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An empirical research on the financial distress risk in the garden and construction industry

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I hereby declare that this PhD dissertation is my original work and it has been written by me in its entirety.

I have duly acknowledged all the sources of information which have been used in this dissertation.

This PhD dissertation has also not been submitted for any degree in any university previously

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Abstract

In recent years, the garden and construction industry has faced significant financial distress due to the downward pressure on the macro economy. This financial distress not only poses risks to the financial stability and management of enterprises but also has far-reaching impacts on society.

This paper utilizes various analytical methods such as case analysis, empirical analysis, and event analysis to derive the following conclusions:(1)The participation of garden construction industry enterprises in public-private partnership (PPP) projects leads to increased financial distress.(2)The higher the debt ratio of the local government where listed garden and construction enterprises are located, the greater the financial distress they experience.(3)Enterprises in the garden and construction industry, whose primary business involves the real estate industry, may be able to alleviate their financial distress in the early stages. However, they struggle to reduce their financial distress during periods of weakness in the real estate industry, particularly after 2019.(4)The financial distress of listed garden and construction enterprises is influenced by the aggressiveness of their business strategies. A more aggressive strategy corresponds to higher levels of financial distress.(5)The financial distress of

garden and construction enterprises is inversely related to the shareholding ratio of the largest shareholders. Higher shareholding ratios are associated with lower levels of financial distress.(6)The issuance of green bonds by listed garden and construction enterprises generates positive excess yield and significantly improves their stock prices. This is primarily due to the fact that green bonds can reduce the debt financing costs of these companies and address investment and financing maturity mismatches.

Based on these findings, the following policy suggestions are proposed:(1)Listed enterprises in the garden and construction industry should carefully evaluate their financial capacity before participating in PPP projects. Excessive reliance on such projects can worsen the investment and financing term structure of these enterprises.(2)It is advisable for listed enterprises in the garden and construction industry to collaborate with local governments that have a relatively low debt ratio and strong financial strength. This can help mitigate the spillover effect of local government debt risks.(3)The garden and construction enterprises are well-suited to an equity structure with a relatively high shareholding ratio of the largest shareholders. These enterprises should adopt a steady development strategy to reduce aggressive investments and high-leverage financing.(4)Encouraging listed garden and construction enterprises to issue green bonds and engage in businesses related to environmental protection and people's livelihoods can help reduce their financing costs and address investment and financing term structure challenges.

Key words: financial distress; garden and construction industry; PPP; local government debt; real estate; degree of strategic radicalism; green bond

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Chapter 1: Introduction

1.1 Theoretical and Practical Significance

1.1.1 Background and Practical Significance

In recent years, the Chinese garden and construction industry has witnessed several enterprises facing financial distress. Notable examples include Beijing Orient Landscape Co., Ltd. (referred to as Orient Garden) and Poten. In 2020, Orient Garden, the most influential garden company listed in China, accumulated a total debt of 30 billion RMB. Similarly, Poten suffered significant losses, with 700 million RMB in 2021 and 194 million RMB in the first half of 2022. Poten's asset-liability ratio currently exceeds 100%, putting it at high risk of a capital chain break.

According to the Wind database, the total revenue of 27 garden and construction industry enterprises in 2021 was 45.782 billion RMB, with an average income of 1.696 billion RMB. However, the total net profit attributed to their parent companies was 5.354 billion RMB, resulting in an average loss of 198 million RMB per company. In the first half of 2022, these 27 listed companies suffered a combined loss of 1.112 billion RMB. The database also reveals that the total accounts receivable balance for these companies was 41.234 billion RMB at the end of 2021 and remained at 39.676 billion RMB in 2022, indicating persistently high levels of accounts receivable in the garden and construction industry. Additionally, the industry's cash flow situation is unfavorable, with only 10 out of the 27 companies reporting positive net cash flow from operating activities at the end of 2021. By 2022, this number had reduced to 8,

indicating a worsening cash flow situation. It is evident from these statistics that most garden and construction industry companies are experiencing financial distress.

The financial distress faced by garden and construction industry enterprises not only poses significant financial and management risks but also has a negative impact on society. In 2018, Orient Garden attempted to issue bonds but failed, exposing its fund crisis and subsequent debt defaults. Following this event, Orient Garden's stock price experienced continuous decline, losing 10 billion RMB in market value within four days. Poten faced a similar situation, as its projects were predominantly focused on third-tier and fourth-tier cities in East and South China, where the economic and financial conditions were weak. The ability to collect accounts receivable in these regions heavily relies on the local government's financial situation, resulting in project payment delays and capital shortages. Consequently, Poten suffered significant losses, and its stock price plummeted in the secondary market. In summary, the financial distress faced by garden and construction industry enterprises presents substantial risks not only to the companies themselves but also to the financial market.

The main factors influencing financial distress encompass macro-level factors, industry-level factors, and micro-level factors. In the garden and construction industry, external factors primarily include the debt ratio of local government PPP (Public-Private Partnership) projects and the state of the real estate industry. From a macro perspective, since 2011, China's economy has entered a new normal characterized by slower economic growth. By the first quarter of 2022, the country's GDP growth rate had dropped to 4.8%. This economic slowdown has created financial pressure on local governments, leading to delayed project settlement

payments. Orient Garden, for example, derives a significant portion of its income from government-invested garden construction projects, water system management, and ecological restoration projects, which it participates in through PPP arrangements. However, collaborating with local governments entails significant risks. Furthermore, the real estate industry, a crucial revenue source for local governments, has been adversely affected by the industry's downturn in recent years. The revenue and expenditure of local governments have been greatly impacted as a result. Moreover, the government's efforts to address local government debt inventories have resulted in reduced investment in municipal garden construction, further affecting Orient Garden's collection progress. As of the first quarter of 2022, Orient Garden's accounts receivable turnover rate had gradually declined, putting it at risk of unrecoverable receivables due to some local governments' inability to make payments.

The decline of the PPP model has compounded the negative impact of advance payments on garden and construction enterprises. Prior to 2016, the scale of PPP projects was limited, and the development of the garden and construction industry remained relatively stable. However, with the introduction of numerous PPP projects, the debt ratio of industry enterprises steadily increased from 2016 to 2018. Combining this with the recession in business revenue, the debt ratio of garden and construction enterprises remained high.

The weakness of the real estate industry has also had a severe impact on the garden and construction sector. The "no speculation in housing" policy and the consequent loss of financing ability for real estate companies, as well as the frequent debt defaults of major real estate enterprises, have worsened the financial situation in the garden and construction industry. The

economic slowdown and the failure to sell land-use rights have prompted local governments to advocate for austerity measures, further deteriorating the industry's financial conditions. Additionally, the outbreak of COVID-19 has pushed the Chinese real estate industry into an unprecedented state of weakness. In the second half of 2021, core indicators of the real estate industry, such as property sales floor space, new housing starts, and land purchases, experienced their slowest growth in over a decade. Monetary policy tightening has increased credit risk for real estate companies, while dwindling confidence in the sector, driven by banks' reluctance to lend and buyer fears, has had a direct negative impact on garden and construction enterprises. For instance, Springfield Garden reported a significant decline in financial results due to the real estate industry downturn, with operating revenue decreasing by 24.40% year-on-year in the first half of 2022, operating net cash flow of -7,410,766.02 RMB, and a 40.98% decrease in operating profit compared to the same period in 2021.

Micro-level factors affecting garden and construction companies mainly pertain to internal governance issues. Listed companies in the garden and construction industry face various governance problems, which contribute significantly to their financial difficulties. Orient Garden, once again, serves as an example. In 2022, Orient Garden faced criticism for delayed information disclosure, specifically regarding the failure to promptly disclose the stock pledge of major shareholders He Qiaonu and Tang Kai from August 2018 to April 2020. Prior to Orient Garden's acquisition by the Beijing State-owned Asset Supervision and Administration Commission, the controlling shareholders were He Qiaonu and Tang Kai, who held 41.54% of the company's shares. In a context of macroeconomic downturn and contractionary monetary

policy, Orient Garden pursued an aggressive expansion policy through PPP projects, ultimately leading to debt defaults. Poten undertook a large number of PPP projects, resulting in rapid growth in operating income and corporate assets but also a significant increase in liabilities. By the end of 2021, Poten's asset-liability ratio had exceeded 100%, and the accumulated amount of overdue principal and rent reached 1.65 billion RMB. As of the first quarter of 2022, Poten's liabilities had reached 10.3 billion RMB.

In conclusion, the financial situation of listed companies in the garden and construction industry has gradually deteriorated. High debt levels, coupled with a slowdown in macroeconomic growth, tightening monetary policy, increasing local government debt risks, lengthy payment cycles for PPP projects, the impact of the weak real estate industry, and internal governance problems, have all contributed to their financial distress. The industry exhibits low cash flow levels, weak solvency, and frequent major debt default events. This paper aims to analyze the reasons for this financial distress, propose governance recommendations for listed companies in the garden and construction industry, and provide regulatory suggestions for the government.

1.1.2 Theoretical Significance

(1) Existing literature mainly analyzes the causes of financial distress from the perspective of listed companies' governance, with limited research on the financial distress specific to the garden and construction industry. This paper focuses on addressing this research gap, providing ideas and a theoretical foundation for analyzing the causes of financial distress in a specific industry.

(2) The paper employs event analysis to examine the impact of green bonds on the financial distress of listed companies in the garden and construction industry. While green bonds are primarily intended to promote the transition to a low-carbon economy and provide a low-cost financing channel for environmental protection and low-carbon projects, their indirect role in helping enterprises improve their financial plight offers insights for policy directions aimed at improving the financial situation of listed companies in the garden and construction industry.

1.2 Research Status and Literature Review

Warner (1997) discovered that the financial distress of enterprises is not attributed to a single factor, but rather stems from a combination of various factors. These factors include macroeconomic conditions, industry-specific factors, and internal factors within the enterprises themselves. This research emphasizes the complex nature of financial distress and highlights the need to consider multiple factors when analyzing its causes.

1.2.1 Micro Factors Affecting Financial Distress of Enterprises

The internal factors that influence listed companies in financial distress can be categorized as company strategies, internal governance, and liquidity.

Wang et al. (2016) highlighted that companies with offensive strategies tend to have higher agency costs compared to those with defensive strategies. Different corporate strategies lead to varying principal-agent costs and information environments. Companies pursuing offensive strategies often lack detailed planning in decision-making, resulting in greater information asymmetry between management and shareholders. This may lead to decisions that prioritize

personal interests over the overall enterprise value. On the other hand, companies with defensive strategies prioritize earnings stability, leading to more conventional decision-making and detailed planning, reducing information asymmetry and agency costs.

In terms of business risk, companies implementing offensive strategies focus on product and market expansion, leading to greater production uncertainty, poor business stability, and volatile performance. As a result, these companies are more prone to financial difficulties. Conversely, companies with defensive strategies seek stable performance with lower uncertainty and operating risks, resulting in significantly better profitability and cash flow in the current period compared to those implementing offensive strategies (Miles and Snow, 1978; Hambrick, 1983; Miles and Snow, 2003).

Low (2009) argued that a reasonable level of risk-taking can improve production efficiency, leading to long-term competitive advantage and enhanced enterprise value. Zhang and Liu (2017) found that companies with more aggressive strategies tend to have higher risk levels.

Regarding the internal regulatory environment, companies pursuing offensive strategies often have unstable and changing internal control mechanisms, increasing the supervision costs for owners over managers. In contrast, defensive companies prioritize efficiency and have more concentrated and stable internal control mechanisms. This facilitates shareholder supervision over managers, lowers agency costs, and reduces the likelihood of financial distress (Miles and Snow, 1978; Miles and Snow, 2003; Bentley, 2013; Wang et al., 2016).

Based on the above analysis, it can be observed that the higher the degree of strategic radicalism, the greater the risk a company may face. While strategic radicalism may enhance

corporate value, it also increases the potential for financial distress. Current literature generally supports the notion that offensive strategies contribute to a company's financial difficulties, while defensive strategies mitigate financial distress. However, there is a lack of research on the impact of strategic radicalism on the financial distress of listed companies in the garden and construction industry.

Additionally, according to Lizal (2002), poor management, improper capital structure utilization, and financial fund management are major factors leading to a company's financial distress. Sun (2007) found that internal factors affecting financial distress include high leverage, excessive debt repayment risk, diversified investment, guarantees, litigation, and poor decision-making. Kristanti et al. (2016) concluded that factors contributing to financial distress include the quality of corporate management and decision-making, as well as the involvement of independent directors. Jiang et al. (2018) identified the largest shareholder's actions damaging the company's interests, external guarantees, and excessive business area allocation as factors leading to financial distress. These studies highlight the importance of a company's internal governance in relation to its financial distress.

The ownership structure of a company plays a crucial role in its internal governance. Key indicators used to measure corporate ownership structure include ownership concentration and the shareholding ratio of the largest shareholder (Marco and Ailsa, 1998; Zhang and Wang, 2021). The degree of ownership concentration significantly impacts a company's operations. When ownership concentration is low, there is no prominent major shareholder, and each shareholder holds a small minority stake with limited control over the company. In such cases,

internal supervision is weak, and company management wields significant control. This situation can lead to moral hazard and adverse selection, deviating from the goal of maximizing company benefits. On the other hand, when ownership concentration is high, the largest shareholder has greater control over the company. To maximize their own interests, the largest shareholder will strengthen company supervision and improve its financial condition (Jensen and Meckling, 1976; Fama and Jensen, 1983; LLSV, 2000; Renneboog et al., 2006).

Sun and Huang (1999) conducted an empirical study on the relationship between ownership structure and financial distress. The results revealed that the influence of the largest shareholder's shareholding ratio on financial distress was defined by a critical value. Below this critical value, the company's value increased as the shareholding ratio of the largest shareholder increased. However, above this critical value, the company's value decreased with an increase in the largest shareholder's shareholding ratio. Fathi and Gueyie (2001) investigated 46 financially distressed companies and 46 healthy companies in Canada to study the relationship between financial distress and corporate governance. The empirical results using logistic regression showed that a larger shareholding ratio was associated with a smaller probability of the company falling into financial distress. Empirical research by Jiang and Wang (2004) demonstrated a significant negative correlation between the largest shareholder's shareholding ratio and the likelihood of special treatment of listed companies. In other words, a higher shareholding ratio reduced the likelihood of the company facing special treatment. Empirical analysis by Li et al. (2004) indicated that the largest shareholder's shareholding ratio had a significant impact on the capital occupation by the controlling shareholder. The relationship

between the largest shareholder's shareholding ratio and the controlling shareholder exhibited a curve that rose initially and then declined. This suggests that the largest shareholder's shareholding ratio has a nonlinear impact on the company's value. Wang Kemin et al. (2006) studied the relationship between corporate governance and financial distress. They found that the shareholding ratio of the controlling shareholder and the likelihood of the company falling into financial distress followed a "U" shape, indicating that companies with state-controlled shareholders were more likely to experience financial distress. Wright et al. (2007) studied bankruptcy risk using a sample of 236 companies in the United States from 1997 to 2005. They employed logistic regression and found that controlling shareholders, through their control rights, could infringe upon the company's interests and had the motivation to privatize the wealth of other shareholders. Weak corporate governance could easily lead to a higher risk of bankruptcy.

The agency theory emphasizes that executive incentives can help reduce agency costs. By aligning the interests of senior executives with those of the company, they are motivated to make favorable decisions in the company's operations (Jensen and Meckling, 1976). Warfield et al. (1995) noted that agency costs can be reduced when managers or institutions hold more shares, as CEOs have a stronger incentive to avoid financial trouble or bankruptcy. In other words, the higher the proportion of shares held by managers, the lower the likelihood of the company encountering financial distress. Lu (2007) analyzed the corporate governance of companies facing abnormal financial conditions, which were considered as financially distressed companies. The empirical results indicated that the influence of executive equity

incentives on corporate performance varied among companies with different controlling shareholders. However, the results supported the notion that a higher proportion of senior executives' equity ownership was associated with more favorable corporate performance. Generally, when senior executives hold a higher proportion of shares, their interests become directly linked to the company's interests, thereby reducing agency costs arising from the separation of ownership and management. A stronger company performance reduces the risk of financial distress. However, Wang and Li (2007) conducted an empirical study on the influence of corporate governance factors on financial distress and arrived at the opposite conclusion. They considered companies specially treated between 1998 and 2005 due to abnormal financial conditions as financially distressed companies, and selected an equal number of financially healthy companies for comparison. They examined corporate governance variables such as the shareholding ratio of senior executives, whether the chairman and general manager were the same person, the shareholding ratio of independent directors, and the shareholding concentration index. The empirical results showed that the proportion of senior executives' shares did not have a significant effect on financial distress.

The above literature suggests that higher ownership concentration strengthens the control ability of the largest shareholder over the company, resulting in relatively low financial distress. A larger shareholding ratio is associated with a smaller probability of the company experiencing financial distress, but this relationship is nonlinear. Most studies support the notion that executive equity incentives can reduce a company's financial distress, although a few scholars argue that this effect is not significant. Currently, there is limited research on the influence of

equity structure factors on the financial distress of listed companies in the garden and construction industry.

In foreign literature, there are limited studies on the relationship between connected transactions and financial distress. This is mainly due to the high requirements for information transparency in foreign countries and the relatively minor impact of connected transactions on whether a company falls into financial distress. Therefore, research in this area is scarce. However, the extensive influence of connected transactions has drawn the attention of many experts in China, given the significant volume of affiliated transactions and their wide-ranging impact. Zhu et al. (2005) proposed the conflict theory of interest hypothesis and the efficient transaction hypothesis based on agency theory (Berle and Means, 1932; Jensen and Meckling, 1976) and transaction cost theory (Coase, 1937) to analyze connected transactions. Under the conflict theory of interest hypothesis, connected transactions increase agency costs and result in the loss of company resources, leading to a decline in enterprise value. On the other hand, the efficient transaction hypothesis suggests that connected transactions can reduce inter-enterprise transaction costs, contribute to the achievement of the overall strategic goals of the entire group company, and maximize enterprise value. Zhu et al. (2005) studied all listed companies on the Shanghai and Shenzhen Stock Exchanges over a one-year period and found that the existence and number of affiliated transactions had no significant impact on enterprise value. However, the amount involved in affiliated transactions had a negative impact on company value, supporting the conflict of interest hypothesis to some extent. Zhu et al. (2005) also analyzed the types of affiliated transactions and found that transactions between listed companies and their

controlling shareholders or their siblings led to a decline in the value of the listed companies, increasing the likelihood of financial difficulties. This situation reflects the conflict of interest hypothesis. The efficient transaction hypothesis is mainly evident in affiliated transactions between listed companies and their subsidiaries, which can provide superior resources to enhance the value of the listed companies. Wang (2006) pointed out in his study that the total amount of annual affiliated transactions, the amount of commodity purchases and sales between affiliated parties, and the ratio of corporate net assets are significantly negatively correlated with enterprise value. Jian and Wong (2003) investigated whether general managers of listed companies used affiliated transactions to improve profitability and transfer resources from listed companies. The research results showed that insiders did indeed use affiliated transactions to improve profitability and simultaneously transfer resources from listed companies. Currently, no scholars have studied the impact of affiliated transactions on the financial distress of listed companies in the garden and construction industry.

Based on the literature analysis above, the influence of micro-level factors on a company's financial distress ultimately rests on the company's capital chain. Cash flow breaks can occur in three types of activities: operating activities, investing activities, and financing activities. Generally, if a company provides excessive commercial credit, it may face difficulties in collecting the rights of creditors, leading to tight cash flow in operating activities and potentially financial distress. If a company fails to assess the credit status of creditors adequately before extending commercial credit and blindly expands its market, it is more likely to encounter customer delinquency and intentional fraud, which can create operational troubles. Poor

management decisions can lead to investments without careful and comprehensive feasibility analysis, resulting in increased operational risks. Irrational diversification and expansion can also raise the possibility of investment failure. If a company fails to evaluate its asset strength objectively and reasonably and lacks a rational understanding of risks, its financial risk will increase. External financing is the foundation of a company's development, as it enables the company to generate profits through investments and operations. Obstacles in financing activities can directly lead to abnormal company operations and serious financial risk. Excessive debt financing, blind expansion, and unreasonable borrowing can all result in negative profitability, failure to repay interest on time, and ultimately bankruptcy. Excessive debt also reduces the residual income available to the company's owners. An unreasonable debt financing structure can contribute to financial troubles, including the financing ratio between long-term and short-term debt and the appropriate mixture of current and long-term assets. If a company uses short-term debt to finance long-term asset investments, it may face difficulties in repaying the debt when it matures, reducing its debt-paying ability and increasing financial distress. Using long-term debt for short-term funding needs increases the company's operating costs, reducing its profit rate and increasing financial distress.

In summary, there is limited literature analyzing the influence of micro factors such as strategic radicalism, corporate internal governance, and connected transactions on the financial distress of companies in the garden and construction industry. This constitutes one of the research directions in this paper.

1.2.2 Industry Factors Affecting Financial Distress of Enterprises

Industry competitiveness refers to the level of diversity within an industry's internal environment and the concentration of resources within individual firms. A perfectly competitive industry is characterized by complete heterogeneity, which creates intense competition for companies operating within it. When a company is unable to repay its debts on time in such a competitive industry, it may face a shortage of investment funds, impacting its competitive advantage in terms of pricing and hindering its ability to maintain a marketing advantage. In highly competitive environments, companies can gain a competitive edge by maintaining low levels of financial leverage.

On the other hand, a company operates in a monopoly industry when it operates in an environment with the highest concentration of resources. In such an industry, resources are concentrated within a specific company, allowing it to generate monopoly profits based on its unique resources. These companies often enjoy strong profitability and have easier access to debt financing.

The level of competition within an industry also influences the debt risk faced by companies. As competition intensifies in the industry, listed companies face more severe competition, leading them to reduce debt financing in order to alleviate financial risks. Empirical analysis conducted by Iataitieh and Rodriguez (2003) using listed companies in Spain as research samples concluded that larger debt financing scales were associated with increased financial risk. To mitigate financial risks, competition in terms of pricing among enterprises can be reduced, thereby reducing the intensity of competition among listed companies.

In summary, industry competitiveness has a significant impact on the debt risk faced by companies. In highly competitive industries, companies may opt for lower levels of financial leverage to maintain their competitive advantage. In contrast, companies operating in monopoly industries can leverage their concentrated resources to generate strong profitability and obtain debt financing easily. The degree of competition within the industry also influences the level of debt financing and financial risks for listed companies. To alleviate financial risks, reducing price competition among enterprises can be an effective strategy to reduce overall competition intensity.

The real estate industry has a close relationship with the garden and construction industry, and when the real estate industry experiences significant weakness, it affects the financial condition of companies in the garden and construction sector. Ni and Ding (2021) highlighted the tremendous impact of the COVID-19 pandemic on the domestic economy in 2020. As a result of the epidemic and internal operational challenges, some domestic enterprises have defaulted on their debt. China Fortune Land Development, for example, has faced several debt defaults since 2021, with a total default amount of 57.22 billion RMB by the end of May 2021. The outbreak of the epidemic in 2020 had a profoundly negative impact on the real estate market, significantly affecting China Fortune Land Development's sales and leading to a substantial decline in its performance.

In 2019, China Fortune Land Development recorded a net profit of 14.685 billion RMB. However, in 2020, its net profit plummeted to 4.808 billion RMB, representing a year-on-year decrease of 67.26%. The company's net profit further declined to -3.738 billion RMB in the first

quarter of 2021. The capital-intensive nature of the real estate industry often leads to real estate companies adopting a high-leverage and high-debt business model, thereby increasing financial risk. When faced with shocks such as the COVID-19 pandemic, the normal business models of real estate companies are disrupted, and the stability of their cash flow becomes insufficient, making it challenging to repay debt in a timely manner (Yang Lingyan, 2022; Chen Xiao, 2022; Qian Chunhong, 2022).

In recent years, real estate enterprises have experienced frequent debt defaults, directly impacting the garden and construction industry. This problem will be the central focus of research in this paper.

1.2.3 Macro Factors Affecting Financial Distress of Enterprises

Greenwald and Stiglitz (1984) conducted a test that demonstrated the influence of the macroeconomy on the employment rate in society, which, in turn, affects the labor supply of enterprises. They also found that financial behaviors can magnify this effect empirically.

Driessen (2005) examined the relationship between the bond default rate and bond prices by analyzing data from 104 companies. His research suggested that factors such as the default risk premium, bond interest rate, tax, and liquidity significantly impact the expected return of corporate bonds. The study concluded that there is a significant positive correlation between the default risk premium and the bond default risk.

Lu and Li (2008) studied listed companies from 1999 to 2007 and discovered that the amount of outstanding credit, real loan interest rate, GDP growth rate, and price growth rate all have a significant impact on financial distress.

Acharya et al. (2007) focused on enterprises that defaulted on their bonds over a 17-year period. Their research proposed that the possibility of corporate bond default increases when non-defaulting companies lack liquidity and cannot recover specific assets pledged by defaulting companies, particularly during industry-wide depressions.

Kuehn et al. (2014) analyzed long-term data from 3,000 companies and short-term data from 320 companies to develop a model. They concluded that the risk of corporate bond default increases with the widening of credit spreads.

Xiao et al. (2013) found in subsequent studies that a weaker legal system in the region where a company is located, or excessive control of the company by a family, increases the risk of corporate bond default.

Wang and Chen (2015) observed that the implicit government guarantee changes with the local economic development of a company. Their study, focusing on urban investment bonds, suggested that stronger regional economic development enhances the role of implicit government guarantees, thereby reducing the financial risk faced by companies.

Overall, the literature demonstrates that macro factors such as default risk premium, bond interest rate, tax, liquidity, legal system, and economic cycle can all influence a company's financial distress. At the macro level, factors directly affecting the garden and construction industry include issues related to PPP projects and local government debt.

Zhang (2022) highlights the challenges in financial management and accounting associated with PPP projects, which ultimately increase project operational risks. Hu and Lin (2023) analyze the current situation and issues in the development of the PPP model in China. They

argue that the PPP model generates financial risks due to various factors, including the lack of relevant laws and regulations, unclear financial risk management indicators, insufficient local government credit, and inadequate understanding and preparation for PPP financial risk management.

Wang et al. (2023), through case analysis, find that insufficient government management ability, poor government credit, and changes in the market environment are key factors contributing to the challenges faced by PPP projects. The literature suggests that PPP projects encounter multiple problems that directly exacerbate the financial difficulties of enterprises involved. Since most municipal garden projects are operated through the PPP model, they are directly impacted by these PPP project issues. Currently, there is limited research in this area, making it another important focus for this paper.

The level of local government debt is indeed an important factor influencing a company's financial distress. Fan and Chi (2021) study the crowding-out effect of local government debt on corporate private investment, primarily through increased corporate financing constraints. Local government debt increases the financing constraints of companies by crowding out the limited formal credit resources available to them, thereby exacerbating their financial difficulties. Yu and Kang (2020) demonstrate that the expansion of local financing vehicle debt inhibits the investment activities of local enterprises.

Wang et al. (2020) highlight that the expansion of local government debt affects enterprises by lowering their debt levels through demand competition mechanisms and increasing their financing costs through price mechanisms. Liu et al. (2020) find a significant negative

correlation between the expansion of local government debt and enterprise innovation, ultimately leading to financial distress for the companies involved.

In the garden and construction industry, local governments play a crucial role as customers. However, the impact of local government debt on the financial distress of companies in this industry has received limited attention in current research. Therefore, this aspect will be an important focus of the paper.

1.3 Research Process and Method

1.3.1 Research Process

This paper aims to analyze the factors contributing to the financial distress of listed companies in the garden construction industry. The research process is structured as follows:

First of all, take the Orient Garden as the case, and analyze the reasons for the serious financial distress;

Secondly, taking listed companies in the garden and construction industry as samples. This paper analyzes the reasons for the financial distress of the garden and construction companies empirically.

Finally, from the perspective of green bond, it analyzes that the issuance of green bond can help alleviate the financial dilemma of the listed companies in the garden and construction industry .

1.3.2 Research Method

This paper employs various research methods, including literature induction, empirical

analysis, case analysis, and event analysis, to provide a comprehensive investigation. The methodological details are as follows:

Literature Induction: The paper conducts a thorough analysis of existing literature to explore the factors influencing financial distress. It considers macroeconomic, industry-specific, and internal company perspectives to identify the research direction.

Case Analysis: Orient Garden serves as a representative case study to analyze the underlying causes of its severe financial distress. This analysis offers valuable insights into the specific challenges faced by the company.

Empirical Analysis: The paper utilizes several models to examine the financial distress of listed companies in the garden and construction industry. The following approaches are employed:（1）Panel Fixed Effect Model: This model assesses the impact of various factors such as PPP projects, local government debt level, the real estate industry, strategic radicalism, affiliated transactions, the largest shareholder's self-restraint, and executive equity incentives on financial distress. It utilizes a panel fixed effect model to explore these relationships.（2）Instrumental Variable Method and Two-Stage OLS Estimation: To address potential endogeneity issues, the paper employs instrumental variable methods and two-stage ordinary least squares (OLS) estimation. These techniques help mitigate the problem of mutual causality between the explained variables and the core explanatory variables.

By combining qualitative and quantitative research approaches, this study provides a comprehensive analysis of the factors influencing financial distress in the garden construction industry. The literature induction helps establish a research direction, while the case analysis

and empirical analysis offer specific insights and statistical evidence to support the research findings.

1.4 Research Content

This paper consists of seven chapters, each addressing specific aspects of the research topic. The main content of each chapter is as follows:

Chapter 1: Introduction

This chapter provides an overview of the background, practical and theoretical significance, research status and literature review, research content and methods, as well as the research innovation and limitations.

Chapter 2: Conceptual Framework and Theoretical Analysis

In this chapter, the concepts of "financial distress" and "garden and construction industry" are defined. Theoretical frameworks such as financing order, maturity mismatch, principal-agent theory, corporate internal governance theory, strategic management theory, and externality theory are employed to analyze the causes and mechanisms of financial distress in the garden and construction industry.

Chapter 3: Case Study of Orient Garden

This chapter focuses on the case study of Orient Garden, examining the process and causes leading to their financial distress. Detailed analysis and findings are presented to shed light on the factors contributing to the company's financial difficulties.

Chapter 4: Empirical Design

The impact of various factors on the financial distress of listed garden construction

companies is analyzed in this chapter. It investigates the influence of PPP projects, local government debt level, the real estate industry, strategic radicalization, affiliated transactions, the largest shareholder's self-restraint, and executive equity incentives. Theoretical analysis hypotheses are proposed, empirical research variables are designed, and relevant empirical models are introduced.

Chapter 5: Empirical Analysis

This chapter describes the main data sources of the empirical variables and presents descriptive statistical analysis. The empirical analysis results are provided to support the research findings.

Chapter 6: Event Study of Green Bond Issuance

Using the event study method, this chapter examines whether the issuance of green bonds can enhance the value of companies by improving their financing environment. It analyzes the cases of Orient Garden and M-Grass Ecology And Environment to assess the impact of green bond issuance on company value.

Chapter 7: Conclusion and Future Research

The final chapter presents the conclusions, suggestions, and limitations of the research. It also highlights the directions for future research and identifies areas that require further investigation.

By organizing the content into these seven chapters, the paper ensures a systematic and comprehensive examination of the financial distress in the garden construction industry. The inclusion of theoretical analysis, case studies, empirical analysis, and event studies strengthens

the overall research framework.

1.5 Research Framework

Figure 1-1 shows the research framework of this paper:

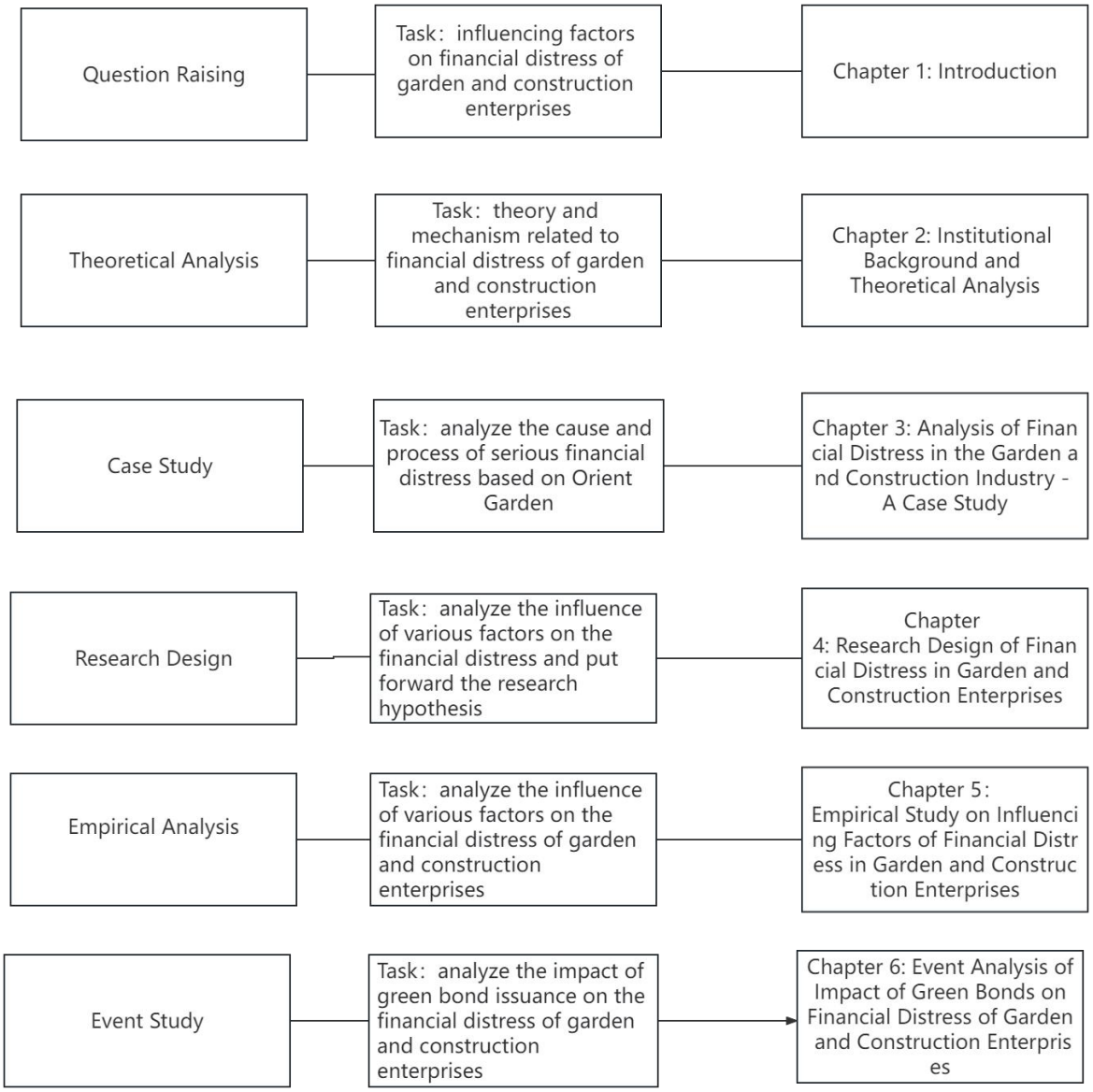

Figure 1-1Research framework

1.6 Innovation Points and Shortcomings

1.6.1Innovations

This paper introduces several key innovations:

The paper explores the heterogeneity of the causes of financial distress in the garden and construction industry, which is often overlooked in existing literature. It goes beyond the internal governance factors of listed companies and examines the external factors closely related to the industry, such as PPP projects, the real estate industry, and local government debt. This approach not only aligns with the industry's reality but also provides a theoretical basis and research ideas for analyzing the causes of financial distress in a specific industry.

For the first time, this paper applies event analysis to examine the impact of green bond issuance on the stock prices of listed companies in the garden and construction industry. The findings reveal a positive excess rate of return and increased company value. The issuance of green bonds is shown to alleviate financial difficulties by reducing financing costs and improving the term structure. This presents a policy-oriented approach to addressing financial distress in the garden and construction industry.

1.6.2 Shortcomings

Despite its contributions, this paper has a few shortcomings:

The analysis of external factors influencing the financial distress of garden and construction industry companies only focuses on local government debt levels, PPP projects, and the real estate industry. Other macro and industrial variables that may impact financial distress are not considered. Future research could expand the analysis to include a broader range of external factors.

In terms of internal factors, the paper only considers strategic radicalism, equity structure, and affiliated transactions. Other internal factors that could contribute to financial distress are

not examined. Due to the limitations of the topic selection and length, further exploration of these factors is not possible.

By acknowledging these limitations, future research can delve deeper into the unexplored external and internal factors that affect financial distress in the garden and construction industry.

Chapter 2: Institutional Background and Theoretical Analysis

2.1 Definition of Terms

2.1.1 Financial Distress

The definition of "financial distress" varies among different studies. According to Beaver (1966), financial distress refers to the inability of a company to timely pay its debt and preferred stock dividend. Altman (1968) defines financial distress as a situation where an enterprise enters legal bankruptcy. However, it is important to note that bankruptcy alone does not always indicate financial distress, as some companies may intentionally file for bankruptcy to reduce costs. Carmichael (1972) defines financial distress as the inability of an enterprise to fulfill its obligations smoothly due to funding shortages or other reasons. Foster (1986) suggests that financially distressed enterprises have significant underlying problems that require large-scale operational restructuring. Ross (1999) defines financial distress in four aspects: business failure, technical bankruptcy, legal bankruptcy, and accounting bankruptcy.

Chen and Chen (2000) consider a company marked as "ST" (Special Treatment) as an indication of financial distress. Wu and Lu (2001) argue that the Z-score model and ZETA model are effective in predicting financial distress. Lv and Han (2004) define financial distress based on liquidity and operating conditions. In terms of liquidity, an enterprise is considered in financial distress if it has a current ratio below 1 for two consecutive years, indicating insufficient current assets to cover current liabilities. In terms of operating conditions, financial

distress is identified when the current ratio is below 1 for two consecutive years and the operating profit is negative in at least one year. Zhang, Zhang, and Cheng (2004) find that bankruptcy or financial difficulties may not necessarily result from losses in developed countries. Their research shows that nearly 80% of bankrupt enterprises were profitable, and the primary reason for their financial distress was insufficient liquidity. Li (2007) defines financial failure or financial crisis as the inability of an enterprise to meet its payment obligations due to insufficient liquidity. Zhang (2013) suggests that the accumulation of financial risk may lead to a financial crisis, but financial risk does not always result in a financial crisis. In China, due to the limited number of delisted enterprises and bankruptcies among listed companies, "special treatment" is often considered an indication of financial distress (Lu, 2006). Zhu and Chen (2007) find that most articles predicting financial distress, published in major domestic economic and management academic journals, use "special treatment" as a sign of distress. Some studies argue that a company is already in financial distress when it incurs a loss initially (Cui et al., 2007). Wu (2011) suggests that "special treatment" does not necessarily indicate financial crisis but rather serves as a signal that the company may potentially face financial crisis.

In this paper, financial distress is defined as the default of debt and preferred stock dividend due to company bankruptcy or difficulty in debt repayment. The z-score model, initially proposed by Altman in 1968 and subsequently modified for broader applicability, is used to measure the severity of financial distress. Since the original z-score developed by Altman mainly reflects the financial distress of American enterprises, Zhang et al. (2010) have

made improvements to the z-score index to make it more suitable for the Chinese market and enterprises. Therefore, this index is employed in this paper to define and measure financial distress.

2.1.2 Listed Garden and Construction Enterprises

In a narrow sense, the garden and construction industry encompasses the entire process of garden project approval, design, construction, and maintenance. In a broader sense, it also includes the production and management of seedlings and flowers, as well as industry-related activities such as technical consultation and training. The business scope of the garden and construction industry primarily covers municipal gardens, real estate gardens, and private family gardening.

Regardless of the specific type of primary business, the core operations of garden and construction enterprises are closely tied to the construction, environmental protection, and greening sectors. Currently, there are approximately 30 listed garden and construction enterprises in China. However, many construction and environmental protection enterprises are also involved, to varying degrees, in the garden and construction business. In order to appropriately expand the sample size for the empirical study conducted in this paper, we have included a total of 106 listed companies from the construction industry and 66 listed companies from the environmental protection industry as the research subjects. These companies are collectively referred to as "listed garden and construction enterprises."

2.2 Institutional Background

2.2.1 Policy Background

Chinese policymakers have consistently emphasized the importance of ecological construction and environmental protection. The concept of ecological progress has become a central theme in the Party's governance, with the "Two Mountains" concept setting the tone for long-term policy emphasis on ecological construction. The idea of creating a "beautiful China" was reiterated at the 18th National Congress of the Communist Party of China, representing the grand goal for future ecological advancement in China.

To promote ecological progress, China has implemented a series of policies. In March 2015, the Political Bureau adopted the "Opinions on Accelerating Ecological Progress," which emphasized the need to promote greener production methods, increase the use of science and technology, reduce energy and resource consumption, and address environmental concerns. In October 2015, at the Fifth Plenary Session of the 18th CPC Central Committee, the promotion of a harmonious coexistence between humans and nature was proposed. The session highlighted the importance of sustainable use of natural resources, spatial structure optimization, scientific environmental patterns, improved ecological governance, strengthened implementation of environmental protection systems, the establishment of ecological security barriers, prioritized conservation and natural restoration, and scientific environmental protection and restoration work.

In March 2017, the State Council revised the Regulations on Urban Greening, which had been issued in 1992, to align with current demands and set higher standards for ecological

civilization. These policies not only promote ecological and environmental protection but also provide standards and guidance for industries involved in ecological and environmental protection. It is crucial to firmly establish the concept that clean waters and lush mountains are invaluable assets, adhere to the path of sustainable development, deeply understand the principle of coexistence between humans and nature, raise awareness of environmental protection, jointly build a rich and beautiful China in ecological civilization, and contribute to the protection of our planet.

On February 28, 2018, during the Third Plenary Session of the 19th CPC Central Committee, the establishment of the Ministry of Ecology and Environment and a comprehensive law enforcement team for ecological environmental protection was decided. This step provided law enforcement support for the construction of ecological civilization. The introduction of policies in various areas has provided both a high level of philosophy and practical approaches and standards for ecological progress.

Specific to the garden and construction industry, the government has also issued various policies and regulations. In 2020, there was a frequent introduction of policies related to the industry. On February 28, 2020, the National Development and Reform Commission issued the Evaluation Index System and Implementation Plan for the Construction of Beautiful China. On March 4, 2020, the State Council issued a notice on actively and orderly promoting spring afforestation under the conditions of epidemic prevention, aiming to continue the construction of garden cities and ensure the completion of annual goals and tasks.

As an important sector within the ecological and environmental protection industry, the

garden and construction industry is encouraged and supported by government policies. With the promotion of ecological civilization construction policies, the industry is expected to experience significant development opportunities. However, it also faces challenges related to financial distress, which will be a key focus area.

2.2.2 Industry Background

From the perspective of industry development, Chinese garden and construction industry has experienced three stages of development roughly:

The first stage is the initial stage (1949-1990). At this stage, The State Council and the Department of Architectural Engineering after a series of urban work meetings and the implementation of relevant policies, determined the focus of urban greening work, made clear the source of fund for urban landscaping, improved nursery construction and nursery stock cultivation, and realized the planned and step-by-step construction and development of urban landscaping gradually. In 1982, the State General Administration of Urban Construction held the fourth national urban landscaping work conference, established to continue the universal greening as the focus of urban landscaping work, continue to strengthen the nursery construction. From then on, the construction of urban landscaping began to enter the climax.

The second stage is the comprehensive development period (1990-1999). This stage, the former Ministry of Construction has issued a series of laws and regulations such as "regulation of urban afforestation planning and construction index", "standard of urban afforestation enterprise qualification", "standard of urban afforestation project construction and acceptance", the industry legal system is gradually improving, laid the foundation for our country

afforestation industry's healthy development. During this decade, the rapid development of Chinese economy, the rapid promotion of the process of urbanization, promoted the continuous expansion of the landscape market scale, industry technical level continued to improve.

The third stage is the booming development period (2000 to present). With the urbanization acceleration and the improvement of material living standards, landscaping has become an important part of the modern urban people's living environment and natural leisure space. With the prosperity and development of social economy, the improvement of people's living standard, as well as the promotion of various governments competing to create "civilized city", "ecological city" and "garden city", etc., the garden and construction industry in China has entered the booming development stage. In 2000, the former Ministry of Construction issued the "Implementation Plan to create a National Garden City", which clearly stipulated the garden city's bid condition, examination procedure, naming commendation methods, etc.; In 2001, The State Council held a national conference on Urban greening and issued a Notice on Strengthening Urban Greening Construction, proposing that by 2010, the green land rate of urban planning built-up area should reach more than 35%, the green coverage rate should reach more than 40%, and the public green space per capita should reach more than 10 square meter. In 2011, the National Afforestation Committee and the State Forestry Administration "National Afforestation Plan Outline (2011-2020)" proposed that by 2020, the green coverage rate of urban built-up area would reach 39.5%, the park green space per capita would reach 11.7 square meter, and the green coverage rate of township built-up area would reach 30% and other targets. Under the guidance of the new policy, governments at all levels have increased their

investment in urban greening and vigorously built "garden cities". The national greening boom with extensive participation of the whole society began to take shape, and the urban greening work entered a new period of historical development.

At present, the market concentration of Chinese garden and construction industry is low, and there are many enterprises in the industry, which have reached at least 16,000 up to now. Even the leading companies in the industry such as Orient Garden and Palm Garden occupy less than 10% of the market share. The market competition in the industry is very full, and there are no large enterprises that can dominate the whole industry. At the same time, Chinese garden and construction industry also shows regional characteristics. Economically developed areas with higher urbanization level have faster development of landscaping industry, and the number of enterprises engaged in related business is correspondingly larger. Urban landscaping enterprises with Grade I qualification are mainly distributed in Zhejiang, Jiangsu, Guangdong and Beijing.

With the cancellation of the qualification examination and approval of garden and construction enterprises in 2017, it is no longer required to have landscape greening qualification as a prerequisite for engaging in the garden and construction industry, industry participants are more extensive, many enterprises enter the market, and the entry threshold of the industry is greatly reduced. But the Ministry of Housing and Urban-Rural Development still requires that the main participants in the urban landscape market should have professional technical management personnel, technical workers, funds, equipment and other conditions that match the construction activities. From the perspective of market players, the marketization of the garden and construction industry makes more enterprises in related industries join the

garden and construction industry, such as enterprises in the construction industry and process design industry, etc., involved in the related projects of the landscape industry through various forms, and the industry competition is intensifying. From the perspective of enterprise projects, the settlement cycle of garden and construction projects is relatively long, and the payback rate of receivables is relatively low, which makes the asset-liability ratio of most garden and construction enterprises generally high. At the same time, the project income is mostly confirmed according to the progress of the project, and the project income is difficult to guarantee, so the income of garden and construction enterprises has a certain volatility. All of these make the operation of garden and construction enterprises have considerable risks.

2.3 Theoretical Analysis

2.3.1 Financial Risk Theory

Li Hong (2013) identified four types of financial risk in the context of garden and construction companies:

Financing Risk: This risk arises when companies heavily rely on debt financing to increase their financial leverage. It includes the potential failure to repay the principal and interest on debts, which can lead to insolvency. Timing is crucial when raising funds, as raising funds too early increases capital costs and burdens the enterprise, while delays in financing can disrupt business operations. Additionally, raising either too much or insufficient funds can have negative consequences. However, due to uncertainties in funding channels and methods, enterprises often face challenges in raising appropriate funds.

Investment Risk: Investment risk refers to the possibility that investment projects fail to

achieve expected benefits due to uncertain factors, thereby affecting profitability and solvency. Successful investments are critical for the survival and development of enterprises. Optimal utilization of limited funds is necessary to improve financial outcomes. However, the complex and ever-changing market environment introduces various risks into the investment process, making returns on invested projects unstable.

Capital Recovery Risk: This risk arises from uncertainties in converting finished products into monetary funds during the process of commodity exchange. There is a risk that enterprises may not be able to recover the entire or a portion of their funds, significantly impacting their financial situation and even leading to bankruptcy. Smooth recovery of funds is essential and requires successful product sales and effective conversion of settlement funds into monetary funds. Sales revenue recovery is influenced by settlement methods, credit policies, collection policies, and other factors. Foreign-related businesses may also face the risk of exchange rate fluctuations.

Income Distribution Risk: Income distribution risk refers to adverse effects on future production and business activities resulting from improper income distribution. This includes reduced solvency, declining reputation, and other negative consequences. Improper income recognition, such as inflated current profits due to environmental factors or improper accounting methods, can lead to advanced tax payments and financial risk. Inappropriate management of the form, timing, and amount of income distribution to investors can also negatively impact solvency and investor enthusiasm.

For listed garden and construction companies, the current macroeconomic downward

pressure increases the difficulty of debt financing. Reduced revenue for local governments and frequent crises in the real estate sector contribute to longer accounts receivable turnover for these companies, further exacerbating foreign investment risk. In summary, the macroeconomic downward pressure, blocked cash flow recovery, and accumulation of financial risks pose significant challenges for listed garden and construction companies.

2.3.2 Sequencing Financing Theory

Initially, American scholars drew attention to the phenomenon of "financing sequence" in enterprises. Fisher (1962) conducted a research survey on corporate capital structure in 1961 and observed that companies were more inclined to use internal funds, such as retained earnings and depreciation funds, for financing. When internal cash flow is sufficient, companies tend to invest the remaining income. However, when internal cash flow falls short, external financing options are considered. Among external financing choices, companies prefer bank loans, followed by issuing bonds, and ultimately resort to issuing stocks as a last resort. Fisher (1962) likened this financing phenomenon to a "pecking order," where decisions are made in a specific order of priority, akin to how a bird selects items. Myers (1977) supported this theory through empirical research on the capital structure of American companies. At the time, capital structure research was based on the assumption of complete information, and the behavior described by the "pecking order" theory could not be adequately explained. Hence, Myers referred to this phenomenon as the "puzzle of capital structure." Following Ross's (1977) introduction of the asymmetric information theory, Myers explored enterprise financing costs under the premise of asymmetric information and proposed the theory of financing order.

Myers and Majluf (1984), two American scholars, introduced the theory of pecking order financing, also known as the pecking order theory. According to this theory, enterprises follow a specific priority sequence in financing. Considering the existing sources of enterprise financing, companies generally adhere to the financing sequence of endogenous financing, creditor financing, and equity financing. The scholars' research indicates that, based on the principle of information asymmetry, by analyzing the size and risk of financing costs associated with these three methods, endogenous financing has the lowest cost, followed by equity financing, while debt financing carries relatively higher costs. Moreover, the average return on equity assets exceeds the average return on debt assets. Generally, the cost of equity financing is higher than the cost of debt financing. Analyzing the result of signal transmission reveals that when an enterprise engages in equity financing, it conveys negative information of "stock price is overvalued" to investors in the market who possess less information. Consequently, these investors reduce their holdings of the company's stocks, leading to a decline in stock price and a reduction in the enterprise's market value. On the other hand, when an enterprise undergoes external debt financing, it conveys positive information to market investors, thereby prioritizing debt financing over equity financing.

For listed companies in the garden and construction industry, projects often require a substantial amount of capital. According to the "pecking order theory," listed companies in the garden and construction industry primarily opt for debt financing.

2.3.3 Maturity Mismatch Theory

The concept of matching theory highlights the importance of aligning a company's assets'

term with its liabilities' term. By doing so, the uncertainty of holding cash flow that cannot cover debt principal and interest can be reduced, thereby mitigating liquidity risk (Morris, 1976). From an investment perspective, term matching ensures that an enterprise's asset and liability maturities are synchronized, facilitating the raising of new investment funds from stable and convenient sources. This, in turn, ensures the adequacy and effectiveness of the investment funds (Myers, 1977). Research on liability-related contracts suggests that when the payback period of investment projects is shorter, the maturity of liabilities will be correspondingly shortened. This further indicates that operational decisions should follow the principle of asset-liability maturity matching. Within the theory of asset and liability maturity matching, matching the maturity of liabilities and assets is a crucial principle in investment and financing decision-making, especially in terms of matching short-term liabilities with current assets and long-term liabilities with long-term assets. In practice, short-term liabilities are typically used for investment projects with relatively short payback periods, while long-term liabilities are employed for investment projects with higher expected returns and longer payback periods (Hart and Moore, 1994). Term matching not only ensures the normal operation of enterprise cash flow but also facilitates the reasonable allocation of investment and financing projects to correspond to higher expected returns.

When the cash flow period generated by assets is longer than the debt period, the company may be unable to provide funds to repay the debt when it matures, leading to the risk of financial distress. Conversely, when the cash flow period generated by assets is shorter than the debt term, it may result in a waste of funds, as the company still needs to continue paying the

corresponding interest even when it halts related production. In current research, the concept of term matching is also applied to the study of the term structure of bank deposits and loans, specifically, the matching of deposit and loan terms. If a bank's deposit business has longer terms than its loan business, it can lead to idle and wasteful funds. On the other hand, if the deposit business has shorter terms than the loan business, it can negatively impact the bank's internal financial structure and cause a "money shortage" in the financial market. This paper applies the concept of term matching to corporate finance, emphasizing that a company's debt term should align with its investment term. In the garden and construction industry, where enterprises require substantial capital for projects, the primary financing method is typically "debt." However, since the future cash flow period of these projects is long, and the debt of garden and construction companies often consists of short-term debt, there is a mismatch in debt maturity, leading to liquidity risk for listed garden and construction companies.

2.3.4 Principal-Agent Theory

Initially, Berle and Means (1932) analyzed the ownership structure of 200 large companies in the United States and identified the dispersed ownership structure as a fundamental characteristic of modern companies. Based on this, the principal-agent problem that companies face primarily stems from the diverging or conflicting interests of the shareholders (principals) and managers (agents). This problem is commonly referred to as the first type of principal-agent problem and has been the starting point for academic research on corporate governance since 1932. Over time, with the contributions of economists such as Jensen and Meckling (1976) and Fama and Jensen (1983), the principal-agent theory gradually developed into the traditional

principal-agent theory in the Western context. According to this theory, the key feature of the modern enterprise system is the separation of ownership and control rights. It is precisely due to this separation that conflicts of interest arise between owners and professional managers, which can be attributed to the economic concepts of "moral hazard" and "adverse selection" resulting from information asymmetry in management.

Early principal-agent theory was based on the premise of relatively dispersed equity ownership with a low concentration of large shareholders. However, subsequent research by scholars both domestically and internationally has shown that the equity ownership of listed companies in most countries' capital markets is relatively or highly concentrated, often with controlling shareholders holding a substantial proportion of shares. Faccio and Lang (2002), in their study of over 200 listed companies from 13 European countries, found a high concentration of equity ownership in all countries except Ireland and the UK. Similarly, Claessens, Djankow, and Fan (2002), in their research on listed companies in East Asian countries, discovered a similar phenomenon. Their sample data covered nine East Asian countries, encompassing approximately 3,000 listed companies, of which around two-thirds had controlling shareholders.

In comparison to companies with more dispersed equity ownership, listed companies with relatively concentrated ownership experience a greater influence from their controlling shareholders, who hold a higher proportion of shares and possess greater control and cash flow rights over the company. Consequently, the principal-agent problems in such listed companies manifest not as conflicts between owners and managers, but primarily as conflicts between

controlling shareholders and minority shareholders. This type of conflict is commonly referred to as the "second type of principal-agent problem" (Shleifer and Vishny, 1997) within academic circles. The ownership structure of listed companies in China fundamentally differs from that of dispersed capital markets in the United Kingdom and the United States. Chinese listed companies typically exhibit relatively concentrated ownership structures. As a result, the early traditional principal-agent theory fails to adequately explain the corporate governance issues encountered by listed companies with relatively or highly concentrated equity ownership. Due to the significant control power wielded by controlling shareholders, they often resort to debt financing to bridge funding gaps for company expansions without diluting their equity interests. However, excessive debt can increase the risk for the company, potentially undermining its interests. Controlling shareholders with a higher proportion of shares are generally less motivated to accumulate excessive debt. On the other hand, controlling shareholders with a relatively lower proportion of shares tend to have a greater willingness to borrow.

2.3.5 Theories of Corporate Internal Governance

Building upon the first type of principal-agent problems discussed earlier, scholars in the field believe that the essence of corporate governance lies in addressing the conflicting interests and objectives between the owners and managers of a company. Specifically, Fama and Jensen (1983) proposed that corporate governance examines the separation of ownership and management in a corporation and the principal-agent relationship between owners and managers, with the aim of reducing the costs associated with the principal-agent problem. As the principal-agent theory progressed, it evolved into the second type of principal-agent theory,

which focuses on the conflict of interest between controlling shareholders and minority shareholders. These theories aim to maximize the interests of company owners and are often referred to as the "shareholder governance model." Subsequently, scholars expanded the concept of corporate governance further. Renneboog et al. (2006) argued that the definition of corporate governance should consider the interests of all stakeholders involved in the company, including creditors, shareholders, and other relevant parties. This concept is known as the "stakeholder governance model."

What constitutes the corporate governance mechanism? The corporate governance mechanism refers to a set of governance models adopted by shareholders who cannot directly participate in the company's operations in order to mitigate agency costs. To minimize agency costs, it is essential to design and establish an effective mechanism, which is the core of corporate governance. From the perspective of the governance targets, corporate governance can be categorized into internal governance mechanisms and external governance mechanisms. The internal governance mechanism primarily focuses on the relationships among shareholders, the board of directors, and management. On the other hand, the external governance mechanism entails the oversight of the company by external entities such as third-party intermediaries, government regulatory bodies, and the media. Internal governance mechanisms play a crucial role in maintaining equity checks and balances and providing equity incentives within listed companies. These mechanisms are also applicable to garden and construction enterprises.

2.3.6 Strategic Management Theory

The modern era of strategic management theory was initiated by Chandler's book "Strategy and Structure: Research on the History of Industrial Enterprises" in 1962. It was in 1976 that Ansoff first introduced the concept of "strategic management," defining it as a combination of daily operational management and long-term planning control activities. Since then, strategic management theory has gained increasing attention from experts and scholars. By the 1990s, the field of strategic management had become a diverse landscape with numerous competing theories. This period witnessed the development and refinement of various renowned strategic management theories, including the Diamond model and balanced scorecard. Mintzberg's 1998 classification of strategic management theories into ten schools from different perspectives highlighted the diverse and complex nature of this theoretical domain. Therefore, it is crucial to review and summarize the developmental stages and related accomplishments of strategic management theory to gain a clearer understanding of its principles and concepts. The evolution of strategic management theory can be categorized into three main stages: classical strategy theory, competitive strategy theory, and core competence theory.

The classical strategy theory emerged with the publication of Chandler's "Strategy and Structure" in 1962. Chandler elucidated the relationship between an organization's strategy and its organizational structure. Scholars focused on strategy formation, and their research findings were classified into two schools: the design school and the planning school. In 1965, Andrews, a key figure in the design school, introduced the SWOT analysis method to guide strategic decision-making by analyzing internal and external environments, strengths, weaknesses,

opportunities, and threats. Andrews emphasized the need to consider the internal and external situations comprehensively before selecting a corporate strategy, aligning opportunities, threats, strengths, and weaknesses to determine the appropriate strategy. Ansoff, in 1965, highlighted that corporate strategy selection and implementation followed a clear and planned process with specific steps. Henderson, the founder of the Boston Company, introduced the Boston Matrix model in 1970, which provided guidance for managing multiple business strategies. The Boston Matrix categorizes existing businesses into four groups (Golden bull, star, problem, and thin dog) based on market growth and market share, enabling the selection of suitable strategies for each business type. The Boston Matrix facilitated practical application, and its introduction further integrated strategic management theory into practice.

The competitive strategy theory, also known as the Porter stage, revolves around the research findings of Michael Porter. In 1980, Porter, a prominent figure in the positioning school, published "Competitive Strategy," marking the beginning of the competitive strategy theory stage. Porter's strategy theory resulted from integrating industrial organization theory. Porter emphasized that a deep understanding of industry competition is crucial for making correct strategic decisions. During this stage, Porter introduced various strategic management methods, such as competitive strategy and the five forces model. These methods formed an organic system that encompassed strategic analysis, selection, and implementation processes. The five forces model enables enterprises to assess external threats and develop appropriate competitive strategies to address them. To successfully implement the strategy, organizations must identify strengths and weaknesses in the value creation process through value chain

analysis and strive to establish competitive advantages in key areas. In 1990, Prahalad and Hamel, key scholars in the core competence school, introduced the concept of "core competence," marking the beginning of the core competence theory stage. They argued that an enterprise's competence determines the quality of its products and, ultimately, its competitiveness. Core competence theory emphasizes the acquisition and maintenance of core competence beyond competitors. Enterprises should assess their internal resources and capabilities, identify gaps compared to competitors, and take measures to rectify deficiencies promptly to avoid falling behind in future competition. Moreover, organizations should continually optimize and innovate their superior resources to develop core capabilities that surpass competitors. Prahalad and Hamel also established three key tests to determine whether an enterprise possesses core competence: value to customers, advantage over competitors, and difficulty of imitation by others. Passing these tests signifies the presence of core competence. Hopland and Nigel introduced the theory of strategic alliances, which offered a fresh perspective in strategic management. While previous theories focused on competition between enterprises, strategic alliances emphasized cooperation to leverage complementary advantages, fostering win-win situations that enhance competitive advantages, improve performance, and reduce financial risks for alliance members.

2.3.7 Externality theory

When an individual's actions have an impact not only on themselves but also on the well-being of others without providing any compensation, it is referred to as an externality. Externalities can be either negative or positive. A negative externality occurs when the effect is

detrimental, while a positive externality occurs when the effect is beneficial to others. In the garden and construction industry, most companies are involved in environmental protection, which represents a clear positive externality. When environmental protection enterprises control environmental pollution, it benefits not only the consumers directly involved, such as the pollutant discharge enterprises, but also the residents in that environment who can enjoy cleaner air and water resources.

The positive externality effect is depicted in Figure 2-1. The private demand curve and the supply curve intersect at point A, which represents the market equilibrium point where the market equilibrium output $Q_{equilibrium}$ and price $P_{equilibrium}$ are determined. At this point, there is no positive externality considered. Point A is considered the most advantageous point based on private benefits alone. However, due to the existence of positive externalities, the overall benefit should be equal to the sum of the values obtained by the consumers directly related to the project and other residents who are indirectly affected. The social value curve in the figure represents the entire social benefits brought by environmental protection, and the distance between this curve and the private value curve of environmental protection consumers reflects the external benefits brought by the environmental protection industry to other residents. From a societal perspective, the intersection point O of the social value curve and the supply curve represents the optimal state for the entire society. The corresponding quantity Q at this point is the socially optimal output after considering the positive externality, and the corresponding price is $P_{optimum}$.

Since the market equilibrium only reflects consumer private benefits, the equilibrium

output $Q_{equilibrium}$ of the environmental protection industry is lower than the socially optimal output $Q_{optimum}$. This means that the actual production of environmental protection enterprises falls below the socially optimal quantity, and the price of environmental protection products does not fully reflect their value. In order to achieve the optimal state for the whole society and internalize the positive externalities, the government needs to provide subsidies and support to the environmental protection industry. One method to achieve this is by developing the green bond market and reducing the financing costs of green projects. Given the significant involvement of many companies in the garden and construction industry in environmental protection business, it is necessary for the government to introduce policies that encourage and support their financing, such as the development of green bonds.

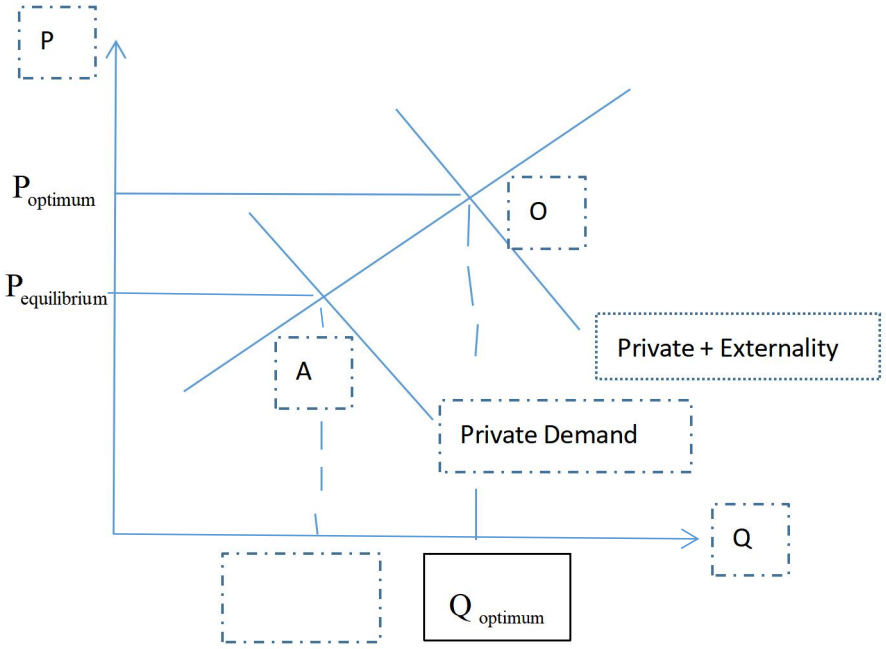

Figure 2-1Positive externalities of environmental protection

2.4 Influencing Factors and Mechanisms of Financial Distress in Garden and Construction Enterprises

(1) PPP project

The scale of investment significantly impacts the maturity mismatch in PPP projects. As the investment scale increases, so does the capital demand, resulting in a mismatch between short-term capital requirements during the initial stages of PPP projects and the long-term asset maturity.

PPP project implementation involves raising capital according to the total investment scale, with projects proceeding after meeting the required auditing standards. Initial capital primarily consists of equity funds from the government and social capital partners. While the government invests in most PPP project companies, its share is typically small, accounting for only 1%, 5%, or 10% of the capital. Therefore, the main source of initial capital is social capital.

By February 2020, the National PPP Comprehensive Information Platform recorded 9,459 PPP projects with a total investment of 1.44 trillion RMB. The relevant regulations from the State Council specify minimum capital ratios for various industries. For example, airport, port, coastal, and inland waterway projects require a minimum capital ratio of 25%, while railway, highway, and urban rail transit projects have a minimum capital ratio of 20%. Low-income housing, general commodity housing projects, and other projects also require a minimum capital ratio of 20%. To lower the investment threshold, the State Council issued a notice to adjust and improve the capital system for fixed asset investment projects, reducing capital requirements in many fields.

However, the large-scale investment in PPP projects leads to a substantial investment and financing gap, necessitating the expansion of short-term debt financing to fill the funding shortfall. Even when considering the minimum capital ratio, the total capital gap for all invested

PPP projects amounts to a staggering 2.88 trillion RMB. The total investment of equity funds reached a peak of 4.53 trillion RMB in 2017, with annual investments consistently exceeding 3 trillion RMB in the following years. Currently, the total amount of debt funds in PPP projects nationwide stands at a significant 11.87 trillion RMB.

During the financial affordability demonstration stage, some PPP projects require extended cooperation terms to align with financial feasibility. However, longer terms introduce more uncertainty, and financial institutions often prefer short-term financing. Financing tools such as bank loans, private funds, government PPP funds, and trust funds, which are of equity nature, struggle to match the long-term nature and low profitability of PPP projects. Additionally, debt funds typically have terms of 5-10 years, based on the life cycle of financial products like bonds and short-term loans from commercial banks. This misaligns with the extensive 20-30 year life cycle of PPP projects, resulting in a maturity mismatch.

Given the large investment scale, most PPP projects cannot meet the capital requirements of the entire project life cycle with one-time financing. Consequently, to attract social capital investment, some PPP project companies may offer income protection clauses to investors, converting equity capital into debt. With the inflexible repayment attributes of creditors' rights and short-term repayment terms, PPP project companies accumulate short-term debts that mismatch with the long-term investment horizon of their assets. Hence, larger investment scales lead to increased capital requirements and, subsequently, expanded short-term debt financing. The maturity mismatch between short-term initial funds, primarily debt funds, and the long-term returns of PPP projects results in a capital stage mismatch.

Companies in the garden and construction industry, given the nature of their core business, have undertaken numerous PPP projects. However, due to the maturity mismatch problem, these companies face significant debt repayment pressure and liquidity risk.

(2) The level of local government debt

In recent years, there has been a significant increase in local government debt. Since 2014, the central government has adopted a policy stance that it is not responsible for local government debt. However, despite the substantial debt burden, local governments have managed to avoid defaulting on their obligations. The primary reason behind this phenomenon appears to be more political in nature rather than purely economic. As local government debt continues to accumulate, there is a consensus among stakeholders that allowing local governments to default could set off a chain reaction, posing systemic risks to participants in the local debt market. This would have wide-ranging implications for banks, local governments, institutions, and retail bondholders.

Listed garden and construction companies largely rely on municipal landscape projects, with local governments serving as their client base. However, due to the financial constraints faced by local governments, there is a possibility of delayed or failed repayments of debt owed to garden and construction companies. This situation has a detrimental impact on the liquidity of companies in the garden and construction industry.

In China, most banks do not provide loans to private companies for periods exceeding one year. To finance projects that require a longer duration, companies are required to repay the loan after one year and then seek re-borrowing with the consent of the bank. If the government fails

to repay its debt to garden and construction companies in a timely manner, it exposes these companies to liquidity risks.

Overall, the financial challenges faced by local governments and their potential impact on garden and construction companies highlight the need for further examination and analysis from a professional and academic perspective.

(3) The real estate industry

The garden and construction industry has experienced significant adverse effects from the weakness in the real estate sector. During the latter half of 2021, several key indicators of the Chinese real estate industry witnessed a decline in growth rates, reaching their lowest levels in nearly a decade. This downturn was evident in the year-on-year growth rates of real estate sales area, new housing construction area, and land purchase area.

For real estate companies, this decline in the real estate sector has brought about two main challenges. Firstly, due to factors related to monetary policy, their capital chains have become tighter, increasing their credit risks. Secondly, market confidence in the real estate industry has diminished, leading to a reluctance among banks to lend to real estate development companies. Additionally, potential buyers have adopted a cautious approach, commonly known as "sparing purchase," due to concerns regarding timely housing delivery.

Multiple factors have contributed to the weakened state of the real estate sector. Given that the real estate landscape represents a significant portion of the main business conducted by garden and construction enterprises, the industry is directly impacted by the downturn in the real estate industry.

In light of these developments, further investigation and analysis are warranted to comprehensively understand the implications and ramifications for the garden and construction industry, from a professional and academic standpoint.

(4) Strategic radicalism

The capital structure of a company is significantly influenced by its strategic positioning. A more aggressive corporate strategy is associated with a lower debt level. As companies adopt more aggressive strategies, their business risk tends to increase. To mitigate the risk of business failure and financial distress, enterprises often opt for a lower-risk financial strategy by reducing their reliance on debt financing.

An aggressive corporate strategy is often accompanied by higher agency costs, arising from the divergence in goals between managers and shareholders. In pursuit of their self-interest, management tends to favor lower financial leverage to alleviate the burden of debt service and interest payments. Additionally, to evade the oversight and constraints imposed by creditors, equity financing is often preferred.

To ensure the sustainable development of enterprises, it is crucial for the company's strategy to align with its capital structure. Companies pursuing offensive strategies should maintain a lower debt level to mitigate the heightened operational risks associated with such strategies and minimize the likelihood of encountering financial difficulties.

To provide a more professional and academic tone, it is important to consider the specific context and use appropriate terminology while discussing strategic positioning and its impact on capital structure.

(5) Affiliated transactions

According to Article 71 of the Measures for the Administration of Information Disclosure of Listed Companies (Decree No. 40 of the Chinese Securities Regulatory Commission), affiliated transactions of a listed company involve the transfer of resources or obligations between the listed company or its controlling subsidiary and affiliated persons. Similarly, the document "Accounting Standards for Business Enterprises No. 36 - Related Party Disclosure" defines affiliated transactions as the transfer of resources, services, or obligations between related parties, regardless of whether a price is involved.

The transaction cost theory, rooted in classical institutional analysis, provides insights into the economic principles underlying economic activities (Riordan and Williamson, 1985). According to this theory, affiliated transactions are a means for companies to reduce transaction costs, thereby enhancing resource utilization efficiency and corporate value. Essentially, affiliated transactions represent internal operations within an enterprise. When the transaction costs between a company and a related party are lower than those in the external market, affiliated transactions occur. The external market often exhibits asymmetries that result in higher search and negotiation costs, whereas related parties possess lower information asymmetry, enabling a reduction in search and negotiation costs while effectively avoiding risks associated with transaction failures.

Moreover, enterprise groups play a role in internal integration and resource allocation. By implementing well-designed internal transactions, overall efficiency can be enhanced, leading to improved enterprise performance and the communication of positive signals to external

stakeholders, thus serving the broader strategic objectives of the company. Within this theoretical framework, affiliated transactions emerge as a common phenomenon and occur when decision-makers perceive lower costs associated with internal transactions compared to external market transactions.

However, it is important to consider the concept of "bounded rationality" within the transaction cost theory. In real economic activities, decision-makers' rationality is often constrained by incomplete information and uncertainty. Consequently, affiliated transactions do not guarantee an increase in company value. While decision-makers may intend to reduce transaction costs, there is also the possibility of making incorrect decisions that can diminish enterprise value and potentially lead to financial crises.

To maintain a professional and academic tone, it is advisable to accurately reference relevant sources and incorporate appropriate terminology when discussing transaction cost theory and affiliated transactions.

(6) Self-restraint ability of the large shareholders

When a controlling shareholder possesses absolute control over a company, they enjoy exclusive authority in its operation and management, thereby overshadowing the influence of minority shareholders. Minority shareholders, owing to their smaller ownership stake, lack the capacity to engage in meaningful competition with controlling shareholders in the objective operation and management of the company. Consequently, they find themselves deprived of a voice in decision-making processes. Moreover, from a subjective perspective, the majority of minority shareholders place complete trust in the controlling shareholders to oversee the listed

company. These two factors combined result in a scenario where the interests of minority shareholders are only served when the decisions made by the controlling shareholder contribute to the actual progress of the company. In such cases, minority shareholders are able to obtain modest gains through a phenomenon commonly known as "free riding."

Within this context, as the proportion of shares held by controlling shareholders increases, the alignment of interests between controlling shareholders and minority shareholders intensifies, as both groups strive to maximize equity. A higher proportion of controlling shares tends to foster greater rationality among controlling shareholders, who become more inclined to avoid excessive debt financing and exercise prudence in managing financial risks.

(7) Executive incentives

Executive incentives typically encompass equity incentives and monetary incentives. Within the modern enterprise system, which separates ownership and management rights, senior executives of listed companies play a crucial role in internal governance. Executive shareholding and monetary incentives can effectively serve as motivational tools and mechanisms for overseeing the operations of listed companies, thereby enhancing internal controls. In comparison to directors, shareholders, and other stakeholders, the management team of listed companies often possesses a deeper understanding of the company's internal functioning. Furthermore, the alignment of interests between management and the company fosters an environment conducive to actively supervising the private activities of controlling shareholders, rather than colluding with them.

(9) Summary

The garden and construction industry heavily relies on two key customer segments: local governments and real estate development companies. However, the financial challenges faced by local governments, such as increasing debt ratios and constrained fiscal expenditure, have led to limited debt repayment abilities, particularly for local governments with a reputable standing. Consequently, some local governments have resorted to payment delays or even default, directly impacting the garden and construction industry's ability to collect receivables in a timely manner. This, in turn, creates significant pressure on the debt repayment obligations of these industry enterprises.

Furthermore, the real estate industry experienced a pronounced downturn in 2019. The weakened state of the real estate sector not only affected the profitability of the garden and construction industry but also hindered their ability to recover accounts receivable promptly. As a result, the debt repayment capacity of garden and construction enterprises sharply declined. The primary sources of debt risk pressure for these enterprises stem from excessive debt levels and mismatches in debt maturity. This refers to the situation where short-term financing is used to support long-term cash inflows, or even instances where the recovery of cash flows becomes untenable. In the backdrop of a sluggish macroeconomic environment, the significant expansion of short-term debt and long-term investments by listed garden and construction companies can be considered a risky behavior on the part of controlling shareholders. Such behavior falls within the purview of internal corporate governance and strategic choices.

Through theoretical analysis, it can be concluded that enterprises characterized by higher degrees of strategic radicalism are more prone to encountering financial difficulties.

Additionally, the higher the shareholding ratio of major shareholders, the weaker the motivation for engaging in such risk-taking behaviors. Conversely, a greater equity balance among non-controlling shareholders reduces the likelihood of such behaviors. Moreover, executive incentives can also help mitigate the occurrence of such risky behavior by controlling shareholders.

Chapter 3: Analysis of Financial Distress in the Garden and Construction Industry - A Case Study of Orient Garden

3.1 Overview of Financial Distress in Orient Garden

3.1.1 Basic Information about Orient Garden

Orient Garden, established in July 1992, was founded through joint funding by He Qiaonu and five other individuals. Initially named Beijing Orient Garden Art Service Department of Haidian District, the company underwent four subsequent name changes. It commenced its operations with a focus on garden engineering design, construction, and operation. In the engineering construction industry, projects often have lengthy construction and payback cycles, necessitating strict capital liquidity management. During its early stages, the company experienced substantial growth, rapid development, and achieved high asset returns. However, with the evolution of the landscape industry and changes in the macroeconomic landscape, the company gradually shifted its main business focus.

The development of Orient Garden can be categorized into three distinct stages. The first stage spanned from the establishment of the company until its listing in 2009, during which it primarily engaged in flower and wood planting, as well as garden engineering design and construction. The second stage, from 2010 to 2016, marked a period of expansion for the company. It diversified its business portfolio by venturing into environmental protection sectors such as wastewater and solid waste treatment, while also exploring opportunities in the broader tourism industry. Additionally, Orient Garden gradually secured PPP (Public-Private Partnership) projects, aiming to consolidate its position in traditional industries while actively exploring new

business avenues. However, starting from 2017, Orient Garden entered its third stage of development, marked by a crisis. The company aggressively pursued numerous project bids and continuously allocated funds to PPP projects with promising returns but extended payback periods. Consequently, a deepening mismatch between investment and financing terms emerged.

3.1.2 Operating Conditions

Orient Garden's journey began with the cultivation of flowers, trees, and the rental of bonsai. However, in 2001, the company shifted its focus to landscape engineering design and maintenance. It achieved notable success by securing prominent municipal garden projects such as the Beijing-Guangzhou Center and the International Trade Center, and actively acquired landscape design enterprises to enhance its business contracting capabilities. Building on its strong performance and substantial growth, Orient Garden received approval from the China Securities Regulatory Commission and successfully listed on the Growth Enterprise Market (GEM) of the Shenzhen Stock Exchange in November 2009. This listing marked a significant milestone as Orient Garden became the first publicly listed company in the landscape industry. With an issuance of 14.5 million shares, the company entered a new phase of growth.

Starting from 2015, Orient Garden expanded its operations into the field of solid waste treatment. The following year, it further diversified into water system management through strategic mergers and acquisitions. It was during this period that the company embarked on Public-Private Partnership (PPP) projects. In 2017, Orient Garden officially entered the all-region tourism sector. The pursuit of PPP projects yielded favorable results, propelling the

company's performance. In October 2017, the share price of Orient Garden peaked at 22.80 RMB per share.

From 2011 to 2019, Orient Garden's core business activities were primarily divided into four areas. The first focused on landscape engineering, encompassing landscape design, construction, and project implementation. The second area centered on ecological restoration, specifically water system management and soil and mine restoration. The third area concentrated on environmental protection, with a focus on industrial waste and hazardous waste treatment. Lastly, the company ventured into the all-region tourism business. Other ancillary businesses included box repair and equipment installation.

Initially rooted in traditional garden engineering, Orient Garden faced increasing competition in this sector. However, the company experienced growth in its environmental protection business, particularly solid waste treatment, as well as ecological restoration activities such as water system management and soil mine restoration. By 2017, the revenue generated from water system management surpassed that of traditional garden engineering, becoming the company's largest revenue segment.

In terms of project execution, Orient Garden primarily undertakes traditional business projects through the PPP model. This involves engaging in construction activities through an "investment + construction" approach, whereby the company provides construction services after signing project contracts with owners in order to obtain corresponding income returns. This model is also applied to the all-region tourism business. Leveraging the PPP model, Orient Garden promotes environmental protection projects in collaboration with partner cities,

contributing to urban development and creating local tourist routes. Following project completion, the operation of the all-region tourism business falls under the responsibility of Beijing Oriental Cultural Tourism Asset Management Co., Ltd., a subsidiary of Orient Garden. This business is then operated through an "investment + construction + operation" model.

3.1.3 Debt Default Status of Orient Garden

This section focuses on analyzing the debt default situation of Orient Garden, specifically the second phase of short-term financing bonds issued by the company in 2018. The bonds had a one-year maturity and were due for repayment on February 12, 2019. However, Orient Garden failed to meet its scheduled principal and interest payment obligations, attributing the default to a technical error caused by an employee's mistake. However, this default revealed a more significant underlying financial crisis.

During the period from January to May 2018, the market witnessed several cases of bond defaults among private enterprises, which had an impact on the primary bond issuance market. A total of 69 bond issuance failures were announced in the two cities during this financing environment. Despite this, Orient Garden's momentum in PPP projects remained unaffected. In the first half of 2018, the company successfully secured 36 PPP projects, with a total winning amount of 33.948 billion RMB. The chairman of Orient Garden, He Qiaonu, expressed a strong belief that "as long as there is a loan, there is no risk."

On May 14, 2018, Orient Garden released the prospectus for two types of planned bonds, with a financing scale not exceeding 1 billion RMB. Out of this amount, 500 million RMB was intended for debt repayment, while the remaining funds were allocated to supplement working

capital. However, due to the tightening of financing channels, Orient Garden encountered the "coldest bond issuance in history" event in April 2018, leading to the cancellation of the corporate bond issuance plan. Despite initial reports indicating subscriptions in the hundreds of millions of RMB, the actual issuance scale of Variety I was only 50 million RMB, with a coupon rate of 7.00%. Variety II received no interest from investors. Subsequently, on June 20, 2018, Shanghai New Century Rating Agency issued a tracking rating report that placed the company on a negative watch list.

To address its financial challenges, Orient Garden sought assistance from various banks. Between August and October 2018, the company received credit and financing support from Minsheng Bank, Industrial Bank, Guangfa Bank, and Huaxia Bank, totaling over 6.4 billion RMB. Additionally, on August 20, 2018, Orient Garden successfully issued its second short-term bond, 18 Orient GardenSCP002, with a total issue size of 1.2 billion RMB. However, this short-term bond financing did not alleviate the long-term strain on the company's capital chain, given its continued expansion of PPP projects.

In response to the need for business pace adjustment, Orient Garden implemented staff reductions in 2018, reducing the employee count from 6,129 at the beginning of the year to 5,244 by year-end. Additionally, the company delayed salary payments and compensation for departing employees. To ease cash flow pressures, Orient Garden had to withdraw from projects in Longyan, Fujian Province, as well as Changzhou and Nantong projects in Jiangsu Province.

On October 17, 2018, Orient Garden announced the resignation of senior positions within the company. The former head of finance, Ms. Zhou Shu, resigned due to personal reasons, and

the vice president, Zhang Zhendi, temporarily assumed her duties. The following day, Orient Garden announced the transfer of 10% equity owned by He Qiaonu, Tang Kai, and his wife, citing the need to obtain funds for the repayment of equity pledge financing and reduce the excessive equity pledge rate held by the controlling shareholder.

Facing ongoing capital chain tensions, on November 2, 2018, Orient Garden decided to introduce a strategic investor, Beijing Yingrun Huimin Fund Management Center (limited partnership). In this arrangement, He Qiaonu transferred 83 million shares of the company, and Tang Kai transferred 51 million shares, amounting to a total of 134 million shares, equivalent to 5.00% of the company's total capital stock, to Beijing Yingrun Huimin Fund Management Center.

Furthermore, on November 16, 2018, Orient Garden sold its solid waste assets to Shanghai Electric. This included the sale of its entire stake in Wujiang Taihu Industrial Waste Treatment Co., Ltd., held jointly with Taizhou Zongze, for 342 million RMB, as well as the sale of its entire stake in Ningbo Haifeng Environmental Protection Co., Ltd., also held jointly with Taizhou Zongze, for 756 million RMB.

The due date for the principal and interest payment of the "18 Orient Garden CP002" short-term financing bond was February 12, 2019. However, the company failed to pay the interest on the bond as scheduled, resulting in a delay of the bond payment on February 13. Subsequently, the company experienced a sharp decline in turnover, with a 97.23% decrease in net profit compared to the same period in the previous year. The asset-liability ratio also rose to 71.3%. As of May 17, 2019, there were still outstanding loans of concern associated with the

company's credit. In May 2019, the company settled two records of interest arrears.

3.2 Financial Distress of Orient Garden

3.2.1 High Debt Ratio of Orient Garden

In recent years, Orient Garden has experienced a significant increase in its business scale and foreign investment, leading to a substantial demand for funds. As a capital-intensive industry, the garden and construction sector requires substantial working capital. Consequently, the company's debt scale has been expanding consistently since 2014.

The garden and construction construction industry, in which Orient Garden operates, is characterized by non-capital construction and a lengthy settlement cycle. Considering the time cost involved, the accumulation of accounts receivable can result in the inefficient use of funds. Moreover, the speed at which the company's total assets increase has not been able to keep pace with the growth of its debt. Consequently, the proportion of debt has been rising steadily year by year.

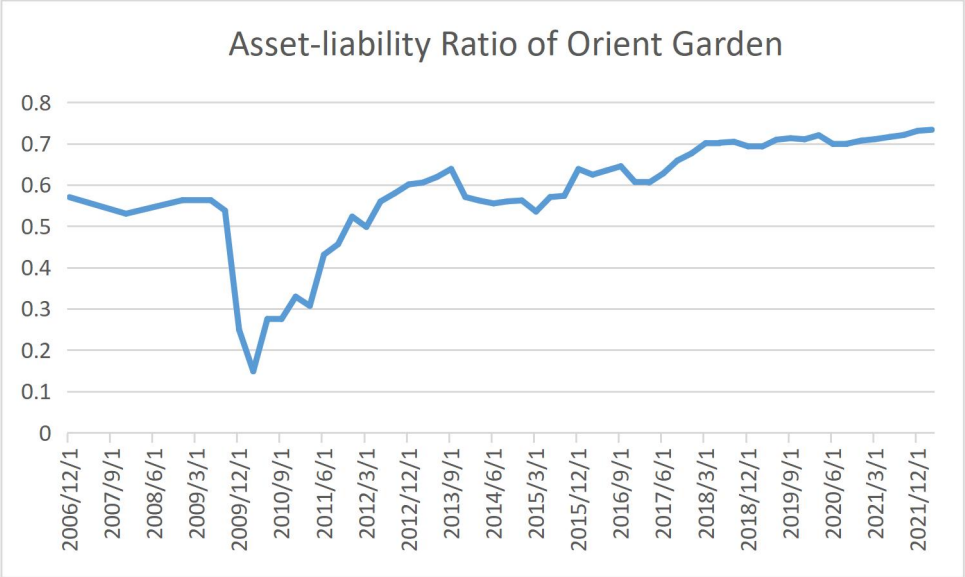

Figure 3-1 Liabilities trend of Orient Garden

From 2016 to the first quarter of 2022, Orient Garden experienced a steady increase in its asset-liability ratio. By the end of 2018, the company's total liabilities had reached 29.184 billion RMB, accounting for approximately 69.33% of its total assets. This significant debt burden was compounded by the tightening external financing environment and the approaching maturity of concentrated debts, exerting further pressure on the company's debt repayment capabilities.

In the first quarter of 2022, Orient Garden's asset-liability ratio surged to 73.34%, while its cash ratio stood at a meager 0.034. These financial indicators indicate an extremely limited ability to meet short-term debt obligations. The combination of a high asset-liability ratio and a low cash ratio underscores the financial constraints faced by the company, hindering its ability to fulfill its debt repayment obligations within the required timeframes.

3.2.2 Maturity Structure Mismatch of Orient Garden

3.2.2.1 Financing Term Structure of Orient Garden

Orient Garden primarily relies on bank loans and bond issuance to secure new financing. In 2018, the company's bank loans were categorized into three main types: short-term loans, long-term loans due within one year, and long-term loans. The weighted average maturity of each loan category was determined by multiplying the proportion of the loan amount within each category by the corresponding loan term. The following analysis provides an in-depth examination of Orient Garden's financing maturity structure in 2018.

Table 3-1Bank loan Analysis of Orient Garden

	Loan amount (hundreds of millions of RMB)	Weighted average borrowing term (years)

Short-term borrowings	29.47	About 1
Long-term borrowings due within one year	0.89	About 1
Long-term borrowing	7.22	8.67
Total	37.58	About 2.47

As presented in Table 3-2, the analysis reveals that short-term loans account for 78.42% of Orient Garden's financing structure. However, due to the absence of specific time periods in the financial statement, the data cannot be further analyzed. Nevertheless, it is apparent that despite the unique nature of its business and the establishment of favorable relationships with multiple banks, the weighted average maturity of the company's bank loans amounting to 3.758 billion RMB is approximately 2.47 years.

Regarding the bond issuance in 2018, Orient Garden's bonds can be categorized into short-term bonds payable (public offering), bonds payable due within one year, and corporate bonds (private placement).

Table 3-2Bank loan analysis of Orient Garden

	Loan amount (100 million RMB)	Weighted average borrowing term (years)
Short-term bonds payable	79.00	0.65
Bonds payable due within one year	10.45	0.48
Corporate bonds	17.54	1.67
Total	106.99	0.8

As depicted in Table 3-3, the analysis reveals that short-term bonds payable constitute 73.83% of the total corporate bond loans, with a weighted average financing term of only 0.8 years. Based on the provided financial data, the weighted average method of debt maturity calculation can be summarized as follows:

Table 3-3Financing maturity mismatch analysis of Orient Garden (2018)

	Loan amount (100 million RMB)	Weighted average borrowing term (years)
Bank borrowings	37.58	About 2.47
Debt financing	106.99	0.80
Total	144.57	About 1.23

As observed in Table 3-3, the financial data for 2018 highlights that Orient Garden Company recorded a new bank loan amounting to approximately 3.758 billion RMB. The weighted average loan term for these loans is approximately 2.47 years. In the same period, the company obtained bond financing totaling around 10.699 billion RMB, with a weighted average loan term of merely 0.80 years. It is worth noting that no equity financing occurred during this period. Notably, short-term financing constituted approximately 91.62% of the company's overall external financing in 2018. Moreover, the weighted average financing term for Orient Garden's external financing operations was approximately 1.23 years.

3.2.2.2 Investment Term Structure of Orient Garden

The investment strategy of Orient Garden primarily revolves around funding equity investments in PPP project SPV companies, making cash payments for merger and acquisition activities, and undertaking the purchase and construction of long-term assets such as fixed assets and intangible assets. Given the nature of the engineering construction industry in which Orient Garden operates, characterized by lengthy settlement cycles and substantial working capital requirements, the company operates in a capital-intensive sector. Furthermore, the investments made by Orient Garden are directed towards equity investments in PPP project SPV companies, with an anticipated return period of approximately three years. It is important to note that the company's business cycle is significantly influenced by factors such as project

construction cycles, project settlement periods, and the recovery cycle of accounts. Consequently, an analysis of the investment aspect of Orient Garden, based on its financial statement for the year 2018, can be summarized as follows:

Table 3-4Investment duration maturity mismatch analysis of Orient Garden(2018)

Major investment projects	Ending balance (hundreds of millions of RMB)	Ending balance (hundreds of millions)	Net value added for the period (RMB 100 million)	Payback period (years)
PPP Project company equity investment funds	79.94	About 2.47	24.57	2.18
M&a companies pay cash	7.64	0.80	1.25	10
Expenditures for the purchase and construction of fixed assets, intangible assets and other long-term assets	1.06	1.12	0.06	20
Total	144.57	About 1.23	25.76	3.07

The business cycle of Orient Garden exhibits significant fluctuations. Since 2018, the company has experienced a slowdown in business development, resulting in extended settlement and accounts recovery cycles, decreased operational efficiency, and an increased business cycle duration of 796.95 days. Efforts have been made to enhance the collection of project funds through measures such as strengthening accounts collection, but the outcomes have been modest. In 2018, the company's long-term investments amounted to 2.934 billion RMB, while its long-term financing reached only 608 million RMB, necessitating the reliance on short-term financing to bridge the gap. Consequently, Orient Garden has continued to

prioritize its commitment to PPP projects, with its expanding long-term investments relying on sustained support from short-term debt.

Regarding the investment aspect of Orient Garden, the company's total external financing in 2018 amounted to 14.457 billion RMB, with a weighted average financing term shorter than 1.23 years. In contrast, the company's investments totaled 8.864 billion RMB, with a weighted investment term of at least 3.07 years. This disparity highlights a notable mismatch between the investment and financing terms within the company's operations.

3.2.2.3 Term Mismatch of Orient Garden

After consulting relevant literature, it is found that the maturity mismatch degree of companies is mainly measured by the improved fund gap equation represented by Zhong et al. (2016) and the fund gap proportion equation constructed by Qiu et al. (2020). However, since the financing debt of these two equations takes 1 year as the demarcation period, assets are divided into long term and short term to analyze the maturity matching degree of investment and financing end, which cannot reflect the specific degree of financing maturity mismatch. Therefore, this chapter will break down the maturity of the assets at the investment and financing end of Orient Garden, and calculate the maturity of the investment end and the financing end respectively by using the weighted average method, and make analysis and comparison in the industry. Please rewrite or polish it in a professional and academic way

(1) Use the fund gap measurement equation for reference

Drawing from Zhong et al. (2016) and Frank and Goyal's (2003) Financing Deficit measurement method, this study employs an improved equation to assess the presence of

short-term financing and long-term investment in Orient Garden. To begin, the analysis focuses on determining the increments of long-term credit and short-term credit within the company. Specifically, the balance sheet variables "long-term loan at the beginning of the term" and "long-term loan at the end of the term" are utilized to calculate the increment of long-term loans in the current period (i.e., long-term loan at the current period minus long-term debt at the early stage). Similarly, the cash flow statement variables "cash received from borrowings" and the "increment of long-term borrowings" are employed to calculate the increment of short-term credit in the current period (i.e., cash received from borrowings minus the increment of long-term borrowings in the current period). By combining the data on the increment of long-term borrowings in the current period and the cash flow statement, the fund gap—represented by the proxy variable SFLI (Short Financing and Long-Term Investment)—is calculated. The formula for calculating the fund gap is as follows: Please rewrite or polish it in a professional and academic way.

The fund gap is determined by subtracting the cash expenditure of investment activities, such as the purchase and construction of fixed assets, from the sum of the current increase of long-term borrowings, current increase of equity, net cash flow from operating activities, and cash inflow from selling fixed assets. In the case of Orient Garden, if the agent variable SFLI representing short-term financing and long-term investment is greater than 0, it indicates that the company's current long-term borrowing is insufficient to fully support its current investment activities. Consequently, a term mismatch arises in terms of short-term financing and long-term investment. By employing the first equation for short-term financing and long-duration

investment, the data collected from 2014 to 2018 for Orient Garden are presented as follows: Please refine the statement in a professional and academic manner.

Table 3-5Measurement of short-financing long-duration investment of Orient Garden by reference to the capital gap equation (100 million RMB)

	2014	2015	2016	2017	2018
Current long-term borrowings	1.7	0.68	8.53	2	7.22
Upfront long-term liabilities	1.24	1.7	0.68	8.53	2
Long-term borrowings for current period increments	0.46	1.02	7.85	6.53	5.22
Obtain the cash received on the loan	33.66	27.95	29	58.19	97.87
Short-term credit increment	33.2	28.97	21.15	64.72	92.65
Construct cash disbursements for long-term assets such as fixed assets	1.14	16.88	26.66	57.91	42.93
Increase in equity for the current period	0.52	0.00	10.44	0.50	1.18
Net cash flow from operating activities	3.03	3.68	15.68	29.24	0.51
Cash inflow from sale of fixed assets	0.01	0.00	0.00	0.00	0.13
Dispose of cash inflows from subsidiaries and other operating units	0.60	0.51	0.11	11.59	6.39
Funding gap	2.58	13.71	7.42	23.11	29.5

As depicted in Table 3-5, the fund gap of Orient Garden amounted to 2.95 billion RMB in 2018, exhibiting a consistent increase over the years, particularly in 2017 and 2018. This indicates the emergence of a maturity mismatch between short-term financing and long-term investment, with the degree of mismatch intensifying over time. Notably, the increment of short-term credit in 2018 alone reached 9.265 billion RMB, which is 1.43 times higher than that of 2017 and 4.38 times higher than that of 2016. Conversely, the increment of long-term loans during the same period is notably lower than that of short-term credit. This suggests that the

company relies on rolling over short-term credit to bridge the fund gap and sustain its long-term investment endeavors. However, this practice has adverse implications for the company's financial condition, increasing the likelihood of default.

3.3 Analysis of Financial Distress of Orient Garden

The financial distress experienced by Orient Garden can be attributed to several key factors as outlined below:

3.3.1 Mismatch in Term Structure of PPP Projects

With the Chinese Ministry of Finance promoting the Public-Private Partnership (PPP) model for infrastructure and public facility construction since 2015, Orient Garden capitalized on this opportunity for rapid expansion. Between 2016 and 2018, the company successfully secured numerous PPP projects, amounting to a total investment of 74 billion RMB. However, the requirement of at least 20% project capital from social capital for PPP projects led to a substantial investment and financing gap for Orient Garden.

To bridge this funding gap, the company relied heavily on short-term debt financing, leading to a mismatch between the short financing terms and the long-term investment nature of the projects. While extending the project cooperation term during the financial affordability demonstration stage is an option, the inherent uncertainty associated with longer-term projects makes financial institutions more inclined towards short-term financing options. As a result, financing tools such as bank loans, private funds, government PPP funds, and trust funds struggle to align with the long-term and low-profitability characteristics of PPP projects. The mismatch in the term structure of financial products, such as bonds and short-term loans, which

typically span 5-10 years, further exacerbates the incongruity with the 20-30 year lifespan of PPP projects.

Moreover, in their efforts to attract social capital investment, some PPP project companies may agree to income guarantee terms that transform equity capital into debt-like repayment obligations with shorter repayment terms. This phenomenon increases the short-term debt burden of PPP project companies and further compounds the term mismatch between debt funds and long-term assets. The larger the investment scale, the greater the capital requirement, resulting in an amplified need for short-term debt financing. This maturity mismatch at the capital stage of PPP projects contributes to Orient Garden's financial distress.

Additionally, the mismatch in PPP project terms significantly raises the risk of defaults. For instance, the Shengjingshan PPP tourism project experienced significant delays in completion, leading to lengthy liquidation procedures. As a consequence of breach of contract, Orient Garden incurred substantial penalties amounting to millions of RMB. Compounded by incomplete project milestones and unacknowledged expenses, the PPP project resulted in significant losses for the company.

Furthermore, the mismatch in project terms leads to increased financial costs for Orient Garden. From 2014 to 2018, the company's financial expenses escalated from 223 million RMB to 687 million RMB. Interest expenses in 2018 alone increased by 409 million RMB in the third quarter, reaching 612 million RMB by year-end—an increase of 60.21% compared to the previous year. While short-term financing is often pursued to reduce financial expenses, Orient Garden's frequent reliance on short-term debt financing failed to achieve this objective. Instead,

it intensified the rise in financial expenses, exacerbated liquidity risks, increased the company's financial burden, and ultimately contributed to debt defaults.

Therefore, the term structure mismatch within PPP projects, the associated financial costs, and the risk of default are key factors underlying the financial distress experienced by Orient Garden.

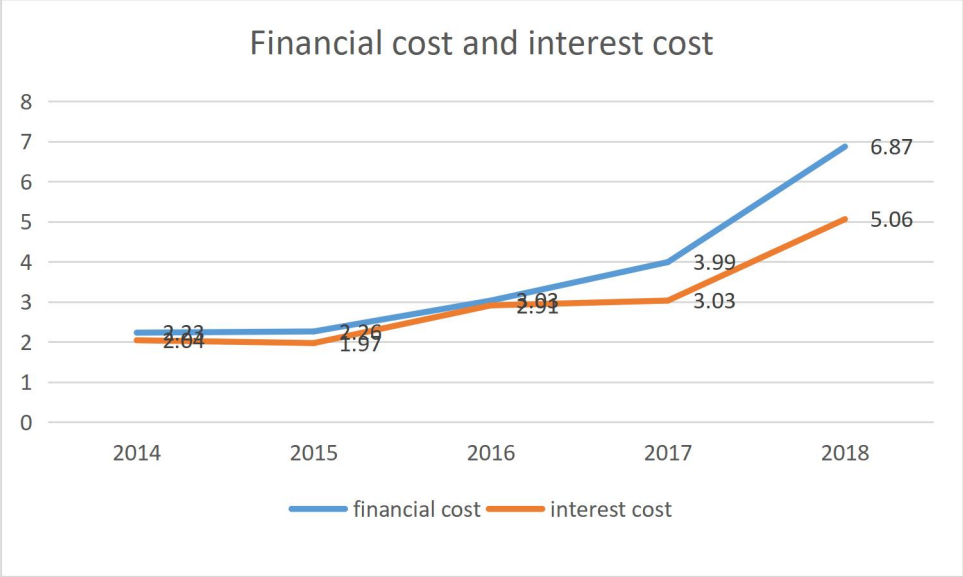

Figure 3-1Trend chart of financial cost of Orient Garden (100 million RMB)

To some extent, Orient Garden employed a financial regulatory arbitrage model, whereby financial institutions invested funds in Special Purpose Vehicles (SPVs) and borrowed from these entities to leverage arbitrage and evade financial regulations. Orient Garden adopted the SPV structure for its PPP projects, and these SPV companies were not included in the consolidated financial statements. Additionally, the company utilized stock pledge financing to secure more funds as stock prices increased, thereby establishing a self-perpetuating cycle of business expansion: "Newly signed PPP projects → Increased order backlog → Higher anticipated profits → Higher stock prices → Expanded availability of financing through stock pledge financing → Further acquisition of PPP projects." However, with the tightening of

external financing in the context of financial deleveraging since 2017, sustaining this chain became challenging. Ultimately, the high-leverage investment and financing methods employed to expand PPP projects served as the fundamental cause behind Orient Garden's catastrophic failure.

Therefore, the significant risks associated with Orient Garden's financial distress can be attributed to the utilization of financial regulatory arbitrage, reliance on SPVs, and the implementation of high-leverage investment and financing strategies to facilitate the expansion of its PPP projects.

3.3.2 Declining Solvency of Local Governments

The declining solvency of local governments has also contributed to the financial distress of Orient Garden. At the end of 2018, the company's balance of advance payments reached 2.598 billion RMB, representing a significant increase of 147.96% compared to the previous year. This increase was primarily driven by the expansion of Orient Garden's PPP business, resulting in a rise in project advance payments by 1.565 billion RMB to 2.571 billion RMB compared to the previous year. Analyzing the details, the advance payments grew by 39.22% compared to the beginning of the year, mainly due to the inclusion of project advance payments that had not yet met the conditions for transfer at the current time.

The timely return of advance payments in the eastern garden project is dependent on the financial capacity of local governments. However, as local governments face increasing financial pressures, their ability to make payments has been reduced. Consequently, Orient Garden experiences growing challenges in recovering funds.

Orient Garden has secured PPP projects across various regions, including Inner Mongolia, Hebei, Tena, Yunnan, Guizhou, Shandong, and others, resulting in the company's business operations being spread nationwide. According to national statistics, except for provinces like Jiangsu, Zhejiang, and Guangdong, the debt ratios of local governments in other provinces have reached relatively high levels. The high debt ratios of local governments directly impact Orient Garden's ability to recover funds and generate profits from its PPP projects.

Therefore, the declining solvency of local governments, characterized by their increasing financial pressures and high debt ratios, poses a significant challenge to Orient Garden's efforts to retrieve funds and achieve profitability from its PPP projects.

3.3.3 Aggressive Investment Expansion Strategy

The financial distress of Orient Garden can also be attributed to its aggressive investment and expansion strategy driven by the company's management. This strategy has led to a situation where the long-term financing available to the company is insufficient to meet the demands of its rapid expansion, particularly through investments in Special Purpose Vehicle (SPV) companies involved in PPP projects. In the first half of 2019, municipal garden projects accounted for 33.28% of Orient Garden's total annual operating revenue among its contracted PPP projects. Additionally, the company heavily relies on PPP business for its expansion, particularly in environmental protection projects, resulting in a high concentration of risk in its business model.

However, the aggressive investment and expansion strategy pursued by Orient Garden did not adequately consider financial risks. During an investor exchange meeting following a bond

issuance, the company's managers expressed a belief that "as long as money can be borrowed, there is no risk." This mindset, coupled with insufficient cash flow reserves to address financial risks, led to a lack of corresponding measures to address the company's investment and financing structure or mitigate potential risks and hidden dangers within its financial operations. As a result, while aggressively expanding its investment scale, Orient Garden resorted to short-term financing after the fact to fill funding gaps, thereby increasing its dependence on short-term debt.

Overall, the company's aggressive investment and expansion strategy, coupled with a lack of attention to financial risks and a reliance on short-term financing to address funding gaps, has contributed to its financial distress.

3.3.4 Corporate Internal Governance Issues

An examination of Figures 3-6 and 3-7 reveals that during Orient Garden's years of rapid expansion (2015-2018), the largest shareholder consistently held a shareholding ratio of over 40%, while the second largest shareholder held a shareholding ratio close to 10%. Notably, both the largest and second largest shareholders are related parties, indicating a significant degree of consistency among key actors. This ownership structure suggests that Orient Garden operates as a "one-share dominant" company, with the largest shareholder exerting substantial control over the company. Consequently, the internal governance mechanisms and equity incentives within Orient Garden may have limited effectiveness in providing checks and balances on the company's operations.

In simpler terms, Orient Garden's internal governance framework may be lacking in terms

of ensuring accountability and oversight. The concentration of ownership in the hands of a single dominant shareholder, particularly when combined with the presence of related parties, can create a situation where decision-making power is consolidated and there may be insufficient independent oversight. This raises concerns regarding potential conflicts of interest and the ability of other shareholders to influence the company's strategic direction or challenge decisions made by the dominant shareholder.

Considering the significance of effective corporate governance in promoting transparency, accountability, and mitigating risks, the internal governance issues observed in Orient Garden's ownership structure warrant attention. Measures should be taken to strengthen the checks and balances within the company's governance mechanisms, enhance transparency, and ensure the protection of the interests of all shareholders.

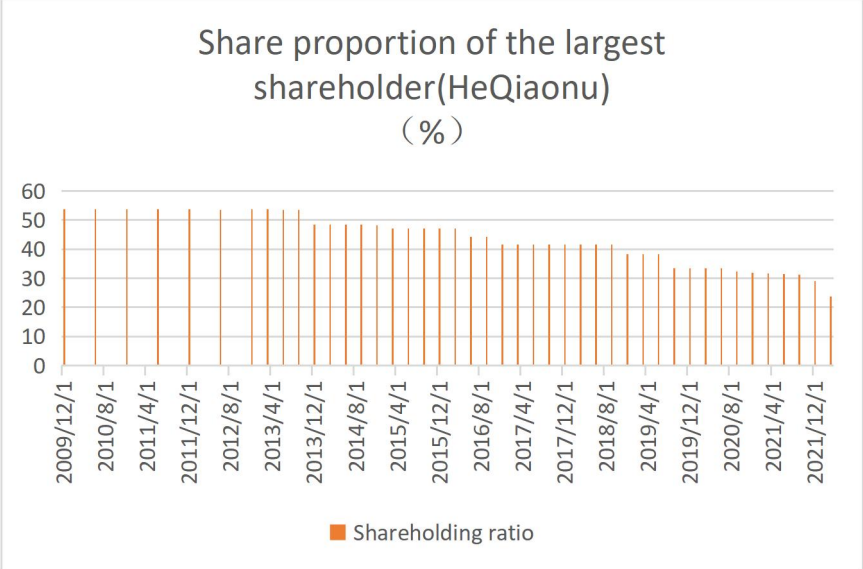

Figure 3-2Shareholding ratio of the largest shareholder of Orient Garden(He Qiaonu)

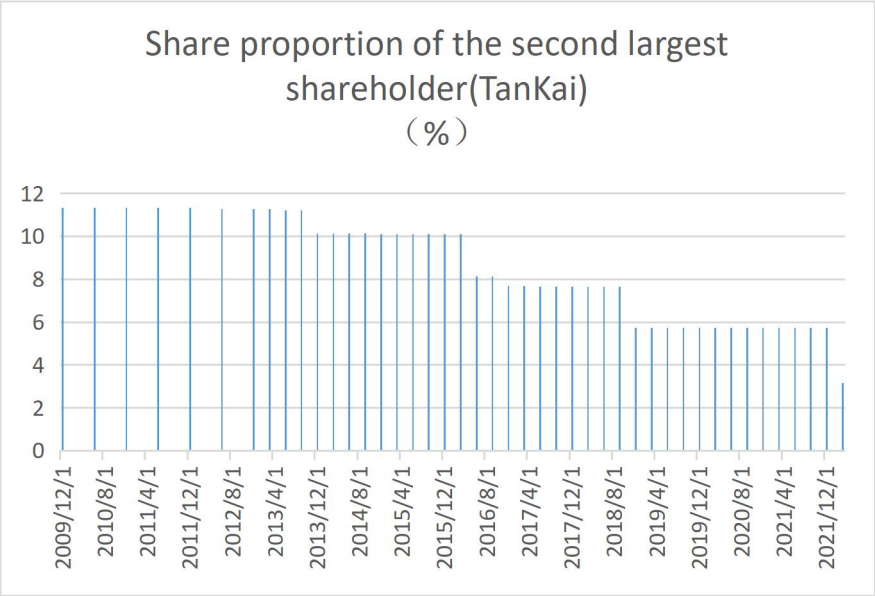

Figure 3-3Shareholding ratio of the second largest shareholder of Orient Garden (Tang Kai)

Orient Garden exhibits characteristics of a typical family business, where key positions within the company are held by individuals related to the controlling shareholder. He Qiaonu, the chairman of Orient Garden, holds a prominent role, while Tang Kai, who is He Qiaonu's husband, serves as the actual financial controller. He Qiaoling, He Qiaonu's elder sister, is responsible for risk control, and He Guojie, her brother, is involved in the company's finance. Wu Xyuan, He Qiaoling's daughter, and Sun Yuan, He Qiaoling's son-in-law, both work in Orient Garden's finance department. Sun Baoping, another family member through marriage, holds a senior executive position in the company. This family-oriented management structure results in a chaotic management environment characterized by nepotism. Key positions are filled by family members, leading to a lack of professional competence, particularly in the area of finance.

From a corporate governance perspective, the board and management of Orient Garden failed to make appropriate strategic planning and adjustments when the company embarked on

a significant transformation towards the PPP business model. Despite expanding its operations from municipal landscape business to water ecological management, industrial waste treatment, and all-region tourism, the company's annual reports from 2014 to 2017 did not provide analyses of the national macroeconomic situation, the availability of social funds, or the company's financing capacity. It was only after the crisis erupted that the disclosed reports mentioned the need for improving the financial system to sustain PPP project financing amidst the "deleveraging" environment. The board of directors, despite the company's aggressive expansion through PPP and offensive strategic planning, failed to promptly consider changes in national macroeconomic policies and the investment and financing landscape. Moreover, they did not address the capital chain rupture and corresponding measures in the annual reports. As a result, operational risks became a probable event.

In summary, Orient Garden's family-centric management structure and inadequate corporate governance practices, particularly in strategic planning and financial management, contributed to the outbreak of operational risks.

Chapter 4: Research Design of Financial Distress in Garden and Construction Enterprises

4.1 Theoretical Analysis and Hypotheses

4.1.1 Analysis of Impact of Public-Private Partnerships (PPP) on Financial Distress of Garden and Construction Enterprises

The investment scale involved in PPP projects is often significant, and one-time financing is insufficient to meet the capital requirements throughout the project's life cycle. As a result, in order to attract investment from social capital, certain income protection clauses may be granted to social capital investors, converting the capital that should be equity into debt. Since debt has a rigid repayment attribute and often has a short-term maturity, companies with PPP projects tend to accumulate short-term debts. This misalignment between the short-term debt financing and the long-term investment duration of assets leads to a capital stage mismatch in PPP projects. Given the industry-specific nature of garden and construction companies, many of them undertake PPP projects. However, due to the maturity mismatch, these companies face significant debt repayment pressure and liquidity risk.

Based on the analysis above, the following hypotheses can be proposed:

H1: The greater the level of active involvement in PPP projects, the higher the financial distress faced by garden and construction enterprises.

4.1.2 Analysis of Impact of Local Government Debt on Financial Distress of Garden and Construction Enterprises

Liu et al. (2020) conducted an empirical study on the financial data of listed companies from 2007 to 2016 and found that the expansion of local government debt had a negative impact on the innovation and development of small and medium-sized enterprises. Similarly, Yang and Sun (2021) investigated major listed companies in the Chinese manufacturing sector from 2008 to 2018 and established an "inverted U-shaped" relationship between the local government debt structure and corporate growth. They also discovered that the financing constraints faced by small and medium-sized enterprises partially mediated this relationship. Chen et al. (2021) conducted experiments that demonstrated the significant squeezing effect of local government debt financing on SMEs' debt financing. This effect was observed in both long-term and short-term government debt samples, and it was more pronounced in eastern and western China. Furthermore, the issuance of local government debt significantly increased SMEs' scale of endogenous and equity financing.

In addition, Fan and Chi (2021) identified the crowding out effect of local government debt on enterprise investment, primarily through increased financing constraints, particularly affecting small and medium-sized private enterprises with high profitability but low financial development. Mei et al. (2021) highlighted that the decline in local government revenue resulting from housing price control, which relies on land transfer and land mortgage loans, directly impacts the debt-paying ability of local governments. This, in turn, increases the debt repayment pressure and tightens the liquidity of the enterprise sector. Rao et al. (2022)

suggested that the expansion of local government debt leads to the crowding out of credit resources, significantly exacerbating the degree of leverage manipulation by enterprises and potentially distorting their leverage ratios. Ma and Zhang (2022) discovered that the expansion of local government debt significantly reduces the investment efficiency of state-owned enterprises, mainly resulting in excessive investment without a significant impact on underinvestment.

Considering that local governments are major customers of garden and construction companies, higher levels of local government debt weaken their ability to pay downstream enterprises and increase the financial risk faced by garden and construction companies.

Based on the research and analysis above, the following assumptions can be proposed:

H2:The higher the debt level of the local government, the greater the likelihood of transferring the debt burden to garden and construction enterprises, consequently increasing their financial distress.

4.1.3 Analysis of Impact of Real Estate Industry on Financial Distress of Garden and Construction Enterprises

The real estate development industry experienced significant growth, with a 33.2 percent increase in investment in 2010, coinciding with the recovery of the national economy. However, since 2011, the government has implemented a series of regulation and control policies to manage the real estate market. As a result, the growth rate of real estate investment dropped to a mere 1 percent in 2015. In 2016, destocking efforts led to relaxed regulation and control policies, causing an increase in demand for real estate driven by both rigid and improvement

factors. Additionally, the sluggish real economy and stock market influenced investors to shift their focus to the real estate industry. The growth rate of real estate investment stabilized and picked up until 2019, when it began to decline once again. By 2022, the growth rate of real estate development investment had even reached negative numbers, indicating a turning point from boom to bust for the real estate industry.

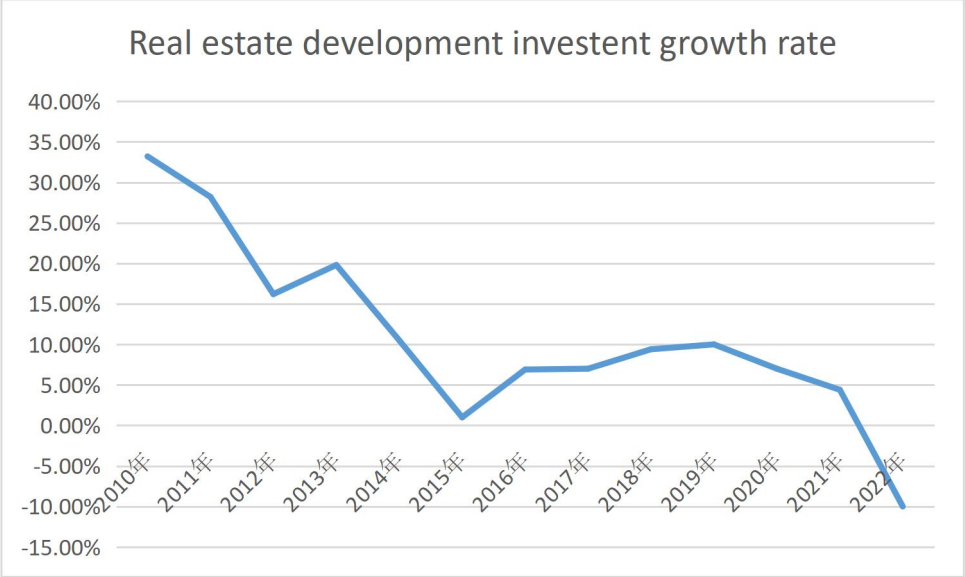

Figure 4-11 Growth rate of real estate development investment

In recent years, the government has introduced "no speculation" policies, including purchase restrictions, loan restrictions, sale restrictions, and tightened land auctions, which have significantly impacted the development and sales of the real estate industry. Moreover, the COVID-19 pandemic has also affected residents' income, further exacerbating the risk of debt default in the highly leveraged real estate industry (Qian, 2022). The National Balance Sheet Research Center conducted a test in the first quarter of 2021, revealing a leverage ratio of 161.4% for the non-financial sector. Corporate debt risks, particularly for large real estate enterprises, have become more prominent. In the same period, the asset-liability ratio was nearly 80%, and the maturity of real estate debt increased from 250 billion to 650 billion

between 2018 and 2021. Sunac China, for instance, had an asset-liability ratio of 83.9% at the end of 2019, excluding the proceeds received in advance, placing it in the red-grade category among real estate enterprises (Chen, 2022).

According to Song and Yu (2021), Evergrande's interim annual report in 2021 revealed a total debt of 1.95 trillion RMB. The debt structure consisted of four main components: interest-bearing liabilities (including bank loans, trusts, bonds, etc.) accounting for 28.9% of total liabilities, advance payments (mainly down payments from homebuyers and loans from banks) accounting for 11.2% of total liabilities, trade accounts payable and other payments (arrears to builders and material suppliers) accounting for 48.3% of total liabilities, and spot income tax liabilities and deferred income tax liabilities accounting for 10.7% of total liabilities. Evergrande exhibited both the characteristic high debt levels of real estate enterprises and an aggressive approach to debt management. Compared to other major domestic real estate companies, Evergrande had a higher leverage ratio and a cash/short-term debt ratio of 0.67, only 29.5% of that of China Resources Land.

As the garden and construction industry is part of the downstream industry chain of real estate, its performance is inevitably influenced by the cyclical fluctuations of the real estate industry. Considering the trend of investment growth in real estate development, this paper proposes the following hypothesis:

H3: The financial distress of garden and construction enterprises was less pronounced in the years before 2019 due to their close association with the real estate

4.1.4 Analysis of Impact of Strategic Radicalism on Financial Distress of Garden and Construction Enterprises

According to the theory of strategic choice, enterprises adopt strategies with varying degrees of radicalism based on their environment, capital scale, personnel, and other factors. The degree of strategic radicalism, in turn, affects the company's operating environment and value creation.

Ittner (1997) and other scholars posit that strategic decisions often influence a company's risk and uncertainty profiles. The more aggressive the company's strategic choices, the higher the operational uncertainty it faces. In general, companies adopt more conservative cash holding strategies to mitigate increased operating risks and avoid financial distress. However, when uncertainty levels rise, enterprises tend to rely more on precautionary cash holding to meet unforeseen needs. Consequently, they maintain high levels of cash holdings.

Ye et al. (2015) explored the impact of corporate strategy on earnings management behavior. Their empirical analysis revealed that the impact of corporate strategy differences on profit management varies significantly. Aggressive corporate strategies can expose companies to greater uncertain risks, leading to poor performance. In such situations, managers often engage in earnings management practices.

Wang and Gao (2019) examined the influence of different strategies on managers' opportunistic behaviors from a corporate strategy perspective. They found that implementing offensive strategies often leads to extraordinary in-service expenditure, over-consumption, and increased internal principal-agent costs. Navissi (2017) focused on the influence of different

strategy types on corporate investment decisions. The research showed that companies with aggressive strategies exhibit stronger innovation capabilities than those with defensive strategies. Consequently, managers tend to adopt aggressive investment strategies, which may sometimes result in excessive investments. On the other hand, companies with defensive strategies tend to be weak in innovation ability and overly conservative in business operation policies, potentially leading to under-investment. Both excessive and insufficient investment are unfavorable for enterprise development, as they can diminish enterprise value and increase operational and financial risks.

Habib et al. (2017) discovered that companies adopting aggressive strategies often exploit information asymmetry and only communicate positive signals to the market, attempting to conceal problems. However, this approach ultimately leads to substantial losses in the company's market value. Once the market becomes aware of capital losses, it quickly loses confidence in the enterprise, causing the stock price to collapse. Consequently, Habib et al. concluded that the higher the degree of strategic radicalism, the greater the risk of a decline in the company's stock price.

Based on the aforementioned analysis, the following hypothesis is derived:

H4: Greater degrees of strategic radicalism lead to increased financial distress for garden and construction companies.

4.1.5 Analysis of Impact of Affiliated Transactions on Financial Distress of Garden and Construction Enterprises

Affiliated transactions conducted by listed companies often involve tunneling behavior.

Major shareholders, driven by their pursuit of private gains, exploit various illicit means to appropriate the company's resources, thereby infringing upon the interests of other shareholders (Liu, 2022; Zhong et al., 2023). Compared to minority shareholders, controlling shareholders possess greater control over the company and hold a dominant position in terms of information. They engage in affiliated transactions and other activities to transfer resources, often employing hidden and diverse tactics. These behaviors not only harm the interests of minority shareholders but also undermine the overall interests of listed companies, thereby imposing financial pressure on them.

H5: The larger the scale of affiliated transactions, the greater the financial distress experienced by garden and construction companies.

4.1.6 Analysis of Impact of Ownership Structure on Financial Distress of Garden and Construction Enterprises

One characteristic of listed companies in China is the concentration of equity and the control rights generally held by the largest shareholders. These controlling shareholders exert significant influence over the behaviors of listed companies. As a result, controlling shareholders can easily engage in practices that "hollow out" the listed companies (Li et al., 2005), thereby increasing the financial risks faced by these companies. While radical debt expansion by controlling shareholders may lead to the growth and strengthening of listed companies, it also amplifies their debt risk. When the controlling shareholder possesses absolute control, they have a dominant voice in the operation and management of the company compared to minority shareholders. The higher the holding proportion of the controlling

shareholders, the more rational they are likely to be, preferring to avoid large debt financing and control financial risks, aligning with the goal of maximizing their rights and interests, just like minority shareholders.

From the perspective of non-controlling shareholders, a high ownership concentration within a listed company, where the controlling shareholder has substantial influence, often results in other shareholders being unable to effectively balance the controlling shareholder. Consequently, they lack the ability to intervene in important decisions or supervise the controlling shareholder, directors, and management. Conversely, when the equity structure of a listed company is excessively dispersed, with numerous shareholders holding small stakes, minority shareholders face challenges in exercising control and supervision over the company's behaviors due to their limited cognition and abilities. However, when the listed company has multiple major shareholders with similar shareholdings, the ownership structure is relatively moderate. In this scenario, each major shareholder possesses the ability and motivation to balance and supervise the controlling shareholder and other interest parties for their own benefit. Each major shareholder actively participates in the management of the company, ensuring that management does not collude with any single shareholder. The counterbalance among shareholders prevents complete subordination to the controlling shareholder and mitigates risks associated with collusion between the controlling shareholder and management.

When management or major shareholders resort to affiliated transactions as a means to transfer interests, the complexity of the principal-agent relationship, coupled with the mode, frequency, and nature of these transactions, can lead to deviations from market rules and

manipulation by major shareholders. Affiliated transactions can become a tool for "hollowing out" the company. Therefore, the greater the degree of affiliated transactions, the more likely garden and construction companies are to face financial distress.

In the modern enterprise system, where ownership and management rights are separated, senior executives of listed companies also play a crucial role in internal governance. Executive shareholding can serve as an effective incentive and supervision mechanism for listed companies, thereby enhancing internal control. Compared to directors, shareholders, and other entities, the management of listed companies possesses a better understanding of the company's actual internal operations. Furthermore, the alignment of management and company interests promotes active supervision of controlling shareholders' private activities rather than collusion with them. Based on the above analysis, the following theoretical assumptions are proposed:

H6: The lower the controlling shareholder's shareholding ratio, the greater the financial distress of garden and construction enterprises.

H7: Executive equity incentives can reduce the financial distress of garden and construction enterprises.

4.2 Research and Design

4.2.1 Definition of Variables

4.2.1.1 Dependent Variable: Financial Distress (Z-Score)

Enterprises can assess their financial situation by analyzing accounting information. It is essential for enterprises to establish an early warning system for financial risks and set critical values for financial indicators to identify and prevent potential financial crises that may

adversely affect the company's development. Renowned scholar Altman (1968) developed the widely used Z-Score model, which has demonstrated accurate results. Numerous researchers (Yu et al., 2008; Xu and He, 2022) have employed the Z-Score model to analyze financial risks and the probability of enterprise bankruptcy. In this study, the Z-Score index is adopted to measure the extent of financial distress in enterprises.

The Z-Score model is an index model that quantifies a company's financial risk. It selects five groups of financial risk indicators that best represent a company and applies a weighted coefficient algorithm to compare the calculated result with empirical data. This process yields a financial risk measurement threshold, which can be used to infer the likelihood of the company's financial risk. The general form of the model is as follows:

$$Zscore=1.2C1+1.4C2+3.3C3+0.6C4+0.999C5 \quad (4\text{-}1)$$

Table 4-1Meaning and calculation formula of indexes of Z-score model

Variables	Meaning	calculation formula
C1	reflect liquidity	(current assets - current liabilities)/total assets
C2	reflecting profit accumulation	(undistributed profit - surplus reserve)/total assets
C3	reflects the productive capacity of the asset	EBIT/total assets
C4	reflect financial structure	(market price per share * total shares)/total

		liabilities
C5	reflect asset utilization effects	operating revenue/total assets

Among them, a lower Z-Score indicates a higher level of financial risk for the business. Table 4-1 presents the components of the Z-Score model. C1 represents an enterprise's operating capacity, C2 reflects its wealth accumulation, C3 indicates its return on investment, C4 reflects its contribution value, and C5 represents its asset utilization efficiency. The probability of a financial crisis can be determined by calculating the Z-Score value using the criteria provided in Table 4-2.

Table 4-2Criterion of Zscore model

Zscore range	model analysis result	conclusion
Zscore < 1.8	Extremely poor financial position	The financial risk of the enterprise is high and the risk of bankruptcy is high
1.8<=Zscore <=2.675	Financial situation is unstable	The enterprise is in potential Financial Crisis
Zscore > 2.675	Good financial position	The probability of bankruptcy is very small

Since its development by Altman (1968), the Z-score index has primarily been used to assess the financial distress of American enterprises. However, in order to adapt it to the unique characteristics of the Chinese market and enterprises, Zhang et al. (2010) made significant improvements to the Z-score index. These modifications ensure its applicability and accuracy when assessing the financial distress of Chinese enterprises.

$$Zscore\_China = 0.517 - 0.460C1 + 9.320C2 + 0.388C3 + 1.158C4 \quad (4\text{-}2)$$

Table 4-3Criterion of Zscore_China model

C1	total liabilities/total assets
C2	net profit/(Total assets at beginning + total assets at end) /2
C3	total working capital/assets
C4	total retained earnings/assets

When the Zscore_China is below 0.5, it indicates that the business is experiencing financial distress. If the Zscore_China is between 0.5 and 0.9, the enterprise is considered to have potential financial distress. On the other hand, when the Zscore_China is equal to or greater than 0.9, it signifies that the enterprise is in a healthy financial state. Throughout the remainder of this article, the term Zscore_China will be abbreviated as Zscore.

4.2.1.2 Explanatory Variables

(1) local government debt ratio (LGDefault)

The current literature mainly summarizes the balance of local government bonds and the balance of local urban investment bonds as the level of local government debt(Mao and Huang, 2018; Rao, Tang and Li, 2022). In order to eliminate the dimensional impact, this paper refers to Chen and Zhang (2017) and defines the local government debt level as the debt ratio of local

governments, namely, the ratio of the total balance of local government bonds and local urban investment bonds to local government fiscal revenue, which reflects the debt level of local governments compared with their fiscal revenue. Some garden and construction companies are large in scale and their projects are all over the country. Theoretically speaking, it is advisable to use the local government debt ratio where the projects are located. However, due to the large number of projects and incomplete information, the local government debt ratio where the projects are located cannot be confirmed. Since most garden and construction companies belong to regional enterprises, the place where the project is located is also the place where the company is registered, so this paper uses the local government debt ratio of the place where the listed company is registered as the measurement of this index.

(2) whether to participate in PPP projects (PPP)

According to the disclosure of the annual report of the listed garden and construction companies, there were PPP projects in that year, " Whether to participate in PPP projects" is counted as "1", otherwise counted as "0".

(3) whether the main business is related to the real estate industry (RealEstate)

According to the annual report disclosure of the listed garden company, if the main business of the year has real estate-related business, this variables is counted as "1", otherwise it is counted as "0".

(4) degree of strategic radicalism (Strategy)

This paper follows (Sun, 2016; Zhai and Sun, 2019) use a comprehensive index (Strategy) to measure the degree of strategic radicalism of a company. Strategy measures from the

following six aspects:

R&d expenditure as a percentage of sales revenue: Aggressive companies typically have more innovative behaviors, so there is more R&D expenditure, the larger the ratio.

Headcount to sales revenue: This measure measures a company's ability to produce and deliver goods and services. Compared with defensive companies, companies with offensive strategy have lower requirements for efficiency and higher requirements for market share. Therefore, more people are needed for each unit of sales revenue, and the greater the ratio.

Historical growth rate of sales revenue: Aggressive companies, which focus on R&D, innovation and market share, generally have a greater ability to grow. The historical growth rate of sales is used as a measure of a company's growth. The greater the ratio.

Selling and administrative expenses as a percentage of sales revenue: Aggressive companies tend to expand product markets. The higher the selling and administrative expenses, the greater the ratio.

Volatility of the number of employees: Aggressive companies pay attention to the convenience of resource allocation, and usually have weak organizational stability and short employee tenure. Therefore, the greater the volatility of employees, the greater the ratio.

The proportion of fixed assets to total assets: the companies with offensive strategy usually have a higher human resource density, while the companies with defensive strategy usually have a higher capital density, and the ratio is smaller.

Take the average of the above 6 variables over the past 5 years. For the first five variables, the "industry-year" sample is divided into 5 groups on average from smallest to largest in terms

of variable value, assigning 0 points to the smallest group and 4 points to the largest group. The sixth variable was grouped in reverse, with the smallest group assigned four points and the largest group assigned zero points. For each "company-year" sample, Strategy equals the sum of the group scores for the six variables, with values ranging from 0 to 24 points. The higher the firm's Strategy value, the more aggressive its strategy is. From the perspective of Strategy types, offensive companies usually have a higher Strategy value, while defensive companies have a lower strategy value.

（3）affiliated transaction (Relation)

Li and Cui (2007) defined the scale of affiliated transactions as the amount of affiliated transactions/average total assets, which reflected the relative value of affiliated transactions and was used to control the impact of the scale of listed companies on the amount of affiliated transactions.

(6) shareholding ratio of the largest shareholder (LargeHolder)

La et al. (2001) used ownership structure data from 27 developed economies to determine the ultimate controlling shareholders of these companies and found that the controlling shareholders' control of the company usually far exceeds their cash flow right, mainly through the use of pyramids and participation in management. This mainly reflects the status of ownership structure of companies in developed economies. However, the data show that there is a high correlation between the control rights and cash flow rights of the controlling shareholders of Chinese listed companies. Moreover, in China, most scholars mainly use the ultimate shareholding ratio of controlling shareholders as the measure of controlling shareholders'

control rights in their research (Liu et al. 2020; Jiang et al., 2015). The data of this measurement method is easy to obtain and relatively comprehensive. Therefore, "shareholding ratio of the controlling shareholders" is chosen as the proxy variable of the controlling shareholders' control right in this chapter.

(7) executive ownership ratio (ManageHolder)

This section uses management's ownership ratio as a proxy variable for executive ownership ratio as the core explanatory variable of this section.

4.2.1.3 Control Variables

(1) Asset size (Asset): According to Qian and Yu Maomao (2022), the debt risks may vary among listed companies of different sizes. Therefore, this study includes the asset size of listed companies in the garden and construction industry as a control variable.

(2) Operation capacity (Operation): The operation capacity of listed garden and construction companies encompasses various management aspects, including inventory management, accounts receivable management, and the speed of asset turnover. To measure operation capacity, this study selects three indicators: total assets turnover rate, inventory turnover rate, and accounts receivable turnover rate. Following the approach of Shi (2013), the Z-score method is employed to standardize the values of these indicators. The standardized values are then summed to represent the operating capacity of listed companies.

(3) Profitability (Profit): Profitability is measured in this study using the return on total assets, as suggested by Feng et al. (2005). To eliminate the dimensional impact, the Z-score method, as adopted by Dan (2013), is applied for standardization of the profitability variable.

Table 4-4Main variable definitions

Variable symbols	Variable name	Variable definition
Zscore	financial distress	Zscore = 0.517-0.460 × asset-liability ratio + 9.320×ROA+ 0.388× working capital as a percentage of total assets + 1.158× retained earnings as a percentage of total assets
PPP	whether to participate in PPP projects	If there was a PPP project in that year, it is counted as "1", otherwise it is counted as "0".
LGDefault	local government debt ratio	Use the ratio of the total outstanding local government bonds and local urban bonds to local government revenue.
RealEstate	whether the main business is related to the real estate industry	If there is a real estate-related business in the main business of the year, it counts as "1", otherwise it counts as "0".
Strategy	degree of strategic radicalism	Construct discrete variables from 6 dimensions to measure the radical degree of enterprise strategy
Relation	affiliated transactions	Amount of affiliated transactions/average total assets. This index reflects the relative value of affiliated transactions and is used to control the impact of the size of listed companies on the amount of affiliated transactions.
LargeHolder	shareholding ratio of the largest shareholder	The ratio of the number of shares held by the largest shareholder to the total share capital of the sample company
ManageHolder	executive ownership ratio	Total management ownership of listed companies
Asset	asset size	Take the total assets of the listed company as 1 billion RMBand logarithm
Operation	operational capacity	To the total assets turnover rate, inventory turnover rate, accounts receivable turnover rate of three indicators to do standardized processing and synthesis.
Profit	Profitability	The value of a standardized measure of return on total assets.

4.2.2 Model Design

4.2.2.1 Panel Model Considering Individual Fixed Effects

To examine the influence of various factors on the financial distress of garden and construction enterprises, a panel fixed effect model is employed. The dependent variable is financial distress (Zscore), while the independent variables include whether the company participates in PPP projects (PPP), the local government debt ratio (LGDefault), whether the main business is related to the real estate industry (RealEstate), degree of strategic radicalism (Strategy), affiliated transactions (Relation), shareholding ratio of the largest shareholder (LargeHolder), and executive ownership ratio (ManageHolder).

In this study, control variables such as asset size (Asset), operation capacity (Operation), and profitability (Profit) are selected. These financial indicators are included to control for their potential effects on the relationship between the explanatory variables and financial distress. The panel fixed effect model with individual fixed effects is constructed using Equations (4-3), (4-4), (4-5), (4-6), (4-7), (4-8), and (4-9).

$$Zscore_{it} = \beta_0 + \beta_1 PPP_{it} + \sum \beta_j control_{jt} + \mu_i + e_{it} \quad (4\text{-}3)$$

$$Zscore_{it} = \beta_0 + \beta_1 LGDefault_{it} + \sum \beta_j control_{jt} + \mu_i + e_{it} \quad (4\text{-}4)$$

$$Zscore_{\mathrm{it}} = \beta_0 + \beta_1 RealEstate_{it} + \sum \beta_j control_{jt} + \mu_i + e_{it} \quad (4\text{-}5)$$

$$Zscore_{it} = \beta_0 + \beta_1 Strategy_{it} + \sum \beta_j control_{jt} + \mu_i + e_{it} \quad (4\text{-}6)$$

$$Zscore_{\mathrm{it}} = \beta_0 + \beta_1 LargeHoler_{it} + \sum \beta_j control_{jt} + \mu_i + e_{it} \quad (4\text{-}7)$$

$$Zscore_{it} = \beta_0 + \beta_1 Relation_{it} + \sum \beta_j control_{jt} + \mu_i + e_{it} \quad (4\text{-}8)$$

$$Zscore_{\mathrm{it}} = \beta_0 + \beta_1 ManageHolder_{it} + \sum \beta_j control_{jt} + \mu_i + e_{it} \quad (4\text{-}9)$$

$\beta_i (i = (0,1,2,3,\ldots\ldots j)$ represents the coefficient corresponding to the variables, μ_i represents the intercept term of the individual heterogeneity, e_{it} is the perturbation term that changes with the individual and time, assuming $\{ e_{it} \}$ is independently and equally distributed, and is not correlated with μ_i .

In this paper, interval estimation method is adopted to estimate the relevant parameters of the above model.

Chapter 5: Empirical Study on Influencing Factors of Financial Distress in Garden and Construction Enterprises

5.1 Descriptive Statistical Analysis

5.1.1 Study Samples and Data Sources

The study samples consist of quarterly data to ensure the timeliness of capturing financial distress. Quarterly frequency data allows for quick updates and better identification of emerging financial distress. The variables "whether there are PPP projects" and "whether the main business is related to the real estate industry" are obtained by processing the financial report information of the sample companies.

Specifically, the annual and quarterly financial reports of the sample companies in the current year indicate the presence of PPP projects as "1", while the absence is denoted as "0". Similarly, the variable "whether the main business is related to the real estate industry" is coded as "1" when the main business includes real estate-related projects, and "0" otherwise.

The data for the local government debt ratio is sourced from the Wind database. Data on affiliated transactions, degree of strategic radicalism, shareholding ratio of the largest shareholder, executive ownership ratio, asset size, profitability, and operating capacity are obtained directly or processed from the relevant data in the Guotaian database.

Figure 5-1 illustrates the trend of the sample size, which increases over the years due to the growing number of listed garden and construction enterprises. The slight decrease in sample size during certain years can be attributed to the presence of missing values. Furthermore, both

Zscore and asset size variables exhibit significant tail-tail behavior at the bilateral 1% level.

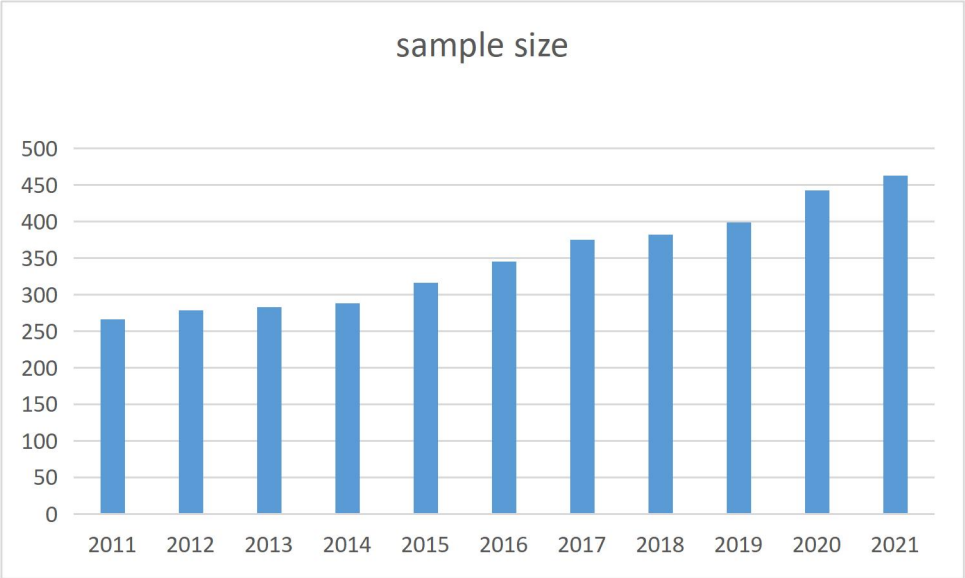

Figure 5-1Distribution of sample statistics by year

5.1.2 Analysis of Descriptive Statistics

To assess profitability, debt levels, and cash flow in the garden and construction industry, three indicators are utilized: return on assets (ROA), asset-liability ratio, and current ratio. Table 5-1 presents the average values of these indicators for all enterprises in the garden and construction industry each year.

Table 5-1Financial status of enterprises in the garden and construction industry

Year	mean_roa	Mean_asset-liability ratio	mean_ current ratio
2011	0.2286	0.4691	2.9432
2012	0.1294	0.4651	5.4626
2013	0.0860	0.4993	2.0220
2014	0.0985	0.5199	1.9404
2015	0.0554	0.5426	1.8757
2016	0.0724	0.5316	1.9513

2017	0.0398	0.5350	1.7662
2018	0.0417	0.5601	1.5841
2019	0.1248	0.5836	1.5417
2020	0.3923	0.5914	1.6022
2021	0.5095	0.5886	1.6648

As depicted in Figure 5-2, the net profit rate of assets in the garden and construction industry has exhibited a declining trend, with several years showing negative values since 2011. This suggests that enterprises in the garden and construction industry have experienced deficits in most years, and the extent of these losses has been increasing.

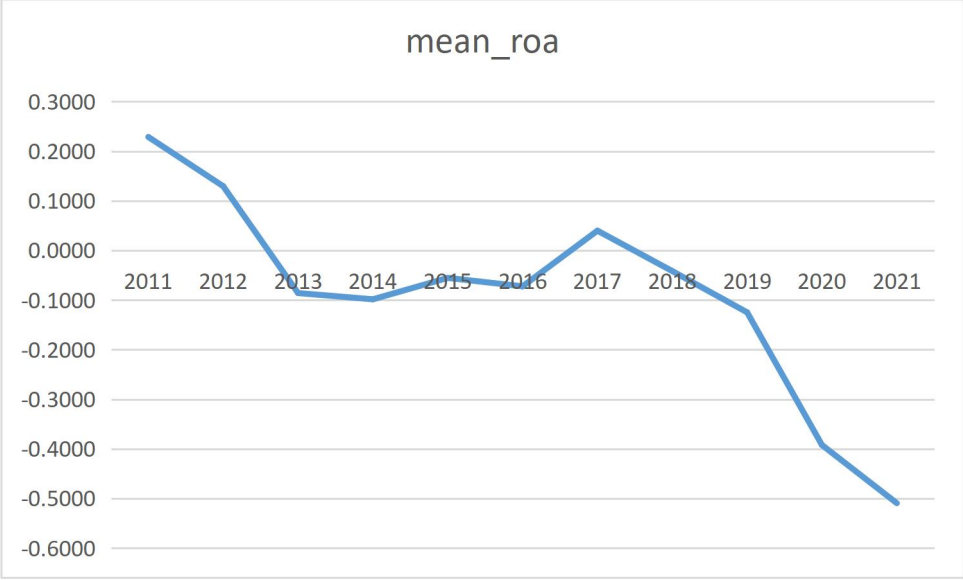

Figure 5-2Average return on equity of enterprises in the garden and construction industry

As illustrated in Figure 5-3, the average asset-liability ratio of enterprises in the garden and construction industry has shown a gradual increase since 2011. This upward trend indicates that the pressure on these enterprises to fulfill their debt obligations has progressively intensified.

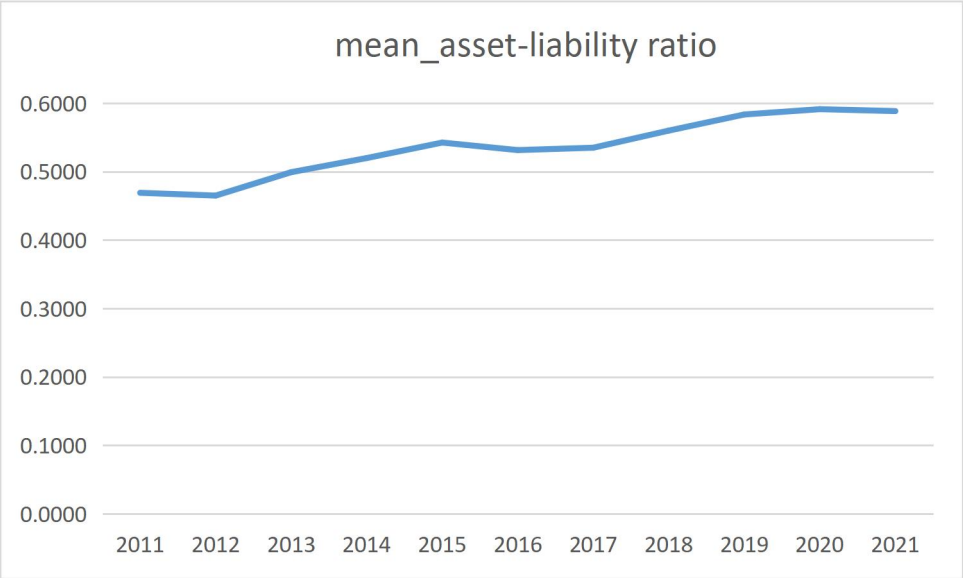

Figure 5-3Average asset-liability ratio of enterprises in the garden and construction industry

As depicted in Figure 5-4, the average liquidity ratio of enterprises in the garden and construction industry experienced a decline after reaching its peak in 2012. This decline indicates a deterioration in the cash flow capacity of these enterprises.

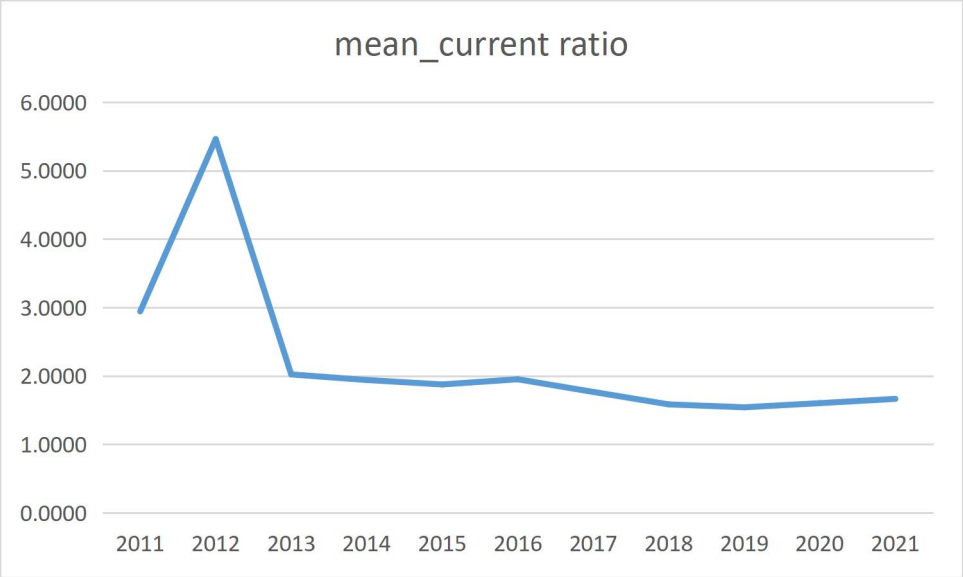

Figure 5-4 Average liquidity ratio of enterprises in the garden and construction industry

Based on the analysis of the aforementioned data, it is evident that the profitability, debt levels, and cash flow of enterprises in the garden and construction industry have been on a downward trajectory, indicating a deterioration in their financial performance. Additionally, the

observed trends indicate a gradual increase in financial distress within the industry.

The descriptive statistical results of the dependent variables, explanatory variables, and control variables in the empirical model are presented in Table 5-2. The standard deviation ranges of each variable are comparable, indicating that data normalization has effectively addressed dimensional differences.

The average value of PPP projects is 0.27, suggesting that while some listed garden and construction companies are involved in PPP-related businesses, the majority of enterprises do not have such engagements. The average value of the local government debt ratio (LGDefault) is 1.97, with "100%" as its unit. This indicates that the current debt ratio of local governments in China is relatively high, aligning with the prevailing situation.

The average value of whether the main business is related to the real estate industry (RealEstate) is 0.37, which surpasses the average value of PPP projects (0.27). This suggests that the operations of listed garden and construction companies are more closely linked to the real estate industry.

The average value of the degree of strategic radicalism (Strategy) is 6.39, with a range between 4 and 11, indicating a reasonable variation. The average value of affiliated transactions (Relation) is 0.34, with a minimum of 0 and a maximum of 3.817, implying a significant proportion of affiliated transactions in the business activities of listed garden and construction companies.

The average value of the shareholding ratio of the largest shareholder (LargeHolder) is 0.35, with the highest value at 0.819 and the lowest at 0.087. This reveals that controlling

shareholders possess a relatively substantial proportion of listed garden and construction companies. The average value of the executive ownership ratio (ManageHolder) is 0.06, with a maximum of 0.714 and a minimum of 0. This indicates considerable variability in equity incentives among senior executives.

The average value of the return on total assets, a profitability indicator, is negative, underscoring the fact that a significant portion of listed garden and construction companies are experiencing losses.

Overall, these descriptive statistics provide valuable insights into the characteristics of the variables in the empirical model and offer a comprehensive understanding of the financial landscape of the garden and construction industry.

Table 5-2Descriptive statistics of main variables

Variables	Sample size	Average	Median	Standard deviation	Minimum	Maximum
Zscore	3778	0.62	0.614	0.51	1.645	1.956
PPP	3839	0.27	0.000	0.44	0.000	1.000
LGDefault	3839	1.97	1.424	1.68	0.044	7.075
RealEstate	3839	0.37	0.000	0.48	0.000	1.000
Strategy	3778	6.39	6.000	1.75	4.000	11.000
Ralation	3778	0.34	0.228	0.38	0.000	3.817
LargeHolder	3839	0.35	0.340	0.14	0.087	0.819
ManageHolder	3774	0.06	0.002	0.13	0.000	0.714
HoldConnection	3839	1.95	2.000	0.22	1.000	2.000
Asset	3778	3.76	3.683	1.17	1.103	7.065
Operation	3778	0.12	0.074	0.85	6.479	4.324
Profit	3766	0.24	0.404	0.68	1.472	3.633

5.2 Empirical Analysis of Influencing Factors on Financial Distress of Garden and Construction Enterprises

5.2.1 Empirical Analysis of Impact of PPP Projects on Financial Distress of Garden and Construction Enterprises

As presented in Table 5-3, the analysis demonstrates a significant negative relationship between the participation in PPP projects (PPP) and the financial distress variables of listed garden and construction companies. This indicates that when these companies engage in PPP projects, their financial distress tends to be more pronounced.

The findings suggest that the involvement of listed garden and construction companies in PPP projects is associated with increased financial distress. This insight contributes to a deeper understanding of the impact of PPP projects on the financial well-being of companies operating in the garden and construction industry.[1]

Table 5-3Regression analysis of PPP projects on the financial distress of listed garden and construction enterprises

Variables	Coefficient (standard deviation)
PPP	7.415 * * *
	(0.809)
Asset	7.557 * * *
	(0.346)
Operation	1.961 * * *
	(0.284)
Profit	1.157 * * *
	(0.359)
Constant	26.300 * * *
	(1.213)
Obs	3766

[1] Note: ***, ** and * represent rejection of the null hypothesis at the significance level of 1%, 5% and 10%, respectively.

R-squared	0.1285

5.2.2Empirical Analysis of Influencing Factors on Financial Distress of Garden and Construction Enterprises

As depicted in Table 5-4, the analysis reveals a significant negative association between the local government debt ratio (LGDefault) and the financial distress variables of listed garden and construction companies. This indicates that as the debt level of local governments increases, the financial distress of these companies also intensifies.

These findings suggest that the financial well-being of listed garden and construction companies is adversely affected by higher local government debt levels. This insight contributes to a better understanding of the relationship between local government debt and the financial distress experienced by companies in the garden and construction sector.

Table 5-4Regression analysis of local government debt ratio on the financial distress of listed garden and construction enterprises

Variables	Coefficient (standard deviation)
LGDefault	2.761 * * *
	(0.257)
Asset	10.070 * * *
	(0.452)
Operation	1.521 * * *
	(0.374)
Profit	0.767 *
	(0.458)
Constant	32.170 * * *
	(1.468)
Obs	3766
R-squared	0.167

5.2.3 Empirical Analysis of Impact of Real Estate Industry on Financial Distress of Garden and Construction Enterprises

In Table 5-5, the empirical analysis examines the impact of the real estate industry on the financial distress of garden and construction enterprises. Prior to 2019, the variable indicating whether the main business is related to the real estate industry (RealEstate) shows a significant positive correlation with financial distress. However, after 2019, the correlation becomes negative, although not statistically significant. These findings suggest that since 2011, although the real estate industry exhibits typical cyclical characteristics, its negative financial impact on downstream listed garden and construction companies has been limited.

These results indicate a changing relationship between the real estate industry and the financial distress of garden and construction enterprises over time. Before 2019, a stronger connection to the real estate industry was associated with higher financial distress. However, in the later period, this relationship became negative, implying that the negative financial impact from the real estate industry on listed garden and construction companies has weakened. This analysis provides valuable insights into the evolving dynamics and mitigating factors affecting the financial well-being of garden and construction companies in relation to the real estate industry.

Table 5-5Regression analysis of real estate industry on financial distress of listed garden and construction enterprises

Variables	Coefficient (standard deviation) (1) Total sample	Coefficient (standard deviation) (2) Before 2019	Coefficient (standard deviation) (3) After 2019
RealEstate	0.254 * * * (0.074)	0.469 * * * (0.073)	0.188 (0.130)

Asset	0.122 * * * (0.016)	0.146 * * * (0.016)	0.081 * * * (0.016)
Operation	0.516 * * * (0.014)	0.630 * * * (0.018)	0.436 * * * (0.009)
Profit	0.074 * * * (0.019)	0.147 * * * (0.022)	0.092 * * * (0.012)
Constant	0.948 * * * (0.061)	0.844 * * * (0.061)	1.0280 * * * (0.082)
Obs	3766	2534	1232
R-squared	0.671	0.695	0.533

5.2.4 Empirical Analysis of Impact of Strategic Radical Degree on Financial Distress of Garden and Construction Enterprises

Table 5-6 presents the results of the empirical analysis, indicating a significant negative relationship between the degree of strategic radicalism and financial distress at a 1% level of significance. This suggests that higher levels of strategic radicalism are associated with greater financial distress among listed garden and construction companies.

Table 5-6Regression analysis of strategic radical degree on financial distress of listed garden and construction enterprises

variable	Coefficient (standard deviation)
Strategy	1.487 * * * (0.280)
Asset	8.103 * * * (0.415)
Operation	2.410 * * * (0.444)
Profit	0.996 * (0.551)
Constant	21.920 * * * (2.105)
Obs	3766

R-squared	0.146

5.2.5 Empirical Analysis of Impact of Affiliated Transactions on Financial Distress of Garden and Construction Enterprises

Table 5-7 indicates a positive correlation between affiliated transactions (Relation) and the variables of financial distress, although the relationship is not statistically significant.

Table 5-7Regression analysis of affiliated transactions on the financial distress of listed garden and construction enterprises

Variables	Coefficient (standard deviation)
Relation	0.059 (1.023)
Asset	6.382 * * * (0.330)
Operation	2.298 * * * (0.355)
Profit	1.094 * * (0.431)
Constant	23.680 * * * (1.267)
Obs	3766
R-squared	0.117

5.2.6 Empirical Analysis of Impact of Affiliated Transactions on Financial Distress of Garden and Construction Enterprises

In this section, the impact of ownership structure on the financial distress of garden and construction enterprises is examined, with variables such as the shareholding ratio of the largest shareholder (LargeHolder) and the executive ownership ratio (ManageHolder). Control variables include assets, profitability, and operational capacity.

Table 5-8 reveals that the shareholding ratio of the largest shareholder exhibits a significant positive correlation with the financial distress of listed garden and construction companies. This suggests that a higher shareholding ratio of the largest shareholder is associated with lower financial distress. The reason behind this relationship lies in the greater concern and involvement of the largest shareholder in the company, leading to reduced agency costs and subsequently lower financial distress.

Furthermore, the executive ownership ratio demonstrates a significant positive correlation with financial distress, indicating that equity incentives for senior executives in listed garden and construction companies can help alleviate financial distress.

Additionally, when considering the nature of the company, the samples are divided into two sub-samples: state-owned enterprises and private enterprises. Regardless of the type of ownership, higher concentration of the largest shareholders' equity and greater equity incentives for senior executives contribute to the reduction of financial distress.

Table 5-8Regression analysis of ownership structure on financial distress of listed garden and construction enterprises

Variables	Coefficient (standard deviation) (1) Total sample	Coefficient (standard deviation) (2) National sample	Coefficient (standard deviation) (3) Private sample
LargeHolder	19.990 * * * (3.773)	17.880 * * * (4.476)	1.8190 * * * (0.297)
ManageHolder	17.630 * * * (2.912)	19.580 * * * (5.035)	0.177 * (0.105)
Asset	7.064 * * * (0.328)	7.865 * * * (0.387)	0.071 * * * (0.027)
Operation	1.670 * * * (0.295)	1.955 * * * (0.373)	0.471 * * * (0.016)

Profit	0.949 * * *	1.142 * *	0.056 * * *
	(0.366)	(0.455)	(0.020)
Constant	33.080 * * *	35.490 * * *	0.634 * * *
	(2.420)	(2.856)	(0.201)
Obs	3766	2916	850
R-squared	0.129	0.144	0.682

5.2.7 Summary of Regression Analysis

The regression analysis conducted in this study revealed significant relationships between various variables and the financial distress indicator. Specifically, variables such as "Whether there are PPP projects" (PPP), "local government debt ratio" (LGDefault), "whether the main business is related to the real estate industry" (RealEstate), "degree of strategic radicalism" (Strategy), "shareholding ratio of the largest shareholder" (LargeHolder), and "executive ownership ratio" (ManageHolder) exhibited strong significance in relation to financial distress.

Table 5-9 provides a summary of the regression analysis results, confirming the findings obtained from the previous analysis. These results contribute to a better understanding of the factors influencing financial distress in the garden and construction industry.

Table 5-9Summary regression analysis

Variables	Coefficient (standard deviation)
PPP	9.968 * * *
	(1.671)
LGDefault	0.044 * * *
	(0.005)
RealEstate	5.386 * *
	(2.568)
Strategy	0.772 *
	(0.442)
LargeHolder	29.230 * * *
	(7.029)
ManageHolder	25.230 * * *
	(6.305)

Asset	16.470 * * * (0.705)
Operation	1.316 * * (0.609)
Profit	0.995 (0.725)
Constant	72.85 * * * (4.698)
Obs	3766
R-squared	0.259

As presented in Table 5-10, the variables "PPP" (Whether there are PPP projects), "whether the main business is related to the real estate industry," "degree of strategic radicalism," "shareholding ratio of the largest shareholder," and "executive ownership ratio" exhibit comparable magnitudes of influence on the financial distress indicator. Notably, PPP projects demonstrate the greatest impact among these variables. On the other hand, the local government debt ratio appears to have the weakest influence on financial distress. These findings provide valuable insights into the relative importance of these factors in contributing to financial distress in the garden and construction industry.

Table 5-10Analysis of economic effects of factors influencing financial distress

Variables	Regression coefficient	Sample standard deviation of variables	Regression coefficient * sample standard deviation of variables
PPP	9.968	0.44	4.386
LGDefault	0.044	1.68	0.074
RealEstate	5.386	0.48	2.585
Strategy	0.772	1.75	1.351
LargeHolder	29.23	0.14	4.092
ManageHolder	25.23	0.13	3.280

Asset	16.47	1.17	19.270
Operation	1.316	0.85	1.119
Profit	0.995	0.68	0.677
Constant	72.85		

5.3 Endogeneity Test and Robustness Test

5.3.1 Endogeneity Test

To address the potential issue of endogeneity between the significant variables and financial distress, an endogeneity test is conducted in this section. The lagged values of the aforementioned variables are selected as instrumental variables to test for endogeneity. It is important to note that the variable "local government debt ratio" is considered an exogenous variable, eliminating the need for an endogeneity test. However, for the other variables that are not exogenous, there is a possibility of endogeneity. Therefore, one lag period of these variables is employed as instrumental variables to perform the endogeneity test.

The results of the endogeneity test regression, as presented in Table 5-11, align with the previous regression results and indicate the absence of endogeneity issues. These findings provide additional support to the robustness and reliability of the results obtained from the previous analyses.

Please note that it is essential to address endogeneity concerns to ensure the validity of the empirical findings. Conducting endogeneity tests helps to mitigate potential biases and enhances the credibility of the research outcomes.[2]

Table 5-11Endogeneity test of main factors affecting financial distress of listed garden and construction enterprises

[2] This paper has made some attempts on the possible endogeneity problem, but there are still many imperfections, such as inability to considering the possibility of missing variables.

variable	Coefficient (standard deviation)
l.PPP	9.918 * * *
	(1.326)
l.RealEstate	5.394 * *
	(2.389)
l.Strategy	0.849 * *
	(0.336)
l. LargeHolder	28.450 * * *
	(5.941)
l. ManageHolder	23.990 * * *
	(4.526)
Asset	12.180 * * *
	(0.555)
Operation	2.170 * * *
	(0.532)
Profit	1.478 * *
	(0.607)
Constant	52.260 * * *
	(3.848)
Obs	3650
R-squared	0.204

5.3.2 Robustness test

In order to ensure the robustness of the analysis on the factors influencing the financial distress of listed garden and construction companies, this section conducts a robustness test by replacing the dependent variable with an alternative variable. Following the approach employed by Hu and Peng (2018), the asset-liability ratio, which reflects the debt-paying ability, is chosen as the alternative variable for financial distress. A higher asset-liability ratio indicates increased debt repayment pressure and greater financial distress.

The findings demonstrate that "whether there are PPP projects," "local government debt ratio," "whether the main business is related to the real estate industry," "degree of strategic

radicalism," "shareholding ratio of the largest shareholder," and "executive ownership ratio" have significant impacts on financial distress. To ensure the robustness of these results, this paper conducts a robustness test on these variables, and the regression results align with the previous findings, further strengthening the validity and reliability of the research outcomes.

By conducting a robustness test, this study addresses the potential concerns regarding the choice of dependent variable and confirms the consistent impact of the examined variables on financial distress. This robustness test contributes to the overall robustness and credibility of the empirical analysis.

Table 5-12Robustness test of factors influencing financial distress of listed garden and construction companies (1)

Variables	Coefficient (standard deviation)
PPP	0.0341 * * *
	(0.0071)
LGDefault	0.0002 * * *
	(2.38 e-05)
RealEstate	0.0619 * * *
	(0.0128)
Strategy	0.0044 * *
	(0.0022)
LargeHolder	0.1270 * * *
	(0.0351)
ManageHolder	0.2390 * * *
	(0.0315)
Asset	0.0986 * * *
	(0.0035)
Operation	0.0284 * * *
	(0.0030)
Profit	0.0229 * * *
	(0.0036)
Constant	0.2450 * * *
	(0.0235)
Obs	3766
R-squared	0.448

Additionally, in this section, a critical value of 0.5 is selected to categorize the Zscore values. If the Zscore is less than 0.5, it indicates that the listed company is experiencing significant financial distress at that time, denoted as "1". On the other hand, if the Zscore is greater than 0.5, it suggests that the listed company is not facing severe financial distress, denoted as "0". By classifying the Zscore values in this manner, a new variable called Zscore_Update is created. This variable is used in a logit regression to conduct a robustness test. The regression results, presented in Table 5-13, reveal that, with the exception of ManageHolder, which is not statistically significant, all other explanatory variables demonstrate significance for Zscore_Update and successfully pass the robustness test.

By employing the Zscore_Update variable in the logit regression and observing the significance of the explanatory variables, this study validates the robustness of the findings. It should be noted that while all variables, except for ManageHolder, display significance in influencing Zscore_Update, further examination may be required to explore the reasons behind the non-significant relationship with ManageHolder. Overall, these results strengthen the robustness of the analysis and reinforce the reliability of the conclusions drawn from the research.

Table 5-13Robustness test of factors influencing financial distress of listed garden construction companies (2)

Variables	Coefficient (standard deviation)
PPP	1.086 * * * (0.160)
LGDefault	0.00159 * * * (0.000467)
RealEstate	1.024 * * * (0.136)
Strategy	0.0578 *

	(0.0354)
LargeHolder	2.794 * * *
	(0.458)
ManageHolder	0.617
	(0.618)
	0.322 * * *
Asset	(0.0674)
Operation	1.301 * * *
	(0.101)
Profit	0.346 * * *
	(0.0950)
Constant	0.890 * * *
	(0.300)
Obs	3766
Psuedo R-squared	0.180

5.4 Summary

In this chapter, the empirical analysis of the garden and construction industry using a fixed-effect panel model has led to several significant findings. The conclusions drawn from the study are as follows:

(1)The involvement of garden and construction industry companies in PPP projects increases their level of financial distress.

(2)The higher the debt ratio of the local government in which the listed garden and construction companies are registered, the greater their financial distress.

(3)Companies in the garden and construction industry, whose main business is related to the real estate industry, can mitigate their financial difficulties in the initial stages. However, they are unable to reduce their financial distress when the real estate industry weakens after 2019.

(4)Listed garden and construction companies with more aggressive strategic approaches experience greater financial distress.

(5)The higher the shareholding ratio of the controlling shareholder, the lower the financial distress of garden and construction companies. However, the robustness test indicates that the influence of executive equity incentives on financial distress is inconclusive.

(6)The impact of affiliated transactions on the financial distress of listed garden and construction companies remains uncertain.

Furthermore, this chapter has employed the instrumental variable method to test the endogeneity of the aforementioned variables. The results indicate no significant endogeneity issues. Additionally, the robustness test, which involved replacing the explained variable, further validated the findings of the study. All the variables examined in the analysis passed the endogeneity test and the robustness test, strengthening the reliability of the research conclusions.

Overall, this chapter provides valuable insights into the factors influencing the financial distress of the garden and construction industry, contributing to the existing body of knowledge in this field.

Chapter 6: Event Analysis of Impact of Green Bonds on Financial Distress of Garden and Construction Enterprises

6.1 Policy Background of Listed Garden and Construction enterprises Issuing Green Bonds

At the national level, the establishment of the green finance system by The State Council in September 2015 laid the foundation for the development of green bonds. As a crucial component of the green finance system, green bonds witnessed rapid growth. Towards the end of 2015, the government introduced various policies to facilitate the growth of green bonds, such as the Catalogue of Projects Supported by Green Bonds and the Guidelines on the Issuance of Green Bonds. These policies provided strong support and guidance from the government, consequently fostering an active green bond market.

China's green bond market follows a "top-down" approach in its development. The issuance of policies and the establishment of an improved system have played significant roles in promoting the issuance of green bonds. In January 2016, the first green finance bond was issued in China, marking an important milestone in the development of the market.

Compared to conventional bonds, green bonds have distinctive characteristics. They are securities with defined limitations on the use of raised funds. Existing green bonds in the market possess four notable features: clear utilization of funds, high credit ratings, flexible bond maturity structures, and lower financing costs. These attributes make green bonds an attractive financing option for issuers.

By analyzing the impact of green bonds on the financial distress of garden and construction

enterprises, this chapter aims to provide valuable insights into the effectiveness of green bond issuance in alleviating financial difficulties within the industry.

(1) Funds raised are dedicated to low-carbon environmental protection projects

The funds raised through green bonds are specifically designated for low-carbon environmental protection projects. These projects primarily focus on supporting clean energy initiatives. Based on classified statistics from the Chinese Financial Information Network, approximately 46.84% of the funds raised through green bonds in 2021 were allocated to clean energy projects. These projects mainly involve the construction and operation of wind power and photovoltaic facilities. Additionally, around 21.77% of the funds were invested in green transportation projects, with a particular emphasis on rail transit initiatives. Other sectors accounted for a relatively smaller proportion of the funds.

The purpose of green bond funds is well-defined and transparent. Issuing entities are strictly prohibited from altering the designated purpose of the raised funds. During the fundraising process and throughout the duration of the green bond, issuers are required to disclose the purpose and utilization of the funds. They must establish independent accounts for fund custody and provide detailed information on fund utilization through a third-party intermediary. This information is then published on the website designated by the China Securities Regulatory Commission (CSRC). These measures aim to enhance transparency regarding the projects and the bonds themselves, thereby instilling confidence among investors.

(2) High credit rating of bonds

In general, issuers of green bonds tend to have relatively high credit ratings. Credit rating

agencies conduct comprehensive assessments of the issuers, considering both internal and external factors that may pose potential risks to their repayment ability. These agencies analyze various aspects and evaluate whether these factors will impact the issuer's ability to fulfill their repayment obligations. Upon completing the evaluation, the credit rating agencies issue credit rating reports.

One significant difference between green bonds and ordinary bonds lies in the requirement for third-party green certification. Green bonds must undergo certification by an independent green certification agency to ensure that the projects financed by these bonds fall within the purview of green certification. This rigorous evaluation process scrutinizes the utilization of the raised funds. Additionally, issuers of green bonds are obligated to provide regular annual reports throughout the bond's duration. These measures contribute to the relatively high credit rating of green bonds.

Overall, the stringent evaluation process, including third-party certification and regular reporting, enhances the credibility and reliability of green bonds, resulting in higher credit ratings for these instruments.

(3) The maturity structure of the bond is flexible

The term structure of green bonds is flexible. For example, fresh bonds adopt the "3+2" interest rate term issuance mode, and the interest rate is lower than that of ordinary bonds. The interest rate term of green bonds can be selected according to the short, medium and long term of the project construction cycle. The weighted average issuance term of green bonds issued in 2020 is about 5 years, an increase of about 11% compared with 2019. The number of green

bonds issued in different maturities is shown in Table 6-1:

Table 6-1Statistics of Chinese green bond issuance duration in 2020

Term of issue	Number of bonds (only)	Quantity as a percentage	Issuance size (100 million RMB)	Proportion of size
Within 1 year	6	3.20%	36.5	1.90%
1 to 5 years	129	68.60%	1361.2	72.20%
6 to 10 years	50	26.60%	431.8	22.90%
10 + years	3	1.60%	55	2.90%
Total	188	100%	1884.5	100%

In terms of the term structure, the majority of green bonds issued in 2020 had maturities ranging from one to five years, accounting for a significant proportion of the total number of bonds (129 bonds, representing 68.6% of the total) and total value (72.2% of the total size). The second-largest category was green bonds with maturities of six to ten years, which had a substantial number of bonds and size, although slightly less than those with maturities of one to five years. This indicates that the term structure of green bonds is predominantly focused on the medium term, encompassing both shorter and longer durations, and exhibits flexibility in its overall composition.

In summary, the term structure of green bonds in 2020 demonstrates a preference for medium-term maturities, with a notable presence of bonds in the one to five-year range, followed closely by bonds in the six to ten-year range. This diverse term structure reflects the flexibility in meeting the financing needs of green projects while accommodating the preferences of issuers and investors.

(4) Low financing cost

An increasing number of enterprises are now choosing green bonds as a new debt financing

tool. Green bonds offer several advantages over traditional bank loans and conventional bond issuances. Firstly, by utilizing green bonds, enterprises can fulfill their social responsibility by contributing to environmental protection, energy conservation, and emission reduction efforts. This aligns with the national policies and regulations promoting sustainable development.

Secondly, issuing green bonds can help reduce the initial issuance cost for enterprises. The funds raised through green bonds are specifically allocated to support the construction of green projects and the development of environmentally friendly industries. This alignment with the national strategy for green and sustainable development carries positive externalities for the environment. Consequently, issuing green bonds often receives support from the government and benefits from favorable tax policies. Additionally, due to their high level of transparency in information disclosure, green bonds are highly regarded by investors. This transparency reduces the risk premium demanded by investors, leading to lower issuance costs.

In summary, green bonds offer a dual advantage for enterprises by enabling them to fulfill their social responsibility while also enjoying cost-saving benefits. By supporting green projects and aligning with national policies, enterprises can receive government support and tax incentives. Moreover, the high level of transparency in green bond issuances enhances investor confidence, leading to lower interest rates and reduced issuance costs.

6.2 Market Reaction Analysis Model

This chapter employs the event study method to investigate the market reaction to the issuance of green bonds by two prominent companies in the garden and construction industry: Orient Garden (002310) and Inner Mongolia M-Grass Ecology And Environment (Group)

Co.,Ltd. (referred to as IMMEE, 300355). The objective is to analyze the changes in stock prices by calculating the excess return and cumulative excess return during the green bond issuance period. This analysis aims to determine whether the issuance of green bonds attracts investor attention in the stock market and whether the green bond label enhances the attractiveness of the companies' stocks. The following steps are undertaken:

(1) Determination of Event Date, Window Period, and Estimated Period:The event date is the specific date when each company issued its green bonds.The window period encompasses several days before and after the event date, providing a timeframe for analyzing stock price movements.The estimated period is utilized to estimate the expected return, serving as a benchmark for assessing market reactions.

(2) Selection of Market Model Method for Expected Return Estimation:The expected return is estimated using the market model approach.

The equation for estimating the expected return can be represented as formula 6-1:

$$E_{rt} = \alpha + \beta R_{mt} \tag{6-1}$$

The explanatory variable R_{mt} in this analysis represents the market return, while the explained variable E_{rt} represents the expected return of individual stocks. The daily return rates of the listed companies and the market return rates of the Chinese Securities circulation index are obtained from the Guotaian database. The regression analysis is performed using the least squares method, using the return rates of individual stocks and market return rates within the estimation window.

To calculate the excess return rate (AR) and cumulative excess return rate (CAR), the

following steps are taken:

(1) Utilize the market model to obtain the expected return rate by substituting the market return rate within the event window into the formula mentioned earlier.

(2) Calculate the excess return rate (AR), which is the difference between the actual return rate and the expected return rate during the event window.

(3) Compute the cumulative excess return rate (CAR) by accumulating the excess return rates (AR) over the window period.

By performing these calculations, the excess return rate (AR) and cumulative excess return rate (CAR) can be determined. These metrics provide valuable insights into the differences between actual and expected return rates during the event window and the cumulative effect of these differences over the specified period.

Please note that the Guotaian database is used to obtain the necessary return rate data for the analysis, and the least squares method is employed for the regression analysis of the return rates. These steps help to quantify the market reaction to the issuance of green bonds by Orient Garden and IMMEE, allowing for a comprehensive evaluation of stock price movements and investor response during the event period.

6.3 Market Reaction Analysis of Orient Garden Issuing Green Bonds

1. Take December 18, 2020 as the event date for analysis

(1) Determine the event date, window period and estimated period

On December 18, 2020, Orient Garden announced the issuance of its first phase of green corporate bonds to qualified investors. The issuance had a maximum scale of 1 billion RMB,

and each bond was priced at 100 RMB. The issuance process involved online inquiry and allotment to qualified investors. The actual issuance took place from December 22, 2020, to December 23, 2020. These bonds had a coupon rate of 5.20% and a term of 5 years.

In the event analysis, we consider December 18, 2020, as the event date, which marks the announcement of Orient Garden's green corporate bond issuance. We designate this day as day 0. The event window spans 5 trading days before and after the event date, from December 11, 2020, to December 25, 2020, denoted as [-5, 5]. The suspension date, if any, will be excluded from this window. It is assumed that no other major events influenced the company's stock price during this period. Furthermore, we take the period of 120 days preceding the event window, specifically from [-150, -30], as the estimated period. The suspension date is also excluded from this period.

（1）Select the market model method to estimate the expected earnings

The least square method is adopted for regression analysis of the model, and the regression equation of the expected return rate is obtained as Formula 6-2:

$$E_{rt} = -0.0017 + 0.5819 * R_{mt} \tag{6-2}$$

Table 6-2 Regression results of green bonds issued by Orient Garden and comprehensive return rates of Shanghai and Shenzhen A-share markets

Variables	Coefficient	T-statistics	P-values
α	- 0.0017	1.2900	0.1990
β	0.5819	5.9200	0.0000
F statistics		35.0100	
P value		0.0000	

（2）Calculate the excess return AR and the cumulative excess return CAR. According

to the market model, the expected return rate of Orient Garden can be obtained by substituting the market return rate within the event window into the above formula, and then the excess rate of return AR and cumulative excess rate of return CAR can be calculated.

Table6-3Regression results of window yield of green bonds issued by Orient Garden and comprehensive yield of Shanghai and Shenzhen A-share markets

Time	AR	CAR	Time	AR	CAR
-5	0.0022	0.0022	1	0.0069	0.0345
-4	0.0076	0.0054	2	0.0072	0.0417
- 3	0.0050	0.0004	3	0.0134	0.0551
-2	0.0080	0.0076	4	0.0468	0.1019
-1	0.0171	0.0246	5	0.0059	0.1078
0	0.0030	0.0276			

In order to assess whether the excess yield is a result of the issuance of green bonds, a T-test was conducted on the cumulative excess return (CAR) to determine the significance of the difference between CAR and 0. The obtained P-value of the test result is 0.0116, which is less than the significance level of 0.05. As a result, the null hypothesis is rejected, suggesting that the issuance of green bonds indeed leads to certain changes in the company's stock price.

Table 6-3 and Figure 6-1 present the findings for the entire event window. It can be observed that the excess return rate exhibits a positive excess rate of return on the fifth and fourth days prior to the event, while showing a negative excess return rate on the third day before the event. Throughout the entire event window, the cumulative excess return is calculated to be -0.1078. These results indicate that the issuance of green bonds by Orient Garden briefly caused an increase in the company's stock price. However, overall, the issuance

did not significantly raise the company's stock price, and investors even displayed a pessimistic attitude towards the green bond issuance by Orient Garden.

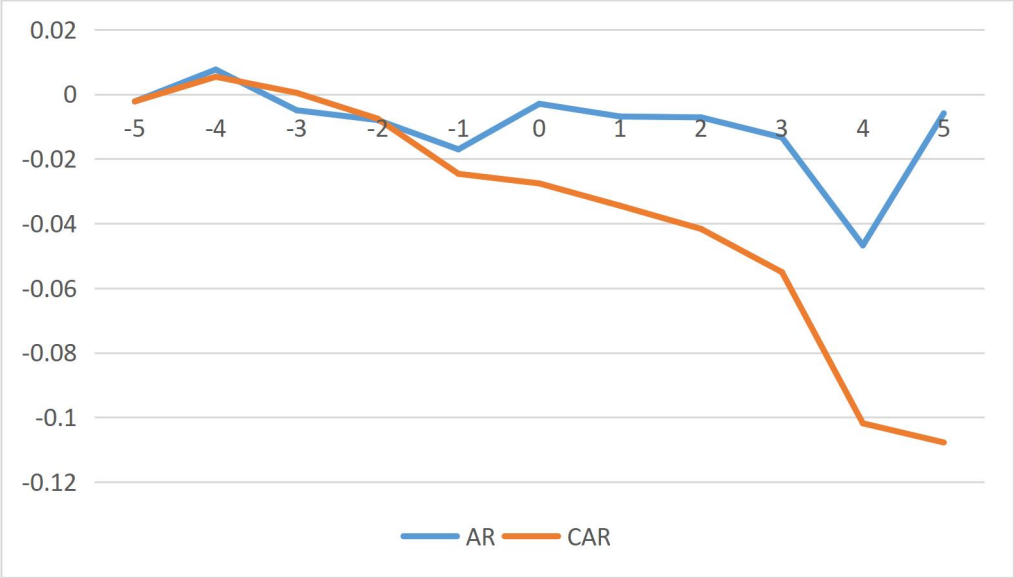

Figure 6-1AR and CAR trends in the event window with the green bond announcement issued by Orient Garden as the event day

2. Take December 21, 2021 as the event day for analysis

(1) Determine the event date, window period and estimated period

December 21, 2021, the first interest payment date of green corporate bonds of Orient Garden, is taken as the event date. We set this day as 0. The event window are between 5 trading days before and after the event date from December 14, 2020 to December 28, 2020, briefly recorded as [-5, 5], excluding the suspension date. It is proposed that there are no other major events affecting the company's stock price in this time, and 120 days before the event window is taken as the estimated period [-150, -30], excluding the suspension date.

（3）Select the market model method to estimate the expected earnings

The least square method is adopted for regression analysis of the model, and the regression equation of the expected return rate is obtained as Formula 6-3:

$$E_{rt} = -0.0023 + 0.6750 * R_{mt} \quad (6\text{-}3)$$

Table 6-4Regression results of the first interest payment of Orient Garden Yield and the comprehensive return rate of Shanghai and Shenzhen A-share markets

Variables	Coefficient	T-statistics	P-values
α	0.0023	1.1900	0.2320
β	0.6750	3.1600	0.0020
F statistic		10.0000	
P value		0.0000	

（4）Calculate the excess return AR and the cumulative excess return CAR. According to the market model, the expected rate of return of Orient Garden can be obtained by substituting the market return rate within the event window into the above formula, and then the excess return rate AR and cumulative excess rate of return CAR can be calculated.

Table 6-5Regression results of the return rate of the first interest payment window period of Orient Garden and the comprehensive return rate of Shanghai and Shenzhen A-share markets

Time	AR	CAR	Time	AR	CAR
-5	0.0085	0.0085	1	0.0119	0.1116
-4	0.0227	0.0312	2	0.0202	0.0914
- 3	0.0317	0.0630	3	0.0014	0.0900
-2	0.0038	0.0668	4	0.0022	0.0922
-1	0.0145	0.0813	5	0.0112	0.0809
0	0.0422	0.1235			

In order to judge whether the excess yield is caused by Orient Garden's first redemption of its green bond interest event, we also conduct T test on CAR to determine the significant difference between CAR and 0, and the test result P value is 0.0000 less than 0.05, rejecting the null hypothesis. It indicates that the event of Orient Garden's first payment of its green bond

interest did cause certain changes in the company's stock price.

As shown in Table 6-5 and Figure 6-2, the excess return rate was positive on the date of the event and in the previous few days, and the excess return rate reached the maximum on the date of the event. After the event date, the excess return gradually starts to turn negative. The cumulative excess return over the entire event window period is 0.0809. This shows that Orient Garden can significantly improve the company's stock price by paying the interest of its green bond on time.

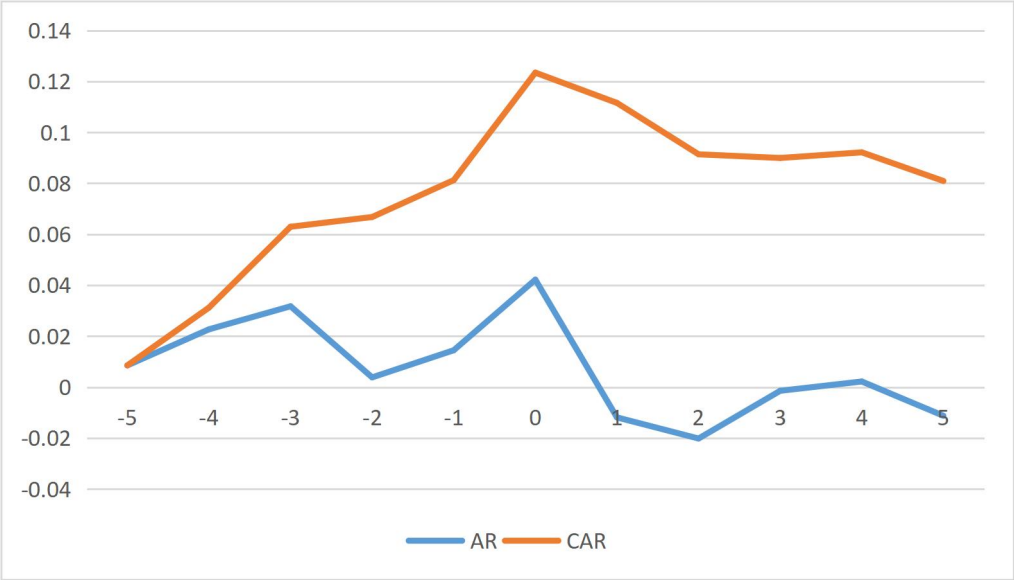

Figure 6-2AR and CAR trends in the event window with the announcement of Orient Garden's first payment of green bond interest as the event day

3. Take December 19, 2022 as the event date for analysis

(1) Determine the event date, window period and estimated period

December 19, 2022, the second interest payment date of green corporate bonds of Orient Garden, is taken as the event date. We set this day as 0. The event window are between 5 trading days before and after the event date from December 09, 2022 to December 23, 2022, briefly recorded as [-5, 5], excluding the suspension date. It is proposed that there are no other

major events affecting the company's stock price in this time, and 120 days before the event window is taken as the estimated period [-150, -30], excluding the suspension date.

(2) Select the market model method to estimate the expected earnings

The least square method is adopted for regression analysis of the model, and the regression equation of the expected return rate is obtained as Formula 6-4:

$$E_{rt} = -0.0003 + 0.9669 * R_{mt} \quad (6\text{-}4)$$

Table 6-6Regression results of the second interest payment of Orient Garden Yield Rate and the comprehensive return rate of Shanghai and Shenzhen A-share markets

Variables	Coefficient	T-statistics	P-values
α	0.0003	0.4600	0.8650
β	0.9669	6.4700	0.0000
F statistics		35.6000	
P value		0.0000	

(3) Calculate the excess return AR and cumulative excess return CAR

According to the market model, the expected return rate of Orient Garden can be obtained by substituting the market return rate within the event window into the above formula, and then the excess rate of return AR and cumulative excess rate of return CAR can be calculated.

Table 6-7Regression results of the return rate of the second interest payment window period of Orient Garden and the comprehensive return rate of Shanghai and Shenzhen A-share markets

Time	AR	CAR	Time	AR	CAR
-5	0.0031	0.0031	1	0.0117	0.0209
-4	0.0072	0.0104	2	0.0140	0.0069
- 3	0.0261	0.0157	3	0.0060	0.0128
-2	0.0259	0.0101	4	0.0016	0.0112
-1	0.0068	0.0033	5	0.0135	0.0023

0	0.0058	0.0091

To assess whether the excess rate of return can be attributed to Orient Garden's second payment of its green bond interest event, a T-test is conducted on the Cumulative Abnormal Return (CAR) against a null hypothesis of zero difference. The test result yields a P-value of 0.0002, which is less than the significance level of 0.05. Consequently, the null hypothesis is rejected, indicating that Orient Garden's second payment of its green bond interest did indeed have a significant impact on the company's stock price.

As depicted in Table 6-7 and Figure 6-3, the excess return rate fluctuates around zero throughout the entire event window, albeit with positive results. The cumulative excess return for the entire event window is calculated as 0.0023. These findings suggest that Orient Garden's second scheduled interest payment for its green bond also had a notable effect on the company's stock price, although it was not as pronounced as the impact observed during the first interest payment event.

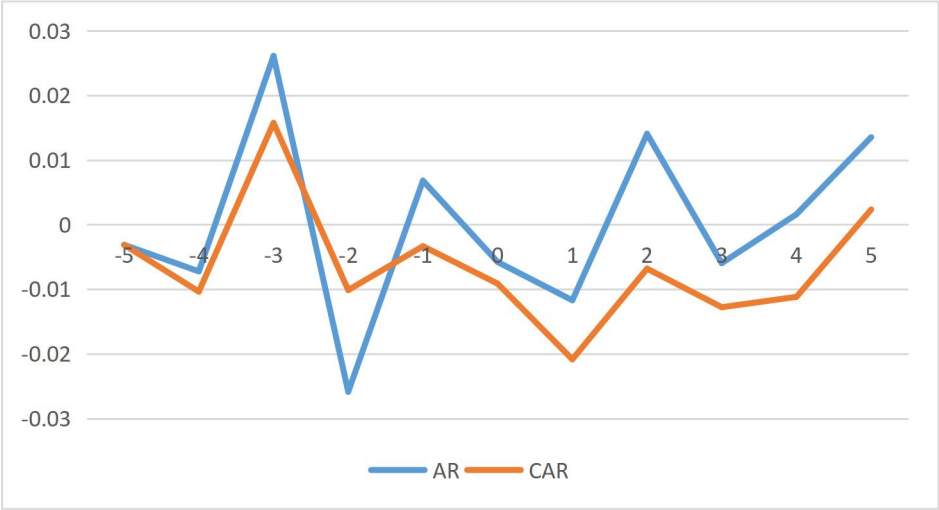

Figure 6-3AR and CAR trends in the event window with the announcement of Orient Garden's second payment of green bond interest as the event day

On May 21, 2018, Orient Garden made an announcement stating that the issuance scale of

the 2018 corporate bonds (the first phase) would not exceed 1 billion RMB. However, in the end, only 50 million RMB worth of bonds were issued. This limited the debt financing options for Orient Garden, leading to significant challenges in securing adequate funding. By the end of 2018, Orient Garden's interest-bearing liabilities had accumulated to approximately 10.386 billion RMB. The situation worsened by the end of 2020, with the company's current liabilities reaching 23.508 billion RMB, including 4.282 billion RMB in short-term liabilities. Unfortunately, the available currency cash amounted to only 1.522 billion RMB.

In the face of this substantial debt repayment pressure, Orient Garden's ability to timely pay the interest on its green bond can be seen as a positive signal by the market. This achievement enhances investor confidence in Orient Garden. This positive market sentiment is reflected in the cumulative excess rate of return observed during the interest event window of the first redemption of its green bonds. However, as the debt dilemma of Orient Garden gradually improved, the excess return rate resulting from the scheduled redemption of its green bond interest decreased.

Based on the above analysis, it is evident that, overall, the issuance of green bonds by Orient Garden has had a positive impact on the company, generating a favorable excess rate of return.

6.4 Market Reaction Analysis of IMMEE Issuing Green Bonds

(1) Determine the event date, window period and estimate period

IMMEE issued green corporate bonds to qualified investors on September 1, 2017. The basic issue amount is 200 million RMB and the overallotment is 50 million RMB. The term is 3

years.

September 1, 2017, the announcement date of IMMEE issuing its green corporate bonds, is taken as the event date. We set this day as 0. The event window are between 5 trading days before and after the event date from August 25, 2017 to September 8, 2017, briefly recorded as [-5, 5], excluding the suspension date. It is proposed that there are no other major events affecting the company's stock price in this time, and 120 days before the event window is taken as the estimated period [-150, -30], excluding the suspension date.

(2) Select the market model method to estimate the expected income

The least square method is used for regression analysis of the model, and the regression equation of the expected return rate is as follows:

$$E_{\mathrm{Rt}} = 0.0003 + 0.9669 * R_{\mathrm{mt}} \tag{6-5}$$

Table 6-8Regression results of the first interest payment of Inner Mongolia eco-rate of return and the comprehensive rate of return of Shanghai and Shenzhen A-share markets

Variables	Coefficient	T-statistics	P-values
α	0.0003	0.1700	0.8650
β	0.9669	5.9700	0.0000
F statistics		35.6000	
P value		0.0000	

(3) Calculate the excess return AR and cumulative excess return CAR. According to the market model, the expected rate of return of green bonds issued by IMMEE can be obtained by substituting the market rate of return within the event window into the above formula, and then the excess rate of return AR and cumulative excess rate of return CAR can be calculated.

Table 6-9Regression results of window rate of return of green bond issued by IMMEE and comprehensive rate of return of Shanghai and Shenzhen A-share markets

Time	AR	CAR	Time	AR	CAR
-5	0.0123	0.0123	1	0.0090	0.0907
-4	0.0057	0.0180	2	0.0159	0.1066
- 3	0.0384	0.0564	3	0.0493	0.0573
-2	0.0108	0.0672	4	0.0033	0.0540
-1	0.0119	0.0553	5	0.0572	0.0032
0	0.0264	0.0816			

To determine whether the excess return rate is influenced by the green bond issuance event of IMMEE, this study conducted a T-test on the cumulative excess return (CAR) and compared it with the null hypothesis value of 0. The resulting P-value of 0.0102, which is less than the significance level of 0.05, indicates that the null hypothesis can be rejected. Hence, it can be concluded that the green bond issuance by IMMEE indeed caused certain changes in the company's stock price.

As presented in Table 6-9 and Figure 6-4, prior to the event date, the excess return rate displayed fluctuations around the zero axis, with both positive and negative values. However, following the event, the excess return rate turned consistently positive, with its value expanding. Moreover, the cumulative excess return during the entire event window amounted to 0.0032, indicating a positive excess return rate. This demonstrates that the issuance of green bonds by IMMEE has had a significant positive impact on the company's stock price.

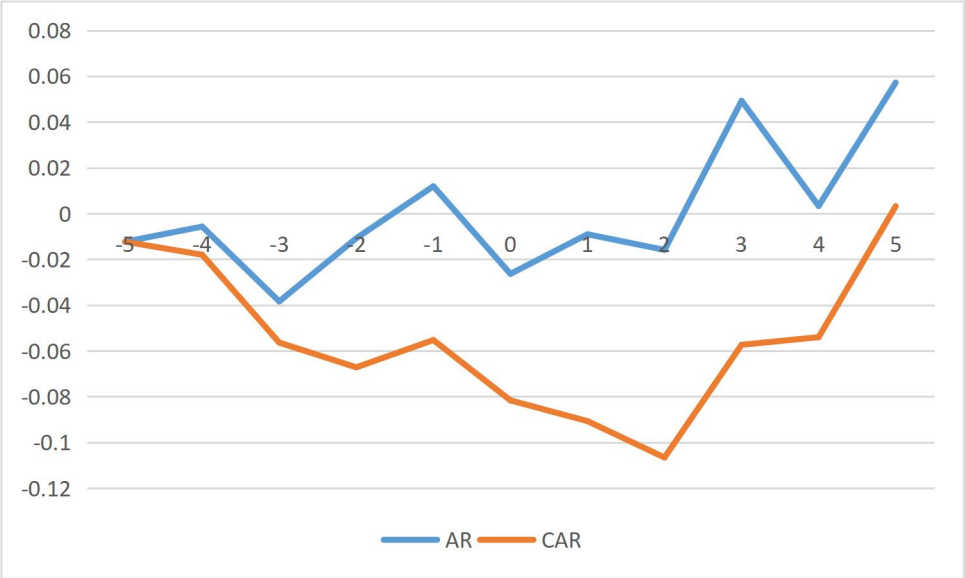

Figure 6-4AR and CAR trends in the event window with the announcement of IMMEE issuing green bonds as the event day

6.5 Analysis of Impact of Green Bond Issuance by Listed Garden Construction Enterprises on Financial Distress

6.5.1 Reduce Financing Costs

From the perspective of Orient Garden themselves, the proportion of financial expenses in the operating income of Orient Garden from 2016 to 2018 has been rising, higher than the average level of the industry. Bank loan is the main financing method of Orient Garden. This indirect financing method has higher interest rate and higher financing cost. According to the historical announcement of the People's Bank Of China, the benchmark interest rate of commercial loans within one year (including one year) will be 4.35% in 2020, the benchmark interest rate of one to five years (including five years) will be 4.75%, and the benchmark interest rate of more than five years will be 4.9%. In 2019, the average interest rate of all kinds of loans of Orient Garden was 7.5%, indicating that the borrowing and financing cost of Orient Garden was high. With the further expansion of the loan scale, the interest expense of

enterprises keeps rising. The higher interest expense will affect the net profit and cash flow of enterprises, and bring certain pressure to the normal operation of enterprises. Therefore, in order to reduce the cost of capital use as far as possible, the use of reasonable low-cost financing is very necessary.

Under the background of policy support, enterprises issuing green bonds not only have high approval efficiency and smooth issuance process, but also can raise funds at a lower interest rate. On December 18, 2020, Orient Garden issued the "Announcement of Green Corporate Bonds (Phase I) Issue for Qualified Investors in 2020". The coupon rate of this bond issue is only 5.20%, which is significantly lower than the bank credit rate in the past, reducing the interest payment burden of Orient Garden.

6.5.2 Easing Maturity Mismatch of Investment and Financing

This paper argues that one of the reasons why Orient Garden issues green bonds is to optimize the debt structure of Orient Garden by using the long-term funds raised by green bonds, alleviate the problem of maturity mismatch of investment and financing, and further stabilize the sources of funds for investment in fixed assets such as ongoing projects. On December 18, 2020, Orient Garden issued its first green bond, which helped to improve its investment and financing term structure mismatch.

6.6 Summary

This chapter analyzed the impact of green bond issuance by Orient Garden and IMMEE, using them as case studies. The event analysis method revealed that green bonds issued by listed garden construction companies can generate positive excess yield and significantly improve

stock prices. This finding demonstrates that green bond issuance has enhanced investors' confidence in these listed companies. The primary reasons behind this positive impact are the reduction in debt financing costs and the mitigation of investment and financing maturity mismatch achieved through green bonds.

Overall, this chapter highlights the positive outcomes associated with green bond issuance by listed garden construction companies, emphasizing the benefits of reduced financing costs and improved alignment between investment and financing.

Chapter 7: Research Conclusions and Policy Suggestions

7.1 Research Conclusions

First and foremost, through the case analysis of Orient Garden, this paper identifies that the financial distress of the company primarily stems from high debt levels and significant investment and financing term mismatches. The key factors contributing to these situations include the term structure mismatch of PPP projects, declining debt repayment capabilities of local governments, an aggressive investment expansion strategy, and internal governance issues within the company.

Furthermore, the empirical analysis yields the following conclusions: (1) Participation of garden and construction industry companies in PPP projects leads to increased financial distress; (2) Higher debt ratios of local governments where the listed garden and construction companies are registered are associated with greater financial distress; (3) Companies in the garden and construction industry, whose main business involves real estate, can alleviate financial difficulties in the early stages but struggle to reduce financial distress amidst a weakened real estate industry after 2019; (4) The more aggressive the strategy of listed garden and construction companies, the higher the financial distress; (5) Higher shareholding ratios of controlling shareholders are associated with lower financial distress for garden and construction companies. The influence of executive equity incentives on financial distress did not pass the robustness test, and the impact of affiliated transactions of listed garden and construction companies on financial distress was not significant.

Lastly, the paper analyzes the market reaction to the green bonds issued by Orient Garden and IMMEE, the only two listed companies in the garden and construction industry that have issued green bonds. It reveals that green bonds can generate positive excess rates of return and significantly improve the stock prices of listed companies. The issuance of green bonds by listed companies in the garden and construction industry boosts investor confidence due to their ability to reduce debt financing costs and address investment and financing term mismatches.

This paper introduces the following main innovations: (1) Existing literature mainly analyzes the causes of financial distress from the perspective of listed companies' internal governance, with limited analysis on the heterogeneity of financial distress in the garden and construction industry. By analyzing the causes of financial distress in this industry, which is a typical traditional capital-intensive industry closely linked to real estate, local government, and national policies, this paper provides research ideas and a basis for traditional capital-intensive enterprises to improve their financial situation. (2) This paper employs event analysis for the first time to analyze the impact of green bonds on the stock prices of listed garden and construction companies, finding that green bond issuance results in positive excess rates of return and increased company value. The main reason behind this is that green bonds alleviate financial distress by reducing financing costs and improving term structures. This perspective offers a policy-driven approach to addressing the financial distress of listed garden and construction companies.

7.2 Policy suggestions

Based on the research conclusions of this paper, the following policy suggestions are

provided, as depicted in Figure 7-1:

(1) Listed companies in the garden and construction industry should prudently engage in PPP projects based on their own financial capacity. Excessive involvement in PPP projects can worsen the investment and financing term structures of garden and construction enterprises.

(2) Companies should seek to collaborate with local governments that exhibit relatively low debt ratios and strong financial capabilities. This will help reduce the spillover effects of local government debt risks on listed companies in the garden and construction industry, thus mitigating the prolonged accounts receivable and subsequent financial distress.

(3) Garden and construction enterprises are suited for an equity structure with relatively high shareholding ratios of the largest shareholders. These enterprises should adopt a steady development strategy, reducing aggressive investments and high-leverage financing.

(4) Encourage listed garden and construction companies involved in environmental protection and public welfare to issue green bonds. This will effectively lower financing costs and alleviate investment and financing term structures.

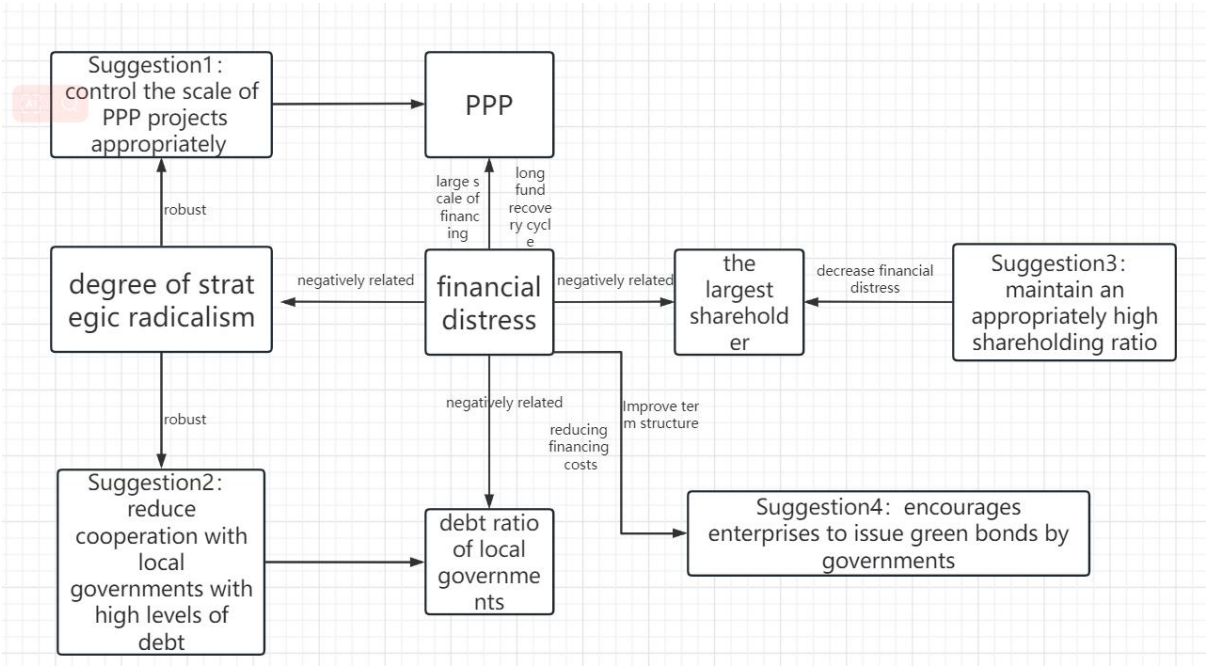

Figure 7-1Logical frame diagram of conclusions and suggestions

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