

## MoneyGuidePro (MGP) Response to Wall Street Journal Article on Monte Carlo Simulations

### Executive Summary

On May 2, 2009, The Wall Street Journal (WSJ) published an article titled "Odds-On Imperfection: Monte Carlo Simulation," with the tag line "Financial Planning Tool Fails to Gauge Extreme Events." While the WSJ article includes some accurate observations regarding Monte Carlo simulations (MCS), we believe MCS calculations are an important part of an overall financial plan. However, we also believe that MCS results, by themselves, are not sufficient. That's why MGP has always provided three results: Average Returns, Bad Timing, and MCS. With the release of MGP:G2, we added two new tests of the MCS results: Security Check and Loss Cushion, which specifically address the risks of a 2008-type event.

This response has two sections. The first section provides an overview of MCS and their results. The next section summarizes how MoneyGuidePro (MGP) uses MCS, in conjunction with other key features, to provide a range of possible results for your plans.

### Overview of MCS Results

Before describing MGP's use of MCS and other features, it is important to articulate several important facts about MCS results. First, MCS are mathematical models (not crystal balls) and, as such, are limited. Because market performance is complex and all the influencing factors are neither well-defined nor predictable, MCS limit their assumptions. Even when using the best available assumptions, MCS results will never accurately reflect the real world. At best, MCS results are an incomplete approximation of potential investment returns. Simplifying assumptions are made. Moreover, MCS results are calculated using indexes (not actual returns for your investments), so are, at best, *an approximation of possible results for indexes*.

Secondly, as the article correctly states, most MCS results give a low probability to extreme events. We have imperfect data (less than 100 years of data for any index, and much less data for most indexes) on which to base MCS assumptions. And, at this moment in 2009, no one knows whether 2008 is an isolated extreme event (as most current MCS assumptions would reflect) or the beginning of a longer downturn. Our best assumptions for MCS are based on the historical data that's available.

Finally, no market model (MCS or any other) can accurately predict the behavior of investors. While investors' behavior is inherently included in historical returns, no one can predict the strength of investors' influence. Every market downturn is exacerbated when investors get scared, and every market uptick is enhanced by investor exuberance.

For these reasons, Monte Carlo simulations provide only a range of possibilities. They don't make predictions, and they won't provide a definitive answer for you or any individual.

## How MoneyGuidePro Uses Monte Carlo Simulations (MCS) – AND Why MCS Results (Alone) Aren't Sufficient

- The MGP SmartCalc methodology calculates three sets of results: Average Returns, Bad Timing, and a Monte Carlo simulation (MCS).
- The Presentation section of MGP explains why no single result is sufficient for most plans. That's why MGP provides three sets of results.
- A Monte Carlo simulation provides a %Probability of Success+based on calculating the results for a plan under many different returns and many return sequences. With the MGP MCS assumptions, very poor returns (similar to those of 2008) would be expected in two or three years out of every hundred years. No one knows for sure whether these assumptions are accurate (because we have less than 100 years of investment market history AND there is no proven predictive model for investment returns), but, they are reasonable assumptions. However, even if the MGP assumptions are accurate, there is still uncertainty because no MCS can predict when such downturns might occur, or their exact magnitude. Moreover, the exact sequence of bad returns AND the timing of the bad returns (e.g., early in the accumulation phase vs. at retirement) can affect the results as much as the value of the bad returns. Getting two years of %moderately bad returns+the first two years in retirement can be worse than getting a single year of %really bad returns+earlier in the plan. MCS illustrates general trends; it doesn't pinpoint when bad returns might occur.
- The MGP Bad Timing feature calculates results using %poor returns+for one or two years. The MGP assumptions for these %poor returns+(using MGP standard portfolios) are shown below.

For historical returns, 2008 replaced 1974 as the worst single year, when using one year of %poor returns.+ The combined returns for 2007-2008 were better than the combined returns for 1973-1974, so the latter two years remain as the worst two-year historical sequence. Prior to 2008, if your advisor showed you only one year of %poor returns+(using the MGP assumptions), your potential loss was probably understated compared to 2008. However, if your advisor showed you two years of %poor returns,+the results are very close for the portfolios with the most equities, and a bit understated for those with more bonds.

### Bad Timing using Historical Returns

Portfolio	One year of %poor returns+ (through 2007)  (1974 returns)	One year of %poor returns+ (through 2008)  (2008 returns)	Two years of %poor returns+ (through 2008)  (1973-74 returns)
Capital Preservation I	-2.22	-4.46	-2.91
Capital Preservation II	-5.20	-9.11	-8.06
Balanced I	-7.25	-12.32	-11.51
Balanced II	-10.37	-17.20	-16.41
Total Return I	-12.19	-19.96	-19.45
Total Return II	-15.53	-25.13	-24.64
Capital Growth I	-18.56	-29.67	-29.52
Capital Growth II	-21.28	-33.80	-33.55
Equity Growth	-23.87	-38.16	-37.57

For projected returns, the portfolio standard deviation (SD) is used to calculate the %poor returns+, which are shown below, and compared to the actual 2008 returns. Similar to historical returns, if your advisor showed you only one year of %poor returns+ (using the MGP assumptions and projected returns), your potential loss was probably understated compared to 2008. However, if your advisor showed you two years of %poor returns+, the results are very close for most portfolios, even somewhat overstated for the more conservative portfolios.

### Bad Timing using Projected Returns

Portfolio	One year of %poor returns+ (two SDs)	Two years of %poor returns+ (two SDs, then one SD)	2008 Returns
Capital Preservation I	-6.16	-6.19	-4.46
Capital Preservation II	-9.16	-10.35	-9.11
Balanced I	-11.37	-13.36	-12.32
Balanced II	-14.70	-17.82	-17.20
Total Return I	-16.68	-20.44	-19.96
Total Return II	-20.41	-25.28	-25.13
Capital Growth I	-23.86	-29.65	-29.67
Capital Growth II	-26.94	-33.48	-33.80
Equity Growth	-30.31	-37.57	-38.16

(SD = Standard Deviation)

- All MGP results (average returns, bad timing, and Monte Carlo simulations) are calculated using current assumptions. As assumptions or your financial circumstances change, the results will also change. Your plan results are a snapshot based on a set of assumptions, not an indelible roadmap that must be followed for better or for worse.
- In addition to the three sets of results MGP calculates, there are other important features that provide clear information to help you make appropriate choices.
  - If you are retired or near retirement, MGP recommends creating Retirement Lifestyle Plans, with many discrete goals categorized as Needs, Wants, and Wishes. (The MGP Goal Wizard provides a step-by-step guide for creating Retirement Lifestyle Plans.)
  - In MGP, each financial goal has both an Ideal and an Acceptable amount (i.e., an Acceptable range). Using this range of satisfactory goal values allows you see a range of potential results for your plan.
  - When you have created a Retirement Lifestyle Plan with many goals, each with an Acceptable range, the results ALWAYS provide much more actionable information than a plan with a single retirement goal. When a plan cannot be fully funded, discretionary goals can be adjusted within their Acceptable ranges. MGP implements trade-offs among all the goals to maximize your satisfaction. This is possible because the trade-offs are based on your specifications, Acceptable ranges, importance of each goal, and your willingness to make adjustments. With a Retirement Lifestyle Plan, the first several levels of trade-offs are automatically built into the plan.
  - MGP's new Security Check and Loss Cushion features (in the Presentation section) assess the impact of poor returns on your plan. The Security Check shows your results if all your financial goals were set to the Acceptable amounts. The Loss Cushion shows the maximum % loss your portfolio could absorb today while still funding your goals at the Acceptable level. Additionally, the Loss Cushion might help you to put 2008 in perspective.
  - The Inside the Numbers section of the Presentation illustrates a range of possible MCS results for your plan, including one of the best and one of the worst potential results.
  - One hedge against an extreme event is the value in your home. When there's a relatively small probability of very poor returns in one or two years, you could include a reverse mortgage as a potential solution, rather than planning to reduce goal values below Acceptable levels throughout retirement, or sacrificing more in your current lifestyle. This doesn't mean you make a decision today to implement a reverse mortgage. Rather, you include it as a potential solution (i.e., as a backstop), if you need additional funds at age 75 or 80.
- As with all plans, you should review your assumptions and results periodically, and update the assumptions when your circumstances change. Financial planning is a process, not a single event.

In many ways, the WSJ article is another example of how investor and media attitudes have swung from the irrational exuberance of the late 1990s to the unreasonable fear of late 2008 and early 2009. Prior to 2008, many people thought they could "have it all" - retire at age 55, work part-time if they felt like it, travel as much as they wanted, fund 100% of college for children and grandchildren, and continue to buy and sell ever-appreciating real estate. Today, many are worried about running out of money for basic living expenses. While there *are* people in dire financial straits, the actual financial situation for many investors is somewhere between their former irrational exuberance and their current unreasonable fear.

Monte Carlo simulations are not crystal balls. Because investment returns are neither certain nor predictable, there is no model, formula, or methodology that can predict either the exact value or the timing of future returns. Even when MCS results show the possibility of very low returns, they will never predict when such low returns will occur. Neither will Bad Timing. However, by using these tools, in combination with the other features in MGP, you will have more information, more education, and a realistic range of possible results.

#### **IMPORTANT DISCLOSURE INFORMATION**

The projections or other information generated by MoneyGuidePro regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results.

The return assumptions in MoneyGuidePro are not reflective of any specific product, and do not include any fees or expenses that may be incurred by investing in specific products. The actual returns of a specific product may be more or less than the returns used in MoneyGuidePro. It is not possible to directly invest in an index. Financial forecasts, rates of return, risk, inflation, and other assumptions may be used as the basis for illustrations. They should not be considered a guarantee of future performance or a guarantee of achieving overall financial objectives. Past performance is not a guarantee or a predictor of future results of either the indices or any particular investment.

MoneyGuidePro results may vary with each use and over time.