PORTFOLIO THEORY

by

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One of the major advances in investment over the last few decades has been the creation of an optimum investment portfolio.

The creation of an optimum investment portfolio is not simply a matter of combining a lot of unique individual securities that have desirable risk-return characteristics.
Background Assumptions

- As an investor you want to maximize the returns for a given level of risk.
- Your portfolio includes all of your assets and liabilities.
- The relationship between the returns for assets in the portfolio is important.
- A good portfolio is not simply a collection of individually good investments.
Risk Aversion

Portfolio theory also assumes that investors are risk averse, meaning that; Given a choice between two assets with equal rates of return, most investors will select the asset with the lower level of risk.
Evidence That Investors are Risk Averse

- The following are some evidence that suggest that investors are risk averse;
- Many investors purchase insurance for: Life, Automobile, Health, and Disability Income. When you buys insurance, this implies that you are willing to pay for the current known cost of the insurance policy to avoid the uncertainty of a potentially larger outlay in the future. The purchaser trades known costs for unknown risk of loss.
Evidence That Investors are Risk Averse

- Also, the Yield on bonds increases with risk classifications from AAA to AA to A and so on. This increase in yield means that investors require a higher rate of return to accept higher risk.
Not all investors are risk averse

The above assumption is not to say that all investors are risk averse regarding all financial commitments. The fact is not everybody buys insurance for everything. Some people have no insurance against anything, either by choice or because they cannot afford it. Risk preference may have to do with amount of money involved - risking small amounts, but insuring large losses.
Definition of Risk

Although there is a difference in definitions of risk and uncertainty, for the purpose of our presentation, and in most financial literature, the two words are used interchangeably. One way of defining risk is;

1. Uncertainty of future outcomes
or
2. Probability of an adverse outcome
Prior to the 1960s there was no specific measure of risk. To build a portfolio model, an investor needs to quantify his risk variable.

The basic portfolio model was developed by Harry Markowitz.
Markowitz Portfolio Theory

- Markowitz showed that the variance of the rate of return was a meaningful measure of portfolio risk under a reasonable set of assumptions. He also derived a formula for computing the variance of a portfolio. This formula for the variance of a portfolio not only indicate the importance of diversifying your investments to reduce the total risk of a portfolio, but also showed how to effectively diversify.
Markowitz Portfolio Theory

Markowitz theory achieved the following:

- Quantifies risk
- Derives the expected rate of return for a portfolio of assets and an expected risk measure
- Shows that the variance of the rate of return is a meaningful measure of portfolio risk
- Derives the formula for computing the variance of a portfolio, showing how to effectively diversify a portfolio
Assumptions of Markowitz Portfolio Theory

The Markowitz model are based on several assumptions regarding the behaviour of investors;

1. Investors consider each investment alternative as being presented by a probability distribution of expected returns over some holding period.
Assumptions of Markowitz Portfolio Theory

2. Investors minimize one-period expected utility, and their utility curves demonstrate diminishing marginal utility of wealth.
Assumptions of Markowitz Portfolio Theory

3. Investors estimate the risk of the portfolio on the basis of the variability of expected returns.
Assumptions of Markowitz Portfolio Theory

4. Investors base decisions solely on expected return and risk, so their utility curves are a function of expected return and the expected variance (or standard deviation) of returns only.
5. For a given risk level, investors prefer higher returns to lower returns. Similarly, for a given level of expected returns, investors prefer less risk to more risk.
Markowitz Portfolio Theory

Using these five assumptions, a single asset or portfolio of assets is considered to be efficient if no other asset or portfolio of assets offers higher expected return with the same (or lower) risk, or lower risk with the same (or higher) expected return.
Alternative Measures of Risk

- Variance or standard deviation of expected return;

  This is a statistical measure of the dispersion of returns around the expected value whereby a larger variance or standard deviation indicates greater dispersion, all other factors being equal. The idea is that the more disperse the expected returns the greater the uncertainty of those returns in any future period.
Alternative Measures of Risk

- Range of returns;
  in this case, it is assumed that a larger range of expected returns, from the lowest to the highest return, means greater uncertainty and risk regarding future expected return.
Returns below expectations;
some investors believe that when you invest, you should be concerned with only returns below the expected return. An example of such a measure is the semi variance.

- Semivariance is a measure that only considers deviations below the mean
Alternative Measures of Risk

Although there are numerous potential measures of risk, we will use the variance or standard deviation of returns because (1) this measure is somewhat intuitive, (2) it is a correct and widely recognized risk measure, and (3) it has been used in most of theoretical asset pricing models. These measures of risk implicitly assume that investors want to minimize the damage from returns less than some target rate.
Expected Rates of Return

- For an individual asset - sum of the product of returns and the corresponding probability of the returns. This is illustrated in table 1 below.

- For a portfolio of assets, the expected rate of return for a portfolio of investments is simply the weighted average of the expected rates of return for the individual investments in the portfolio. This is illustrated in table 2 below.
## Computation of Expected Return for an Individual Risky Investment

<table>
<thead>
<tr>
<th>Possible Rate of Return (Percent)</th>
<th>Probability</th>
<th>Expected Return (Percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>0.25</td>
<td>0.1100</td>
</tr>
<tr>
<td>25</td>
<td>0.10</td>
<td>0.2500</td>
</tr>
<tr>
<td>30</td>
<td>0.12</td>
<td>0.3600</td>
</tr>
<tr>
<td>35</td>
<td>0.14</td>
<td>0.4900</td>
</tr>
</tbody>
</table>
Computation of the Expected Return for a Portfolio of Risky Assets

Table 2

\[
E(R_{\text{por} 
\text{i}}) = \sum_{i=1}^{n} W_i \cdot R_i
\]

where:
- \( W_i \) = the percent of the portfolio in asset \( i \)
- \( E(R_{\text{i}}) \) = the expected rate of return for asset \( i \)
As noted, we will be using the variance or the standard deviation of return as the measure of risk. We will demonstrate how to compute the standard deviation of return for an individual investment. And subsequently after discussing some other statistical concepts, we will consider the determination of the standard deviation for a portfolio of investment.
Variance (Standard Deviation) of Returns for an Individual Investment

Standard deviation is the square root of the variance.

Variance is a measure of the variation of possible rates of return $R_i$, from the expected rate of return $[E(R_i)]$.

The formula for the computation of an individual investment variance and standard deviation are given below followed by a demonstration in Table 3 below.
Variance (Standard Deviation) of Returns for an Individual Investment

$$\text{Variance} \ (\sigma^2) = \sum_{i=1}^{n} [R_i - E(R_i)]^2 P_i$$

where $P_i$ is the probability of the possible rate of return, $R_i$
Variance (Standard Deviation) of Returns for an Individual Investment

Standard Deviation

\[
(\sigma) = \sqrt{\sum_{i=1}^{n} [R_i - E(R_i)]^2 P_i}
\]
Variance (Standard Deviation) of Returns for an Individual Investment

<table>
<thead>
<tr>
<th>Expected Rate of Return ($E(R_i)$)</th>
<th>$R_i - E(R_i)$</th>
<th>$(R_i - E(R_i))^2 P_i$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.08</td>
<td>0.03</td>
<td>0.0009 $P_i$</td>
</tr>
<tr>
<td>0.08</td>
<td>0.02</td>
<td>0.000225 $P_i$</td>
</tr>
<tr>
<td>0.10</td>
<td>0.01</td>
<td>0.0001 $P_i$</td>
</tr>
<tr>
<td>0.12</td>
<td>0.01</td>
<td>0.000025 $P_i$</td>
</tr>
<tr>
<td>0.14</td>
<td>0.03</td>
<td>0.0009 $P_i$</td>
</tr>
</tbody>
</table>

Variance ($\sigma^2$) = .0050
Standard Deviation ($\sigma$) = .02236
Variance (Standard Deviation) of Returns for a Portfolio

- Two basic concepts in statistics, Covariance and correlation, must be understood before we discuss the formula for the variance of the rate of return for a portfolio.

- Covariance:

  In the subsequent sessions we will discuss what the covariance of return is intended to measure, give the formula for computing it, and present an example of the computation.
Variance (Standard Deviation) of Returns for a Portfolio

- Covariance is a measure of the degree to which two variables move together relative to their individual mean values over time.
Variance (Standard Deviation) of Returns for a Portfolio

- A positive covariance means that the rate of return for two investments tend to move in the same direction relative to their individual means during the same time periods. In contrast, a negative covariance means that the rate of return for two individual investments tend to move in different directions relative to their means during specified time periods.
Variance (Standard Deviation) of Returns for a Portfolio

- The table below contains monthly closing prices and dividends for coca-cola and Home depot. You can use this data to compute monthly rates of return for these two stocks during the year. Although the rates of return for the two stocks moved together in some months, in other months they moved in opposite directions. The covariance statistic provides an absolute measure of how they moved together over time.
Variance (Standard Deviation) of Returns for a Portfolio

Computation of Monthly Rates of Return

<table>
<thead>
<tr>
<th>Date</th>
<th>Closing Price</th>
<th>Dividend</th>
<th>Return (%)</th>
<th>Closing Price</th>
<th>Dividend</th>
<th>Return (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec.00</td>
<td>60.938</td>
<td></td>
<td></td>
<td>45.688</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan.01</td>
<td>58.000</td>
<td>-4.82%</td>
<td></td>
<td>48.200</td>
<td>5.50%</td>
<td></td>
</tr>
<tr>
<td>Feb.01</td>
<td>53.030</td>
<td>-8.57%</td>
<td></td>
<td>42.500</td>
<td>-11.83%</td>
<td></td>
</tr>
<tr>
<td>Mar.01</td>
<td>45.160</td>
<td>0.18</td>
<td>-14.50%</td>
<td>43.100</td>
<td>0.04</td>
<td>1.51%</td>
</tr>
<tr>
<td>Apr.01</td>
<td>46.190</td>
<td>2.28%</td>
<td></td>
<td>47.100</td>
<td>9.28%</td>
<td></td>
</tr>
<tr>
<td>May.01</td>
<td>47.400</td>
<td>2.62%</td>
<td></td>
<td>49.290</td>
<td>4.65%</td>
<td></td>
</tr>
<tr>
<td>Jun.01</td>
<td>45.000</td>
<td>0.18</td>
<td>-4.68%</td>
<td>47.240</td>
<td>0.04</td>
<td>-4.08%</td>
</tr>
<tr>
<td>Jul.01</td>
<td>44.600</td>
<td>-0.89%</td>
<td></td>
<td>50.370</td>
<td>6.63%</td>
<td></td>
</tr>
<tr>
<td>Aug.01</td>
<td>48.670</td>
<td>9.13%</td>
<td></td>
<td>45.950</td>
<td>0.04</td>
<td>-8.70%</td>
</tr>
<tr>
<td>Sep.01</td>
<td>46.850</td>
<td>0.18</td>
<td>-3.37%</td>
<td>38.370</td>
<td>-16.50%</td>
<td></td>
</tr>
<tr>
<td>Oct.01</td>
<td>47.880</td>
<td>2.20%</td>
<td></td>
<td>38.230</td>
<td>-0.36%</td>
<td></td>
</tr>
<tr>
<td>Nov.01</td>
<td>46.960</td>
<td>0.18</td>
<td>-1.55%</td>
<td>46.650</td>
<td>0.05</td>
<td>22.16%</td>
</tr>
<tr>
<td>Dec.01</td>
<td>47.150</td>
<td>0.40%</td>
<td></td>
<td>51.010</td>
<td>9.35%</td>
<td></td>
</tr>
</tbody>
</table>

E(RCoca-Cola) = -1.81%  
E(Rhome Depot) = 1.47%
Covariance of Returns

For two assets, i and j, (Coca-cola and Home Depot) the covariance of rates of return is defined as:

\[ \text{Cov}_{ij} = E\{[R_i - E(R_i)][R_j - E(R_j)]\} \]
Covariance and Correlation

- Interpretation of the absolute number for the covariance is very difficult. For a covariance of 16.85, we know that the relationship between the stocks are generally positive but it is not possible to be more specific. We therefore standardize the covariance by the use of the correlation coefficient in order to make the interpretation of the covariance more meaningful.

- The **Correlation Coefficient** is obtained by standardizing (dividing) the covariance by the product of the individual standard deviations.
Covariance and Correlation

Correlation coefficient varies from -1 to +1

\[ r_{ij} = \frac{\text{Cov}_{ij}}{\sigma_i \sigma_j} \]

where:

- \( r_{ij} \) = the correlation coefficient of returns
- \( \sigma_i \) = the standard deviation of \( R_{it} \)
- \( \sigma_j \) = the standard deviation of \( R_{jt} \)
Correlation Coefficient

- It can vary only in the range +1 to -1. A value of +1 would indicate perfect positive correlation. This means that returns for the two assets move together in a completely linear manner. A value of -1 would indicate perfect correlation. This means that the returns for two assets have the same percentage movement, but in opposite directions.
Portfolio Standard Deviation Formula

\[ \sigma_{\text{port}} = \sqrt{\sum_{i=1}^{n} w_i^2 \sigma_i^2 + \sum_{i=1}^{n} \sum_{j=1}^{n} w_i w_j \text{Cov}_{ij}} \]

where:

\( \sigma_{\text{port}} \) = the standard deviation of the portfolio

\( W_i \) = the weights of the individual assets in the portfolio, where weights are determined by the proportion of value in the portfolio

\( \sigma_i^2 \) = the variance of rates of return for asset \( i \)

\( \text{Cov}_{ij} \) = the covariance between the rates of return for assets \( i \) and \( j \)

where \( \text{Cov}_{ij} = r_{ij} \sigma_i \sigma_j \)
The portfolio standard deviation formula shown above indicates that the standard deviation for a portfolio of assets is a function of the weighted average of the individual variances (where the weights are squared), plus the weighted covariances between all the assets in the portfolio.
The standard deviation of a portfolio of assets encompasses not only the variances of the individual assets, but also includes the covariances between pairs of individual assets in the portfolio. Further it has been proven that in a portfolio with large number of securities, this formula reduces to the sum of the weighted covariances.
Portfolio Standard Deviation Calculation

- Any asset of a portfolio may be described by two characteristics:
  - The expected rate of return
  - The expected standard deviations of returns
- The correlation, measured by covariance, affects the portfolio standard deviation
- Low correlation reduces portfolio risk while not affecting the expected return
## Combining Stocks with Different Returns and Risk

<table>
<thead>
<tr>
<th>Asset</th>
<th>$E(R_i)$</th>
<th>$W_i$</th>
<th>$\sigma^2_i$</th>
<th>$\sigma_i$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.10</td>
<td>.50</td>
<td>.0049</td>
<td>.07</td>
</tr>
<tr>
<td>2</td>
<td>.20</td>
<td>.50</td>
<td>.0100</td>
<td>.10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Case</th>
<th>Correlation Coefficient</th>
<th>Covariance</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>+1.00</td>
<td>.0070</td>
</tr>
<tr>
<td>b</td>
<td>+0.50</td>
<td>.0035</td>
</tr>
<tr>
<td>c</td>
<td>0.00</td>
<td>.0000</td>
</tr>
<tr>
<td>d</td>
<td>-0.50</td>
<td>-.0035</td>
</tr>
<tr>
<td>e</td>
<td>-1.00</td>
<td>-.0070</td>
</tr>
</tbody>
</table>
Combining Stocks with Different Returns and Risk

- Assets may differ in expected rates of return and individual standard deviations
- Negative correlation reduces portfolio risk
- Combining two assets with -1.0 correlation reduces the portfolio standard deviation to zero only when individual standard deviations are equal
### Constant Correlation with Changing Weights

<table>
<thead>
<tr>
<th>Asset</th>
<th>E(R&lt;sub&gt;i&lt;/sub&gt;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.10</td>
</tr>
<tr>
<td>2</td>
<td>0.20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Case</th>
<th>W&lt;sub&gt;1&lt;/sub&gt;</th>
<th>W&lt;sup&gt;2&lt;/sup&gt;</th>
<th>E(R&lt;sub&gt;i&lt;/sub&gt;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>f</td>
<td>0.00</td>
<td>1.00</td>
<td>0.20</td>
</tr>
<tr>
<td>g</td>
<td>0.20</td>
<td>0.80</td>
<td>0.18</td>
</tr>
<tr>
<td>h</td>
<td>0.40</td>
<td>0.60</td>
<td>0.16</td>
</tr>
<tr>
<td>i</td>
<td>0.50</td>
<td>0.50</td>
<td>0.15</td>
</tr>
<tr>
<td>j</td>
<td>0.60</td>
<td>0.40</td>
<td>0.14</td>
</tr>
<tr>
<td>k</td>
<td>0.80</td>
<td>0.20</td>
<td>0.12</td>
</tr>
<tr>
<td>l</td>
<td>1.00</td>
<td>0.00</td>
<td>0.10</td>
</tr>
</tbody>
</table>
## Constant Correlation with Changing Weights

<table>
<thead>
<tr>
<th>Case</th>
<th>$W_1$</th>
<th>$W_2$</th>
<th>$E(R_i)$</th>
<th>$E(R_{port})$</th>
</tr>
</thead>
<tbody>
<tr>
<td>f</td>
<td>0.00</td>
<td>1.00</td>
<td>0.20</td>
<td>0.1000</td>
</tr>
<tr>
<td>g</td>
<td>0.20</td>
<td>0.80</td>
<td>0.18</td>
<td>0.0812</td>
</tr>
<tr>
<td>h</td>
<td>0.40</td>
<td>0.60</td>
<td>0.16</td>
<td>0.0662</td>
</tr>
<tr>
<td>i</td>
<td>0.50</td>
<td>0.50</td>
<td>0.15</td>
<td>0.0610</td>
</tr>
<tr>
<td>j</td>
<td>0.60</td>
<td>0.40</td>
<td>0.14</td>
<td>0.0580</td>
</tr>
<tr>
<td>k</td>
<td>0.80</td>
<td>0.20</td>
<td>0.12</td>
<td>0.0595</td>
</tr>
<tr>
<td>l</td>
<td>1.00</td>
<td>0.00</td>
<td>0.10</td>
<td>0.0700</td>
</tr>
</tbody>
</table>
With two perfectly correlated assets, it is only possible to create a two asset portfolio with risk-return along a line between either single asset.
With uncorrelated assets it is possible to create a two asset portfolio with lower risk than either single asset.
Portfolio Risk-Return Plots for Different Weights

With negatively correlated assets, it is possible to create a two-asset portfolio with much lower risk than either single asset.
Portfolio Risk-Return Plots for Different Weights

With perfectly negatively correlated assets it is possible to create a two asset portfolio with almost no risk.
Estimation Issues

- Results of portfolio allocation depend on accurate statistical inputs
- Estimates of:
  - Expected returns
  - Standard deviation
  - Correlation coefficient
    - Among entire set of assets
    - With 100 assets, 4,950 correlation estimates
- Estimation risk refers to potential errors
Estimation Issues

- Results of portfolio allocation depend on accurate statistical inputs
- Estimates of
  - Expected returns
  - Standard deviation
  - Correlation coefficient
    - Among entire set of assets
    - With 100 assets, 4,950 correlation estimates
- Estimation risk refers to potential errors
Estimation Issues

- With assumption that stock returns can be described by a single market model, the number of correlations required reduces to the number of assets
- Single index market model:

\[ b_i = \text{the slope coefficient that relates the returns for security } i \text{ to the returns for the aggregate stock market} \]

\[ R_m = \text{the returns for the aggregate stock market} \]
Estimation Issues

If all the securities are similarly related to the market and a $b_i$ derived for each one, it can be shown that the correlation coefficient between two securities $i$ and $j$ is given as:

$$r_{ij} = b_i b_j \frac{\sigma^2_m}{\sigma_i \sigma_j}$$

where $\sigma^2_m = \text{the variance of returns for the aggregate stock market}$
The Efficient Frontier

- The efficient frontier represents that set of portfolios with the maximum rate of return for every given level of risk, or the minimum risk for every level of return.

- Frontier will be portfolios of investments rather than individual securities.
  - Exceptions being the asset with the highest return and the asset with the lowest risk.
Efficient Frontier for Alternative Portfolios

E(R) vs. Standard Deviation of Return

A - B - C
The Efficient Frontier and Investor Utility

- An individual investor's utility curve specifies the trade-offs he is willing to make between expected return and risk.
- The slope of the efficient frontier curve decreases steadily as you move upward.
- These two interactions will determine the particular portfolio selected by an individual investor.
The Efficient Frontier and Investor Utility

- The optimal portfolio has the highest utility for a given investor.
- It lies at the point of tangency between the efficient frontier and the utility curve with the highest possible utility.
The risk in a portfolio of diverse individual stocks will be less than the risk inherent in holding any single one of the individual stocks (provided the risks of the various stocks are not directly related). Consider a portfolio that holds two risky stocks: one that pays off when it rains and another that pays off when it doesn't rain.
A portfolio that contains both assets will always pay off, regardless of whether it rains or shines. Adding one risky asset to another can reduce the overall risk of an all-weather portfolio.

In other words, Markowitz showed that investment is not just about picking stocks, but about choosing the right combination of stocks among which to distribute one's
Two Kinds of Risk
Modern portfolio theory states that the risk for individual stock returns has two components:

*Systematic Risk* - These are market risks that cannot be diversified away. Interest rates, recessions and wars are examples of systematic risks.
Modern Portfolio Theory

- **Unsystematic Risk** - Also known as "specific risk or diversifiable risk", this risk is specific to individual stocks and can be diversified away as you increase the number of stocks in your portfolio (see Figure 1). It represents the component of a stock's return that is not correlated with general market moves.
For a well-diversified portfolio, the risk - or average deviation from the mean - of each stock contributes little to portfolio risk. Instead, it is the difference - or covariance - between individual stocks' levels of risk that determines overall portfolio risk. As a result, investors benefit from holding diversified portfolios instead of individual stocks.
Number of Stocks in a Portfolio and the Standard Deviation of Portfolio Return

<table>
<thead>
<tr>
<th>Number of Stocks in the Portfolio</th>
<th>Standard Deviation of Return</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Systematic Risk (systematic risk)</td>
</tr>
<tr>
<td></td>
<td>Unsystematic Risk (diversifiable)</td>
</tr>
<tr>
<td>Total Risk</td>
<td></td>
</tr>
<tr>
<td>Systematic Risk</td>
<td></td>
</tr>
</tbody>
</table>

- Standard Deviation of the Market Portfolio (systematic risk)
The Efficient Frontier

Now that we understand the benefits of diversification, the question of how to identify the best level of diversification arises.

This question is addressed by the efficient frontier.
For every level of return, there is one portfolio that offers the lowest possible risk, and for every level of risk, there is a portfolio that offers the highest return. These combinations can be plotted on a graph, and the resulting line is the efficient frontier. Figure 2 shows the efficient frontier for just two stocks - a high risk/high return technology stock (Google) and a low risk/low return consumer products stock (Coca Cola).
THE EFFICIENT FRONTIER

Efficient Frontier For Two Stocks

Stock Return (%)

Risk (Standard Deviation (%)) Of Returns

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Any portfolio that lies on the upper part of the curve is efficient: it gives the maximum expected return for a given level of risk. A rational investor will only hold a portfolio that lies somewhere on the efficient frontier. The maximum level of risk that the investor will assume is determined by the position of the portfolio on the line.
Modern portfolio theory takes this idea even further. It suggests that combining a stock portfolio that sits on the efficient frontier with a risk-free asset, the purchase of which is funded by borrowing, can actually increase returns beyond the efficient frontier. In other words, if you were to borrow to acquire a risk-free stock, then the remaining stock portfolio could have a riskier profile and, therefore, a higher return than you might otherwise choose.
What MPT Means for You
Modern portfolio theory has had a marked impact on how investors perceive risk, return and portfolio management.

The theory demonstrates that portfolio diversification can reduce investment risk. In fact, modern money managers routinely follow its precepts.
Modern Portfolio Theory

- That being said, MPT has some shortcomings in the real world. For starters, it often requires investors to rethink notions of risk. Sometimes it demands that the investor take on a perceived risky investment (futures, for example) in order to reduce overall risk.
Modern Portfolio Theory

- That can be a tough sell to an investor not familiar with the benefits of sophisticated portfolio management techniques. Furthermore, MPT assumes that it is possible to select stocks whose individual performance is independent of other investments in the portfolio. But market historians have shown that there are no such instruments; in times of market stress, seemingly independent investments do, in fact, act as though they are related.
Likewise, it is logical to borrow to hold a risk-free asset and increase your portfolio returns, but finding a truly risk-free asset is another matter. Government-backed bonds are presumed to be risk free, but, in reality, they are not. Securities such as Treasury bonds are free of default risk, but expectations of higher inflation and interest rate changes can both affect their value.
Modern Portfolio Theory

- Then there is the question of the number of stocks required for diversification. How many is enough? Mutual funds can contain dozens and dozens of stocks. Investment guru William J. Bernstein says that even 100 stocks is not enough to diversify away unsystematic risk. By contrast, Edwin J. Elton and Martin J. Gruber, in their book "Modern Portfolio Theory And Investment Analysis" (1981), conclude that you would come very close to achieving optimal diversity after adding the twentieth stock.
The gist of MPT is that the market is hard to beat and that the people who beat the market are those who take above-average risk. It is also implied that these risk takers will get their comeuppance when markets turn down.
CONCLUSION

- Then again, investors such as Warren Buffett remind us that portfolio theory is just that - theory.
CONCLUSION

- At the end of the day, a portfolio's success rests on the investor's skills and the time he or she devotes to it. Sometimes it is better to pick a small number of out-of-favour investments and wait for the market to turn in your favour than to rely on market averages alone.
THANK YOU FOR LISTENING