The Dangerous Retirement Calculator Assumption
An Assumption That Makes an Ass out of U and Me

"Never assume, boy, because if you do you'll make an *ass* out of *u* and *me*."

The first time I heard that line was on some TV show in the sixties when I was just a boy. Whoever said these words (Lucille Ball, maybe) had written the word "assume" on a chalkboard. As she said the sentence she underlined the *ass*, then the *u*, then the *me*.

Assumptions can get us into trouble, no doubt about that.

The issue at hand is the current state of software tools which promise to show you how much money you need to retire, and what kind of lifestyle you can expect. While the best of these tools do offer a valuable service (in that they force you to consider every aspect of retirement), they are doing a disservice in that they might be too optimistic with the projections they make.

What causes these programs to be too optimistic? Their projections are based on constant inflation rates and constant investment return rates. Let me explain.

Two of the key assumptions in making projections about your retirement finances are rates of inflation and rates of investment return. I have looked at several retirement calculators and every one of them makes the same assumption. They use historical data to find average annual inflation rates and average annual investment return rates for various broad categories of assets. Then, perhaps based on your designation for asset allocation or perhaps on some expected return rates you enter, these programs assume you will experience these rates of inflation and investment return every year into the future, the same inflation rate and investment return rate each year.

Unfortunately, inflation and the markets do not work this way. They vary up and down, sometimes dramatically. To assume they will remain constant in the future is just silly.

Is silly too strong a word? I don't think so. Consider these analogies from everyday life that show that projections based on averages are indeed silly:

- El Paso, Texas receives about nine inches a year in rain. If you go to El Paso would you expect to see 0.02465 inches of rain each and every day?

- The average man is about 5'10" tall. What would you think of a retailer that sold clothes that fit only this size man?

- Some events trigger great excitement; others make you bored. If you could predict how you'd feel in the future, would you expect to always feel ambivalent?

With respect to retirement planning, just how misleading are projections based on constant rates of return?

To find this out, I recently downloaded the latest, free tool offered by one of the major mutual fund companies. The download took about 30 minutes. After that, I installed the software and got to work.

The software was very nicely presented. The questionnaire was in depth, with many questions that made me think about aspects of retirement I hadn't considered before. There were business graphics showing how my fortune would grow over the next 30 years, and tables showing me how much my kids would inherit someday.

Then, though, I found the information I was looking for. I found how I could change the asset allocation of my portfolio to see how this change affected expected annual rates of return, and how this would in turn affect the ending value of my portfolio.

The program gave me three core assets to choose from: stocks, bonds and cash. I left cash out of the equation and decided to look at four portfolios consisting of stocks and bonds (see Table 1).

This program, like the other retirement planners I've seen, did not have a way to look at varying investment return rates or varying inflation rates. Instead, you pick your portfolio (or simply enter an expected rate of investment return) and your expected inflation rate and these rates are held constant throughout the simulation.

In my tests, I considered a fairly typical scenario, that of a retired, 65-year old couple. Their funding parameters are as follows:

- $1,000,000 in portfolio at time of retirement
- Withdraw 7% the first year and adjust by inflation each year thereafter
- 30 year life expectancy
- Inflation is 4.5% per year
- Taxes are not a consideration

Their hope is that they will not run out of money.

I tested each of the portfolios to see what the program would tell me about their future. Would they be able to sustain a withdrawal rate of 7% with annual adjustments of 4.5% a year? If so, how much money will be left in the account after 30 years?

I ran each portfolio in turn, and each time the program congratulated me, saying something like, "Based on your information and the assumptions we used you will have ample resources throughout your lifetime."

In each case, the withdrawal stream was the same: $70,000 the first year, then adjusted by inflation thereafter until a final withdrawal of $250,883 in the final year. The results of each portfolio are given in Table 1.

Table 1 - The Portfolios and How They Fared, According to the Retirement Calculator

Stocks	Bonds	Rate of Return	Ending Value
50%	50%	10.1%	$185,701
60%	40%	10.5%	$1,066,726
80%	20%	11.3%	$3,109,504
100%		12.0%	$5,488,532

Now we come to the crux of the matter. By assuming a constant inflation rate and constant investment return rate, have I lost some valuable information? Is the program indicating a bright future when in fact the retirement strategy is not sound?

To answer these questions I used a program called WAT$, from Jaye C. Jarrett & Co., Inc. This program calculates historical success rates for investment and retirement strategies using historical data.

For the data I used annual returns from Ibbotson Associates SBBI 1999 Yearbook. I used the Large Cap Index for the stock component and the Intermediate-term Government Bond Index for the bond component.

WAT$ runs investment simulations to answer the question, "Had you actually lived through a particular time in history, with your particular investment strategy and goal, would you have succeeded?"

I ran every 30-year period from 1926 to 1998 (1926-55, 1927-56, …, 1969-98, 44 observations in all) to determine the historical success rates and the average and worst-case ending values of the account, using the same funding parameters as used in the retirement calculator.

I ran the tests in two ways, first using a fixed rate of inflation (as did the retirement calculator) and then using actual historical inflation rates.

The results of the fixed inflation rate test are in Table 2.

Table 2 - The Portfolios and How They Fared, According to Actual Market Volatility and a Fixed Inflation Rate of 4.5%

Stocks	Bonds	Average Annual Rate of Return	Historical Success Rate	Average Ending Value	Worst-case Ending Value
50%	50%	9.32%	**0%**	-$2.4 million	-$3.3 million
60%	40%	10.09%	**0%**	-$2.1 million	-$3.4 million
80%	20%	11.63%	30%	-$0.99 million	-$3.5 million
100%		13.17%	41%	$0.88 million	-$3.7 million

The most surprising result is that, in the past 70 years, there has never been a 30-year period in which the retirement strategy in question would have succeeded using either the 50/50 or 60/40 stock/bond portfolios. Yet, the retirement calculator and its fixed return approach led us to believe we would succeed.

How do we account for this discrepancy?

Well, a small part of it is the average annual return assumed by the retirement calculator. With the 50/50 mix, the retirement calculator assumes a 10.1% of return, which is quite a bit higher than the 9.31% we get using equal amounts of Large Cap Stocks and Intermediate-term Government bonds. Still, this difference is not enough to take us from 100% success to 100% failure.

The larger part of the story is the assumption that you can and will earn the same rate of return year after year. Markets don't work like that. They move up and down, like the rainfall rates in El Paso.

One thing that especially hurts any retirement strategy is a poor return early in the 30-year cycle. In this case, not only does the account value drop as a result of the retiree's withdrawal, but it gets hit with a second drop from its poor performance. During the following years it is difficult, if not impossible, for the account to recover.

This event, of having a bad performing year early in retirement, is the reverse of dollar cost averaging. The idea is that the more money in an account, the greater the impact of a good or bad rate of return.

In terms of historical success, our best bet is 100% Large Cap Stocks. Even here, though, we obtain only a 41% chance of success.

How, then, can the retirement calculator suggest we can succeed with such strategies? They use a bad assumption that, if we believe them, makes an ass out of us.

I ran one other test. This time, in place of the fixed 4.5% inflation rate, I used actual inflation rates. So, instead of increasing withdrawals each year at a constant rate, I withdraw an amount equal to the prior year withdrawal adjusted by the prior year inflation rate. Using this method I guarantee that I will maintain buying power. The results of this test are in Table 3.

Table 3 - The Portfolios and How They Fared, According to Actual Market Volatility and Actual Inflation Rates

Stocks	**Bonds**	**Average Annual Rate of Return**	**Historical Success Rate**	**Average Ending Value**	**Worst-case Ending Value**
50%	50%	9.32%	14%	-$1.6 million	-$4.2 million
60%	40%	10.09%	32%	-$1.2 million	-$4.3 million
80%	20%	11.63%	41%	$0.17 million	-$4.4 million
100%		13.17%	50%	$2.2 million	-$4.5 million

Using actual inflation rates rather than a fixed 4.5% inflation rate results in historical success rates that are a little higher. Still, the best we do is 50% historical success.

Interestingly, although our success rates climb, or worst-case values get worse. This is because inflation rates, like the markets, vary quite a bit over time (from a low of -10.3% in 1932 to a high of 18.2% in 1946). Retirees who hit a period of both high inflation and poor market performance are in for some nasty surprises if they try to withdraw high initial amounts and if they try to maintain buying power.

What to do about all this?

The obvious conclusion is to not rely too heavily on retirement calculators. As we have seen here, they can be misleading. Another thing you can do is to review your position regularly to make sure you are on track. Finally, keep in mind that projections of any kind are based on assumptions. And you know what happens when we assume.

Study conducted by Zunna, Inc. using WAT$.

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