The Annuity Decision

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An increasing number of baby boomers are in the retirement transition period, those few years before and after retirement when long-range plans are drawn up and, as has been pointed out by Dr. Moshe Milevsky[1], the effect of poor returns in the first decade of retirement is magnified. "It should be quite clear from our analysis that the first decade of retirement is a sensitive and fragile period regardless of who you are and how much you are spending. Once again, poor market performance during the retirement risk zone can decimate an investment portfolio."

This is due to the sequence of returns risk. If we have a permanent portfolio from which no money is drawn, the value at the end of any given period is determined by multiplying the initial value by the return factors for each year – it makes no difference whether good returns are experienced first or last.

In the presence of annual cash withdrawals, it is much more to an investor's benefit to have the higher returns at the beginning of the period than at the end – since a withdrawal of a fixed amount at the end of the first year represents a smaller proportion of the total portfolio.

There are a number of ways that this risk can be minimized. One method is increased investment in long-term bonds – a thirty-year bond with a 5% coupon will (barring default) provide cash returns of 5% annually for thirty years and return its principal at the end of the period, regardless of the sequence of price gyrations in the interim. Another popular method is annuitization.

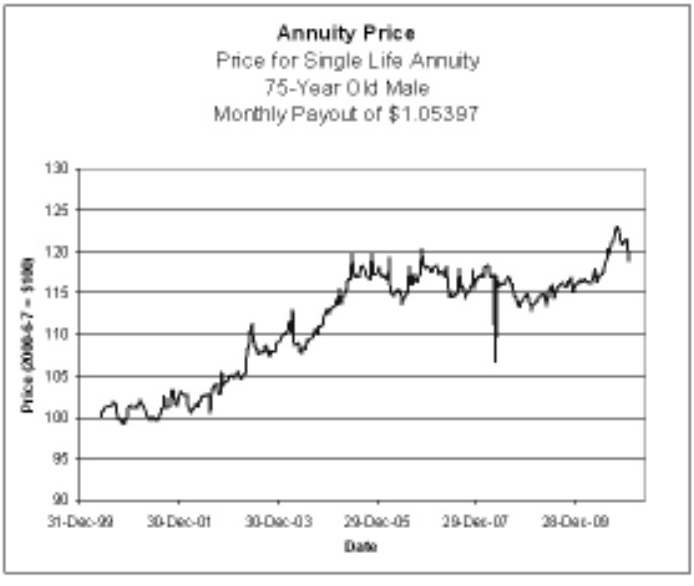
A Brief Description of Annuities

Annuities are a financial product in which the purchaser buys an income stream for life. At current rates (available via http://www.canadianbusiness.com/my_money/rates/index.jsp?ref=ln) a 75-year-old male can pay $100,000 to an insurance company and receive in exchange their promise that they will pay him a certain amount of money every month for life – rates vary, but $875 per month is a reasonable average currently. This is an annual rate of 10.5%, which sounds very generous, but a large proportion of this is return of capital – or, if one lives long enough, the return of other people's capital.

Annuities can be purchased with a guaranteed payout period, so that even if the purchaser dies, his heirs will continue to benefit from the investment throughout the guarantee period. This is an expensive choice: if the 75-year-old client wishes to purchase a ten-year guarantee, his monthly payout will be reduced to about $750 or, to put it another way, the cost of monthly income of $875 will increase from $100,000 to $117,000. He has, essentially, spent $17,000 on life insurance.

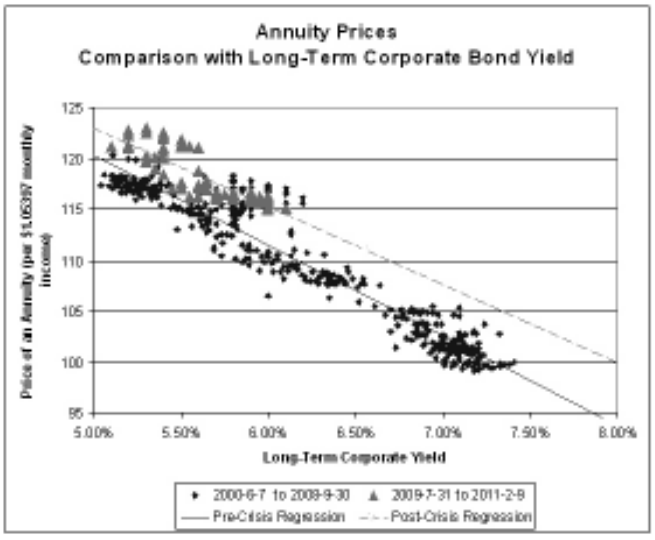
The Pricing of Annuities

The price of an annuity will vary dramatically according to market conditions. Using the excellent data available from http://www.ifid.ca, Chart 1 illustrates the historical price of monthly payments of $1.05397 (I chose this rather odd figure because that made the first price, dated 2000-6-7, exactly $100).



To understand the variance, we must return to first principles and our other choice for ensuring a long-term income stream.

When an insurer receives a payment for an annuity, they must invest the funds themselves, and the bulk of these funds will be invested in medium-term (5-10 years) and long-term (more than 10 years) bonds. Chart 2 compares annuity prices with the yield on long-term corporate bonds.



Like Gaul, the available data is divided into three parts. The first part is the period from June 2000 until June 2008, ie. the "pre-crisis period"; the second covers the period of the financial crisis from July 2008 until July 2009 during which the relationship between yields and annuity prices broke down (a lot of long-standing relationships broke down around then!), and the post-crisis period from August 2009 until February 2011. Data from the crisis period are not shown on the chart.

Correllations are very good: about 92% pre-crisis (which means that 92% of the variance in annuity prices can be explained by the variance in long-term corporate bond yields), while the post-crisis correlation is about 72%.

Further, we can estimate the Modified Duration (see *Canadian MoneySaver*, May 2007) of annuity prices at about 8.9 in the pre-crisis period and 7.7 post-crisis, which means that a 1% change in long-term corporate yields (for instance, from the current level of about 5.6% to either 4.6% or 6.6%) will cause the price of the annuity to change by 8.9% (using pre-crisis data) or 7.7% (post-crisis data).

It also seems that insurance companies have increased the price of annuities in the post-crisis period but this conclusion will have to remain tentative until more data is available.

Annuities as an Investment

We can estimate the value of annuities as an investment by looking at the profitability of annuities to their issuers.

Longevity data is available all over the Internet. I used the U.S. Government's Social Security Life Table, prepared using data from 2005. Data provided there show that for every 100,000 males born, 60,102 will live to age 75. So I performed calculations starting with the purchase of 60,102 annuity contracts for a 75-year-old male and calculated the cash flows that would result over the years as the population declined with standard mortality (the last survivor lasts another 35 years to age 110).

As it turns out, the internal rate of return for this sequence of cash flows is 0.8%. In other words, the insurer only has to earn 0.8% interest on the invested capital to meet its obligations – anything extra is gross profit. That's a pretty nice business!

We may conclude that annuities are a very poor investment for those with average longevity expectations, but that doesn't mean we should ignore them.

Annuities as Insurance

Retirees do not have perfect foreknowledge of the date of their demise. The risk that their capital may run out is a constant worry. On the other hand, many people wish to spend as much as they can during their retirement years, ideally dying broke. The uncertainty of longevity is a great unknown that makes it impossible to make precise plans.

This is where annuities shine. An annuity purchaser who is unfortunate enough to be hit by a bus five minutes after signing the contract has realized a loss of 100% on his investment, but if he lives twenty years following purchase (longer than expectation, but still well within the realm of possibility), he will realize a rate of return on his investment of 9.44%, assuming a contract rate of $904.35 monthly per $100,000 invested. I will suggest that it is currently impossible to find any investment that will give such a high rate of return with the same degree of safety.

Investment Conclusions

Annuities are a poor investment, but annuities are excellent insurance. Consideration of these factors leads one to believe that one should minimize annuity purchases, subject to maximizing the probability that the retirement portfolio plan meets its objectives.

Annuities should be considered for inclusion in a retirement plan to the extent that they are required to prevent the depletion of capital through sales of other assets. Note that for discussion purposes, I am assuming the investor wants to retain capital, which can be bequeathed to heirs or used to provide flexibility as the retirement period unfolds.

Consider an investor with $100,000 in free capital who wishes to spend the equivalent of $8,000 annually of pre-

tax income in perpetuity. His investment choices are long-term corporate bonds at 5.5%, or an annuity paying $875 monthly ($10,500 annually) per $100,000 invested.

He should not invest his entire nest egg in corporate bonds because in order to meet his spending goals he will have to sell assets annually. This will expose him to sequence of returns risk, which will greatly magnify the chances that his retirement plans will fail.

On the other hand, he should not put the entire lump sum into an annuity because this will deplete his free capital to zero. There will be nothing to bequeath to heirs and no flexibility to change his plans at a later date should his circumstances change. He could save his excess income, but that merely reverses the sequence of returns problem.

Instead he should, as the initial stage in a comprehensive financial plan, get one of his grandkids to do a little algebra:

$$5.5\% \times C + 10.5\% \times A = 8{,}000$$
And
$$A + C = 100{,}000$$

Here C is the amount invested in long-term corporate bonds, A is the amount invested in the annuity, 8,000 is his desired annual pre-tax income and 100,000 is the total amount to be invested, as earlier specified. If his grandchild has been paying attention in math class, he will come up with the answer: the portfolio that meets this objective is a 50-50 split between corporate bonds and an annuity. The annuity will then provide payments of $5,250 annually and the bonds $2,750 to meet the required total of $8,000. The risk of capital depletion has been addressed by channeling all the required use of capital through the annuity, and a great deal of flexibility remains since half the capital remains in the client's hands. Any problem with sequence of returns risk has been deferred until the maturity of the bonds – which can quite reasonably be chosen to be thirty years.

Naturally, further elaboration is necessary. There is the risk of inflation and there are taxation complications to name but two obvious improvements to this simple model. But this example should provide a place to start.

[1] Moshe A. Milevsky and Thomas S. Salisbury, *Asset Allocation and the Transition to Income: The Importance of Product Allocation in the Retirement Risk Zone,* available online at http://www.ifid.ca/pdf_workingpapers/WP2006OCT3.pdf

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