

Application of Financial Derivatives in Enterprise Exchange Rate Risk Management

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Abstract: With the development of the times, enterprise exchange rate risk has gradually been taken seriously by enterprises. The foreign exchange risk of a company is related to changes in its profitability, net cash flow, and market value. The change in exchange rate not only affects the business performance of enterprises, but also has a significant impact on the national economy. Therefore, how to control the exchange rate risk of enterprises is the focus of research that enterprises need to focus on today. This article studied the use of financial derivatives for foreign exchange risk management, thus aiming to improve the efficiency of enterprise exchange rate risk management through financial derivative tools. This article investigated the proportion of companies engaged in hedging business among listed companies over a period of time through experiments. It could be seen that the proportion reached 4.89% in 2017 and 5.84% in 2018. This indicated that the number of physical enterprises using hedging business for risk management was still increasing, which proved that financial derivatives were indeed very helpful for enterprise exchange rate risk management.

1. Introduction

With the continuous increase in the openness of the Chinese market, the Chinese economy and finance are constantly aligning with the world, and the speed is constantly accelerating. While the degree of economic marketization is gradually deepening, financial risks are also increasing, especially the risk of the RMB exchange rate is further deepening. In the 2007 financial crisis, the collapse of export enterprises caused by exchange rates is vividly remembered. In the current situation where exchange rates are becoming increasingly unstable and difficult to predict, the management of foreign exchange risk is very important.

The use of financial derivatives for the management of foreign exchange risk in companies has been widely applied. The identification of sensitive areas and multidimensional parameter analysis in enterprise exchange rate management are the steps of intelligent analysis. There are many theories about financial derivatives and corporate foreign exchange management. For example, some scholars have adopted an innovative method to identify the risk management benefits of CSR (Corporate-Social-Responsibility) [1-2]. Some scholars propose that the combination of individual

risk aversion and other execution characteristics plays a key role in hedging [3-4]. Other scholars claim that the share of imports through PA (Polyamide) increases with exchange rate fluctuations. For companies in industries with limited liquidity, this impact is more pronounced and needs to be alleviated through better local financial development [5-6]. The advancement of financial derivative technology has prompted companies to redefine exchange rate risk management, thereby improving financial efficiency and reducing labor costs. Financial derivative tools have played an important role in the field of enterprise exchange rate risk management.

The application of financial derivatives in the company's foreign exchange market was the focus of this paper. The article briefly introduced the current development status of enterprise exchange rate risk management, and elaborated on the current problems in the field of enterprise exchange rate risk management. In response to the changing trends of common exchange rate risks in enterprises, object-oriented identification methods could be used to design enterprise exchange rate risks. In this article, the main research focused on financial derivatives, corporate exchange rates, and risk management, and system design and simulation experiments were conducted.

2. Application of Financial Derivatives in Managing Foreign Exchange Risk of Enterprises

2.1 Overview of the Development of Financial Derivatives

Financial derivative is a concept corresponding to basic financial instruments, which is derived from basic financial products [7]. Foreign exchange, bonds, stocks, leverage, and credit are the main characteristics of a financing method. In the "Interim Measures for the Management of Derivative Product Trading Business of Financial Institutions" released by the China Banking Regulatory Commission in 2004, it is defined as a contractual relationship whose price is related to the basic value data. The change in value of one or more assets not only affects the price change of one or several investments, but also affects the risk of one or several investments. This contract includes forwards, futures, swaps, and options. The characteristics of financial derivatives are: virtuality, intertemporal nature, compulsion, correlation, uncertainty, and high risk. It is generally combined with the following risks: credit risk, market risk, liquidity risk, settlement risk, operational risk and legal risk [8]. The derivatives market has its fundamental role in price discovery and asset allocation. It is divided into two categories: speculative and hedging. Among these factors, speculative trading is an indispensable part of the market, which can bear price risk, and promote price discovery, so as to slow down price fluctuations and increase market liquidity. In modern market economy, hedging is a strong security guarantee [9]. The role of the financial derivative market is an external manifestation of its function, and its degree of effectiveness depends on the degree of perfection of external conditions such as society, economy, and politics [10]. Financial derivatives can play a positive role in dispersing and transferring price risks and stabilizing the national economy; it can provide a certain reference for the country's macro decision-making; it promotes the internationalization of the economy; it is conducive to establishing and improving the market economy system [11].

2.2 Exchange Rate Risk

The concept of "exchange rate risk" was first proposed by a scholar in 1974. He defined "foreign exchange risk" as "the gain or loss caused by changes in foreign exchange rates" and divided it into the risk of the balance sheet of overseas branches operating in various currencies, the profit risk of overseas businesses, the risk that has not yet had an impact on them, and the risk of overseas branches. He summarized it into "transaction risk" and "accounting exposure" [12]. Some scholars in their (1984) research believe that exchange rate risk refers to the impact of exchange rate

fluctuations on a company's cash flow and corporate value. This is manifested in the following five aspects: (1) the impact on sales prices and unit purchase costs; (2) all indirect impacts on the planned output of any location; (3) impact on the market value of existing physical assets; (4) impact on the market value of long-term assets and liabilities; (5) the impact on the market value of short-term assets and liabilities [13]. The exchange rate affects the value of assets and liabilities, and changes the cash flow of enterprises, thus affecting the economic environment, competitive position, and future development potential of the industry through the above five aspects, thereby ultimately affecting the value of enterprises [14]. Scholars found in their research (2002) that exchange rate risk also belongs to a type of speculative risk, which has both positive and negative aspects. It can bring profits to enterprises and may also bring losses to them [15]. Therefore, in the face of exchange rate risk, enterprises generally adopt three attitudes: risk preference, risk neutrality, and risk avoidance. The fluctuation of exchange rates in exchange rate risk management can have a significant impact on multinational corporations with significant international trade activities and frequent capital flows. This poses unimaginable uncertainty to the future operating results and cash flows of multinational enterprises [16]. However, is there no exchange rate risk for companies that have not had direct exposure to exchange rate business? In fact, this is not the case. From the definition of exchange rate risk by several scholars, it can be seen that the existence of exchange rate business is not a prerequisite for the existence of exchange rate risk. When a company's value changes with exchange rate fluctuations, the company would generate exchange rate risk [17]. From the perspective of company operations, although the company is not directly related to foreign exchange transactions, as it is in an open country, changes in foreign exchange can also have a certain impact on the company's assets and future profits [18]. A foreign competitor of a company may experience a decrease in the price of its goods due to currency fluctuations, which puts the company at a disadvantage in competition with other companies. Therefore, in an open and competitive market, currency fluctuations can have an impact on the value and profits of a company's assets, and the company would face exchange rate risks [19]. In daily production and operation, among various financial risks faced by enterprises, exchange rate risk is the most important risk [20].

In terms of identification and quality of exchange rate risk, some scholars have classified exchange rate risk into three categories: conversion risk, transaction risk, and economic risk.

The impact of the three types of suture on the production and operation of enterprises can be summarized in Table 1

Table 1: Comparison of types of corporate exchange rate risks

Risk type	Conversion risk	Transaction risk	Economic risk
Target	Consolidated report	Short-term trading	Long-term strategic planning
Focus of attention	Assets, liabilities and income statement related project	Cash flow	Cash flow
Value-oriented	Book value	Economic value	Economic value
Time-oriented	Past	Past and future	Future
Timelimit	Limited	Limited	Unlimited

2.3 Risk Management in Foreign Exchange Trading

Exchange rate risk management is a special type of risk management. Although there are differences in management methods, tools, and other aspects between the two, their basic purposes and principles are consistent.

Since the last century, with the continuous development of financial markets, the connections between world financial markets have become increasingly close. As a result, various factors in the financial market, such as exchange rates and interest rates, have become increasingly unstable and volatile. At this time, it is necessary for economic entities to change their old ideas and determine corresponding risk management goals.

With the continuous development and improvement of the financial market, various financial derivatives have also emerged. These products can improve the traditional wind direction management and change the concept of enterprise risk management to a certain extent by touching another trading position without changing the daily operating position of the enterprise. To achieve the above objectives, enterprises should adhere to the following four principles in exchange rate risk management.

1) Integrity

The so-called overall management refers to the overall management of a company’s foreign exchange risk, which should be considered from a holistic perspective. Each element and system are inseparable, and the system should be a synthesis of the interactions and influences among its constituent elements. This cannot be done solely for a single company’s project management, but rather to consider the company as a whole, so as to optimize the allocation of company resources.

2) Clear priority

When managing foreign exchange risks, it is necessary to clarify their priorities and effectively manage them. If these risks cannot be effectively managed, huge losses would occur. At the same time, the lack of prioritization would inevitably lead to unreasonable resource allocation, thus resulting in significant risks that cannot be effectively controlled and irreparable losses.

3) Combination of strategy and strategy

In foreign exchange risk management, enterprises should strengthen coordination at the strategic and strategic levels. The strategic level needs to make good planning. This can ensure the certainty of exchange rate risk management.

3. Theoretical Framework for Hedging Corporate Risk and Foreign Exchange Risk

3.1 Volatility of Chinese Currency

From recent reforms, the value of the RMB has gradually returned to a stable state after a period of rapid appreciation. If the fluctuation of the RMB against foreign currencies is analyzed in detail, more meaningful features would be found, as shown in Figure 1:

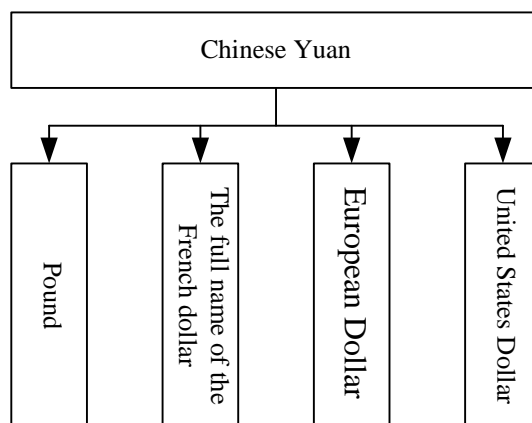


Figure 1: Analysis of exchange rate fluctuations

China adopts the fixed exchange rate system. Although the exchange rate fluctuated to a certain extent before 1995, on the whole, the trend of the exchange rate was basically stable, and the RMB remained unchanged against the US dollar for a considerable period of time. However, after the reform of the exchange rate system in 2005, at 12:49 Beijing time on March 2nd, the exchange rate was 6.2980 USD/RMB. Driven by the central parity rate of the Chinese yuan, the exchange rate between the Chinese yuan and the US dollar reached a 17 year high. Before the reform of the exchange rate system in 2005, the Chinese yuan used a single currency pegged to the US dollar, and the exchange rates of other countries were largely determined by the exchange rate of the US dollar against other currencies. The exchange rate changes between the Chinese yuan and non US dollar currencies showed high consistency with the changes between the US dollar and non US dollar currencies. With the reform of the exchange rate system, the dependence of the RMB on the US dollar in international settlement has also changed. The fluctuation between the Chinese yuan and currencies of various countries, including the US dollar, is becoming increasingly frequent and increasing. The volatility of the RMB against other countries' currencies shows a significant upward trend, but the volatility of the RMB against the Japanese yen is not significant. The future trend of the RMB is more difficult to predict, and the difficulty of hedging has also increased.

3.2 Necessity of Establishing a Hedging Theory System

How to determine the optimal hedging ratio and hedging effect is an important content in current hedging theory. The method of reducing foreign exchange risk discussed in this article was achieved through hedging techniques, so it was necessary to establish a theoretical framework for hedging.

3.3 Design Concept of Theoretical Architecture

The overall design idea of the paper is as follows:

- 1) First is to select the object to study. This theme should be representative and have as few variables as possible. Only in this way can it be more easily popularized.
- 2) The financial environment in which the respondent is located is assumed;
- 3) Hedging decision-making issues: This article mainly studied whether economic entities needed to engage in hedging, how effective hedging was, and what impact it would have on economic entities.

Of course, in this paper, the mainstream of the field could not be left, and the advantages of existing research must be inherited.

3.4 Investigation Object and Environmental Positioning

This project defines an export competitive enterprise with general characteristics such as cost and utility functions, risk avoidance, and acceptable prices as “cost and utility functions with general characteristics, risk avoidance, and acceptable prices”. All export products produced by this company are produced in China. Since the product can be exported to multiple countries, it is assumed that the total output of the product exported to two countries is q_i (represented by $i=1$ and 2). The company sells products to country i , and the price of the products is predetermined and calculated in the currency of country i .

$$q_i \geq 0, q_1 + q_2 = q \quad (1)$$

3.5 Key Points of Theoretical Framework

Starting from the financial market environment of the enterprise itself and its location, and combined with previous research, this article explored strategies for enterprises to avoid exchange rate risks.

In the foreign exchange market, due to the high volatility of the foreign exchange market, enterprises are increasingly paying attention to their hedging strategies. Therefore, risk management in the foreign exchange market has become an important goal for enterprises in the foreign exchange market. Based on these results, some important conclusions have been drawn, such as the “complete hedging theory” and the “separation theory”.

The total position held by the export company in the currency futures market is set to z , and $z=z_1+z_2$. Among them, the position ($i=1,2$) between the local currency and the currency futures of two export destination countries is z_i . z_i would conduct a closing transaction at the spot exchange rate at the end of the period. The net income or net loss generated in the national currency i is $(e_i^f-e_i)z_i$.

By definition, the formulas are as follows:

$$\tilde{O}=[e_1p_1q_1+e_2p_2q_2-C(q)]+(e_1^f-e_1)z_1+(e_2^f-e_2)z_2 \quad (2)$$

$$\{[e_1p_1q_1+(e_1^f-e_1)z_1]+e_2p_2q_2+(e_2^f-e_2)z_2\}-C(q_1-q_2) \quad (3)$$

4. Empirical Investigation on the Use of Financial Derivatives for Enterprise Foreign Exchange Risk Management

4.1 International Monetary Fund

In fact, with the rapid development of the Chinese economy, more and more companies are starting to use financial derivatives as a means of hedging. The number of companies announcing hedging business and the number of listed companies are shown in Figure 2:



Figure 2: Number of companies announcing hedge business and number of listed companies

From Figure 2, it could be seen that in 2018, 145 companies disclosed information on hedging transactions. There were 2480 listed companies in Shanghai and Shenzhen, accounting for 5.84%. The disclosed hedging business accounted for 4.89% in 2017, which was an increase from the

previous two years. This indicated that the number of risk management for hedging business by Chinese physical enterprises was still increasing.

5. Conclusions

In the current international economic and financial situation, the increasing volatility and unpredictability of exchange rates have brought severe challenges to relevant entities facing foreign exchange risks. The use of financial derivatives to avoid exchange rate risk has been widely used in international trade. However, due to various subjective and objective reasons, the use of derivatives to manage exchange rate risk has not received sufficient attention in China. After the 2007 subprime crisis, many Chinese economic entities believed that derivatives were harmful but not beneficial, which is a very wrong concept. Based on existing literature research, this article aimed to provide an effective and safe method for Chinese entities to use derivative instruments for hedging through theoretical and empirical research, so as to provide a practical and effective means for enterprises to prevent exchange rate risks.

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