A White Paper

Mitigating the Four Major Risks of Sustainable Inflation-Adjusted Retirement Income

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Abstract

• Research has shown that a baby boomer's greatest fear is running out of income in retirement. In 1994, William Bengen relieved some of this angst when he unveiled his inflation-adjusted income study, frequently referred to as "the 4% Rule." Bengen defined an inflation-adjusted 4% withdrawal rate (over 30 years) of 50% stocks and 50% bonds in a retirement portfolio as historically safe. His finding became the guiding standard of most retirement income practitioners for nearly two decades.

• In 2008, Nobel Laureate William Sharpe cast some doubt on Bengen's theory when his research revealed that Bengen's 4% rule was not completely safe. Examination in 2013 by Dr. Michael Finke, Dr. Wade Pfau and Morningstar researcher David Blanchett determined that by using the U.S. economic climate of the 21st century for analysis (rather than that of the historical 20th century that was used by Bengen), the acclaimed 4% rule would have an astounding failure rate of 57%.

• Later in 2013, Pfau released his pivotal study, "Breaking Free from the Safe Withdrawal Rate Paradigm: Extending the Efficient Frontier for Retirement Income," in which Pfau plotted 1,001 different financial product allocations, projecting (1) the ending death value of each asset mix and (2) its probability to provide 30 years of the retiree's income needs, thus discerning the efficient retirement income frontier of various mixes of investment products. The product allocations that demonstrated the most lackluster retirement frontier were the combination of stocks and bonds. What performed best? "When considering how the various product allocations meet these objectives, I found that the combinations that best meet both criteria are those consisting of stocks and fixed SPIAs," according to Pfau.

• In the following paper, Pfau has added one more product mix to his study: a fixed indexed annuity (FIA) with a 30-year inflation-adjusted income rider. His results demonstrate that this specific FIA (illustrated using its worst-case guaranteed projections) compared quite favorably to his above-referenced stock/SPIA combo at 3% assumed inflation and outperformed all of his other product allocations at a 4% assumed inflation rate.

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Introduction

How much our world has changed. In 1950, a retiring 65-year-old male worker's average life expectancy was 12.8 years.[1] While this mortality average translated into 50% of retirees living past age 78, it also assumed the other half would die in their 60s or 70s. This fear of untimely death resulted in the purchase of massive amounts of life insurance, as well as the development of an entire insurance industry built upon "man's greatest financial fear – that of dying too soon."

That was then. Demographers now project that by 2050, one in four Americans will be 65 or older, 20 million people will live beyond age 85, and one million will live past age 100, effectively producing the "Florida-zation of America."[2] To complicate the situation, almost 50% of retiring baby boomers express little or no faith that they have saved enough money for retirement.[3] Today's boomers that are readying for retirement don't share the fear of their predecessors about dying too soon, but rather, living too long.

Wanting to exploit this escalating demographic, virtually anyone who sells or distributes retail financial services is now eager to label themselves (overtly or covertly) as "retirement planners." Furthermore, most financial product manufacturers have been quick to emphasize how their particular product can enhance the retiree's retirement income portfolio. The predictable result is a boomer demographic overwhelmed by industry and media noise and confused (and anxious) about their retirement future.

The goal of this paper is to bring clarity to the major retirement income shortfalls produced by traditional inflation-adjusted models. Retirement planners should also discover common-sense, conservative, inflation-adjusted retirement income solutions that may solve most, if not all, of the problems encountered by planners and retirees through traditional inflation-adjusted retirement income solutions.

[1] http://www.cdc.gov/nchs/data/hus/2011/022.pdf
[2] http://articles.latimes.com/2010/apr/19/opinion/la-oe-rodriguez19-2010apr19
[3] http://abcnews.go.com/US/baby-boomers-saved-retirement/story?id=13302603

The Pending Doom of the Gold Standard of Retirement Income

In October 1994, the *Journal of Financial Planning* published research by author and CERTIFIED FINANCIAL PLANNER™ William Bengen regarding safe retirement withdrawal rates, aptly titled "Determining Withdrawal Rates Using Historical Data."[4] Bengen's research revealed what a safe retirement withdrawal percentage should (theoretically) be when adjusted for inflation annually. This prominent thesis determined that 4% of a portfolio's value (comprised of 50% stocks and 50% bonds) could be safely withdrawn from the initial portfolio, and then annually adjusted for inflation for 30 years.

In 2008, Nobel laureate William Sharpe (of Sharpe Ratio fame) released research that found the 4% rule wasn't always successful. Rather, he cited historical success rates somewhere between 85% and 90% (i.e., a failure rate of 10-15%).[5] While Sharpe's safety disclosure didn't do much to dampen the retirement planning industry's overall enthusiasm for Bengen's 4% rule, it did place a "cynical chink" in the armor, causing some academics to begin to question the validity of this standard bearer.

After the equity market crashes of 2000 and 2008 and accompanying periods of historically low interest rates, analytical skepticism began to challenge the long-held 4% rule. Bengen's work was based upon the stock, bond and inflation history of the American 20th century. However, as Pfau aptly pointed to in his 2013 research paper, "An International Perspective on Safe Withdrawal Rates: The Demise of the 4 Percent Rule?"[6], the U.S. markets of the 20th century were prosperous when compared to the other major developed countries (as early as 2004, Dimson, Marsh and Staunton argued that using past U.S. market data to project future stock market returns would lead to "success bias" and "irrational optimism"[7]).

Of the 17 developed countries Pfau studied, only four would have been able to sustain a safe withdrawal rate of 4% in the 20th century (Canada, Sweden, Denmark and the United States). Seven countries could have sustained withdrawals of 3%, only one with 2%, four with 1%, and Japan would have been able only to limp along with a 0.47% safe withdrawal rate.[8] Unfortunately, for the 76 million U.S. baby boomers heading into retirement, many economists now believe that the U.S. economy of the 21st century will more likely resemble that of historical Europe, rather than the U.S. markets of the 1900s.[9]

Before continuing, a utilitarian observation needs to be made: Whether a mutual fund manager or registered investment advisor managing discount stocks or ETFs, virtually all financial and investment advisors charge fees. The realistic inflation-adjusted withdrawal rate research conducted by Pfau was compiled using no management fees. Obviously this "no fee" assumption is not realistic in our financial system. Without including management fees, Pfau was able to produce a safe inflation-adjusted historical withdrawal rate in the American 20th century of 4.04%. Adding in a relatively low 1% advisory fee, Pfau's after-fee safe inflation-adjusted withdrawal rate for 20th century America dropped to 3.56%.[10] Therefore, reason and objectivity may suggest that Pfau's post-management fee of 3.56% is the true safe withdrawal rate to which academics and planners should be comparing other income alternatives, not 4%.

[4] www.retailinvestor.org/pdf/Bengen1.pdf
[5] www.stanford.edu/~wfsharpe/retecon/4percent.pdf
[6] http://www.fpanet.org/journal/CurrentIssue/TableofContents/AnInternationalPerspectiveonSafeWithdrawalRates/
[7] Ibid
[8] Ibid
[9] Ibid
[10] http://www.marketwatch.com/story/fees-and-sustainable-retirement-income-2013-03-20

The Four Risks of the 4% "Safe" Income Rule

When retirement planners and academics question the validity of the 4% rule, it is generally because of the risk known as "sequence of returns." This risk involves the actual order in which a retirement portfolio's investment returns occur. Generally, negative portfolio returns early in retirement have a more destructive impact on the retiree's income portfolio than negative returns in the later part of retirement. This early drag on the portfolio's value is caused by both negative market performance and withdrawals necessary to fund retirement needs. The result is a smaller portfolio. A smaller portfolio contains fewer assets, and is therefore unable to capitalize as effectively on future rebounds, threatening the affordability of day-to-day living expenses.[11]

Notice our hypothetical examples in Exhibit A. In our first example, negative portfolio rates of return are shown predominantly in the first one-third of our 20-year period. Assuming a 4% withdrawal rate (growing at an assumed 3% per year), our retirement portfolio will run out of money in 15 years.

In our second retirement portfolio, the losses are reversed and primarily experienced at the end of the retirement period. Not only does the retirement income portfolio not run out of money, but it actually ends with 50% of the original invested proceeds, enabling the retiree to continue drawing income potentially well into the future.

This "sequence of returns" explanation and illustration in Exhibit A are what most planners and academics generally consider to be the major risk of an inflation-adjusted retirement income portfolio and, therefore, the assumed major risk of the 4% rule. This analysis may be overly simplistic. More careful examination suggests there are at least four major risks for a retirement planner to overcome when addressing the challenge of developing a sustainable inflation-adjusted retirement income portfolio:

1. Equity sequence of returns
2. Bond-yield sequence of returns
3. Sequence of Inflation®
4. Longevity

Exhibit A: Equity Sequence of Returns

Losses at Beginning of Period

Year	Beginning Amount	Return	Annual Withdrawal $4000 + 3% Inflation
1	$100,000	-18%	$78,120
2	$78,120	-21%	$57,595
3	$57,595	8%	$57,959
4	$57,959	-5%	$50,690
5	$50,690	13%	$52,778
6	$52,778	-15%	$40,224
7	$40,224	5%	$37,459
8	$37,459	-17%	$26,171
9	$26,171	15%	$25,030
10	$25,030	8%	$21,813
11	$21,813	22%	$21,237
12	$21,237	4%	$16,549
13	$16,549	-12%	$8,860
14	$8,860	11%	$3,961
15	$3,961	8%	
16		-12%	
17		18%	
18		16%	
19		6%	
20		15%	

Reversing the Losses

Year	Beginning Amount	Return	Annual Withdrawal $4000 + 3% Inflation
1	$100,000	15%	$111,120
2	$111,120	6%	$113,667
3	$113,667	16%	$127,610
4	$127,610	18%	$146,209
5	$146,209	-12%	$124,162
6	$124,162	8%	$129,458
7	$129,458	11%	$138,922
8	$138,922	-12%	$117,332
9	$117,332	4%	$116,958
10	$116,958	22%	$137,470
11	$137,470	8%	$143,092
12	$143,092	15%	$159,019
13	$159,019	-17%	$126,283
14	$126,283	5%	$126,723
15	$126,723	-15%	$101,664
16	$101,664	13%	$108,648
17	$108,648	-5%	$96,797
18	$96,797	8%	$97,929
19	$97,929	-21%	$70,554
20	$70,554	-18%	$50,841

Note: This hypothetical 20-year scenario is not meant to suggest that retirement planners should ordinarily be illustrating 20-year retirement durations; rather, this condensed 20-year scenario is simply used to save space.

[11] https://www.fidelity.com/viewpoints/safeguard-retirement-savings
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Equity Sequence of Returns

Equity sequence of returns has been addressed in Exhibit A. However, it should be noted that retirement planners are often tempted to exclusively denote equities as all or some portion of the stock market. When broadly discussing equities in regard to an inflation-adjusted retirement income portfolio, any type of real asset ownership can be classified as an equity (e.g., real estate, REITs, oil and gas, collectibles), not simply publicly/privately traded stocks.

Bond-Yield Sequence of Returns

One confusing aspect of discussing the four inflation-adjusted retirement income risks (FIARIR – pronounced "fire") is that all four are interconnected, producing obvious scholastic awkwardness when attempting to separate one from the others. While some illustrations of the components of FIARIR will be presented separately, it should be understood that there is a symbiotic relationship between these four risks. However, later in this paper there will be a concerted effort to reduce (if not eliminate) the effects of some of these risks.

Finke, Pfau and Blanchett addressed the risk of bond-yield sequence of returns (although not by name, or even through segregation) in their essay, "The 4% Rule Is Not Safe in a Low-Yield World."[13] The remainder of this section will rely primarily upon their essay and corresponding research.

The United States is now, and has been for some time, in an unusually low-yield bond market, producing current intermediate-term real bond-yields (i.e., adjusted for inflation) that are 4% lower than their historical norm.[14] While the inflation risk will be addressed later, it should be noted that more than a few economists view inflation to be a significant future risk to retirees who currently own bonds. Recently, "[i]n an investor alert, the Financial Industry Regulatory Authority Inc. (FINRA) told investors that in the event of rising interest rates [editor comment: almost certainly in concert with inflation], 'outstanding bonds, particularly those with a low interest rate and high duration may experience significant price drops.' A bond fund with 10-year duration will decrease in value by 10% if rates rise just one percentage point, the alert warns."[15]

Finke, Pfau and Blanchett (using Bengen's portfolio model of 50% stocks and 50% bonds, a 4% inflation-adjusted withdrawal rate, average current[16] real [after-inflation] TIPS' return as well as the historic real equity premium) concluded that a current retiree withdrawing an inflation-adjusted 4% would have a 57% chance of portfolio failure.[17] Portfolio failure was defined as the retirement account running entirely out of money.

The above 57% portfolio failure rate assumed that bond-yields will not revert to their historical real averages of 2.6%. But because of bond-yield sequence of return risk, research shows that a future climb in real interest rates is not as promising as one might suspect. If real bond returns center on -1.4% for 10 years and then revert to the historical (real) 2.6% average, the failure rate drops from 57% to 32%. Even if the interest rate reversion happens in five years, the failure rate is still 18%.[18] Furthermore, the above research did not include any management fees, which would suggest that these bleak results were even more optimistic than actual real-world managed returns.[19]

[13] http://wsisonline.com/papers_files/The%204%20Percent%20Rule.pdf
[14] Ibid
[15] http://www.investmentnews.com/article/20130214/FREE/130219947
[16] January, 2013
[17] http://wsisonline.com/papers_files/The%204%20Percent%20Rule.pdf
[18] Ibid
[19] Ibid

Let's briefly pause to understand the utility of the above research. Retirement planners must place their clients' interests above their own. Retirees are placing their financial well-being in the care of professional retirement planners and are expecting accurate (and ethical) retirement income projections. Therefore, for a retirement planner to place retirees in an inflation-adjusted portfolio allocation that has at best an 18% chance of portfolio failure (over a 30-year retirement scenario) seems, at the very least, questionable.

The following statistic underscores the gravity of retiree portfolio depletion: In a recent national poll of people ages 44 to 75, AARP reports that 61% said they fear depleting their retirement assets more than they fear death.[20] In other words, nearly two-thirds of retirees fear their portfolio's demise more than their own.

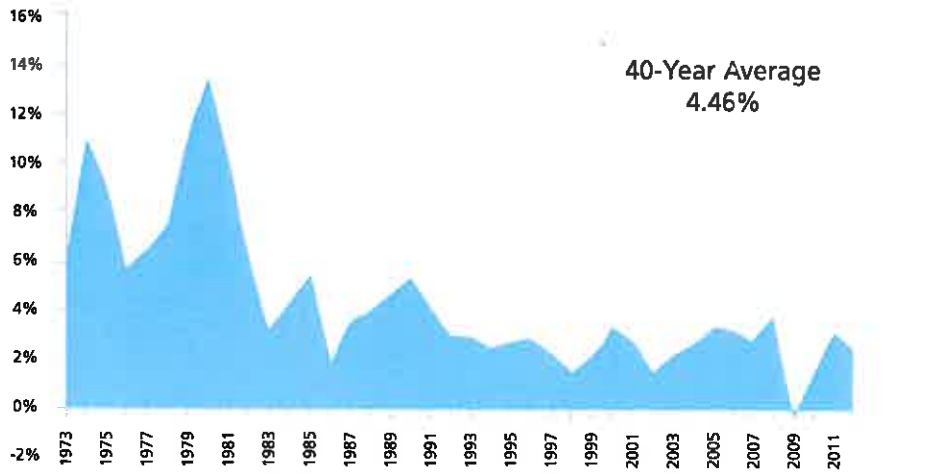
The impact of asset management fees cannot be overstated. Again, Finke, Pfau and Blanchett's research assumed no fees when assessing real rates of return. As stated, the January 2013 real bond-yield was -1.4%. It would seem ethically suspect (and financially adverse) for an investment advisor to charge a 1% annual management fee on a large portion of a retiree's retirement portfolio that is yielding -1.4% in real return before adding the drag of a fee.

Sequence of Inflation®

When discussing FIARIR (or even the general category of sequence of returns) there seems to be an absence of conversation about the Sequence of Inflation®. This is puzzling, as the historic rate of inflation over the past 40 years has averaged nearly 4.5%.[21] (This 40-year time frame is significant because actuaries are currently projecting that at least one spouse will live 40 or more years in 10% of retirement cases).[22] As one can observe from Exhibit B, inflation was quite high 40 years ago and did not retreat to our recent moderate averages until the 1990s.

Exhibit B: 40-Year Historical Rate of Inflation

CPI-U 1973-2012



[20] http://www.aarp.org/work/retirement-planning/info-06-2010/running_out_of_money_worse_than_death.html
[21] http://inflationdata.com/inflation/Inflation_Rate/HistoricalInflation.aspx
[22] http://www.soa.org/search.aspx?searchterm=Longevity%202011%20risks%20and%20process%20of%20retirement%20survey%20report (See Exhibit E)

If we use the 40-year historic rate of the S&P 500 (with dividends being used to cover management fees) as our investment vehicle, the historic rate of inflation and an inflation-adjusted withdrawal rate of 4%, we observe that our income portfolio fails in year 15 (Exhibit C).

Exhibit C: 40-Year Purchasing Power of $1M, 4% Withdrawal Increased for Inflation (CPI-U)

Historical Rate of Inflation	Year	Beginning Value	Withdrawal @ 4% + Historical Inflation	Subtotal	Plus Earnings on S&P 500	Annual Gain/Loss	Ending Amount
6.16%	1 1973	$1,000,000	$40,000	$960,000	-17.37%	$ (166,752)	$793,248
11.03%	2 1974	$793,248	$42,464	$750,784	-29.72%	$ (223,133)	$527,651
9.20%	3 1975	$527,651	$47,148	$480,503	31.55%	$151,599	$632,102
5.75%	4 1976	$632,102	$51,485	$580,617	19.15%	$111,188	$691,805
6.50%	5 1977	$691,805	$54,446	$637,359	-11.50%	$ (73,296)	$564,063
7.62%	6 1978	$564,063	$57,985	$506,078	1.06%	$5,364	$511,442
11.22%	7 1979	$511,442	$62,403	$449,039	12.31%	$55,277	$504,316
13.58%	8 1980	$504,316	$69,405	$434,911	25.77%	$112,077	$546,988
10.35%	9 1981	$546,988	$78,830	$468,158	-9.73%	$ (45,552)	$422,606
6.16%	10 1982	$422,606	$86,989	$335,617	14.76%	$49,537	$385,154
3.22%	11 1983	$385,154	$92,347	$292,806	17.27%	$50,568	$343,374
4.30%	12 1984	$343,374	$95,321	$248,053	1.40%	$3,473	$251,526
5.55%	13 1985	$251,526	$99,420	$152,106	26.33%	$40,050	$192,156
1.91%	14 1986	$192,156	$104,938	$87,218	14.62%	$12,751	$99,969
3.66%	15 1987	$99,969	$99,969		2.03%		
4.08%	16 1988				12.40%		
4.83%	17 1989				27.25%		
5.39%	18 1990				-6.56%		
4.25%	19 1991				26.31%		
3.03%	20 1992				4.46%		
2.96%	21 1993				7.06%		
2.61%	22 1994				-1.54%		
2.81%	23 1995				34.11%		
2.93%	24 1996				20.26%		
2.34%	25 1997				31.01%		
1.55%	26 1998				26.67%		
2.19%	27 1999				19.53%		
3.38%	28 2000				-10.14%		
2.83%	29 2001				-13.04%		
1.59%	30 2002				-23.37%		
2.27%	31 2003				26.38%		
2.68%	32 2004				9.00%		
3.39%	33 2005				3.00%		
3.24%	34 2006				13.60%		
2.85%	35 2007				3.55%		
3.85%	36 2008				-38.49%		
-0.34%	37 2009				26.46%		
1.64%	38 2010				8.12%		
3.16%	39 2011				0.00%		
2.50%	40 2012				13.10%		

Referencing Exhibit C, one might be tempted to assume that the cause of this portfolio failure is entirely due to equity sequence of returns (since in this example equities are the sole investment vehicle). However, the assumption is not accurate. The portfolio failure was mainly the result of Sequence of Inflation®. In Exhibit D below, the 40-year inflation rate is reversed, resulting in no portfolio failure until well past Bengen's 30-year safe harbor. This example validates the FIARIR assertion that Sequence of Inflation® is one of the four major risks of the 4% rule.

Looking at the above examples of inflation history (Exhibit C), one may appropriately question whether the United States will sustain the high inflation it experienced in the 1970s and 1980s in the near future and thus produce similar negative results as exhibited above by the effects of Sequence of Inflation®.

It should be noted that (as of yet) there has been little speculation of higher than recently experienced inflation in the near future. The examples in Exhibit C and D are simply to illustrate that Sequence of Inflation® is a viable risk and, as such, should be part of the FIARIR family.

If higher-than-normal inflation occurs in the United States' foreseeable future, it would seem prudent to understand the major cause: the rapid growth in money supply.[23] In other words, inflation is primarily the result of the government aggressively printing money.

[23] http://www.philadelphiafed.org/research-and-data/publications/business-review/1993/brma93lb.pdf

By the end of 2012, the U.S. monetary base had increased by over 62% in just four years.[24] As part of Quantitative Easing 1 and 2, the government printed $2.1 trillion. Subsequently, the Federal Reserve implemented QE3, whereby the Fed has an open-ended mandate to create $85 billion of fiat money per month.[25]

A recent MoneyWatch article titled "Get Ready: Inflation Could Hit 15%" argued that "Americans are likely to get smacked by an unwelcome blast from the past – runaway inflation – in the not-too-distant future, thanks to economic policies that are aimed at helping the economy today."[26]

Is there agreement among economists that the United States is destined for high inflation in the foreseeable future? No; some say yes[27], and others differ. However, because of the recent and continued high velocity of money creation, and since the Sequence of Inflation® is a proven FIARIR risk, every retirement income plan should incorporate investment vehicles that will counteract the effects of our current moderate inflationary environment and the very real possibility of more aggressive inflation in the future.

Exhibit D: 40-Year Purchasing Power of $1M, 4% Withdrawal Increased for Reversed Inflation (Cont'd)

Historical Rate of Inflation	Year	Beginning Value	Withdrawal @ 4% + Historical Inflation	Subtotal	Plus Earnings on S&P 500	Annual Gain/Loss	Ending Amount
2.50%	1 1973	$1,000,000	$40,000	$960,000	-17.37%	$ (166 752)	$793,248
3.16%	2 1974	$793,248	$41,000	$752,248	-29.72%	$ (223,568)	$528,680
1.64%	3 1975	$528,680	$42,296	$486,384	31.55%	$153,454	$639,839
-0.34%	4 1976	$639,839	$42,989	$596,849	19.15%	$114,297	$711,146
3.85%	5 1977	$711,146	$42,843	$668,303	-11.50%	$ (76,855)	$591,448
2.85%	6 1978	$591,448	$44,493	$546,955	1.06%	$5,798	$552,753
3.24%	7 1979	$552,753	$45,761	$506,993	12.31%	$62,411	$569,403
3.39%	8 1980	$569,403	$47,243	$522,160	25.77%	$134,561	$656,721
2.68%	9 1981	$656,721	$48,845	$607.876	-9.73%	$ (59,146)	$548,730
2.27%	10 1982	$548,730	$50,154	$498,576	14.76%	$73,590	$572,166
1.59%	11 1983	$572,166	$51,292	$520,873	17.27%	$89,955	$610,828
2.83%	12 1984	$610,828	$52,108	$558,720	1.40%	$7,822	$566,543
3.38%	13 1985	$566,543	$53,582	$512,960	26.33%	$135,062	$648,022
2.19%	14 1986	$648,022	$55,394	$592,629	14.62%	$86,642	$679,271
1.55%	15 1987	$679,271	$56,607	$622.664	2.03%	$12,640	$635,305
2.34%	16 1988	$635,305	$57,484	$577,820	12.40%	$71,650	$649,470
2.93%	17 1989	$649,470	$58,829	$590.641	27.25%	$160,950	$751,591
2.81%	18 1990	$751,591	$60,553	$691,038	-6.56%	$ (45,332)	$645,706
2.61%	19 1991	$645,706	$62,254	$583,451	26.31%	$153,506	$736,957
2.96%	20 1992	$736,957	$63,879	$673,078	4.46%	$30,019	$703,097
3.03%	21 1993	$703,097	$65,770	$637,327	7.06%	$44,995	$682,322
4.25%	22 1994	$682,322	$67,763	$614.559	-1.54%	$ (9,464)	$605,095
5.39%	23 1995	$605,095	$70,643	$534.452	34.11%	$182,302	$716,754
4.83%	24 1996	$716,754	$74,451	$642,303	20.26%	$130,131	$772,434
4.08%	25 1997	$772,434	$78,047	$694,397	31.01%	$215,229	$909,717
3.66%	26 1998	$909,717	$81,231	$828,486	26.67%	$220,957	$1,049,443
1.91%	27 1999	$1,049,443	$84,204	$965,239	19.53%	$188,511	$1,153,750
5.55%	28 2000	$1,153,750	$85,812	$1,067,938	-10.14%	$ (108,289)	$959,649
4.30%	29 2001	$959,649	$90,575	$869,075	-13.04%	$ (113.327)	$755,747
3.22%	30 2002	$755,747	$94,469	$661,278	-23.37%	$ (154,541)	$506,737
6.16%	31 2003	$506,737	$97,511	$409.226	26.38%	$107,954	$517,180
10.35%	32 2004	$517,180	$103,518	$413.662	9.00%	$37,233	$450,891
13.58%	33 2005	$450,891	$114,232	$336.559	3.00%	$10,100	$346,759
11.22%	34 2006	$346,759	$129,745	$217,014	13.60%	$29,514	$246,528
7.62%	35 2007	$246,528	$144,302	$102.225	3.55%	$3,629	$105,854
6.50%	36 2008	$105,854	$105,854		-38.49%		
5.75%	37 2009				26.46%		
9.20%	38 2010				8.12%		
11.03%	39 2011				0.00%		
6.16%	40 2012				13.10%		

Longevity

Often, baby boomers and retirees underestimate their longevity by guesstimating their life expectancy, based upon some blood relative's age at death or assuming one's own demise to be governed by average life expectancies at birth.[28] While there is a minor correlation among family members' longevity, life expectancy of dead relatives is not a factor on which one's own retirement duration (and consequently, one's income needs) should be based.[29]

[24] Board of Governors of the Federal Reserve System
[25] http://www.washingtonpost.com/blogs/wonkblog/wp/2012/09/13/qe3-what-is-quantitative-easing-and-will-it-help-the-economy/
[26] http://www.cbsnews.com/8301-505144_162-57397566/get-ready-inflation-could-hit-15/
[27] ibid
[28] Harold Evensky & Deena Katz, Retirement Income Redesigned, Bloomberg Press, 2006, p.74.
[29] Matthew Greenwald & Associates is a marketing research firm specializing in financial services and retirement analysis.

Likewise, U.S. lifetime mortality tables are similarly misleading. These tables are based upon projections of when the average person will die, meaning they include many people who die before (or long before) reaching retirement age. These early deaths lower the average, thus skewing projected retirement longevity for people at, or near, retirement age. This leads to the obvious consequence for many retirees (as well as ill-informed retirement planners) of an underestimation of realistic life expectancies in retirement (and a corresponding retirement income deficit).

Exhibit E: Probability of Living from 65 to Various Ages[30]

Age	Male	Female	Survivor
80	68%	77%	93%
85	50%	62%	81%
90	30%	42%	60%
95	13%	21%	31%
100	3%	7%	10%

Current average life expectancy at birth is 78.3 years.[31] However, for retirement planners, the most relevant mortality statistic is not one's life expectancy at birth, but rather one's life expectancy during retirement. The "Probability of Living from 65 to Various Ages" mortality chart from the Society of Actuaries (Exhibit E) shows that the average life expectancy of males and females at age 80 is respectively 18% and 27% higher when compared to average life expectancy using an "at-birth" mortality table.

This leads us to the heart of Bengen's 4% rule. Bengen determined a safe retirement to last 30 years. However, as noted in Exhibit E above, the average 65-year-old male is projected to have a 13% chance of living past 30 years of retirement. An average female is projected to have a 21% probability of surpassing 30 years, while married couples have a 31% chance of one spouse outliving Bengen's 30-year retirement. Stated differently, almost one-third of married couples retiring today will have longer mortality than Bengen's 30-year retirement model.

This is a problem; extending the systematic removal of 4% inflation-adjusted annual portfolio withdrawals for additional years exponentially increases the potential of portfolio failure. In other words, the greater the longevity, the more likely Bengen's historic 4% rule will fail, which therefore embraces longevity as a recognized FIARIR risk.

Mitigating the Four Inflation-Adjusted Retirement Income Risks

As previously mentioned, retirees who desire sustainable, inflation-adjusted income will face the aforementioned FIARIR risks: (1) equity sequence of returns, (2) bond-yield sequence of returns, (3) Sequence of Inflation® and (4) longevity. To overcome the possibility of retirement portfolio failure, these risks should be addressed and mitigated.

The first question to be addressed is: "How can retirement portfolios mitigate against the FIARIR?" The second question: "Is it in the retiree's best interest to fully mitigate against the FIARIR?"

http://www.google.com/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=1&sqi=2&ved=0CDIQFjAA&url=http%3A%2F%2Fwww.soa.org%2Ffiles%2Fresearch%2Fprojects%2Fresearch-key-finding-longevity.pdf&ei=LApjUbCQKcGG2wX994CYAw&usg=AFQjCNFdmWyT3sQjZaMdn5IetyesR74P-Q&sig2=M36ekeUjl4KpCLK5XN2jWw&bvm=bv.44770516,d.b2I (75% of Social Security Mortality)

U.S. National Center for Health Statistics, 206, Vol. 57, April 17, 2009

How to Mitigate a Retirement Portfolio Against the FIARIR

One may partially or fully mitigate the risks of a retirement income portfolio against the FIARIR by using an investment vehicle that is not subject to equity or bond-yield sequence of returns, Sequence of Inflation® or longevity.

Pfau has constructed several inflation-adjusted retirement income comparatives illustrating varying percentages in stocks and bonds; differing percentages of stocks with a variable annuity invested 70% in stocks and 30% in bonds (with a guaranteed lifetime withdrawal benefit [GLWB]); and a differing percentage in stocks and a regular SPIA.

The following are the underlying assumptions for Pfau's first comparison (Exhibit F):

Exhibit F: The Efficient Retirement Income Frontier (Stocks with Bonds, Variable Annuities, and SPIAs) 3% Inflation

Husband and wife both age 65

30-year life expectancy – assume both die in year 30

3% annual inflation, fixed with no volatility

6% annual income needs

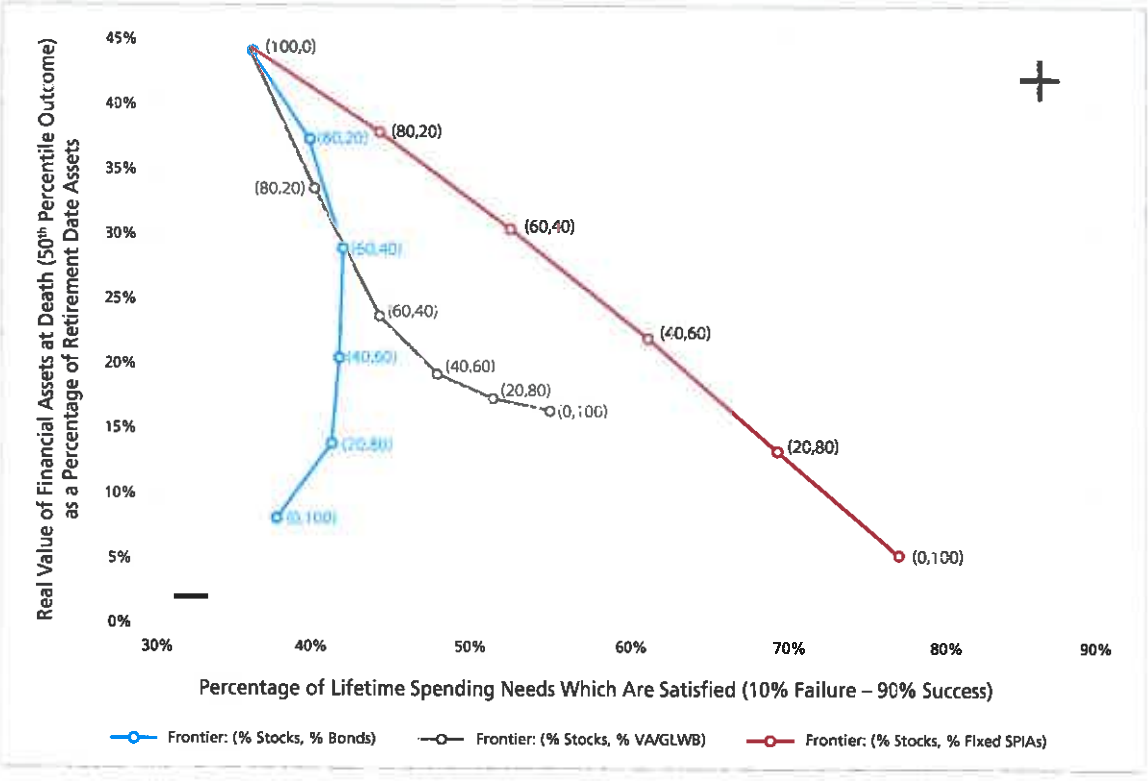
2% of income needs derived from Social Security, indexed for 3% inflation

4% of income needs derived from retirement assets

Fixed joint SPIA: 5.52% fixed payout (high payout due to risk pooling)

VA/joint GLWB: Invested in 70% stocks and 30% bonds with a .95% GLWB annual fee (providing a 4% guaranteed payout rate with an annual high water mark) with a base VA fee of 2.29% which is the current average VA fee[32]

Stocks and bonds: Stocks with real return of 5.1% (20% volatility), bonds have a real return of 0.3% (volatility 7%), with an RIA management fee of 1%



[32] IRI Fact Book, 11th edition, page 47

Exhibit F illustrates Pfau's synopsis of 1,001 differing Monte Carlo product allocations. The first objective of Pfau's probability plotting (as opposed to a timeline chart) is to calculate the likelihood of having a 50/50 chance of obtaining a specific percentage of the retiree's original investment at death. This death value is obtained by observing the left-hand vertical percentages. For example, observing the 60% stock/40% bond product allocation, one can simply plot a mental line to the left and discern that the death value of this particular stock/bond product allocation is projected to be nearly 30% of the original investment.

The second probability objective of Pfau's analysis is to determine the percentage of lifetime retirement spending needs that should be met by each specific product allocation at the 10th percentile of outcomes. What this means is that in 90% of Pfau's simulations, retirees would be able to meet a larger percentage of their spending goals over a 30-year horizon, but in 10% of cases they would meet less of their spending goals (this reflects a bad-luck case, but it is not a worst-case scenario). The percentage of lifetime retirement spending needs is derived by aligning the specific product allocation with the bottom horizontal lifetime spending needs success rate. As an example, again observe the 60% stock/40% bond product allocation. If one now plots a mental vertical line from this product allocation to the bottom horizontal chart, it would show that this 60/40 product allocation would cover a little more than 40% of the retiree's lifetime spending needs.

Therefore, by using Pfau's probability chart (Exhibit F), one can determine that a 60% stock/40% bond asset allocation has the above-mentioned probability of meeting about 40% of the retiree's income goals, while projecting around 30% of the original investment left for an inheritance, on average.

The ultimate objective of Pfau's probability graph is to determine where allocations belong on something academics call "the efficient income frontier." The most efficient income frontier is away from the lower left "Negative Quadrant" and toward the upper right "Positive Quadrant."

If the product allocations of stocks/bonds shown in Exhibit F are compared to the product allocations of stocks/variable annuities, one would quickly surmise that the stock/VA asset allocation produces a more efficient retirement income frontier, especially at the lower-risk asset mixes.

Now to the unanticipated conclusion of Pfau's retirement income probability analytics: the stock/joint SPIA product allocations. As any objective observer would discern, the stock/SPIA product allocations proved (by no small margin) to produce the most efficient frontier when matched against either a stock/bond or stock/VA comparative. According to Pfau, "...the evidence suggests that optimal product allocations consist of stocks and fixed SPIAs, and clients need not bother with bonds, inflation-adjusted SPIAs or VA/GLWBs. Though SPIAs do not offer liquidity, they provide mortality credits and generate bond-like income without any maturity date, and they support a higher stock allocation for remaining financial assets. Altogether, this allows a client to better meet both retirement financial objectives."[33]

In other words, replacing bonds with a SPIA solved three of the four inflation-adjusted retirement income risks (FIARIR): the risks of equity sequence of returns, bond-yield sequence of returns and longevity risk. The only FIARIR the SPIA does not resolve is the Sequence of Inflation® risk.

[33] http://www.fpanet.org/journal/ABroaderFrameworkforDeterminingan EfficientFrontier/

The Challenge of Using SPIAs in an Inflation-Adjusted Retirement Income Portfolio

As observed, SPIAs work particularly well when substituted for bonds in an inflation-adjusted retirement income portfolio. Unfortunately, more than a few retirees, as well as retirement planners, struggle with placing lifetime SPIAs inside a retiree's income portfolio. The challenges with which they sometimes struggle include:

- A general aversion to annuities
- The finality of the decision
- No residual for heirs
- Lack of control
- Lack of diversification

It's difficult to fully appreciate (and comprehend) the irony in how much retirees love Social Security and pensions, yet shun SPIAs. All three are, in fact, virtually the same creature packaged differently. This enigma is so common that scholars have referred to it as the "annuity puzzle."[34] Case in point: Fewer than 5% of Americans have voluntarily purchased a life annuity[35], and of all fixed annuities currently sold, only 8% are immediate annuities, with lifetime SPIAs being even a smaller segment of that percentage.[36]

This aversion to SPIAs can be illustrated through big lottery winners. Even though a lump-sum lottery disbursement is less than half of the normal 20 years of annuity payments (which is generally a much shorter time frame than the winner's life expectancy), 80% still choose the highly reduced single payment.[37]

With Social Security, as with most pensions, the retiree does not receive a choice as to a lump-sum payout versus lifetime income. Therefore, the worker seems to be more amenable to willingly accept these "pension-type SPIAs." Conversely, with his own money, the retiree customarily rejects the concept of a personal pension vis-à-vis a lifetime SPIA when suggested as a retirement income solution.

One of the main reasons SPIAs are not selected as the lifetime income vehicle of choice is that SPIAs are viewed as a one-time irrevocable decision that generally will leave none of its value to heirs. In case of a catastrophic emergency, medical crisis or family emergency early in retirement, the retiree cannot change his mind and "ask the insurance company for a refund."

Defying authority since the 1960s and 1970s, today's baby boomers want to be able to maintain control at all times.[38] Suggesting to a baby boomer that one should inexplicably volunteer to immediately and irrevocably give up control of a sizable portion of his retirement portfolio is often a deal killer. If forced into an immediate annuity or structured settlement (e.g., lawsuit payout), baby boomers will actually sell their SPIA or legal settlement in the secondary market to companies such as J.G. Wentworth, often at a sizable discount. (Note: J.G. Wentworth claims that they have purchased more than $2 billion of these contracts from those desirous of liquidity).[39]

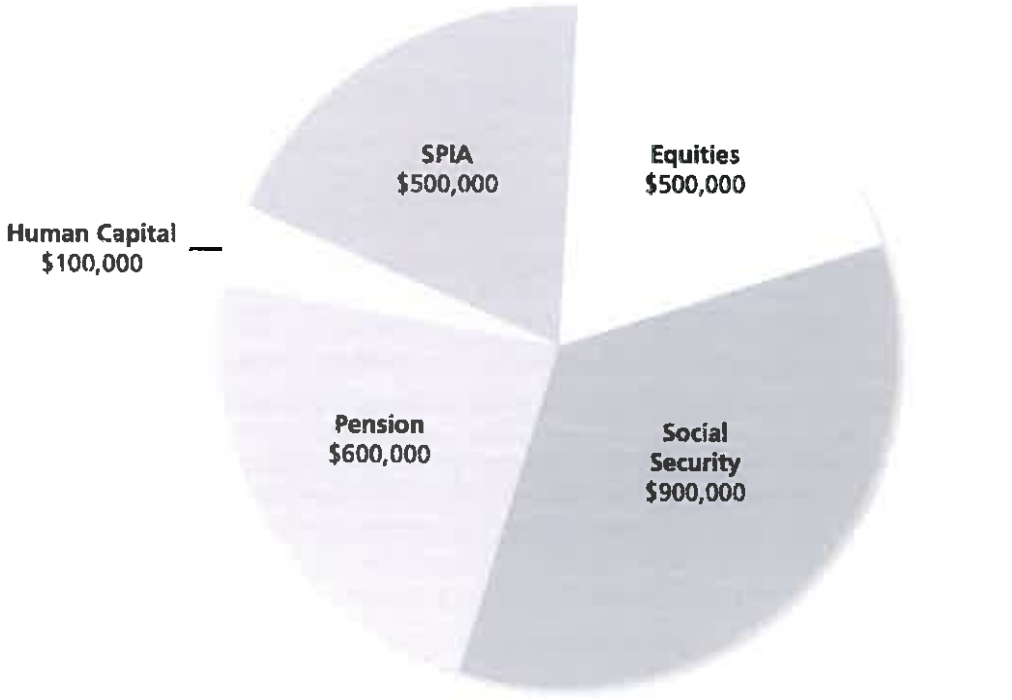
[34] Modigiliani, Nobel prize lecture. Available at www.nobelprize.org/nobel_prizes/economic-sciences/laureates/1985/modigliani-lecture.pdf (1985)
[35] http://www.ifid.ca/pdf_workingpapers/WP2006NOV20.pdf
[36] IRI Fact Book, 11th Edition, pg. 51
[37] http://entertainment.howstuffworks.com/lottery2.htm
[38] http://www.nestleprofessional.com/united-states/en/SiteArticles/Pages/InsightsMIXMagazineMarketingtoBabyBoomers.aspx?UrlReferrer
[39] http://www.bankrate.com/finance/debt/want-settlement-cash-now-not-so-fast-1.aspx

Oddly enough, a SPIA may cause the retiree to have too much of their retirement income portfolio in one asset class. This concept may best be illustrated through the following case study:

- Husband and wife age 65, assuming a 30-year life expectancy for both
- Social Security of $30,000 per year indexed for inflation
- Husband's pension of $20,000 per year, with 100% survivor benefits, indexed for inflation
- Husband planning on working part-time for five years, $20,000 per year indexed for inflation
- Retirement portfolio of $1 million, 50% equities and 50% SPIA

Assuming we discount the Social Security at the rate of inflation, as well as the pension and the husband's work (human capital), the present value of their retirement income assets is shown in Exhibit G below.

Exhibit G: Present Value of Retiree's Retirement Income Assets



Out of the $2.6 million of the couple's retirement income capital, 80% is irrevocably locked in virtual SPIAs. Only 20% (the equities) is available for an early retirement catastrophic emergency, medical crisis, family disaster, etc. This may prove to be problematic if an early retirement emergency occurs in a bear market, forcing the retiree to sell his equities during this downward correction, let alone during a major market collapse similar to what happened in 2008.

While a stock/SPIA portfolio scenario may seem to generate the best academic lifetime inflation-adjusted retirement income solution (Exhibit F), in practicality, it may not be the right individual fit. Furthermore, aligning 80% of a client's retirement income assets into irrevocable SPIAs may not be viewed as a retirement planning "best practice" and may open the advising planner to peer criticism and legal exposure.

A More Flexible SPIA

While overweighting a retiree's income portfolio with SPIAs and SPIA-like income may be problematic, avoiding the SPIA solution may not be in the retiree's best interest either. SPIAs, while underwritten by bonds, prove to be better bonds in respect to retirement income because of their ability to pool risk.

Risk pooling is combining the uncertainty of individuals into a calculable risk of large groups. For example, a 70-year-old retiree may or may not die this year. However, if he is placed with 99,999 other retirees his age, insurance actuaries may predict that 1% of the total group (1,000 70-year-old males) will die in the current year. The uncertainty is that the insurance company doesn't know specifically which of the 1,000 will die; they only know the actuarial quantity. This little bit of information is what makes risk pooling possible. If the underlying bond portfolio that is supporting the retirement income risk pool is yielding 3%, then an insurance company can pay a higher income out of their risk pool to the retiree than this 3% yield, because their actuaries have determined that 1,000 of the risk pool will die this year. Thus, the appropriate share of the surplus bond portfolio can be distributed to the remainder of the risk pool.[40]

Historically, risk-pooled retirement income has been in the form of a SPIA. While performing admirably, most retirees reject this form of high guaranteed lifetime retirement income because of its inflexibility.

With the onslaught of the baby boomers and the expected corresponding demand for investment control, a new generation of risk-pooled income evolved. These were generically called fixed indexed annuities (FIAs) with an income rider.

Current competitive state-of-the-art FIAs can give the retiree emergency access to remaining principal up to 20 years after triggering income, link the retiree's income to inflation (CPI) for up to 30 years, turn income streams off and on, are uncapped and, most importantly, continue to be risk-pooled. In obtaining this flexibility, when compared with the SPIA, the retiree often gives up a little initial guaranteed income potential, but gains the possibility of higher market-linked retirement income, especially for those who experience longevity in retirement.

In Exhibit H, Pfau revised his income comparatives from Exhibit F by adding an additional mix of products: a percentage in stocks and a percentage in an inflation-adjusted, state-of-the-art FIA.

[40] http://glossary.econguru.com/economic-term/risk+pooling

Note: The inflation-adjusted FIA is illustrated using its guaranteed minimum income projections.
Below are the underlying assumptions for Pfau's first revised comparison (Exhibit H):

Exhibit H: The Efficient Retirement Income Frontier (Stocks with Bonds, Variable Annuities, SPIAs and Real FIAs) 3% Inflation

Husband and wife both age 65
30-year life expectancy – assume both die in year 30
3% annual inflation, fixed with no volatility
6% annual income needs
2% of income needs derived from Social Security, indexed for 3% inflation
4% of income needs derived from retirement assets
Fixed joint SPIA: 5.52% fixed payout (high payout due to risk pooling)
Inflation-Adjusted FIA: Minimum guaranteed inflation-adjusted joint payout (annually capped @ 10%)
VA/joint GLWB: Invested in 70% stocks and 30% bonds with a 0.95% GLWB annual fee (providing a 4% guaranteed payout rate with an annual high water mark) with a base VA fee of 2.29% which is the current average VA fee
Stocks and bonds: Stocks with real return of 5.1% (20% volatility), bonds have a real return of 0.3% (volatility 7%), with an RIA management fee of 1%

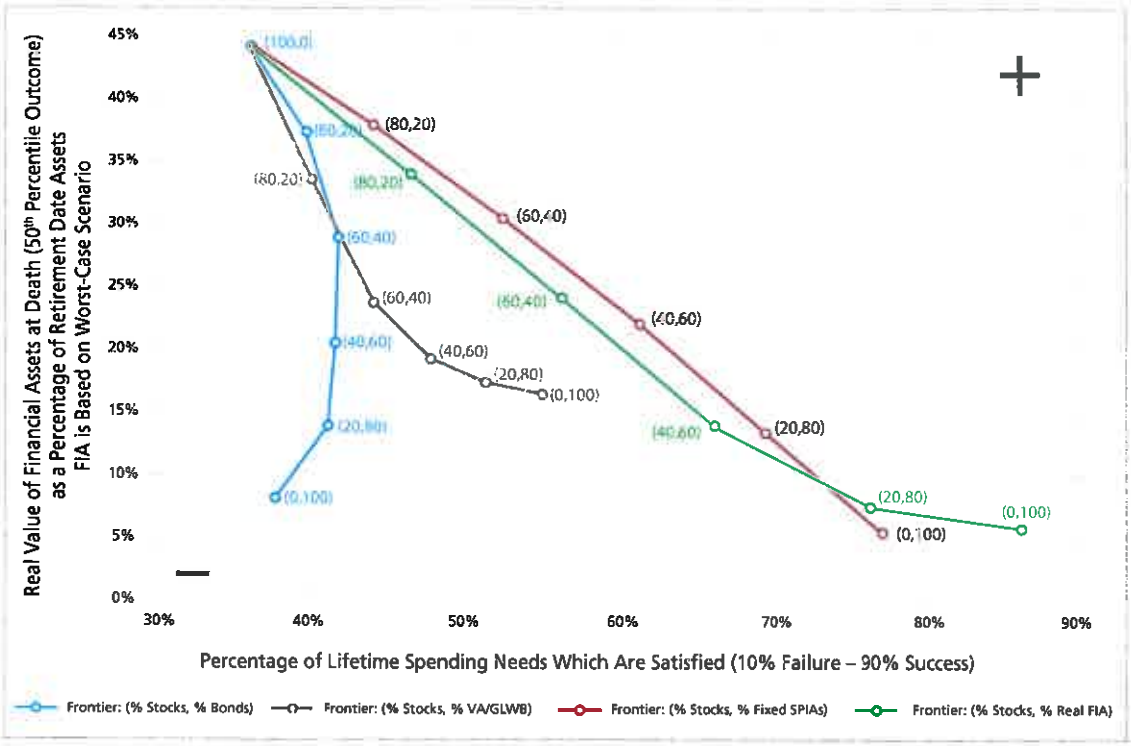


Exhibit H is the same retirement income probability chart shown in Exhibit F, but with the inclusion of an FIA with a joint inflation-adjusted income rider. Assuming 3% inflation, the stock/SPIA displays a slightly better retirement income frontier than the stock/real FIA ("real" meaning inflation-adjusted). However, Pfau's efficient retirement frontier is weighted to include the death benefit values. To gain the slightly better death benefit from the stock/SPIA, the retiree would have to forfeit the enviable liquidity offered by the real FIA.

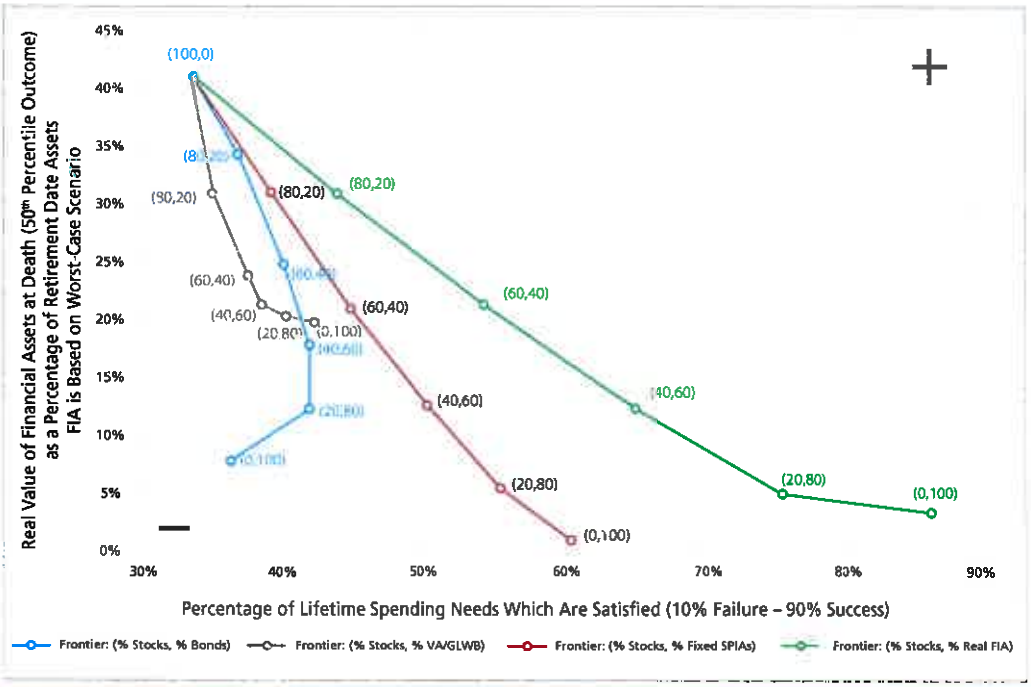
Conversely, when simply focusing on the coverage of lifetime spending needs, the real FIA illustrates (in all stock asset allocations) noticeably higher income probabilities than the SPIA. It should be noted that the real FIA's income assumptions do not include any bonuses or roll-ups, but are based entirely upon its guaranteed worst-case inflation-adjusted income yield. The fact that these worst-case outcomes for the real FIA perform well when compared to the other product allocations that are not worst-case is likewise impressive.

If the retirees' major concern is on their sustainable joint income for life, rather than maximizing the husband and wife's ultimate inheritance value, then the stock/real FIA outperforms the stock/SPIA at all of the asset allocation percentages in our assumed 3% inflation scenario by a substantial margin. Furthermore, for our retired couple, it should go without saying that the longer the surviving spouse lives, the higher the probability that the stock/real FIA's income should exponentially outperform the stock/SPIA.

While the SPIA is immune to three of the four major inflation-adjusted retirement income risks (as mentioned above, equity sequence of returns, bond-yield sequence of returns and longevity), the reason the real FIA's income (divorced from the stock allocations) performs so well is that it also eliminates the fourth major risk, Sequence of Inflation®. Therefore, as illustrated in Pfau's 30-year retirement income probability comparative (Exhibit H), for every year there is inflation, the real FIA will increase its income payout, whereas the SPIA payment will remain constant.

To better illustrate the income efficiencies over 30-years with a real FIA, observe the same retirement income probability chart below, but with one exception: Pfau illustrates inflation at 4% rather than 3%.

Exhibit I: The Efficient Retirement Income Frontier (Stocks with Bonds, Variable Annuities, SPIAs and Real FIAs) 4% Inflation



Notice that increasing assumed inflation by only 1% pushed the stock/bond, stock/VA and stock/SPIA allocations all in the wrong direction, toward the left side and the bottom. However, the stock/real FIA did not move at all. This is because the real FIA is immune to this jump from 3% to 4% assumed annual inflation. Since the stock/real FIA allocations did not move, those allocations obviously proved at 4% to have the most efficient retirement income frontier.

Conclusion

Earlier in this paper, the question was asked, "How can retirement portfolios mitigate against the four major inflation-adjusted retirement income risks?" The conclusions of Pfau's last two probability graphs (Exhibit H and I) methodically answered this question, as the stock/real FIA allocation's performance was admirable, if not noticeably superior, when compared to the other alternatives.

The second question asked was: "Is it in the retiree's best interest to fully mitigate against the four inflation-adjusted retirement income risks?" This answer demands the retirement planner to use both the science and the art of sustainable inflation-adjusted retirement planning to resolve the income conundrum confronting retiring baby boomers. Observing Pfau's analysis in Exhibit H and I, one can observe that a retiree may potentially align his retirement income to successfully mitigate against the four major risks of sustainable inflation-adjusted retirement income through investing 100% of his retirement assets into a state-of-the-art real FIA. This is the science.

Now the art: Should retirees actually position all of their retirement investments in a real FIA in an effort to avoid the FIARIR? Observe the post-demise asset probabilities at the left side of Pfau's graphs as well as the income success probabilities at its base. Assuming we ignore the problems that may result from the obvious lack of diversification, if the retiree's estate goals are greater than the probability of passing 5% of their retirement funds to heirs at demise, then investing all of the retirement assets into a real FIA could be problematic. Ultimately, the percentage of a real FIA in a retiree's retirement accounts must be subordinated to the client's financial goals, risk profile, risk capacity, diversification and lifetime liquidity needs. While the utility of a real FIA in a moderate- or high-inflation environment is academically sound, the challenge for the retirement planner is to holistically address all of the client's financial and family objectives in retirement. While determining the client's inflation-adjusted retirement income needs, the risks of equity sequence of returns, bond-yield sequence of returns, Sequence of Inflation® and longevity should be addressed and resolved. The art is in how the retirement planner and client balance the tangibility of guaranteed lifetime inflation-adjusted income with the retiree's other retirement objectives.

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Commentary

Rex has over 30 years of experience in the financial services industry, providing nationally sponsored educational trainings for over 10,000 CPAs, attorneys and retirement planners in advanced estate, retirement plan distribution, and retirement income planning techniques.

In addition to holding a B.S. degree from Iowa State University and a B.A. degree from Bob Jones University, Rex earned his Master of Science degree with an academic emphasis in retirement planning from the College for Financial Planning, a division of the National Endowment for Financial Education. He holds the designation of CERTIFIED FINANCIAL PLANNER professional and is a member of the Institute of Certified Financial Planners. Additionally, Rex has earned the designations of Chartered Advisor of Philanthropy® (CAP) and Chartered Advisor for Senior Living® (CASL), both conferred by The American College, Bryn Mawr, Pa.

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Wade is a professor of retirement income in the new Ph.D. program for Financial and Retirement Planning at The American College in Bryn Mawr, PA. He is a past selectee for the *InvestmentNews* Power 20 for people expected to shape the financial advisory industry, and is a recipient of *Financial Planning* magazine's Influencer Awards. His research article on safe savings rates won the inaugural *Journal of Financial Planning* Montgomery-Warschauer Editor's Award, and his work on evaluating the outcomes of different retirement income strategies received an Academic Thought Leadership Award from the Retirement Income Industry Association. He has also served as a past curriculum director for that organization's Retirement Management Analyst (RMA) designation program, and he has contributed to the curriculum of The American College's Retirement Income Certified Professional (RICP) designation. He holds a doctorate in economics from Princeton University, and he has published research on retirement planning in a wide variety of academic and practitioner research journals. He is also an active blogger on retirement research, maintains the educational Retirement Researcher website, and is a monthly columnist for Advisor Perspectives, a RetireMentor for MarketWatch, and an expert panelist for *The Wall Street Journal*.