Investment Planning Answer Book by Jay L. Shein, Portfolio Strategy and Design

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An investment portfolio will contain various asset classes and investments in varying proportions depending on investor's objectives and tolerance for risk. In the past, the focus was on returns and volatility of a particular investment. The return and volatility are insufficient when evaluating and designing an investment portfolio. The other important components of portfolio design must include correlation of returns for the securities of the portfolio and the various asset classes included in the portfolio. The risk of a portfolio as measured by standard deviation will be less than the weighted average risk of the securities contained in the portfolio unless all the investments are perfectly correlated.

Investment Planning Answer Book by Jay L. Shein, Q 4:1, How can Modern Portfolio Theory be used to design investment portfolios?

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The key element to Modern Portfolio Theory is portfolio risk which is based on the benefits derived from diversification. When investments are combined in the portfolio that are not perfectly correlated, they can be designed in a manner that can increase the expected return of the portfolio without increasing the risk. Said another way, the portfolio risk can be reduced without reducing the return.

All investors should hold the same basket of securities in the same proportions as the world's investable wealth, according to Modern Portfolio Theory. An investor willing to take a higher risk would simply lever up the basket of securities, and an investor willing to take a lower risk would sell some of the basket for a less risky portfolio. This assumes that an investor can both borrow and lend at the risk-free rate. It also assumes that all investors have the same time horizon and live in a transaction-free world. Since this and many other elements of Modern Portfolio Theory may not fit into all investor's goals and risk tolerances, it is important to focus on the major benefits derived from the Modern Portfolio Theory.

Investment Planning Answer Book by Jay L. Shein, Q 4:2, How did Modern Portfolio Theory become prevalent?

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Before the advent of Modern Portfolio Theory, analyzing an investment usually involved evaluating the risk and return of the specific investment. Harry Markowitz, who pioneered Modern Portfolio Theory in 1952 (and subsequently won the Nobel Prize in Economics in 1990) observed that viewing an investment by itself without considering the other investments in a portfolio is very risky. Assets that had a low correlation to each other when combined in a portfolio reduced the risk of the whole portfolio because of the dissimilar patterns of returns of the other investments. Because of this, the correlation between one security and another became an important consideration.

Investment Planning Answer Book by Jay L. Shein, Q 4:3, Does Modern Portfolio Theory and asset allocation always work?

Each investor's objectives, tolerance for risk, and time horizon should be considered when designing a diversified portfolio. Modern Portfolio Theory would suggest that markets are efficient, hence all securities are properly priced and any attempts to time the market would be ineffective. The goal is to structure a portfolio that has the highest expected return for any given level of risk or the lowest risk for any given level of return. If the investment advisor assumes that the markets are efficient, they might conclude that the best approach would be a strategically allocated portfolio with a buy and hold strategy. The focus should be on a diversified portfolio of various asset classes. If each asset class is sufficiently diversified, the investment advisor can focus on allocating between the various asset classes available for investment portfolio implementation. Over long periods of time, asset class returns are inconsistent and correlations can change. Standard deviations tend to stay more consistent over long periods of time for various asset classes.

In studying history, it can be observed that the relationship between asset classes does not always pan out as expected. Many times, especially during capital market turmoil, the correlation of asset classes that had lower correlation to each other increases. Therefore, the diversification benefit that was assumed from employing different asset classes in a portfolio can go away, especially in short periods of time. For the very long term investor this may not be problematic because they have a long time horizon. This would be typical of a pension or endowment portfolio. However, individual investors who usually have long term-time horizons will usually evaluate the portfolio more frequently and be unable to stay with a portfolio when all asset classes become highly correlated and the portfolio is declining significantly in value. This would bode well for a tactical asset allocation approach as opposed to a strategic approach. With a tactical approach, changes in the portfolio allocations would be more frequent with the intent of protecting the portfolio or possibly enhancing returns. With a strategic approach, the portfolio would attempt to maintain a constant mix of the various asset classes. Some would argue against a tactical approach because they do not feel anyone is consistently capable of making good tactical decisions. The strategic approach would suggest that the investor should stay invested regardless of how poorly the portfolio performs either on an ex-post or ex-ante basis. The strategic approach may cause a large loss in portfolio value. Portfolios that are highly diversified may limit the upside return potential of a portfolio. Consequently, it is important that the investor's objectives, goals, and tolerance for risk be taken into consideration whether a strategic or more tactical approach is used.

In summary, each advisor or wealth manager will have to decide whether the strategic approach or the tactical approach is acceptable to them. The tactical approach will take much more work and diligence than a strategic approach. The major benefit that can be derived from Modern Portfolio Theory is that diversification can reduce portfolio risk. It is wise to remember that Modern Portfolio Theory, while beneficial for portfolio management, is not modern portfolio fact.

Investment Planning Answer Book by Jay L. Shein, Q 4:4, Is strategic or tactical management a form of market timing?

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Strategic asset management allocates various market classes in proportion to the objectives, tolerance, and risk of the investor. Typically, they will have a minimum of three asset classes and many times additional classes. Asset classes can be broad or a subclass of a broad asset class. For instance, with U.S. stocks, sub-asset classes could be large, mid, and small company stocks. Large, mid, and small company stocks could also be divided into growth, value, or core stock sub-asset classes.

We can look at a simple strategic allocation for purposes of this explanation. A portfolio which is 50 percent U.S. stocks and 50 percent U.S. bonds is implemented for a particular investor. Over time, one of these broad asset classes will grow and become a more dominant part of the portfolio. The typical strategic manager would rebalance the portfolio at a specified time. This may be quarterly, some other timeframe, or when the portfolio becomes out of balance by 5-10 percent or some other amount previously determined. If this hypothetical 50 percent U.S. stocks and 50 percent bonds portfolio were to become 60 percent U.S. stocks and 40 percent U.S. bonds with a rebalancing trigger of 10 percent, then the advisor would sell U.S. stocks and buy U.S. bonds to bring the portfolio back to its original 50/50 mix. While this would be a typical discipline of the portfolio manager in a strategically allocated portfolio, it does have an element of market timing. This rebalancing automatically buys the asset class that is the most undervalued and sells the asset class that is most overvalued. While this can enhance the portfolio risk reward parameters over a long period of time, it may be disastrous in a continuously declining stock market. In a continuously declining stock market, the portfolio would be buying more and more of the undervalued securities as they continue to decline, therefore accelerating the loss of portfolio value. While this strategic approach with rebalancing appears to have merit, it also appears to contain flaws.

The tactical approach may be used by reallocating to the various asset classes available to the portfolio and making changes, possibly small or large, depending on investment portfolio latitude. Consider a simple portfolio such as one that starts out with 50 percent allocated to U.S. stocks and 50 percent allocated to U.S. bonds. If the wealth manager or advisor determines by macroeconomic, quantitative, or other methodology that the U.S. stock market is going to decline in value while the U.S. bond market will not, the advisor could sell some or all of the U.S. stocks and allocate them to U.S. bonds. Some tactical approaches make small changes between various asset classes while others may make large changes. Of course, this becomes more complex when there are many asset classes to choose from and reallocate to such as U.S. stocks, U.S. bonds, commodities, foreign stocks, foreign bonds, real estate, and hedge funds. While the investor may have some benefit from this more active approach, the advisor will find that much more time is required to use a tactical approach.

Since both strategic and tactical asset allocation approaches make changes to the allocation over time whether by the discipline, the process or by conscious decision, they both have an element of market timing. Some wealth managers and investment advisors will find that some blend of both approaches will best suit the investors they service.

Investment Planning Answer Book by Jay L. Shein, Expected Returns

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Expected returns are an important consideration when designing a portfolio and allocating between various asset classes. Many advisors use historical returns, also known as ex-post returns to make forward-looking projections which are also referred to as ex-ante return expectations. Another way for projecting expected returns for portfolios is in connection with a mathematical model or by combining a mathematical model with some expected economic outcomes. Designing an investment portfolio is sometimes referred to as combining science with art.

Investment Planning Answer Book by Jay L. Shein, Q 4:5, Are there basic returns statistics that advisors should be familiar with?

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Return calculations are very important since they are used to design investment portfolios as well as to measure performance of a portfolio. Performance measurement is only one aspect of portfolio analysis and design. Many times, too much emphasis is placed on performance while risk or investor objectives are ignored. Advisors should be able to explain and understand basic return calculations. The most basic return calculations are arithmetic and geometric averages. The arithmetic mean is the simple average of all the observations in a specific time. For example:

Year	*Return*
1	2%
2	6%
3	−4%
4	4%
5	8%

Therefore, the arithmetic mean would equal 3.2%.

The arithmetic mean is most commonly used for projecting average rates of return for future periods of time. The arithmetic mean is also sometimes used as a starting point for determining return expectations for mean variance optimizers.

Investment Planning Answer Book by Jay L. Shein, Q 4:6, What method is used to measure holding period return?

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Holding period return is one of the simplest methodologies used to estimate a return over a single period. It is calculated by taking the ending portfolio value, subtracting the beginning portfolio value, adding dividends, and dividing that calculation by the beginning portfolio value.

$$\text{Holding period return} = \frac{\text{ending value} - \text{beginning value} + \text{dividends}}{\text{beginning value}}$$

EXAMPLE

If Investor X started with one million dollars on January 1, the ending value of the portfolio was $1,080,000, and the portfolio did not issue any dividends, then the holding period return would equal eight percent as shown in the following calculation:

($1,080,000 − $1,000,000) / $1,000,000 = 8%

Investment Planning Answer Book by Jay L. Shein, Q 4:7, What are the most important methods for measuring portfolio return?

The time weighted return is the best method for measuring portfolio managers, investment managers, or mutual fund performance. Time weighted return reduces the impact of cash flows so that the additions and withdrawals from the portfolio do not affect the portfolio managers' returns which they have no control over. Because of this, it is considered an unbiased measure of portfolio return. Time weighted returns are calculated by linking together returns of sub-periods such as multiple holding period returns. The formula for time weighted returns is as follows:

$(1 + R_1) (1 + R_2) (1 + R_3)\ldots(1 + R_N) - 1$

In this equation, *R* is the period return. This linked time weighted return can be annualized with the following formula:

$(1 + R)^{1/T} - 1$

In this equation, *R* is equal to the cumulative return and *T* is the number of years in the period. As can be seen, annualized returns are not the same as taking the cumulative returns and dividing by the number of periods or years. This linking of returns has the effect of geometric compounding as opposed to an arithmetic average.

For example, using the same returns as previously noted, the time weighted return can be calculated as follows:

Year	*Return*
1	2%
2	6%
3	−4%
4	4%
5	8%

$(1 + 0.02) (1 + 0.06) (1 + -0.04) (1 + 0.04) (1 + 0.08) - 1 = 0.1658 = 16.58\%$

To annualize the return, use the formula noted above:

$(1 + 0.1658)^{1/5} - 1 = 0.0312 = 3.12\%$

Investment Planning Answer Book by Jay L. Shein, Q 4:8, How is internal rate of return (IRR) calculated and used?

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Internal rate of return is sometimes referred to as the dollar rate of return, or value weighted return. Time weighted return (TWR) is best used to evaluate the advisor managing a portfolio. IRR gives an indication to the investor of whether they are on track to meet their objectives. Both TWR and IRR are valuable tools when evaluating investment portfolios and investor objectives. TWR does not consider cash flows in or out of a portfolio which is something the portfolio manager/advisor has no control over; therefore, it demonstrates how well the portfolio manager is doing. IRR does consider cash flows in and out of the portfolio and how it affects the investor's wealth accumulation. IRR looks at each cash flow in and out of the portfolio and compounds it for the time period that it is held in the portfolio by a rate of return that equals the stream of cash flows relative to the ending value. To calculate IRR for two cash flows, the first period cash flow is multiplied by one plus the internal rate of return squared and then added to the second period cash flow multiplied by one plus the internal rate of return squared.

$EV = (\text{CF period } a) \times (1 + R)^2 + (\text{CF period } b) \times (1 + R)^2$

Solve this equation for R by trial and error where:

EV = ending value

CF period *a* = cash flow for period *a* being considered

CF period *b* = cash flow for period *b* being considered

R = internal rate of return

The financial advisor will typically use software, spreadsheets, or financial calculators to do these calculations. However, it is still important for the wealth manager/investment advisor to be able to calculate various types of returns in order to adequately understand the nuances of these methodologies.

In conclusion, investment advisors and investors should look at time weighted return when determining how well their portfolio managers are doing. The advisor and investor should look at internal rate of return to determine how successful a portfolio is doing relative to the investor's objectives while taking into consideration cash flows in and out of the portfolio. Neither time weighted return nor internal rate of return looks at the return when adjusted for risk which is always an important component of the analysis. Investors are ill-advised to focus only on returns while ignoring risk. Many investors who have done this have had disastrous results in their investment portfolios.

Investment Planning Answer Book by Jay L. Shein, Correlation Coefficients

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One of the most important aspects of portfolio theory involves diversification. Diversification can reduce portfolio volatility. The correlation coefficient is an important mathematical concept used to develop diversified portfolios. Investments that are highly correlated move in tandem with each other while investments that are not highly correlated do not. Investments that are negatively correlated move opposite each other relative to their respective mean. A correlation of one between two investment assets would be indicative of a perfect correlation and would have no diversification benefit in a portfolio. Investment assets with low or negative correlations relative to each other will reduce portfolio variance.

Investment Planning Answer Book by Jay L. Shein, Q 4:9, Is there a difference between correlation and covariance?

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Correlation measures the degree of association and direction of return of two assets. Correlation does not give an indication of the magnitude of that relationship, whereas, covariance does. This covariance magnitude is calculated by multiplying the correlation coefficient times the standard deviation of each of the two investment asset returns.

$$COV_{ij} = \rho_{ij} \sigma_i \sigma_j$$

where

COV_{ij} = covariance between investment *i* and investment *j*

ρ_{ij} = correlation coefficient between investment *i* and investment *j*

σ_i = standard deviation of investment *i*

σ_j = standard deviation of investment *j*

Investment Planning Answer Book by Jay L. Shein, Q 4:10, How does the advisor use correlation?

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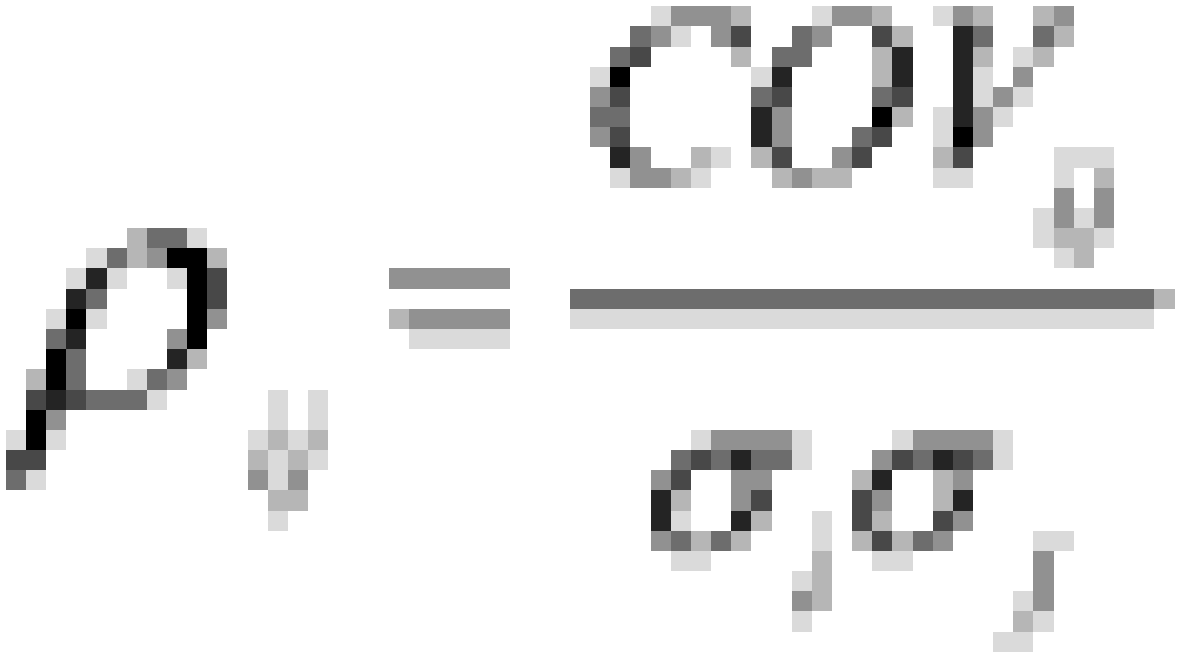
Correlations range from negative one which is perfectly negatively correlated to positive one which is perfectly positively correlated. To calculate correlation,



where

COV_{ij} = covariance between investment *i* and investment *j*

ρ_{ij} = correlation coefficient between investment *i* and investment *j*

σ_i = standard deviation of investment *i*

σ_j = standard deviation of investment *j*

An example of portfolios with two asset classes:

Year	*Return Investment A*	*Return Investment B*
1	10%	6%
2	12%	4%
3	14%	2%
4	11%	5%

5	9%	7%
6	13%	3%
7	15%	1%

Correlation = −1

In this example, investment A and B both had positive returns in all years which might lead some to think that this is a positive correlation. However, while they were all positive returns, one investment had a return higher for that year than its mean while the other investment for that year had a return lower than its mean.

Another example:

Year	***Return Investment C***	***Return Investment D***
1	3%	−2%
2	1%	−4%
3	0%	−5%
4	−1%	−6%
5	−2%	−7%
6	−3%	−8%
7	6%	1%
8	8%	3%

Correlation = −1

In this example, investment C and D both had negative and positive returns. When investment C was above its mean, investment D was also above its mean, resulting in a positive correlation which in this case was a perfect correlation.

A final example:

Year	*Return Investment E*	*Return Investment F*
1	1%	6%
2	3%	4%
3	6%	2%
4	9%	4%
5	1%	6%
6	3%	2%

Correlation = 0.5

In this example, investment E and F both had positive returns in all years. But sometimes, investment E was at or above its mean when investment F was at or below its mean and vice versa.

From these examples it can be concluded that while it is important to have assets which are not highly correlated with each other, it is just as important that those assets have positive expected returns.

One of the tools investment advisors use is a mean variance optimizer (MVO) which requires correlation assumptions. Many advisors use MVOs to assist in portfolio design. MVOs are used to design efficient portfolios such as a portfolio that has the highest return for the risk an investor is willing to take or a portfolio that has the lowest risk to meet the return objectives of the investor. The three main inputs for an MVO are as follows: expected return of each asset class, the standard deviation of each asset class, and the correlation between each asset class. While MVOs can be used to help understand relationships and assist in portfolio design, they should not be relied upon as the primary indicator for future portfolio risk adjusted return or absolute performance. MVOs are good educational and research tools. While they are used by many advisors, they do have limitations. If ex-post inputs are used in an MVO, the advisor will only see how the portfolio performed based on history which may have no bearing on the future. If ex-ante inputs are used, these capital market expectations are unlikely to come to fruition which means the portfolio outcomes will be different than indicated by the MVO. Experience and judgment will be a valuable part of overcoming the limitations of MVOs.

When portfolios are being designed, advisors should look for asset classes that have high expected positive returns with low or negative correlations to each other. If one asset class has returns that are higher than its

average and a second asset class also has returns that are higher than its average, these two asset classes will be positively correlated. If one asset class has returns that are higher than its average while another asset class has returns that are lower than its average, these two asset classes will have negative correlation.

Investment Planning Answer Book by Jay L. Shein, Standard Deviation

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The term risk can have many definitions. One such definition is that risk is not achieving one's goals. Another definition might be the uncertainty of an outcome and another might be the feelings of regret that an investor experiences after a significant drop in their portfolio's value. Some might consider the real risk as not taking any risk at all. There are various measures of risk which are used to evaluate an investment portfolio. Standard deviation is an important measure of risk that all investment advisors should be familiar with. Each investor wants an acceptable rate of return for the risk they are willing to take. While there are other measures of risk and risk adjusted return, standard deviation is a foundation for portfolio design and one of the inputs for mean variance optimizers.

Investment Planning Answer Book by Jay L. Shein, Q 4:11, How does standard deviation measure risk?

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Standard deviation measures the amount of dispersion of returns around a historic average or expected outcome. Standard deviation is a measure of total risk which encompasses diversifiable risk, also known as unsystematic risk, and non-diversifiable risk, also known as systematic risk. It measures the degree of uncertainty in an investment portfolio. Ex-ante calculations are used when the investment advisor wants to consider the probability of future incomes. It is calculated as follows:

$$\sigma = \sqrt{\sum_{s} p(s)\left[r(s) - E(r)\right]^2}$$

Where:

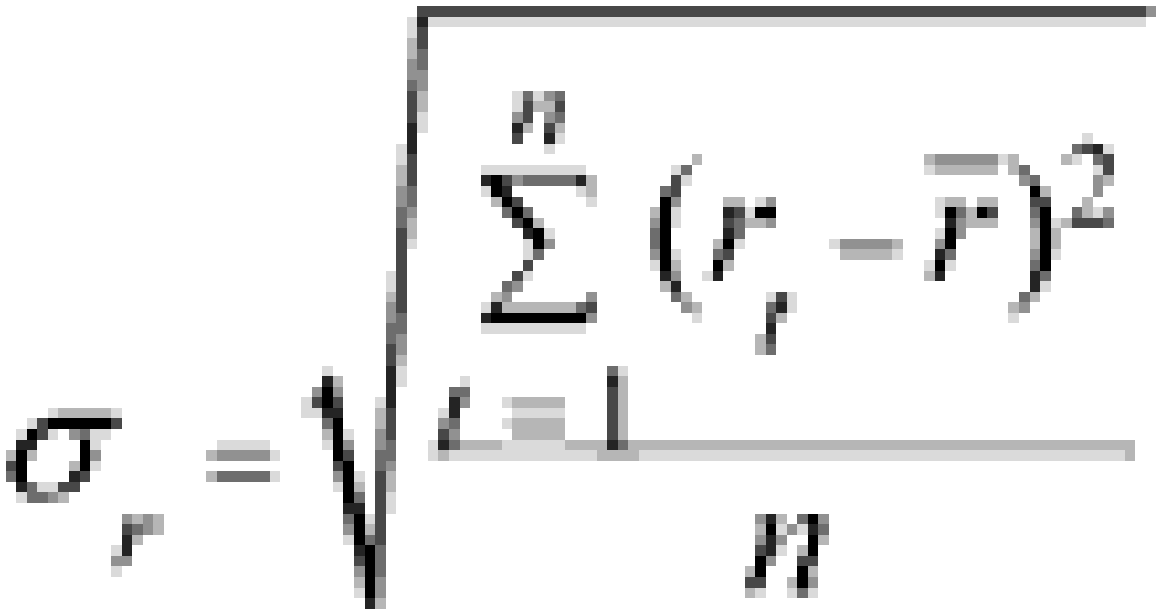
σ = standard deviation

p(s) = probability of the scenario

r(s) = the return for the scenario

E(r) = the weighted expected return

Ex-post returns can be calculated with the following formula when the total population is considered.



Where:

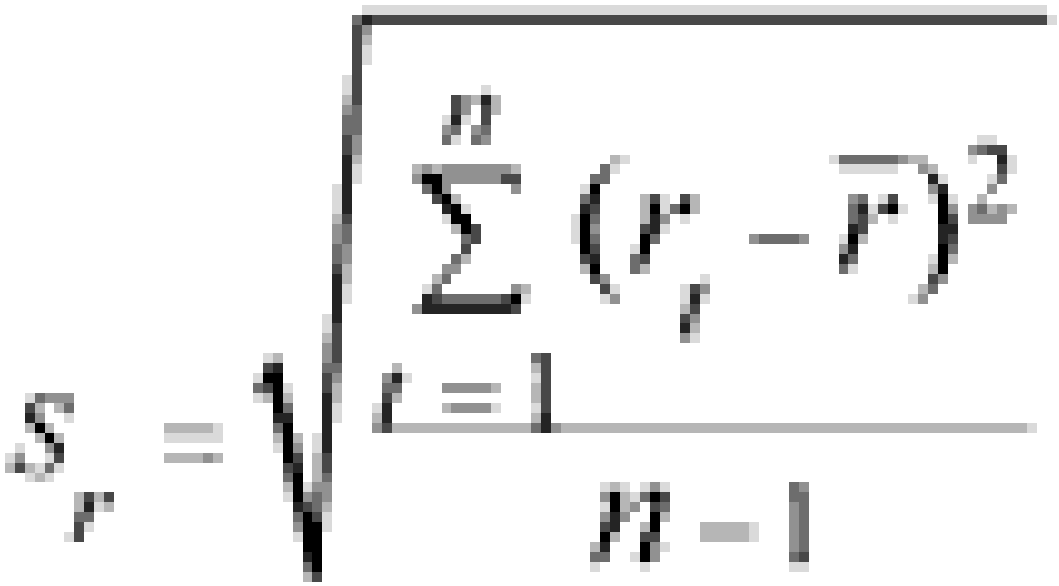
σ_r = standard deviation of investment return

r_t = investment period return

$\bar{r}$ = investment mean return

n = number of periods

When adjusting for a degree of freedom, the formula for the ex-post standard deviation is as follows:



Where:

S_r = standard deviation of investment return

r_t = investment period return

$\bar{r}$ = investment mean return

n = number of periods

Most investment software programs and financial calculators default to standard deviation with an adjustment for one degree of freedom. The reason that one degree of freedom is typically used is because, in most cases, all the data will not be available. If the advisor had the total population of data, the standard deviation would typically be higher. Since they typically do not have sufficient data, adjusting for one degree of freedom increases the standard deviation closer to what it would be if the total population of data was available.

Risk is a concept that should be discussed with investors on a regular basis. Standard deviation is not the answer to all risks that the investor faces, but it does help in explaining and understanding risk relative to return. One standard deviation encompasses approximately sixty-eight percent of occurrences, and two standard deviations encompass approximately ninety-five percent of occurrences. One standard deviation will typically

encompass many of the occurrences, while two standard deviations will usually encompass more of the worse case scenarios. However, no one should be lulled into a feeling of confidence that investment portfolios will be constrained to two standard deviations events. Investments may experience multiple standard deviation events which are much worse than a two standard deviation expectation such as the standard deviation from the mean of the U.S. and foreign stock markets in 2008. Investment advisors, wealth managers, and investors should not be complacent thinking that their portfolio's worst case scenarios will be a two standard deviation event. Highly improbable events may be unpredictable and have massive impact on investment portfolios. These highly improbable events seem to happen more often than can be explained by typical statistical models. Most investors would be best advised that they may experience three to four or more standard deviation events in their investment portfolios at least once in their portfolio's duration.

Investment Planning Answer Book by Jay L. Shein, Q 4:12, What are some of the distributive properties of standard deviation?

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The assumption in most cases is that the distribution of data has a normal distribution represented by a bell-shaped curve. This type of distribution has a mean, median, and mode that are all the same. Other characteristics that should be observed are the skewness and kurtosis. These bell-shaped curves imply frequency of various outcomes. In a normal bell-shaped curve, these frequency distributions are symmetrical (normal). The skewness of a normal distribution is always equal to zero. Investments that have positive or negative skewness will have an average return that is higher or lower than the median. Investors who are risk-averse desire positive skewness. With a positive skewness, there is less chance for significant negative events. Kurtosis measures how large the tails are in a distribution. Risk-averse investors look for low kurtosis in investments because the tails in the distribution are thin and the returns have a higher probability of falling closer to the mean.

Investment Planning Answer Book by Jay L. Shein, Q 4:13, How can the standard deviation of investment asset classes be used to measure the standard deviation of the portfolio?

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If a portfolio has two or more investments that are all perfectly correlated with each other, the advisor can simply use a weighted average of the standard deviations to calculate the standard deviation of the portfolio. For instance, if investment A had a standard deviation of 10 percent and represented 40 percent of the portfolio, and investment B had a standard deviation of 8 percent and represented 60 percent of the portfolio, the standard deviation of the portfolio would be 8.8 percent. There is no diversification benefit when you have investments that are perfectly correlated. In most cases, you would not have your investment assets perfectly correlated, so calculating the standard deviation of the portfolio would be more complex. This would be true if one was combining various asset classes such as stocks, bonds, and commodities or combining various money managers in a portfolio such as a stock manager, a bond manager, and a real estate manager. The equation for calculating the standard deviation of a multiple asset class portfolio is:

$$\sigma_p = \sqrt{\sum_{i=1}^{n}\sum_{j=1}^{n} w_i w_j \sigma_i \sigma_j \rho_{ij}}$$

Where:

σ_p = standard deviation of the portfolio

w_i and w_j = the portfolio weights of asset classes i and j

σ_i and δ_j = standard deviations of returns on asset classes i and j

ρ_{ij} = correlation between returns on asset classes i and j

For a simple calculation with just two asset classes, the following equation can be used:

$$\sigma_p = \sqrt{w_i^2\sigma_i^2 + w_j^2\sigma_j^2 + 2w_i w_j COV_{ij}}$$

Where:

σ_p = standard deviation of the portfolio

w_i and w_j = the portfolio weights of asset classes i and j

σ_i and δ_j = standard deviations of returns on asset classes i and j

COV_{ij} = covariance between asset classes i and j

It is important to consider correlation when calculating standard deviation of an investment portfolio. The advisor is looking to add investment asset classes that have low correlations to the other asset classes in the portfolio. Adding an investment to the portfolio with a higher risk as measured by standard deviation which also has a low correlation to the portfolio's other investments will reduce the portfolio risk. Portfolios with the highest expected return and the lowest standard deviation are the most desirable. Standard deviation is a major component of Modern Portfolio Theory (MPT) as it helps to quantify the relationship between expected return and risk. Investors willing to accept higher standard deviations (risk) should expect higher returns in the long run.

Investment Planning Answer Book by Jay L. Shein, Q 4:14, Are there problems with using standard deviation?

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Standard deviation has been criticized because it treats upside risk and downside risk equally. A portfolio with a low standard deviation may have more stable investment performance which may not be desirable. For example, investment return could average -3 percent per year and have a 0 percent standard deviation. Most investors would accept a higher standard deviation with the expectation of a higher long-term positive return. Because standard deviation treats upside and downside risk equally, a statistic risk some advisors use is downside deviation or semivariance. Semivariance is sometimes referred to as Post Modern Portfolio Theory.

When applying standard deviation to investment returns, your best guess at expected outcomes may not be a good guess if you have a large standard deviation. Even though certain investments such as stocks have high standard deviations, many view them as less risky than bonds or treasury bills when the investor has a long-term investment horizon. Standard deviations tend to be steady over long periods of time so that historical standard deviations may be reasonably reliable when projecting future outcomes. For portfolios that are not well-diversified, using the historical standard deviation to derive some expected standard deviation for the future is not as reliable. Sometimes advisors and investors are confident when they have a statistic such as a historical standard deviation. They feel that this mathematical measurement gives them a high degree of confidence for the future. We have seen in the history of the capital markets that actual standard deviation (risk) of diversified portfolios can end up being much greater than expected such as that which occurred in 2008.

Investment Planning Answer Book by Jay L. Shein, Q 4:15, Is there a different between Modern Portfolio Theory and Post Modern Portfolio Theory?

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Modern Portfolio Theory uses standard deviation as a proper measurement of risk. It looks at the risk return relationship and considers the benefits of diversification. A major criticism of using standard deviation is that it treats upside and downside risk the same. Because of this, Modern Portfolio Theory has been criticized. The champions of Post Modern Portfolio Theory feel it is better to use a downside measure of risk such as downside deviation or semivariance to measure risk.

Many investors equate risk with the idea of losing money. They do not equate risk with making money. If investors are only concerned about losing money and therefore look at downside risk, they may be missing the real risk of an investment. One of the difficulties of using downside measures of risk is the difficulty in deciding what is considered downside risk. Is it anything below zero return? Is it below the average return? Or is it below the investor's minimal acceptable return? This alone makes it a difficult statistic to use. Investments with high upside volatility as measured by standard deviation can be disastrous on the downside. The twenty year bull market in Japanese equity which ended in 1989 and the technology bubble of the late 1990s are examples of periods of time with high return and high volatility. After many years, these investments which had high returns and high standard deviations suffered tremendously. It is difficult to find investment asset classes which have either only downside risk or upside risk. The Long Term Capital Management, a large hedge fund that crashed in 1998, is another example of an investment that apparently had low downside risk. Investments that have high risks on the upside are most likely to have high risks on the downside also. Investment advisors should not rely on any one measure of risk to capture all of the variables. The advisor may find it beneficial to look at multiple measures of risk such as standard deviation and downside deviation.

Investment Planning Answer Book by Jay L. Shein, Mean Variance Portfolios

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Mean variance optimized portfolios are investment portfolios that give the highest expected return for any given level of risk or the lowest level of risk for a given expected return. Mean variance optimizers (MVOs) use mathematical relationships to develop these portfolios. They are used to assist in the development of investment portfolios.

Investment Planning Answer Book by Jay L. Shein, Q 4:16, What are the advantages of mean variance optimized portfolios?

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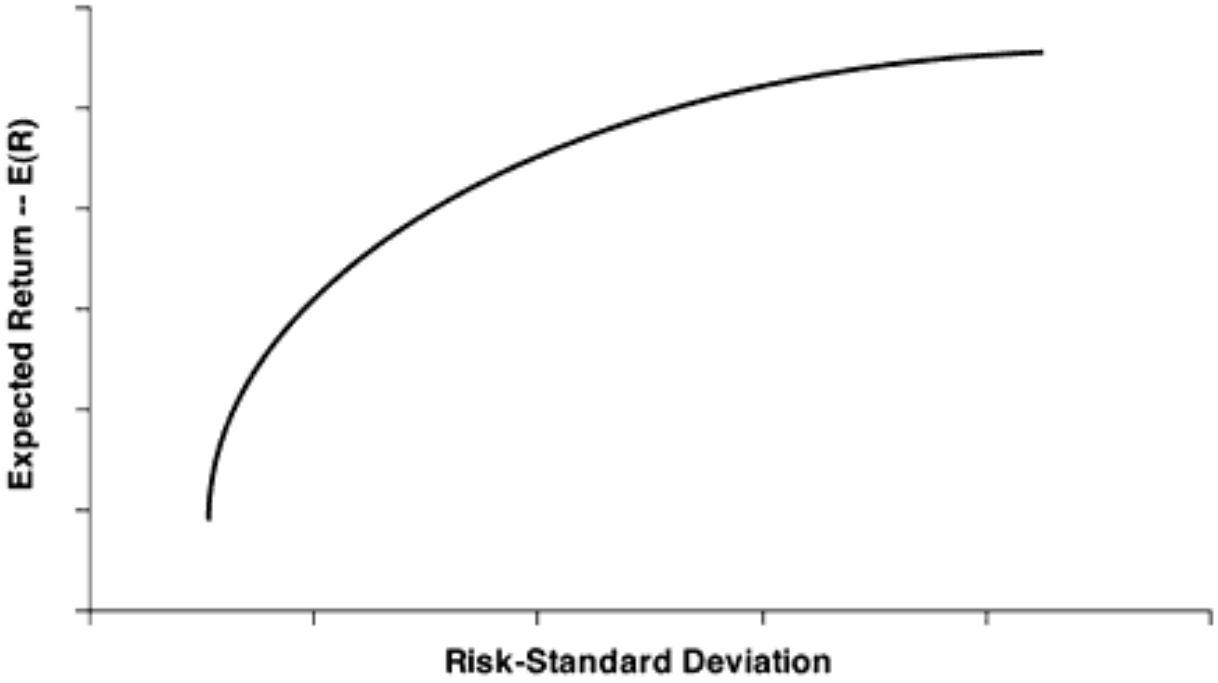
Many academic studies have demonstrated that the choice of asset classes and their weights in the portfolio have a large impact in the variability of return in the long run. The three main portfolio attributes that come into play in this research are the investment policy decision which is the decision which establishes what percentage of the portfolio is to be invested in each asset class, the security selection decision which determines how much to invest in each individual security, and the market timing decision which considers the timing of when the various amounts should be invested. This research and subsequent work has shown that the asset allocation decision (investment policy decision) is the most important one. There have been many challenges to this concept that suggest that the other portfolio return attributes play a more important role than previously thought. Some of this research has shown that market timing decision and security selection decision can play a very important role in portfolio management. Even though there is controversy about the most important attributes of portfolio return and variability, asset allocation and the use of mean variance optimizers (MVOs) have some benefits for the wealth manager/investment advisor. Mean variance optimizer can help the advisor develop an appropriate mix of investment alternatives. Using a mean variance optimizer can help the advisor and the investor sort through the many investment alternatives in a logical manner. This tool is designed to help focus on the long-term financial planning goals and objectives of investors.

A mean variance optimizer is a mathematical process that uses quadratic algorithms which allow investment advisors to develop the efficient frontier. Investment portfolios that lie on the efficient frontier give the investor the highest level of return for the amount of risk they are willing to take. To develop the efficient frontier with the use of MVOs, the investment advisor will have to provide or develop the following three major inputs: the expected return of each asset class, the expected standard deviation of each asset class, and the correlation between each pair of asset classes. Using MVOs is based on Modern Portfolio Theory which assumes that investors are rational and want the highest return for any given level of risk. MVOs are visual aids for explaining and demonstrating these portfolio diversification concepts to investors. MVOs allow investment advisors to get a better understanding of how the diversification works and the benefits it provides investors. Portfolios produced by MVOs which lie on the efficient frontier are represented by a curved line. These mathematically efficient portfolios that lie on the efficient frontier are portfolios that offer the best risk return tradeoff with the various mixes of asset classes. Portfolios that lie below the efficient frontier are considered inefficient as the portfolio risk reward parameters can be improved by changing the portfolio mix so that it lies on the efficient frontier. For example, a portfolio that is below the efficient frontier can have higher return with the same amount of risk by changing the portfolio mix to the one that is directly above the inefficient portfolio and lies directly on the efficient frontier curve. Another example would be where an investor is comfortable with the expected return of his inefficient portfolio but he would like to know if he could reduce the risk. In this case, the portfolio mix can be changed to a mix that is on the efficient frontier curve and has the same return as the inefficient portfolio.



Investment Planning Answer Book by Jay L. Shein, Q 4:17, What are some of the disadvantages of mean variance optimized portfolios?

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Modern Portfolio Theory (MPT) assumes that all rational investors would seek a mean variance optimized portfolio, a portfolio that offers the best return for the risk an investor is willing to take. There are many tools the wealth manager and investment advisor should use to design and manage an investment portfolio which can include economic, fundamental, and quantitative information. So while MVOs and asset allocation has its critics, understanding the arguments against MPT and MVOs is important for the advisor to be able to appreciate the basics of portfolio theory in order for them to understand its limitations.

MPT software packages have been criticized for a variety of reasons. Let's look at the pros and cons of these critiques. One criticism is that the expectations that are created by MVOs cannot be accomplished. Some have used historical returns for the inputs of MVOs. This can be problematic as the historical returns being used could be either a representative of an uncharacteristically high return period or an uncharacteristically low return period. Because the output from MVOs can be very sensitive to the inputs, using historical returns may make the MVO a trend follower. It is better to develop inputs that are based on market equilibriums that use inputs such as inflation expectations and the risk premiums on the various asset classes.

Another criticism of the MVOs is that there could be fundamental changes of the capital markets that could affect the long-term assumptions going forward. While this is definitely true, it does not mean that the wealth manager or investor should ignore planning for the future. It is indicative of the fact that planning needs to be periodically reviewed and modified based on current and expected conditions.

A third criticism is that the financial and capital markets may experience unforeseen events or catastrophes. Yes, shocks to the financial markets can occur without warning such as some of those that occurred in 2008. Investment banks failed, banks failed, and the credit markets dried up. Planning for these types of events are really not part of good financial planning, they are part of disaster planning. Advisors and investors should design their plans and investment portfolios based on the most likely path. MVOs are not new and have been used for many years by institutions and financial advisors. Like most technology, it can be used improperly. It is very beneficial for the investment advisor to work with an MVO to understand its benefits and caveats.

Since the accuracy of the inputs for MVOs is suspect due to the fact that they are used to design a portfolio that is forward looking, many advisors feel that portfolios that cluster around the efficient frontier, as created by the MVO, is acceptable. Since no one knows the future, any portfolio on or below the efficient frontier could actually be the optimal one after the fact. The investment advisor can strain the amount allocated to a specific asset class when using an MVO, especially when they feel that the output is inappropriate. MVOs are valuable educational tools that can help the investor understand the tradeoffs between strategies.