ADVISOR PERSPECTIVES

Unlocking the Two Mysteries behind SPIAs

By Wade Pfau
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Two mysteries confound planners who purchase single-premium immediate annuities (SPIAs) for their clients: Why does the present value of a SPIA often exceed its cost, and why do equity allocations appear to increase when a SPIA is purchased? Unlocking those mysteries requires advisors to use a different framework – based on the household balance sheet – for the withdrawal phase of retirement.

Building a retirement income strategy requires more than just deciding on a withdrawal rate for a client's financial assets. The client's entire household balance sheet must be considered, matching assets (human, social and financial) to liabilities (essential and discretionary expenses). A crucial aspect is monitoring the present value of income from single-premium immediate annuities (SPIAs).

I'll show how those mysteries are solved in the context of a household balance sheet, but first let's look at how advisors can determine the present value of a SPIA.

Quantifying the present value of a SPIA

Innovative thinking on the topic of retirement income has come from the Retirement Income Industry Association (RIIA). The association establishes the household balance sheet as the central point from which advisors develop retirement income options for their clients. On the asset side, a client's balance sheet includes not just financial assets, but also social and human capital, such as continued part-time employment and Social Security benefits.

Many individuals tend to shy away from purchasing SPIAs because they prefer to see assets appearing on their financial statements. This feels tangible and real to them. When they annuitize, it is as if their financial assets have been replaced by a much more abstract notion of a guaranteed income stream.

Many clients have difficulty quantifying the full value of a guaranteed income stream, and they don't think of it as part of their balance sheets. How much is a guaranteed income stream of $10,000 per year for life worth? Clients may be hard-pressed to give an answer, but actuaries can. Their answers provide a basis for valuing SPIAs.

As a refresher for how this works, Table 1 provides a set of calculations for a guaranteed income for life owned by a 65-year-old male. We need two key pieces of information to calculate its present value. First, we require a reasonable discount rate with similar risk

characteristics as the annuity payments. Intuitively, the payments received in the future are worth less than the payments received sooner, because if we had the income today we would be able to invest it in an asset earning the discount rate, which would grow to provide the same future income as the annuity payment. Table 1 is created using a 2% discount rate and shows the discounted values of the future income stream.

We also need to know the probabilities of survival to each subsequent age, since the annuity only pays when the owner is alive. The table shows survival probabilities for a 65-year-old male at each subsequent age using the 2009 period life table from the Social Security Administration. The final column shows the survival-weighted discounted value of the future income stream. This is the income earned in a given year, times the discount factor for that year, times the probability of surviving to that year. When we add these values across all of the future years, we get the present value of the annuity on an actuarial basis.

This guaranteed income stream would cost the client $147,816. It can be included on the asset side of a client's balance sheet to properly reflect the value of the SPIA when it is purchased. Guaranteed income does indeed have a present value.

Table 1. Calculating the Value of $10,000 Income Stream for a 65-Year Old Male

Discount Rate:	2%					
Age	Income	Discount Factor	Discounted Value of Income		Survival Probabilities*	Survival-Weighted Discounted Value
65	$10,000	1.0000	$10,000		1.0000	$10,000
66	$10,000	0.9804	$9,804		0.9838	$9,645
67	$10,000	0.9612	$9,612		0.9665	$9,290
68	$10,000	0.9423	$9,423		0.9480	$8,933
69	$10,000	0.9238	$9,238		0.9283	$8,576
70	$10,000	0.9057	$9,057		0.9074	$8,219
71	$10,000	0.8880	$8,880		0.8852	$7,860
72	$10,000	0.8706	$8,706		0.8615	$7,500
73	$10,000	0.8535	$8,535		0.8364	$7,139
74	$10,000	0.8368	$8,368		0.8097	$6,775
75	$10,000	0.8203	$8,203		0.7815	$6,411
76	$10,000	0.8043	$8,043		0.7516	$6,045
77	$10,000	0.7885	$7,885		0.7200	$5,677
78	$10,000	0.7730	$7,730		0.6867	$5,308
79	$10,000	0.7579	$7,579		0.6518	$4,940
80	$10,000	0.7430	$7,430		0.6154	$4,573

81	$10,000	0.7284	$7,284		0.5775	$4,207
82	$10,000	0.7142	$7,142		0.5381	$3,843
83	$10,000	0.7002	$7,002		0.4976	$3,484
84	$10,000	0.6864	$6,864		0.4562	$3,131
85	$10,000	0.6730	$6,730		0.4142	$2,787
86	$10,000	0.6598	$6,598		0.3721	$2,455
87	$10,000	0.6468	$6,468		0.3303	$2,137
88	$10,000	0.6342	$6,342		0.2892	$1,834
89	$10,000	0.6217	$6,217		0.2493	$1,550
90	$10,000	0.6095	$6,095		0.2113	$1,288
91	$10,000	0.5976	$5,976		0.1757	$1,050
92	$10,000	0.5859	$5,859		0.1431	$838
93	$10,000	0.5744	$5,744		0.1140	$655
94	$10,000	0.5631	$5,631		0.0885	$498
95	$10,000	0.5521	$5,521		0.0669	$369
96	$10,000	0.5412	$5,412		0.0492	$266
97	$10,000	0.5306	$5,306		0.0353	$187
98	$10,000	0.5202	$5,202		0.0246	$128
99	$10,000	0.5100	$5,100		0.0167	$85
100	$10,000	0.5000	$5,000		0.0111	$56
101	$10,000	0.4902	$4,902		0.0071	$35
102	$10,000	0.4806	$4,806		0.0045	$22
103	$10,000	0.4712	$4,712		0.0027	$13
104	$10,000	0.4619	$4,619		0.0016	$7
Present Value of the Annuity = Sum of Survival-Weighted Discounted Values:						$147,816
*Survival Probabilities are calculated from the Social Security Administration's 2009 Period Life Table.						

Mystery 1: Are SPIAs a free lunch?

The first mystery (Why does the present value of a SPIA often exceed its cost?) became apparent as I listened to financial planner Mike Lonier, of New Jersey-based Lonier Financial Advisory, present the spreadsheet he developed for working with clients using the household-balance-sheet view. His presentation was part of RIIA's intensive retirement seminar held at Salem State University in July.

Mike was calculating the present values of assets and liabilities for a hypothetical client assuming a 30-year retirement planning horizon. I noticed that the present value of the SPIA payments included on the balance sheet greatly exceeded the cost of the SPIA.

Let's modify the illustration from Table 1, in which the cost of the SPIA is $147,816. After buying the SPIA, Mike would calculate its present value to be included in his client's balance sheet. As mentioned, his balance sheet was based on a 30-year planning horizon, not on actual survival probabilities. Table 2 creates the calculations for the present value of the SPIA with a fixed 30-year planning horizon. What essentially happens is that the survival probabilities are assumed to be 100% for 30 years, and then they fall to zero. Calculating the survival-weighted present value with these alternative assumptions gives us a present value for the SPIA of $228,444. This is 54.5% larger than the cost of the SPIA.

In other words, the SPIA purchase immediately increased the value of the balance sheet assets by $80,628. And who said there is no such thing as a free lunch?

Table 2. Calculating the Present Value Annuity for a 30-Year Planning Horizon

Discount Rate:	2%					
Age	Income	Discount Factor	Discounted Value of Income		Survival Probabilities	Survival-Weighted Discounted Value
65	$10,000	1.0000	$10,000		1	$10,000
66	$10,000	0.9804	$9,804		1	$9,804
67	$10,000	0.9612	$9,612		1	$9,612
68	$10,000	0.9423	$9,423		1	$9,423
69	$10,000	0.9238	$9,238		1	$9,238
70	$10,000	0.9057	$9,057		1	$9,057
71	$10,000	0.8880	$8,880		1	$8,880
72	$10,000	0.8706	$8,706		1	$8,706
73	$10,000	0.8535	$8,535		1	$8,535
74	$10,000	0.8368	$8,368		1	$8,368
75	$10,000	0.8203	$8,203		1	$8,203
76	$10,000	0.8043	$8,043		1	$8,043
77	$10,000	0.7885	$7,885		1	$7,885
78	$10,000	0.7730	$7,730		1	$7,730
79	$10,000	0.7579	$7,579		1	$7,579
80	$10,000	0.7430	$7,430		1	$7,430
81	$10,000	0.7284	$7,284		1	$7,284
82	$10,000	0.7142	$7,142		1	$7,142
83	$10,000	0.7002	$7,002		1	$7,002
84	$10,000	0.6864	$6,864		1	$6,864
85	$10,000	0.6730	$6,730		1	$6,730
86	$10,000	0.6598	$6,598		1	$6,598

87	$10,000	0.6468	$6,468		1	$6,468
88	$10,000	0.6342	$6,342		1	$6,342
89	$10,000	0.6217	$6,217		1	$6,217
90	$10,000	0.6095	$6,095		1	$6,095
91	$10,000	0.5976	$5,976		1	$5,976
92	$10,000	0.5859	$5,859		1	$5,859
93	$10,000	0.5744	$5,744		1	$5,744
94	$10,000	0.5631	$5,631		1	$5,631
95	$10,000	0.5521	$5,521		0	$0
96	$10,000	0.5412	$5,412		0	$0
97	$10,000	0.5306	$5,306		0	$0
98	$10,000	0.5202	$5,202		0	$0
99	$10,000	0.5100	$5,100		0	$0
100	$10,000	0.5000	$5,000		0	$0
101	$10,000	0.4902	$4,902		0	$0
102	$10,000	0.4806	$4,806		0	$0
103	$10,000	0.4712	$4,712		0	$0
104	$10,000	0.4619	$4,619		0	$0
Present Value of the Annuity = Sum of Survival-Weighted Discounted Values:						$228,444

The mystery: Is this cheating? Does it make sense to value the SPIA on the balance sheet by more than its cost?

This can be justified, but it depends on the circumstances of the client. In one of the most important research articles written on retirement income, Moshe Milevsky and Huaxiong Huang's Spending Retirement on Planet Vulcan: The Impact of Longevity Risk Aversion on Optimal Withdrawal Rates from the March/April 2011 issue of *Financial Analysts Journal*, the authors discussed the idea of longevity-risk aversion. Essentially, this is how clients feel about outliving their financial assets. Milevsky and Huang argued that we could identify how longevity-risk aversion manifests itself by noting that risk-averse clients will plan for a longer life expectancy than dictated by any "biological/medical estimate."

So while the annuity may have been priced under a reasonable actuarial assumption that the median life expectancy for the client is about 18 years at age 65 (Table 1 shows that age 83 is when the probability of survival is about 50%), clients may very well wish to make their planning under the assumption that they will live for 30 years, or even more. In this case, the client could place a personal value on the SPIA that is otherwise higher than its market value.

While it may make sense for particular clients to do this, it is important to remain cognizant about what is going on from the balance-sheet perspective. In this framework, partial annuitization (through the purchase of a SPIA) immediately increases the funded ratio for the client as it creates a one-time increase in assets without any offsets on the liability side of the balance sheet.

Mystery 2: Why do SPIAs cause equity allocations to increase?

The second mystery (Why do equity allocations appear to increase when a SPIA is purchased?) comes from a research article I recently co-authored with Michael Kitces, The True Impact Of Immediate Annuities On Retirement Sustainability: A Total Wealth Perspective. The mystery is that when clients use part of their financial assets to purchase SPIAs and then maintain fixed asset allocations for their remaining financial assets, their equity allocation will usually rise over the retirement period from a balance-sheet perspective.

We have known since the 2001 classic article, Making Retirement Income Last a Lifetime, by John Ameriks, Bob Veres and Mark Warshawsky, that purchasing a SPIA with part of one's assets at retirement will reduce the failure rate for the portfolio and allow for larger bequest after enough time passes for remaining assets to grow in value.

But it turns out that from a balance-sheet perspective, partial annuitization ends up behaving as though it were a so-called bucket strategy, in which the retiree disproportionately spends down their fixed-income assets first, leaving their stocks to grow. The present value of remaining SPIA payments declines as retirement progresses and continued survival probabilities worsen. These factors cause stock allocations to increase as a percentage of the client's assets.

It also turns out that using a rising equity allocation results in lower failure rates (i.e., the possibility that the client will outlive his or her assets) for portfolios. Rising equity allocations reduce client vulnerability to sequence-of-return risk, since the stock allocation is less at the time the client's retirement, when the client is most vulnerable to an absolute loss in wealth.

Partial annuitization has two effects. The effect arising from this rising equity allocation can be mimicked without a SPIA by simply using a rising equity allocation with a portfolio of stocks and bonds. The second impact of partial annuitization is the real value provided by the SPIA: its longevity protection and mortality credits provided to those living beyond their life expectancies.

SPIAs do indeed provide benefits to their owners, such as longevity protection. But one needs to live well past life expectancy before the unique benefits of SPIAs can be enjoyed.

Inflation-adjusted SPIAs look a lot better than fixed SPIAs when viewed with the balance-sheet approach. They provide lower failure rates, and more of their benefits come from mortality credits, as they don't provoke as steep a rise in equity allocation as do fixed SPIAs. Earlier research, including an article I wrote about the efficient frontier for retirement income, gave too much credit to SPIAs by comparing them to a stock/bond strategy that maintained a fixed asset allocation without accounting for SPIAs' rising equity allocation.

This mystery becomes clear once one thinks in terms of the household balance sheet.

The bottom line

Strategies for the withdrawal phase of retirement require a different thought process than for when one is accumulating assets. The objective in this phase is not to maximize a risk-adjusted return, but to provide a sustainable income over an unknown length of time. Planning for this income requires a holistic process where issues are framed from the perspective of the client's household balance sheet. This requires advisors to quantify the present values of different cash flow streams, whether they represent income or expenditures. I have solved two important mysteries facing advisors when incorporating the present value of a SPIA in their client's balance sheet.

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