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Leverage Risk and Business Performance

-- Based on the Empirical Data of A-share Listed Companies in Shanghai Stock Exchange

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Abstract

This article selects the data from 2014 to 2018, the Shanghai A-share listed companies in China, using the method of theoretical analysis and empirical study explores the management risk financial risk and the relationship between the business performance of the research results show that the operating risk showed A negative correlation relationship between financial risk and operating performance to enterprises at the same time puts forward some measures of avoiding risk.

Keywords

The Shanghai A-share Listed Companies; Leverage Risk; Business Risk; Financial Risk; Business Performance.

1. Introduction

Since the reform and opening up in 1978, China's economy has achieved rapid development, and its development speed is in a leading position compared with many countries, in which enterprises play an important role. However, in recent years, the market competition has become more and more serious, and enterprises have been forced to go bankrupt, restructure and acquire in such an environment. Under such circumstances, as senior managers of enterprises, they deeply realize the importance of enterprise risks, and at the same time, they deeply realize that business performance is closely related to risks, and good business performance must be under reasonable risk control. Generally speaking, leverage risk mainly includes financial risk and operational risk. From a microscopic point of view, business risk refers to the uncertainty of future earnings caused by changes in business decisions, that is, enterprises do not know whether they will benefit in the future. Financial risk refers to the probability that an enterprise will reduce its after-tax earnings or lose its solvency due to financing, that is, the enterprise does not know whether it can repay its debts in this environment. At present, the research on risk and performance in China is mainly based on a certain industry. However, the industry has its particularity, so the opinions based on a certain industry can not provide us with guidance. Scholes[1] puts forward that we should intensify innovation and continuously push forward the new risk management system. At the same time, as research scholars, we should not only pay attention to the macro market, but also pay attention to the micro economic leverage. When we study, we can combine financial variables with leverage risk based on a specific enterprise framework. Zhou Xianyi and Yang Li [2] studied the relationship between leverage risk and enterprise performance from the perspective of microeconomic leverage, taking the data of listed companies in China as research samples. The research results show that there is a reverse collocation mechanism between operational risk and financial risk, which will have a significant impact on joint risk. Based on this, they also found that the relationship between various risks and enterprise performance is

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a cubic function relationship rather than a linear relationship, and they are also manifested in different monotonous intervals. Therefore, this paper will study the relationship between leverage risk and business performance from the perspective of microeconomic leverage. The greatest contribution of this paper lies in dividing leverage risk into operational risk and financial risk, and discussing the relationship between them and operational performance respectively. At the same time, the research results of this paper can provide guidance for enterprises and other stakeholders, which is conducive to the implementation of policies and the improvement of business performance.

2. Literature Review and Theoretical Hypothesis

2.1. Business Risk and Business Performance

On the relationship between business risk and business performance, this paper mainly introduces the index of operating leverage. At the same time, different scholars have different views on the relationship between business risk and business performance. Gilley[3] found that risk-taking has a positive correlation with business performance, and the external environment plays a moderating role between these two variables. Taking risks in a turbulent environment will reduce business performance. Wang Xiaohong [4] found that the relationship between operating leverage and business performance was significantly negative, and she also found that operating leverage and financial leverage changed inversely. James C.Van, Horne John M[5] found that the operating leverage coefficient is a potential coefficient, and only when the cost of sales and production changes, the operating risk will occur. Gapenski.Louis Charles[6] found that operating leverage is the proportion of fixed costs to total costs. Rorschach [7] found that the greater the business risk, the better the business performance, that is, there is a significant positive relationship between them. Shen Weitao [8] found that there is a negative correlation between performance indicators and corporate risks by analyzing the research data of listed companies in Shanghai and Shenzhen. Zhu Zhiming [9] pointed out that under normal circumstances, there is a negative correlation between risk level and business performance. Cai Yanhui and Feng Youxiao [10] found that the greater the business risk, the higher the business performance. Parmacli and Lanioglo[11] pointed out that the relationship between operating leverage effect and business safety margin is negative. Arellano and Scofield[12] pointed out that the ratio of fixed cost to sales and the change of enterprise profit rate will affect operating leverage. The operating performance of an enterprise generally refers to the operating efficiency and performance. If an enterprise is affected by the unfavorable external environment, there may be some mistakes in its operation. According to the relevant theoretical research, when the enterprise is affected by the operating leverage, it will make the earnings before interest and tax of the enterprise decline faster than the sales decline, which will directly lead to the decline in business performance. Based on this, this paper puts forward hypothesis 1:

H1: There is a significant negative correlation between business risk and business performance.

2.2. Financial Risks and Business Performance

On the relationship between financial risk and business performance, this paper mainly introduces the index of financial leverage. Yan Yu [13] thinks that there is no significant negative correlation between financial leverage and business performance. Hu Zhenxing [14] found through research that the simultaneous action of operating leverage and financial leverage will make enterprises take greater risks, but on this basis, the performance of enterprises will be significantly improved. Yu Pengyi [15] thinks that the relationship between financial risk and enterprise value is not linear. Under normal circumstances, enterprise financial risk is positively correlated with enterprise value. The smaller the risk, the higher the

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value, and vice versa. Cai Yanhui and Feng Youxiao [10] found that the relationship between financial risk and enterprise performance is significantly negative based on the empirical data of Southwest China. Wang Xiaohong [4] found through research that financial leverage and operating leverage's Federation play an important role in operating leverage, while financial leverage and business performance are negatively correlated. When an enterprise's financial risk is relatively large, under the action of financial leverage, the after-tax profit per share will drop rapidly and even suffer losses. If the enterprise wants to continue to survive, it must raise funds. In the absence of other channels, the enterprise can only finance through debt. In the long run, the enterprise will be heavily in debt and short of funds, which will eventually reduce its operating performance. Based on this, this paper puts forward hypothesis 2

H2: There is a negative correlation between financial risks and business performance

3. Sample Selection and Research Design

3.1. Sample Selection and Data Sources

The research data of this paper comes from WIND database, and the selected research samples are listed companies in Shanghai Stock Exchange from 2014 to 2018. In order to make the research results more reasonable, this paper processed the data as follows: firstly, companies with incomplete data were screened out by EXCEL software, secondly, ST and *ST companies were eliminated, and finally, some industries, such as finance and insurance, were eliminated. After data elimination, it is found that the most constructed data is unbalanced panel data, with a total of 3165 observations. The statistical analysis software used in this paper is Stata16.

3.2. Variable Interpretation

3.2.1. Interpreted Variables

The explained variable in this paper is business risk, but return on total assets (ROA) is used to replace business risk. The calculation method of ROA is net profit/total assets. In general, the larger the value, the stronger the profitability, the better the competitiveness and development ability of the enterprise, which will improve the performance of the enterprise.

3.2.2. Explain Variables

The explanatory variables of this paper are operational risk and financial risk, in which the operational leverage coefficient DOL is used to measure the operational risk of enterprises, and its calculation method is fixed assets/total assets, while the financial risk is measured by degree of financial leverage DFL, and its calculation method is liabilities/owner's equity. 3. Control variables in order to make the research results more reasonable, this paper selects three control variables: current ratio (CR), enterprise Size (Size) and asset-liability ratio (ACR).

See table 1 for the specific definitions of the above variables:

3.3. Model Building

In order to verify the relationship between business risk and business performance in Hypothesis 1, a model (1) is constructed

$$ROA = \beta_0 + \beta_1 DOL + \beta_2 CR + \beta_3 Size + \beta_4 ALR + \varepsilon$$

The interpreted variable ROA measures the business performance of an enterprise, and the explanatory variable is the operating leverage coefficient. According to the quantitative knowledge learned, if the sign of DOL regression coefficient is negative, it can be proved that the relationship between them is negatively correlated, that is, the greater the operating leverage coefficient, the lower the business performance.

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In order to verify the relationship between financial risk and business performance in Hypothesis 2, a model (2) is constructed

Table 1. Definition of main variables

Types of variables	Variable name	Variable code	Variable description
Interpreted variable	Total asset-liability ratio	ROA	Net profit/total assets
Explanatory variable	Operating leverage	DOL	Fixed assets/total assets
	Financial leverage coefficient	DFL	Liabilities/owners' equity
Control variable	Current Ratio	CR	Current assets/liabilities
	Enterprise scale	Size	Logarithm of total assets
	Asset-liability ratio	ACR	Total liabilities/total assets

$$ROA = \beta_0 + \beta_1 DFL + \beta_2 CR + \beta_3 Size + \beta_4 ALR + \varepsilon$$

The explanatory variable is ROA, which measures the business performance of an enterprise, and the explanatory variable DFL measures the degree of financial leverage. Similarly, if the regression coefficient of DFL is negative, it can be proved that there is a negative correlation between them. Generally speaking, the greater the degree of financial leverage, the lower the business performance.

4. Analysis of Empirical Results

4.1. Descriptive Statistics

Table 2 is a descriptive statistical result. From the table, we can see that the average operating performance of the companies selected in this paper is 0.031, and the standard deviation is 0.06, which shows that the overall operating performance level of the sample companies is better, and the average operating leverage coefficient is 0.233, which is generally small, indicating that the overall experience risk of the sample companies is small. According to the learned knowledge, if the degree of financial leverage is less than 1, it is called a low-risk area; if the degree of financial leverage is in the range of 1 and 2, it is called a financial leverage safety space; if its coefficient is greater than 2, it is called a high-risk financial leverage interval. It can be seen from Table 2 that the average value of DFL is 1.732, which indicates that the selected sample companies are in the safe space of financial leverage, and the overall risk is relatively small. At the same time, we also find that the production and operation status and development potential of enterprises will affect the size of degree of financial leverage.

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Table 2. Descriptive statistics

Variables	Obs	Mean	Std.Dev.	Min	Max
ROA	3165	.031	.06	-.9	.372
DOL	3165	.233	.189	0	.901
DFL	3165	1.732	5.011	-30.44	205.89
CR	3165	1.844	2.485	.079	54.507
Size	3165	22.848	1.418	18.37	28.098
ACR	3165	.507	.203	.017	1.548

4.2. Correlation Coefficient Analysis

According to the correlation coefficient table, we can see that the absolute value of correlation coefficient is basically stable between 0.1 and 0.3, and only a few of them exceed 0.3, so the probability of collinearity is relatively low, which is proved by further variance expansion factor test. The maximum vif in Stata is 1.22, and most of them are between 1 and 2. According to the quantitative knowledge, there is basically no multicollinearity in each model. At the same time, using stata to test the original hypothesis, it is found that there is no heteroscedasticity between them. Therefore, this model has passed the test of heteroscedasticity and multicollinearity, which will lay the foundation for the next multiple regression.

Table 3. Correlation coefficient

	ROA	DOL	DFL	CR	Size	ACR
ROA	1.000					
DOL	-0.080***	1.000				
DFL	-0.183***	-0.027	1.000			
CR	0.112***	-0.212***	-0.096***	1.000		
Size	0.091**	0.043**	0.079***	-0.223***	1.000	
ACR	-0.333***	0.015	0.341***	-0.458***	0.424***	1.000

4.3. Analysis of Regression Results

The data in this paper are unbalanced panel data, so firstly, all the data are converted into balanced panel data, then all the models are tested, and it is found that there are no obvious collinearity and heteroscedasticity problems. Finally, all the models are regressed by fixed effect. The regression results are shown in Table 4:

According to the first column of Table 4, we can see that the regression coefficient of DOL to ROA is -0.0328 and is significant at the level of 5%, which can prove that Hypothesis 1, there is a negative correlation between business risk and business performance, that is, the greater the business risk, the lower the business performance. The reasons may be as follows: when the business risk of an enterprise is relatively large, it will be affected by the operating leverage, at which time, the rate of decline of the enterprise's earnings before interest and tax will generally be greater than the rate of decline of sales, thus reducing the enterprise's performance.

According to the second column of Table 4, we can see that the regression coefficient of DFL to ROA is -0.00114, which is significant at the level of 0.1%, which can prove that the relationship between financial risk and operating performance in Hypothesis 2 is a significant negative correlation. In other words, the greater the financial risk, the lower the business performance.

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This is mainly because when the financial risks of enterprises are relatively large, the after-tax profits per share will drop rapidly under the action of financial leverage, and enterprises must raise funds in order to survive. In the absence of channels for raising funds, enterprises may choose to raise funds through liabilities, which will lead to heavy debts and ultimately reduce the performance of enterprises.

Table 4. Regression results of model

	Model 1	Model 2
Variable	ROA	ROA
DOL	-0.0328* (0.0155)	
CR	-0.00307*** (0.000633)	-0.00290*** (0.000628)
Size	0.0214*** (0.00229)	0.0227*** (0.00216)
ACR	-0.234*** (0.0110)	-0.228*** (0.0110)
DFL		-0.00114*** (0.000210)
_cons	-0.325*** (0.0534)	-0.365*** (0.0494)
N	3165	3165
r2	0.182	0.190
F	140.7	148.3

Standard errors in parentheses * p < 0.05, ** p < 0.01, *** p < 0.001.

4.4. Robustness Test

In this paper, the way of robustness test is to change the calculation method of financial leverage and operating leverage into another calculation method, that is, operating leverage coefficient DOL= operating profit/ (pre-tax profit+ financial expense), degree of financial leverage DFL= (pre-tax profit+ financial expense)/pre-tax profit. Then, the data are subjected to fixed effect regression and OLS regression, and compared, and finally the fixed effect regression is chosen. After the regression, it is found that the regression results are basically consistent with the previous ones.

5. Research Conclusions and Suggestions

5.1. Conclusion

In this paper, the data of A-share listed companies in Shanghai stock exchange from 2014 to 2018 were downloaded from WIND database, with a total of 3165 samples. the relationship between leverage risk (operating risk and financial risk) and operating performance was analyzed by using stata16 and Excel statistical software, and the conclusions are as follows. First, the relationship between business risk and business performance is negatively correlated, that is, generally speaking, when the business leverage coefficient is relatively large, the business performance will be relatively low. Second, the relationship between financial risks and business performance is significantly negative. Generally speaking, the greater the degree

of financial leverage, the lower the business performance. This is mainly because, nowadays, the market competition is fierce, and enterprises may borrow heavily in the process of production and operation, which will lead to a rapid increase in financial expenses and an obvious increase in degree of financial leverage. Based on this, business performance will obviously decline.

Compared with related researchers, it is found that the limitation of this paper mainly lies in the less selected data, which may lead to the limitation of sample size, which will affect the accuracy of research results. Secondly, the control variables selected in this paper are relatively few, which needs to be further improved.

5.2. Suggestions

5.2.1. Avoid Risks

In fact, many risks can be avoided during the operation of an enterprise. If the enterprise is not sure about the market of a certain product, it can develop other products suitable for the market demand instead of developing this product at all. For example, an insurance company may not operate a business with great risks. There are many ways to avoid risks, such as canceling a risky investment project.

5.2.2. Reduce Risks

In the process of business operation, business risks are inevitable, so it is necessary to reduce the risks. For example, when developing new products, you can make a thorough investigation on the market of products as far as possible, so that the estimated data can meet the future data as much as possible, which will increase the business performance of enterprises.

5.2.3. Spread Risks

When an enterprise invests its own funds in a project, the risk will be great, but if the enterprise invests its own funds in a number of projects, its risk will be reduced, because although one of the projects is not profitable, there are always some projects that can be profitable, and the two offset each other, which can reduce the investment risk and increase the performance of the enterprise.

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