

# WHY PURCHASE A DEFERRED FIXED ANNUITY IN A RISING INTEREST-RATE ENVIRONMENT?

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

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This white paper explores the dilemma about the relationship between interest rates and fixed annuities. We explore this dilemma within the context of a household approaching retirement that is seeking an appropriate strategy to combine growth with the preservation of assets within the fixed-income portion of an investment portfolio. We compare bonds with deferred fixed annuities. Each approach has advantages and disadvantages to be discussed. The analysis will make clear that the potential role of deferred fixed annuities may be underappreciated when interest rates are low, even assuming interest rates do rise in the future.

## Introduction

The United States has experienced historically low interest rates in recent years, leading to lower returns for fixed-income assets. This creates unique challenges for those approaching retirement, as the practical impact of low interest rates is to increase the cost of retirement. Given lower interest rates, retirees must accumulate a larger asset base to fund the same retirement goal. They are less able to rely on investment income as a source of spending. They may also worry more about taking market risk after leaving the labor force.

Investors approaching retirement, burdened by low interest rates, may find themselves holding out hope that interest rates will soon rise. They may or may not be right. Interest rates have remained low for longer than many expected. Nonetheless, holding out hope for rising interest rates may lead near retirees to make financial decisions that are not always in their best interest, even if their hope is realized and interest rates do rise.

In particular, near retirees may view deferred fixed annuities as a bad option that could lock in lower interest rates today and remove the option to invest in higher-yielding assets in the future, causing them to consider other options such as bonds. However, investing in bonds may not work out as well even if rates do rise. Longer-maturity bonds may offer higher yields but, if not held to maturity, will experience capital losses with a rate increase. Shorter-term bonds may not experience losses with rising rates, but their lower yields may not be as competitive as today's deferred fixed annuity rates, and still may not produce better returns with subsequent reinvestment taking place if rates do rise in the future. One misconception that surrounds this interest rate dilemma is the notion that it is a bad time to consider annuities when interest rates are low.

Purchasing a deferred fixed annuity at present has the potential to outperform other fixed-income strategies, even in a rising-rate environment.

Purchasing a deferred fixed annuity at present has potential to outperform other fixed-income strategies, even in a rising-rate environment. This assertion will be quantified through examples.

The discussion concludes with a further consideration about using lifetime income guarantees as a part of funding retirement-income goals. Individuals may purchase fixed-income assets to provide retirement income. A deferred fixed annuity can set the stage for more lifetime retirement income by providing more assets at retirement, especially on an after-tax basis, with the flexibility to then convert assets into an annuity that offers lifetime income guarantees with further efficiency provided by the tax-exclusion ratio on nonqualified assets.

A deferred fixed annuity can set the stage for more lifetime retirement income by providing more assets at retirement.

## Understanding Fixed-Income Assets

To understand the role of different fixed income assets (bond funds, individual bonds, deferred fixed annuities) prior to retirement, it is important to have a clear understanding about the meaning of bonds, how the price of bonds is determined, and how the value of bonds fluctuate in response to changing interest rates.

### What Is a Bond?

Simply, a bond is a contractual obligation to make a series of specific payments on specific dates. Typically, this includes interest payments made on a semiannual basis and the return of the bond's face value when the bond matures. Bonds are issued to raise funds by both governments and private corporations, and they are purchased by investors seeking an investment return on their capital. Bonds are generally viewed as a less-risky investment than stocks, offering less potential for price appreciation along with less price volatility and downside risk. A collection of bonds may be pooled together into a single bond fund or held within an insurer's general account when held through an annuity. Deferred fixed annuities also function as a type of bond in terms of providing specified cash flows based on fixed growth rates over specified time periods, though they are not traded on secondary markets. The word "bond" is usually reserved for fixed-income assets that are traded on secondary markets.

## How are Bond Interest Rates Determined?

Bond interest rates are determined by the interaction of supply and demand for the bonds as they continue to be traded. An increase in demand—such as that triggered for U.S. Treasuries by a “flight to quality” when investors are panicked by the falling prices of risky assets and seek a safe haven—will push up the price of these bonds. Conversely, a stretched government seeking to raise funds through an increasing supply of new bond issues will reduce the price of bonds.

A bond that sells at par value can be purchased for the same price as its face value. Bonds may also sell at a premium (higher than face value) or discount (lower than face value). Rising interest-rate environments will lower prices for existing bonds already issued and available for resale. The price must be reduced so the subsequent return to a new purchaser of the bond can match the higher returns available on new bonds with higher interest rates. Conversely, lower interest rates will increase the price that existing bonds can sell for. If sold at their face value, these older bonds offer higher returns than newly issued bonds, and their owners will want to hold them. An agreeable selling price can be found only if the bond sells at a premium, and then the new purchaser receives a subsequent return on the purchase price that is in line with newly issued bonds. The price of a bond on the secondary market will fluctuate in the opposite direction of interest rates. **Exhibit I** provides a similar illustration of this effect, showing how the price of a bond changes in relation to a change in interest rates and the time to maturity of the bond.

### Exhibit I: Relationship between Bond Prices and Interest Rates

	Current Bond Value			Coupon Rate			Current Interest Rate		
	\$1,000			2% (annual)			2%		
Years to Maturity	New Interest Rate								
	1.0%	1.5%	2.0%	2.5%	3.0%	3.5%	4.0%	4.5%	5.0%
1	\$1,009.90	\$1,004.93	\$1,000.00	\$995.12	\$990.29	\$985.51	\$980.77	\$976.08	\$971.43
5	\$1,048.53	\$1,023.91	\$1,000.00	\$976.77	\$954.20	\$932.27	\$910.96	\$890.25	\$870.12
10	\$1,094.71	\$1,046.11	\$1,000.00	\$956.24	\$914.70	\$875.25	\$837.78	\$802.18	\$768.35
20	\$1,180.46	\$1,085.84	\$1,000.00	\$922.05	\$851.23	\$786.81	\$728.19	\$674.80	\$626.13
30	\$1,258.08	\$1,120.08	\$1,000.00	\$895.35	\$804.00	\$724.12	\$654.16	\$592.78	\$538.83

The yield to maturity can differ from a bond’s coupon rate as bonds are bought and sold at prices other than their face value, exposing the investor to interest-rate risk—the risk that a bond price will fall due to rising interest rates.

In the universe of bonds, there is not one single interest rate. Differences in interest rates among bonds reflect several factors:

1. The time to maturity for the bond (longer-term bonds will experience more price volatility as interest rates change).
2. The credit risk of the bond (bonds that are more likely to default on their promised payments are riskier and must reward investors with higher yields).
3. Liquidity (bonds that are more actively traded may offer lower yields).
4. The tax status of the bond (municipal bonds from state and local government agencies are free from federal income taxes and thus offer lower interest rates).

Bonds also may feature other options that affect the price an investor is willing to pay. For instance, if the bond is “callable” (meaning the issuer retains the right to repay it early if interest rates decline to save on interest costs), the potential capital gains are reduced to the bond holder, which in turn lowers the price investors are willing to pay. The chart below helps to outline the major differences between U.S. government treasury bonds and corporate bonds.

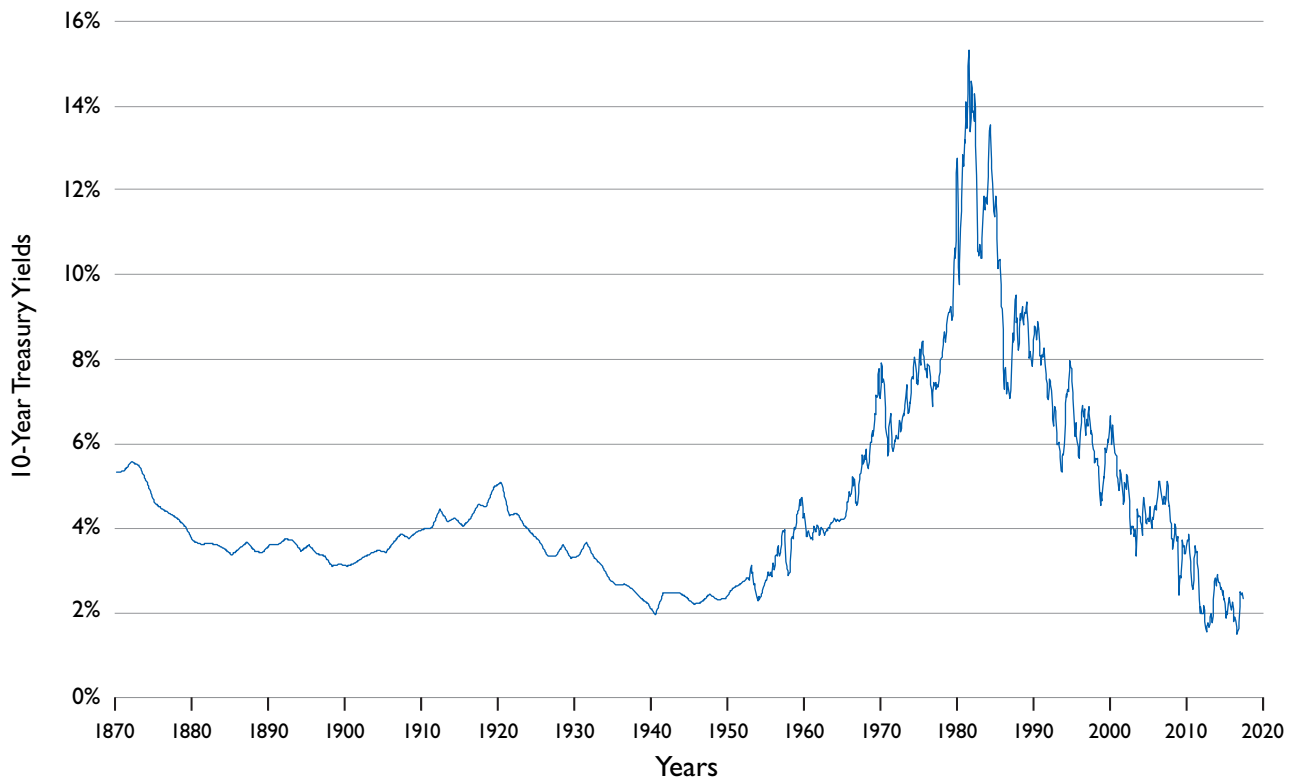
	<b>U.S. Government Treasury Bonds</b>	<b>Corporate Bonds</b>
<b>Credit Risk</b>	<ul style="list-style-type: none"> <li>○ Lowest credit risk, backed by the full faith and credit of the U.S. government</li> </ul>	<ul style="list-style-type: none"> <li>○ Low to high credit risk with a greater risk of bond default due to the changing financial strength of the company issuing the bond</li> </ul>
<b>Interest-Rate Risk</b>	<ul style="list-style-type: none"> <li>○ If interest rates rise, bonds with longer maturities are exposed to larger capital losses than bonds with shorter maturities</li> </ul>	
<b>Yields</b>	<ul style="list-style-type: none"> <li>○ Lower yields than corporate bonds with the same maturity date</li> </ul>	<ul style="list-style-type: none"> <li>○ Higher yields than U.S. government Treasuries with the same maturity date</li> </ul>
<b>Taxes</b>	<ul style="list-style-type: none"> <li>○ Interest is taxed at ordinary income-tax rates at the federal level; interest is not taxed at the state or local level</li> </ul>	<ul style="list-style-type: none"> <li>○ Interest is taxed at ordinary income rates at federal, state and local level</li> </ul>
	<ul style="list-style-type: none"> <li>○ Capital gains are taxed at appropriate capital-gains rates</li> </ul>	



## Low Interest Rates

Interest rates are low at present. **Exhibit 2** shows yields of ten-year Treasury bonds. In the United States, we do not have much experience being in a prolonged low interest-rate environment, as the early 1940s was the only other period when ten-year Treasuries fell to the 2% range, which is where ten-year Treasury bonds have been in recent years.

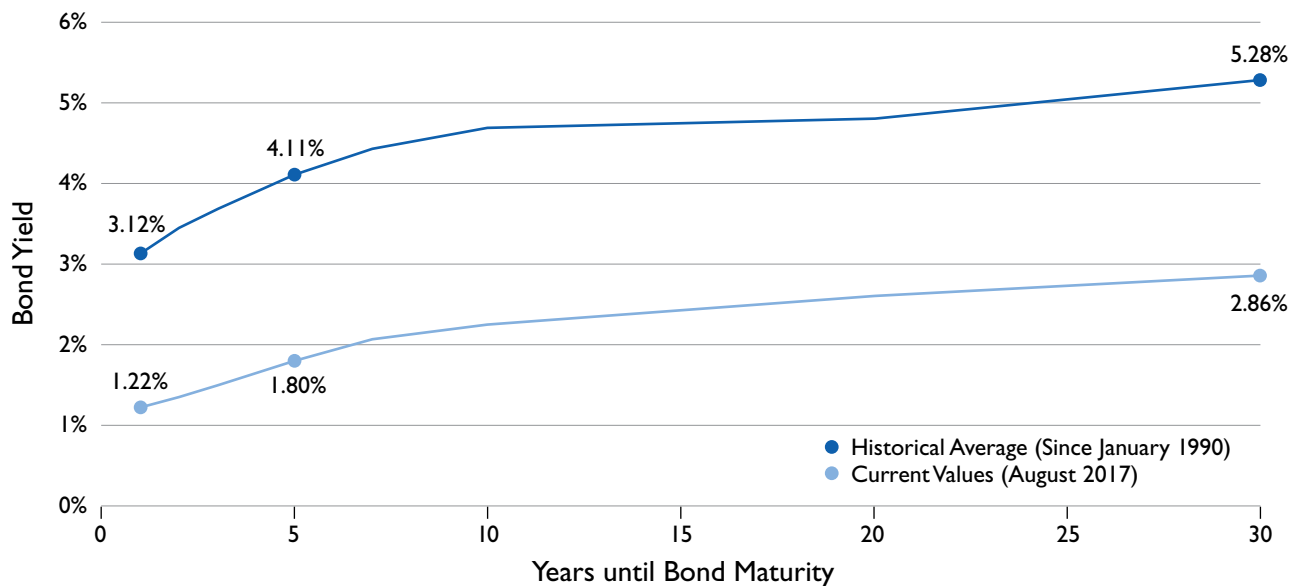
**Exhibit 2: Ten-Year Treasury Yields at the Start of Each Year, 1871–2017**



Source: Robert Shiller's data (<http://www.econ.yale.edu/~shiller/data.htm>).

**Exhibit 3** further helps to make the point about low interest rates. This exhibit shows the Treasury yield curve at the start of August 2017 along with the average bond yields since January 1990. The Treasury Department provides this data since January 2, 1990. Since that date, on average, one-year Treasuries yielded 3.12% (1.9% higher than at present), with five-year yields at 4.11% (2.31% more than at present), and thirty-year yields at 5.28% (2.42% more than at present).

### Exhibit 3: Treasury Yield Curve



Source: U.S. Department of the Treasury (<https://www.treasury.gov/resource-center/data-chart-center/interest-rates/>).

## Risk of Rising Interest Rates

**A low interest rate environment is risky for investors, especially those approaching retirement.**

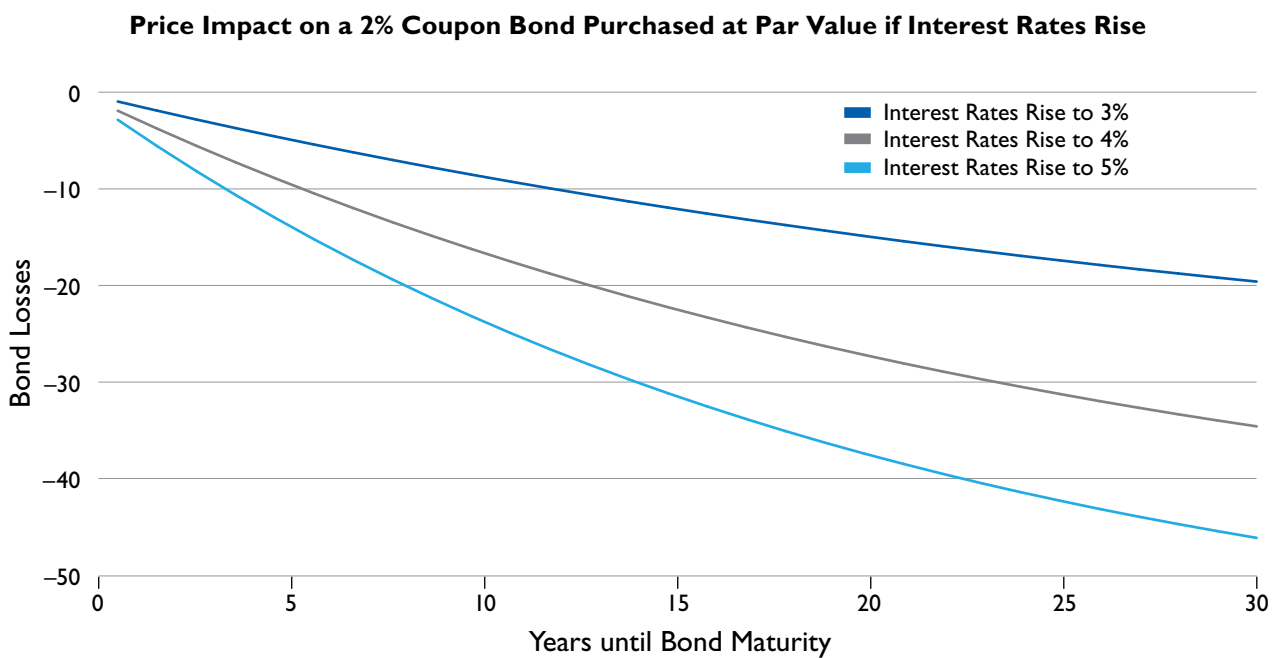
First, it is important to understand that bond prices will decrease if interest rates rise. Bond funds can be volatile and experience losses, and individual bonds may also experience loss when sold before maturity. Bond duration is a measure of just how sensitive bond prices are to interest rate changes.

**Exhibit 4** quantifies this relationship between interest-rate changes, bond prices, and bond duration. It shows the price impact on a 2% coupon bond, initially selling at par value, caused by an increase in interest rates to 3%, 4%, or 5%. The exhibit shows this relationship for bond maturities ranging from one year to 30 years. For example, the exhibit shows that for a ten-year bond, a subsequent increase in interest rates

from 2% to 3% caused the bond's price to fall by 8.5%. This bond has a duration of 8.5, meaning that a 1% rise in interest rates leads to an 8.5% drop in price. Here, we can clearly see how bond prices move counter to interest rates, and how price fluctuations are more dramatic for longer-term bonds. At the extreme, the thirty-year bond would experience a 19.6% drop in price if interest rates rose by 1%. This loss grows to 34.6% if rates rise by 2%, and it further grows to 46.1% if interest rates rise by 3%.

As noted earlier, on August 1, 2017, thirty-year Treasury bond yields were 2.42% below their historical average since January 1990. If interest rates on thirty-year Treasuries were to rise soon to the 5.28% average number experienced since that earlier date, this would imply a potential capital loss of 36%. Despite their reputation as reliable and predictable, bonds can be risky. **Longer-term bonds may be as risky as stocks when interest rates are low.** Those waiting for a rate increase to purchase an annuity may find that capital losses on their bond funds will be greater than any potential gain experienced from a higher annuity interest rate, leaving them in a worse overall position than before.

#### Exhibit 4: Relationship between Interest Rates and Bond Prices



Source: Author's calculations.

This sensitivity to losses from bonds that accompany rising interest rates is a particularly important matter for near retirees because of something called sequence of returns risk. Individuals who behave in exactly the same way over their careers—saving the same percentage of the same salary for the same number of years—can experience disparate outcomes based solely on the specific sequence of investment returns that accompanies their career and retirement. This sequence of returns risk is generally discussed within the context of the retirement phase. It is the idea that the ordering of market returns matters, not just the average market return over the long term. To be clear, sequence of returns risk does exist prior to retirement as well if individuals are adding new savings to their investment portfolio over time. **Investment losses and gains experienced near retirement have the biggest impact on final wealth accumulations because these returns affect larger asset amounts due to a longer history of contributions and savings into the account.**

**Exhibit 5** attempts to give a clearer picture of how sequence-of-returns risk impacts the accumulation phase. The exhibit is based on statistical regression analysis, which determines how much of the outcome (wealth accumulation at retirement) can be explained by the returns experienced in each year of a thirty-year accumulation period. The exhibit isolates the impact of each year's portfolio return on wealth accumulation using a larger sample of one hundred thousand Monte Carlo simulations. With little saved and wealth accumulations at insignificant levels in the early part of one's career, the early returns have very little impact on the absolute level of wealth accumulated at the end of the savings period. But as

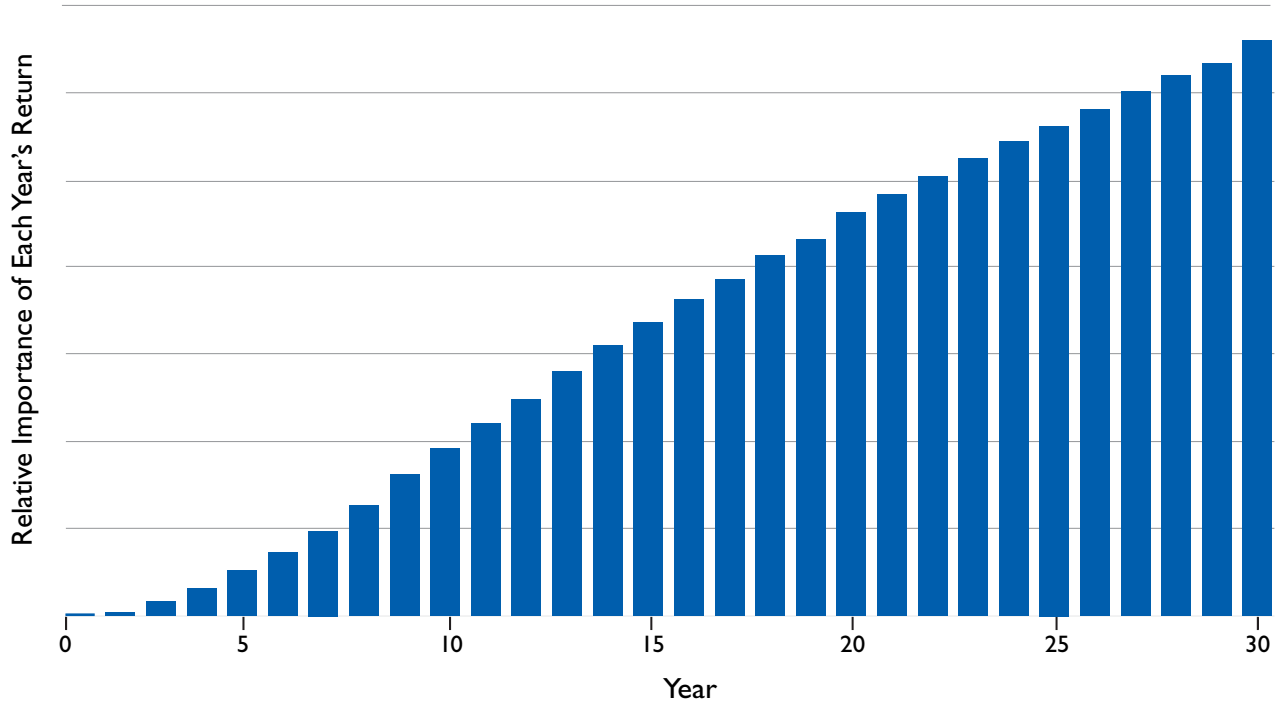
Simply put, later market returns impact more years of contributions and larger asset levels.

retirement approaches, a given percentage return produces an increasing impact on the final wealth value in absolute terms, leaving individuals particularly

vulnerable to these later returns. Simply put, later market returns impact more years of contributions and larger asset levels. Though bonds are generally perceived to be less risky assets, they are exposed to interest rate risk and a near-retiree depending on bond funds to maintain the value of their assets may be vulnerable to having their financial plan steered off course by a rise in interest rates during these key pre-retirement years if they need to sell bonds before maturity to meet expenses.

## Exhibit 5: Sequence-of>Returns Risk in the Pre-Retirement Wealth Accumulation Phase

### The Market Returns Experienced in the Years Leading Up to Retirement Matter More



Source: Author's calculations.

## Deferred Fixed Annuities

This discussion so far has provided examples to prepare us for considering the role of deferred fixed annuities in the period leading up to retirement, as well as to understand that it may make sense to allocate assets to a deferred fixed annuity even if one feels confident that interest rates are going to rise in the future. Deferred fixed annuities offer several important benefits relative to bonds, bond funds, or money-market accounts. A deferred fixed annuity is a long-term contract between an individual(s) and an insurance company that can help provide growth through tax deferral, a guaranteed interest rate, and future retirement income.

The benefits offered by deferred fixed annuities relative to other fixed income choices include:

- 1. Protection of the value of the annuity from investment volatility:** Deferred fixed annuities support growth at a specific interest rate without exposure to price fluctuations and potential losses as interest rates change. Principal is protected and secured. This provides a way to take risk off the table in the pivotal years before the retirement date.
- 2. Higher yields:** Deferred fixed annuities provide an ability to earn higher yields than Treasury bonds because insurance company general accounts may invest in higher-yielding corporate issues. Insurance company general accounts provide diversification, similar to a bond fund, but without the interest rate risk to the annuity contract holder, and they provide the principal protection offered by an individual bond that is held to maturity.
- 3. Less credit risk:** Deferred fixed annuities may offer lower credit risk because insurance companies can diversify their holdings across a large range of fixed income securities.
- 4. Tax deferral:** Deferred fixed annuities allow the taxes on investment growth to be deferred until the maturity date of the deferred fixed annuity. Because an annuity is tax-deferred for individuals, interest will compound without current income tax. Assets grow faster because individuals do not pay taxes on the interest earned until they actually withdraw it or until it is distributed to them.

Tax deferral is only relevant when the annuity is purchased outside of a qualified retirement plan. As for disadvantages, deferred fixed annuities may have penalties or withdrawal charges due on distributions taken before the end of the annuity's withdrawal charge period, which can mean that they offer less flexibility than bonds.

## Fixed Annuities vs. Bonds for Retirement Income

To illustrate these differences, we will investigate a scenario in which an investor anticipates retiring in seven years and considers three different options for a portion of his or her fixed income investments over the next seven years:

- 1.** A seven-year, deferred fixed annuity.
- 2.** Investment in short-term bonds with one-year maturities, rolling into a new issue each year as the previous one matures to avoid interest-rate risk. (In this scenario, we compare outcomes for both when interest rates stay at their current levels and when interest rates rise.)
- 3.** Invest in a seven-year bond to seek a higher yield. (But, as with most deferred fixed annuities, there would not be a way to invest at a higher rate during the next seven years should interest rates rise.)

The following example compares bonds held in a taxable account subject to interest payments taxable on an ongoing basis, compared to a deferred fixed annuity offering tax deferral on the growth until the maturity date. As we assume investment during the period leading up to retirement, we use a higher federal income tax rate of 33% in the first six years, and a tax rate of 25% in the seventh year when retirement begins and total income will presumably be less. We are assuming the investor lives in a state with no income tax.

**Exhibit 6** provides the outcomes for the first scenario in which a seven-year deferred fixed annuity offering a 2.5% interest rate is compared to a strategy of holding one-year bonds for the next seven years. The yield for those bonds is assumed to match the Treasury rate of 1.22%, as of early August 2017, and not to increase in subsequent years. For the deferred fixed annuity, the accumulation value is \$118,869, which leaves \$114,151 after taxes are paid. Meanwhile, the bond strategy produces \$108,859 before taxes, or \$105,967 after taxes. **On an after-tax basis, the deferred fixed annuity strategy offers a 7.72% higher overall return over the seven-year period.**

### Exhibit 6: Comparing a Seven-Year Deferred Fixed Annuity to Rolling Over One-Year Treasury Bonds

#### When Interest Rates Stay at Current Levels

Returns								
Year	Deferred Fixed Annuity	Taxable Bonds	Income-Tax Rate	Deferred Fixed Annuity (Pretax)	Deferred Fixed Annuity (Post-Tax)	Taxable Bonds (Pretax)	Taxable Bonds (Post-Tax)	Accumulation Difference (Annuity-Bonds)
1	2.50%	1.22%	33%	\$102,500	\$102,500	\$101,220	\$100,817	
2	2.50%	1.22%	33%	\$105,063	\$105,063	\$102,455	\$101,641	
3	2.50%	1.22%	33%	\$107,689	\$107,689	\$103,705	\$102,472	
4	2.50%	1.22%	33%	\$110,381	\$110,381	\$104,970	\$103,310	
5	2.50%	1.22%	33%	\$113,141	\$113,141	\$106,251	\$104,154	
6	2.50%	1.22%	33%	\$115,969	\$115,969	\$107,547	\$105,006	
7	2.50%	1.22%	25%	\$118,869	<b>\$114,151</b>	\$108,859	<b>\$105,967</b>	<b>7.72%</b>

Source: Author's calculations.

Next, **Exhibit 7** provides the outcomes for the second scenario in which interest rates rise in a linear fashion to their historical averages since January 1990 during the next seven years. For those worried about losing out on investing in rising rates, the expectation may be that the bond strategy will beat a deferred fixed annuity. Again, a seven-year deferred fixed annuity offering a 2.5% interest rate is compared to a strategy of holding one-year bonds for the next seven years. The initial yield for those bonds is assumed to match the current Treasury rate of 1.22%, but this yield rises to 3.12% by year seven. **Even with rising rates, the deferred fixed annuity still comes out ahead, providing \$114,151 after taxes are paid, compared to \$111,394 available with the bond strategy after taxes are paid.**

### Exhibit 7: Comparing a Seven-Year Deferred Fixed Annuity to Rolling Over One-Year Treasury Bonds

#### When Interest Rates Rise to their Historical Average During the Next Seven Years

Returns								
Year	Deferred Fixed Annuity	Taxable Bonds	Income-Tax Rate	Deferred Fixed Annuity (Pretax)	Deferred Fixed Annuity (Post-Tax)	Taxable Bonds (Pretax)	Taxable Bonds (Post-Tax)	Accumulation Difference (Annuity-Bonds)
1	2.50%	1.22%	33%	\$102,500	\$102,500	\$101,220	\$100,817	
2	2.50%	1.76%	33%	\$105,063	\$105,063	\$103,004	\$102,008	
3	2.50%	2.03%	33%	\$107,689	\$107,689	\$105,100	\$103,399	
4	2.50%	2.31%	33%	\$110,381	\$110,381	\$107,523	\$104,996	
5	2.50%	2.58%	33%	\$113,141	\$113,141	\$110,294	\$106,809	
6	2.50%	2.85%	33%	\$115,969	\$115,969	\$113,436	\$108,847	
7	2.50%	3.12%	25%	\$118,869	<b>\$114,151</b>	\$116,975	<b>\$111,394</b>	<b>2.48%</b>

Source: Author's calculations.

Finally, **Exhibit 8** provides the outcomes for the third scenario in which the bond strategy seeks the higher yields offered by a seven-year bond and plans to hold the bond to maturity. A seven-year deferred fixed annuity offering a 2.5% interest rate is compared to a seven-year Treasury bond offering 2.07%. Again, the deferred fixed annuity performs better with the higher-yields offered through its exposure to corporate bonds and through its tax-deferral benefits. **The after-tax \$114,151 compares to \$110,302 from bonds, which is a difference of 3.49%.**



## Exhibit 8: Comparing a Seven-Year Deferred Fixed Annuity to Holding a Seven-Year Treasury Bond

### When Interest Rates Stay at Current Levels

Returns								
Year	Deferred Fixed Annuity	Taxable Bonds	Income-Tax Rate	Deferred Fixed Annuity (Pretax)	Deferred Fixed Annuity (Post-Tax)	Taxable Bonds (Pretax)	Taxable Bonds (Post-Tax)	Accumulation Difference (Annuity-Bonds)
1	2.50%	2.07%	33%	\$102,500	\$102,500	\$102,070	\$101,387	
2	2.50%	2.07%	33%	\$105,063	\$105,063	\$104,183	\$102,793	
3	2.50%	2.07%	33%	\$107,689	\$107,689	\$106,339	\$104,219	
4	2.50%	2.07%	33%	\$110,381	\$110,381	\$108,541	\$105,664	
5	2.50%	2.07%	33%	\$113,141	\$113,141	\$110,787	\$107,130	
6	2.50%	2.07%	33%	\$115,969	\$115,969	\$113,081	\$108,615	
7	2.50%	2.07%	25%	\$118,869	<b>\$114,151</b>	\$115,422	<b>\$110,302</b>	<b>3.49%</b>

Source: Author's calculations.

## Conclusion

Contrary to what one may expect, a deferred fixed annuity offers a tool to securely accumulate assets by managing market volatility and the sequence of returns risk in the pivotal years leading to retirement. It can offer higher after-tax returns even in scenarios where interest rates rise to their historical averages. This can better set the stage for retirement and for creating lifetime retirement income. The issues raised here about interest-rate risk and sequence-of-returns risk are further amplified in retirement. When distributions are taken, a bigger percentage of assets must be sold to meet spending after losses take place. Annuities offer a way to manage these interest-rate and market-volatility risks. A lifetime income guarantee further protects from longevity risk, which is the risk of not knowing how long the retirement plan must last.

Holders of deferred fixed annuities have the option to convert the annuity contract value into reliable lifetime income. If interest rates are higher at this point, payout rates offered for guaranteed lifetime income may naturally be higher as well, and deferred fixed annuities also have minimum annuity rates to protect against lower interest rates at this point. It is worth considering further about how a deferred fixed annuity may be used as part of a strategy that will eventually lead to guaranteed lifetime income through annuitization.

Investors approaching retirement in a low interest-rate environment may find themselves wishing for a rise in interest rates. In holding out hope for rising interest rates, near retirees may make financial decisions that are not always in their best interest. The white paper has quantified this matter by showing ways in which a deferred fixed annuity can pay a competitive return after taxes even in a rising interest-rate environment.

To learn more about fixed annuities visit [PacificLife.com](https://www.PacificLife.com)



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