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The Influence of Financial Derivatives on the Financial Risk of the Company

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Abstract: Financial derivatives for a company, like a double-edged sword. When operating well, it can effectively relieve the operating pressure and avoid risks of enterprises, and bring smooth cash flow. Throughout the history of listed companies, the financial derivatives brought by the thunder events also frequent occurrence, listed companies therefore delisted. This paper first finds out what purpose the company uses financial derivatives by combining the previous literature, and then establishes a regression model to explore how financial derivatives affect the company's financial risk. The regression results are significant. Finally, combining the literature and research results, it makes a flow chart of the company's use of financial derivatives. This paper finds that companies that use financial derivatives face smaller financial risks than those that do not, indicating that financial derivatives play a prominent role in managing financial risks.

1. Introduction

Financial derivatives play a very important role in the financial market. For companies, derivatives can smooth cash flow, reduce performance volatility and improve innovation ability. Recently, the price of crude oil and coal has been soaring, among which the price of coal has soared from 500 yuan/ton to about 1,900 yuan/ton. For China, a country that relies on thermal energy for power generation, the rising price of coal will inevitably bring increased pressure on the power generation companies, which will lead to the losses of the companies[1]. For a time, many cities in northern China fell into power shortage. For those companies that signed coal derivatives agreements, the rise in coal prices did not cause much of a crisis, but helped them weather the storm. On the other hand, improper use of financial instruments will cause the company to fall into serious

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financial crisis and thus face the risk of delisting. For example, the famous Barings Bank collapse event caused the company to lose 1 billion dollars due to the traders' futures operation, and then Barings Bank went bankrupt. Another domestic listed company, Shanghai Lux, lost 691 million yuan in the first quarter of 2018 due to speculation in financial derivatives, and the company's share price immediately halved. From this we can see that financial derivatives are like a double-edged sword. In my opinion, it is particularly important to study the relationship between financial derivatives and the financial risks of listed companies, which can not only give the majority of investors an early warning of the financial risks of companies, avoid thunderstorms, but also help relevant departments to provide effective basis for supervision[2].

2. Literature Analysis

Domestic and foreign studies show that the application of derivative instruments in financial risk management can effectively reduce the cost of financial difficulties, avoid underinvestment and reduce expected taxes and fees, adjust the capital structure of enterprises, disperse the financial risks of enterprises, and ensure the maximization of shareholders' interests under the condition of controllable risks[3]. This paper mainly focuses on the study of financial derivatives and financial risks of listed companies. Due to its unique leverage (companies can leverage dozens of times of funds with a small amount of margin) [4], derivatives may bring huge investment profits or losses to companies if not used properly. Since the 1980s, some scholars have begun to study the application effect of financial derivatives in enterprises. (Stulz, 1996) and (Bessembinde, 1991) have long proposed that trading derivatives can be used to reduce the possibility of enterprises falling into financial risks, save taxes and expenses and avoid under-investment. The application of financial derivatives in enterprises mainly focuses on the credit default and the fluctuation of exchange rate, price and interest rate in the daily business process [5].

2.1. Financial Risks

Financial risk is the ultimate embodiment of all the risks in the process of production and management of an enterprise, which widely exists in every link of an enterprise. Xiang Dewei (1994) made a specific analysis of the connotation and characteristics of the financial risks of enterprises, and sorted out and summarized the connotation of the production and operation links of enterprises, the causes and the risk avoidance measures[6]. Financial risk can be summarized as the possibility that an enterprise cannot repay funds due to the operation of liabilities (Wang Shuai, 2017); Financial risks exist widely in all links of enterprise production and operation, and may be generated in financing, operation, investment and other activities (Huang Min, 2018).

2.2. Value of Financial Derivatives

In terms of the use value of financial derivatives in the company's financial risk management, derivatives can smooth pre-tax earnings and enhance the value of the company due to the characteristics of leverage and intermaturity trading [7-8]. Using hedging to hedge risks can reduce tax debt, avoid underinvestment and thus improve the value of corporate equity capital [9]. The more convexity of tax function, the more effectively tax cost can be reduced through hedging (Main, 1983). In real activities, it is often difficult for enterprises to use derivatives for pure hedging, which is opposite to spot market transactions[10], with the same kind, the same quantity and the matching term. Due to the standardization of contracts and the existence of basis risk, there are more or less speculative elements in the use of derivatives by companies (Cao Yushan, 2017), and the speculative behavior of derivatives is inevitable (Brown,2006).

Through previous studies, it is found that financial derivatives do not directly affect financial risks, but have a transmission process. The transmission process of financial derivatives to corporate financial risks is as follows Figure 1.

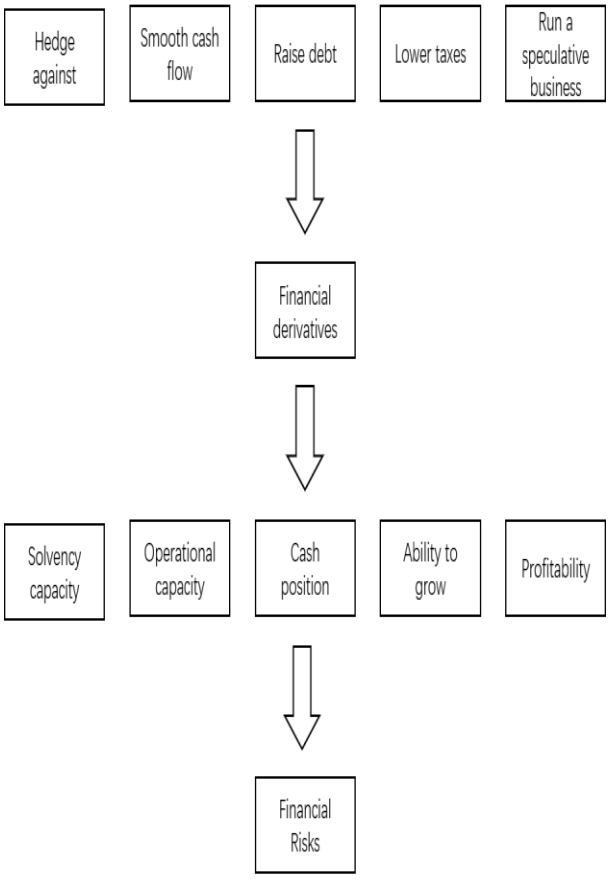

Figure 1. The transmission of financial derivatives to corporate financial risk

3. Theoretical Analysis and Hypothesis Testing

3.1. Putting Forward Hypotheses

Financial derivatives are an important tool for risk management of listed companies. Using the hedging function (traders actually buy and sell goods in the spot and carry out opposite trading transactions in futures exchanges at the same time) can reduce the fluctuations of exchange rate, price and interest rate brought about by changes in external environment and provide stable cash flow for the company. Reduce financial risk by improving liquidity and inadequacy in operating activities[11]. However, in real life, it is impossible to lock the price and quantity of goods every time in the derivatives transaction, and there is also an element of investment operation, which also makes the enterprise fall into the trap of financial risks in the future. In terms of financial risk, the current mainstream view believes that financial risk mainly comes from the company's debt paying ability, operating ability, cash position, growth ability and profitability of these five aspects. Through a simple theoretical analysis, it can be known that financial derivatives have advantages and disadvantages. Therefore, I propose the following hypothesis:

H1: Other things being equal, companies using financial derivatives have low financial risk.

H2: Other things being equal, companies that use financial derivatives have high financial risks.

3.2. Variable Design

3.2.1. Explained variables

For the measurement of financial risk, Z-score model (EI Altman, 1913) is used to measure the five operating capabilities of the company (debt paying, profit making, operation, cash flow and growth ability) respectively through the five financial indicators of the company. Z-score model is as follows:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 0.999X_5 \quad (1)$$

Where X_1 is the asset-liability ratio, reflecting the company's solvency; ;X_2 is the growth rate of net profit, reflecting the growth capacity of the company; X_3 is inventory turnover, reflecting the company's operating capacity; X_4 is the current ratio, which reflects whether the company's cash flow is sufficient. X_5 is the return on equity, which reflects the profitability of the company. According to the definition of Z-value, the larger the Z-value is, the smaller the financial risk the enterprise will take; otherwise, the greater the financial risk will be. Generally, it is considered that the Z-value is less than 1.8, and the enterprise is considered to have a great possibility of financial risk. The Z-value is between 1.8 and 2.75, indicating that the company is in the gray area where financial risks occur. If the Z value is greater than 2.75, the possibility of financial risk of the company is very small.

3.2.2. Explanatory Variables

Select five listed companies from Shanghai and Shenzhen A-shares from 2017 to 2020, find out the companies using financial derivatives by manually searching the financial statements of these companies, and introduce dummy variables[12]. The following processing: The company that uses financial derivatives is defined as 1, and the company that does not use financial derivatives is defined as 0.

3.2.3. The Source of the Data

All the data in this paper are from the annual financial statements of listed companies. The annual data of 7 A-share listed companies in Shanghai and Shenzhen from 2017 to 2020 are selected for regression analysis. In order to make the data more convincing and retain its validity, the author makes the following processing: (1) put forward ST and *ST listed companies; (2) Do not choose financial listed companies; (3) Select 5 listed enterprises through random simulation. There are a total of 25 sets of data from different industries and years. The selected data are shown in the table 1 below. The data in this paper are processed by Stata software.

Table 1. Z-value and use of financial derivatives of 5 listed companies from 2016 to 2020

Year/Stock	Gree Electric Appliances	River motor	Poly Development	Shanxi Coal Industry	Makohara Stock
2016	1.78(0)	2.35(0)	0.92(1)	3.01(1)	1.94(0)
2017	1.56(0)	2.21(0)	1.2(1)	3.54(1)	2.64(1)
2018	2.24(1)	3.36(0)	1.78(1)	2.91(1)	1.57(0)
2019	2.21(1)	2.41(0)	2.34(1)	3.76(1)	2.11(1)
2020	2.93(1)	2.73(0)	2.03(1)	3.56(1)	1.91(1)

In the table, 1.78 (0) means that Z value is 1.78, 0 means that the company has not used financial

derivatives this year, 1 means that the company has used financial derivatives this year. The data comes from the annual reports of listed companies.

4. Empirical Analysis

4.1. Establishment of Model

Based on the above theoretical analysis and hypothesis testing, the model of the relationship between financial derivatives and corporate financial risk is established as follows:

$$f - risk = \beta_0 + \beta_1 derivatives + \mu \quad (2)$$

Where, f-risk is Z value, derivatives is whether the company uses financial derivatives, μ is the random error term.

4.2. Regression Analysis

Combined with the model and the data in Table 2, the regression results are shown in the following table:

Table 2. Regression results of the model

Parameter	Estimate of value
β_0	1.0825*(3.47),0.9733**(2.89),0.2279***(2.76)
β_1	0.0334*(7.87),0.1018**(6.44),0.1773***(1.08)
The t statistic is in parentheses;***$p < 0.01$,** $p < 0.05$,* $p < 0.1$	

It can be seen from the regression results that the t value of the regression coefficient is less than the critical value at the significance level of 1%, indicating that the regression results are not significant. At the significance level of 5% and 10%, the T-value is larger than the critical value at this time, indicating that the regression results are significant. At the significant level of 5% and 10%, the regression coefficients of financial derivatives on financial risk are both positive, which indicates that the use of financial derivatives is conducive to the company's financial risk management.

In my opinion, the regression coefficient of the model is not significant at the significance level of 1%. On the one hand, it is because the sample data selected are too small; on the other hand, the indicators selected cannot fully represent the information to be expressed; on the other hand, the company may not use financial derivatives for hedging purposes, and there may be hidden uncertainties and speculative motives[13]. Liu Shulian (2009) pointed out that in the capital market, due to the existence of factors such as basis error, the hedging ratio cannot be zero or 100%, so the ideal risk-avoidance scheme of "equal amount of time and cash" cannot be realized in hedging, which means that the company will inevitably bear potential risks when using financial derivatives to hedge. Guo Fei (2019) Just because of the complexity and high leverage of financial derivatives, executives usually expect high returns from high-risk decision-making behaviors in order to demonstrate their outstanding talents and high returns. Sometimes, when the company is in serious financial crisis, the management will put all their eggs in one's own water and engage in high-risk projects. These factors indicate that the use of financial derivatives has potential risks[14]. In summary, the impact of financial derivatives on the company's financial risks is sorted out again, as shown in the following figure 2:

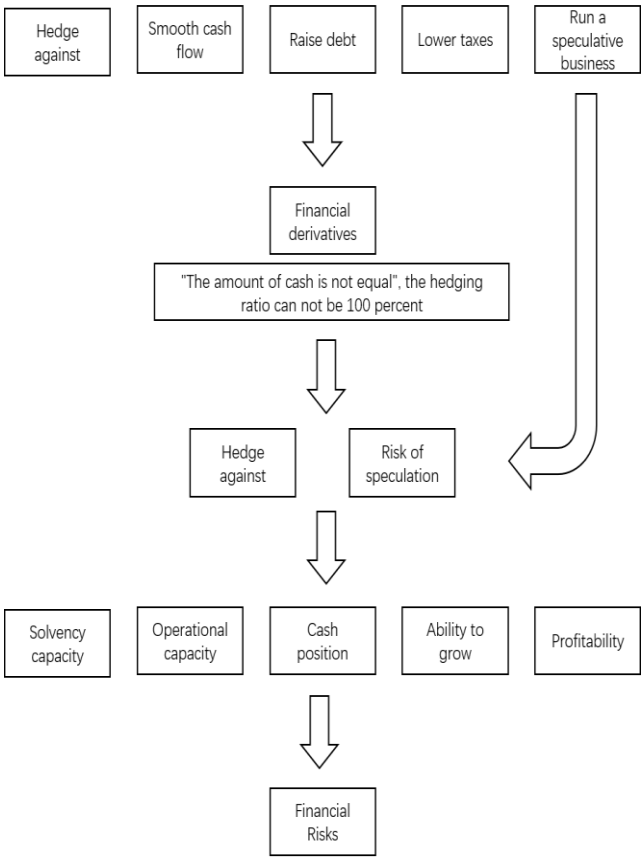

Figure 2. The transmission of financial derivatives to the company's financial risk

5. The Innovation and Deficiency of this Paper

5.1. Innovations

This paper focuses on the study of financial derivatives on the company's financial risk, discusses the company's willingness to use financial derivatives from the company's purpose, and then explores the company's financial risk from the financial indicators on this basis[15].

5.2. Shortcomings

The data collected was limited, mainly manual search, and persuasion was not strong enough. Moreover, the company's financial risk is not only measured from the financial indicators, but also influenced by many factors. There are many kinds of financial derivatives, such as futures, options, swaps and so on.

6. Research Conclusions and Policy Recommendations

6.1. Research Conclusions

The main purpose of this paper is to explore the influence of the use of financial derivatives on the company's financial risk. First of all, by reading the literature of previous studies, the reasons, advantages and disadvantages of the company's use of financial derivatives are found out. Financial derivatives can bring smooth cash flow, hedging and tax reduction advantages to the company, but

also bring operating difficulties and huge leverage investment risks and other disadvantages to the company. Furthermore, the direct factors affecting financial risks were found out from the previous literature, and the purpose and how financial derivatives affected the financial risks of the company were explored. This paper finds that in the case of unstable external environment, companies will use financial derivatives to avoid risks. However, in the process of using financial derivatives, the price and quantity of transactions are often unable to fully match, which will more or less bring speculation to the company and increase the financial risk. On this basis, combined with the corresponding model and data for empirical analysis, from the regression results, the use of financial derivatives of the company compared with the use of financial derivatives of the company less financial risk.

6.2. Policy Suggestions

According to the above research conclusions, the use of financial derivatives can reduce the financial risk of the company. This requires the company to use financial derivatives for reasonable purposes. For the purpose of the company's operation, blind speculation will increase the financial risk of the company. The company should strengthen the financial literacy of its managers and consider reducing financial risks on the premise that the use of financial derivatives will not bring speculative risks to the company. The relevant departments should improve the institutional supervision measures to ensure that the rules and regulations guaranteeing the financial risk management of enterprises and the application of financial derivatives can be effectively implemented to ensure that the daily management of enterprises within the scope of compliance.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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