**Risk**

There are **five technical measures of risk** used in Modern Portfolio Theory. After briefly addressing the types of risk common to various investments in Week 1, we briefly addressed risk measurements, but a greater understanding of the purpose and means of calculating these types of risks is certainly warranted, particularly as a necessary baseline to our examination of Modern Portfolio Theory in greater detail.

**Alpha** or "**Jensen's Alpha**" is used to measure the performance of a portfolio relative to an index. Alpha can be positive or negative. A positive alpha of 3.0 would indicate that the return was 3% higher than the benchmark index. This may be the S&P 500 or another index, or as a point of reference the expected return of a CAPM analysis. Conversely, an alpha of -5.0 would mean that the portfolio has underperformed by 5%. Alpha is typically used to determine how much value a manager adds to or subtracts from a fund's overall return. It is not enough to evaluate a fund manager simply by their returns. Were the returns in line with a benchmark? Do they justify the amount of risk taken? Alpha is an excellent tool to answer these questions.

**Beta** or the "**Beta Coefficient**" measures the degree to which a security moves with the market. A security with a beta of 1.0 is likely to move in line with the market. An index fund based on the reference index would have a beta of almost exactly 1.0. Another security with a beta of 1.3 would be expected to be 30% more volatile than the market overall, while a security with a beta of 0.7 would be expected to be 30% less volatile. A rational investor given the choice of two securities with the same expected return would choose the one with the lower beta. Why accept greater volatility for the same return? Investors will of course accept a higher beta for a greater expected return.

**R-squared** is a measure that represents the amount of a fund or security's movement that is attributable to a benchmark index. Values range from 0 to 100. R-squared lower than 70 indicate that not a sufficient amount of the activity is tied to the market. The implications are that Beta should be ignored in these circumstances. R-squared can be instrumental in determining how useful Beta is. Of course the benchmark used for comparison can have a great effect on the outcome. We need to know if our measurements have value in a given context.

**Standard Deviation** is used to determine the degree to which an investment's returns deviates from the mean. For example, two funds may have identical returns on an annualized basis. Which should the investor choose? The fund with the lower standard deviation will have had less variance from year to year. In short, a "smoother" ride, even if to the same destination.

The **Sharpe Ratio** was developed by Nobel Prize winner William Sharpe. The purpose is to determine the degree to which investment returns are due to superior security selection or by assuming excess risk. An investment with a high Sharpe ratio has a better risk adjusted return, although it is important to point out that it may not necessarily have a higher nominal return or simple percentage return independent of risk considerations.

The tools described above allow us to view returns in context with risk. Many investors find the funds with the highest rates of return appealing as potential investments, but the returns cannot be viewed in isolation. Given a full contextualized examination which takes into account the amount of risk assumed to achieve a given return, investors and planners can make appropriate decisions regarding desire for return as well as tolerance for risk.