

Study on the Impact of Industry Prosperity on the Level of Corporate Risk Taking

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ABSTRACT

Based on the principal-agent theory, we construct a research framework of "external environment—investment efficiency—corporate risk-taking level." Utilizing data on industry prosperity from 2019 to 2023 and combining panel data on corporate risk-taking levels in the eastern, central, and western regions of China, we employ a multi-time-point DID model for OLS regression to analyze the impact of industry prosperity on the level of corporate risk-taking under regional differences. The results indicate: (1) Companies in industries with higher prosperity tend to have higher investment efficiency and more stable revenue, leading to lower levels of corporate risk-taking; (2) Higher market freedom weakens the influence of industry prosperity on the local corporate risk-taking level; (3) The degree of market liberalization in the eastern, central, and western regions of China is gradually decreasing, making the impact of industry prosperity on the risk-taking level of companies highest in the western region, followed by the central region, and the eastern region experiencing the smallest impact.

KEYWORDS: Regional differences; Industry prosperity; Corporate risk-taking; Eastern, central, and western regions

1. INTRODUCTION

Profit and risk coexist. From the perspective of a business, high-return investment projects can significantly increase the profit margin, achieving the goal of maximizing corporate value. However, they also inevitably bring higher risks. If funds cannot be recovered, substantial losses may be incurred. On the other hand, low-risk investment projects may result in inadequate resource utilization for a business, hindering the improvement of profitability. Different industries have varying development prospects, and companies in industries with high prosperity may experience more stable returns and lower levels of risk due to optimistic market conditions and economic situations. Conversely, companies in industries with lower prosperity may face greater revenue fluctuations, leading to higher levels of risk. Economic development levels in China's eastern, central, and western regions differ, and there are variations in the processes of marketization and market freedom. Therefore, the impact of industry prosperity on corporate risk-taking levels may differ across regions. Studying the influence of industry prosperity on corporate risk-taking levels in different regions is beneficial for corporate governance and can

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promote regional economic balance and stable development.

2. Overview of Corporate Risk-Taking Level Research

2.1. External Environment and Corporate Risk-Taking Level

Research on corporate risk-taking mainly focuses on the impact of factors such as market environment and the process of marketization on corporate risk-taking levels, both domestically and internationally. In terms of the market environment, studies have found that industry prospects can influence a company's risk-taking level. If a company operates in an industry with favorable prospects, its revenue situation is often stable, resulting in a lower risk-taking level. Other research indicates a negative correlation between the degree of monetary policy tightness and corporate risk-taking level. In a lenient monetary policy environment, companies are more inclined to take risks, whereas they adopt measures to reduce risk-taking levels in a tight monetary policy environment. Smaller enterprises, with their higher debt-to-asset ratio, tend to be more sensitive to changes in

monetary policy. Additionally, social networks play a crucial role in the external environment. Relevant studies suggest that social networks have a positive impact on corporate risk-taking levels. Companies can source significant investment opportunities from social networks, facilitating their investment activities. Regarding regional characteristics, research suggests that a company's risk-taking level is influenced by the local culture of individualism, with a positive correlation—higher levels of individualism lead to higher corporate risk-taking levels[4-5]. Concerning the marketization process, studies show that a faster marketization process in a region corresponds to a higher degree of economic liberalization. In such cases, market liquidity increases, prompting listed companies to prioritize market price fluctuations as signals. This inclination towards high-return investment projects enhances investment efficiency and strengthens corporate risk-taking levels.

2.2. Theoretical Framework of "External Environment—Investment Efficiency—Corporate Risk-Taking Level"

Based on the principal-agent theory, the interests of the principal (enterprise owner) and the agent (management) are often divergent. The owner seeks to maximize the value of the enterprise, while the agent is more concerned about personal gains from management. Consequently, managers may make decisions that harm the interests of the enterprise, such as choosing high-risk projects for personal performance goals without considering the company's operational conditions, or making inefficient decisions to minimize responsibility. When the external environment changes, the investment decision-making behavior of executives may also change. Firstly, the impact of industry prosperity plays a significant role. When the industry in which a company operates is prosperous, with stable production and sales activities during a robust upward phase, top management's decision-making aims to maintain stable revenue. In such circumstances, there is a tendency not to prefer high-risk, high-return investment activities, resulting in relatively lower investment efficiency. The level of corporate risk-taking is reflected in revenue fluctuations, and during an industry upswing, revenue fluctuations are minimal, indicating lower corporate risk-taking. Conversely, when the industry is in a downturn, the corporate risk-taking level increases. Secondly, under regional differences, the influence of industry prosperity on corporate risk-taking levels varies. Regional differences are primarily manifested in variations in the marketization process. According to resource dependence theory, differences in a

company's strategic resources lead to heterogeneous performance. In regions where marketization processes are faster, resources such as land, funds, and product sales channels are more abundant, and market freedom is higher. This richness in resources promotes increased investment efficiency, thereby weakening the impact of industry prosperity on corporate risk-taking levels. Building upon this, our study establishes the theoretical framework of "External Environment—Investment Efficiency—Corporate Risk-Taking Level" to investigate the impact of industry prosperity on corporate risk-taking levels under regional differences.

3. Research Objects, Research Design, and Data Sources

3.1. Research Objects

Considering the unique nature of financial industry accounting, this study excludes data from the financial sector. The study focuses on ten representative industries: manufacturing, agriculture, forestry, transportation, accommodation and catering, wholesale and retail, real estate, education, culture, sports and entertainment, and scientific research and technical services. These industries collectively cover over 85% of enterprises in China.

3.2. Research Design

3.2.1. Research Hypotheses

Industries in different external environments exhibit varying degrees of prosperity. If a company operates in an industry with high prosperity, it often has an ample supply of raw materials, mature sales channels, and stable product sales, resulting in relatively stable revenue and a lower level of corporate risk-taking. Conversely, companies in industries with lower prosperity experience greater revenue fluctuations due to external environmental influences, leading to a relatively higher level of corporate risk-taking[9]. Considering the different degrees of marketization in regions, where market freedom varies, with the eastern region having the highest and the western region the lowest, this study proposes the following hypothesis:

H1: The higher the industry prosperity, the lower the corporate risk-taking level, and this effect is moderated by market freedom.

3.2.2. Sample Selection

The primary data source for this study is the Guotai-An database. The sample comprises financial data from listed companies in China's ten representative industries, including manufacturing, agriculture, forestry, transportation, etc., for the years 2018 to 2022. The sample is processed as follows: 1. The data is categorized based on the geographical regions of

the companies—eastern, central, and western regions;
 2. Companies with incomplete or missing data for certain years are excluded to ensure data consistency;
 3. Companies with extreme or clearly abnormal values are excluded to ensure data validity; 4. ST (special treatment) companies and those from the

financial industry are excluded. The final sample consists of 3055 companies from China's eastern, central, and western regions, with 1194, 1017, and 844 companies, respectively. All selected companies are listed companies with continuous and complete annual reports for the years 2019 to 2022.

3.2.3. Variable Design

Dependent Variable: Corporate Risk-Taking Level (Risk)

Existing literature suggests four main methods for measuring corporate risk-taking levels: (1) stock return volatility based on market indicators; (2) standard deviation of return on assets (ROA) based on financial indicators; (3) diversification through mergers and acquisitions or diversified operations; (4) research and development expenditure. This study adopts the standard deviation of ROA to measure the corporate risk-taking level. The standard deviation of ROA reflects the amplitude of the company's earnings volatility, effectively capturing its risk-taking level.

Drawing from existing literature, this study employs the following method to measure corporate risk-taking levels: assessing the volatility of annual profits over a three-year observation period[10]. To calculate this indicator, we use the annual ROA values for each year and adjust them to obtain the adjusted ROA (ADJ_ROA) using the industry average ROA. Subsequently, the standard deviation of the adjusted ROA for each company over the observation period represents the company's risk-taking level. The relationship is expressed as follows:

$$Risk_{i,t} = \sqrt{\frac{1}{N-1} \sum_{n=1}^N (ADJ_{i,t} - ROA_{in} - \frac{1}{N} \sum_{n=1}^N ADJ_{i,t} - ROA_{in})^2}$$

In the equation: Risk_{i,t} represents the level of corporate risk-taking; ADJ_ROA_{in} represents the dependent variable adjusted with the industry average; "N" is the sample size, and "n" denotes the number of years.

Explanatory Variable: Industry Prosperity (IM). This study utilizes the industry prosperity index from the Industry Monitoring Platform of the Development Research Center of the State Council to determine specific values. Control Variables: Enterprise Size (Size) is measured by the natural logarithm of total assets at the end of the period; Enterprise Funds (Cash) is calculated as the ratio of cash and short-term investments at the end of the period to total assets at the end of the year; Debt-to-Asset Ratio (Lev) is the ratio of total liabilities to total assets at the end of the period; Enterprise Growth (Growth) is measured by the growth rate of the main business of the enterprise; Listing Years (Age) represents the number of years since the company went public; Executive Shareholding (Share) indicates the percentage of shares held by the company's executives; along with Year Dummy Variables (Year) and Industry Dummy Variables (Industry).

3.2.4. Model Design

Regarding the relationship between industry prosperity, executive turnover, and risk-taking, this paper conducts an empirical examination using panel data through multiple linear regression analysis. The specific model is as follows:

$$Risk = \beta_0 + \beta_1 IM + \beta_2 Size + \beta_3 Lev + \beta_4 Cash + \beta_5 Age + \beta_6 Growth + \beta_7 Share + \sum Industry + \sum Year + \epsilon_t$$

In the equation, β_0 — β_6 represents the estimated parameters for each variable; IM stands for industry prosperity; Size represents enterprise size; S is the debt-to-asset ratio; Cash denotes enterprise funds; Age indicates the number of years a company has been listed; Growth represents the enterprise's growth; Share denotes the percentage of shares held by executives; Industry and Year are dummy variables; ϵ_t is a randomly distributed variable that is independent and follows the same normal distribution.

This model is designed to test hypothesis H1. If $\beta_1 < 0$, it proves a negative correlation between industry prosperity and the level of corporate risk-taking. The study will conduct grouped regressions based on the eastern, central, and western regions for the sample companies. The higher the significance level of β_1 , the stronger the correlation, indicating a greater impact of industry prosperity on the level of corporate risk-taking.

3.3. Data Sources

The data primarily comes from the National Bureau of Statistics website, the "China Statistical Yearbook" for the years 2019 to 2022, as well as CBNDData and the Guotai An database.

4. Impact Analysis of Industry Prosperity on Corporate Risk-Taking

4.1. Correlation Analysis

In this study, a correlation analysis was conducted on the variables in the model of corporate risk-taking and industry prosperity. As shown in Table 1, the correlation coefficient between corporate risk-taking level (Risk) and industry prosperity (IM) is negative. This implies that industry prosperity may decrease the level of corporate risk-taking. Furthermore, there is a negative correlation between the level of corporate risk-taking and executive shareholding (Share), indicating that a higher executive shareholding ratio is associated with a lower level of risk-taking. On the other hand, corporate risk-taking is positively correlated with enterprise size (Size), cash balance (Cash), debt-to-asset ratio (Lev), and enterprise growth (Growth), suggesting that these factors have a positive impact on the level of corporate risk-taking.

Tab.1 Correlation analysis

	Risk	IM	Size	Lev	Cash	Age	Growth	Share
Risk	1	-0.0297*	0.0159*	0.3038**	0.0728*	0.2191*	0.0688***	-0.0521*
IM	-0.0297*	1	0.0482***	-0.0562**	0.0687	0.0609	0.0815**	0.0380***
Size	0.0159*	0.0482***	1	-0.8726**	0.0424**	-0.0056	0.0597***	0.0018**
Lev	0.3038**	-0.0562**	-0.8726**	1	-0.0975**	-0.0633*	-0.0443**	-0.2301**
Cash	0.0728*	0.0687	0.0424**	-0.0975**	1	0.0159*	0.0931**	0.0751*
Age	0.2191*	0.0609	-0.0056	-0.0633*	0.0159*	1	0.2617	0.3152
Growth	0.0688***	0.0815**	0.0597***	-0.0443**	-0.0931**	0.2617	1	-0.0045
Share	-0.0521*	0.0380***	0.0018**	-0.2301**	0.0751*	0.3152	-0.0045	1

Note:*, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

4.2. Regression Analysis

4.2.1. Regression Analysis of Corporate Risk-Taking and Industry Prosperity

By conducting linear regression on the model of corporate risk-taking and industry prosperity, the results in Table 2 are obtained. From the data in the table, it can be observed that the coefficients for the explanatory variable IM in the eastern, central, and western regions are -0.0016, -0.0024, and -0.0033 (rounded to four decimal places), with p-values of 0.0625, 0.0236, and 0.0008 (rounded to four decimal places), respectively. These coefficients pass significance tests at the 10%, 5%, and 1% levels, indicating a negative correlation between industry prosperity and corporate risk-taking. As seen in the regression results for companies in the eastern, central, and western regions, the significance levels for the explanatory variable IM gradually decrease. This demonstrates that market freedom inhibits this influence. This is because the eastern region underwent market economic system reforms earlier, with a faster marketization process, resulting in higher market freedom and stronger liquidity. The exchange of resources, expansion of sales channels, and enlargement of customer bases are easier, often accompanied by more lenient economic policies. Therefore, the impact of industry prosperity on corporate risk-taking in the eastern region is relatively small under the intervention of market freedom. In contrast, the central and western regions, with relatively lower market freedom, experience a greater impact on corporate risk-taking from industry prosperity.

Tab.2 Regression analysis

Dependent variable	Predicted sign	Companies in the Eastern Region	Companies in the Central Region	Companies in the Western Region
IM	-	-0.0016* (-1.89)	-0.0024** (-2.05)	-0.0033*** (-2.77)
Size	+	-0.1273*** (-15.04)	-0.0135*** (-8.95)	-0.0114*** (-11.97)
Lev	-	0.4858*** (10.44)	0.0563*** (6.72)	0.0313*** (6.50)
Cash	+	0.0464*** (6.41)	0.1214*** (8.46)	-0.0053 (-0.78)
Age	+	0.0002* (1.80)	0.0000 (-0.45)	0.0005*** (4.34)

Growth	+	-0.0028** (-1.99)	-0.0015 (-0.47)	-0.0027** (-2.32)
Share	-	-0.0413*** (-3.87)	-0.1309* (-0.63)	-0.0327*** (-4.12)
Year		Control	Control	Control
Industry		Control	Control	Control

Note:*, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

5. Conclusions and Recommendations

5.1. Conclusions

The level of risk undertaken by a business is crucial to its daily operations, investment decisions, and overall developmental status. Scholars both domestically and internationally have extensively researched various aspects of this phenomenon. In China, many companies, when measuring their level of risk, may make erroneous estimations due to limited considerations and a lack of integration with the developmental conditions of their respective industries. This paper examines the risk-taking levels of Chinese listed companies from the perspectives of industry prosperity and executive turnover, leading to the following conclusions:

Companies in industries with higher prosperity may experience relatively stable earnings and minimal fluctuations due to optimistic market conditions and economic outlook. Conversely, companies in industries with lower prosperity may face significant earnings volatility amid unfavorable market conditions and economic outlook.

When the industry prosperity negatively affects the risk-taking levels of listed companies, those undergoing executive turnover exhibit a mitigating effect compared to companies with unchanged executive leadership. For instance, when there is a change in top management, companies may adopt a more conservative approach in decision-making, leaning towards projects with stable returns. Consequently, earnings volatility decreases, leading to a reduction in the company's risk-taking level. Therefore, executive turnover weakens the negative impact of industry prosperity on the risk-taking levels of companies.

In summary, there is a negative correlation between industry prosperity and the risk-taking levels of companies, and the occurrence of executive turnover diminishes the adverse impact of industry prosperity on the risk-taking levels of businesses.

5.2. Recommendations

Relevant studies both domestically and internationally have demonstrated that risk-taking significantly enhances a company's growth rate in operating income, capital allocation efficiency, and

overall enterprise value, playing a crucial role in its development. However, in decision-making, the management of companies often tends to lean towards risk aversion to ensure the security of their own work and income. This inclination may lead to the rejection of projects with higher risks but also higher returns, thereby compromising the interests of the company owners. In light of the theoretical analysis and empirical results presented in the preceding sections regarding the relationship between industry prosperity, executive turnover, and enterprise risk-taking, this paper puts forth the following recommendations:

Manage your risk-taking level based on the industry prosperity in which your company operates. When the industry is thriving, and the market is stable due to optimistic development trends, the company's income fluctuations are minimal, resulting in a lower risk-taking level. In such scenarios, more aggressive decisions, such as investing in high-risk high-return projects, can be adopted to enhance the risk-taking level, increase enterprise value, and improve capital allocation efficiency. Additionally, measures like equity incentives for the management team or advancing the company's market-oriented processes can be implemented to moderately elevate the risk-taking level. Conversely, in periods of low industry prosperity characterized by less optimistic development prospects and market instability, leading to significant income fluctuations, the risk-taking level tends to be higher. Adopting a more conservative approach, such as favoring low-risk projects in operational or investment decisions, or implementing measures like reducing equity incentives and compensation incentives for the management team, can help lower the company's risk-taking level.

Further enhance the internal power structure and governance mechanisms within the company to improve the effectiveness of management contracts and increase the willingness of agents to take on risks. Simultaneously, a well-developed corporate governance framework can significantly oversee the decision-making of agents, reducing instances where they are unwilling to take on risks for the pursuit of

personal interests. Specific measures can be undertaken in the following areas:

1. Enhance the independence and effectiveness of the internal compensation management committee. If management personnel have excessive influence over compensation contracts, their decision-making is difficult to supervise and restrain effectively. Therefore, it is essential to diminish management's intervention in compensation contracts to constrain their decision-making behavior.
2. The decision-making behavior of the management must be subject to effective oversight; otherwise, it may lead to instances of private behavior at the executive level. To address this, it is crucial to maximize the supervisory role of the supervisory board and intensify oversight of the management. At the same time, efforts should be made to avoid agents deliberately making conservative decisions for the stability of their own interests.
3. The establishment and improvement of an independent director system are also necessary. This system can enhance the constraints on management contracts and behavior.
4. To prevent excessive concentration of power in the management, considering the separation of the roles of chairman and general manager could be beneficial. This approach reduces the likelihood of management avoiding corporate responsibilities and being unwilling to take on risks for personal gain.

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