Introduction to Modern Portfolio Theory

The purpose of this article is to provide a brief explanation of Markowitz's modern portfolio theory and how you can use it to more effectively allocate your investment portfolio.

Perhaps equally important to what will be covered is what is excluded: this is not a mathematical derivation of the model. For a thorough explanation of the math behind the model, see this article in Wikipedia. The objective of this article is to show how you can apply modern portfolio theory in real life to create an optimized portfolio.

Introduction

In its simplest form, portfolio theory is about finding the balance between ***maximizing your return*** and ***minimizing your risk***. The objective is to select your investments in such as way as to diversify your risks while not reducing your expected return. It is actually simple to apply and effective. While it does not replace the role of an informed investor, it can provide a powerful tool to complement an actively managed portfolio.

Models should never be blindly applied–see any number of articles on the role of models in the collapse of LTCM or other large funds. But an understanding of how the portfolio theory works will enable you to make more informed decisions about which mutual funds to include in your 401k or which ETF's to buy for your individual investor account.

Your portfolio probably consists of a number of stocks, bonds, ETF's, and mutual funds. The mix of these assets constitutes your portfolio allocation. How your portfolio is allocated determines its performance. During the first quarter of every year, investors typically spend a few hours reallocating their retirement accounts. Most allocation decisions are based on past performance, gut feelings, or some arbitrary selection process. In this series, we'll introduce you to the modern portfolio theory and demonstrate how you can use Microsoft Excel to construct an efficient and optimal portfolio.

Definitions and Assumptions on MPT

Before we begin to explain portfolio theory and its application, let's begin by defining a number of key terms. A common nomenclature is essential to correctly interpreting this series.

- Return: For many assets, this may include both capital appreciation (the price of the stock rises) and dividends. For debt instruments, the return may include price appreciation (for example, when interest rates fall), the periodic interest payments, or the payment of the principal. Expected returns may be based on historical performance; however, it is important to think critically about whether past performance is likely to continue in the future. (For example, do you really expect to see a 50% rise in technology stocks year-over-year for the next 10 years?)
- Risk: This is perhaps the most contentious definition. In the context of this series, risk is the measure of variability in the expected return. We will use simple statistical tools to quantify risk. Risk is typically based on past volatility; however, as with returns, investors should think critically about the assumptions underlying the estimates of risk. If anything, the recent credit crisis has shown that two assets that appeared to be unrelated (uncorrelated, which we'll cover later) may actually move together quite quickly under certain economic conditions.