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CC:
Subject: Beating the drum regarding Monte Carlo
Date: Thursday, May 25, 2006 4:52:00 PM
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[image005.gif](#)

Ellen

I do not know whether you read my March review dealing with safe withdrawal rates, but it addressed the issue of Monte Carlo simulations amongst others.

Monte Carlo as the name suggests is a computer simulation technique that picks its numbers at random from historical data, much like a roulette wheel at the

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Casino . The attraction of Monte Carlo has developed largely because of a belief that market movements are random and independent (note A Random Walk Down Wall Street) and also because of the difficulty in forecasting future returns.

In truth market movements while random are not independent. Market movements are actually constrained by earnings growth and the cost of capital; the simple dividend discount model states this implicit relationship and is essentially the proof to the observed reversion to the mean.

If returns are independent, it does not matter whether you are at the top of a stock market and economic cycle or at the bottom, the probability of future returns based on the probability distribution remains the same. In reality we know this is not the case; investors can experience negative returns for long periods of time following market peaks.

What this means is that the probability distribution of returns from a Monte Carlo simulation are the not the actual probability distributions facing the investor. For example, a 90% probability of success from a simulation may only be a 40% probability of success at the top of a market and economic cycle, and likewise, a 40% probability of success may actually be a 90% probability at the bottom of a cycle. The probability of success and failure is not a constant, it shifts in accordance with economic and market risk, something which Monte Carlo

ignores. As such what a Monte Carlo may state as low probability event is actually a much higher probability event at certain points in time. Ergo, the probability distribution shifts, or at least it should.

Since capital values of portfolios can be significantly impacted by valuation differences between a market high and a market trough, so will the ability of their assets to meet needs be likewise affected if future returns are based on a non adjusted Monte Carlo analysis.

While the return distribution of a Monte Carlo simulation will give advisors a better handle on the distribution of return over time, it does not solve the problem of managing and modeling risks to returns at a given point in time and hence, [offers little guidance on the actual probability of return](#), thereby disputing its main selling point. Like a lot of these systems they are designed for the retail financial services market place where there is limited understanding of the fundamental issues at hand.

Even if markets were at historical average market valuations and economies at the average economic point underlying the long term return data, the probability distribution of the Monte Carlo would not reflect the true probability distribution since the outlying low probability events are derived from data incorporating extreme events which are not related to the current valuation dynamics.

While the limitations of simple historical average returns are well known, it must be noted that the Monte Carlo output and historical average returns are related and therefore exposed to similar flaws. Note that Monte Carlo simulations have a critical flaw shared with simple average historical returns. The distribution of future returns provided by a simulation are averaged returns over long periods of time.

Short term return/risk has a much bigger impact on the ability of a portfolio to meet financial needs over time than long term averages and hence it is still possible to drown in a river with an average depth of 12 inches or four feet as the case may be.

It is important to understand that the probability distributions of slot machine outcomes and tosses of the coin are different from the probability distributions of market returns and as such the comfort of acceptance in other disciplines should not be relied upon in this specific area of personal finance. When tossing a coin you do indeed start from scratch with an equal probability of heads or tails, irrespective of the prior outcome, but in a market where return is constrained by earnings growth and the cost of capital you do not start each period with the same probability distribution.

The higher you move up a ladder the greater the probability of injury if

someone decides to shake it hard.

This is both a very simple and a very complex area and one in which both sides of the story need to be presented for individuals to understand the true risks and rewards of different portfolio planning disciplines.

Regards

Andrew Teasdale



"A Web site well worth viewing"

Jonathan Chevreau in the "National Post", 27 March 2006.

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needs and, to rid the industry of endemic and institutionalised financial abuse."

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Note that there are a number of different techniques for generating Monte Carlo output.