

RISK AND RETURN

Modern Portfolio Theory

Modern Portfolio Theory (MPT) is a mathematical approach to build an investment portfolio with a view to optimize the expected return on the basis of a given level of risk. In essence, the MPT formalizes the concept of diversification in that owning different kinds of financial assets is less risky than owning merely one type. It also emphasizes that risk is an inherent part of reward, illustrated by an “efficient frontier” of optimal portfolios.

MPT is in essence a mathematical model with the purpose to optimize an investor's expected return given a certain risk. Harry Markowitz, Nobel Prize laureate and co-developer of the MPT, provided us – among others – with numerous insights in regards to the impact of diversification:

That the return of a portfolio is composed of the relative return contributions of its individual securities is obvious. And that diversifying returns over several assets makes more sense for many investors than putting all eggs just in one basket, too.

What seems less obvious at first sight, though, is the following: The total risk of a portfolio – or its volatility or standard deviation - is actually not determined by simply adding up the relative proportions of the risks of each individual security of the portfolio. Instead, the risk of a portfolio is a function of the correlations among the assets of the portfolio. Thereby the correlations of each asset pair of the portfolio have to be taken into account.

Hence, the concept of the MPT is of utmost relevance to which extent diversification impacts risk: Investing in a broad variety of assets reduces risk – alas: volatility. As long as asset prices do not change in perfect synchrony – alas: are not perfectly correlated -, a diversified portfolio will have less risk than the sum of the weighted average risk of each of its assets. Eventually, a

portfolio may even be less volatile than the least volatile of its assets.

Therefore, an asset's risk and return should not be assessed by itself, but by how it contributes to a portfolio's overall risk and return. Whereby, the efficient frontier is the very set of optimal portfolios offering the highest expected return for a defined level of risk (or the lowest risk for a given level of expected return). Hence, portfolios that lie below the efficient frontier are not considered optimal, as they do not provide enough return for the given level of risk.

It seems evident that one can reduce risk – alas: volatility - by adding a stock of an airline to a stock of an oil exploration and production company: The price of the stock of the oil company is expected to increase with an increase of oil prices, while the stock of the airline - kerosene being a large part of its cost base - is expected to decline. The respective performance of each of these stocks will assumedly be negatively correlated: If the one goes up, the other one will go down.

MPT pushes this idea a significant step further, though: It postulates that even if two stocks are positively – as long as not fully and perfectly - correlated, then these two stocks together – forming a portfolio – would have a lower risk – alas: a lower volatility or standard deviation - than the relative weighting of the risks of the two stocks. So, if one added to the stock of an oil company a stock of an oil equipment manufacturer - they usually also perform well, if oil prices rise, however with a slight delay -, then this addition – despite the fact that both stocks are positively correlated - would nevertheless reduce the overall portfolio risk.

Having said this, not all risks can be eliminated by building a portfolio. The so-called market risk – also referred to as: systematic risk - can actually not be diversified away. Empirical and statistical research concludes that a well-diversified portfolio - a portfolio only exposed to market or systematic risk with unsystematic (alas: company-specific) risk in essence diversified away - consists of at least 15-20 companies.

