The Alpha of SPIAs

A new index illustrates the value of an income annuity

By Lowell Aronoff and Moshe A. Milevsky

Most practitioners understand that longevity insurance—whether in the form of a single premium immediate annuity (SPIA) or a defined benefit pension, or even the guaranteed withdrawal benefit within a variable annuity (VA)—provides income that can't be outlived and is therefore an important part of an optimal retirement portfolio.


Milevsky

The pooling and sharing of longevity risk—the risk that an individual will live longer than their assets last—allows clients to transfer liabilities from their personal balance sheet to the insurance company's corporate balance sheet. In this article we show how annuitization, properly measured, can also increase a portfolio's investment return. We do this with a metric we call the Implied Longevity Yield (ILY).

This article is aimed at the large community of financial advisors—more comfortable with the capital markets language of alpha and beta—who remain unconvinced about the value of annuitization and consequently may be providing consumers suboptimal advice. We pose the question: Can a systematic withdrawal plan (SWiP) that is composed of a portfolio of equities and fixed income assets truly beat an alternate plan where some of the fixed assets are used to buy a SPIA?

A Case Study: Understanding the ILY

Let's start our analysis with Mr. Client, a 67 year-old male in average health who is about to retire and desires an additional $4,000 per month beyond his Social Security benefits. We start by ignoring the impact of income taxes, inflation and a possible spouse but revisit these important details in the conclusion.

According to data provided by **CANNEX Financial Exchanges** in November 2008, Mr. Client could purchase a life SPIA with a five-year period certain that pays $4,000 per month for the sum of $498,471.

If Mr. Client simply waits a few years, the upfront cost of $4,000 per month for life would decline. This is an actuarial axiom due to the lower remaining lifespan. In fact, if interest rates remain at their current level the cost of a monthly $4,000 for life at the age of 70 would be $464,866. And, at the age of 75 it would fall to $408,826.

At a first naïve glance one might be tempted to delay annuitization until the cost is lower. But of course, to be indifferent, Mr. Client would have to generate the same monthly income of $4,000 from total portfolio returns. Is this achievable?

What is the total return that Mr. Client must earn during the delay period in order to generate the same $4,000 in monthly income and still have enough in the portfolio to purchase the same income stream at the end of the waiting period? We define this to be the implied longevity yield (ILY).

In the above case, the answer is that 67-year-old Mr. Client would have to earn 7.33% each year until the age of 72, and 7.25% each year until the age of 77, in order to beat the annuity. How do we know this? Well, one could approximate this with the internal rate of return of a series of cash flows. A more precise answer requires some advanced calculus.

Either way, Table 1 (below) displays ILY values for a variety of ages and waiting periods. The spread between the ILY and the return available from a risk-free instrument is a measure of the SPIA's investment alpha.

The return that must be earned to beat the annuity (the ILY) is higher for males than females. Intuitively, this is because males are more likely to die during the waiting period. And, since longevity risk is pooled, the principal and interest are shared among a smaller expected number of survivors.

ALPHA, *cont. on page 16*

Thresholds for Beating a SPIA's 'ILY'

Gender, age at proposed time of SPIA purchase	Average annual portfolio return on a $500,000 premium needed in intervening years to justify delaying SPIA purchase for:		
Male	**5 Years**	**10 Years**	**15 Years**
62	6.07%	6.07%	6.04%
67	6.54%	6.46%	6.30%
75	7.79%	7.22%	6.63%
Female			
62	5.81%	5.81%	5.80%
67	6.07%	6.06%	6.03%
75	6.98%	6.77%	6.45%

Source: Cannex

What are the probabilities (in %) that portfolio A or B would beat these five annualized returns over these three time periods?

Portfolio A: 100% Equity

Annual return	5 Years	10 Years	15 Years
6.5%	56.7%	59.4%	61.4%
8.0%	50.0%	50.0%	50.0%
9.5%	43.3%	40.6%	38.6%
11.0%	36.9%	31.8%	28.1%
12.5%	30.7%	23.8%	19.2%

Portfolio B: 70% Stock/ 30% Bond

Annual return	5 Years	10 Years	15 Years
6.5%	53.7%	55.2%	56.4%
8.0%	44.8%	42.7%	41.1%
9.5%	36.2%	30.8%	27.0%
11.0%	28.2%	20.7%	15.9%
12.5%	21.1%	12.9%	8.3%

Source: Lehman Corporate or Aggregate index

Assumptions: A nominal expected growth rate (geometric mean) of 8% (reflecting the long term historical performance of the S&P 500) from all equity portfolio (after all fees) and 7.1% from the 70/30 portfolio.

ALPHA, cont. from page 15

Consequently, the ILY is higher since the male must earn a greater return to meet his withdrawal requirements and afford the SPIA at the end of the waiting period. The same effect results in a higher ILY for older ages since an older person is more likely to die during the waiting period.


Aronoff

Portfolio: What Are The Odds?

Can a diversified portfolio beat these rates? First, let's consider the payout rate from alternative fixed income instruments that do not offer longevity protection. In mid-November 2008, the yield of risk-free U.S. treasury bonds was 2.5% for 5 years, 3.8% for 10 years and 4.5% for 20 years, according to the **Federal Reserve.** Thus, it would be difficult for the groups summarized in Table 1 to achieve the required returns by investing in risk-free treasuries.

Would incorporating equity/stocks with higher growth potential allow the client to beat the ILY? In Table 2 (above) we provide a probabilistic analysis, based on the long-term performance of the S&P. It gauges the probability that a diversified portfolio will exceed a given annualized rate over a period ranging from 5 to 15 years.

For example, a 70% equity/30% bond mix has only a 55% chance of earning an annualized rate greater than 6.5% over the next 10 years. The same portfolio has a 42.7% chance of achieving an 8.0% return. While the portfolio may have the growth potential to exceed the ILY, there is a substantial risk of shortfall. In sum, it is difficult to find an alternative investment vehicle that offers such high yields at advanced ages.

Putting it All Together

While a SPIA may be amongst the least liquid investment products, it provides a higher alpha than similar investments that do not have longevity protection, such as bonds issued by government or highly-rated companies. Similarly, a portfolio allocated to a mix of equity and bonds has a low probability of exceeding the ILY at advanced ages.

On an after-tax basis the SPIA odds are even better. An income annuity purchased with non-qualified funds is taxed more favorably, because the IRS allows a portion of each payment to be considered repayment of principal and not subject to tax.

The Implied Longevity Yield (ILY), an analogue for the SPIA's alpha, is a metric that allows professionals to quantify the cost of delaying annuitization and therefore helps determine whether a SPIA belongs in the client's retirement portfolio. *rir*

Lowell Aronoff is CEO of **CANNEX Financial Exchanges Limited** and can be reached at Lowell.Aronoff@cannex.com.

Moshe Milevsky is an associate professor of finance at **York University** and executive director of the **IFID Centre.** He can be reached at milevsky@ifid.ca.

The CANNEX-IFID Annuity Index, which tracks the spread between the ILY and the yield of 10-year Canadian Treasury bonds, can be found at ifid.ca/payout.htm. ILY is a registered trademark of CANNEX Financial Exchanges.

The actuarial mathematics behind the ILY are described in "Implied Longevity Yield: A Note on Developing an Index for Payout Annuities", *Journal of Risk and Insurance*, 2005, Vol. 72(2), pp. 301-320.