



## **The Osbon Minute**

### **The Fallacy of Annualized Return**

*Hope for the best, prepare for the worst, and plan for the expected*

In designing a portfolio, long-term historical performance of distinct asset classes is generally the only fact-based guide we have for long-term future performance. For instance, the S&P 500, representing large cap domestic stocks, has historically returned an annualized total return of approximately 8.8 percent over the last 20 years<sup>1</sup>. Based on that average, we would expect similar annualized returns going forward.

But that does not mean we will get them this year or next. That's thanks to the other measure that affects our expectations: risk, which is typically measured by standard deviation. The standard deviation for the S&P over the same time period has been 16.3 percent. Without getting too deep into your old stats textbook, this means that about two-thirds of the time the annual return has been 8.8 percent plus or minus 16.3 percent.

Using historical performance as a guide, we would therefore expect the future return in any one year to fall somewhere between - 7.5 and + 25.1 percent about two-thirds of the time, and higher or lower than that range in the other one-third of years. Clearly investors in large cap stocks must have a healthy tolerance for volatility – there is no reason to expect a smooth ride.

Time is an important variable too. The longer one holds the S&P 500, the more likely annualized return is to trend toward the long term historical average (your stats book calls this regression to the mean). However, as the last decade has emphatically reminded us, equity markets can underperform or outperform historical averages for extended periods, and the performance in any given year can be far higher or lower than the historical average. For instance, the index was down 37 percent in 2008 and up 26.5 percent in 2009<sup>2</sup>, both far afield of the long-term average.



**Expect a range of outcomes**

Any attempt to boil down performance of an asset class to one number sets an unrealistic expectation, one that ignores the impact of risk, both positive and negative. Still, elaborate cash flow projections and financial plans are often based on consistently earning the annualized return, year after year, decade after decade. **It is far more realistic to view future performance as a probability distribution** – a range of possible outcomes centered on the long-term average.

Monte Carlo simulations help to define these ranges. A powerful computerized tool that runs thousands of combinations of possible year-to-year returns, Monte Carlo analysis yields a distribution of long-term outcomes – good, bad, and average. Using these ranges, investors can plan for the expected, but also appreciate the best and prepare for the worst.

This is what Monte Carlo analysis tells us about the S&P 500: Using an expected annualized total return of 8.8 percent and risk of 16.3 percent, a one million dollar portfolio invested in the S&P 500 for twenty years yields an expected value of \$4,316,981. This is the most likely ending value, but the range of plausible outcomes is very wide (see chart):

- In 95 percent of cases, the ending value is expected to be at least \$1.454 million.
- In the best 25% of cases, expected value is at least \$6.799 million.
- And in the very best 5 percent of cases, the expected final sum would be at least \$13.339 million.

**Expected Ending Value of \$1,000,000 (2010 to 2030)**

	<b>Confidence level</b>	<b>S&amp;P 500</b> Expected return = 8.8% Risk = 16.3%	<b>15 year municipal bonds</b> Expected return = 6.8% Risk = 5.5%
<i>Best Case</i>	5%	\$13,339,853	\$5,399,405
	25%	\$6,799,588	\$4,331,775
<i>Expected</i>	50%	\$4,316,981	\$3,710,252
	75%	\$2,756,839	\$3,179,783
<i>Worst Case</i>	95%	\$1,454,702	\$2,530,034

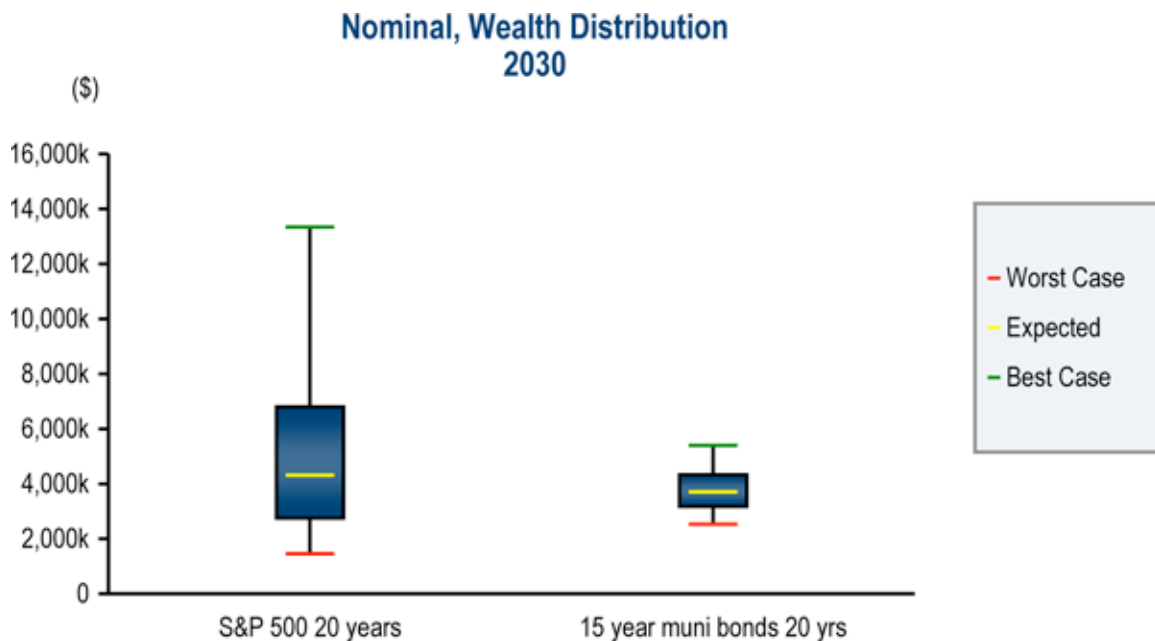
source: Windham



**Unique return and risk profiles**

Every asset class behaves differently. Compared to the S&P 500, the long-term return on 15 year municipal bonds is lower (6.8 percent), and less risky (5.5 percent). The lower expected annualized return means a million dollars invested in 15 year munis is most likely to be worth \$3.710 million in twenty years. The lower standard deviation means a narrower range of outcomes around that expected final value.

In the graphic below, the most likely twenty year outcomes for the S&P and municipal bonds are shown as yellow lines. The 25th to 75th percentile ranges of results are defined by the blue boxes, and 5th and 95th percentile results by the red and green lines, respectively. Note the much narrower range of expected outcomes for bonds.



source: Windham

**Implications for planning**

Understanding that expected returns can vary widely has important implications for planning. If an investor hopes to grow \$1 million into \$4.3 million in 20 years, there’s about a 50-50 chance of achieving that goal with an S&P 500 index, but only about a 25 percent probability of doing so with 15 year municipal bonds.



If the goal, however, is less about growth and more about capital preservation – for instance to be nearly certain of having \$2.5 million after twenty years while minimizing the chance of a loss – municipal bonds, with their more modest but less variable returns, on average, are a more likely choice. These are simple hypothetical examples, of course. Most portfolios decisions involve the balancing of many asset classes based on their distinct risk and return profiles.

Rational expectations are essential in investing. Building a financial plan that assumes consistent best-case performance is foolhardy, of course. Expecting the worst case is equally extreme. Understanding what lies in between is the more relevant challenge. Although it is the most likely outcome, counting on the expected return is no sure bet. On average, actual returns will be lower than expected half the time, and higher half the time. Investors who embrace the idea of asset class returns as a range of possible outcomes rather than a fixed point are much more likely to set and attain realistic, achievable goals.

<sup>1</sup>All historical risk and return data, projections, calculations and Monte Carlo analysis, unless otherwise noted, provided by Windham Portfolio Advisor®, a service of Windham Capital Management.

<sup>2</sup>Wikipedia — [http://en.wikipedia.org/wiki/S%26P\\_500](http://en.wikipedia.org/wiki/S%26P_500)

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