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The Value of Monte Carlo Analysis in Uncertain Times

When you sit down with a financial professional to update your retirement plan; be sure to inquire whether your plan will use a Monte Carlo simulation, a financial forecasting method that has become popular in the last few years. Monte Carlo financial simulations project and illustrate the probability that you'll reach your financial goals, and can help you make better -informed investment decisions.

Estimating investment returns

All financial forecasts must account for variables like inflation rates and investment returns. The catch is that these variables have to be estimated, and the estimate used is critical to a forecast's results. For example, a forecast that assumes stocks will earn an average of 4% each year for the next 20 years will differ significantly from a forecast that assumes an average annual return of 8% over the same time period.

Estimating investment returns is particularly difficult. For example, the volatility of stock returns makes short-term projections almost meaningless. Multiple factors influence investment returns, including events such as natural disasters and terrorist attacks, which are unpredictable. So, it's important to understand how different forecasting methods handle this inherent uncertainty.

Basic forecasting methods

Straight-line forecasting methods assume a constant value for the projection period. For example, a straight-line forecast might show that a portfolio worth \$116,000 today would have a future value of approximately \$250,000 if the portfolio grows by an annual compounded return of 8% for the next 10 years. This projection is helpful, but it has a flaw: In the real world, returns aren't typically that consistent from year to year.

Forecasting methods that utilize "scenarios" provide a range of possible outcomes. Continuing with the 10-year example above, a "best-case scenario" might assume that your portfolio will grow by an average 12% annual return and reach \$360,000. The "most-likely scenario" might assume an 8% return (for a \$250,000 value), and the "worst-case scenario" might use 4%, resulting in a final value of roughly \$171,000. Scenarios give you a better idea of the range of possible outcomes. However, they aren't very precise in estimating the likelihood of any specific result.



Why is a Monte Carlo simulation useful?

In contrast to more basic forecasting methods, a Monte Carlo simulation explicitly accounts for volatility, especially the volatility of investment returns. It enables you to see the spectrum of thousands of possible outcomes, taking into account not only the many variables involved, but also the range of potential values for each of those variables.

By attempting to replicate the uncertainty of the real world, a Monte Carlo simulation can actually provide a detailed illustration of how likely it is that a given investment strategy will meet your needs. For example, when it comes to retirement planning, a Monte Carlo simulation can help you answer specific questions, such as:

- Given a certain set of assumptions, what is the probability that you will run out of funds before age 85?
- If that probability is unacceptably high, how much additional money would you need to invest each year or what asset allocation mix is required to decrease the probability to 10%?

About New Wealth Advisors.

New Wealth Advisors is an independent, fee-only, SEC-registered investment advisor, operating as a multi-family investment office. We work with newly wealthy individuals and families to protect, grow and manage assets.

The mechanics of a Monte Carlo simulation

A Monte Carlo simulation typically involves hundreds or thousands of individual forecasts or “iterations,” based on data that you provide (e.g., your portfolio, timeframes, and financial goals). Each of these individual iterations draws a result based on the historical performance of each investment class included in the simulation.

Each asset class—small-cap stocks, corporate bonds, etc.—has an average (or mean) return for a given period. Standard deviation measures the statistical variation of the actual returns of that asset class around the average for that period. A higher standard deviation implies greater volatility. The returns for stocks have a higher standard deviation than the returns for U.S. Treasury bonds, for instance.

There are different types of Monte Carlo computational methods, but each generates a forecast that reflects the variable patterns of investment returns. Software modeling stock returns, for example, might produce a series of annual returns such as the following: Year 1: -7%; Year 2: -9%; Year 3: +16%, and so on. For a 10-year projection, a Monte Carlo simulation will produce a series of 10 randomly generated returns—one for each year in the forecast—based on the model’s inputs. A separate series of random returns is generated for each iteration in the simulation.

Monte Carlo simulation output and use

Monte Carlo applications run multiple iterations; the combined iterations are considered a simulation. Each program has its own

method of presenting results, but most provide numerical and graphical outputs. A graph of a Monte Carlo simulation might appear as a series of statistical “bands” around a calculated average.

Example: Let’s say a Monte Carlo simulation performs 1,000 iterations using your current retirement assumptions and investment strategy. Of those 1,000 iterations, 600 indicate that your assumptions will result in a successful outcome, while 400 iterations indicate that you will fall short of your goal. The simulation tells you that you have a 60% chance of successfully meeting your retirement goals.

Pros and cons of Monte Carlo

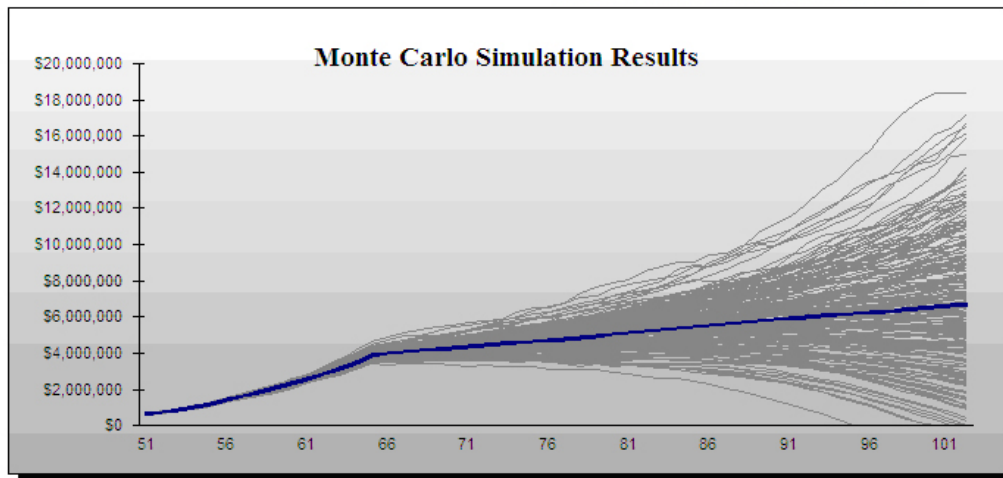
A Monte Carlo simulation illustrates how your future finances might look based on the assumptions you provide. However, it could prove incorrect—that’s the nature of a forecast.

However, a Monte Carlo simulation is an important tool because it can illustrate how changes to your plan can affect the likelihood of achieving your goals. Combined with periodic progress reviews and plan updates, Monte Carlo forecasts can help you make better-informed investment decisions to keep your financial goals on track. At New Wealth Advisors we meet regularly with clients to review the impact of changing financial circumstances and events on their specific life goals. Our Monte Carlo analysis uses 10,000 iterations, providing the highest level of predictability available in financial forecasting.

Results from 10,000 Monte Carlo Simulation Trials

Original Retirement Capital estimate	\$6,768,796	Percentage of results above zero*	96%
Minimum (worst case) result	\$0	Percentage with \$ remaining at Bill’s age 98	99%
Average Monte Carlo result	\$6,694,654	Percentage with \$ remaining at Bill’s age 93	100%
Maximum Monte Carlo result	\$24,199,083	Percentage with \$ remaining at Bill’s age 88	100%

* Percent of times money is remaining at last age shown.



The bold line is the estimated retirement capital value over time using fixed rates.

Annual rate of return of 5.35% in the original retirement estimate varied from 5.16% to 6.20% based on portfolio changes over time. This simulation used a 1.78% standard deviation to create ten thousand sets of normally distributed random rates of return based on the annual rates of return in the original estimate (95% of the rates fall between 1.60% and 9.76%). A standard deviation rate of 2.00% was applied to the inflation rate used on personal expenses.



College Costs: Increases and Trends

Many of the developments we saw last year in the world of higher education will continue to play out in 2009, as the largest high school class in American history heads off to college.



Costs, costs, costs

For the 2008/09 school year, the total average cost (tuition and fees, room and board, books and supplies, transportation, and other miscellaneous expenses) for an in-state public college student is \$18,326; for an out-of-state public college student, \$29,193; and for a private college student, a whopping \$37,390 (Source: The College Board's Trends in Student Pricing 2008 Report). According to the College Board, over the past decade, college costs have increased an average of 5% to 6% a year.

This year, the ever-increasing cost of college comes at a time when many parents may be grappling with reduced college savings due to the ailing economy. With less savings, lower home equity against which to borrow, and possibly stagnating incomes or a recent job loss, parents may be less able to contribute to their children's ever-growing college financial need.

Borrowing

Enter student loans. The amount of borrowing for college has increased tremendously over the past decade, especially in the area of private student loans. Last year, private loans comprised 23% of total education loan dollars, compared to 5% ten years ago (Source: The College Board and The Project on Student Debt). The reason for the increase? The borrowing limits on federal student loans haven't kept pace with the rise in college costs.

However, the ongoing credit crunch has altered the marketplace this year. Many private lenders have dropped out of the student lending business completely, and those still in it are charging higher interest rates and requiring more stringent credit checks.

A study conducted last August by educational lender Sallie Mae concluded that 70% of families didn't even consider their child's likely post-graduation income when deciding how much to borrow for college, and 40% said they paid no attention to cost when searching for a college. But there's evidence this pattern may be changing. Around the country, college administrators report an increased focus on price at college fairs, and a majority of families say in online surveys that they are seeking less prestigious schools for money reasons.

Public college trends

But just as public colleges find themselves more in demand than ever by cash-strapped students and employees looking to gain a leg up in the workforce, state budget deficits are forcing many states to reduce their public higher education expenditures, resulting in markedly higher tuition and fees. So far, at least 20 states have made cuts to their public university budgets or are planning large tuition increases. And more states are expected to be in financial peril in 2009, jeopardizing future public higher education expenditures. (Source: *The Wall Street Journal*, October 17, 2008, "State Budget Cuts Push Tuition Higher").

Private college trends

The highest tier private colleges—the Ivies and a few select institutions—have enjoyed record endowment growth over the past few years (not counting the economic downturn) and have translated those gains into increased merit aid awards (which aren't based on financial need) for the best students. Many of these institutions have even gone so far as to offer a free education to students whose families earn up to \$150,000 or \$200,000 per year.

But go one or two levels below, and many colleges in the second and third tiers aren't in a position to meet all of their students' financial need. These colleges continue to hand out merit aid, but are more selective (and less generous) in their awards. So students at these schools could end up paying more out-of-pocket.

Federal legislation

Against this backdrop, the federal government passed the Higher Education Opportunity Act last year. Among other things, the Act will make it easier for students to apply for federal student loans and to research college costs on a new website, www.college.gov.

And in 2009, it will be interesting to see what ideas and policies President Obama, who just finished paying off his own student loans in 2004, brings to the college table.

A look at student debt

According to the College Board, almost two-thirds of college students graduated with student loans last year, with an average debt load of \$22,700.

One unfortunate trend of widespread student borrowing has been an increase in the number of heavily leveraged young college graduates. In fact, many families are considering private bailouts for their children who took on too much college debt.

(Source: *The Wall Street Journal*, October 8, 2008, "The Next Bailout: Your Adult Children?")



Retirement Plan and IRA Limits for 2009

An increasing number of retirement plan and IRA limits are indexed for inflation each year. Some of the key numbers for 2009 are discussed below.

Elective deferrals

If you're lucky enough to be eligible to participate in a 401(k), 403(b), 457(b), or SAR-SEP plan, you can make elective deferrals of up to \$16,500 in 2009, up from \$15,500 in 2008. If you're age 50 or older, you also can make a catch-up contribution of up to \$5,500 to these plans in 2009, up from \$5,000 in 2008.

If your 401(k) or 403(b) plan allows Roth contributions, your total elective contributions, pretax and Roth, can't exceed \$16,500 (\$22,000 with catch-up contributions). You can split your contribution any way you wish. For example, you can make \$9,500 of Roth contributions and \$7,000 of pretax 401(k) contributions. It's up to you.

If you participate in a SIMPLE IRA or SIMPLE 401(k) plan, you can contribute up to \$11,500 in 2009 (up from \$10,500 in 2008). If you're age 50 or older, the maximum catch-up contribution to a SIMPLE IRA or SIMPLE 401(k) plan in 2009 is \$2,500, unchanged from 2008.

IRA limits remain the same for 2009

The amount you can contribute to a traditional or Roth IRA remains at \$5,000 for 2009, and the maximum catch-up contribution for those age 50 or older remains at \$1,000. You can contribute to an IRA in addition to an employer-sponsored retirement plan. But if you (or your spouse) participate in an employer sponsored plan, your ability to deduct traditional IRA contributions may be limited, depending on your income. Roth contributions are also subject to income limits.

Contribution limits: 2009 tax year* (2008 limits in parentheses)		
Plan type	Annual dollar limit	Catch-up limit
401(k), 403(b), and 457(b)** plans	\$16,500 (\$15,500)	\$5,500 (\$5,000)
SIMPLE plans	\$11,500 (\$10,500)	\$2,500 (\$2,500)
Traditional and Roth IRAs	\$5,000 (\$5,000)	\$1,000 (\$1,000)

*Contributions can't exceed 100% of your pay. If you participate in a 403(b) or 457(b) plan, special rules may allow an even greater catch-up contribution.

**\$5,500 catch-up applies only to governmental 457(b) plans.

Some other key numbers for 2009

For 2009, the maximum amount of compensation your employer can take into account when calculating SEP and qualified plan contributions and benefits is \$245,000 (up from \$230,000 in 2008).

The maximum annual benefit you can receive from a defined benefit pension plan is limited to \$195,000 in 2009 (up from \$185,000 in 2008).

And the maximum amount that can be allocated to your account in a defined contribution plan (for example, a 401(k) plan or profit sharing plan) in 2009 is \$49,000 (up from \$46,000 in 2008), plus age-50 catch-up contributions. (This includes both your contributions and your employer's contributions. Special rules apply if your employer sponsors more than one retirement plan.)

Income phaseout range for determining deductibility of traditional IRA contributions in 2009	
1. Covered by an employer plan	
Single/Head of household	\$55,000 - \$65,000 (\$53,000 - \$63,000 in 2008)
Married filing jointly	\$89,000 - \$109,000 (\$85,000 - \$105,000 in 2008)
Married filing separately	\$0 - \$10,000 (same for 2008)
2. Not covered by an employer plan, but filing joint return with a spouse who is covered	\$166,000 - \$176,000 (\$159,000 - \$169,000 in 2008)
Income phaseout range for determining ability of fund Roth IRA in 2009	
Single/Head of household	\$105,000 - \$120,000 (\$101,000 - \$116,000 in 2008)
Married filing jointly	\$166,000 - \$176,000 (\$159,000 - \$169,000 in 2008)
Married filing separately	\$0 - \$10,000 (same in 2008)



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