



Hedging with Different Financial Risks by Constructing Investment Portfolios

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Abstract. Risks play an important role in investor's decisions. So far, scholars have developed many strategies that can mitigate financial risks in theory, but for risks in real life, their changes are influenced by many complex factors. Therefore, constructing a valid investment portfolio in real life is still challenging. This article will construct various investment portfolios to hedge different financial risks. The research methods used in this paper are as follows. First, find some real investment opportunities and figure out their risks. Then, collect real-life data about different financial products that can be used to construct portfolios. Finally, identify portfolios that can mitigate risks. It was found that interest rate futures contracts, gold, and investments in different national markets can effectively mitigate interest rates, purchasing power, and exchange risks, respectively. The actual cases prove that individual investors can mitigate the financial risks of investment by constructing investment portfolios. The study found that investors can choose to invest in socially and economically stable areas, which can avoid many risks without the need to hedge their portfolios.

Keywords: Hedging Risk, Investment Portfolio, Data Analysis.

1 Introduction

More and more investors are paying attention to financial risks in their investments and realising the importance of reducing risks [1]. The wealth of individual investors is often limited, and a significant financial risk event can cause assets to shrink significantly or even be wiped out. Hedging strategies can reduce losses during market volatility and provide a solid layer of protection for assets. Market conditions are unpredictable, and a single portfolio is vulnerable to risk shocks. Hedging can reduce income volatility and enable individual investors to obtain relatively stable returns under different market environments, which is more conducive to realising long-term financial goals [2]. In recent years, due to the COVID-19 epidemic, changes in the international situation and geopolitical conflicts, economic instability has increased the impact of financial risks on investment. Many countries have started issuing derivative financial products for investors to choose from to construct their investment portfolios and hedge financial risks. Many scholars have also provided methods for hedging financial risks from the perspectives of management and

finance. It is still a challenge to hedge financial risks by constructing investment portfolios because of the complex situation in real life. Can systemic risks such as interest rate risks be effectively hedged through investment portfolios? What is the most effective investment portfolio for inflation caused by COVID-19 and geopolitical conflicts, and how can investors hedge the risk of these destabilising factors? This article researches the appropriate strategies to hedge financial risk effectively based on data from different financial product trends. The real life example and case study methods are selected in this analysis to work on the research purpose. The article concentrates on the interest rate, purchasing power, and exchange risks and considers different financial strategies of distinct objects, such as individual investors and enterprises.

2 Interest rate risks

Interest rate risk refers to the possibility of economic entities suffering losses due to changes in market interest rates. In today's complex financial environment, the fluctuation of interest rates is frequent and significant, which brings vast uncertainty and risk to various economic entities. As a financial derivative instrument, interest rate futures play a crucial role in hedging interest rate risk. The impact of interest rates is widespread. For financial institutions, such as banks, changes in interest rates may affect the value matching between assets and liabilities, thus affecting profitability and capital adequacy ratio [1]. Besides, when enterprises face interest rate fluctuations, it may lead to changes in borrowing costs, affecting investment decisions, financing plans and cash flow stability. The value of an investor's portfolio may also fluctuate significantly due to changes in interest rates.

Interest rate futures are futures contracts with fixed-income securities as the subject matter, and their prices are inversely changing with market interest rates. Risk hedging is achieved by taking a position in the futures market opposite to the spot market.

The characteristics of interest rate futures allow it to hedge interest rate risk effectively. Standardised contracts improve the convenience and liquidity of transactions. The leverage effect can control larger contracts with smaller funds. The price discovery function reflects the market's expectation of future interest rates.

2.1 Case 1: Interest rate risk management of commercial banks

A large commercial bank has many long-term fixed-rate loans and short-term floating-rate deposits. With market interest rates expected to rise, banks face the risk of a reduction in net interest income. To hedge this risk, banks decided to use interest rate futures to hedge. Banks sell interest rate futures contracts on the futures market that match the term and amount of the loan. When market interest rates rise as expected, the value of the loan assets declines, but gains on futures contracts compensate for this loss, thus stabilising the bank's net interest income [2].

2.2 Case 2: Corporate bond issuance and interest rate risk hedging

One company plans to issue bonds in six months to raise money to expand production. However, the uncertainty of market interest rates makes enterprises worry about increasing issuance costs. Firms buy interest rate futures contracts of the corresponding maturity and size to lock in the expected low interest rate. Before the bond issue, if the market interest rate rises, the bond issue cost will increase, but the profit of the futures contract can offset this extra cost. On the contrary, if the market interest rate falls, although the futures contract will incur losses, the reduction of bond issuance cost is enough to make up for the futures' losses to realise the effective hedging of interest rate risk [3].

2.3 Case 3: Individual investor hedging

The interest rate on the Chinese three-year Treasury Bond from March to April 2017 is 3.80%, and the interest rate on the Chinese three-year Treasury Bond in 2019 is 4.00%. In 2017, an individual investor with sizeable fixed-income investments held many Chinese three-year Treasury bonds. In anticipation of rising market interest rates in the future, this would cause the price of his bonds to fall, resulting in an asset impairment. In order to hedge this risk, he decided to use interest-rate futures to hedge. He sold interest-rate futures contracts that matched his bond investments. As market interest rates did rise, the price of his bonds fell, but at the same time, his short position in the interest rate futures market made up for the loss of bond prices to a large extent, effectively reducing the risk of the overall portfolio. By using interest rate futures to hedge, he successfully mitigated the adverse impact of interest rate changes on the value of his portfolio and realised effective management of interest rate risk.

By comparing the risk indicators before and after hedging, such as standard deviation and VaR, the effect of interest rate futures in hedging interest rate risk can be evaluated quantitatively. Through the study of the above examples, it can be seen that interest rate futures have a significant effect in hedging interest rate risks. However, in practical applications, it is necessary to fully consider various factors, formulate a reasonable hedging strategy, and constantly optimise and adjust.

3 Purchasing power risks

In periods of economic instability and inflation, purchasing power risk becomes a significant concern for investors. The prices of most products and services rise with inflation, so the same sum of currency can buy fewer products and services.

3.1 Anti-inflation assets

Investors tend to construct their portfolios with anti-inflation assets. Gold is a typical means of anti-inflation assets. It has unique characteristics that make it important in

hedging purchasing power risks. The supply of gold is relatively limited, and its physical and chemical properties are stable, making it difficult to degrade or lose. People always see gold as a kind of asset that holds its value, so they tend to invest in gold during inflation, which leads to an increase in gold prices. The anti-inflation property of gold allows its price to rise and to maintain or even increase its purchasing power [4].

The pandemic has stopped business activities worldwide, with consumer demand plummeting and international trade hindered. Many countries are in recession with negative GDP growth. Central banks have resorted to highly loose monetary policy in response to the recession, slashing interest rates and implementing quantitative easing [5]. The government has also launched a huge fiscal stimulus package that has led to a vast increase in the money supply, raising fears of inflation. The stock market has experienced sharp fluctuations, and investor confidence has been severely hit. Bond market yields have fallen sharply, and traditional portfolios are under intense pressure.

The price of gold fell briefly in the early days of the epidemic but then quickly rebounded and hit a record high above \$2,000 per ounce in August 2020. Investment demand has surged, with purchases of gold bars and coins rising and gold exchange-traded funds (ETFs) holding record highs. During the epidemic, the correlation between gold and risk assets such as stocks decreased and showed a negative correlation, further highlighting its risk-averse properties.

Individual investor hedging. The following two charts respectively show the market trends of New York gold and London gold in the past 11 years [6, 7]. (Fig.1 and Fig. 2) It can be seen from them that in the early two years of the epidemic, the price of gold increased significantly compared to before the epidemic. Take the example of an investor who allocated 20% of his portfolio to gold before the pandemic. During the epidemic, the stock market plummeted, but the gold part of the portfolio achieved significant appreciation, thereby mitigating the loss of the overall portfolio and effectively hedging the purchasing power risk.



Fig. 1. Market trend of the New York Gold index.

(Data source: Nasdaq)



Fig. 2. Market trend of the London Gold index.

(Data source: Nasdaq)

Economic instability during the pandemic highlighted the severity of purchasing power risks, and gold played a critical hedging role during this period. Through its function as a store of value, a haven asset, and a diversified portfolio, gold helps investors protect the value of their assets during economic turmoil. Similarly, at the

beginning of 2023, Silicon Valley Bank went bankrupt, and global geopolitical conflicts continued in 2023, especially the Israeli-Palestinian conflict that occurred in October, causing global economic instability. As shown in the charts, the price of gold began to rise in 2023, proving that investors tend to invest in gold during periods of economic instability.

inflation-linked bond. As a particular financial instrument, inflation-linked bonds have unique advantages in hedging purchasing power risks. Principal and interest payments on inflation-linked bonds are adjusted for the inflation rate. This means that when the price level rises, the amount paid on the bond will increase accordingly, ensuring that the investor will receive a return that matches the inflation rate. Inflation-linked bonds can maintain their real value in an inflationary environment by being indexed to inflation [8]. Unlike traditional fixed-income bonds, they do not suffer from a decline in real returns due to inflation.

Case 1: A period of mild economic inflation. Suppose that in an economic system, inflation remains at a moderate rate of around 3% per year for some time. Investors construct a portfolio that consists of 50% conventional bonds and 50% inflation-linked bonds. During this period, conventional bonds yield 5%, but due to the impact of inflation, their real yield is only 2% ($5\% - 3\%$). The yield on inflation-linked bonds, which adjusts as inflation rises, is 5% in real terms. Combined, the real return rate of the entire portfolio is 3.5% ($((2\% + 5\%) / 2)$), which effectively hedges part of the purchasing power risk.

Case 2: High inflation period. In another scenario, the economy suffers from severe inflation, soaring to 8 percent a year. The composition of the portfolio remains the same. At this point, the actual yield on conventional bonds turns negative, negative 3% ($5\% - 8\%$). The actual yield on inflation-linked bonds rose to 8%. The actual return on the entire portfolio is 2.5% ($((-3\% + 8\%) / 2)$), which is lower, but it still successfully mitigated the risk of a significant drop in purchasing power compared to simply investing in traditional bonds.

Case 3: Deflation period. Suppose the economy is deflationary, with the price level falling by 2% yearly. While conventional bonds still yield 5%, their real yield rises to 7% ($5\% + 2\%$). Inflation-linked bonds pay a smaller amount but have less impact on overall returns because of their limited representation in the portfolio. The portfolio has a real return of about 6% ($((7\% + 3\%) / 2)$), maintaining a relatively stable return in a deflationary environment.

As a result, the proportion of inflation-linked bonds in the portfolio can be adjusted appropriately depending on the expectation of future inflation [9]. An appropriate reduction should be made in the expectation of low inflation or deflation to increase its proportion in the face of high inflation expectations. Therefore, investors can hedge the purchasing power risk by adding inflation-linked bonds to the portfolio.

Case 4: Individual investor hedging. According to the International Monetary Fund data, the inflation rate was relatively low between 2014 and 2019, staying below 2%. However, in 2020, due to the pandemic and large-scale fiscal stimulus measures, the inflation rate began to rise and reached a relatively high level in 2021 and 2022 before falling back. If the investor constructs his portfolio with inflation-linked bonds during the inflation (2021-2022), the overall loss will be mitigated, similar to case 2.

4 Exchange risk

Exchange rate risk refers to the possibility of changes in the value of an economic entity's foreign exchange assets or liabilities due to changes in exchange rates. With the global economy's close connection and the financial market's internationalisation, exchange rate fluctuations have become an important factor affecting the return on international investment. Investors are exposed to the risk that the value of their assets will fluctuate due to changes in the exchange rate between their currency and that of other currencies. Exchange risk reduces the stability of investment returns and influences the financial status and business decisions of multinational enterprises. Expanding to different countries has become a common risk management strategy to address this challenge. By diversifying assets across countries and regions, non-systemic risks, including exchange rate risks, can be reduced. Different countries' economies and financial markets tend to have low correlations, allowing portfolios to achieve a degree of risk hedging in the face of currency fluctuations [10]. Calculating the portfolio's standard deviation and β coefficient, the risk level before and after investment expansion is compared to evaluate the degree of exchange rate risk reduction [11].

4.1 Case 1: Investment by American investors in Asian markets

An American investor holds an extensive portfolio of stocks and bonds in his home market. However, due to fluctuations in the exchange rate of the US dollar, the value of its assets has been dramatically affected. In order to hedge currency risk, the investor decided to invest part of the money in Asian markets, especially Japan and China. When the US dollar depreciates against the Japanese yen and the Chinese yuan, investment returns in the Asian market increase when translated back into the US dollar, making up for the loss of domestic investment due to exchange rate changes.

4.2 Case 2: Diversification strategy of multinational enterprises

A multinational company has production sites and sales markets in several countries worldwide, and its revenues and costs involve multiple currencies. In order to reduce the impact of exchange rate risk on corporate profits, enterprises not only carry out production and sales layouts in different countries but also invest funds in local financial assets [10]. For example, when the local currency appreciates, the return on

overseas investment is relatively reduced, but the profit of overseas business increases. On the contrary, when the local currency depreciates, the return on overseas investment increases, thus achieving a certain degree of risk balance.

4.3 Case 3: Individual investor hedging

An individual investor engaged in cross-border e-commerce business. His business mainly imports goods from the UK and sells them in China. Every month, he must pay a fixed payment to the British supplier, which is settled in sterling. Because the RMB exchange rate against the pound fluctuates frequently, this creates much uncertainty in his cost accounting. In early 2023, he predicted the RMB could depreciate against the sterling in the next six months. He decided to invest some of his money in sterling to hedge this risk. He bought a certain amount of sterling on a foreign exchange trading platform and held it for six months. As he had expected, the RMB depreciated against the sterling over the half-year period, as shown in the figure below, illustrating the GBPCNY exchange rate trend [12]. (Fig.3) If he had not hedged his sterling investment in advance, he would have had to pay more in RMB when he made the payment. However, because he bought sterling in advance when he needed to pay for goods, he could complete the payment at a relatively low exchange rate cost, effectively reducing the risk of cost increase caused by exchange rate fluctuations and guaranteeing his business profits.



Fig. 3. Market trend of the GBPCNY index.

(Data source: Yahoo Finance)

Through the analysis of the above examples, it is clear that expanding the investment scope to different countries significantly affects hedging exchange rate risks. However, implementing this strategy is challenging and requires investors to fully understand the relevant markets, develop a sound investment plan, and continuously monitor and adjust their portfolios.

5 Conclusion

By researching, this article discovers that investors can add interest rate futures to their portfolios when investors predict that bond rates will rise. Then, if the interest rate increases, the overall loss will decrease. During a period of high-interest-rate volatility, this investment strategy can ensure that investors get a relatively stable income. In this way, investors achieve the goal of reducing risk. The purchasing power risk, which always happens because of inflation, can be mitigated by investment in gold and inflation-linked bonds. When inflation is high during the COVID-19 pandemic and geopolitical conflicts intensify in 2023 and 2024, the price of gold increases significantly. It shows that when the economy is unstable, and the world situation changes, investing in gold or increasing the proportion of gold in the investment portfolio is an effective strategy to hedge the purchasing power risk caused by inflation. Investors can also pay attention to authoritative inflation statistics and add inflation-linked bonds to their portfolios as a hedge against purchasing power risk when inflation is high. As for the exchange risk, investors can spread their investment from the native market to other countries due to the differences between the markets in different countries. Investing in different currencies can hedge exchange risk from regional economic instability. Consequently, investors can choose to invest in a stable region during the economic period to avoid financial risk.

This article concentrates on data from recent years. It is even more instructive for investing today. When investors observe the interest rate of bonds rising, they can invest in interest-rate futures appropriately. As long as there are times of economic turmoil, investing in gold can yield gains in the gold portion. When the local economy is in turmoil, investors can expand investment to unaffected areas, thus hedging local risks. This article references investors regarding the strategies for hedging financial risks today. It is helpful for investors to know what kind of portfolio can be constructed to hedge different financial risks.

Finally, this article does not consider the influence of the monetary policy of different countries. If investors understand the country's monetary policy, investment decisions may be made to avoid many risks without hedging. Future studies can consider the central bank's monetary policy to determine how investors should deal with risks and minimise risks to obtain stable income.

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