QWeMA GROUP INC

Vol 1.-Issue 6-August 2011

Retirement Income: Analyzed

Retiremen: Income Analyt:cs Newsletter from The QWeMA Group

Question of the Month: My client has unrealistic expectations regarding how much he/she can spend during retirement, given the size of their nest egg. They just do not have enough. What is the best way to explain this to them? How **sustainable** is their retirement income plan if they do not reduce their standard of living?

Answer:

Unfortunately, a growing number of the financial planning tools that are widely used to answer this and related retirement "sustainability" questions often give overly optimistic results, which then culminate in a false sense of security that indeed your clients do *have enough*, when in fact they don't.

One of the by-products of the embedded faulty logic is that lifetime income products - specifically life annuities - often get the short-end of the stick when viewed thru these tainted lenses. In other words, your clients might actually have enough – but only if they are willing to allocate a substantial portion of their nest egg to life annuities. More on this later. First, let us look at the cost of retirement.

Let us start with some basic retirement arithmetic. Imagine your client is exactly 65 years old and he/she would like to retire today. Besides the entitled income from government and corporate pensions, they have determined they need an additional cash-flow of $1,000 per month ($12K per year) for the rest of their life. We will assume that they (and you) are not fooled by, or suffer from, what economists call "money illusion" and that these monthly desires are expressed in real inflation-adjusted terms (i.e. today's dollars).

So, how much of a lump-sum nest egg do they need today, to generate this specified stream of income for the rest of their life?

Fortunately, *this* limited question is easy to address without any complicated retirement analytics or software. The route to an answer begins with a present value analysis that *assumes* an investment return and *assumes* an investment horizon. Once you make these two assumptions, any business calculator can provide you with an answer. Ergo, we have taken the liberty of displaying some values below in Table 1, under a variety of life horizons and investment returns.

In order to calculate the required size of the nest egg, we have applied the following formula. This function describes the present value of a term certain (non-random) annuity discounted at the appropriate rate in continuous time.

$$PV(C,R,D) = C\frac{1-e^{-R(D-Age)}}{R}$$

In this case, 'C' represents, consumption or $12,000, 'R' represents the appropriate real interest rate, 'D' represents the number of years in retirement and 'Age' represents the age of your client.

Of note is the fact that the aforementioned formula collapses when R is equal to zero. In which case, time value of money formula is not applicable and the values presented in the table are a simple product of annual income and years in retirement. We must also highlight the fact that the values in the table have been rounded to the nearest hundred dollars.

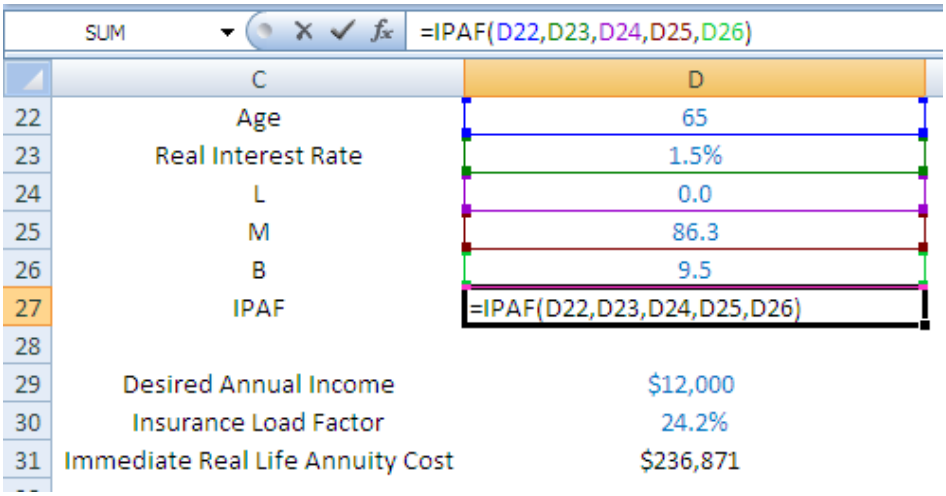
Table 1 provides values assuming investment returns of 0%, 1.5%, 4.0% and 6.5% and income plans that last to age 84, 90 and 97. We have selected these odd-looking numbers deliberately, for reasons will soon be clear.

Table 1

What Size Nest Egg Do You Need?
Retiring at Age 65 and Requiring $1,000 of Monthly Income for Life

		REAL Inflation-adjusted Investment Return (Interest Rate)			
	Age	0.0%	1.5%	4.0%	6.5%
Invest & Plan to Life Expectancy:	84.2	$230,500	$200,300	$160,900	$131,600
Invest & Plan to 75th Percentile:	90.1	$301,700	$251,300	$190,300	$148,600
Invest & Plan to 95th Percentile:	97.1	$385,100	$305,700	$216,900	$161,700
Purchase (REAL) Life Annuity:		N.A.	$236,900	N.A.	N.A.

Also within Table 1 is an estimate for the cost of a $1,000 per month life annuity, purchased at the age of 65. By using the **IPAF function** in **QVEL**, which provides an estimate of the fair value of what an individual should pay today to receive $1 per year for the rest of their life, in the screenshot below, we demonstrate that by multiplying the **IPAF** value by desired annual income and grossing this product up by an insurance load factor (which accounts for risks, profit margins, anti-selection etcetera), we create an estimate for the cost of the aforementioned annuity. Note that this particular number is harder to obtain – a business calculator and the above-mentioned present value formula isn't enough – and you probably have to call your favorite insurance company for that one. This aforementioned product works out to a value of approximately $236,900 in today's environment. Of course, this value is subject to change with adjustments in any of the input parameters and therefore should not be taken as absolute. Also of note is the fact that all of the input values in the screenshot below have been rounded to the nearest tenth decimal place.



We will say more about the implication of the annuity number, in a moment.

Here is how to read and interpret the table. If you are retiring at the age of 65 and would like an income stream until life expectancy, which is age 84.2 – after which, we presume, you plan to shoot yourself -- and this money is invested at a rate of 1.5%, then you need a nest egg of a little over $200,000 at retirement. So says the math.

If you don't trust the present value formulas then go ahead and build a spreadsheet to convince yourself that $200,000 invested at 1.5%/12=0.125% monthly (plus inflation) that experiences monthly withdrawals of $1,000 (plus inflation), will exhaust itself in exactly 19.2 years, which is precisely the 50% mark on the longevity tables.

Now we deliberately selected 1.5% as the investment return in the above paragraph, since it is the best rate you can actually guarantee in today's environment on an after-inflation basis. Note that in late July 2011, long-term inflation-linked (U.S Government) bonds are yielding 1.5%. We all might believe this is artificially low, but it is the best you can get if you want something that is guaranteed.

Of course, if you worry about things that have probabilities smaller than 50% -- like living beyond life expectancy – and you plan your retirement to the 75th percentile, which is age 90, then you need a retirement nest egg of approximately $251,000. This will generate the $1,000 monthly income for the extra six years. Stated differently, the present value of $1,000 per month until the age of 90 is $251,000 when discounted at 1.5%. If you worry about events with probabilities smaller than 25% and you plan to the 95th percentile of the mortality table, which is age 97, then you need a nest egg of approximately $306,000 to generate the $1,000 of monthly income.

This is a basic application of the time value of money, given today's interest rates. Of course, most people look at the $306,000 price tag for a meager $1,000 and balk, or they get very depressed. Scale this up by a factor of 10, for those who want a monthly income of $10,000 and retirement will cost a cool $3 million, if you want the money to last to the age of 97- which is the 95th percentile of your lifespan.

Enter the retirement planning software used by confused (or unscrupulous) advisors and they have a better and more soothing answer. If you invest more aggressively then you don't need to use the small, pathetic and depressing 1.5% real return column in the above table. If, they say, you purchase more equity-based mutual funds, or invest more heavily in stocks, then you are entitled to use the much higher 6.5% column – "*Because in the long run, stocks have averaged 6.5% after inflation, even if you include the fees I will be charging*."

So, if you are willing to take a bit more equity market risk, all you need is $131,600 at retirement if you plan to life expectancy. And, even if your retirement horizon is age 90, then all you need is $148,600 at retirement, per $1,000 of monthly income. As for age 97, don't worry about it (they say). Most people don't reach that age.

And, if you only have $100,000 in your retirement account and you absolutely must have $1,000 per month until age 85, here is another way to make the numbers dance:

If you surrender to the 1.5% return (by investing very safely), then your so called "coverage ratio" will be $100,000/$200,300 ≈ 50%, which is the relationship between what you *have* and what you *need*. This means that you can only cover 50% of your desired income. That's your current (very safe) portfolio. On

the other hand, if you invest very aggressively – which then entitles you to use a 6.5% return -- your coverage ratio can increase to $100,000/$131,600 ≈ 76%. We believe this is the wrong approach.

Assuming a more aggressive portfolio, in the hopes that you can move to the upper right-hand corner of the table -- and hence require a smaller nest egg for retirement -- is a mirage. You can't tweak expected return (a.k.a. asset allocations) assumptions until you get the numbers that you like.

Very low real interest rates, such as 1.5% currently available, translate into a high cost of retirement, and vice versa. Betting that these rates will eventually go back to normal, or that equity markets will make your retirement cheaper, is just that, betting. In fact, this sort of thinking is precisely the mistake that got the pension fund industry (and many of their actuaries) into big trouble.

Here is one of the axioms of financial economics. If you are going to assume a higher expected investment return – like 6.5% -- compared to what is available with no risk, then you must also allow for the possibility that things will not work out and you might earn much less than expected. Average the two scenarios – and account for this risk properly – and you are left exactly where you started, namely the present value of your $1,000 under a risk-free return is $230,500 if you plan to life expectancy and $385,100 if you plan to the 95th percentile.

If you do not like how big this number looks – and you want certainty -- then save more, retire later and plan to spend less. Assuming, expecting or anticipating 6.5% and/or planning to age 90 (only) won't solve a structural funding problem. Greece is a nice place to retire, but not a very good role model for how to manage retirement finances.

Now let us get to the second of two points, which is the estimate for the cost of a real inflation-adjusted life annuity, displayed in the final row of the table.

Here is a fact: If you spend $236,900 on a life annuity from an insurance company, it will generate the desired $1,000 per month income – adjusted by the consumer price index -- with no investment or mortality risk. You do not have to *assume* how long you will live or *assume* what your portfolio will earn over the random horizon of retirement.

As such, the $236,900 is effectively the cost of your retirement income plan. Any other answer involves extra risk, possibly invisible to the naked eye. It is often obscured from view due to heroic assumptions hardwired into financial calculators.

SUSTAINABILITY

Given the aforementioned discussion, let us examine the impact of various annuity product allocations on an individual with a $236,900 nest egg seeking $12,000 annually. Clearly, if you allocate 100% of your nest egg to the annuity product, so that the entire $1,000 per month comes from the annuity your Retirement Sustainability Quotient (RSQ) is 100%. There is no risk of outliving your wealth.

That being said, what if you want to plan for fixed horizon? Let us assume that you plan to life expectancy and are curious about how Pensionizing™ 75%, 50% or 25% of your nest egg will influence the ruin probability of your strategy while the residual is invested in a portfolio that is EXPECTED to earn 6.5% after fees with a volatility of 20% per year.

Within this deterministic framework, the question becomes: What is the probability of being ruined at any time *before* the end of your planning horizon? Using the **PrCrossingSWiP** function in **QVEL** will answer this question. The screenshot below provides one example of how to call the aforementioned function in Excel. This example provides the ruin probability of the SWiP account for a 65 year old planning to life expectancy, consuming $9,000 annually from their account, while their wealth is invested at an expected return of 6.5% net of fees and a volatility of 20% annually.

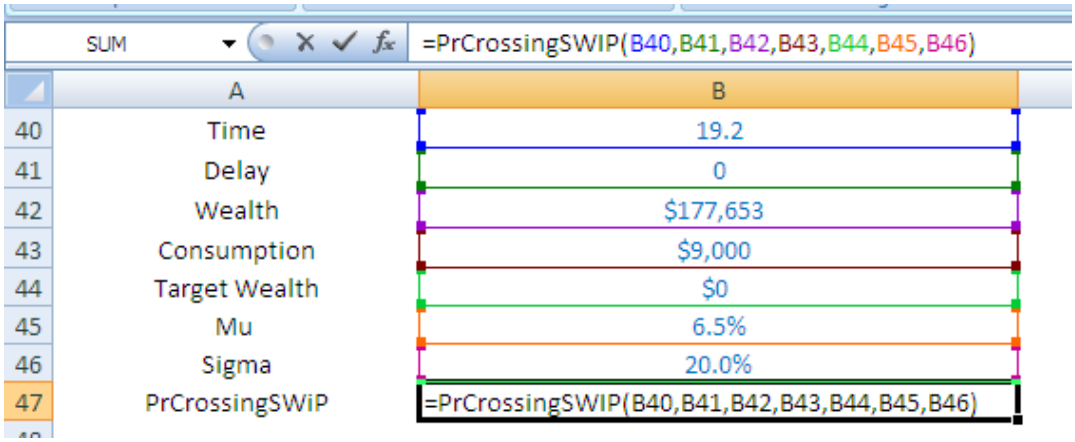


Table 2 below demonstrates the results of all of the other cases. This table demonstrates that regardless of the SWiP withdrawal, the ruin probability remains constant; which may comes as a surprise. The constant probability is attributable to the fact that there is a constant spending rate from the SWiP account. As the ratio of the annual SWiP withdrawals to the amount allocated to the SWiP account changes, they change in an equal proportion, thus, causing no change in the ruin probability.

Table 2

			SWiP Ruin Probability		
Percent Allocated to Annuity	Annual Withdrawal From SWiP	Spending Ratio	Invest & Plan to Life Expectancy:	Invest & Plan to 75th Percentile:	Invest & Plan to 95th Percentile:
			84.2	90.1	97.1
25%	$9,000	5.07%	20.54%	33.18%	43.34%
50%	$6,000	5.07%	20.54%	33.18%	43.34%
75%	$3,000	5.07%	20.54%	33.18%	43.34%

In a more realistic framework, where the retirement planning horizon is truly unknown, Table 3, presented below, demonstrates how RSQ increases with a larger allocation to the annuity. As in the deterministic framework, as the allocation to annuities increases, the LifeTime Ruin Probability **(LRP in QVEL)**, which calculates the probability of the SWiP account being ruined while the individual is still alive, remains constant. The increase in RSQ, which is defined as the quotient of income sources weighted by the probability of receiving the source of income to desired income, is attributable to the unseen risk of longevity and the larger weight given to the annuity in the numerator of the ratio. Realize that regardless of the annuity allocation, market risks remain constant. However, as the allocation to annuities

increases, the individual forgoes the risk of outliving the portion of their nest egg allocated to the SWiP account and relies more heavily on a guaranteed source of income, thus, increasing their RSQ.

Table 3

Percent Allocated to Annuity	Annual Withdrawal From SWiP	LifeTime Ruin Probability	RSQ
25%	$9,000	20.13%	84.90%
50%	$6,000	20.13%	89.94%
75%	$3,000	20.13%	94.97%

Ultimately, as we have demonstrated, assuming a more aggressive rate of return – or planning to some arbitrary age -- and then claiming that retirement has suddenly become "cheaper" is a dangerous fallacy that will end up costing many retirees quite dearly. Ask anyone who assumed a 6.5% investment return over the last decade – or the 100,000 American centenarians -- how *their* retirement is panning out.

More importantly, a life annuity should not be viewed as just another (expensive) way to finance a retirement income or worse yet, as just one possible tool in a growing arsenal of products. Rather, the annuity price is actually a market signal of what retirement really costs. And, it is the *cheapest and safest way* to convert a nest egg into a lifetime of secure income. Market prices convey information and the cost of a life annuity is a hard-drive full of intelligence.

Alas, the real dilemma is what fraction of your nest egg you really want to allocate to actual retirement – and eventually convert into some sort of life annuity – and what fraction should be allocated to the kids, the grandkids and beyond, perhaps using life insurance and other estate transfer tools. *That* is a personal decision that has less to do with expected returns and probabilities and everything to do with personal preferences. Extracting this information from clients in a consistent manner is precisely where advisors can really add value.

This month's newsletter was written by Moshe A. Milevsky together with Simon Dabrowski.

A condensed version of this article will appear in the September version of Research magazine, available on line at http://www.advisorone.com/