PACIFIC LIFE

FIXED INDEXED ANNUITIES AS A FIXED INCOME ALTERNATIVE FOR NEAR-RETIREES

A White Paper for Pacific Life by Wade D. Pfau, Ph.D., CFA®

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Summary

The role that a fixed indexed annuity (FIA) can play in helping near-retirees accumulate and protect assets in the crucial years leading up to retirement is not widely understood. This is because FIAs are a relatively new financial tool. An important difference between FIAs and bonds or other fixed-income alternatives, which can lose value when interest rates rise, is that the contract value of a FIA is protected from downside risk. For clients targeting a specific retirement savings goal, the ability to control downside risk, along with the tax-deferred nature of a FIA, may help ensure that their retirement savings goals will be met.

In this white paper, Wade D. Pfau illustrates this point by using historical data to explore the cumulative returns of stocks, bonds, and the interest earned for FIAs over rolling seven-year periods leading up to retirement. His analysis shows that, by managing market volatility, FIAs have the potential to provide clients with more protected lifetime income from a given asset base.

Pacific Life Insurance Company commissioned Wade D. Pfau, Ph.D., CFA, to write this report. Wade Pfau is not an employee of, nor affiliated with, Pacific Life.

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INTRODUCTION

Our focus in this white paper is on how a fixed indexed annuity (FIA) may provide attractive interest-earning opportunity/volatility characteristics relative to traditional bond funds or other fixed-income assets. FIAs may help retirees protect wealth and achieve their retirement savings goals, while also providing a degree of upside potential in the pivotal years leading up to retirement. We analyze this by comparing the hypothetical performance of a FIA (for which historical data is not available and must be simulated) against the historical data for other asset classes.

FIAs credit interest to the cash value of the annuity contract based either on a fixed interest rate or on the performance of an index-linked option. On the risk spectrum, even when FIAs are linked to stock market indexes, they should not be compared to stock investments such as index mutual funds; rather, they should be viewed as an alternative to investing in other fixed-income assets. Unlike fixed-income options, FIAs protect against loss of principal (as it is important to recognize bonds can lose value when interest rates rise) and offer tax-deferral properties relative to assets held in taxable accounts. Tax deferral is only relevant when the annuity is purchased outside a qualified retirement plan. Something to note is that FIAs are designed for retirement. Penalties may apply for distributions prior to age 59½ and withdrawal charges are due on distributions taken before the end of the annuity's withdrawal charge period. However, upon retirement, the client can convert those assets into protected lifetime income.

Protecting Principal

Many financial professionals will use FIAs to protect principal in the sense that even if the underlying index declines significantly in value, the FIA owner does not lose money; the owner is simply not credited interest in that year. The insurance company invests enough of the principal in bonds with the intention that it will grow to the value of the principal at the end of the term. For those who have a target amount for their retirement savings, the ability to control this downside risk while offering upside potential may help ensure that the goal will be met.

How an Insurance Company Credits Interest

After protecting principal, remaining funds are used by the insurance company for two purposes:

1. To pay company expenses.
2. To invest for upside by purchasing options on the market index that can potentially provide a payoff when the market index grows in value (not counting dividends) relative to its value at the beginning of the term.

FIAs generally offer several interest-crediting options. This white paper focuses on the **participation rate with spread** method. If the value of the market index is below the index value at the beginning of the

Definitions

Participation rate: A set percentage that helps determine how much of a positive market index return will be credited at the end of an index term.

Spread: A percentage that is deducted from the adjusted index return (the amount after the index return is multiplied by the participation rate, minus the spread) before interest is credited.

option term, the option expires without value, but the insurance company has protected the principal. If the value of the market index gains relative to its value at the beginning of the option term, those gains are used to credit interest to the FIA, enabling the insurance company to pass on some of the market's upside growth to the FIA owner. The participation rate applied to the upside depends on interest rates and the costs of the financial derivatives used to support the upside above the floor (a 0% credit).

Managing Downside Risk

Investment losses (either through stock market downturns or capital losses on bonds) experienced as a client's retirement date approaches have the biggest impact on retirement savings, because these returns affect a longer history of contributions and savings into the account. A FIA can function as an additional choice within an accumulation portfolio to better manage downside risks. FIAs can lay a foundation for either needing fewer assets to retire, or to potentially have more assets for retirement. It is with this context that we will explore the role of a FIA in a retirement income plan. We examine the cumulative returns over a seven-year period preceding retirement, net of taxes and fees, for stocks, bonds, and interest earned for FIAs.

Near-retirees should work with a financial professional to explore the role FIAs could play in a retirement portfolio, considering the range of potential outcomes for different retirement strategies. The inclusion of a FIA impacts the range of wealth outcomes both on the downside and upside. FIAs also offer tax deferral, unlike investment assets held in taxable accounts that face ongoing taxes on their growth. With the ability to better manage downside risk and avoid capital losses, FIAs offer behavioral benefits to retirees to help them stay the course with their retirement strategies. A FIA serves as a tool to help clients move into retirement by managing market volatility and the **sequence of returns** risk in the pivotal years leading to retirement. This can better set the stage for retirement and for creating more protected lifetime income from a given asset base.

> FIAs can lay a foundation for either needing fewer assets to retire, or to potentially have more assets for retirement.

Period of Analysis

The analysis in this paper will be completed using rolling seven-year periods from historical data (1962–2018). It provides a more careful review of past FIA performance than simply assuming that today's FIA parameters would have been applicable in historical data. *The "methodology" section on page 5 of this paper provides readers with detail to demonstrate the degree of upside potential that a FIA may have historically been able to provide.*

Definition

Sequence of returns: The concept that negative or low market returns have the most impact on retirement income in the years leading up to, and immediately following, retirement.

FINDINGS

We estimate annual returns net of taxes and fees for stocks **(S&P 500® index)** and bonds **(Morningstar Intermediate US Government Bond Index)**, and interest earned for the FIA based on rolling seven-year periods starting each month from January 1962 to December 2011, and ending in each month from December 1969 to November 2018. *The methodology for the way calculations were determined back to 1962 can be found in the "Methodology" section of this paper.*

Table 1 provides the results. For annual growth rates net of fees and taxes, the S&P 500® index held in a taxable account averaged 6.73% annual growth. The standard deviation for these seven-year average returns is 5.14%. In 94% of the simulations, the S&P 500® index provided nonnegative cumulative growth net of taxes and fees over the rolling seven-year periods. Regarding bonds in a taxable account, the net average return was 3.63% on an annual basis. The standard deviation for the seven-year average compounded returns is 2.11%. Nonnegative net growth was achieved for bonds in 99% of the rolling historical periods. If these assets were instead held within a tax-deferred qualified retirement plan, net performance increases for both. The S&P 500® index averaged 7.27% on a net basis, while bonds averaged 4.15%. Nonnegative net growth was achieved in 97% and 99% of the cases, respectively.

For the FIA, the net average interest earned is 6.43% with a 3.85% standard deviation. With the floor offered by the FIA, nonnegative growth was achieved in 100% of the historical cases. This is important to note because the standard deviation measure does not properly account for how the FIA does not provide negative interest. Its volatility is being driven by its upside potential, explaining partly why it is more volatile than bonds. Nevertheless, the upside participation integrated with the downside protection along with the tax deferral allows the FIA to earn higher average interest with lower volatility than stocks in a taxable account. Stocks in a tax-deferred account, which neutralize the tax advantages of the FIA, earn a higher average return but with greater volatility as well. We can observe that the interest credited to the FIA is favorable in relation to returns with stocks and bonds. A FIA may serve an important role in the asset allocation for near-retirees.

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Definitions

S&P 500® index: A market capitalization-weighted index of 500 widely held stocks often used as a proxy for the U.S. stock market.

Morningstar Intermediate US Government Bond Index: Includes U.S. Treasury and U.S. Government Agency bonds with maturities between four and seven years.

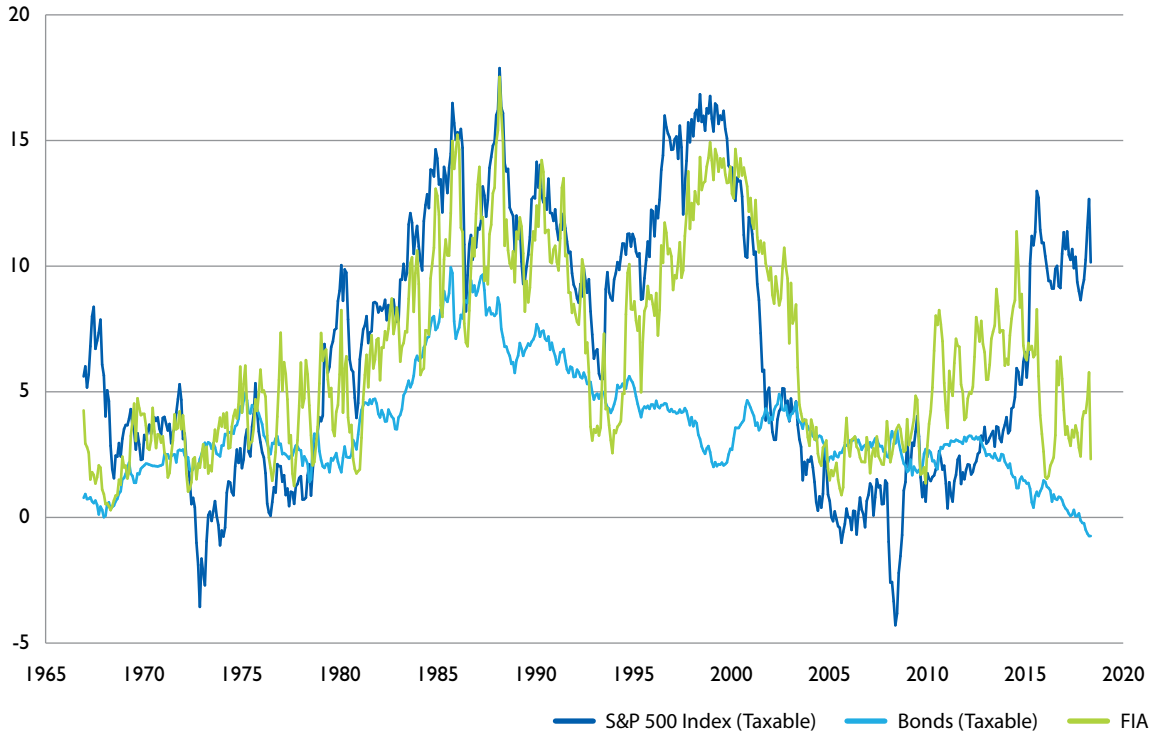
Table 1: Simulated Historical Returns for Stocks and Bonds, and Interest Credited for FIAs

Historical Rolling 7-Year Periods January 1962 – November 2018	Net Annualized Return	Standard Deviation for Seven-Year Net Annualized Return	Percentage of Simulations with Nonnegative Net Growth
S&P 500® index (Total Returns) [Taxable Account]	6.73%	5.14%	94%
ITGBs (Total Returns) [Taxable Account]	3.63%	2.11%	99%
S&P 500® index (Total Returns) [Tax-Deferred Account]	7.27%	5.04%	97%
ITGBs (Total Returns) [Tax-Deferred Account]	4.15%	2.20%	99%
Fixed Indexed Annuity	6.43%	3.85%	100%

Past performance is no guarantee of future results. Inception date is 1/1/62. Interest credited is based on a rolling seven-year period using a one-year S&P 500® index point-to-point option with a floor of 0% and varying participation rates and spreads. FIAs were not available in 1962 (see Methodology). Net Annualized Returns are net of fees for stocks and bonds. Returns reflect reinvestment of dividends and distributions. Indexes are unmanaged and cannot be invested in directly. Further, they hold no cash and incur no expenses. Assumes no withdrawals are taken during the period. Your results may vary. ITGBs refer to intermediate-term government bonds as a proxy for the Morningstar Intermediate US Government Bond Index.

Figure 1 complements the results in Table 1 by showing the historical simulated performance of the FIA along with stocks and bonds held in taxable accounts during the historical period.

Figure 1: Rolling Historical Performance of Stocks, Bonds, and FIAs



Source: Author's calculations, 2018. Past performance is no indication of future results.

METHODOLOGY

Modeling the performance of FIAs is more complex than modeling returns for traditional asset classes such as stock and bonds. The simplest approach to modeling FIAs is to assume that their current parameters (such as **floors, caps,** participation rates, and/or spreads) would have applied equally in the past. However, this is not satisfactory, because changing market conditions over time would have led those parameters to also be different. As well, many FIAs have recently been created, so relying on their historical interest credited or historical parameter values is not an option. To obtain a better sense about what their past parameters could have been, a more complete model to price FIAs must account for the risk-free interest rate, the broader yield curve and credit spread, internal insurance company costs, the implied volatility of the underlying index linked to the FIA, and the dividend yield for the underlying index. The interest earned for FIAs is more complicated than just modeling stock and bond returns, because these variables are not all readily observable. In particular, insurance company expenses and assumptions about the performance of their investments, as well as the implied volatility of the stock market, are variables that will require assumptions. Here we explain the methodology used to approximate, as best as possible, how a FIA may have performed historically.

FIA Modeling

The FIA modeled in this white paper is based on a FIA with a seven-year withdrawal charge schedule, a one-year index term, and a purchase payment of $100,000. The index modeled is the S&P 500® index and the interest-crediting method is the participation rate with spread method.

With the S&P 500® index and the participation rate with spread interest-crediting method, a percentage of a positive index return, minus any spread amount, is credited at the end of each yearly term on the anniversary date of the contract. If, after deducting the spread the return is negative, the contract will not be credited with any interest (but the contract will not lose value). Generally, the participation rate and spread are declared at contract issue and guaranteed for one contract year. These can be changed after the first contract year, subject to contractual terms, and are predetermined in advance of each new annual term starting on contract anniversary dates. For the purposes of this analysis, we assume that the insurer will support the original parameters throughout each seven-year period.

Definitions

Floor: No interest credited at the end of an index term.

Cap: The maximum rate of interest that can be credited at the end of an index term.

This analysis assumes the declared spread stays consistent at 2%. The insurer can configure both participation rates and spreads to find a different balance (as a higher spread also supports a higher participation rate). But in this analysis, we assume the spread remains fixed at 2% and only the participation rate is adjusted to account for current market environments. The exception is that once the simulated participation rate exceeds 100%, we reduce the spread to 1% and then to 0% in order to calibrate a participation rate of 100%. Once the spread is 0%, we cap the participation rate at 100%. Technically, there is not a cap on how high the FIA interest-crediting link may rise, so this is meant to be a conservative assumption for FIA performance. Likewise, we would increase the spread if the simulated participation rate fell below a 15% minimum level, but this did not happen in the historical period under consideration.

Determining Historical Performance for a FIA

Next, we describe the methods for calculating historical participation rates for the FIA in order to evaluate how the FIA performed historically against stock and bond returns. The participation rate is the outcome of the formula:

$$\textbf{Participation Rate} = \frac{\text{Options Budget}}{\text{Price of Call Option}}$$

To perform this calculation, we must determine the value of the options budget and the price of the call option to obtain exposure to market upside. We consider each of these factors in turn.

The options budget is the amount of funds the insurer makes available to purchase financial derivatives after protecting the value of principal and covering company expenses. It is the yield on the insurer's general account less a deduction to cover company costs. The FIA offers a fixed-rate option, which can be used as a proxy for the size of the options budget after accounting for the otherwise unobservable internal spread. We approximate performance for the general account of the insurance company using **Moody's Seasoned BAA Corporate Bond Yield**, which is available from the Federal Reserve Bank of St. Louis. Because modeling the internal expenses for a specific insurer is not practical, we assume that the historical fixed rates will be 2.24% less than the corporate bond yield in the historical data. Though this spread will better match the fixed rates to corporate bonds, it is important to note that it will overestimate the spread in practice, since the bond index is based on 10-year bonds, which is longer-dated that the seven-year FIA term.

Definition

Moody's Seasoned BAA Corporate Bond Yield: Reflects the average yield of constituent corporate bonds that have been given Moody's Baa credit rating.

We also assume that these fixed rates proxy the options budget the insurer can spend on financial derivatives after protecting principal and covering company expenses. While we assume a $100,000 purchase payment, the example can be made simpler by just thinking in terms per $100 of assets. Specifically, for $100, the options budget (using an estimated fixed rate of 2.28% for December 2018 based on the Moody's Seasoned BAA Corporate Bond Yield minus the average spread is:

$$\textbf{Options Budget} = \$100 \times \frac{\text{Fixed Rate}}{1 + \text{Fixed Rate}} = \$100 \times \frac{0.0228}{1 + 0.0228} = \$2.23$$

Next, the price of call options that provide upside exposure are modeled using the Black-Scholes option pricing formula. This formula requires six inputs: the current price of the index, the strike price that the index can be purchased at, the risk-free interest rate, the time to the option expiration date, the implied volatility of the underlying index, and the dividend yield for the index. These six inputs are defined as follows for the S&P 500® index. The current index value we have in mind is simply $100 worth of the index. Because the FIA has a 2% spread (except when the simulated participation rate exceeds 100% as explained earlier), index price gains must exceed 2% before a payment is credited for index performance. Index returns under 2% will leave the option to expire worthless, but principal has been protected. This leads to a strike price for this example of $102. Next, the risk-free interest rate is treated as the **One-Year Treasury Constant Maturity Rate**, with data also available from the St. Louis Federal Reserve Bank since January 1962. This data series provides the limit on how far back we are able to model FIA performance. This is the maturity that matches the one-year term for the FIA. Time to maturity is also one in this case, reflecting this same one-year horizon for each term. Next, implied volatility is based on a moving average of the standard deviation of realized S&P 500® index monthly returns over the previous 12-month period. A larger implied volatility raises the cost of the call option, which in turn reduces the participation rate. Implied volatility is difficult to estimate as it is based on the

Definition

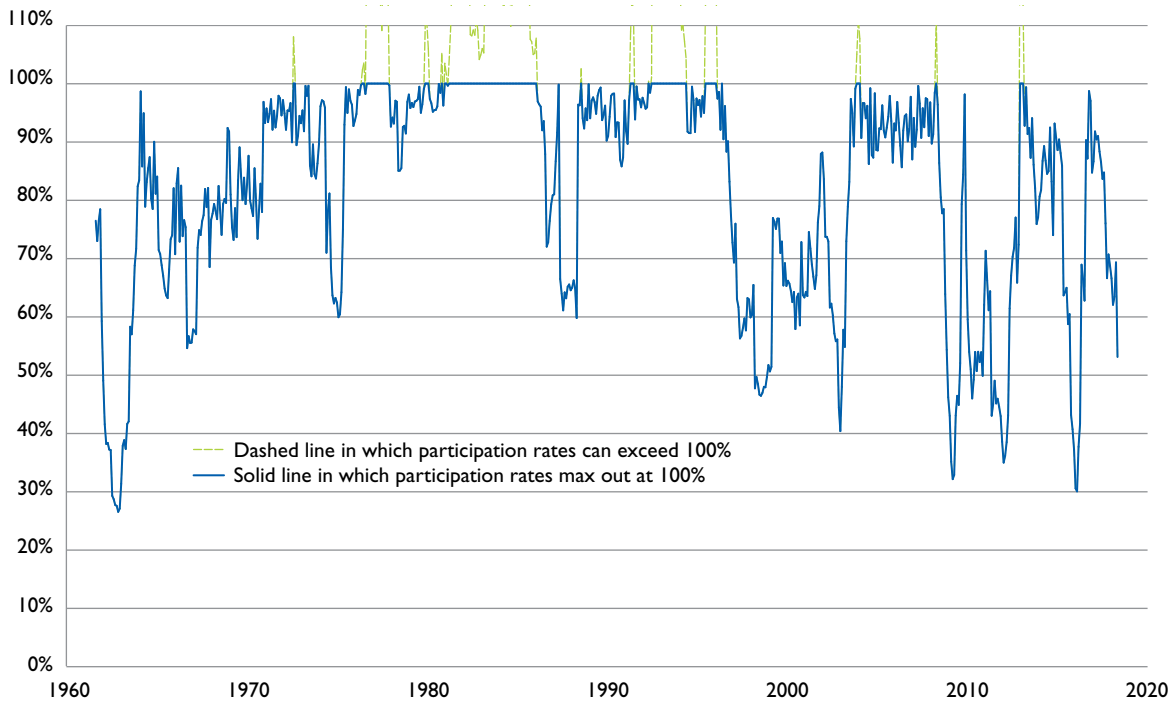
One-Year Treasury Constant Maturity Rate: An index published by the Federal Reserve Board based on the monthly average yield of a range of Treasury securities, all adjusted to the equivalent of a one-year maturity.

future, and our use of past volatility is only an estimate. Finally, the dividend yield is added to account for the portion of the S&P 500® index total return that reflects dividend payments. Dividend yields are calculated from data available at Robert Shiller's website. As an example, our simulated call option price for December 2018 is based on the value of inputs in November 2018, which we calculate using the *blsprice* function for the Black-Scholes formula in Excel:

> **Call Option Price = *blsprice*** ($100, $102, 2.7%, 1, 12.19%, 1.92%) **=** $4.23

Combining these factors, we obtain an estimated participation rate in December 2018 of 2.23/4.23 = 53%. When providing the interest-link to the S&P 500® index, the insurance company can use the $2.23 options budget to buy 53% of a call option costing $4.23, which provides 53% of the upside above the spread. As well, it is important to emphasize that the stock index exposure is based on price returns for the index not including dividends paid by the stocks. This is because the FIA does not invest in the underlying stocks of the index. It buys call options based on the index price returns. The key reasons why estimates can vary from actual numbers relate to the assumptions made about corporate bond yields, the spread between the insurer return and the fixed rate, and the way that implied volatility is estimated. Nonetheless, the hope is that this methodology provides a simulated performance that will better match reality than the more common, but vastly simplified, assumption that today's parameters would have applied at each point in the historical data. Figure 2 provides the simulated historical participation rates for the FIA created with this methodology.

Figure 2: Simulated Historical Initial Participation Rates for the Fixed Indexed Annuity



Source: Author's calculations, 2018. Past performance is no indication of future results.

Because of the dynamic nature of interest-rate fluctuations and call-option pricing, the participation rate can naturally be expected to equal different values over time as shown in Figure 2. These participation rates represent initial rates at each time period that are assumed to hold over the subsequent seven years for each contract. This analysis is for a seven-year accumulation period and assumes that withdrawals are not taken during this time. The analysis also assumes that no optional benefits, such as the guaranteed minimum withdrawal benefit or an enhanced death benefit, are purchased.

We measured FIA performance with total returns for the S&P 500® index as a proxy for stocks and the Morningstar Intermediate US Government Bond Index as a proxy for bonds. We look at rolling annual historical data starting from each month. All the necessary data for determining FIA performance is available from January 1962 to November 2018. When investigating the role of a FIA as an asset class, we must also consider cumulative growth after also accounting for taxes and expenses to properly analyze the potential role to be played by a FIA in the preretirement years. The FIA pricing is already

net of internal fees built into the spread of the product, while the market returns provided are gross returns not accounting for investment expenses. To calculate performance net of taxes and fees, we assume the following parameters: the combined federal and state income-tax rate is 32%, the long-term capital gains tax rate is 20%, and the combined expense ratio for the underlying investment funds and advisory assets-under-management fees is 1.2%. The investment expenses could be conceptualized as a 1% advisory fee with a relatively low 0.2% expense ratio on the underlying stock and bond funds, as may be typical for index funds.

For accumulation strategies, we will consider stocks and bonds in both taxable and tax-deferred accounts, as well as fixed indexed annuities that provide tax deferral. Net growth for taxable assets (both stocks and bonds) is calculated by applying the income-tax rate annually to the dividends and interest. This annual taxation on the income returns reduces some of the compounding growth potential for the investments. Capital gains taxes on the price returns are deferred until the end of the accumulation period. The expense ratio for stocks and bonds is applied at the end of each year as well. As for the FIA, stocks, and bonds held in a tax-deferred account, growth is tax-deferred until the end of the accumulation period when the income-tax rate is applied to accumulated growth in the account. For stocks and bonds, expenses are taken on an annual basis as well.

An important point about the downside protection of the FIA is the annual reset feature. This means that index returns are assessed on an annual basis without a need to overcome any cumulative losses. If the market was down 40% in the previous year, interest is credited at 0%, and the next year begins with a fresh start. The process described above repeats for each new term.

CONCLUSION

Though the interest they credit is linked to the S&P 500® index, the anticipated interest credited for FIAs will be more similar to bonds than to stocks. In this investigation, it was necessary to make numerous assumptions to test the historical potential for FIAs within a portfolio, and the conclusion is that there is a role for FIAs. They are unlike stocks and unlike bonds. Principal is protected for FIAs, while bonds can experience capital losses when interest rates rise. With the use of a participation rate, FIAs may have more volatile interest credited than bonds, but that volatility is based more on upside than downside. Owners should not think about FIAs as an alternative to owning stocks, despite our results showing that the interest credited to a FIA has the potential to be competitive with stocks net of taxes and fees while experiencing less volatility. FIAs can provide another option for fixed-income assets that protects principal and has the potential to outperform bonds when considered net of taxes and fees. Their unique interest-crediting structure leads us to conclude that FIAs may have a role to play in preretirement accumulation portfolios and are worth a careful consideration by those preparing for retirement.

FIAs can provide another option for fixed-income assets that protects principal and has the potential to outperform bonds when considered net of taxes and fees.

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A fixed indexed annuity is not a security and does not participate directly in the stock market or any index, so it is not an investment.

Annuity withdrawals and other distributions of taxable amounts, including death benefit payouts, will be subject to ordinary income tax. For nonqualified contracts, an additional 3.8% federal tax may apply on net investment income. If withdrawals and other distributions are taken prior to age 59½, an additional 10% federal tax may apply. A withdrawal charge and a market value adjustment (MVA) also may apply. Withdrawals will reduce the contract value and the value of the death benefits, and also may reduce the value of any optional benefits.

Under current law, a nonqualified annuity that is owned by an individual is generally entitled to tax deferral. IRAs and qualified plans—such as 401(k)s and 403(b)s—are already tax deferred. Therefore, a deferred annuity should be used only to fund an IRA or qualified plan to benefit from the annuity's features other than tax deferral. These include lifetime income and death benefit options.

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