

Modern Portfolio Theory (MPT) forms the basis for essentially all institutional investment management strategies today and is central to the portfolio construction process here at Gemmer. In this paper, we discuss the basics of MPT and the relationship between risk and return.

Although ideas about managing investment portfolios existed before the 1950's, it was Harry Markowitz who, in his 1952 paper titled "Portfolio Selection," laid out the groundwork for portfolio diversification. In 1990, Markowitz won the Nobel Prize for his contribution to financial economics, and his work remains a foundational principle for investment managers around the world.

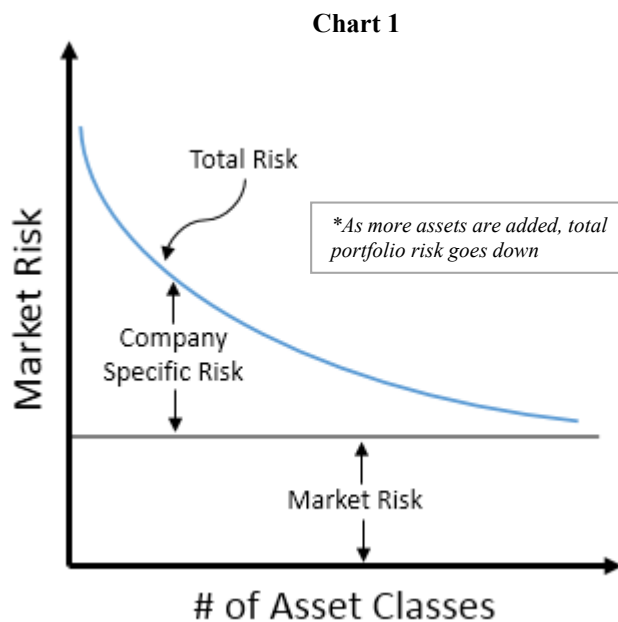
Prior to Markowitz's work, investment managers used to consider only the merits of an individual holding within a portfolio. While this is an important aspect of the process, the more critical task is to consider the investment's characteristics within the context of the entire portfolio. Markowitz found that investors were missing the fact that there is **correlation** between assets within a portfolio, and that this correlation is more important than a single asset's risk in determining portfolio return (please reference the *glossary of terms* for a more detailed explanation of correlation).

Before we go any further, it would be beneficial to outline some of the basic assumptions of MPT:

1. Financial markets are efficient, that is to say they process all available information rapidly, making it difficult to gain a competitive advantage from market anomalies.
2. Investors are risk averse and rational- they will always choose the less risky portfolio given the same level of return.
3. As compensation for taking on greater risk, riskier investments offer higher returns over time (more on this below).
4. Correlation between assets within a portfolio is a greater contributor to expected return than individual security risk.

Risk vs. Return

It is essential to understand the relationship between risk and return when discussing modern portfolio theory. Risk, according to MPT is **volatility** (technically, **Standard Deviation**), or the likelihood that an investment will go up and down in value – taking into account the frequency and magnitude of the changes. There are two broad categories of this volatility: **market risk** and **company specific risk**. Market risk is the possibility that the entire market will fluctuate either up or down, taking every asset along for the ride. Things like an oil price shock and a surprise interest rate cut would fall into



this category. Company specific (or unsystematic risk) is the possibility that a single investment will exhibit higher volatility in isolation. The most common event would be a single company missing an earnings forecast.

As we will discuss in our paper on asset allocation, only one of these risks can theoretically be eliminated. While you cannot eliminate market risk, you can greatly reduce company specific risk through the process of **diversification**. As you can see from the graph on the first page, if enough asset classes are added to a portfolio, an investor will own the entire universe of securities, effectively eliminating company specific risk.

After defining risk, MPT asserts that given a choice between two portfolios with equal *returns*, a rational investor will choose the portfolio with the lower *risk*. Conversely, if an investor takes on a portfolio with higher risk, they expect to be compensated in the form of higher return.

The Efficient Frontier

One of the central axioms of Markowitz's MPT is the **efficient frontier** – the ideal portfolio for a given level of risk, or the lowest risk portfolio for a given level of return. Basically Markowitz plotted every available asset combination on a risk/return matrix, as shown to the right (each dot is a possible portfolio combination). Because one of the assumptions of MPT is that investors are risk averse, there is only one rational portfolio choice for every given level of return. In short, for every level of expected return, there is a portfolio that will offer the lowest risk. Conversely, for every level of risk there is a portfolio that offers the highest possible return.

Asset Allocation & Diversification

MPT shifts the focus away from individual security analysis toward the efficient allocation of capital across specific asset classes. By using this “top-down” asset allocation strategy, an investor can reduce portfolio risk simply by holding combinations of assets (or asset classes) that are not perfectly positively correlated. In other words, investors can reduce their unsystematic risk through the use of **diversification**.

Modern portfolio theory has been in existence for over 60 years and while it is not a perfect solution to all investment management problems, it remains one of the most powerful tools managers possess in optimizing portfolios to meet investor needs.

