

Study on the Utilization and Impact of Financial Derivatives in Chinese Listed Companies

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Abstract. In recent years, Chinese companies have been facing increasing risks in the financial market. In addition, international commodity prices fluctuated dramatically due to the geopolitical and global economic situation, further increasing the business risks of enterprises. Against this background, the importance of financial derivatives as a risk management tool is becoming more and more prominent, and the demand for their application by enterprises is rising. This paper systematically analyses the development status, structure and change trends of the financial derivatives market of Chinese listed companies and discusses how enterprises can optimize risk management and financial decision-making through derivatives. The study finds that the number of listed companies disclosing derivative financial assets grows significantly between 2019 and 2023, and the use of financial derivatives expands gradually, especially in the areas of interest rate, equity and currency derivatives. The findings of this study provide a reference for firms to formulate more effective risk management strategies and empirical support for policy makers to optimize the regulatory system and market structure.

1 Introduction

In recent years, Chinese enterprises have faced financial market risks such as fluctuations in exchange rates, interest rates, and commodity prices, posing challenges to financial stability and profitability. The exchange rate of RMB against USD has fluctuated significantly since 2019, depreciating from 6.7 to 7.3 in 2022. Although there has been a rebound in 2023, it is still in a high volatility range. The volatility of global interest rates and uncertainty in commodity prices have also increased the difficulty of cost management for businesses, especially in industries such as energy, manufacturing, and agriculture.

To cope with these risks, companies are increasingly using financial derivatives for hedging. The global trading volume of derivatives has increased significantly in recent years, with a total of 137.293 billion contracts traded on exchange worldwide in 2023, a year-on-year increase of 63.74%. In China, from 2019 to 2023, the fair value and nominal principal of currency, equity, and interest rate derivatives have all shown an increasing trend, reflecting the increased acceptance of derivative instruments by enterprises and the expansion of the Chinese derivatives market.

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In this context, this article focuses on the use and impact of financial derivatives by Chinese listed companies, systematically analyzes the scale, structure, and trends of the Chinese derivatives market, and explores how companies can use derivative instruments for risk management to optimize financial decisions. The research contribution of this article can be divided into three aspects: firstly, studying the use of derivatives can help enterprises better identify and respond to market uncertainty. Secondly, the Chinese derivatives market has developed rapidly in recent years, in depth analysis of its evolution trends and application practices can provide valuable references for policy makers and market participants. Thirdly, companies can better understand the role of financial derivatives, develop reasonable risk management strategies, and improve their stability and competitiveness.

2 Literature Review

2.1 Regulation and development of financial derivatives markets

In terms of regulatory issues in the financial derivatives market, Miao points out that the scale and depth of China's derivatives market are small and insufficient, especially the development of interest rate and credit derivatives is relatively lagging behind [1]. Meng recommend strengthening the supervision of derivative trading to cope with the challenges brought by market changes and improve the risk management capabilities of financial institutions [2]. Huang uses interest rate swaps as an example to explore the applicable conditions of hedging accounting in commercial banks and its impact on the financial stability of banks [3]. Zhang emphasizes that enterprises should follow the principle of "risk neutrality" when managing exchange rate risks, avoid speculative behavior, and make reasonable use of foreign exchange derivatives. And it was suggested to strengthen market supervision and regulatory construction to reduce trading risks [4].

2.2 Decision-making on the use of corporate financial derivatives

Research has shown that Chinese multinational corporations primarily use derivatives for hedging purposes rather than speculative purposes when making decisions on the use of corporate financial derivatives. Based on the data of A-share listed multinational companies from 2011 to 2018, Zheng&Yang analyze the decision-making process of companies using financial derivatives and find that there are differences in the determining factors of whether companies use derivatives and the scale of use, and the optimal hedging theory cannot fully explain this decision [5]. The role of media sentiment in corporate financial derivative decision-making has also received attention. The research results indicate that fluctuations in media sentiment related to exchange rates significantly increase the probability of companies using foreign exchange derivatives, and management risk preference plays a key role in this process [6]. Zhou & Ma point out that Chinese commercial banks using interest rate derivatives can effectively reduce banks' risk-taking, while the impact of foreign exchange derivatives is not significant [7]. In contrast, Zhang et al. find that the behavior of commercial banks holding financial derivatives is positively correlated with their risk-taking level [8].

2.3 The Impact of Fintech on the Derivatives Market

With the development of financial technology, blockchain technology, smart contracts, and digital currencies have had a profound impact on the derivatives market. Research has shown that blockchain technology can enhance market transparency and reduce intermediary costs, while smart contracts can achieve automated execution and improve transaction efficiency.

In 2021, the global trading volume of blockchain derivatives reached 35 billion US dollars, a year-on-year increase of 75%. However, the rapid development of financial technology has also brought about issues of increased compliance costs and market volatility. For example, compliance spending by global financial institutions increased by 9.6% in 2021[9]. In addition, the widespread use of financial derivatives may also have an impact on wealth distribution. A cross-border study covering 15 countries (2001-2021) found a significant positive correlation between derivative trading and wealth inequality[10].

3 Derivatives Market Size, Structure and Trends of Listed Companies in China

3.1 Development of Derivatives Market for Listed Companies

From the perspective of listed companies, the number of companies disclosing derivative financial assets has significantly increased from 6 to 306 between 2019 and 2023, accounting for 5.7% of the total number of listed companies. In addition, the total scale of derivative financial assets has also increased from 36 billion yuan in 2012 to 545 billion yuan in 2022. This significant growth not only reflects the improvement of listed companies' awareness and application ability of derivative instruments, but also reflects the changes in the market environment that encourage enterprises to more actively use derivatives for risk management.

Between 2019 and 2023, the use of derivative financial instruments by listed companies has significantly increased, with a 31 fold surge in the number of companies using interest rate derivatives, increasing from 2 to 64; The number of equity derivatives has increased from 1 to 39, and people's acceptance and application scope of equity derivatives have expanded; Currency derivatives have grown from nothing to 31, and with the increasing demand for currency derivatives under global economic integration, companies are increasingly relying on derivative instruments to manage risks and optimize their business.

3.2 Derivatives Market Structure Analysis

3.2.1 Interest rate derivative

As shown in figure 1, from 2019 to 2023, the nominal principal of interest rate derivatives of all listed companies showed a significant growth trend, especially reaching a high point in 2021 and then slightly decreasing, but still maintaining a high level. The fair value of assets and liabilities began to significantly increase in 2020, reached its peak in 2021.

In 2021, the nominal principal of interest rate derivatives reached a high point, which is due to the combined effect of multiple factors. First, the global economy is gradually recovering from the impact of the COVID-19 epidemic, but the uncertainty of recovery has increased the market's expected fluctuations in future interest rate changes, prompting enterprises to seek more hedging tools to manage potential interest rate risks. In addition, with the increasing expectation of economic recovery, companies future financing costs increase. Therefore, by increasing the nominal principal of interest rate derivatives to lock in the current lower interest rate level, they can reduce future financial costs.

3.2.2 Equity derivative

As shown in figure 2, from 2019 to 2023, publicly traded companies experience significant dynamics in their use of equity derivatives, adjusting their responses to market volatility and

risk management strategies. Notional principal remains low through 2020 and then rises significantly in 2021, reflecting increased corporate hedging needs, while a small decline in 2022 stem from changing market conditions or adjustments in hedging strategies. By 2023, the notional principal amount increases again to its highest point, as the Company's expectations for future market volatility increase. The fair value of assets and liabilities are both close to zero until 2020, but rise in tandem from 2021 onwards. After 2021, the growth in the fair value of assets slows, while the fair value of liabilities declines in 2022, before picking up in 2023. These figures as a whole present a cyclical picture of the Company's management of equity derivatives, which is influenced by multiple factors including market volatility, economic expectations, regulatory environment, and internal risk management strategies.

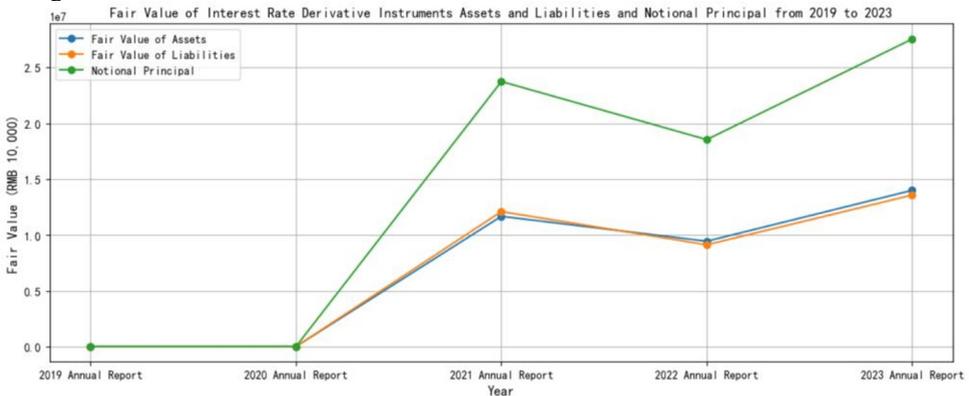


Fig. 1. Fair Value of Interest Rate Instruments Assets and Liabilities and National Principal from 2019 to 2023

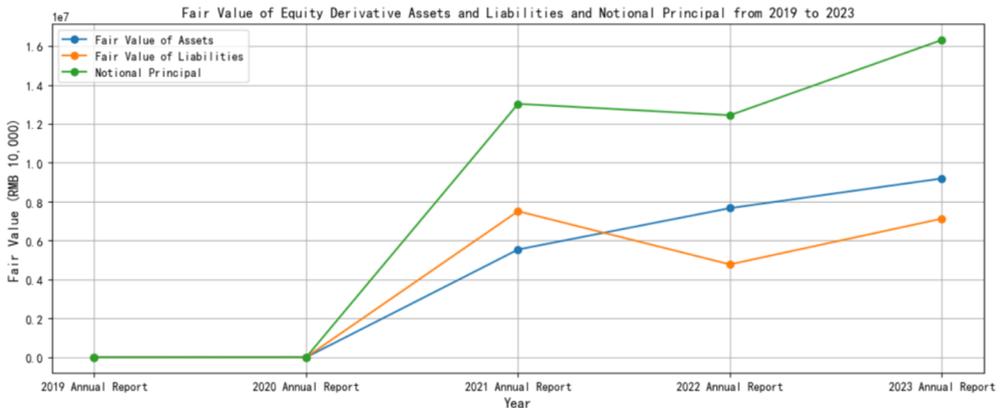


Fig. 2. Fair Value of Equity Derivative Assets and Liabilities and National Principal from 2019 to 2023

3.2.3 Currency derivatives

As shown in figure 3, from 2019 to 2023, the notional principal amount shows a significant growth trend from zero in 2019 to almost RMB500 million in 2023, indicating an increase in market demand for currency derivatives. The fair value of assets and liabilities also shows a growing trend, but the growth is relatively small and the gap between them is gradually narrowing. The reasons for the increase in demand for currency derivatives were related to the opening up of financial markets, the increase in investment in domestic RMB bonds by foreign institutions and the growing demand for foreign exchange hedging by enterprises

using foreign exchange option business. In addition, with the orderly progress of RMB internationalization, the market's increasing willingness to use RMB for trading purposes has also contributed to the growth in demand for currency derivatives.

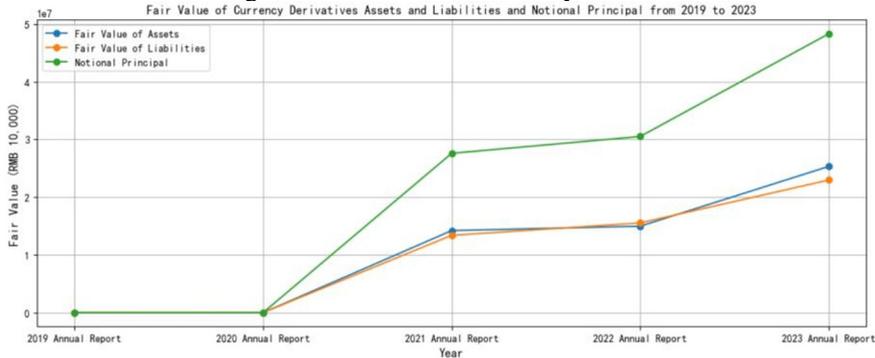


Fig. 3. Fair Value of Currency Derivative Assets and Liabilities and National Principal from 2019 to 2023

3.3 Derivatives market trends

3.3.1 Diversification of the types of derivatives

Derivative financial products are increasingly diversified, including futures, options, interest rate swaps and credit derivatives. With the innovation of financial instruments, enterprises have more flexible choices in financial management. For example, futures contracts allow enterprises to lock in future prices, thereby reducing the risk of fluctuations in raw material costs, while options give enterprises the right to choose under specific conditions, helping to protect their interests under unfavorable market conditions. Market demand for derivatives is diversifying, and enterprises are increasingly emphasizing the use of derivatives for risk management and financial planning.

3.3.2 Changes in market participants

The structure of participants in the derivatives market has also evolved. Traditionally, banks have been the main market participants, providing derivatives trading services and acting as market makers to enhance market liquidity. However, the participation of non-financial corporations is increasing, and many companies use derivatives for risk management to hedge their exposure to fluctuations in exchange rates, interest rates and raw material prices. For example, manufacturing companies use raw material futures contracts to lock in purchasing costs and thus avoid profit fluctuations due to price volatility. In addition, investors also use derivatives for speculative trading in an attempt to profit from market fluctuations. While such speculative activities increase market liquidity, they also increase market volatility, making risk management more complex.

4 the Impact of Derivatives Utilization on Firm Performance

4.1 Overall Impact of Derivatives Utilization on Firm Value

A correlation analysis of Derivative Financial Assets (DFA) and Enterprise Value (EV) of non-financial corporations from 2019 to 2023 reveals that the correlation between the two is

extremely weak from 2019 to 2021, with correlation coefficients almost close to zero (2019 is -0.0035, 0.0091 in 2020 and 0.0057 in 2021). This phenomenon can be largely attributed to the relatively small scale of firms' use of derivatives between 2019 and 2021, and the limited availability of data prevents the potential impact of derivatives on firm value from fully emerging.

However, from 2022 onwards, with the significant expansion of the scale of derivatives use, the correlation shows a clear upward trend (the correlation coefficient is 0.0276 in 2022), and although there is a small drop in 2023 (0.0189), it still remains at a high level. This change suggests that as the frequency and scale of firms' use of derivatives increases, their impact on firm value begins to emerge gradually. This further suggests that the relationship between derivatives and enterprise value is not fixed, but is influenced by a combination of multiple factors such as the scale of derivatives use, the way of use, and the market environment.

Specifically, between 2019 and 2021, the correlation is close to zero due to the general lack of large-scale use of derivatives by firms, and the characteristics of the data at this stage limit in-depth analysis of the relationship between derivatives and firm value. However, from 2022 onwards, as the scale of derivatives use expands, the increase in correlation indicates that the potential impact of derivatives on firm value begins to be captured by the data. If firms use derivatives appropriately for risk management, such as hedging against exchange rate risk, interest rate risk, or raw material price volatility risk, then derivatives serve to protect firm value during market volatility, thereby enhancing firm value. On the contrary, if firms use derivatives for speculative purposes, they can increase financial risk and thus weaken long-term firm value (Figure 4).

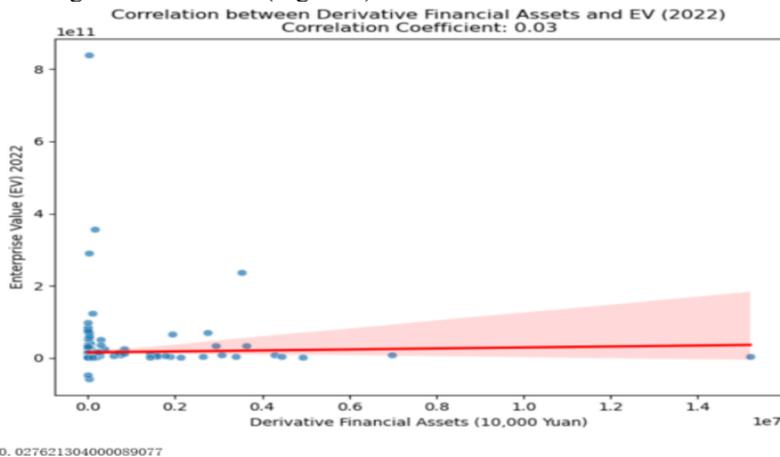


Fig. 4. Correlation between Derivative Financial Assets and EV (2022)

4.2 Influence of Derivatives Utilization on Corporate Financial Performance

4.2.1 Exchange rate risk management and corporate financial stability

Enterprises are exposed to financial risks arising from exchange rate fluctuations in the course of globalized operations, especially those involving a large number of international transactions. In order to reduce profit volatility companies often use foreign exchange derivatives for exchange rate risk management.

For example, as a leading global shipping company, COSCO Haixiang's business involves various currencies such as the U.S. dollar, the euro and the RMB, and it is exposed to greater exchange rate risks.2023, the RMB exchange rate against the U.S. dollar has

fluctuated from 6.8 to 7.0, and in order to cope with the exchange rate fluctuations, COSCO Haixiang has adopted a variety of financial tools to hedge, including locking the exchange rate of U.S. dollar revenues and expenditures by means of foreign exchange forward contracts; using currency swaps to convert part of its US dollar debt into RMB debt; and purchasing foreign exchange options (US dollar put and RMB call options). Despite the large fluctuations in the exchange rate between RMB and USD in 2023, the Company's finance costs did not increase significantly as a result and remained stable. Meanwhile, the company realized a net profit of 28.396 billion yuan, showing that the profit level was also not significantly affected by the exchange rate fluctuations. The results shows that the Company has achieved remarkable results in exchange rate risk management, safeguarding the soundness of its overall financial position and also enhancing its market competitiveness, providing a solid guarantee for the Company's long-term sound operation.

4.2.2 Interest rate risk management and financing cost control

In modern financial markets, interest rate volatility is one of the main risks faced by enterprises in the process of financing. 2022 The Federal Reserve raised interest rates several times, and interest rates in the global financial market rose, and domestic interest rates were also affected to a certain extent.

For example, Vanke, as a leading real estate development enterprise in China, has a large scale of financing. Vanke faces a huge risk of rising interest rates. Various measures have been taken to manage interest rate risk and optimize financing costs. Among them, Cross-Currency Swap is one of its important financial instruments, it has reduced the financing cost of foreign currency debt to a certain extent and effectively hedged the uncertainty caused by exchange rate fluctuations. According to the disclosure of Vanke's 2023 financial statements: the amount of CCS contracts held by Vanke was USD 1,000.0 million, a decrease from USD 1,721.0 million in 2022. Through CCS contracts, Vanke fixes the interest rate for future payments, thereby reducing the risk of an increase in financing costs due to fluctuations in market interest rates. Adjusting the interest rate structure of U.S. dollar-denominated debt through CCS gives it interest expense advantage over traditional foreign currency debt.

4.2.3 Commodity price risk management and cost optimization

Commodity price volatility poses a significant impact on production costs and profitability, especially in industries involving key raw materials such as energy, metals and agricultural products.

For example, Southwest Airlines has implemented a flexible hedging strategy through the use of financial derivative instruments such as options and swaps to address the risks associated with fuel price fluctuations and reduce the financial impact of oil price volatility. Specifically, during the period of significant increases in international oil prices in 2022, Southwest Airlines implemented a layered option strategy to increase its hedge ratio to approximately 65% in order to provide partial coverage in the event of oil price volatility. This layered structure effectively covers a percentage of fuel costs in different price ranges, thereby mitigating the uncertainty associated with oil price volatility. At the same time, the Company also holds a portion of fixed price swaps signed in 2019 to lock in fuel costs in the range of US\$60-70 per barrel, which further helps the Company hedge against the risk of significant oil price fluctuations.

5 Conclusion

This study focuses on the financial derivatives of Chinese listed companies, exploring the size, structure, and trends of the derivatives market, and analyzing the ways in which companies use derivatives for risk management and their financial impact.

Based on the above research, enterprises should pay attention to the following points when using financial derivatives for risk management: (1) optimize hedging strategies, comprehensively use derivative instruments such as options, forwards, and swaps to cope with risk exposure in different market environments; (2) Strengthen the risk management capability of derivatives, improve the construction of internal risk control system, and ensure that derivative trading matches the overall financial strategy of the enterprise; (3) Improve transparency in information disclosure, comply with regulatory requirements, reduce potential compliance risks, and enhance market trust.

Future research can further analyze the specific ways in which companies use derivatives, as well as the long-term impact mechanism of different usage methods on corporate value. Meanwhile, by considering factors such as industry classification, company size, and types of derivatives, a more comprehensive exploration of the complex relationship between derivatives and enterprise value can be conducted.

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