Do-It-Yourself Retirement Spreadsheets

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Virtually all those who know how to do a spreadsheet analysis eventually try to forecast their future using their own homemade program. Since this is inevitable, let me give you some hints how to improve your results.

Returns

The entire effort will be wasted unless you start with reasonable values for returns. This is so important, I'll say it again: Don't waste your time using investment returns that do not apply to your intended investment allocation and circumstances. For example, retirees use much more conservative allocations than people still in the work force. But even with the same allocation, a retiree is withdrawing money instead of depositing it. A regular depositor benefits from dollar cost averaging and effectively gets a higher return. On the other hand regular withdrawals effectively produce lower returns, an effect I call reverse dollar cost averaging. Generally, retirees will get about 1% lower return than savers.

The other key point about returns is that you must subtract transaction costs or mutual fund costs. Most financial services won't tell you to do this because it's in their best interest to think you will do better using their services. However, the average investor loses more than 1% of the return due to these costs, and variable annuity owners most often lose more than 2%. Only a few mutual funds and even fewer individual investors actually do better than the S&P 500 index due to these costs.

A security sales person may lead you to think you'll get 8% by showing you the return from an index that holds investments similar to the fund he or she is hawking. Subtract 1% (sometimes up to 5%) for the fund costs and 1% for reverse dollar cost averaging, and you are down to 6% return. Your investments will actually grow a LOT slower than the sales person indicates.

If near, or in retirement, you should also consider the chance you will have of succeeding. Many newly retired people get hit with bad losses in the stock market shortly after retiring. This is a devastating effect. A Monte Carlo analysis (more on this later) will help shed some light on the uncertainty in your forecast if properly done. One way or another, you should provide for this possibility. Common approaches are to use an even lower return and/or some reserves for such contingencies.

Although it's possible to do a competent analysis with after-tax returns, you should be aware that there are situations where it is better to use **before-tax returns**. If you have not yet retired and are paying all of your income tax from your wages, your savings will grow at a before-tax rate. People who have retired will find that if they do an analysis of a taxable account as if it were a deferred-tax account with before-tax returns, the results will be conservative compared to a detailed analysis in which taxable investments are analyzed separately from deferred tax investments.

Before-tax real return = (Actual return – Inflation) / (1 + Inflation).

Many of you will do a simplified analysis where you assume one return for every preretirement year and another return for every postretirment year. The preretirement real return can be based on conventional long-term historical results because (1) conventional real returns are based on saving scenarios, (2) savers benefit from dollar cost averaging, and (3) because a person can always work longer to get more savings if the actual results turn out to be less than predicted. Retirees don't enjoy any of those benefits and therefore should use more conservative returns. You might start by using one-half of what you would calculate using real returns that match your portfolio allocations.

A more sophisticated spreadsheet analysis will use a different return for each year. There are library references that will give you real return histories for major classes of securities, but you will avoid a lot of cumulative errors if you use an integrated index for returns (including reinvested dividends and interest). In effect, this index shows the growth of a $1 investment over the years in the historical data base. Adjust each year of this index by multiplying it by the ratio of the Consumer Price Index (CPI) in the first year divided by the CPI in the current year. Then, to get the real return, use the expression:

Real return in each year = (Ending adjusted value of the index – Beginning adjusted value of the index) / Beginning adjusted value of the index.

Finally, you must be sure to reduce real returns by whatever may be your estimate of transaction costs. Even the pros often miss this point. On the average, mutual funds have fallen about a percentage point lower than the index representing the mutual fund class, and only a few actually do better than the index. Even these few seldom achieve better performance more than a year or two in a row. All of this is because of their internal costs and broker/agent costs which together may be as low as 0.2% or even above 5% per year.

If you have a program that can do Monte Carlo analysis, you will get a better perspective of the variability is in retirement projections. However, be sure to use <u>real</u> returns in the statistical descriptions. Even with that, I still get squeamish about the fact that the Monte Carlo analysis will assume there is no serial dependence, that is, it doesn't care about the actual historical order of returns. To avoid this problem, you can set up your simulation using actual periods of past history in a Monte Carlo analysis. You can use this approach in a Monte Carlo program if you assume there is an equal probability of starting a scenario in each year of your data base up to the point where the ending year is the last year in the data base. In my poor man's Monte Carlo program, the Retirement Autopilot from www.analyzenow.com, I simply put a spinner so that you can quickly flash through fifty scenarios without investing in a Monte Carlo program. Monte Carlo programs are expensive and complex, but for those of you with the time and capability, they are a worthwhile addition if properly done.

Many of the commercial retirement programs that use Monte Carlo analyses either fail to use real returns for their statistical base or ignore transaction costs, or they fail to do either. Before making a financial commitment, know what you are getting.

Your returns are very dependent on your asset allocation. As people get older (and that may happen to you), they tend to get more conservative. That means you should really set up your model so that the percentage of stocks decrease each year, at least in retirement. For example, if your weighted average real return was (Stock %) x (Stock Real Return) + (Bond %) x (Bond Real Return), then each year you might reduce the Stock % by 1% and increase the Bond % by 1%.

Fixed Pension or Annuities

If you have a fixed pension or annuity, you realize that its value will decrease each year. When you use real returns, you will have to account for this reduction either by assuming some conservative value for inflation, or, if you are using an annual simulation, by the actual inflation of each particular year. I've found the easiest way to do this is to use the actual Consumer Price Index (CPI) histories to make the adjustments. Then the value of a fixed pension is equal to the initial value times the ratio of the initial CPI to the CPI in the current historical year. Make sure you understand the basis for an employer's estimate of a future pension.

Investment Balances

Whether you are using financial equations or your own compounding calculations, you should account for the fact that deposits and withdrawals are made throughout the year, not all just at the beginning of the year, or all just at the end of the year. This is really simple to do with a spreadsheet analysis where each year is a separate row on the spreadsheet. Here is the equation:

End of the year balance = (Beginning of year balance + 0.5 x deposits – 0.5 x withdrawals) x (1 + Return for the year) + 0.5 x deposits – 0.5 x withdrawals.

When applying the equation, you collect all of the deposits for the year (savings, Social Security, pensions, special payments, etc.) and all of the withdrawals for the year (retirement living expenses, special expenses, income taxes, and debt payments) for entries.

Special Situations

You can provide a lot of program flexibility by using logic equations. (I've been using Microsoft Excel for so many years, that all of the examples below are based on their formats using f_x on the Excel toolbar.

Let's illustrate a typical logical expression. These are usually in the form of:

If you want something when a particular even happens, then you will get result A, otherwise you will get result B.

For example, if you want annual payments of $10,000 to start after age 61, you can represent the payment with the expression:

If(Age > 61, XN, 0) where XN is the cell where you entered $10,000.

(In MS Excel, the $ sign indicates an absolute cell reference instead of a relative cell reference.)

Or if you expected to buy a car at age 65 for $30,000, you could use the expression:

If(Age = 65, XN, 0) where XN is the cell where you entered $30,000.

Or if you wanted to include annual long-term health care costs of $50,000 per year for ages 91 through 93, you could use the expression:

If(and(Age>90, Age<94), XN, 0) where XN is the cell where you entered $50,000.

Often it's useful to be able to pick up values from a table. Examples here could be life expectancies for IRA required minimum distribution or the return for a particular year. If you only have two columns, say one column listing years and another listing the returns for those years, you can use the following expression to get the return for a particular year:

Lookup(Year, $Top cell in the first column : $Last cell in the second column)

Or if you have more than two columns, say, the first column is age, the second is single life expectancy, and the third is Minimum Distribution Incidental Benefit (MDIB) life expectancy, and you want the MDIB life expectancy, you can use the expression:

Vlookup(Age, $Top cell in the first column : $Last cell in the last column, 3)

where the 3 in the expression means you want to look in the third column.

There are a number of other equations built into spreadsheets that are useful, but the last one I'd like to mention that is especially so, is Microsoft's Goal Seek. I often use Goal Seek to compute real returns in withdrawal scenarios because those kind of returns are not published anywhere. More likely you might use Goal Seek to find the level of preretirement savings needed to get to some investment balance at the beginning of retirement or perhaps postretirement expenses that would completely exhaust your investments on the last day of your life. Let's say you are working on a spreadsheet to do the latter. You simply select the cell you want to be a particular value (in this case, the ending investment balance on the last day of you life), click on Goal Seek, tab and enter 0 as the value you want that cell to be, and then tab and enter the cell which has your retirement expense assumption. After you press Enter, the computer will make a large number of trials to estimate the level of retirement expenses that will completely use up your investments during your lifetime.

Common Sense

Make sure that your spreadsheet is comprehensive. Include all known financial events such as debt payments, taxes, and estimates for large future purchases (in today's dollars if you use real returns). Then step back from the math and recognize that there is no way that you are going to be able to foresee all of the problems in your future. Set aside some part of your investments as a contingency for unknowns. Common sense says that there is no single answer for such a contingency. At the minimum, you might consider costing special events that could well happen and/or set aside at least one year's expenses that are not covered by Social Security and a pension when you are in retirement. Then let's hope that future will favor you with prolonged good economic times and good health so that all of this was needless conservatism. But don't base your future plans on hope. Try to be as realistic as possible. From what I've seen, this is the wisest course.