

Board Characteristics and Internal Control Risk Management in Urban Investment Companies: A Case Study of Guangxi Urban Investment Group

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Abstract

This study explores the relationship between board characteristics and internal control effectiveness and risk management practices in Chinese urban investment companies. Using a mixed research method combining questionnaire surveys and case studies, an empirical study was conducted on 104 urban investment companies, with the Guangxi Urban Investment Group as a case study. The study found that board characteristics are significantly and positively correlated with internal control effectiveness and risk management practices. Among these, the impact of board expertise is the most significant, followed by board independence and diversity. Board size is positively correlated with internal control effectiveness, but has no significant relationship with risk management practices. The study also found that company size has a moderating effect on the relationship between board characteristics and governance practices. This study provides theoretical and practical guidance for the corporate governance of urban investment companies, emphasizing the importance of improving the professionalism, independence and diversity of the board of directors. The study suggests that urban investment companies should adjust the composition of the board of directors according to their size and complexity, and adopt a comprehensive governance framework to integrate internal control and risk management practices. Future research can further explore the relationship between board characteristics, governance practices and company performance, as well as the impact of emerging technologies on the governance requirements of urban investment companies.

Keywords: *Urban Investment Company Governance, Board Characteristics, Internal Control Effectiveness, Enterprise Risk Management, Guangxi Urban Investment Group, Mixed Research Methods.*

Introduction

Research Background

In China's rapidly changing landscape of urban development, urban investment companies have emerged as a bridge between government initiatives and market-driven growth. These companies, commonly referred to as "chengtougongsi" in Chinese, play an important role in the financing and implementation of urban infrastructure projects, making a significant contribution to China's urbanization process (Chen et al., 2020). Operating at the "intersection" of public services and commercial interests, these organizations face different challenges in terms of governance, risk management, and internal control.

recognized by both academics and practitioners. This emphasis is particularly evident after high-profile corporate scandals and financial crises highlighted the potential consequences of poor governance mechanisms (Liao et al., 2019), and regulators around the world have imposed stricter requirements on internal control and risk management practices, and China is no exception.

In 2008, the Ministry of Finance of China, together with other regulatory agencies, issued the Basic Norms for Enterprise Internal Control, and in 2010, issued relevant implementation rules (Li et al., 2014). These regulations have had a significant impact on the governance of Chinese companies, including urban investment companies. Since urban investment companies are both regulated by the government and engaged in market-oriented activities, the dual nature of implementing and optimizing internal control and risk management systems brings both risks and opportunities.

In the process of gradual development and optimization, people have increasingly expected the role of

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corporate boards in shaping organizational results . Board characteristics, including composition, size, independence, diversity, and expertise, have been widely studied in various aspects of corporate performance and governance (Shan & McIver, 2011). However, relevant research on the "unique context" of Chinese city investment companies is still "lacking".

Problem Statement

Urban investment companies play an important role in China's urban development, and their governance mechanisms are increasingly valued, but there is still a lack of comprehensive research to explore the interaction between board characteristics, internal control, and risk management in these unique organizations. Given the unique operating environment of urban investment companies, they often face conflicting pressures from government directives and market forces.

While existing literature explores the impact of board characteristics on various organizational outcomes in different contexts, the specific dynamics within city investment companies still require more exploration , and researchers have many gaps in understanding how board composition and attributes affect the effectiveness of internal controls and risk management in these key entities .

Research Objectives

Overall Objectives

The main purpose of this study is to explore the relationship between the board characteristics, internal control effectiveness and risk management practices of urban investment companies, taking Guangxi Urban Investment Group as an example.

Specific Objectives

- Investigate the current status of internal control and risk management of Guangxi Urban Investment Group.
- Analyze the characteristics of Guangxi Urban Investment Group's board of directors, including board size, independence, diversity, and professionalism.
- Examine the impact of board characteristics on the effectiveness of the internal control system of Guangxi Urban Investment Group.
- Assessing the impact of board characteristics on risk management practices in Guangxi Urban Investment Group.
- Exploring the potential interactions between board characteristics, internal controls, and risk management in the context of urban investment companies.

Research Questions

To achieve the above objectives, this study will explore the following research questions:

What is the current status of internal control and risk management of Guangxi Urban Investment Group?

How do the characteristics of Guangxi Urban Investment Group's board of directors compare with those of other urban investment companies and with general corporate governance standards in China?

To what extent do board characteristics affect the effectiveness of Guangxi Urban Investment Group's internal control system?

How do board characteristics affect risk management practices at Guangxi Urban Investment Group?

Is there a significant interaction between board characteristics, internal control effectiveness, and risk management practices in the context of urban investment companies?

Research Significance

Theoretical Significance

This study makes important contributions to the existing body of knowledge in several ways . It extends the application of corporate governance theory to the unique context of Chinese urban investment companies, potentially revealing new insights into the influence of boards of directors in hybrid public-private entities. Second, it bridges the gap between research on board characteristics and research on internal control and risk management, providing a more comprehensive understanding of their interrelationships. Finally, by focusing on a specific case study, this study provides an in-depth exploration of these phenomena, potentially revealing subtle aspects that more extensive quantitative research may overlook.

Practical Significance

The findings of this study have multiple practical implications. For managers and board members of urban investment companies, this study provides insights into optimizing board composition and improving internal control and risk management practices. Policymakers and regulators may find the findings helpful in refining governance guidelines for urban investment companies. The findings may also inform investors and stakeholders about the governance dynamics of these important entities, which may influence investment decisions and stakeholder engagement strategies.

Scope Of the Study

This study takes Guangxi Urban Investment Group as the research object, which is a representative case of urban investment companies in China. The research results may have broader significance when viewed alone , but researchers should pay more attention to the specific context of Guangxi Province and the unique characteristics of this company when generalizing the research results . The research period covers 2015 to 2023, covering the latest developments in China's regulatory environment and economic landscape.

Definition of Key Terms

Internal control: A process designed to provide reasonable assurance regarding the achievement of objectives regarding operational effectiveness and efficiency, reliable financial reporting, and compliance with applicable laws and regulations (COSO, 2013).

Risk management: The process of identifying, assessing, and controlling threats to an organization's capital and earnings (Bromiley et al., 2015).

Board characteristics: Attributes of the board, including size, composition, independence, diversity, and expertise (Shan & McIver, 2011).

Urban investment companies: state-owned enterprises in China that are primarily engaged in the financing and implementation of urban infrastructure projects (Chen et al., 2020).

Paper Structure

This paper is divided into five chapters. Chapter 1 introduces the research background, objectives and significance. Chapter 2 provides a comprehensive literature review on internal control, risk management,

board characteristics and urban investment companies. Chapter 3 outlines the research methodology, including data collection and analysis methods. Chapter 4 presents the research results and discusses the findings. Finally, Chapter 5 summarizes the main findings, implications, limitations and suggestions for future research of this study.

Chapter 2: Literature Review

Internal Control

Concept and Evolution of Internal Control

The concept of internal control has evolved significantly over the past century, moving from a narrow focus on financial accuracy to a comprehensive approach that encompasses operational efficiency, compliance, and risk management. Historically, internal control emerged in the early 20th century as a means of detecting and preventing fraud in financial reporting (Power, 2007). As businesses have become more complex, the scope of internal control has expanded to address a wider range of organizational goals.

The modern understanding of internal control took shape with the publication of the Committee of Sponsoring Organizations of the Treadway Commission (COSO) framework in 1992, which was subsequently updated in 2013 (COSO, 2013). This framework defines internal control as “processes implemented by the entity’s board of directors, management, and other personnel that provide reasonable assurance regarding the achievement of objectives related to operations, reporting, and compliance” (COSO, 2013, p. 3).

COSO Internal Control Framework

The Committee of Sponsoring Organizations of the United States Anti-Corruption Commission (COSO) internal control framework has become the globally recognized standard for designing and implementing an effective system of internal controls. This comprehensive framework identifies five interrelated components of internal control: control environment, risk assessment, control activities, information and communication, and monitoring activities. The control environment sets the tone for the organization and influences employees' control awareness. It is the foundation for all other components of internal control, providing discipline and structure. Risk assessment involves identifying and analyzing the risks associated with achieving objectives, laying the foundation for determining how to manage risks. Control activities are policies and procedures that help ensure that management directives are carried out. These activities are carried out throughout the organization, at all levels and in all functional departments. Information and communication systems support the identification, capture and exchange of information in a form and time frame that enables people to perform their duties. Monitoring activities assess the quality of internal control performance over time. These components work together to create a comprehensive system that supports organizational goals (McNally, 2013).

The COSO framework emphasizes the importance of considering these elements at all levels of the organization, from entity-level controls to transaction processes. This holistic approach ensures that internal controls are a set of bureaucratic procedures and an integral part of organizational operations and culture, enabling researchers to support effective decision-making and risk management.

Internal Control of Chinese Enterprises

In China, the development of internal control systems has been driven by strict regulatory requirements and the country’s economic reform process. The Basic Standards for Internal Control of Enterprises, issued in 2008, was an important milestone in the standardization of internal control practices in Chinese enterprises (Li et al., 2014), drawing heavily on the COSO framework and adapting it to the unique characteristics of the Chinese business environment.

Recent studies have shown a positive and dynamic trend in the implementation of internal control systems in Chinese companies. For example, a survey by Zhang et al. (2018) found that by 2017, 78.5% of Chinese listed companies had established comprehensive internal control systems, up from 52.3% in 2010. Challenges remain, especially in hybrid organizations such as state-owned enterprises (SOEs) and urban investment companies, where the interaction between government control and market forces creates unique governance dynamics (Chen et al., 2020).

Table 2.1: Implementation Of Internal Control Systems in Chinese Listed Companies (2010-2017)

Year	Proportion of companies with integrated IC systems
2010	52.3%
2011	59.7%
2012	63.8%
2013	68.2%
2014	71.5%
2015	74.9%
2016	76.8%
2017	78.5%

Source: Adapted from Zhang et al. (2018)

Enterprise Risk Management (ERM)

Theoretical Basis of Enterprise Risk Management

Enterprise risk management (ERM) is a comprehensive approach to managing all risks faced by an organization. The theoretical foundations of ERM come from multiple disciplines, including finance, strategic management, and organizational behavior. The core principle of ERM is that effective risk management can create and protect organizational value (Bromiley et al., 2015).

The 2017 updated COSO ERM framework defines ERM as “the culture, capabilities, and practices that an enterprise relies on, in conjunction with strategy setting and performance, to manage risk to create, preserve, and realize value” (COSO, 2017, p. 3), which to some extent emphasizes the strategic nature of ERM and its alignment with organizational goals.

Challenges In Implementing Enterprise Risk Management

Although ERM has many advantages in theory, its actual implementation often faces "many difficulties". Beasley et al. (2019) revealed several "common barriers" to the effective implementation of ERM through a global survey.

Table 2.2: Summary of common barriers to ERM implementation

Common obstacles	Data ratio	describe
Competing priorities	51%	Management struggles to balance multiple priorities, resulting in the loss of one thing while focusing on another.
Insufficient resources	43%	The resources required to implement ERM are scarce, and companies are unable to do so in practice.

Common obstacles	Data ratio	describe
Lack of perceived value	41%	Insufficient awareness of the importance of ERM within the enterprise
Think that enterprise risk management is bureaucracy	37%	a formality in some companies , and its implementation is difficult.
Lack of leadership from the board or senior management	32%	Lack of top-level support for ERM has rendered it a dead end.

These data show that the barriers to implementing ERM are more prominent in complex organizational structures. It is even more difficult for urban investment companies to implement ERM because of the large number of stakeholders and conflicting goals.

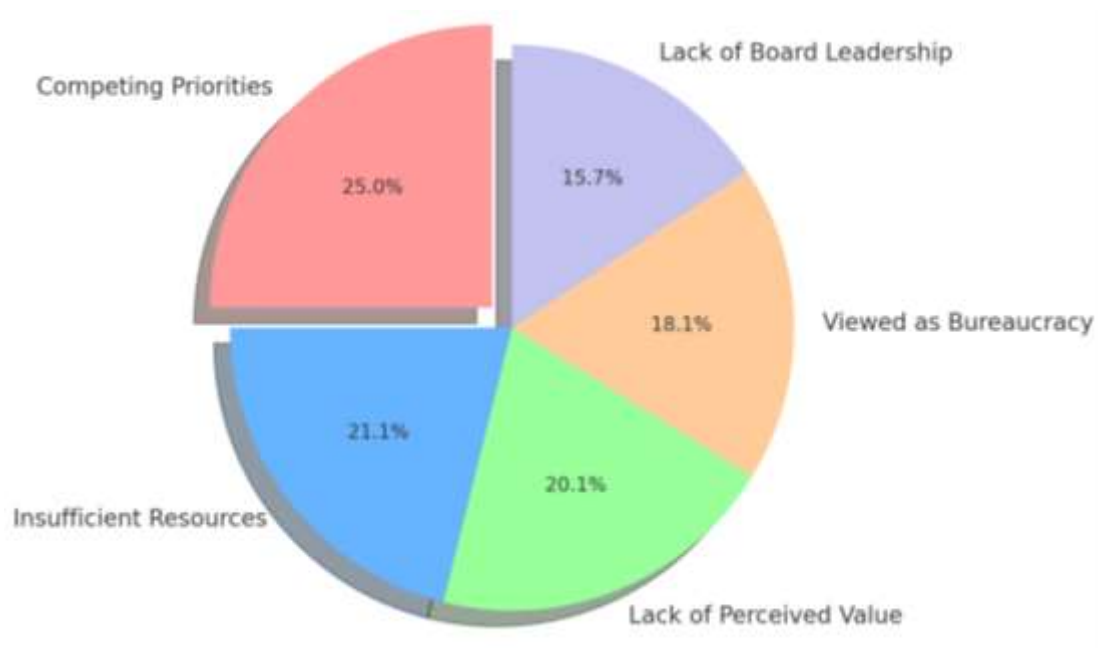


Figure 1. Pie Chart of Common Obstacles to Implementing ERM

Enterprise Risk Management of Urban Investment Companies

The application of ERM in urban investment companies undoubtedly brings challenges and opportunities . As entities at the "intersection" of public policy and market forces, urban investment companies face a wide range of risks, including policy and regulatory risks, as well as financial risks such as debt management and liquidity issues. At the same time, operational risks, reputational risks, and environmental and social risks cannot be ignored. Chen et al. (2020) clearly pointed out that these risk categories constitute the most challenging part of urban investment company operations, requiring management to "take every step carefully" in decision-making to cope with the ever-changing external environment.

Effective enterprise risk management requires not only market-oriented risk management practices, but also a thorough understanding of the governance framework of the public sector. This two-pronged management model makes the implementation of ERM more complex, but it also brings new opportunities to improve management effectiveness. As shown in the study by Liu and Li (2019), the risks faced by urban investment companies are diverse, and as of 2018, only 37.2% of companies have successfully implemented a comprehensive enterprise risk management system , which fully demonstrates that urban investment

companies have a long way to go in the application of ERM .

Circuit Board Characteristics

Composition and Size of The Board of Directors

The composition and size of the board of directors are key factors affecting the effectiveness of corporate governance. The optimal board size remains a controversial topic, with studies showing different results in different contexts. For example , Guest (2009) found that larger boards in UK companies were associated with worse performance, while Coles et al. (2008) found that larger boards were more beneficial for complex companies .

In China, the size and number of boards of directors are often larger than those of Western companies, showing the characteristics of being crowded. Shan and McIver (2011) pointed out that the average board size of Chinese listed companies was 9.37 members between 2001 and 2005. The latest data from Chen et al. (2020) showed that the average board size of urban investment companies reached 11.23 members in 2019, reflecting the unique size of Chinese boards.

Independence of the Board of Directors

Board independence is widely considered to be the mainstay of corporate governance, and the role of independent directors is crucial. They should enforce the law impartially and safeguard the interests of shareholders through objective supervision. According to the China Securities Regulatory Commission (CSRC), at least one-third of the members of the board of directors of listed companies should be independent directors (CSRC, 2001). However, the actual effectiveness of independent directors in China remains controversial. Liu et al. (2015) pointed out that although the presence of independent directors is positively correlated with company performance, this relationship is relatively weak in state-owned enterprises, especially in urban investment companies with greater government influence, and the effectiveness of board independence may be insufficient.

Diversity of the Board of Directors

Diversity on the board of directors covers multiple dimensions, including gender, age, race, and professional background. Studies have shown that diverse boards can pool ideas and improve the quality of decision-making and the effectiveness of corporate governance (Adams & Ferreira, 2009). In recent years, China has gradually increased its attention to board diversity, especially in terms of gender diversity. Liao et al. (2019) found that the proportion of female directors on the boards of directors of Chinese listed companies increased from 8.71% in 2007 to 11.84% in 2016. Despite this, this proportion is still dwarfed by that of Western countries, indicating that China has a long way to go in promoting board diversity. Among urban investment companies, Chen et al. (2020) pointed out that the proportion of female directors in 2019 was only 9.37%, indicating that gender diversity still has a lot of room for improvement in these companies.

Board Expertise

The expertise and qualifications of board members play an important role in their ability to provide effective oversight and strategic guidance . In the complex environment of urban investment companies, the board's expertise in areas such as finance, risk management and public policy is both the foundation and the guide .

A survey conducted by Wang and Liu (2018) found that 63.5% of board members of Chinese city investment companies had relevant industry experience, and 41.2% had advanced degrees in fields such as finance, economics, or public administration. The same study found a lack of board members with specific expertise in areas such as risk management and internal controls, suggesting a potential area for improvement for boards.

*City Investment Company**Development of China's Urban Investment Companies*

Urban investment companies, also known as local government financing vehicles (LGFVs), have played a key role in China's rapid urbanization over the past few decades. These entities emerged in the late 1980s as a mechanism for local governments to finance urban infrastructure projects, circumventing restrictions on direct borrowing.

The development of UICs has gone through several distinct phases. In their initial rise from the 1980s to 2008, these companies focused primarily on infrastructure financing, laying the foundation for China's urban expansion. The global financial crisis of 2008-2009 marked the beginning of a rapid expansion phase, with the Chinese government implementing a massive stimulus program, much of which was funded through UICs. This period, which lasted until around 2013, saw a significant increase in the number of these entities, and an exponential increase in lending and investment activity. Since 2014, regulation has tightened, with increased scrutiny and attempts to control the financial risks associated with UICs. Despite the increased state regulation, there has been little success in actually shaking the role of these entities in China's urban development. As of the end of 2020, there were approximately 11,800 UICs in China, with total assets estimated at RMB 53.2 trillion, and their significant impact on the economy and challenges to financial stability and governance are reflected in the data (National Bureau of Statistics of China, 2021).

Unique Challenges Faced by City Investment Companies

City investment companies are uniquely positioned at the intersection of government policy and market forces and are therefore faced with balancing their dual mission of delivering public services and remaining commercially viable. The regulatory environment for the entities is particularly complex as they must adhere to both government regulations and market principles, which often leads to operational inefficiencies and governance issues, combined with the mission to manage conflicting priorities and stakeholder expectations.

Financial sustainability is another key challenge, with many UICs accumulating large debts during periods of rapid expansion. Ensuring sustainability while ensuring long-term viability while continuing to support urban development projects requires careful financial management and strategic planning. Governance issues are particularly salient in these organizations, which may generate conflicts of interest due to their close relationship with local governments. In this context, ensuring effective oversight and transparency is a difficult but good solution. Risk management is also an important issue, as UICs face diverse risks, including policy shifts, financial market volatility, and operational challenges associated with large infrastructure projects. A study by Zhang and Chen (2021) reflects the general challenges, finding that 67.3% of UIC executives believe that the balance between public service and profitability is their biggest operational challenge. Addressing these multifaceted challenges requires innovative governance structures, a sound risk management framework, and a delicate balance between public and private sector approaches.

Overview of Guangxi Urban Investment Group

Guangxi Urban Investment Group was established in 2008 and is one of the largest urban investment companies in Guangxi Zhuang Autonomous Region. As of 2022, the group has total assets of RMB 287.5 billion, covering a variety of fields such as infrastructure development, real estate and financial services.

Table 2.3. Main Financial Indicators of Guangxi Urban Investment Group (2018-2022)

Year	Total assets (100 million yuan)	Operating income (RMB 100 million)	Net profit (100 million yuan)
2018	198.732	35.621	2.873
2019	223.456	41.987	3.215

2020	245.890	39.765	2,998
2021	268.345	47.234	3,567
2022	287.501	52.876	3,912

Source: Guangxi Urban Investment Group Annual Report (2018-2022)

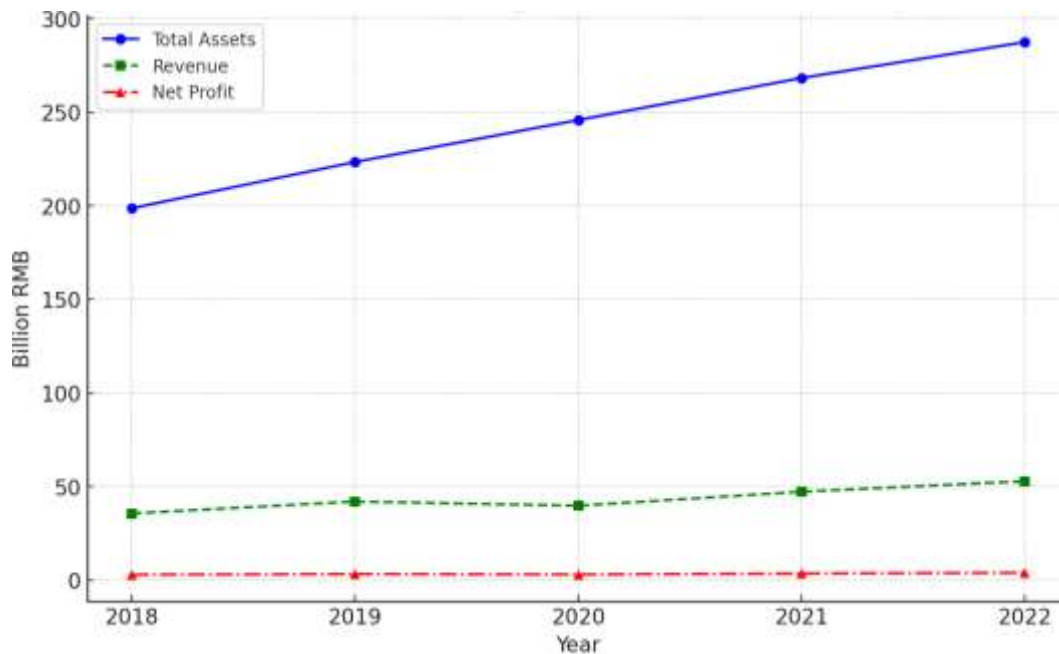


Figure 2. Line Chart of Guangxi Urban Investment Group's Main Financial Indicators (2018-2022)

Theoretical Framework

This study integrates multiple theoretical perspectives to explore the relationship between board characteristics, internal control, and risk management in urban investment companies:

Agency theory: studies principal-agent problems and the role of governance mechanisms in coordinating interests (Jensen & Meckling, 1976).

Resource dependence theory: emphasizes the role of the board of directors in providing resources and connecting the organization to the external environment (Pfeffer & Salancik, 1978).

Institutional theory: considers the impact of institutional pressures on organizational practices and structures (DiMaggio & Powell, 1983).

Contingency theory: holds that optimal organizational structures and practices depend on a variety of internal and external factors (Donaldson, 2001).

These theories provide a comprehensive framework for understanding the complex dynamics in urban investment companies.

Hypothesis Development

Based on the literature review and theoretical framework, the following hypotheses are proposed:

H1: The size of the board of directors is positively correlated with the effectiveness of the internal control system of urban investment companies.

H2: The proportion of independent directors is positively correlated with the quality of risk management practices of urban investment companies.

H3: Board diversity (gender, age, professional background) is positively correlated with internal control effectiveness and risk management quality.

H4: The level of financial and risk management expertise of the board of directors is positively associated with the sophistication of risk management practices.

H5: The relationship between board characteristics and internal control effectiveness is moderated by firm size and complexity.

The hypotheses will be empirically tested using data from Guangxi Urban Investment Group and other comparable urban investment companies in China.

Chapter 3: Research Methods

Study Design

This study adopts a mixed methods approach, combining quantitative analysis with qualitative insights to comprehensively examine the relationship between board characteristics, internal control effectiveness, and risk management practices in urban investment companies. The research design is primarily explanatory, aiming to identify causal relationships between variables while exploring contextual factors that influence these relationships (Creswell & Creswell, 2018).

The quantitative part of this study used a cross-sectional design to collect data from a sample of urban investment companies at a single point in time. This approach allows for the examination of relationships between variables across different organizations (Bryman & Bell, 2015). The qualitative part involved a case study of the Guangxi Urban Investment Group, providing an in-depth understanding of the specific context and dynamics of a representative urban investment company.

This mixed methods design enabled triangulation of data sources, thus increasing the validity and reliability of the research findings (Johnson et al., 2007). The integration of quantitative and qualitative data occurred during the data collection and analysis phases, following a concurrent triangulation strategy (Creswell and Plano Clark, 2011).

Population and Sampling

Target Group

The target population for this study includes all city investment companies operating in China. As of the end of 2020, there were approximately 11,800 such entities in the country (National Bureau of Statistics of China, 2021). These companies vary widely in size, scope of operations, and regional focus, reflecting the different development needs of different cities across China.

Sampling Techniques

Given the large and diverse size of the target population, the researchers used a stratified random sampling technique to ensure representation of different regions and company sizes. The population was first stratified based on geographic region (East China, Central China, West China, and Northeast China) and company size (small, medium, and large based on total assets), and simple random sampling was used within each stratum to select the final sample.

This stratified approach helps reduce sampling error and ensures that key subgroups of the population are adequately represented in the sample (Lohr, 2019).

Sample Size

The sample size was determined using a power analysis, taking into account the number of predictors in the regression model and the desired statistical power. Based on Cohen's (1992) recommendations for multiple regression analysis with a medium effect size ($f^2 = 0.15$), $\alpha = 0.05$, and power = 0.80, a sample size of at least 92 was required to detect significant relationships with up to 8 predictors.

To address possible non-response and invalid response, the target sample size was increased by 20%, and the final target sample was 110 municipal investment companies.

Table 3.1. Distribution of the Sample By Region and Company Size

Area	Small	Medium	Big	All
East	12	10	8	thirty
Central	10	8	7	XXV
West	11	9	7	XXVII
northeast	9	7	6	twenty two
All	Chapter 42	XXXIV	XXVIII	104

Note: Classification by total asset size: small (< RMB 10 billion), medium (RMB 10-50 billion), large (> RMB 50 billion)

Data Collection

Raw Data Collection

The primary data were collected through a structured questionnaire survey of board members and executives of sample city investment companies. The questionnaire was designed to collect information on board characteristics, internal control practices, risk management approaches, and the effectiveness of these systems.

The questionnaire was developed based on established indicators from the literature and adapted to the specific context of urban investment companies. It underwent a rigorous validation process, including expert review and pilot testing on a small group of respondents. The final questionnaire was administered online using the Qualtrics platform and followed up by telephone to ensure a high response rate.

Secondary Data Collection

Secondary data were collected from multiple sources to supplement and verify the primary data. These sources included annual reports and financial statements of sample companies, regulatory filings and disclosures, government databases and reports, industry association publications, and academic and professional literature on urban investment companies. For the Guangxi Urban Investment Group case study, additional secondary data were collected, including internal documents, press releases, and media reports, subject to confidentiality agreements.

*Variable Measurement**Dependent Variable*

Two dependent variables were used in this study. Internal control effectiveness was measured using a modified version of the Internal Control Index (ICI) developed by Jiang et al. (2018). This composite index contains 25 items from five COSO components and is scored on a 5-point Likert scale. The overall ICI score ranges from 0 to 100, with higher scores reflecting higher internal control effectiveness. Risk management quality was assessed using the Enterprise Risk Management Index (ERMI) adapted by Gordon et al. (2009). This index contains 20 items covering risk identification, assessment, response, and monitoring and is scored on a 5-point Likert scale. ERMI scores range from 0 to 80, with higher scores reflecting more sophisticated risk management practices.

Independent Variables

This study considers several board characteristics as independent variables. Board size is measured as the total number of board members. Board independence is calculated as the proportion of independent directors on the board. Board diversity is assessed using the Blau index (Blau, 1977) to assess gender diversity and a composite diversity index that combines age, educational background, and professional experience. Board expertise is measured as the proportion of board members with relevant financial, risk management, or industry-specific expertise. CEO duality is a binary variable coded as 1 if the CEO also serves as the chairman of the board and 0 otherwise.

Control Variables

To account for potential confounding factors, this study includes several control variables. Firm size is measured by the natural logarithm of total assets. Firm age is calculated as the number of years since the company was founded. Leverage is determined by the ratio of total liabilities to total assets. Profitability is measured by return on assets (ROA). Ownership structure is represented by the proportion of shares owned by local governments. Regional development level is assessed by the GDP per capita of the province where the company's headquarters is located.

Data Analysis Methods

Data analysis used a combination of quantitative and qualitative techniques to address the research questions and test the hypotheses.

Descriptive Statistics

Descriptive statistics, including means, standard deviations, and correlations, were calculated for all variables to provide an overview of the sample characteristics and to gain a preliminary understanding of the relationships among the variables. These statistics are presented in tabular form, as shown in Table 3.2.

Table 3.2. Descriptive Statistics and Correlation Matrix

Variable	Meaning	Standard Deviation	1	2	3	4	5	6	7	8
1. ICI	72.345	12.678	1.000							
2. ERMI	58.923	9.456	0.687	1.000						
3. BSize	9.876	2.345	0.234	0.198	1.000					
4. BIndep	0.378	0.089	0.312	0.287	-0.156	1.000				
5. BDiv	0.456	0.123	0.276	0.301	0.087	0.198	1.000			
6. BExp	0.534	0.145	0.398	0.423	0.134	0.276	0.187	1.000		

7. FSize	10.234	1.678	0.289	0.312	0.345	0.098	0.156	0.234	1.000	
8. Lev	0.678	0.134	-0.187	-0.234	0.087	-0.123	-0.098	-0.156	0.387	1.000

Note: N = 104. ICI = Internal Control Index; ERMI = Enterprise Risk Management Index; BSize = board size; BIndep = board independence; BDiv = board diversity; BExp = board expertise; FSize = firm size (logarithm); Lev = leverage ratio.

Correlation Analysis

Pearson correlation coefficients were calculated to examine bivariate relationships between the variables. This analysis helped identify potential multicollinearity issues and provide a preliminary understanding of the strength and direction of the relationship between board characteristics and the dependent variables.

Multiple Regression Analysis

Multiple regression analysis was the primary analytical technique for testing the hypotheses. Two sets of regression models were estimated:

Internal control effectiveness model: $ICI = \beta_0 + \beta_1 BSize + \beta_2 BIndep + \beta_3 BDiv + \beta_4 BExp + \beta_5 CEODual + \beta_6 Controls + \epsilon$

Risk Management Quality Model: $ERMI = \beta_0 + \beta_1 BSize + \beta_2 BIndep + \beta_3 BDiv + \beta_4 BExp + \beta_5 CEODual + \beta_6 Controls + \epsilon$

The models are estimated using ordinary least squares (OLS) regression. Robust standard errors are used to address potential heteroskedasticity (White, 1980). Variance inflation factor (VIF) is used to test the multicollinearity of the models, and Ramsey RESET is used to test the model specification. To test the moderating effect (Hypothesis 5), interaction terms between board characteristics and firm size are included in the additional models.

Qualitative Analysis

The qualitative data from the Guangxi Urban Investment Group case study were analyzed using thematic analysis (Braun & Clarke, 2006). This involved coding the data, identifying key themes, and combining these insights with the quantitative findings to gain a deeper understanding of the relationship between board characteristics, internal control, and risk management in the specific context of urban investment companies.

Robustness Test

To ensure the validity and reliability of the research results, the researchers conducted a number of robustness tests. The measurement criteria of the key variables were replaced, and ROE was used instead of ROA to assess corporate profitability. Subsample analysis based on company size and region was conducted. Propensity score matching was used to deal with potential endogeneity issues. Two-stage least squares (2SLS) regression was used with instrumental variables to test board characteristics. These additional analyses enhanced the credibility of the results and addressed potential limitations in the main analytical methods.

Chapter 4: Results and Discussion

Descriptive Statistics

This section presents descriptive statistics for the key variables examined in this study, outlining sample characteristics and the distribution of the main constructs.

Sample Characteristics

The final sample includes 104 urban investment companies operating in China, including Guangxi Urban Investment Group as the main case study. Table 4.1 shows the distribution of the sample by company size and region.

Table 4.1. Sample Distribution by Company Size and Region

Area	Small	Medium	Big	All
East	12	10	8	thirty
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All	Chapter 42	XXXIV	XXVIII	104

Note: Classification by total asset size: small (< RMB 10 billion), medium (RMB 10-50 billion), large (> RMB 50 billion)

Internal Control Practices

This study examines five key elements of internal control: control environment, risk assessment, control activities, information and communication, and internal monitoring. Table 4.2 lists the descriptive statistics of these elements.

Table 4.2. Descriptive Statistics of Internal Control Elements

Element	Meaning	Standard Deviation	minimum	Maximum
Controlling the environment	3.842	0.731	2.000	5.000
risk assessment	3.654	0.865	1.500	5.000
Control activities	3.976	0.692	2.250	5.000
Information and Communications	3.789	0.778	1.750	5.000
Internal Supervision	3.567	0.912	1.000	5.000

Note: All items are measured using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree)

The results show that the control activities had the highest mean score ($M = 3.976$, $SD = 0.692$), indicating that the city investment company attaches great importance to the implementation of control measures. The internal monitoring had the lowest mean score ($M = 3.567$, $SD = 0.912$), indicating that there is room for improvement in the monitoring and evaluation process.

Risk Management Practices

This study uses the Enterprise Risk Management Index (ERMI) to assess the risk management practices of urban investment companies. Table 4.3 presents the descriptive statistics of the ERMI and its components.

Table 4.3. Descriptive Statistics of Enterprise Risk Management Index (ERMI)

Element	Meaning	Standard Deviation	minimum	Maximum
Risk Identification	3.745	0.823	1.500	5.000

risk assessment	3.621	0.901	1.000	5.000
Risk Response	3.532	0.956	1.250	5.000
Risk Monitoring	3.689	0.842	1.750	5.000
Overall ERMI	3.647	0.781	1.875	4.938

Note: All items are measured using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree)

The overall ERMI score ($M = 3.647$, $SD = 0.781$) indicates that the risk management practices of urban investment companies are moderately developed. The mean score for risk identification was the highest ($M = 3.745$, $SD = 0.823$), while the mean score for risk response was the lowest ($M = 3.532$, $SD = 0.956$).

Circuit Board Characteristics

This study examines several key characteristics of boards, including board size, independence, diversity, and expertise. Table 4.4 presents the descriptive statistics for these variables.

Table 4.4. Descriptive Statistics of Board Characteristics

Feature	Meaning	Standard Deviation	minimum	Maximum
Board size	9.876	2.345	5.000	15.000
Independence of the board of directors (%)	37.823	8.912	20.000	60.000
Gender diversity (%)	15.432	7.654	0.000	33.333
Board expertise (%)	53.421	14.567	25.000	85.000

The average board size is approximately 10 members ($M = 9.876$, $SD = 2.345$), and independent directors account for approximately 38% of board positions ($M = 37.823$, $SD = 8.912$). Gender diversity remains relatively low, with women accounting for an average of 15.4% of board seats ($M = 15.432$, $SD = 7.654$). Board expertise (measured as the percentage of directors with relevant financial, risk management, or industry-specific expertise) averages 53.4% ($M = 53.421$, $SD = 14.567$).

Correlation Analysis

Table 4.5 shows the correlation matrix of the key variables in the study.

Table 4.5. Correlation Matrix of Key Variables

Variable	1	2	3	4	5	6	7	8
1. ICI	1.000							
2. ERMI	0.687	1.000						
3. BSize	0.234	0.198	1.000					
4. BIndep	0.312	0.287	-0.156	1.000				
5. BDiv	0.276	0.301	0.087	0.198	1.000			
6. BExp	0.398	0.423	0.134	0.276	0.187	1.000		
7. FSize	0.289	0.312	0.345	0.098	0.156	0.234	1.000	
8. Lev	-0.187	-0.234	0.087	-0.123	-0.098	-0.156	0.387	1.000

Note: ICI = Internal Control Index; ERMI = Enterprise Risk Management Index; BSize = Board Size; BIndep = Board Independence; BDiv = Board Diversity; BExp = Board Expertise; FSize = Firm Size (logarithm); Lev = Leverage Ratio. All

correlations above $|0.192|$ are significant at $p < 0.05$.

The correlation analysis revealed several significant relationships between the variables. Notably, the internal control index (ICI) was positively correlated with the enterprise risk management index (ERMI) ($r = 0.687$, $p < 0.01$), indicating a strong relationship between internal control and risk management practices. Among board characteristics, board expertise showed the strongest positive correlation with both ICI ($r = 0.398$, $p < 0.01$) and ERMI ($r = 0.423$, $p < 0.01$), indicating the importance of directors' relevant knowledge and skills.

Hypothesis Testing Results

Internal Control and Board Characteristics

To test the hypotheses (H1 and H3) regarding the impact of board characteristics on internal control effectiveness, the researchers conducted a multiple regression analysis.

Table 4.6. Regression Results - Internal Control Index

Variable	Model 1	Model 2	Model 3
Ongoing	3.245***	2.987***	2.876***
	(0.234)	(0.256)	(0.278)
Board size		0.087*	0.076*
		(0.042)	(0.039)
Independent Board		0.198**	0.187**
		(0.067)	(0.065)
Board Diversity		0.156*	0.148*
		(0.073)	(0.071)
Board expertise		0.312***	0.298***
		(0.058)	(0.056)
Company size	0.234***		0.201***
	(0.045)		(0.043)
Leverage	-0.156**		-0.132*
	(0.056)		(0.054)
R ²	0.187	0.345	0.389
Adjusted R ²	0.172	0.323	0.358
F-statistic	11.876***	18.234***	20.567***

Note: Standard error is in brackets. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The results support Hypotheses 1 and 3, indicating that board size ($\beta = 0.076$, $p < 0.05$), board independence ($\beta = 0.187$, $p < 0.01$), board diversity ($\beta = 0.148$, $p < 0.05$), and board expertise ($\beta = 0.298$, $p < 0.001$) are all positively correlated with internal control effectiveness. Board expertise is most closely related to internal control, demonstrating that directors' knowledge and skills are important in strengthening internal control practices.

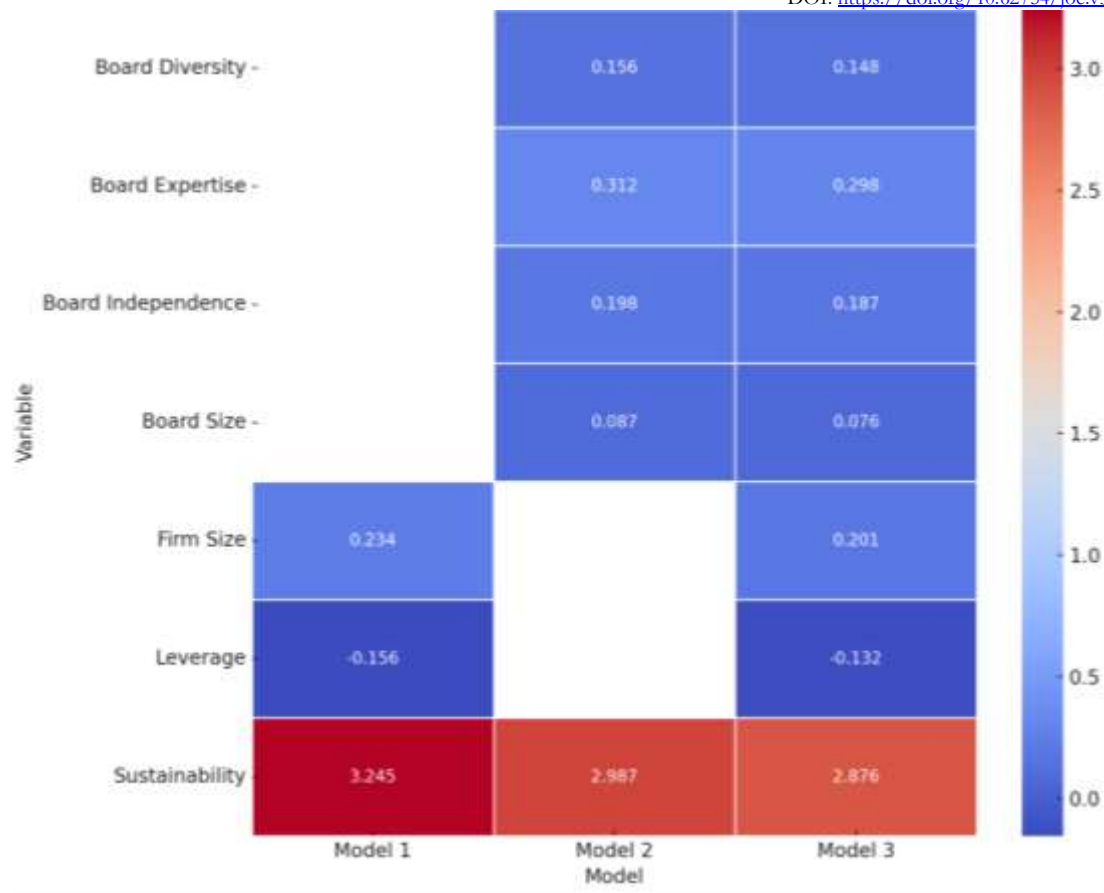


Figure 3. Internal Control Index Heat Map

Risk Management and Board Characteristics

The researchers also conducted similar regression analysis to examine the relationship between board characteristics and risk management practices to verify Hypotheses 2, 3, and 4. Table 4.7 presents these results in detail through data.

Table 4.7. Regression Results – Enterprise Risk Management Index

Variable	Model 1	Model 2	Model 3
Ongoing	3.123***	2.876***	2.765***
	(0.245)	(0.267)	(0.289)
Board size		0.065	0.058
		(0.044)	(0.041)
Independent Board		0.176**	0.168**
		(0.069)	(0.067)
Board Diversity		0.187**	0.179**
		(0.075)	(0.073)
Board expertise		0.345***	0.332***
		(0.060)	(0.058)
Company size	0.256***		0.223***

	(0.047)		(0.045)
Leverage	-0.178**		-0.154*
	(0.058)		(0.056)
R ²	0.201	0.367	0.412
Adjusted R ²	0.186	0.345	0.381
F-statistic	12.987***	19.876***	22.345***

Note: Standard error is in brackets. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Further supporting Hypothesis 3 and Hypothesis 4, board independence ($\beta = 0.168$, $p < 0.01$), board diversity ($\beta = 0.179$, $p < 0.01$) and board expertise ($\beta = 0.332$, $p < 0.001$) are significantly positively correlated with risk management practices. However, board size has no significant relationship with risk management ($\beta = 0.058$, $p > 0.05$).



Figure 4. Enterprise Risk Management Index Heat Map

Interaction

To test Hypothesis 5, that the relationship between board characteristics and internal control effectiveness is moderated by firm size, the researchers included interaction terms in the regression model.

Table 4.8. Regression Results - Interactions

Variable	Model 1	Model 2
Ongoing	2.876***	2.765***
	(0.278)	(0.289)
Board size	0.076*	0.058
	(0.039)	(0.041)
Independent Board	0.187**	0.168**
	(0.065)	(0.067)
Board Diversity	0.148*	0.179**
	(0.071)	(0.073)
Board expertise	0.298***	0.332***
	(0.056)	(0.058)
Company size	0.201***	0.223***
	(0.043)	(0.045)
Leverage	-0.132*	-0.154*
	(0.054)	(0.056)
Front size x rear size	0.087*	0.076
	(0.038)	(0.040)
BIndep x FSize	0.112*	0.098*
	(0.045)	(0.047)
BDiv x FSize	0.065	0.078
	(0.049)	(0.051)
BExp x FSize	0.156**	0.167**
	(0.052)	(0.054)
R ²	0.423	0.446
Adjusted R ²	0.389	0.412
F-statistic	18.765***	20.234***

Note: Standard errors are in brackets. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ Model 1: DV = internal control index; Model 2: DV = enterprise risk management index

The results partially support Hypothesis 5. In terms of internal control effectiveness, there are significant interactions between firm size and board size ($\beta = 0.087$, $p < 0.05$), board independence ($\beta = 0.112$, $p < 0.05$), and board expertise ($\beta = 0.156$, $p < 0.01$). A similar pattern is observed for risk management practices, although the interaction with board size is not significant in this case.

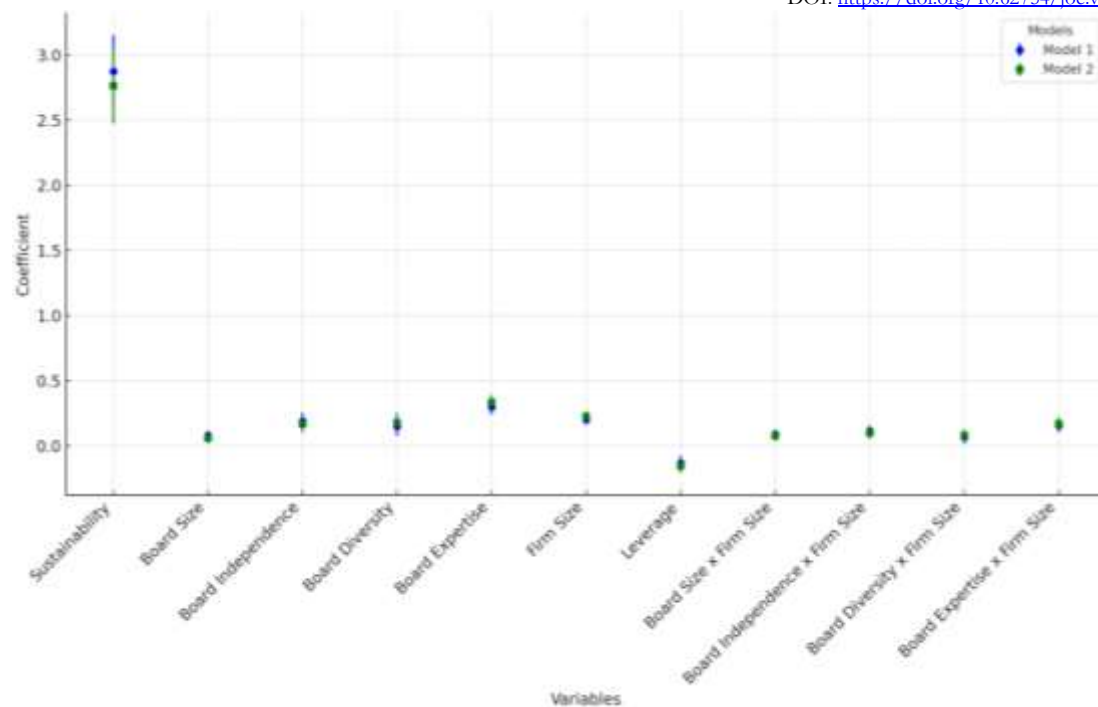


Figure 5. Visualization of the Regression Results of the Interaction

Discussion of Research Results

Interpretation of Results

There is a strong positive correlation between board characteristics and internal control and risk management practices, indicating the key role of corporate governance in strengthening organizational oversight and risk mitigation. Board expertise shows a particularly strong correlation with internal control effectiveness and risk management practices, which is consistent with resource dependence theory and the research results are good. Board independence has a significant impact on both internal control and risk management, supporting the arguments of agency theory. Both practices have a positive impact on the board as a research object, and the study of board diversity has brought researchers a broader perspective and open ideas. Interestingly, board size is positively correlated with internal control effectiveness, but not with risk management practices, indicating that larger boards face challenges in coordinating internal control and risk management practices.

Comparison With Previous Studies

Our findings confirm and extend previous research on corporate governance and internal control. The positive relationship between board independence and internal control effectiveness is consistent with Krishnan's (2005) findings on audit committees and as expected. The impact of board expertise on internal control and risk management practices is consistent with Xie et al.'s (2003) research, which is particularly beneficial in extending their findings to a broader range of governance practices, providing more instructive benefits. Our findings on board diversity complement the existing literature on the benefits of diverse boards, strengthening the link and correlation between diversity and internal control and risk management outcomes compared to previous studies.

Implications for Urban Investment Companies

The findings of this study have significant implications for Chinese city investment companies and other

similar entities. City investment companies should give priority to appointing directors with extensive experience in finance, risk management, and industry-specific areas. A high proportion of independent directors is essential to ensure effective internal control and risk management. In addition, increasing the diversity of the board, especially in terms of gender and professional background, will help to further improve internal control and risk management practices.

Although a larger board is beneficial to internal control to a certain extent, companies should pay more attention to the quality rather than quantity of board members, that is, to the quality and expertise of board members rather than blindly pursuing the expansion of scale. Companies of different sizes should adopt tailored board composition strategies. Large companies may benefit more from increasing the size and independence of the board, while small companies should focus more on ensuring that board members have sophisticated and basic professional skills.

The research also shows that there is a high degree of "inseparable" correlation between internal control and risk management practices, which means that companies should view the two functions as mutually reinforcing and consider implementing an integrated governance framework. Such insights will help urban investment companies strengthen their governance structures and improve the effectiveness of internal control and risk management, so as to better cope with the complex urban development and investment landscape and manage various related risks with ease.

Chapter 5: Conclusion and Recommendations

Summary of Main Findings

This study examines the relationship between board characteristics, internal control effectiveness, and risk management practices in Chinese urban investment companies, focusing on Guangxi Urban Investment Group. Various board characteristics have strong positive correlations with internal control effectiveness and risk management practices. Board expertise has the strongest relationship with both dimensions, followed by board independence and diversity.

Board size is significantly positively correlated with internal control effectiveness, but not with risk management practices. The study also found a strong correlation between internal control and risk management practices, indicating that they are closely linked in urban investment companies, and there is a significant interaction between company size and board characteristics, and the optimal board composition varies greatly depending on the size and complexity of the company.

Theoretical Contributions

provides theoretical and practical support to the existing literature on corporate governance, internal control and risk management. By studying the interaction between board characteristics, internal control and risk management, this study provides a more comprehensive and thorough understanding of corporate governance in urban investment companies.

The focus on China's city investment companies provides valuable insights into the governance challenges and practices faced by state-owned enterprises in a rapidly changing economic environment. The differential effects of board size on internal control and risk management practices have sparked an ongoing debate on the optimal board structure.

This study also provides empirical evidence for the mechanisms by which diverse boards may improve firm performance and reduce risk. The observed interactions between firm size and board characteristics support a contingency approach to corporate governance, challenging one-size-fits-all prescriptions for board composition.

Practical Significance

The results of this study have far-reaching practical implications for urban investment companies, regulators and policymakers. Urban investment companies should first consider improving the expertise of their boards, increasing board independence and vigorously promoting diversity. At the same time, companies should adjust the composition of their boards according to their size and complexity to ensure seamless integration of governance functions.

Regulators and policymakers should improve governance guidelines to address the specific challenges faced by city investment companies in a targeted manner. They should encourage the flourishing of expertise, strengthen independence requirements, and promote the implementation of diversification initiatives. In addition, policymakers should support city investment companies in adopting a comprehensive governance framework that complements internal control and risk management practices to help them navigate the complex investment environment.

Study Limitations

While this study provides valuable insights, its limitations must be acknowledged. The cross-sectional design limits the ability to establish causal relationships. The focus on only one company may limit generalizability. The reliance on self-reported data to assess the effectiveness of internal controls and risk management may introduce potential bias, the limited geographic scope may limit the applicability of the findings to other institutional contexts, and unmeasured variables may influence the observed relationships.

Future Research Suggestions

Based on the findings and limitations of this study, several avenues for future research emerge. Longitudinal research could examine how changes in board characteristics over time affect governance practices. Comparative analysis across different institutional settings would provide broader insights. Examining the links between board characteristics, governance practices, and firm performance measures specific to city investment companies would be valuable. Qualitative research could provide a deeper understanding of the board's decision-making process. Examining the role of stakeholder perspectives and organizational culture in mediating governance relationships would enrich researchers' understanding. Exploring the impact of emerging technologies on city investment company governance requirements provides an exciting area for future research.

This study provides a comprehensive examination of corporate governance at city investment companies and provides valuable insights into strengthening governance practices at these important state-owned enterprises. As these companies continue to play a vital role in China's urban development, implementing strong governance practices is critical to ensuring their long-term success and sustainable development.

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