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Abstract:

• We offer the first empirical exploration of fixed indexed annuity returns based upon actual contracts that were sold and actual interest that was credited.
• Annuity returns have been competitive with alternative portfolios of stocks and bonds.
• Their design has limited the downside returns associated with declining markets.
• They have achieved respectable returns in more robust equity markets.
• Studies that have criticized FIAs are typically based on hypothesized crediting rate formulae, constant participation rates and caps, and unrealistic simulations of stock market and interest rate behavior. When actual policy data are used, the conclusions change.
• Our study is exploratory, because although it is based on actual contracts and actual crediting rates, our policy data set is neither randomly selected nor comprehensive.

Keywords: Indexed annuities, retirement, optimal asset allocation

JEL classifications: G11, G22, G23, J26

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Introduction

Financial advisors and financial planners have sought various programs to provide clients protection from systematic risk, also known as market risk. Various asset allocation strategies have been used with limited success when extreme market movements and "black swans" occur (Taleb, 2007). It has been known for close to 50 years that equity market returns do not conform to a Guassian, or Normal distribution (Mandelbrot, 1963; Fama, 1963).[i] Rather, probability distributions of market returns are typically skewed and leptokurtic (fat-tailed). When these leptokurtic events occur on the positive side of the distribution, clients are delighted, but the opposite is true when these events occur on the negative end of the two-tailed distribution.

Principal preservation products have evolved to address the needs of many risk-averse consumers by providing them a safety net for their investment/savings capital. The products are structured in a way that reduces correlations with other asset classes. To illustrate better the extremes of market returns, we can examine the Russell 3000 index that accounts for nearly 98% of the publicly traded U.S. equity market. A study by Eric Crittenden and Cole Wilcox (2008) at Blackstar Funds was conducted using Russell 3000 data from 1983 through 2006. The findings were that "about 40% of the stocks had negative returns over their lifetime, and about 20% of stocks lost nearly all of their value. A little more than 10% of stocks recorded huge wins over 500%" (Richardson, 2009). These data indicate that most of the positive market return over time comes from relatively few performers, which lends support to the use of stock index strategies as part of an overall portfolio. Furthermore it supports the notion that there is significant risk in the stock market and thus, for moderately to highly risk-averse clients, the need for principal protection programs such as fixed indexed annuities (FIA's). Nearly 96% of FIA's possess reset (or ratchet) features that allow for locking in positive returns each annual or biannual period. By eliminating the prejudicial effects occasioned by significant stock market declines, and locking in returns annually or biannually, there is less of a need to try and capture large upside market swings to recover from the declines.

As financial professionals, we are tasked with assisting our more risk-averse clients to protect themselves from black swans and many of us have a fiduciary responsibility. One of the significant developments for principal or asset preservation vehicles has been the fixed index annuity (VanderPal, 2004). During the past few years various articles have been written regarding the value in FIA's and some people relying upon these studies have drawn misleading inferences from them.

The article begins by dispelling the two basic errors people often make in assessing the message of FIA studies. We will illustrate these misconceptions by using actual crediting rates on various kinds of FIA policies. With these data we are able to show actual returns on FIA's rather than make inferences from hypothetical crediting rates derived from assumed (and often constant) rate caps, assumed crediting rate formulae, and hypothetical participation rates, often coupled with theoretical stock market and interest rate moves. This should help inform the public and correct

the inaccurate information portrayed by some journalists and industry professionals. Furthermore, the article will delve into additional FIA features that provide advantages not found in ordinary securities and various principal preservation programs.

FIA Market Growth

The table below indicates the growth in sales of FIA's since 1997. Overall sales of FIA's in 2008 of $26.7 billion are small compared to fixed deferred annuity sales of $95.1 billion and variable annuities sales of $155 billion in 2008 (Green, 2009), and dwarfed by securities sales.

Equity Index Annuity Sales

Year	In billions of dollars
1997	3.00
1998	4.20
1999	5.15
2000	5.25
2001	6.50
2002	11.70
2003	14.01
2004	23.00
2005	27.26
2006	25.30
2007	25.20
2008	26.70

Sources: Various reports from The Advantage Group, and (Koco, 2009)

Although the FIA market may be small relative to more established markets, it has nonetheless attracted several performance studies. We have noticed two basic limitations that typify most studies and articles that attempt to describe potential index annuity performance. The first of these is assuming crediting formulae that are rarely used and crediting rates that are seldom observed. While this type of exploratory exercise is fine in and of itself, a problem arises when readers assume the theoretical results are somehow representative of the index annuity world. The second limitation is making assumptions about stock market and interest rate behavior that are not well supported. This can lead people to make inferences about actual FIA behavior that are unjustified. Our study examines these limitations and shows how actual index annuity returns are at odds with many of the hypothetical conclusions.

Are Hypothetical Returns Representative?

Collins, Lam and Stampfli (2009) created a term end point structure (they call it a multi-year, point-to-point) that applied a 75% participation rate to any gain over a seven-year period. They then calculated the annual return, deducted a 1% spread, and finally compounded the lower of 8% or the calculated annual yield to produce the total gain for the period. This is a rather cumbersome structure, and one we cannot find was ever used on any index annuity.

In reviewing specifications on the over 400 index annuities marketed since the first index annuity sale in February 1995 (Marrion, 2003), we failed to find any term end point product that used a crediting method which had a participation rate of less than 100% combined with both a cap and a yield spread greater than zero. Indeed, in reviewing all of the product information we have assembled since 1995, the only annuity we found which had a participation rate of less than 100% that could change each year and deducted a yield spread or asset fee and had a cap was the Americo FlexPlus annuity marketed around the turn of the century. However, it did not use a term end point design; instead this product used an annual reset or ratchet design, the performance of which differs radically from a term end point structure (Marrion, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007).

Often a financial columnist or an occasional other writer will dismiss the index annuity concept by proposing that a consumer purchase a long-term zero-coupon bond together with an index fund instead of an index annuity (Clements, 2005; Pressman, 2007; Warner, 2005; McCann and Luo, 2006). These columnists and other writers often posit the term end point crediting method as the representative interest crediting structure. However, all term end point designs account for less than 4.5% of sales over the last four years and term end point design using two crediting components represents even less (Marrion, 2006, 2007; Moore, 2008, 2009). Indeed, Collins, Lam and Stampfli (2009) base their conclusions on a term end point that uses a cap, but less than 1% of the products have ever placed a cap on a term end point crediting method (Marrion, 2009). Such a product is certainly not representative of index annuity crediting methods in practice.

The assumed index participation rates may also not be representative. For example, for their chart of seven-year periods starting in December 1988 and with the final seven-year period beginning in December 2000, Collins, Lam and Stampfli (2009) assume a term end point participation rate of 70% to 75%, depending upon whether the seventh-year index values are averaged, and place an 8% cap on any yearly gain. Since index annuities were not around until the mid-1990s we cannot decisively state what rates would have been for the early years used. However, one can gather the actual participation rate data from when products did appear. We can state that based on actual FIA's offered, if you had purchased every available index annuity using a term-end point annuity with a seven-year term on the first business day of each month from January 1997 through December 2000 your average participation rate would have been 72% without a cap (Marrion, 1997, 1998, 1999, 2000).[ii]

Looking at "representative" annual reset methods, Collins, Lam and Sampfli (2009) assume 55% index participation with a 7% annual cap or 60% averaged index participation with a 7.5% cap. McCann (2008) compares returns from 1990 through 2007 of the S&P 500 with a hypothetical annual reset point-to-point design that assumes a constant 6.5% cap. However, in reviewing actual new money rates for annual reset designs from 1996 to the present, one would have encountered effective participation this low at only a few points in 2003 and 2004 and in 2007 and 2008. Indeed, many averaging products were offering 100% first-year participation without a cap in the late '90s, and many annual point-to-point products have offered 100% participation allowing for possible double-digit gains (Marrion, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007).

There is nothing wrong with showing how a term end point method might have performed under these assumptions. However, we must keep in mind that the results of the study are not representative of FIA's performance, as they depend upon a crediting rate method not used in over 95% of sales, and combinations of other contract features not observed in practice.

Dubious Assumptions

#1 Participation Rates and Caps Never Change

Collins, Lam and Stampfli (2009) assumed an averaging method had a 60% participation rate with a 7.5% cap and applied it to the past. McCann (2008) assumed a constant 6.5% cap for all of his index annuity performance calculations, which appears to have been a cap on the date his story was completed, when interest rates were heading toward historic lows. On the day he completed his story the constant maturity rate of a 10-year U.S. Treasury Note was 3.64%; by contrast, during the 1990 until 2000 period (within the time frames of both studies) the 10-year Treasury rate was nearly twice as high, averaging 6.66% (Federal Reserve Board, 2009). Lewis (2005) assumed either a 5% or 9% cap on an annual reset design and ignored the interest rate environment that might change these caps, but allowed for the returns to positively affect the T-bill comparison he made. Higher bond yields generate more interest income thus allowing carriers to buy or synthesize more options to increase index participation, which is why some annual point-to-point products were able to offer 100% participation and 14% caps in the previous decade (Marrion, 1996).

Lewis (2005), McCann (2008) and Collins, Lam and Stampfli (2009) assume constant index annuity participation holding rates, caps and spreads steady over long periods of time. The flaw is this does not take into account the real world effect of changes in interest rate environments and market volatility's effect on the cost of providing the index participation. One cannot assume today's rate would have existed in the past because the financial conditions of the past were often quite different. One cannot simply posit a participation rate or cap on crediting rates, hold it constant, and then attempt to make conclusive comparisons with actual stock index returns. Clearly the reach of the conclusions is limited by the unrealistic assumptions underlying the annuity modeled.

Not every study adopts these simplifying assumptions. Gaillardetz and Lin (2006) note that when interest rates increase participation rates also go up, unless offset by increased volatility. One carrier suggested that the uncapped guaranteed participation rates on their seven-year averaging annual reset product from 1980 through 1995 would have ranged from 135% to 260% based on bond yields and call option prices in effect (Physicians Life, 1996). They understand that index participation is driven by bond yields and option costs and these change over time.

#2 Annual Stock Market Returns of 17.6% Are Normal

Collins, Lam and Sampfli (2009) mention that many attempts to show index annuity comparisons are exercises in data mining and we quite agree. One way to data mine is to make long-term predictions based on using low participation rates that do not represent the reality of long-term rates. Another is to intentionally select periods that favor one choice over another.

McCann (2008) makes a performance comparison over a 30-year period that happens to start in a year with the lowest end-of-year S&P 500 value over the previous 45 years. Using the correct December 2004 index values, the annualized growth rate of the S&P 500 for McCann's selected comparison period is 10.05%. By contrast, the S&P 500 growth rate from December 1954 to December 1984, another 30-year period, was 5.25%, and the average annual growth from December 1964 to December 1994 was 5.79%.

In the 30-year period that McCann selected for constructing his comparisons, the S&P 500 ended at 1211.92. If you used a monthly averaged annual reset method to compute where a monthly averaged S&P 500 would have ended at you get an ending value of 591, which is 49% of the actual S&P 500 level. By contrast, if your 30-year period ends December 1984 the S&P 500 level is 167.24; however, the monthly averaged S&P 500 computed value is 161.37, almost equal to the actual S&P 500 level. Many performance comparisons pit index annuities against stock market investments over the '80s and '90s when stock market returns averaged 17.6% and ignore the preceding eight decades with their average return of 8.5% (Bogle, 2003).

#3 Stock Market Returns Conform to a Normal Distribution, Interest Rates and Volatility Are Constant

A more egregious problem in some of the studies that simply simulate hypothetical stock market return scenarios in order to generate hypothetical policy crediting rates is that the simulations are often based on an assumed distribution of stock returns that cannot be supported. For example, McCann and Luo (2006) have conducted studies of hypothetical crediting rate behavior assuming that equity market rates of return conform to a Normal distribution. When Babbel, Herce and Dutta (2008) re-examined that study but used an empirical distribution which matched the historical record, while keeping in tact all of the other assumptions of McCann and Luo, they found that annual crediting rates in the range of 5-15% were about twice as common as what were being credited under the Normal assumption. This implies that FIA's were far more valuable than was being represented under the hypothetical distribution of stock market returns.

In a similar vein, several studies assume that interest rates and volatility are constant throughout an annuity's life, in order to construct their performance comparisons. Of course the simplifying assumption has never occurred in the marketplace, and the alternative investments to which FIA's are compared have their returns affected by interest rate movements as well as volatility changes.

#4 Managerial Discretion Is Not Involved

Over 95% of index annuity sales are in products that may change at least one element of their interest crediting methodology after the reset period. Two primary factors affecting subsequent index participation are bond yields and the price of call options (Gaillardetz and Lin, 2006). However, the ultimate determining factor in setting index participation in future years is not the interest rate environment or the cost of options, it is what carrier management decides to do. This human element introduces a random variable that cannot be quantified, thereby making any attempt to project any returns ultimately subjective.

Reality

Index annuities have been producing returns since the first one was purchased on February 15, 1995. Unfortunately, most of the articles and studies ignore these data and attempt to portray how index annuities should have performed while ignoring actual results. What we show below are actual results. They are not intended to be a prediction of how index annuities will perform in the future, nor are the results intended to be representative of overall industry performance. They results are what they are. Our data set does have limitations, which we describe presently so that readers may draw their own conclusions.

Annualized Five-Year Returns

Period	S&P return	FIA avg. return	Number of FIA's	Return Range
1997-2002	9.39%	9.19%	5	7.80% to 12.16%
1998-2003	-0.42%	5.46%	13	3.00% to 7.97%
1999-2004	-2.77%	4.69%	8	3.00% to 6.63%
2000-2005	-3.08%	4.33%	28	0.85% to 8.66%
2001-2006	5.11%	4.36%	13	1.91% to 6.55%
2002-2007	13.37%	6.12%	23	3.00% to 8.39%
2003-2008	3.18%	6.05%	19	3.00% to 7.80%

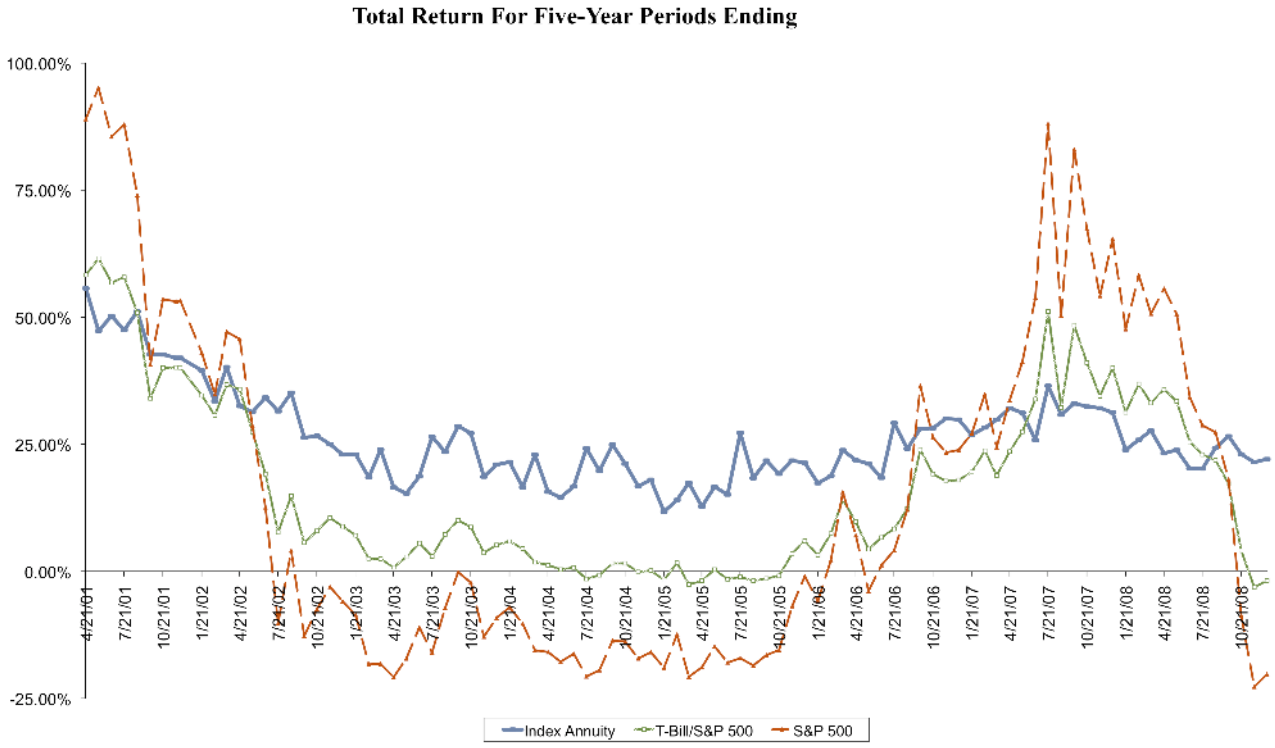
These results are based on copies of actual customer statements received with personal information blacked out, for each of the preceding five-year periods, requested on an annual basis since 2002. The return data reflect contract periods closest to 30 September with the exception of the 1997-2002 period that uses a 2 January date. The returns reflect the results of products with term end point, high water mark, and annual reset designs with and without crediting rate caps, and with and without averaging. The returns do reflect any fees charged, but not surrender penalties. Annuitization was not required to receive these returns. Initial premium bonuses, if any, were reflected only if immediately available as cash values (did not require vesting or annuitization).

There are several limitations with the data above. The main one is that they are derived from carriers that chose to participate and that chose the products for which they reported returns. This could have imparted some bias in returns, and may differ from what a larger, more random sample would have produced for the periods. Although some of the annuities had contract years ending on the 30th, the contract anniversaries encompassed a three-week range around that end date. The data collected are very few for some periods. And the data reflect results across a very small spectrum of time, only looking at 1997-2008 and then only at one day out of each year. Nonetheless, the 109 contracts for which we have data are real contracts and reflect actual crediting rates that were provided to annuity owners over time under twelve different crediting rate structures used in FIA designs.

From 1997 through 2007 the five-year annualized returns for FIA's averaged 5.79%. This compares to 5.39% for taxable bond funds and 4.73% for fixed annuities. The FIA and taxable bond fund provided a negative correlation of 0.11 which is a very important consideration for invest-

ing and asset allocation to work effectively. The FIA may be considered a separate asset class. The authors support the concept of principal protected investments being their own asset class due to removing the negative side of the two-tailed distribution and providing for variability in upside performance with guaranteed minimum returns which sets the overall earnings at maturity of the FIA contract above zero.

This next data set reflects the actual real-world total five-year returns credited to annuityowners for an annual point-to-point with cap structured index annuity assuming an annuity is purchased on the 21st of every month beginning April 1996 with a final purchase on December 2003. This annuity was selected because it has been steadily offered every month for 13 years and its performance is publicly available. It is not intended to be representative of anything except itself. The chart below compares the FIA returns with the total returns of the S&P 500 over the same period, and a blended return composed of 50% of the S&P 500 total return and 50% of the compounded return for a series of one-year, U.S. constant maturity T-bills. We have not deducted from these alternative portfolios any of the annual expenses that typify mutual funds, thereby biasing the comparison to favor mutual funds.



Collins, Lam and Stampfli (2009) attempted to predict the future by using the past and creating "a rich set of probable future results [that] is available for inspection." Based on these "probable" futures they found the index annuity minimum guarantee to be beneficial at times, but that the index annuity payoff "always lags the investment portfolio's payoff for returns." McCann (2008) created his own hypothetical annuity structure and in the future he created, he stated that "99.8%

of the time the investor would be better off with the Treasury securities and stocks than with the equity-indexed annuity." However, if your future was the actual period from April 1996 through December 2008, and you had purchased this real-world-still-being-marketed index annuity month after month, the not-pretend index annuity results bested the S&P 500 alone 66% of the time and a 50/50 mix of one-year Treasury Bills and the S&P 500 80% of the time.

Liquidity and Risk

According to Collins, Lam and Stampfli (2009), FIA's are not liquid investments and have "formidable" surrender charges. The authors failed to take into account the various free withdrawal provisions in all FIA's. Generally a 10% withdrawal is allowed annually without surrender penalty and some firms offer more standard withdrawal provisions. That is about triple what you can withdraw from a Treasury bond portfolio in today's interest rate climate without subjecting yourself to losses of principal occasioned by bond price fluctuations, and even more so when the alternative portfolio includes common stock. Most articles analyzing appropriate withdrawal rates for retirees range in the 4-6% range annually, depending upon various methods of thought. This being said, a 10% withdrawal privilege should not be an issue for most retirees and individuals.

Nearly all FIA's provide a full surrender value upon death of the owner or annuitant. Many FIA issuers offer full surrender for nursing home stays, extended hospital visits and terminal illness (VanderPal, 2008). Several carriers offer full surrender for unemployment if under 65 years of age. The surrender charges when applied outside of the free withdrawal provisions typically depend on the minimum term of the annuity and whether any bonuses are paid, and usually decline each following year. Another difference is that in the case of a non-qualified annuity purchase, the accumulation value grows tax deferred, whereas with a non-qualified portfolio of stocks and bonds, taxes are incurred along the way. Babbel and Reddy (2009) have shown that the difference between these two tax treatments can ultimately produce after-tax income potential from the annuity that would require alternative taxable mixes of stocks and bonds to produce annual returns that must be substantially higher than the annuity returns in order to provide for an equivalent after-tax income.[iii] This is another missing element in our comparison that biases the result in favor of the alternative portfolio. Moreover, FIA's in almost all states are protected from creditors and against seizure in situations of litigation, which is not typically true of stock and bond mutual funds unless held in a protected vehicle.

FIA opponents commonly cite surrender fees as an issue. First, with the various free withdrawal privileges and based on the appropriate range of annual withdrawals, most individuals who purchase an FIA will not encounter a penalty except through their choice. Second, surrender fees are required by state insurance regulators in order for policies to be qualified for sale. The existence of surrender fees helps an insurer recapture up-font costs on products that were designed to be held for several years, and protects persisting policies from the imposition of extra costs by those who choose to surrender early. Third, the idea that securities do not have penalties is not only flawed but simply not accurate. Even if the actual mutual fund one is holding does not assess surrender charges, it is subject to annual management fees and market risk. Bogle (2005) has shown these costs of "financial intermediation" are non-trivial over time. If your mutual fund or investments decline in value 20% and that investor is making withdrawals for income, this may become a catastrophic event for the investor. Remember that the more an investment declines, ex-

ponentially, the more the investment must go up to simply recover and adding withdrawals to the scenario can exacerbate a potential catastrophic event (VanderPal, 2008). Furthermore, FIA's provide a guaranteed minimum return along with principal preservation which mutual funds and other similar investments do not provide.

The S&P 500 index as of August of 2009 finally reached 1,000. It has taken 12 years for the S&P 500 index to break even due to the volatility and risk with the two economic bubbles experienced from technology stocks and the real estate crisis. While the S&P 500 index has produced near zero total return over 12 years, the FIA using the S&P 500 index on average produced returns of 5.79% using a 5-year annualized rolling return from 1997-2007. Even if you add taxable dividends to the index, the FIA has performed better, at least based on the data we have reviewed.

Fees and Expenses

"Although FIAs do not provide complete participation in an index, based on various crediting methods and market anomalies, returns may actually be better over time than in mutual funds or variable annuities. Consider that variable annuities with mortality and administration expenses (M&E), sub-account management fees and other various charges can account for up to 4.00% of annual expenses that erode market returns on variable annuities" (VanderPal, 2008). According to Morningstar the average mortality and expense and management fees are 2.08%. For example, a variable annuity sub-account that earned 10% in the market would net less than 8% to the client's account after internal fees are deducted from earnings. Unlike mutual funds, an FIA does not deduct sales charges, management fees or 12b-1 marketing fees. Instead, the insurance company uses a small amount from the underlying portfolio which lowers participation in the market index to cover administrative costs and commissions to brokers (VanderPal, 2008). Because the FIA provides policy crediting rate formulae and periodic annuityowner reports net of any fees and management expenses, it does not separately disclose them.

Consumer Risk Aversion

Finally, most of the aforementioned fixed indexed annuity studies have failed to take into account the level of risk aversion of an individual consumer. An exception to this pattern is the study of Babbel, Herce and Dutta (2008) that explicitly takes into account the level of consumer risk aversion. Using the criteria of multiperiod utility analysis, they find that for moderate and strongly risk-averse individuals, the fixed indexed annuity is judged superior in performance to various combinations of stocks and bonds. This is not surprising because a risk-averse consumer will penalize an investment alternative that does not avoid downside risk in a quest to achieve superior returns. Because FIA's are designed in a way to avoid downside risk, they tend to produce preferred return patterns for such consumers when compared to alternative investment strategies that expose consumers to significant levels of that risk.

Conclusion

Much of the analysis published on index annuities is based on hypothetical returns that are generated by using selected time periods and crediting criteria to produce the preordained conclusion desired. If the analysis is produced for the annuity industry the conclusion is positive, if it is directed towards the securities industry it is negative. The reality is at least some index annuities have produced returns that have been truly competitive with certificates of deposit, fixed rate annuities, taxable bond funds, and even equities at times (Marrion, 2008). How will index annuities perform in the future? We do not know but the concept has proven to work in the past and any articles should reflect this. FIAs were not designed to be direct competitors of index investing nor have FIAs been promoted to provide returns to compete with equity mutual funds or ETFs. The FIA is designed for safety of principal with returns linked to upside market performance.

References

Babbel, David F. and Ravi Reddy. 2009. "Measuring the Tax Benefit of a Tax-Deferred Annuity." *Journal of Financial Planning* 22, 10 (October).

Babbel, David F., Migel A. Herce, and Kabir Dutta. 2008. "Un-Supermodels and the FIA." Presentation given at the Morningstar- Ibbotson Associates / IFID Centre Retirement Income Products Executive Symposium, University of Chicago, November 11; the slides presentation is available at: http://corporate.morningstar.com/ib/documents/UserGuides/UnSupermodelsFIA.pdf and the video presentation at: http://corporate.morningstar.com/ib/tools/David_Babbel/tape2b.html

Bogle, John C. 2005. "The Relentless Rules of Humble Arithmetic." *Financial Analysts* Journal 61, 6 (November/December).

Bogle, John C. 2003. "The policy portfolio in an era of subdued returns." Speech before the Investment Analysts Society of Chicago and The EnnisKnupp Client Conference. Chicago, IL. June 5. Bogle Financial Markets Research Center. http://www.vanguard.com/bogle_site/sp20030605.html

Collins, Patrick J., Huy Lam, and Josh Stampfli. 2009. "Equity Indexed Annuities: Downside Protection, But at What Cost?" *Journal of Financial Planning* 22, 5 (May).

Clements, Jonathan. 2005. "A do-it-yourself kit for investors: Build your own equity-indexed annuity." *Wall Street Journal*. January 26: D.1.

Crittenden, Eric and Col Wilcox. 2008. "The Capitalism Distribution – The Realities of Common Stock Returns." BlackStar Funds. http://info@blackstarfunds.com/files/TheCapitalismDistribution.pdf

Fama, Eugene. 1965. "The Behavior of Stock-Market Prices." *Journal of Business* 38, 1 (January).

Federal Reserve Board of Governors. "10-Year Treasury Constant Maturity Rate. H.15. 2009-06-02 9:06 AM CDT Release."

Gaillardetz, Patrice, and X Sheldon Lin. 2006. "Valuation of equity-linked insurance and annuity products with binomial models." *North American Actuarial Journal* 10, 4 (October).

Green, James. 2009. "2008 Sales of Variable Annuities Faltered; Fixed Sales Soared." *Investment Advisor Magazine* (April).

Koco, Linda. (2009) "2008 FIA Sales Seen Rising 6.2%." *National Underwriter* 13, 5 (March).

Lewis, W. Cris. 2005. A return-risk evaluation of an indexed annuity investment. *The Journal of Wealth Management* 7, 4 (Spring).

Mandelbrot, Benoît. 1963. "The variation of certain speculative prices." *Journal of Business* 36, 4 (October).

Marrion, Jack. 2009. "Product Trends." *Index Compendium*. Advantage Compendium, Ltd. 13, 7.

Marrion, Jack. 2008. "Fixed annuities are competitive with taxable bond mutual funds." *Index Compendium* 12, 2.

Marrion, Jack. 2003. *Index Annuities: Power & Protection*. Advantage Group. St. Louis.

Marrion, Jack. 2002. "Interest crediting concepts." *Index Compendium*. Advantage Compendium, Ltd. 6, 3.

Marrion, Jack. 1996-2000. *Index Annuities Report*. Advantage Compendium, Ltd.

Marrion, Jack. 1996-2007. *Advantage Index Product Sales & Market Report.* Advantage Compendium, Ltd. Volumes 1-39.

McCann, Craig J. 2008. "An Economic Analysis of Equity-Indexed Annuities." Securities Litigation & Consulting Group, Inc. September 10.

McCann, Craig J. and Dengpan Luo. 2006. "An Overview of Equity-Indexed Annuities." Securities Litigation & Consulting Group, Inc. June.

Moore, Sheryl. 2007-2009. *Advantage Index Product Sales & Market Report*. AnnuitySpecs.com. Volumes 40-46.

Physicians Life Insurance Company. 1996. *Vista 500 Market Index Annuity Producers Guide*, p.15.

Pressman, Aaron. 2007. "Retirement made complicated; why equity-indexed annuities have a bad name and what investors need to know." *Business Week*. Sep 24, Issue 4051; pg. 98.

Richardson, M. T. 2009. *The Ivy Portfolio.* Hoboken: John Wiley & Sons, Inc.

Taleb, N. N. 2007. *The Black Swan:The Impact of the Highly Improbable.* London: Penguin Books.

VanderPal, Geoffrey. (2008) "Equity Index Annuities." *Journal of Personal Finance* 7, 2.

VanderPal, Geoffrey. (2004) "The Advantages and Disadvantages of Equity Index Annuities." *Journal of Financial Planning* 17, 1 (January).

Warner, Joan. 2005. "EIAs: Behind the hype: Equity-indexed annuities are flying off the shelves, but they carry risks that regulators fear are not fully disclosed." *Financial Planning* (October).

Endnotes

[i] A recent confirmation of this finding is in Babbel, Herce and Dutta (2008). In their study, the authors found that there was less than one chance in a million that monthly stock market returns from 1926-2008, and various sub-periods during that time interval, conform to a Normal distribution, whether measured by a Jarque-Bera, an Anderson-Darling, or a Kolmogorov-Smirnov goodness of fit test.

[ii] To be precise, the average term end point participation rates for seven-year periods were: 1997-87%, 1998-71%, 1999-61%, 2000-70%.

[iii] Their study showed that an alternative portfolio would have to generate an additional pre-tax return that in some cases reached over 200 basis points per year. The ultimate size of the tax benefit from tax deferral depends on the length of time the annuity is held during the accumulation and decumulation phases of ownership, whether a deferred annuity is annuitized at the end of the surrender period, or taken as a lump sum distribution, the level of yields net of expenses, the marginal tax rates on ordinary income of the investor, and the differential between tax rates on ordinary income and tax-preferred treatment of dividends and capital gains. McCann and Luo (2006) claimed that the benefits of tax deferral were "de minimis."