Inflation-Driven Derivative Investment Strategies: A Comparative Analysis of Chinese and US Enterprises in 2022

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Abstract. Affected by the COVID-19 epidemic, the Russia-Ukraine conflict, climate change and other reasons, the global economy has shown an inflationary trend. In the context of inflation, governments and companies will bear different levels of risk. As a hedging tool, derivatives have become an important tool for all asset owners to fight against inflation risk. Through the comparative analysis of the derivative investment strategies of multiple enterprises in China and the United States in 2022, this paper tries to obtain the types of investment strategies of enterprises using derivative investment to combat inflation risk under the inflation. It has been observed that in 2022, enterprises primarily face inflation risks related to exchange rates, interest rates, and depreciation of enterprise value. In order to mitigate these risks, the formulation of the enterprise's derivative investment strategy takes into account various factors such as the enterprise's production and operation strategy, regional standard systems, and currency settlement types. Finally, based on comparative analysis, it is posited that enterprises exhibit a greater inclination towards employing interest rate and exchange rate derivatives as a means to mitigate inflation risk. In contrast, general investors can derive enhanced hedging functionality by utilizing commodity options and futures. However, when employing financial derivatives for investment purposes, one must consider the integrity of the derivatives market as well as the positioning within the industrial chain.

Keywords: Inflation, Financial derivatives, Exchange rate risk, Interest rate risk.

1. Introduction

After the Russia-Ukraine war, the new coronavirus epidemic, and the disruption of the global supply chain in 2022, the Federal Reserve implemented the policy of quantitative easing based on the aim of controlling inflation, and finally pushed the inflation rate of the United States to an unprecedented high in 2023. Although the International Monetary Fund predicts that the US inflation rate will fall to 3.5% in 2023, it still presents great opportunities and challenges for the global economy. For a moderate inflation rate, a slow and gradual increase in prices has a positive stimulatory effect on the economy and income, and such uneven price increases will directly affect the capital market. Due to excessive money supply and relatively stable productivity in the short term, the real value of money in a fixed unit decrease. Investors, in order to hedge against the risk of asset depreciation, naturally put their cash flows into the capital markets to hedge against the risk of inflation. This strategy is most vividly displayed in the context of the US inflation rate as high as 8.1% in 2022. The prosperity of the US stock market in 2022 can be attributed to inflation, as there appears to be no investment strategy beyond the capital market that can maintain a relatively significant real yield amidst an 8.1% inflation rate.

However, even if the US stock market shows a prosperous scene in 2022, stocks themselves only realize the function of "storing value" under the background of inflation due to the nature of property ownership, and they cannot be used as a long-term and effective risk control tool in asset management. So, derivatives are the more appropriate choice. As a tool of risk control, financial derivatives have two functions. First, firms manage the risks they may foresee through a mix of underlying derivatives. Second, the investment attribute based on the price difference of the underlying asset between the performance date and the contract date. Therefore, on the basis of weighing the investment attributes and hedging attributes of financial derivatives, it is of value to explore how to construct and manage derivatives portfolios under inflation risk to achieve different investment purposes. Therefore, from risk control, this paper will discuss how different forms of derivatives hedge the depreciation rate of

real property value to realize risk control under inflation, and how to use the financialization attribute of derivatives trading to achieve investment profits as much as possible under the risk. On this basis, it will explore how to reallocate the derivatives portfolio. This paper aims to examine how portfolio allocation can effectively achieve a two-fold balance between risk management and investment profitability, drawing on individual cases against the backdrop of the global market's rising inflation rate from 2019 onward.

2. The Effect of Inflation on Derivatives Trading

Since 2022, currency devaluation in most developing economies poses a risk of exacerbating food and energy price inflation. The World Bank's Commodity Markets Report notes that oil prices in local currencies have risen sharply in emerging market economies and developing economies due to currency depreciation. Coupled with the disruption of exports from Russia and Ukraine and global climate change, the commodity market will face multiple risks [1]. In the context of the financialization of commodity futures, the price of commodities is no longer only driven by supply and demand. Although the contradiction between supply and demand is still the basic factor affecting the fluctuation of international commodity prices in the long run, all kinds of natural disasters, production cycle changes and policy regulation can have a considerable impression on commodity prices. Speculative factors in derivatives trading, such as futures and options, can cause short-term fluctuations in commodity prices [2]. Because of financialization and indexation, speculative factors have become the most important factor causing the volatility of commodity prices. The indexation of commodity futures directly intensifies the long-term market volatility [2]. Moreover, the interaction between loose monetary policy and commodity futures speculation contributed to the rise in commodity prices. On the other hand, the supply-side effect on inflation is very direct. In the face of sudden changes in conditions, such as food, energy, housing and other commodities, there is no effective policy to alleviate the shortage of supply in the short term [3]. This ensures that in the unexpected inflation, the option futures of some commodities will remain at a relatively stable high level.

Secondly, the decline in the real value of currency caused by inflation is also affected by the position of the currency country in the supply chain. And there is a correlation between changes in a country's inflation level and the value of currency in the exchange market [4]. In other words, the yields that some foreign exchange derivatives under the inflation are also affected by the position of the country in the industrial chain. When enterprises use exchange derivatives as an arbitrage tool, they have to face the possibility of increasing risk management costs or failing to form effective risk control. For example, if Chinese enterprises want to use foreign exchange derivatives to combat inflation risks, they have to look directly at the current situation of the relative depreciation of the RMB, thus increasing the cost of their own risk control. From the perspective of countries, there is an obvious lag effect in the pass-through effect of exchange rate changes on inflation level. The time interval between the impact of exchange rate changes and the transmission to CPI and PPI provides the host country with the opportunity to implement monetary policies to combat the risks caused by inflation.

3. Literature References

Considering that different countries have different division of labor in the industrial chain, the types of inflation they face under the background of inflation are also different. Therefore, this paper will analyze the investment strategies of derivatives trading under different inflation types through the different risks faced by the Chinese and American governments or enterprises and the specific methods implemented in the same inflation environment between 2022 and 2023.

3.1. Derivative Investment Strategies of Chinese Companies

The implementation of the Futures and Derivatives Law (hereafter referred to as FDL) from August 2022 aims to reduce investment costs for investors and standardize the futures and derivatives trading market, thus laying a solid foundation for China to enter the global futures and derivatives market. Before that, it needs to be admitted that the size of China's derivatives market is limited by the lack of reasonable supervision and mature derivatives trading rules. The Table 1 and Table 2 below show the countries/regions in terms of trading volume in the field of derivatives in 2022, and the trading volume in the field of commodity derivatives. It can be seen that the market share of the Chinese mainland in financial derivatives and commodity derivatives is disproportionate, and it can also be considered that the attitude of the Chinese mainland towards financial derivatives trading is relatively conservative. As a result, the volume of derivatives trading is out of proportion to China's vast market.

Table 1. Ranking of Countries or Regions in terms of Derivatives Volume in 2022

Ranking in 2022	Ranking in 2021	Country and Region	Trading Volume (million lots)	Year Increase and Decrease	Market shares
1	1	India	39968	109.96%	47.67%
2	2	US	16657	9.36%	19.87%
3	3	Brazil	8314	-5.05%	9.92%
4	4	China	6768	-9.93%	8.07%
5	7	Turkey	2727	31.03%	3.25%

Table 2. Ranking of Countries or Regions in terms of Commodity Derivatives Volume in 2022[5]

Ranking in 2022	Ranking in 2021	Country and Region	Trading Volume (million lots)	Year Increase and Decrease	Market shares
1	1	China	6616	-10.50%	72.29%
2	2	US	1295	-1.70%	14.15%
3	4	England	599	-15.31%	6.54%
4	5	India	225	19.01%	2.45%
5	1	Russia	161	-77.60%	1.76%

And Commercial banks are also the main force in financial derivatives transactions. Chinese commercial banks have a strong need to use derivative transactions to hedge risk. Among them, state-owned commercial banks accounted for 55% of the foreign exchange derivatives trading volume in 2020, and the average annual growth rate of foreign exchange derivatives trading volume of five state-owned banks reached 40.15% from 2009 to 2020. Although non-state-owned banks accounted for a small proportion in the total amount of foreign exchange derivatives trading, their growth rate was rapid [6].

Due to the high degree of concentration of derivatives business, the difficulty of operation technology, the design and pricing of products are concentrated in the hands of a few professional institutions. When non-financial enterprises face obscure derivatives products and immature derivatives market, the risks they have to face not only include the risks in enterprise operation and management, but also the operational risks in derivatives trading [7] .Therefore, although Chinese enterprises have gradually tried to hedge corporate risks through financial derivatives in recent years, the benefits they can achieve are very limited due to the immaturity of market norms and their unfamiliarity with derivatives trading. In terms of transaction types, there is still a single transaction category in China's derivatives market, and the most widely traded derivatives are still exchange derivatives. China's non-financial enterprises generally face the exchange rate risk brought by the depreciation of the RMB in the face of unexpected inflation caused by 2022. Due to the foreign currency exposure generated by sales, procurement and financing, the exchange management strategy adopted by them generally matches the currency exposure generated in the process of sales and procurement through natural hedging to achieve local currency balance. When natural hedging cannot

completely eliminate foreign exchange exposure, foreign exchange forward management is mainly adopted [8]. Enterprises that use derivatives to realize risk management also generally exist in southeast coastal areas, which is mainly because there is a single type of derivatives in China's derivatives market, and the risks that can be hedged are quite limited. And such as the existence of exchange rate risk enterprises are also concentrated in the southeast coastal areas [9]. The rational use of derivative tools for risk hedging to increase the level of enterprise value and risk resistance is also mostly manifested as against the cash flow risk in transactions.

3.2. Derivative Investment Strategies of American Companies

Affected by the international situation, the value of the dollar gradually rose until October 2022. In the inflation and the rising value of the dollar, US multinationals are also facing supply chain disruptions and rising raw material prices. Large technology companies usually pay some of their costs directly in foreign currencies such as Chinese yuan and Japanese yen. When the dollar is used as the unit of account, the profit margin of the enterprise will also be affected by the exchange rate fluctuations. Therefore, large multinational enterprises usually use foreign exchange derivatives to hedge foreign exchange risks in the face of exchange rate fluctuations under unexpected inflation. Tesla, for example, does business in multiple currencies, and its revenue and operating costs are calculated based on the currency of the country in which the subsidiary is located. Changes in exchange rates directly affect margins that are denominated in dollars, so Tesla typically doesn't hedge foreign exchange risk. Tesla will consider the historical trend of foreign currency exchange rates, calculate and determine that the foreign exchange rates of all currencies are kept at a relatively low level in the short term to control risks [10].

Apple's investment strategy and strategic focus is to maintain asset value and liquidity. Because Apple is a net recipient of dollars, a stronger dollar negatively affects its gross profit. Therefore, in order to counter the interest rate risk, Apple directly adjusts the pricing of local goods. In addition, Apple enters into foreign currency forward and option contracts with financial institutions to hedge foreign currency risk for purposes such as the existing debt and transactions and the forecast of future cash flows [11]. At NVIDIA, the company's sale and transactions (with third-party vendors) are priced and paid in U.S. dollars. Its trading is not affected by exchange rate fluctuations. The purpose of using derivatives as a tool is mainly to mitigate the impact of operating costs caused by exchange rate fluctuations. It designates the external forward contract as a hedge against cash flow. And the change in the value of the contract is included in the income or expense to hedge the change in the fair value of the asset caused by the foreign currency valuation [12].

Based on the derivative investment strategies of the above three technology companies in 2022, it can be found that there are also differences in interest rate and foreign exchange risks according to different production and operation modes and corporate ownership structures. In the process of production and sales, it generally uses a variety of currencies for settlement, which needs to bear more complex interest rate risk. Under normal circumstances, a single foreign exchange derivative tool cannot be used to hedge exchange rate risk. The fixed use of the US dollar as the settlement currency in the production and sales process requires relatively low exchange rate risk. The use of foreign exchange derivatives is also to ensure liquidity and the expected debts. In addition to hedging the exchange rate risk, the use of securities derivatives to hedge interest rate risk, such as interest rate changes caused by the company's cash, cash equivalents, securities interest fluctuations and hedging cost changes [11].

3.3. Comparison of Derivative Strategies between Chinese and American Enterprises

Through a comprehensive analysis of the derivative strategies used by Chinese and American enterprises in 2022, it is evident that the primary objective of employing derivative instruments lies in mitigating risks associated with interest rates and exchange rates, while ensuring stability in liquidity and the successful repayment of maturing debt. First of all, since China and the United States are in different positions in the global industrial chain, the impact of inflation on Chinese and

American enterprises and the types of risks are also different. Secondly, there are differences in the standard system and market maturity of the derivatives market between China and the United States. The derivatives market in China is still in its infancy, which leads to the fact that most Chinese enterprises do not have the ability and understanding to use derivatives for risk avoidance or speculation, so there are relatively few enterprise strategies that can be used as a comparative analysis.

The trading volume of commodity futures and options in China in 2022 was 6.616 billion lots, accounting for 72.3% of the total trading volume of 9.153 billion lots in global commodity futures and options, while the trading volume of futures and options was 6.768 billion lots, accounting for 8.1% of the global total of 83.848 billion lots [13]. One of the reasons for this imbalance is that the number of enterprises with exchange rate and interest rate risks is still small in the Chinese market environment, and most Chinese enterprises do not have significant hedge demand for financial derivatives. In contrast, the United States, as a pioneer in the derivatives market, has a deep accumulation of technological and product innovation. The culture, economy, financial system and regulatory system are better than in China, which promotes the innovation of derivative varieties. In short, China, Beijing still holds a conservative attitude towards the financialization of derivatives trading. Although it gradually opens its attitude towards derivatives market with the promulgation of laws and regulations such as FDL, the main purpose of guaranteeing derivatives trading is still to serve the real economy. China's attitude towards derivatives trading is particularly clear when compared to the total volume of derivatives trading in India in 2022. Due to the similar division of labor between India and China in the global industrial chain and the comparable market size, India ranked first in the world with 39.968 billion transactions and a year-on-year growth rate of 109.62% in 2022. The National Stock Exchange of India (NSE), Bank Nifty Index Option, CNX Nifty Index Option and Nifty Financial Services Index Option rose 108.27%, 148.70% and 15472.35% respectively [14]. It is not difficult to see the difference in the attitude of the two countries towards the financialization of derivatives.

3.4. Derivatives Investment Suggestion

From the derivative investment strategy in 2022, it is not difficult to find that the interest rate and foreign exchange market have become the main production place for multinational enterprises to combat inflation risk. There are two main strategies implemented by multinational enterprises to offset inflation risk. One is to hedge inflation risk through financial derivatives, and derivative transactions tend to diversify risks through various types of financial derivatives. According to the empirical cases from 1990 to 1996, when the overseas income of non-financial listed enterprises is greater than the overseas expenditure, risk hedging with derivatives can significantly improve the value of the enterprise [15]. In Biguri's empirical study, risk hedging emerges as an insurance strategy capable of effectively stabilizing corporate cash flow and enhancing corporate value, irrespective of the firm's risk preference [16]. Therefore, the author suggests that enterprises should strive to minimize the profit attributes in their derivatives investments. Second, streamline the production and sales structure of the enterprise itself. Such as streamlining distribution networks and reducing the number of missteps from production to sale, using a common currency for settlement, etc. Achieve cost reduction and efficiency as much as possible. The complex production process will increase the cost and reduce the efficiency of derivatives to hedge inflation risk.

For general investors, they can be divided into two types of investors according to the differences in investment purposes: speculation and value preservation. In the inflation, commodity options and futures still have general consumption attributes, and commodities such as energy, metal and agricultural products have their inherent value. Even if the price of such commodities fluctuates due to inflation, the actual value of the commodity can exceed the lower limit of the value of the guaranteed derivative, so the commodity derivatives can be used as a hedging tool for investors. Restrictions on small investors in derivatives hinder risk diversification. Derivatives should align with investor needs and insurance purposes through flexible contracts, bridging the gap with other insurance instruments [17]. Based on the purpose of speculation, general investors should pay

attention to the current financial derivatives market and tend to choose the open and standardized derivatives market for investment. Although for the general investor, derivatives may not be the best choice for profit. In a research of Chennai city by Ravichandran, it is believed that small investors are willing to pursue profits through derivatives trading even in the absence of relevant knowledge about the derivatives market. The effective approach lies in utilizing derivatives as a tool for mitigating risks associated with stock market investments, thereby enabling them to achieve greater profitability by leveraging the risk control nature of derivatives [18]. In addition, the capital flow in the financial derivatives market is particularly important. Because the terminal of the production chain can gather more capital and there are various ways to hedge inflation risk, the financial derivatives of the terminal country or region of the production chain are preferred to be invested.

4. Conclusion

Based on the comparative analysis of the derivative investment strategies of Chinese and American enterprises under the background of the gradual rise of global inflation in recent years, it is found that the interest rate and exchange risk caused by inflation are the main purposes of enterprise investment in derivatives. The differences in enterprise investment strategies are mainly caused by the following reasons:

1. The laws and regulations of the country or region where the enterprise is located, and the maturity of the derivatives market will affect the derivatives investment strategy of the enterprise. The lack of effective derivatives market trading standards will increase the cost and risk of using derivatives to achieve hedging. The immature derivatives trading market and the low financial attribute of derivatives will reduce the enthusiasm of enterprises to invest in derivatives.

2. The production and sales mode and rights structure of an enterprise determine its derivatives investment strategy. The main purpose of non-financial enterprises for derivatives trading is still hedging. And the risk type of hedging is relatively clear. Compared with the overall gross profit of enterprises, the efficiency of using derivatives trading for profit is limited and the risk is large. Financial institutions and commercial banks are still the main force of speculative behavior in derivatives trading.

3. The currency type of settlement determines the responsible degree of foreign exchange derivatives investment strategy to a certain extent. Firms typically restrict sales to a single currency such as the US dollar and settle with third-party manufacturers to reduce the cost of using foreign exchange derivatives to hedge currency risk. The use of multiple currencies for settlement increases the complexity of hedging with derivatives.

Due to the limitation of literature sources and length of the article, this paper can present a relatively limited derivative investment strategy of enterprises. And this paper can only analyze and summarize the quantitative and qualitative disclosure of market risks of enterprises in the same type and different regions in 2022. Moreover, according to the difference of enterprise types, commodity options and futures cannot be a popular choice for enterprise hedging, so it is only mentioned as an element of comparative analysis in this paper. The author believes that with the development of globalization, derivatives as an important hedge tool will be widely accepted by all countries in the world. In this process inevitably promote the financialization of derivatives trading. Reasonable emphasis on the financial attributes of derivatives can stimulate the liquidity of the derivatives market, but it may also cause financial risks due to insufficient regulations and other reasons. Overall, the global derivatives market is maintaining a benign trend.

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