

# Monte Carlo Planning



Many people attend to daily financial affairs, but have little idea as to whether and how they will achieve longer-term financial security. The spreadsheet at [www.wenzelanalytics.com](http://www.wenzelanalytics.com), Papers, Planning 06.xls, is a tool to help in doing likely future projections.

It is easy to read that historical equity returns average 9.8% and then make future projections based on that rate each year. Doing so creates a very misleading picture, as historical returns vary considerably. Assuming an average rate of return is a setup for becoming overly anxious when normal volatility occurs. In order to have enough on that future date, it is important to attend to probability more than volatility. It is better to understand market variability and plan to capitalize on it rather than to fight it with unrealistic and unproductive requirements of consistent returns.

The Excel spreadsheet is a tool for seeing how various scenarios might play out if future years resemble a random selection of past years. Input your projected income and expenses for years going forward, along with other relevant data such as allocation between equities, Treasury Bills, bonds and real estate. Multiple scenarios are then calculated using randomly selected years since 1928 (or a more recent year of your choosing). A comparison is also shown for calculations using a fixed rate of return.

The two principal advantages to the spreadsheet are: 1). Returns are calculated based upon historical precedent, rather than assumptions about normal statistical distributions. The market varies more than a normal bell-shaped curve. Standard deviation is hard to intuitively understand. 2). The spreadsheet is not a black box. A general model with all assumptions available and permitting your changes is better than to have a model attempting to be too precise, or that is built on unknown assumptions or unable to incorporate your unique situation.

The purpose of financial projections is to guide right actions now more than to guarantee financial circumstances far into the future. Rather than searching for precision, what is important is to experiment with different assumptions and explore the probable patterns that evolve. Every time you press  $\wedge r$  you see the results of another 100 simulations.

As for discoveries, many people find they had unrealistic ideas about the longer-term impact of different allocations between fixed income and equities. Another surprise is that the same input numbers for a hundred scenarios can produce a 50% likelihood of being broke in twenty years, and a 20% likelihood of having ten million. Like driving from your house to my house, you need to turn the wheel along the way and alternate between the accelerator and the brake to get where you want to go. The model is like a windshield allowing you to see where you are headed.

A good article can be found at [www.financeware.com/ruminations/WP\\_understandingmontecarlo.pdf](http://www.financeware.com/ruminations/WP_understandingmontecarlo.pdf). A Google search will provide lots of other Monte Carlo simulation tools and information.

## Assumptions

- The formulas were checked and rechecked and are assumed to be accurate, but there may be errors. You may need to adapt formulas and columns to accommodate your situation. Enter data in the grey boxes.
- Inflation, interest rates and equity returns in future years will be generally similar to such rates in past years. Social Security COLA (Cost of Living Adjustment) will correspond to inflation rates. You may want to set the COLA to say 75% of inflation.
- The returns and rates for one year do not have a statistical probability of impacting returns the next year.
- Within any given year, the relationship between inflation, interest rates and equity returns will be similar to what has historically been the case.
- The major features of the financial environment will continue, such as Social Security benefits, tax rates, relative cost of living, and lack of major changes such as out-of-pocket medical or long-term care expenses.
- Investments such as in small cap stocks or emerging markets will also approximate the historical returns of the S&P 500. Equity returns are based on the S&P 500, including dividends.

***An alternative to mutual funds.***

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