



Hedge Risk with Two Asset Allocation Strategies: Constant Weight Investment Strategy and Modern Portfolio Theory

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Abstract. The financial market is recognized as a high-risk environment with numerous opportunities. Recently, stock market volatility has increased, particularly in the aftermath of the pandemic, leading to lower returns and limited macroeconomic growth, which have posed significant challenges for the financial sector. In such uncertain times, effective risk management strategies are essential for successful investment. Two key methods to mitigate risk are hedge funding and asset allocation strategies, which can protect investors from significant exposure to market fluctuations. By applying modern portfolio theory (MPT) and constant-weight investment strategies, risk-averse investors can construct diversified portfolios that optimize returns while minimizing exposure to unmanageable risk. This article illustrates these strategies with real-life examples from companies like JP Morgan and GE, demonstrating how these methods can be effectively implemented. The research aims to familiarize investors with risk hedging strategies and provide a comprehensive, step-by-step guide to building an optimal investment portfolio. Investors looking to successfully manage risk while navigating the complexity of today's financial markets will find this contribution to be very helpful.

Keywords: Portfolio theory, investment strategy, risk and return, diversification, hedge fund.

1 Introduction

The financial market is always considered a place of high risk and limitless possibilities. The stock market has been volatile recently, especially after the pandemic [1]. Returns have not been as good as before, and there has been a lack of macroeconomic growth; the financial industry is undergoing a dramatic time. Therefore, appropriate risk management methods are essential for investment participation. Many strategies in this area that help investors generate profit through a careful market analysis are used by various investors. Among them, hedging strategy plays an important role. Financial hedging usually involves taking a stake in two distinct financial instruments that are correlated oppositely. Specifically, investors have two options when price swings occur: either accept or manage the risks more actively. This “risk management” involves hedging,

either financially or physically. The pricing of the acquisition or sale of tangible goods is matched to the price of future production and sales to implement physical hedging. The practice of managing price risks by offsetting the price fluctuations of associated physical transactions through financial derivatives (such as futures or options) is known as financial hedging [2]. Therefore, the chance that the other instrument will appreciate in value in the event that the value of the first one declines may mitigate any risk connected with the deteriorating position. This paper uses asset allocating strategy and hedge funds strategies to demonstrate the impact of portfolio allocation on returns under different hedging strategies. By using the method in this paper, the volatility of investment can be effectively reduced and the yield can be improved. This research paper will contribute to the investors who want to get a balance between risk and return and will also provide methods to investors who is confused by taking risk.

2 Hedge strategies

There are several hedging strategies investors use. The hedge fund and asset-allocating strategies are selected as the sample for this analysis.

Hedge funds mean combining the capital of several wealthy individuals and big businesses in an effort to maximise profits and lower risk [3]. Through this process, two investments with opposing reactions can hedge against market unpredictability and gain return [4]. Asset allocating strategy means investing across various asset classes through asset allocation techniques, which helps investors manage risk and return according to their risk tolerance and financial objectives [5]. Both of these investment strategies can reduce investment risk and volatility.

3 Modern portfolio theory

Two often utilized investment tools in industry are the Sharpe ratio and modern portfolio theory (MPT) [6]. Two Nobel laureates are William F. Sharpe (the creator of the Sharpe ratio) and Harry Markowitz (the creator of MPT). Although the literature does not explain why their theories are the cornerstone of industry, the fact that they were granted Nobel prizes may shed light on the reasoning behind the combining of these models. While selecting strategies and theories, investors may be influenced by subjectivity and sentiment, and the prominence of these economists' Nobel medals may also have an impact.

MPT is a thorough analytical tool appropriate for serving as an overview of the innovative methodology. Other optimization tools can be used after the principles of the method are grasped. Modifying the weights of the assets (w_i) to produce a portfolio with a total weight of one is how MPT finds the most efficient investment portfolios based on risk and utility.

When determining an efficient frontier and the corresponding optimal portfolio, MPT takes into account the covariance between assets [7]. The ratios have an impact on how an investor's portfolio grows (their alphas) in relation to the market since they

evaluate risk and reward differently. The form of the MPT efficient boundaries generated by the ratios makes this clear. A portfolio exhibits higher independence when the efficient borders of the portfolio diverge from the market in that degree.

The geometry of efficient frontiers represents the risk in every possible portfolio. The slope between the efficient frontier and the market proxy, or hurdle rate determines the ideal portfolio [8]. Greater volatility in returns within a risk band is indicated by a steeper line. The slope shows how sensitive you are to changes in risk. Additionally, the slope fluctuates in reaction to modifications in the market proxy. As a result, the ideal portfolio and risk sensitivity shift, along with the matching expected return alphas and betas [9]. The efficient border of the market should ideally be beta. Alpha could be responsible for any modifications to the efficient frontier's shape of the portfolio. Any portfolio that is not on an efficiency frontier suggests that the portfolios may be inefficient since there is a chance that the assets will either yield higher returns for the same risk or that the risk will be reduced.

Various ratios yield distinct efficient frontiers and portfolios for an identical set of assets.¹ The tangent lines' slope demonstrates how the returns' sensitivity to variations in risk fluctuates. A direct comparison might not make sense because the risk (denominator of the ratio) in each ratio is interpreted differently. We can locate a common comparison platform and compare the outcomes of all the models because each portfolio can have all four ratios calculated. MPT is not without flaws and inefficiencies, though.

Although Sharpe believes this approach offers a thorough insight of an asset's functionality, there may be problems because it suggests a portfolio based on historical data. MPT theory and Sharpe assume that investment results are homogeneous (uniform) and that investors agree that previous performance predicts future returns. MPT, however, might not take recent events—like breaking news—into account. Furthermore, MPT is questioned when combined with the Sharpe ratio since it makes the assumption that market sentiment can be assumed and that volatility is normally distributed [10].

Several research [11] have examined various statistical dispersions, such as skew or kurtotic distributions, and have demonstrated differences in predicted results. Additional research using simulated distributions has shown that leptokurtic and negatively skewed distributions are advantageous [12]. This is logical since negatively skewed distributions allow investors to realize larger gains because they favour above-average returns. The variation of predicted returns is thought to be smaller in positive kurtotic distributions than in normally distributed returns. According to Xiong and Idzorek, MPT under conventional assumptions is not as effective as tests using distinct distributions. But they employ unrestricted models in their research.

Therefore, this research test their results using MPT. Moreover, Section 4 goes into great detail about the advantages and disadvantages of the Sharpe ratio. Even though several studies demonstrate a variety of outcomes in the suggested portfolios, their results do not significantly improve over an prolonged duration. This was not the case while employing the unique strategy, indicating that making use of the ratios' derivations can provide fresh perspectives on portfolio dynamics and improved performance.

4 Adopt the hedging strategy in the real-life example

This paper selects JP Morgan's and GE Aerospace's stock to show how these two hedging strategies work.

4.1 Method

In order to balance risk and reward in accordance with their financial goals, risk tolerance, and investment horizon, investors allocate their portfolios among different asset classes, such as stocks, fixed-income securities, and cash equivalents.

This is a crucial strategy in portfolio management. This is a very personal choice that takes into account each investor's particular situation, including their capacity and desire to withstand market volatility and possible losses. The asset allocation strategy usually changes over time in response to changes in an investor's time horizon for investments, risk tolerance, and financial status. Investors frequently rebalance their portfolios when the actual asset allocations deviate from the target due to different returns among asset classes in order to preserve the intended risk profile and alignment with investment objectives. Maintaining the portfolio's alignment with the investor's long-term financial plan is contingent upon this continuous process.

In the areas of investment banking, commercial banking, processing financial transactions, and asset management, JP Morgan is a pioneer. They cater to millions of consumers worldwide, mainly in the US, and many well-known corporations, institutions, and government clients worldwide [13]. GE Aerospace is a \$30 billion revenue global provider of engines, systems, and services. This aviation technology pioneer continues to design, develop, and manufacture jet engines, components, and integrated systems for use in general aviation, business, military, and commercial aircraft, as well as gas turbines derived from aerodynamics for maritime use. Furthermore, GE Aerospace is global's top integrated engine maintenance resource [14].

Firstly, what must be done in order to get real data is to obtain the closing prices of the two stocks on the American Stock Exchange website for each day of the year. Then divide each day's closing price by the previous day's closing price minus one to get the daily return. Next, it is needed to calculate the daily expected return, which only requires averaging the daily return from the beginning of the year to date to obtain the daily average return. In addition, the annual expected return is additionally important to consider. In addition to the return on investment, rational investors should also pay attention to the risk and volatility of stocks, so here this research need to calculate the standard variance of each stock. In order to further determine the percentage of each stock in the portfolio so as to obtain the highest investment return and the lowest investment risk, what need to do is to calculate the best matching scheme of the portfolio, that is, to calculate its Sharpe ratio.

The Sharpe ratio is calculated as the expected return of the portfolio minus the risk-free return for each year divided by the standard variance of the portfolio. Next, is to calculate the standard deviation of the stock. To calculate the correlation between stocks, all daily returns of each stock are taken, and the formula in Excel is used to

compute them. Then, the Sharpe ratio is determined by substituting the calculated expected return, risk-free return, and standard deviation of the portfolio into the Sharpe ratio formula. Excel Solver is used to optimize and visualize the Sharpe ratio.

4.2 Real-life Practice with Hedge Strategy

Here is an example of the hedging strategy. Now, an investor wants to buy 100 stocks, and stock A over stock B is equal to 50%: 50%, assuming that stock A and stock B are both priced at the same price, at \$1. Now the price of stock B is unchanged, and stock A has doubled, which means that stock A is now totally worth \$100; by this time, the investors will need to sell 25 shares of stock A to keep the weight of stock A is 50% of the overall portfolio.

4.3 Real-life practice with Morden Portfolio Theory

In this part, the Modern Portfolio Theory is practised with two real-life stocks, JP Morgan and GE.

With its headquarters located in New York City, JP Morgan is one of the biggest and most reputable financial services companies worldwide. It was established in 2000 as a result of the merger of Chase Manhattan Corporation and J.P. Morgan & Co. and offers a broad range of financial services, such as asset management, private banking, investment banking, commercial banking, and treasury services. The company serves businesses, governments, institutions, and private citizens worldwide. Founded in 1892, General Electric Company (GE) is a worldwide business with its headquarters located in Boston, Massachusetts. GE was founded by Thomas Edison and has since grown into a diverse organization with activities in a number of industries, including power, renewable energy, healthcare, aviation, and financial services.

The daily closing stock price of JP Morgan and GE collected from Nasdaq are used to calculate the annual return and the standard deviation, which is presented in Table 1.

Table 1. expected return and standard deviation of two stocks.

	JP Morgan	GE
Expected return	12.74%	81.60%
Standard deviation	317.34%	487.10%

The correlation of these two stocks is 0.3551, which means these two stocks are less likely to move toward each other. This also supported the evidence that these two stocks can be used to reduce the overall portfolio risk.

With the formula of expected return and standard deviation of the portfolio, the scatter plot between risk and return can be obtained, which is Fig. 1.

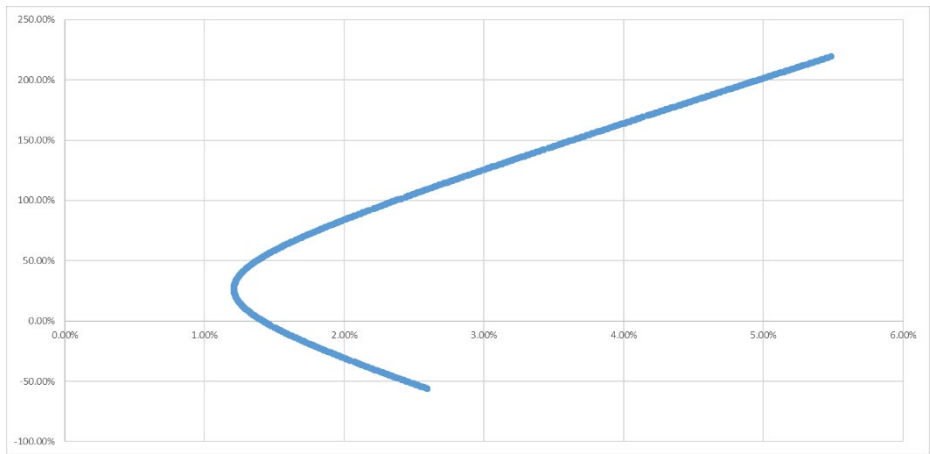


Fig. 1. Risk and return of the portfolio under different weights.

(Photo credit: original)

To get the optimal portfolio under these two financial assets, the Sharpe ratio should be calculated. The risk-free rate used here is 10-year US Treasury bill, which is 3.80%. With the Excel Solver, the optimal weight of the portfolio can be calculated, which is presented in Table 2.

Table 2. weight of Optimal Portfolio

	Weight
JP Morgan	-41.35%
GE	141.35%

This means that the investors borrow 41.35% of the overall value of the portfolio from the market and sell it immediately. Then, all the money will be used to purchase GE stock. This will help the portfolio achieve the best relationship between risk and return, which is the highest excess return per risk token by the investor. And the Sharpe ratio is the slope of the line passed risk-free rate point and tangent with the efficient frontier. (Fig. 2.)

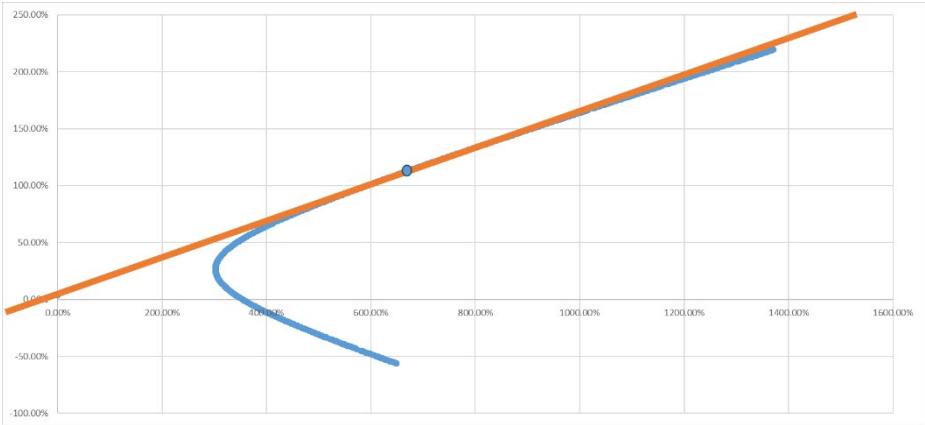


Fig. 2. Capital market line and the efficient frontier.

(Photo credit: original)

When the portfolio includes -41.35% of JP Morgan and 141.35% of GE, it will achieve the highest Sharpe ratio. At this time, the risk and return of the portfolio is shown in Table 3.

Table 3. Risk and return of the optimal portfolio.

Expected return	110.076%
Standard deviation	653.554%
Sharpe ratio	16.26%

5 Conclusion

Investors always trying to generate profit by investing in equity, which is stock. However, the risk of investment is a problem that stops investors from making higher returns. This research introduced two investment methods to help investors build their portfolios, which are the constant weight investment strategy and modern portfolio theory. The constant weight investment strategy asks the investors to keep the constant weight of different financial assets in the portfolio when the financial assets' stock price changes. And the modern portfolio theory is to build the portfolio by choosing the weight of different financial assets when the Sharpe Ratio of the portfolio is maximized. The real-life examples of JP Morgan and GE are used to show how to use these two methods. This research contributed to helping investors choose a proper investment strategy to allocate their money and balance the risk and return.

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