During the “accumulation” phase, growth of a generic uncapped FIA is based upon an index subject to a floor and a participation rate. For example, over a 3-year period, the FIA might use the S&P 500® Price Index subject to a 0% floor and a participation rate of 60% of any positive index performance. In a 3-year period where the S&P 500® Price Index gained 10%, the FIA would credit interest at 6.0%. In a 3-year period where the S&P 500® Price Index declined -10%, the FIA would not lose money subject to the 0% floor.

This downside protection is very powerful and attractive to many individuals planning for retirement. In exchange for giving up some upside performance (the 60% participation rate), the insurance company bears the risk of the price index falling below 0%. The floor is one way to mitigate financial market risk, but also gain exposure to potentially higher equity performance than traditional fixed income investments. In today’s extremely low interest rate environment, the prospects of capital gain appreciation for fixed income investments is lower. As a result, the ability to gain exposure to equity like returns may be an attractive alternative, particularly if we expect equities to outperform bonds.

Illustration: Generic Uncapped Large Cap Equity FIA

For the period 1927-2016 (90 years), we simulated the net performance of an FIA with a large cap equity index based upon thirty 3-year holding periods, the price return of a large cap equity index, a minimum 3-year net return floor of not less than 0.00%, and uncapped dynamic participation rates (net of assumed fees). The simulated participation rates in **Exhibit 7** were provided by AnnGen Development, LLC, a leading expert in annuity product structuring and development. Inputs to the model include historical volatility, interest rates, and dividend rates. Participation rates are net of profit margin assumptions of the insurance company offering the contract. There are many ways to model the performance of an FIA. All have limitations. We chose to use dynamic participation rates (as opposed to fixed participation rates) believing dynamic rates were more realistic.

Exhibit 7: Simulated Dynamic Participation Rates, Uncapped Large Cap FIA (1927-2016)



Source: AnnGen Development, LLC

Recall that the FIA “transforms” equity returns into a “tailored” return/risk profile. The FIA eliminates downside risk while allowing for participation in a portion of positive equity returns. Lastly, owners of an FIA do give up some upside equity performance (as well as dividends since performance is tied to price return) in exchange for the insurance company bearing the risk of losses.

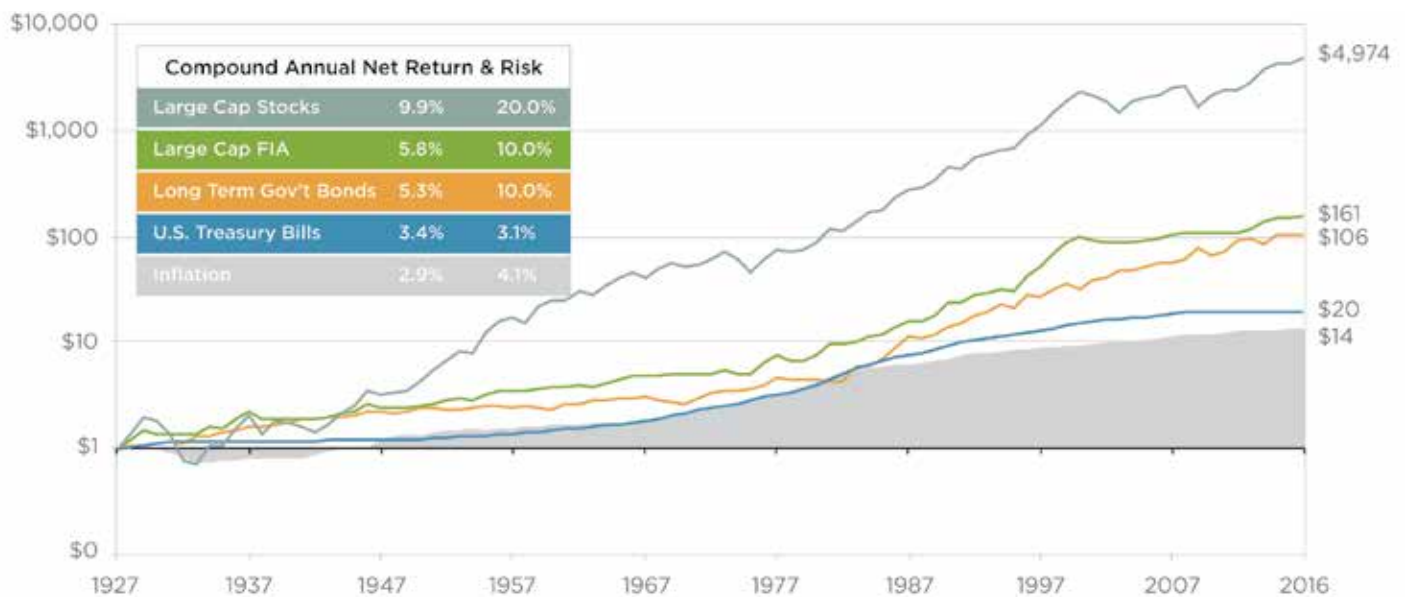
Exhibit 8a shows the annualized performance for the period 1927-2016, net of assumed fees for Large Cap Stocks, Long Term Gov't Bonds, U.S. Treasury Bills, Inflation, and the simulated FIA. Since the FIA is simulated net of fees, for comparison, we assume annual expenses/fees for passive stock and bond funds to be 0.10% and 0.19% respectively. **Exhibit 8b** presents the hypothetical growth of \$1 net of fees for the period 1927-2016 for Large Cap Stocks, Long Term Gov't Bonds, U.S. Treasury Bills, Inflation, and the simulated FIA.

Exhibit 8a: FIA Hypothetical Net Return (1927-2016)

	Large Cap Stocks	Long Term Gov't Bonds	FIA
Annualized Return	9.92%	5.32%	5.81%
Standard Deviation	19.99%	9.97%	10.01%
Minimum Annualized 3-Year Return	-27.00%	-2.32%	0.00%
Maximum Annualized 3-Year Return	30.76%	23.30%	27.56%

Source: 2017 SBBi Yearbook, Roger G. Ibbotson, Duff & Phelps; Zebra Capital; AnnGen Development, LLC

Exhibit 8b: FIA Hypothetical Growth of \$1 Net of Fees (1927-2016)



Source: 2017 SBBi Yearbook, Roger G. Ibbotson, Duff & Phelps; Zebra Capital; AnnGen Development, LLC

The simulated FIA outperformed bonds with comparable overall risk and better downside protection. We can see the elimination of downside risk more clearly in the distributions of 3-year returns comparing the FIA to large cap stocks and then to long term government bonds in Exhibits 9 a, b and c.

Exhibit 9a: Large Cap Stocks – 3-Year Annualized Net Return Distribution (1927-2016)



Exhibit 9b: Long Term Gov't Bonds – 3-Year Annualized Net Return Distribution (1927-2016)

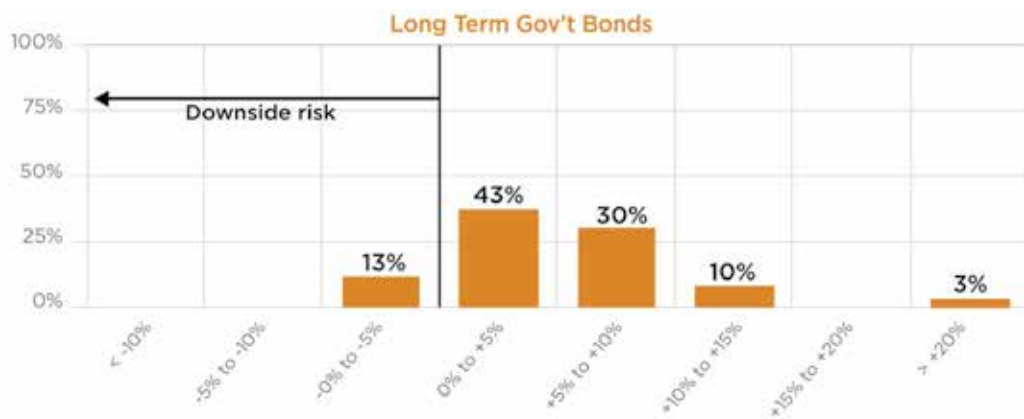


Exhibit 9c: Fixed Indexed Annuities – 3-Year Annualized Net Return Distribution (1927-2016)



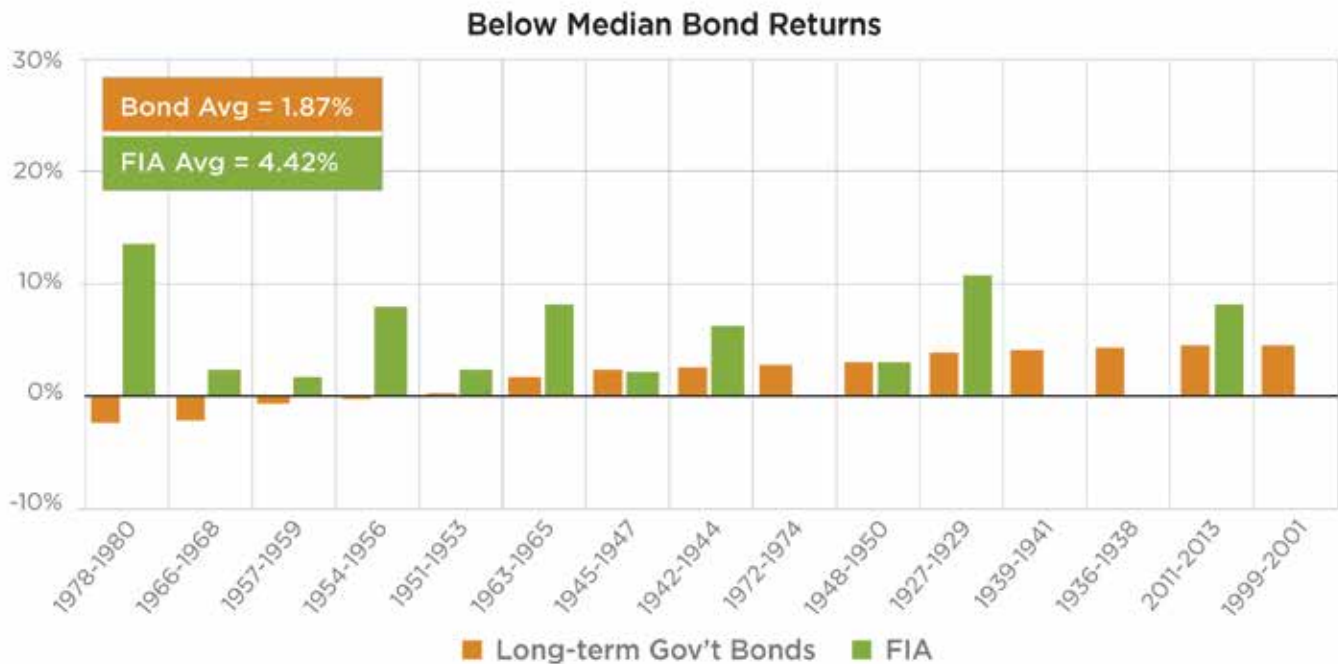
Source: 2017 SBBi Yearbook, Roger G. Ibbotson, Duff & Phelps; Zebra Capital; AnnGen Development, LLC

FIA as an Asset Class in Portfolio Construction

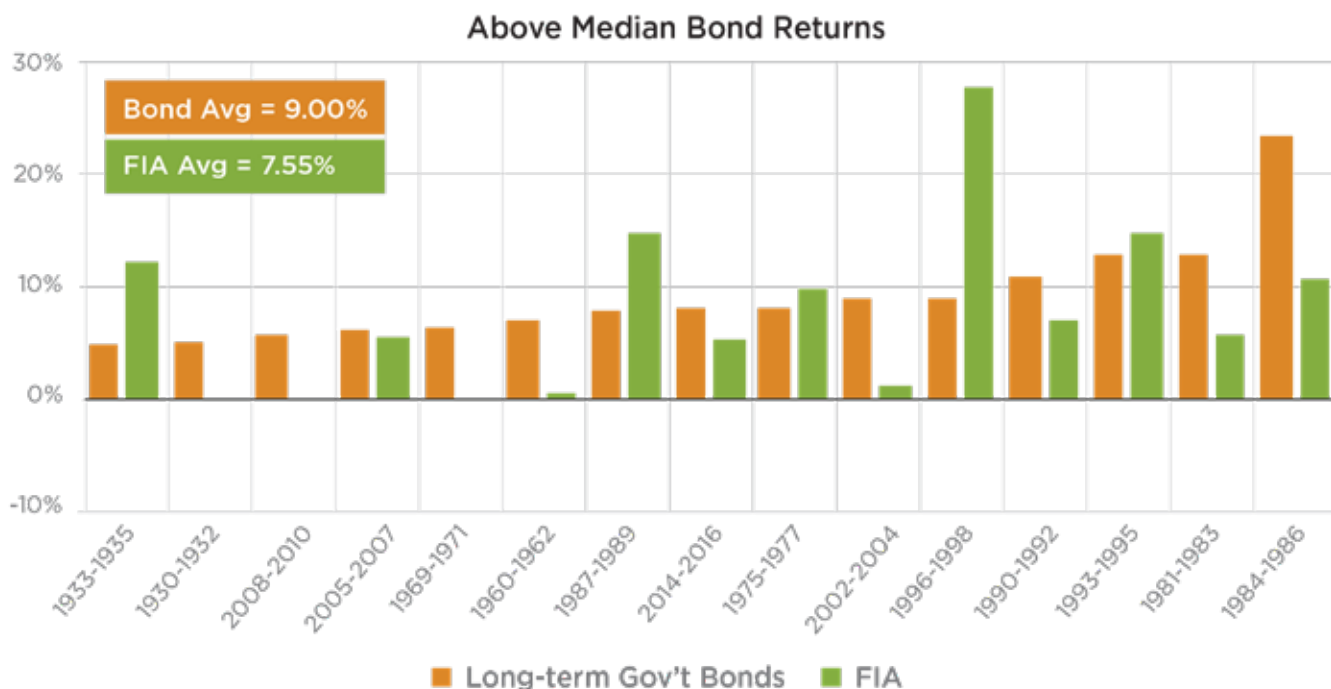
We have always believed annuities deserve a place in retirement portfolios. We also believe they are a viable option in accumulation portfolios leading up to retirement.

We analyzed how the FIA performed in environments when long term government bonds outperformed and in environments when long term government bonds underperformed. During the period 1927-2016, there were thirty 3-year time frames. We isolated the fifteen 3-year periods when bonds performed below median and the fifteen 3-year periods where bonds performed above median. **Exhibit 10a** shows the average 3-year annualized performance for bonds during the worst fifteen 3-year periods was 1.87%. During those same periods, the FIA averaged an annualized return of 4.42%. In the fifteen 3-year periods in which bonds performed above median, bonds returned 9.0% on average while the FIA returned 7.55%.

Exhibit 10a: FIA vs. Bonds - Below Median and Above Median Bond Returns (1927-2016)



Source: 2017 SBBI Yearbook, Roger G. Ibbotson, Duff & Phelps; Zebra Capital; AnnGen Development, LLC



Source: 2017 SBBi Yearbook, Roger G. Ibbotson, Duff & Phelps; Zebra Capital; AnnGen Development, LLC

In **Exhibit 10b**, we simulate three portfolios: (1) a base case 60% equity and 40% fixed income portfolio (“60/40 Stocks & Bonds”), (2) a 60% equity, 20% fixed income and 20% FIA (“60/20/20 Stocks, Bonds & FIA”), and (3) a 60% equity and 40% FIA portfolio (“60/40 Stocks & FIA”). In Below Median Bond Return Environments, on average, adding FIA exposure was additive. Stocks did well on average in these periods and the FIA tied to equity performance also performed well. In Above Median Bond Return Environments, portfolios including FIAs underperformed. In the overall period, on average, including FIA exposure was additive.

Exhibit 10b: Below Median and Above Median Bond Return Environments (1927-2016)

	Below Median Bond Return Environments Average Return	Above Median Bond Return Environments Average Return	Overall Period Average Return
Long Term Gov't Bonds	1.87%	9.00%	5.43%
Large Cap Stocks	11.43%	9.84%	10.63%
FIA	4.42%	7.55%	5.98%
60/40 (Stocks & Bonds)	7.60%	9.50%	8.55%
60/20/20 (Stocks, Bonds & FIA)	8.12%	9.21%	8.66%
60/40 (Stocks & FIA)	8.63%	8.92%	8.77%

Source: 2017 SBBi Yearbook, Roger G. Ibbotson, Duff & Phelps; Zebra Capital; AnnGen Development, LLC

FIA Scenario Analysis

Finally, we wanted to perform prospective scenario analysis to see how additive a generic FIA might be in various stress scenarios and environments for stocks and bonds over 3-year periods.

Given our view that rates are more likely to increase than decrease, we considered four interest rate environments: Rates are unchanged and rates increase by +1%, +2% and +3% over a 3-year period. At the same time, we stress equities in four environments: Equities are down -10%, unchanged, up +10%, and up +20% annualized over the 3-year period.

For our fixed income proxy, we used the iShares 7-10 Year Treasury Bond ETF which currently has a distribution yield of 1.83% and an effective duration of 7.62 years. The effective duration is a measure of sensitivity to changes in interest rates. For the generic large cap FIA, we assume a current dividend yield of 1.92% and a current net participation rate of 46% (Source: AnnGen Development, LLC).

To estimate the expected annualized return for fixed income in each rate environment, we assume the current distribution yield is paid out in year 1, that rates increase at each year-end, and that rate increases occur evenly over the 3-year time frame (at year-end). We also assume duration is constant over the period.

Exhibit 11a: Rates are Unchanged Over a 3-Year Period – Expected 3-Year Annualized Return

	Equity Environments (3-year Annualized Return)			
	-10.0%	0.0%	+10.0%	+20.0%
Equities	-10.0%	0.0%	10.0%	20.0%
Fixed Income	1.8%	1.8%	1.8%	1.8%
FIA	0.0%	0.0%	3.7%	8.3%
60/40 (Stocks & Bonds)	-5.3%	0.7%	6.7%	12.7%
60/20/20 (Stocks, Bonds & FIA)	-5.6%	0.4%	7.1%	14.0%
60/40 (Stocks & FIA)	-6.0%	0.0%	7.5%	15.3%

Source: Zebra Capital

Exhibit 11b: Rates Increase +1% Over a 3-Year Period - Expected 3-Year Annualized Return

	Equity Environments (3-year Annualized Return)			
	-10.0%	0.0%	+10.0%	+20.0%
Equities	-10.0%	0.0%	10.0%	20.0%
Fixed Income	-0.4%	-0.4%	-0.4%	-0.4%
FIA	0.0%	0.0%	3.7%	8.3%
60/40 (Stocks & Bonds)	-6.2%	-0.2%	5.8%	11.8%
60/20/20 (Stocks, Bonds & FIA)	-6.1%	-0.1%	6.7%	13.6%
60/40 (Stocks & FIA)	-6.0%	0.0%	7.5%	15.3%

Source: Zebra Capital

Exhibit 11c: Rates Increase +2% Over a 3-Year Period - Expected 3-Year Annualized Return

	Equity Environments (3-year Annualized Return)			
	-10.0%	0.0%	+10.0%	+20.0%
Equities	-10.0%	0.0%	10.0%	20.0%
Fixed Income	-2.6%	-2.6%	-2.6%	-2.6%
FIA	0.0%	0.0%	3.7%	8.3%
60/40 (Stocks & Bonds)	-7.0%	-1.0%	5.0%	11.0%
60/20/20 (Stocks, Bonds & FIA)	-6.5%	-0.5%	6.2%	13.1%
60/40 (Stocks & FIA)	-6.0%	0.0%	7.5%	15.3%

Source: Zebra Capital

Exhibit 11d: Rates Increase +3% Over a 3-Year Period - Expected 3-Year Annualized Return

	Equity Environments (3-year Annualized Return)			
	-10.0%	0.0%	+10.0%	+20.0%
Equities	-10.0%	0.0%	10.0%	20.0%
Fixed Income	-4.8%	-4.8%	-4.8%	-4.8%
FIA	0.0%	0.0%	3.7%	8.3%
60/40 (Stocks & Bonds)	-7.9%	-1.9%	4.1%	10.1%
60/20/20 (Stocks, Bonds & FIA)	-7.0%	-1.0%	5.8%	12.7%
60/40 (Stocks & FIA)	-6.0%	0.0%	7.5%	15.3%

Source: Zebra Capital

Exhibit 12a summarizes the expected 3-year annualized return impact of shifting a base case portfolio (60/40 Stocks & Bonds) to a portfolio including a generic large cap FIA (60/20/20 Stocks, Bonds & FIA). In environments where rates are unchanged and equities are unchanged to down, the portfolio including the FIA would be expected to underperform. In all other environments considered, allocating to the FIA was additive. You would expect the FIA to be additive if rates increase and/or equities are positive.

Exhibit 12a: Change in Expected Annualized 3-Year Return: 60/20/20 FIA Portfolio vs. 60/40 Base Case

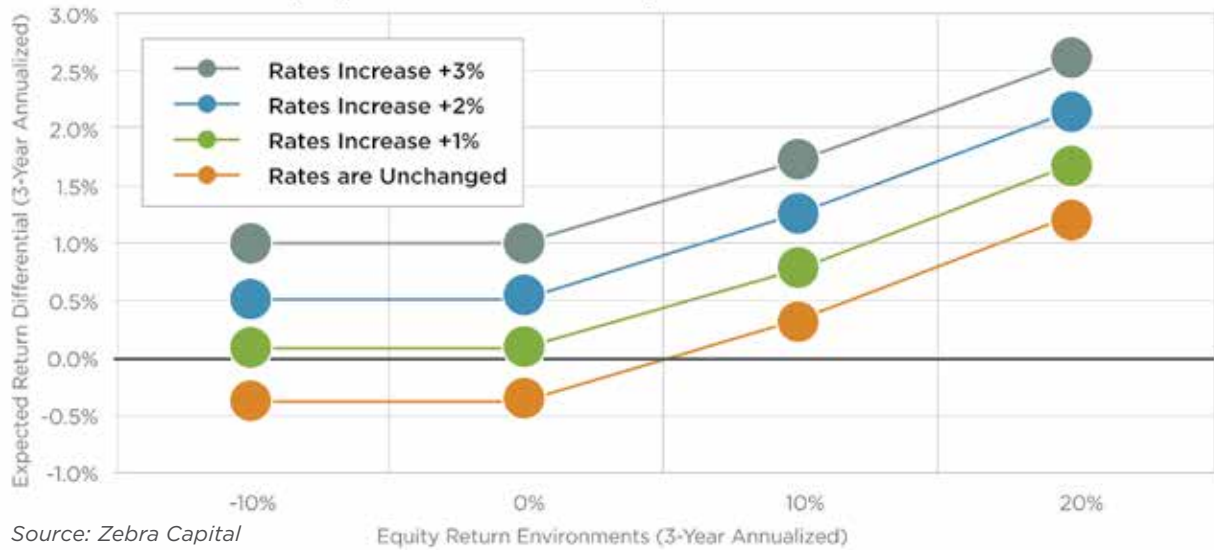
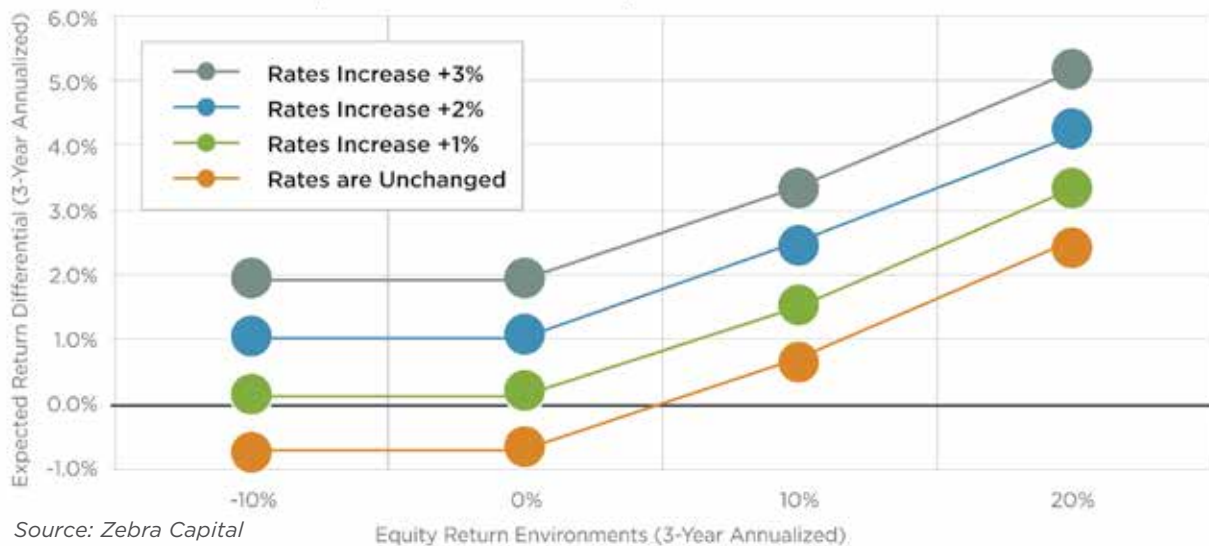


Exhibit 12b summarizes the expected return impact of shifting a base case portfolio (60/40 Stocks & Bonds) to a portfolio replacing fixed income with a generic large cap FIA (60/40 Stocks & FIA). In all equity scenarios considered and in all rising interest rate environments, allocating to an FIA was additive.

Exhibit 12b: Change in Expected Annualized 3-Year Return: 60/40 FIA Portfolio vs. 60/40 Base Case



Conclusions

- We began with conventional wisdom. Stocks beat bonds by a wide margin. Stocks are riskier than bonds. As we approach retirement, it is prudent to de-risk portfolios and shift a greater allocation toward bond-like investments. Although we believe this wisdom to still be true, we caution individuals preparing for or in retirement not to become complacent, particularly in this low interest rate environment. Each person's goals and risk tolerances are different and there are other options to consider.
- Annuities have for a long time deserved a place in retirement portfolios, and the evolution of the industry has made these vehicles more flexible and attractive. As with any investment, working with a trusted advisor/provider and doing your own due diligence is key.
- FIAs have many attractive features as both an accumulation investment and as a potential source of income in retirement. In simulation, the FIA performed better net of assumed fees than long term government bonds. We showed the FIA had comparable volatility to bonds but with better downside protection. In our study, when bonds underperformed, the FIA performed quite well. It is our view, considering today's low interest rate environment and our modest expectations for bond returns in the coming future, FIAs are an alternative to consider.

Appendix on Dynamic Participation Rates - AnnGen Development, LLC

Historical monthly simulated S&P 500® Index participation rates were calculated by assuming that a client purchased an index annuity and held it for 12 years, then subsequently purchased additional index annuities holding each for 12 years. The index annuity tracked an uncapped 3-year S&P 500® Index crediting method using dynamic participation/renewal rates for four index terms. The participation rates were calculated by taking the hedge budget for the 3-year crediting method term divided by the simulated S&P 500® 3-year call option price. The hedge budget set was calculated at the beginning of each contract holding period, and the simulated S&P 500® Index option prices were calculated every three years.

Historical simulated hedge budgets were calculated based on historical corporate bond rates less a derived pricing margin which is the spread that an insurance carrier deducts to cover expenses and taxes to achieve target profitability. Historical simulated S&P 500® 3-year at the money call options prices were calculated based upon a Black-Scholes valuation approach, and relied on various inputs including historical volatility, dividends, interest rates, and S&P 500® Index levels. Estimated implied volatility premia and option dealer margins were accounted for in the simulated option prices. Interest rate data was sourced from the Saint Louis Federal Reserve's website. Equity market data was sourced from Bloomberg, and historical dividend yields were sourced from Professor Ashwath Damodaran's NYU Stern School of Business website.

The simulated participation rates are only meant to be indicative estimates, and most likely would have deviated from these estimates for numerous reasons. Further if a client purchased an annuity in a different month or rolled into a new annuity on a different date than what was assumed in this simulation, then that client most likely would have received different participation rates.

Genesis Financial helped develop the first fixed indexed annuity, KeyIndex, with Keyport Life. KeyIndex was introduced in February 1995. The FIA crediting rates and performance before that date were developed through back-testing with Genesis Financial based on historical data.

The opinions expressed herein are those of Professor Roger Ibbotson and/or others acting in an academic and/or research-related capacity and not as a representative, or on behalf, of Zebra Capital Management, LLC ("Zebra Capital").

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