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QIS Insights

Investment Characteristics of FIAs

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- **If Americans are not saving enough for retirement, it may be in part because of a perceived lack of good options.** Skepticism lingers about stock market investing given the memory of the 2008 global crash, but thirty years of falling interest rates leave little yield in more conservative investments.

- **Retirement investors face mental traps that can endanger long term returns.** Experimental studies have shown that people tend to make investment decisions based on their own recent experiences, which can be deceptive.

- **The standard retirement savings solution, a heavy allocation to bonds, is not ideal.** It is true that investors must avoid large losses late in life, but bond yields are low and bonds may prove less a less safe investment in the future than they have in the past.

- **Fixed Indexed Annuities (FIAs) aim to address both market risks and behavioral traps.** An FIA aims to provide a principal-guaranteed investment that grows at a steady rate tied in part to the stock market. It is also a long term contract and thus constrains investors from acting on their short term feelings.

- **We conducted a simple historical simulation to examine the investment characteristics of hypothetical FIA products.** The simulation appears to show that FIAs, properly structured, offer a favorable risk and return profile compared to the alternatives. If offered at reasonable cost, FIAs may be beneficial to consider along with other investments in a retirement portfolio.

Introduction: The Need for Financial Innovation

American households appear not to be saving enough. By one measure, the National Retirement Risk Index, 50% of working age households are at major risk of not accumulating enough assets to maintain their lifestyle in retirement.[1] Failing to save is irresponsible, but there is a sense in which it is understandable given that we are only ten years removed from the last stock market crash. At that time, millions of investors who believed they had been prudent in steadily building an investment portfolio saw their good behavior seemingly penalized when that portfolio declined in value. The stock market has long since erased the losses of 2008, but cynicism lingers toward stock market investing. On the other hand, in a world where a 10-year US government bond yields less than 3% there are few if any principal-guaranteed investments that offer an acceptable return (Figure 1). Investors may not be saving in part because they do not see any appealing options.

Better investment products might be part of the solution for the retirement savings problem in this country. An improved investment product might combine a degree of participation in the stock market with a guarantee against the loss of principal, offering a better combination of risk and reward than is available from investing in stocks or bonds alone. Fixed Indexed Annuities (hereafter "FIAs") have been marketed as such. The design of an FIA is intended to provide a principal-guaranteed investment that grows at a steady rate tied to the stock market. This paper aims to evaluate the investment characteristics of FIA products. We will begin by elaborating the main risks that a good retirement product ought to address.

Figure 1: Yields are low by historical standards

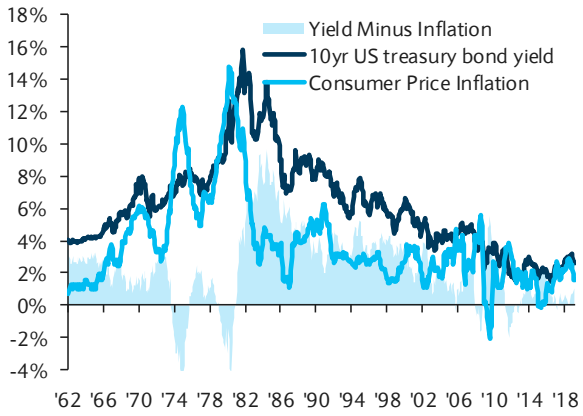
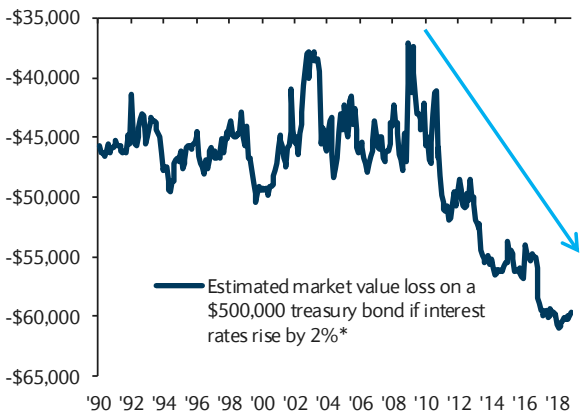


Figure 2: Bonds have become riskier at lower yields[2]



Source: Barclays, Bloomberg. Graphs through February 2019.

Market Risks and Mental Traps

Investors actually face two sources of risk: the market and their own mental and behavioural biases. Investors with good savings habits do not need to make clever trades just to live well in retirement. They must, however, avoid large losses late in life and they must avoid being influenced too much by their own short-term feelings.

[1] The National Retirement Risk Index is calculated by the Center for Retirement Research at Boston College. For updates and commentary see http://crr.bc.edu/special-projects/national-retirement-risk-index/

[2] While bonds guarantee the full return of principal unless the issuer defaults, bonds prices can still fluctuate widely prior to maturity. A bond's sensitivity to interest rates is called its "duration." Specifically, duration is the change in a bond's price given a 1% change in a bond's yield. Duration increases as interest rates decrease, meaning, all else equal, lower-yielding bonds have more volatile prices. As interest rates have fallen, duration has generally risen. The graph shows the following through time: duration of the Bloomberg Barclays Aggregate 7-10 Year Treasury Index x 2% x $500,000.

Large losses late in life are dangerous for a retirement portfolio because there is only a limited amount of time to make them up before withdrawals must begin. Once an investor retires and begins taking withdrawals to meet living expenses, the base on which to earn future returns starts to shrink. For example, in 2008 an investor with ten years remaining until retirement could have waited for the market to rally and made back all of his losses. An investor making withdrawals, however, would have had to sell parts of his portfolio at a depressed value.

This problem is, of course, well known, but the standard solution for older investors, a heavy allocation to bonds and money market funds, is not ideal. Not only are bond yields low by historical standards but bonds may prove less safe than they may seem. Bond yields in the United States have generally been falling for 30 years along with inflation, meaning that bonds have generally been rising in value. If that long term trend finally shifts and yields or inflation begin to rise, bonds would become a wasting asset rather than a safe haven.[3]

Mental traps might be more subtle than market risks, but they are nonetheless just as serious. The temptation to follow fashion and speculate on the popular investment of the day is a sadly common problem. Excess caution, however, is also a common problem. University studies have documented at least two mental traps that help to explain both excess greed and excess caution.

One mental trap is called "availability bias." Availability bias is the tendency of people to rely on the most recent information when making a decision (Tversky, Kahneman 1973). It may contribute to erroneous extrapolation. In the mid 2000s, people believed real estate prices would continue to rise because they had risen in the past. Today, low interest rates may be causing investors to believe interest rates cannot rise very much. Interestingly the availability bias could be invoked either to attack or defend the current level of the US stock market. On the one hand, a ten year bull market may have given investors a complacent view that the stock market delivers steady positive returns and is not very volatile. On the other hand, the memory of 2008 might lead them to overestimate the frequency of major crashes and, as mentioned above, to be cynical about publicly traded shares as a source of lasting wealth.

Another mental trap has been termed "myopic loss aversion." Myopic loss aversion simply means investors become more risk-averse the more often they evaluate outcomes (Thaler, Tversky et al, 1997). Published experiments found that investors who were shown their portfolio returns frequently tended to invest in a conservative bond fund when they could have made more money investing in stocks. Stocks have historically been volatile, and the mental stress of short term loss can cause investors to trade in and out of the market or to avoid stocks altogether, harming their own long term gains in both cases.

The existence of known mental traps suggests there are benefits to long-term investment contracts because they positively constrain investors' behavior, allowing them to act neither on temporary feelings of greed nor of panic. An FIA is a long term contract that, in addition to constraining an investor's behavior regarding the money invested, also aims to manage risk by flooring losses and locking in gains. The next section addresses how FIAs are created in order to make such a thing possible.

Fixed Indexed Annuity Basics

An FIA is intended as a retirement savings and income vehicle. Investors make one or more initial contributions of principal and the principal grows in value over a designated accumulation period, generally at a rate of return referencing a broad stock market index (hence the name Fixed *indexed* Annuity). At the end of the accumulation period, a distribution phase begins, and the investor has several choices as to the configuration of the payout. This paper focuses solely on the risks and rewards that FIAs present during the accumulation phase.

[3] When interest rates rise bond prices fall. When interest rates fall bond prices rise. Inflation erodes the real value of principal, meaning that even when principal is repaid in full at the maturity of the bond, it is worth less than before because there was inflation in the meantime.

An FIA aims to eliminate the risk of principal loss through a guarantee (the credit risk of the guarantor, of course, still remains) while offering a level of participation in stock market upside. FIA construction targets a return profile that is moderate, stable and floored at zero. FIAs are a relatively new variation on the retirement annuity, a type of financial contract that has existed in various forms since the early 20th century.

Typical FIA terms will generally state that the principal is guaranteed and the return will be based on a "participation rate:" a percentage share in any index return over a span of time. The participation rate an FIA provider can offer depends, among other things, on interest rates, options prices and management expenses. Participation rates can vary widely before contract issue and between renewal periods; once established, the participation rate for a given period is guaranteed. Participation rates are a crucial item for investors to consider.[4]

FIA product construction can be varied and nuanced, with many optional features and some optional expenses. At the core, however, an FIA is constructed from just two pieces: a high quality bond portfolio and a call option on a stock market index. An FIA investor's money is invested in the bond portfolio. The periodic interest earnings on the bonds are used to buy a call option. A call option pays the option buyer either the return on the stock market index or zero, whichever is greater. If the stock index declines, the investor loses only the price of the option. The combined portfolio consisting of the bond and the option, then, is one for which returns are floored at zero and any positive returns are tied to the appreciation of the relevant stock market index. This investment strategy can be undertaken fairly easily by institutional investors; at the retail level most investors can only realistically access this strategy through a structured product like an FIA.

The Shiller Barclays CAPE US Sector USD Index

An FIA can be created to reference any investment index on which options can be reliably priced. Famous market indices like the S&P 500 are obvious candidates for use in FIA design because they are instantly recognizable to investors. An FIA might also, however, reference a customized index. This paper contemplates one such FIA, hereafter called the "CAPE FIA", that references the Shiller Barclays CAPE™ US Sector USD Index (hereafter the "CAPE Index").

The CAPE Index aims to incorporate the principle of long-term value investing by investing in stock market sectors that are potentially undervalued based on their Cyclically Adjusted Price-to-Earnings (CAPE) ratio. The Index takes equal exposure to the four US sectors that have the lowest modified CAPE ratios and possess relatively strong price momentum.

The CAPE Index undertakes the strategy by buying and selling sector ETFs. Each month, the Index ranks ten US sectors based on modified CAPE ratio (a proxy for value) and twelve-month performance (a proxy for what is popularly called "momentum"). The Index selects the five sectors with the lowest modified CAPE ratio and then eliminates from consideration the sector in that group with the worst twelve month momentum, leaving four sectors to buy that month. The sector ranking and selection process repeats every month.

The idea behind the CAPE ratio is to improve upon the more traditional one year price-to-earnings (P/E) ratio. Traditionally a stock was considered expensive if the share price was a large multiple of the company's annual earnings per share and cheap if the share price was a small multiple. One year earnings, however, are volatile and vary greatly throughout the economic cycle. The CAPE ratio is a P/E ratio that uses the ten year average of inflation-adjusted earnings instead of single year earnings. In doing so it aims to compare the current stock price

[4] The return on an FIA is essentially the return on the reference index multiplied by a participation rate which fluctuates through time based on option prices, minus strategy fees and optional benefits. More strictly, the FIA returns are often based on a participation rate multiplied by *volatility controlled versions* of the reference indices. Volatility control is a trading methodology that aims to hold the daily variation of the index within certain limits. FIAs reference volatility controlled indices in order to manage the cost of the options trading that enables FIA construction.

against a better measure of the company's long-term profitability. The Index uses a modified version of the CAPE Ratio to standardize comparison across sectors and incorporates a trailing 12 months momentum test to try and avoid sectors that, while perhaps undervalued, appear likely to continue dropping in price.

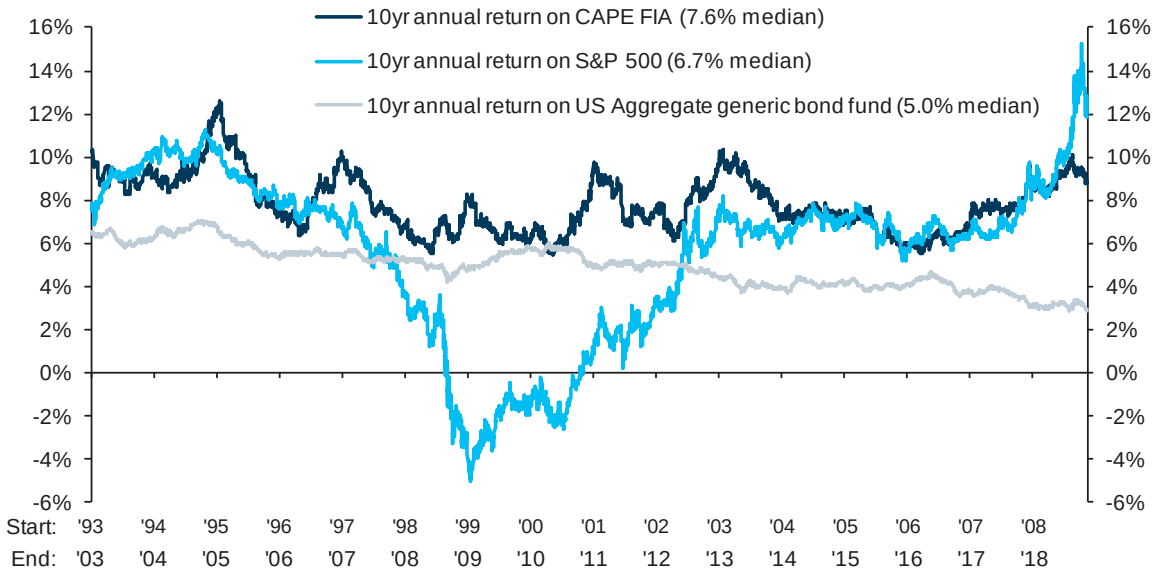
FIAs Versus the Alternatives

To demonstrate the practical investment characteristics of an FIA we simulated a historical series of returns using simplified assumptions.[5] Using the historical performance of the CAPE Index and applying the participation rates historically available based on options pricing and FIA structuring rules we generated a set of hypothetical monthly returns on FIA contracts with inception dates from 1993 through 2008. The contracts are assumed to be an industry standard length of ten years. It is for this reason that the simulation ends ten years ago: average annual returns can only be calculated with a ten-year look-back.

In our simulation a CAPE FIA returned a median 7.6% per year. FIAs of either variety offered returns comparable or superior to a generic S&P 500 index fund in approximately three quarters of all the 10 year periods considered, and would have allowed investors to avoid the negative returns earned on an S&P 500 index fund in the periods beginning 1999-2001. Simulated returns were superior to the returns on the Bloomberg Barclays US Aggregate, an industry standard bond index, in 99% of all periods. This is an impressive result because long term interest rates have fallen more or less continuously since 1980, making the past 30 years a historical record bull market in bonds (when interest rates fall, bond prices rise).

Readers should note that average annual return, while impressive in the simulation, is, as stated at the outset, not the most important consideration for an investor approaching retirement. Rather, downside protection and the beneficial sequencing of returns should dominate investor considerations. The consistency of FIA returns through time and the absence of negative returns in the historical sample, more so than the good average returns, is what we consider to be most noteworthy.

Figure 3: Next Ten Year Investment Returns, Starting Dates 1993 – 2008[5]



Source: Barclays. Ten year periods starting January 1993- December 2008. Results are simulated. Past performance is not indicative of future results.

[5] For a summary of the simulation assumptions please see the appendix.

An FIA purchase is not, of course, an all-or-nothing proposition. Savers are likely to include an FIA or other annuity in their portfolio alongside stock and bond investments. When considered in this context, an important trait of FIAs comes to the surface: a possible diversification benefit. The stock market is well known to fluctuate with the strength of the US economy in part because stocks represent an ownership interest in the profits of listed corporations, which can vary greatly through time. What is often less appreciated is that, at least in our simulation period, bond market returns as represented by the US Aggregate also displayed sensitivity to the economy, performing better in strong economic environments than in weaker ones. The CAPE FIA, while delivering a higher average return than bonds (and with a principal guarantee), also displayed less 10-year return sensitivity to the economic environment. This is demonstrated in figures 4 and 5. A line of best fit is drawn on each graph to try and assess the relationship between GDP growth and investment returns. The slope of the line in figure suggests almost no relationship between the economic growth and FIA returns. In contrast, the slope of the line in figure 5 is close to 1, which implies a stronger relationship. It suggests that, all else equal, a 1% decline in the economic growth rate reduced bond fund returns by about 1%. FIA returns, if less correlated to the economy than either bonds or stocks, could be highly beneficial in a portfolio mix combined with other investments.

Figure 4: CAPE FIA returns vs. economic growth
10 year periods starting at annual intervals '93-'08

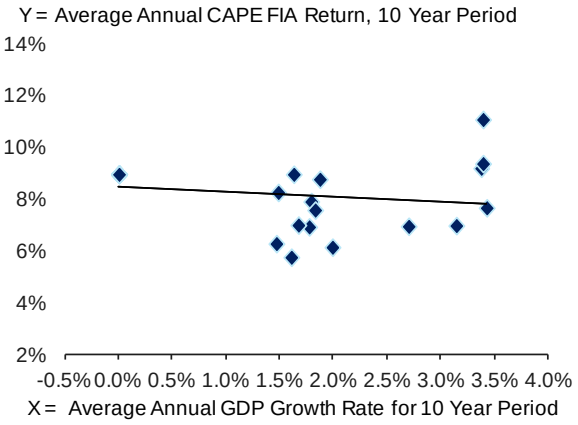


Figure 5: Bond fund returns vs. economic growth
10 year periods starting at annual intervals '93-'08

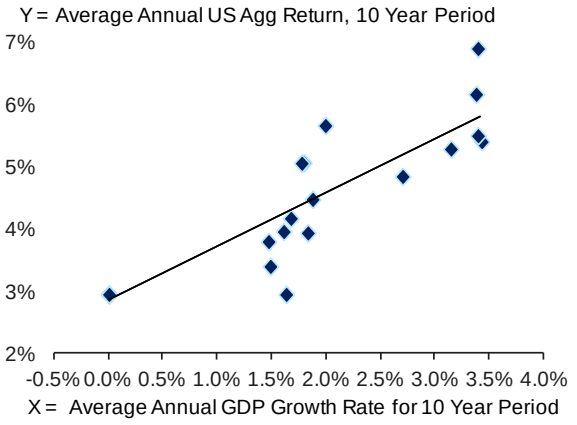


Figure 6: Distribution of CAPE FIA returns
10 year periods starting at quarterly intervals '93-'08

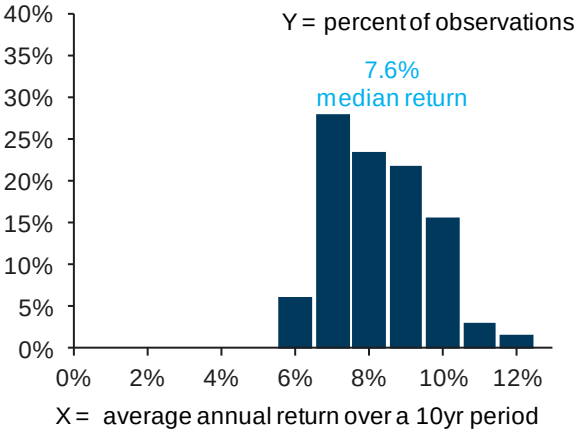
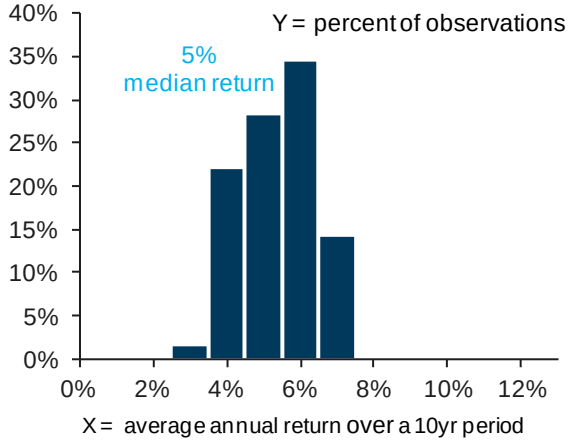


Figure 7: Distribution of generic bond fund returns
10 year periods starting at quarterly intervals '93-'08



Source for all graphs: Barclays. Results are simulated. Past performance is not indicative of future results.

Part V: Key Risks and Conclusion

FIA returns were impressive in a historical simulation. FIAs are, however, a highly structured investment product that depends on the creditworthiness, competence and fair dealing of the FIA provider to perform as advertised. As previously mentioned, FIA construction varies widely and includes several different areas where optional fees, expenses and extra features can be added. The return simulation used in this paper attempts to incorporate a realistic expense profile but the performance of any specific FIA would be highly dependent on the specific terms of the contract. FIAs also present further special risks:

- The principal guarantee is subject to the claims-paying ability of the FIA provider, that is, to the provider's financial health as a business.

- The contract may stipulate restrictions on withdrawals. Principal withdrawals are a business transaction with the FIA issuer: there is no open market to transfer part of one's FIA contract as if one were selling a conventional security like a stock.

- The findings in this paper are the product of specific historical market conditions that may not repeat.

- FIA performance is subject to the performance of the stock market index that it references and to the participation rate on that index. The participation rate itself varies with the market conditions prevailing at the time of contract inception, and under certain circumstances can even be changed during the contract period. The participation rate is offered at the discretion of the FIA provider.[6]

Subject to the qualifications above, the conclusion of this paper is that an FIA structure, if well designed, offers a potentially beneficial alternative investment for a retirement portfolio. FIAs appear to offer the following benefits:

- **Behavioral constraint.** Because FIAs are a long term contract they constrain investors' behavior, limiting their ability to act on temporary feelings of greed or panic and fall into known mental traps.

- **Tailored risk.** Over-allocating to bonds late in life is not an ideal investment solution: yields are low and bonds may prove a far worse investment in the future than they have in the past. By combining a principal guarantee with a degree of stock market participation, FIAs appear to offer a risk/reward profile that differs from either bonds or stocks alone.

- **Principal guarantee.** The design of an FIA aims to place a floor under potential losses. Historical simulation also suggests that the structure would have provided stable returns in stressful economic environments.

- **Diversification benefit.** In simulation, FIA returns appeared less correlated to the economy than either bonds or stocks, potentially making them additive to a portfolio mix when combined with other investments.

6 The formulae we used for the simulation suggest that an annuity provider can generally offer a higher participation rate if interest rates are high and option prices are low and must generally offer a lower participation rate if interest rates are low and option prices are high. The simulation assumes this to be the case. The provider is not, however, obligated to do so.

Appendix: Simulation Assumptions

1) Annual options budget available for constructing the Shiller FIA is calculated from Barclays' estimates on A-rating corporate bond per annum coupons at the start of each period minus a flat spread of 2.13% per annum, which is Barclays estimate for management and operation costs of insurance companies generally.

2) Option prices on the Shiller index are estimated by Barclays.

3) Generic S&P 500 fund returns are calculated from S&P 500 Total Return Index ("SPTR index") minus expense ratios estimated by the Investment Company Institute ("ICI)" for equity mutual funds. The ICI estimates for equity mutual funds expense ratios are 0.99% in 2000 and 0.59% in 2017. Before 2000, Barclays uses 0.99% as S&P 500 fund expense ratios. After 2017, Barclays uses 0.59% as S&P 500 fund expense ratios.

4) Generic bond fund returns are calculated from Bloomberg Barclays US Aggregate ("Agg") Total Return Index ("LBUSTRUU Index") minus expense ratios estimated by ICI for bond mutual funds. The ICI estimates for bond mutual funds expense ratios are 0.76% in 2000 and 0.48% in 2017. Before 2000, Barclays uses 0.76% as Generic Agg fund expense ratios. After 2017, Barclays uses 0.48% as Generic Agg fund expense ratios.

5) Funds expense ratios come from the Investment Company Institute annual fact book and are intended to be representative of an industry average.

6) These simulations are provided for illustrative purposes only and do not reflect actual products available in the market at any time.

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