The impact of the Free Trade Zones establishment on the Corporate Risk-Taking level and its mechanism: Based on the empirical evidence of Chinese listed companies

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Abstract. The corporate risk-taking level is of great significance for enterprises to seize development opportunities. Meanwhile, the establishment of Pilot Free Trade Zones in China encourages Chinese enterprises to be bold in trying and exploring. Based on the data of Chinese listed companies from 2007 to 2021, this study employs the multi-period Difference in Differences model and finds that the establishment of Free Trade Zones can significantly improve the corporate risk-taking level. This study provides a theoretical reference for promoting the Free Trade Zones policy, raising the risk-taking level of Chinese listed companies, and achieving long-term economic development.

Keywords: Free Trade Zones; Corporate Risk-Taking; multi-period Difference in Differences model

1   Introduction

The level of corporate risk-taking represents the external manifestation of short-term strategic decision-making. A higher level of risk-taking can ensure that enterprises have sufficient investment in risk and innovation, which is conducive to improving enterprise performance, promoting the healthy and long-term development of enterprises.

However, according to the calculations of John et al [10] and Lv W.D. et al [5], the average risk-taking level of Chinese enterprises, at this stage, is significantly lower than that of enterprises in developed countries and regions such as the United Kingdom and the United States. Therefore, improving the level of corporate risk-taking has become the focus of both the enterprise field and the research field. Since 2013, the establishment of Free Trade Zones undoubtedly provides a great opportunity for the development of listed companies in China. It also helps enterprises to increase investment and expand their presence in the global market. Therefore, we focus on the impact of establishing a Free Trade Zone on the level of corporate risk-taking and its mechanism.

2   Theoretical analysis

The establishment of the Free Trade Zones has brought a variety of positive effects both macroscopically and microscopically, and it may affect the corporate risk-taking level by alleviating the financing constraints of enterprises and providing government subsidies.

Firstly, due to the financial opening-up reform in the Free Trade Zones, including system innovation and service innovation, as well as the improvement of the business environment, enterprises can have more diversified financing channels and financing methods, which reduces external financing costs [6] [7]. The establishment of the Free Trade Zones has also led to the rapid growth of foreign direct investment, and studies have proved that the introduction of foreign direct investment can effectively alleviate the financing constraints faced by China's private enterprises [3] [4]. This will make it easier for enterprises to obtain funds for risky investments, and it will be possible for enterprises to transfer funds from ordinary productive investments to high-risk and high-return investment projects.

Secondly, in order to fully leverage the policy advantages of Free Trade Zones, the government provides various subsidies to eligible enterprises and factories, including cost subsidies, employment subsidies, and tax subsidies. On one hand, this provides companies with additional resources, enabling them to undertake more risky investment projects. On the other hand, it also instills stronger confidence and security of enterprises, raising their expectations of regional economic growth and encouraging managers to prioritize long-term development [2]. This, in turn, further enhances risk-taking level of enterprises.

Based on the above analysis, we put forward the following hypothesis to be tested: The establishment of a Free Trade Zone can improve the corporate risk-taking level.

3   Research design

3.1   Sample Selection and Data Sources

We chose listed companies in China as the research object. The data of A-share listed companies in Shanghai and Shenzhen stock markets from 2007 to 2021 were obtained from CSMAR database as research samples. We exclude the samples of listed companies in the financial industry and the lack of financial data. In addition, in order to prevent the influence of extreme values on the results, we deal with the tail reduction of continuous variables by 1% of the upper and lower quantiles.

3.2   Model setting and variable description

Explained variable.
The level of corporate risk taking is expressed by expression $RiskT_{i,t}$. According to the existing literature on corporate risk-taking [8] [9] [10], as the uncertainty of future cash inflows directly affects the level of corporate risk-taking, many scholars use the

volatility of corporate earnings to measure the level of corporate risk-taking. The formula is as follows:

$$\text{RiskT}_{i,t} = \sqrt{\frac{1}{N-1}\sum_{n=1}^{N}\left(\text{ADJ\_ROA}_{in} - \frac{1}{N}\sum_{n=1}^{N}\text{ADJ\_ROA}_{in}\right)^2} \mid N=3, \ \text{Among them：} \tag{1}$$

$$ADJ\_ROA_{in} = \frac{EBITDA_{in}}{ASSETS_{in}} - \frac{1}{X_n}\sum_{k=1}^{X}\frac{EBITDA_{kn}}{ASSETS_{kn}} \tag{2}$$

"i" represents the enterprise; "n" represents the year during the observation period, with values ranging from 1 to 3; "X" is the total number of enterprises in an industry; "k" is the enterprise number of an industry. Return on Assets (ROA) is adjusted by the industry average.

Explanatory variable.

We introduce the virtual variable FTZ_{it} as the explanatory variable to indicate whether the province where the sample is located has set up a Free Trade Zone. The sample is assigned according to the year in which the country approved the establishment of the Free Trade Zones. When the province where the sample is not established, it is 0, and it is 1 after the establishment of the current year and the following year. Table 1 shows the time when each province (city) in China was approved to set up a Pilot Free Trade Zones.

Table 1. Time when each province (city) was approved to set up a Pilot Free Trade Zones

Year	Provinces (cities) approved to set up Pilot Free Trade Zones
2013	Shanghai
2015	Guangdong, Fujian, Tianjin
2017	Liaoning, Zhejiang, Henan, Hubei, Chongqing, Sichuan, Shaanxi
2018	Hainan
2019	Shandong, Jiangsu, Guangxi, Hebei, Yunnan, Heilongjiang
2020	Beijing, Hunan, Anhui

Control variable.

Refer to previous studies [1] [5] [8] [10], we consider the following factors that affect the level of firm risk-taking: the size of the enterprise (Size), the leverage of the enterprise (Leverage), the annual growth rate of the enterprise's operating income (Sales), the age of the enterprise's operating life (Age), the proportion of the largest shareholder (Ownership), the capital intensity of the enterprise (Klr) and the initial performance of the enterprise (Pfrate).

Finally, we construct the following model to test the impact of the establishment of Free Trade Zones on the level of corporate risk-taking:

$$\text{RiskT}_{i,t} = \beta_0 + \beta_1 FTZ_{i,t} + \beta_2 \text{Controls}_{i,t} + \beta_3 \text{Dummy} + \varepsilon_{i,t} \tag{3}$$

"i" represents the enterprise, "t" represents the year, "Controls$_{it}$" represents the set of control variables, "Dummy" represents the fixed effect of the individual and year, and "ε" is the residual term.

4   Empirical results and analysis

4.1   Descriptive Statistics

Table 2 shows the results of descriptive statistics. In the sample data, the average corporate risk-taking level is 3.474, which is higher than the level calculated by Lv W.D. et al [5] from 2003 to 2013, but still lower than the risk-taking level observed in developed countries or regions. In addition, the level of risk-taking among Chinese listed enterprises varies significantly, and many enterprises still have ample room for improvement in this area.

Table 2. Results of Descriptive Statistics

Variable	N	Mean	Median	SD	Min	Max
FTZ	32,616	0.388	0.000	0.487	0	1
RiskT	32,616	3.474	2.118	3.859	0.121	19.492
Size	32,616	22.13	21.958	1.278	19.73	26.09
Leverage	32,616	3.187	2.264	2.707	1.018	17.42
Age	32,616	17.24	17.000	5.810	5	32
Ownership	32,616	34.39	32.120	14.65	9.190	74.02
Sales	32,616	0.191	0.113	0.486	-0.594	3.303
Klr	32,616	12.55	12.547	1.178	0	19.62
Pfrate	32,616	0.0483	0.050	0.0761	-0.332	0.244

4.2   Baseline Regression

We employ multi-dimensional panel fixed effect estimation with clustering robust standard error for benchmark regression. Column (1) of Table 3 controls for time effects, and subsequent columns further control for individual effects, gradually adding control variables. It can be seen from the results of each column that the coefficients of the independent variable FTZ are significantly positive. As a result, it has been proven that the establishment of a Free Trade Zones, can enhance the level of corporate risk-taking.

Table 3. Result of the Baseline Regression

Variables	RiskT			
	(1)	(2)	(3)	(4)
FTZ	0.185*	0.280***	0.259***	0.238***
	(1.78)	(2.86)	(2.70)	(2.66)
Controls	YES	YES	YES	YES
Firm FE	NO	YES	YES	YES
Year FE	YES	YES	YES	YES
N	32,616	32,616	32,616	32,616
R^2	0.021	0.403	0.419	0.458

Note: The corresponding clustering standard errors are in parentheses. The corresponding clustering standard errors are in parentheses: ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

5   Robust Test

We tested the robustness of the model by employing more robust standard errors and incorporating alternative measures of Corporate Risk-taking. According to studies conducted by scholars such as Yu M.G. et al (2013), the level of corporate risk-taking can also be measured by analyzing the ROA's range over a three-year period, as well as the ratio of R&D expenditure to total assets at the end of each year from 2007 to 2021. According to the regression results in Table 4, the independent variable FTZ remains significant. Therefore, the conclusion that the establishment of a free trade zone can enhance the risk-taking level of enterprises remains valid.

Table 4. Results of Robust Test

Variables	Cluster years	Use ROA's Range	Use R&D/Assets
FTZ	0.238**	0.448***	0.064*
	(2.74)	(2.76)	(1.80)
Controls	YES	YES	YES
Firm FE	YES	YES	YES
Year FE	YES	YES	YES
N	32,616	32,616	24,817
R^2	0.458	0.463	0.789

Note: The corresponding clustering standard errors are in parentheses. The symbols ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively; The values of the explanatory variables are mul-tiplied by 100.

6   Conclusion

This study examines the impact of the establishment of Free Trade Zones on the corporate risk-taking behaviors from a micro perspective. Through the above research, we

reach the conclusion that the establishment of Free Trade Zones can significantly improve the corporate risk-taking level. This shows us that the state should prioritize the role of the Free Trade Zone policy and continue to promote the development of Free Trade Zones; Enterprises should focus on investing in and managing high-risk projects, appropriately increasing their risk-taking level to enhance operational efficiency.

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