4-2024

Diversification, policy shock, and firm performance: An empirical study of the game industry in China

Weiwei LI
Singapore Management University, weiwei.li.2021@ckdba.smu.edu.sg

DIVERSIFICATION, POLICY SHOCK, AND FIRM PERFORMANCE: AN EMPIRICAL STUDY OF THE GAME INDUSTRY IN CHINA

LI, WEIWEI

SINGAPORE MANAGEMENT UNIVERSITY

2024

Diversification, Policy Shock, and Firm Performance: An Empirical Study of the Game Industry in China

Li, Weiwei

Submitted to Lee Kong Chian School of Business in partial fulfillment of the requirements for the Degree of Doctor in Business Administration

Dissertation Committee

Wang Heli (Chair)
Professor of Strategic Management
Singapore Management University

Wang Yijiang(Co-Supervisor)
Professor of Human Resource Management and Economics
Cheung Kong Graduate School of Business

Lin Pengkai
Assistant Professor of Accounting
Singapore Management University

SINGAPORE MANAGEMENT UNIVERSITY

2024

I hereby declare that this DBA 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 DBA dissertation.

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

Li, Weiwei

3 April 2024

Diversification, Policy Shock, and Firm Performance: An Empirical Study of the Game Industry in China

Li, Weiwei

Abstract

Based on the reform of the game licence approval system in 2018, this thesis studied how diversification strategies influence the ability of game enterprises to withstand risk shocks. Specifically, using financial data from A-share enterprises and third-party game product data, this thesis applied econometric methods to examine and obtain a comprehensive picture of the policy effect on the performance of game enterprises, and explored how different diversification strategies affect risk.

Taking other application software enterprises as the control group, this thesis explored the effect of policy shocks on business performance using a difference-in-differences method. The profitability of game enterprises was found to decline significantly relative to other software enterprises after a significant policy shock. The thesis further examined how product diversification, industrial diversification, and international diversification affect enterprises' ability to withstand shocks. The results showed that although the three diversification strategies reduced enterprises' return on assets in peacetime, they had different effects in the face of the policy shock. Specifically, the product diversification strategy did not help enterprises mitigate the decline in performance caused by the shock, with product diversification in the game industry leading to a further decline in profitability. The industrial

diversification strategy in different industries could effectively help enterprises withstand risks, such that their performance declined less after the policy shock. The international diversification strategy had an effect similar to that of industrial diversification by reducing the policy shock's deleterious effect on enterprises. Furthermore, the net effect of international diversification after the shock was positive, namely the "premium" generated during the crisis was greater than the "discount" in normal times. Overall, the risk sharing effect of international diversification was better than the risk sharing effect of industrial diversification. Not only did it generate a lower "discount" than industrial diversification in normal times but it also generated a higher "premium" during the crisis.

This thesis concludes that related diversification has a lower ability to diversify risks than unrelated diversification. When dealing with risk shocks in specific fields, only through unrelated diversification strategies, such as industrial diversification and international diversification, can enterprises stabilise returns and diversify risks.

Keywords: policy shock, diversification strategy, game, DID method

Table of Contents

Acknowledgement

I received much encouragement, help, and support while I worked on my thesis, and I would like to sincerely thank those involved.

First, I thank my supervisors, Prof. Wang Yijiang, Prof. Wang Heli, and Prof. Lin Pengkai. They shared their invaluable academic knowledge on this research and provided key advice on research methodology and thesis structure. Focusing on the connections between policy shocks, diversification strategies and business performance, I faced many challenges and difficulties during the research process because the topic is complex. It was the in-depth knowledge and infinite enthusiasm of my three supervisors that led me to overcome these obstacles and allowed me to complete my dissertation. I express my deep respect and gratitude to all three of my supervisors!

I thank my DBA teachers, especially Ms. Li Linna, who often used her weekends to provide me with countless help and advice for the completion of my dissertation. I am also grateful to my DBA classmates, whose thinking, challenges, and advice during the research process became invaluable assets that enriched the breadth of my thinking and the dimensions of my problem solving.

In addition, I thank my team of assistants for the great support rendered in data compilation and related financial data collection, and whose hard work and dedication contributed to my research.

Finally, I must express my deepest gratitude to my family, especially my wife, Sun Yuqi, who is not only my life partner and career partner but also my DBA sister. It was her continued support and encouragement, as well as her

handling of many of my family responsibilities, that enabled me to focus on my academic research and overcome the difficulties and challenges of this long and demanding journey of doctoral research.

Once again, I express my heartfelt thanks to everyone who encouraged, assisted, and supported me. I will always hold a special place in my heart for knowledge and exploration.

Chapter I Introduction

Since 2001, online games have become a key component of China's Internet economy with their rapid development, driving cultural innovation, meeting the spiritual and cultural needs of the masses, and leading the development of cutting-edge technologies such as computer chips and artificial intelligence. However, the lack of cultural connotation, social responsibility, innovation drive, and other problems have also been highlighted, restricting the game industry's capacity for healthy development. To address these problems, relevant regulatory authorities implemented various measures in 2018, to help game enterprises better undertake their cultural mission, effectively fulfil their social responsibility for youth protection, accelerate industry transformation and high-quality development, and promote the dissemination of excellent games overseas.

Following the reform of the licence approval system, the approval of game licences was suspended between April and November 2018, and the number of licences granted each month after the resumption of approval also fell. The game industry has been severely affected by this regulatory policy adjustment. However, different game enterprises in the industry perform differently, demonstrating different degrees of risk resistance. According to the revenue composition of different game enterprises, whether an enterprise has implemented a diversification policy is an important factor affecting its risk resistance. Therefore, this thesis analysed the correlation between diversification strategies, policy shocks, and business performance through empirical research, to provide a reference for corporate strategic management

practices.

Enterprises employing a diversification strategy selectively enter new industries in order to occupy a greater number of markets and expand into new markets, or to avoid the risk of having operations in only one industry. Considering the fast-paced development of the global economy and the expansion of business scale, diversification strategies have become a common choice for enterprises in various countries to capture more market share and increase profitability. Enterprises of different types around the world typically enter new business areas or regions to achieve diversification. In particular, with the promotion of international integration, enterprises from various countries have triggered a wave of cross-border mergers and acquisitions (M&As), and achieved international diversification through the acquisition of enterprises in different fields and in different countries.

Enterprises diversify for a variety of reasons. Enterprises can diversify to consolidate their competitive advantage. Specifically, to achieve rapid growth, enterprises can actively expand into other markets through diversification, thereby leading to an increase in the total number of business units and gaining greater market share. Enterprises can also choose to adopt a strategy of diversification to diversify risks. Enterprises face risks related to market, finance, policy, law, natural disasters, and other aspects. By introducing different products or entering different market areas, enterprises can reduce their dependence on a single product or market, disperse operational risks, and ensure stable business performance.

Diversification strategies have raised concerns among scholars, and numerous evaluations have been conducted regarding their effectiveness. However, scholars are divided regarding the effect of diversification on business income. They have put forward different views, leading to two academic schools: “diversification discount” and “diversification premium.” The former view holds that diversification strategies can reduce enterprise value, while the latter view holds that diversification can increase enterprise value. The diversification discount view is based on the principal–agent problem (Scharfstein & Stein, 2000). That is, with the growth of business departments and scale, management difficulties increase because the value orientation of owners and managers is not necessarily consistent. While shareholders seek to maximise value when making decisions, department managers may act for their own benefit, which can be detrimental to the enterprise as a whole. Therefore, enterprises must implement mechanisms to incentivise managers to serve the goal of maximising the interests of owners, which is often accompanied by additional costs. These problems become more pronounced as the business structure becomes more complex, in turn increasing agency costs. Therefore, diversification strategies can reduce operating efficiency and lead to a diversification discount.

The diversification premium viewpoint derives from the relationship between diversification and enterprises’ financing capacity and resource utilisation efficiency (Stein, 2003). Because of their broader business scope and larger scale, diversified enterprises can access external financing more easily than non-diversified enterprises, providing them with more room to grow.

Furthermore, diversification strategies allow enterprises to operate in the internal capital market, enabling them to redistribute their resources internally. Because diversified enterprises can reallocate their resources among different business units, they can improve their resource utilisation efficiency. However, some studies have shown that the additional benefits brought by the internal capital market to diversified enterprises only exist when financial frictions are severe. In normal times, both diversified and non-diversified enterprises can access financing through external capital markets, so internal capital markets cannot offer additional benefits. However, with increased external financing constraints, the business development of non-diversified enterprises is affected by capital constraints, while diversified enterprises can offset the impact of external financing constraints to some extent by reallocating resources among different subsidiaries or departments (Matvos & Seru, 2014).

In recent years, studies have shown that diversification strategies may lead to a discount in peacetime but strengthen firm value during crises (Bakke & Gu, 2016; Kuppuswamy & Villalonga, 2015; Matvos & Seru, 2014). Matvos and Seru (2014) simulated how internal capital markets affect enterprises based on a dynamic micro-mechanism model. They found that compared with non-diversified enterprises, the performance of diversified enterprises improves when the external capital market is in crisis. Moreover, they showed that the greater the extent of productivity decentralisation in the sector, the more beneficial the internal capital markets. Bakke and Gu (2016) also revealed that enterprises can use internal capital markets to mitigate the effect of financing constraints, such that diversified enterprises can hold fewer cash reserves than

non-diversified enterprises. These views were supported by Aivazian et al. (2019), who used the asset price crisis in the information technology (IT) industry in the United States (US) in 2000–2001 as a quasi-natural setting and found that product diversification was an effective risk-hedging strategy. They found that the 2000–2001 asset price crisis increased the risks of players in non-IT industries and led to a reduction in their investment levels and enterprise value. However, when the crisis spread from the IT industry to other industries, diversified enterprises were better able to withstand the economic shock than non-diversified enterprises. Utilising the 2008 global financial crisis as a risk event, Kuppuswamy and Villalonga (2015) studied the additional benefits that enterprises could obtain through diversification during the crisis. They showed that diversified enterprises obtained more profits from the internal and external capital markets than non-diversified enterprises.

However, crisis events of interest to research institutes may exhibit certain endogeneity. According to Kuppuswamy and Villalonga (2015), the 2008 global financial crisis was triggered by completely exogenous factors and ultimately transmitted its impact to the real economy. Aivazian et al. (2019) argued that the impact on the IT industry can be considered exogenous to other industries. However, this type of economic crisis is an endogenous economic event caused by problems in economic functioning. Academics have not defined the exogenous causes of the global financial crisis and the bursting of the IT bubble, so it is difficult to prove that these events are not related to the performance and diversification strategy of the enterprises studied. To scientifically measure the effect of diversification in times of crisis, researchers

need to find an exogenous risk shock and compare the performance outcomes of diversified and non-diversified enterprises after the shock.

As the reform of the licence approval system in 2018 in China was issued by relevant departments without notice or communication to standardise the operation of the game industry, most enterprises were unaware of it and did not account for the reform during prior planning or adjustment of their business strategies. Therefore, the reform has no direct relationship with the profitability of enterprises and their choices of diversification strategies and can be regarded as a quasi-natural experiment.

Taking China's reform of the game licence approval system in 2018 as the research context, this thesis comprehensively studied the impact of diversification strategies on enterprises to prevent grey rhino events similar to policy shocks. Unlike previous studies, this study examined three types of diversification strategies: product diversification, industrial diversification, and international diversification. Research has generally argued that diversification affects business performance differently based on the type of diversification. For example, some studies have shown that compared with unrelated diversification, related diversification is more likely to improve business performance (Rumelt, 1974). Because related diversification is a strategy of diversification and decentralisation among industries familiar to enterprises, fewer additional investments are required during the diversification process, leading to greater efficiency and better performance.

This study's results revealed that the performance of game enterprises was negatively affected by the reform. Compared with other software enterprises, the return on assets (*ROA*) and return on equity (*ROE*) of game enterprises decreased by 3 and 4 percentage points (pp), respectively. Additionally, diversification generally led to a discount, and product diversification, industrial diversification, and international diversification led to a decline in the rate of return to varying degrees.

However, in terms of risk prevention, the three diversification strategies performed differently. Using the methodology of difference-in-differences (DID), this thesis examined the performance of diversified and non-diversified enterprises in the face of this policy shock. The empirical results showed that product diversification did not help enterprises strengthen their risk resistance. After the policy shock, the relative *ROA* of enterprises with product diversification decreased by 1.6 pp and their *ROE* decreased by 2 pp compared with non-diversified enterprises. Therefore, the product diversification strategy will make enterprises worse off in the face of shocks, indicating that product diversification is implemented at a discount in times of crisis. Regarding how the reform impacted the game industry, product diversification was found to not help enterprises improve their risk resistance. In contrast, industrial and international diversification helped enterprises boost their risk resistance. That is, compared with non-diversified enterprises, the performance of diversified enterprises improved after the policy shock. Specifically, the results showed that the *ROA* and *ROE* of enterprises with industrial diversification decreased respectively by 1.6 pp and 2.3 pp less than those without diversification during

the crisis. Internationally diversified enterprises saw their *ROA* decrease by 1.9 pp and their *ROE* by 2.5 pp less during the crisis than their counterparts. Although these two diversification strategies will make enterprises perform at a discount in peacetime, they will generate a premium in times of crisis. Furthermore, industrial and international diversification strategies can help enterprises disperse risks. The above findings suggest that unrelated diversification across different industries or regions can help enterprises improve their risk resistance in specific areas, compared with product diversification, which is strongly correlated within an industry. The results further showed that increasing international diversification helped enterprises strengthen their risk resistance, as the diversification premium generated during the crisis increased with the increase in the proportion of overseas income.

This study also verified some conclusions of previous studies on diversification. Specifically, the results highlighted the diversification discount phenomenon in product diversification, industrial diversification, and international diversification, showing that the performance of diversified enterprises was worse than that of enterprises without diversification. However, the results also showed that diversification strategies are not without merit. When enterprises face risk shocks, a diversification strategy can demonstrate their ability to diversify risks, help them cope with risks, and mitigate the deleterious effect of these shocks. Therefore, the effect of diversification strategies should be evaluated by simultaneously considering two aspects: the decline in business efficiency due to the increase in agency costs and the improvement in antishock capability due to risk diversification. A reasonable

level of diversification enables enterprises to achieve a balance between maintaining their usual profitability and enhancing their ability to withstand shocks.

1.1 Research Background

The online game industry has emerged and developed thanks to China's rapid economic growth. As a typical representative of the IT industry, the game industry was strongly supported by China's national policy at the beginning of its development and was listed in the "863" plan. The industry has grown rapidly in recent decades, establishing itself among the largest markets in the world. According to statistics from the Game Publishing Committee of China Audio-Video and Digital Publishing Association, the sales revenue of China's online game market was RMB265.884 billion in 2022, of which RMB222.377 billion came from self-developed games in the domestic market, with the number of players reaching 664 million. In light of the COVID-19 pandemic, China's game sales revenue declined in 2022, but the game industry remains a major part of the Chinese Internet economy. In the list of 100 largest Internet enterprises released by the Internet Society of China in 2022, 24 game enterprises made the list, such as Tencent, Bilibili, miHoYo, NetEase, and 37 Interactive Entertainment.

Figure 1.1

Game Sales Revenue in China

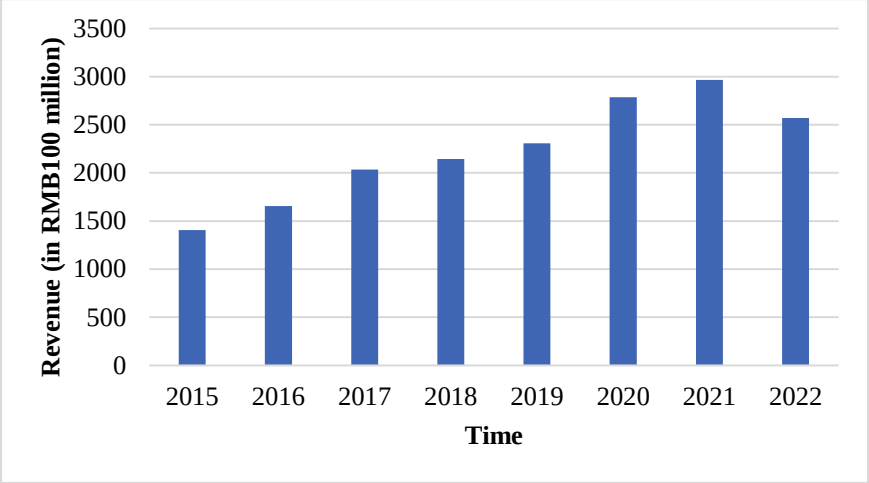
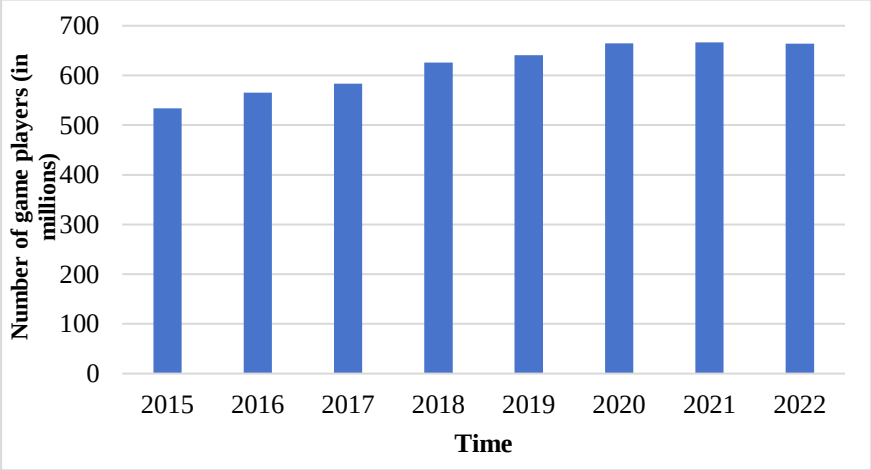


Figure 1.2

Number of Game Players in China



However, as a new industry emerging principally within the last 20 years, the game industry is not widely accepted by Chinese society. For various reasons such as youth protection, cultural values, social impact, and cyberspace

governance, this industry has long been restricted by Chinese authorities, including approval of game licences, limitation of game duration, censorship of game content, and real-name authentication. In 2005, the National Press and Publication Administration issued the *Development Standards for the Online Game Anti-Addiction System and the Real-Name Authentication Program for the Online Game Anti-Addiction System*, and began preparations for the deployment of the anti-addiction system. In 2007, government bodies such as the National Press and Publication Administration, the Ministry of Education, and the Ministry of Public Security jointly issued the *Circular on the Protection of the Physical and Mental Health of Minors and the Implementation of the Anti-Addiction System for Online Games*, marking the widespread launch of the anti-addiction system for online games. In 2013, China began implementing the newly revised Law on the Protection of Minors, implementing various measures to prevent minors from spending time on the Internet. In 2015, the game licence system was formally introduced, requiring all online games to be licensed, which imposed a threshold for the game industry. In 2017, the *Interim Measures for the Administration of Online Games* were issued, requiring players to use valid identity cards for real-name registration, which would be retained by online game enterprises. In 2018, the game licence approval system was reformed and the number of game licences issued dropped dramatically. In August 2021, the National Press and Publication Administration issued the *Circular on Further Strict Management and Effective Prevention of Minors' Online Gaming Addiction*, imposing strict restrictions on the number of hours that online gaming services can be provided to minors. In December 2023, the National Press and Publication Administration issued the *Guidelines for the*

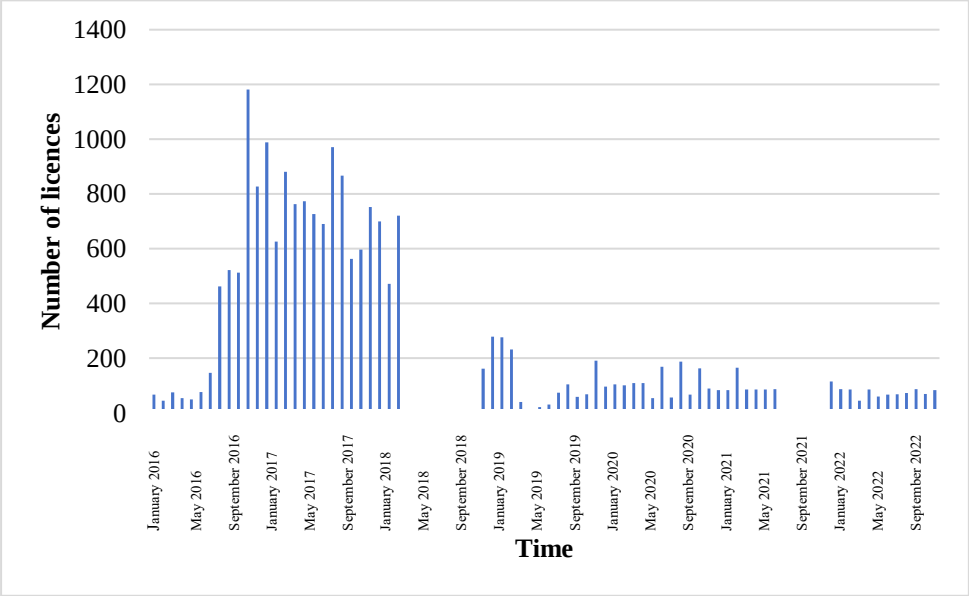
Administrative Measures of Online Games for the comprehensive and standardised management of the operation of the game industry. This clearly shows that the Chinese game industry is subject to far more policy restrictions than other industries, with a relatively high frequency of restrictive policies. In this context, examining how to mitigate the impact of policy shocks on enterprises through appropriate strategic choices has practical value. Specifically, it is essential to examine a certain policy shock and study the changes in business performance before and after the shock and how different corporate strategies affect enterprises' ability to withstand shocks.

Diversification strategies, as a common risk diversification strategy, are widely used by game enterprises. At the target market level, many game enterprises have adopted international models. As the domestic game market gradually reaches full saturation, it is increasingly difficult to further expand the market. Game enterprises view globalisation as an important performance driver. In 2022, Chinese-developed games generated sales revenue of USD17.346 billion in overseas markets. At the industrial layout level, online games are not the only activity of game enterprises. Many enterprises have developed their social media, cloud computing, culture and sports, education, and other aspects to diversify their strategic planning and business investments, to further increase their market value and brand influence. Game products can be divided into role-playing games, strategy games, simulation games, action games, and other types. Using different strategies, some enterprises choose to develop a specific type or a few types of games, while others focus on different types of games to attract more players and increase their performance.

Although diversification strategies are widely used by game enterprises, the effect of game diversification strategies remains unclear. In particular, the question of whether diversification strategies can help enterprises cope with the impact of restrictive policies needs to be explored. It is critical for the game industry, which is vulnerable to policy restrictions, to scientifically evaluate the effect of diversification strategies in order to enable enterprises to make more scientific strategic choices in the future. This analysis will also complement research on diversification strategies. Therefore, this thesis examined whether diversification strategies can affect the anti-risk ability of game enterprises based on China's reform of the game licence approval system in 2018.

Figure 1.3

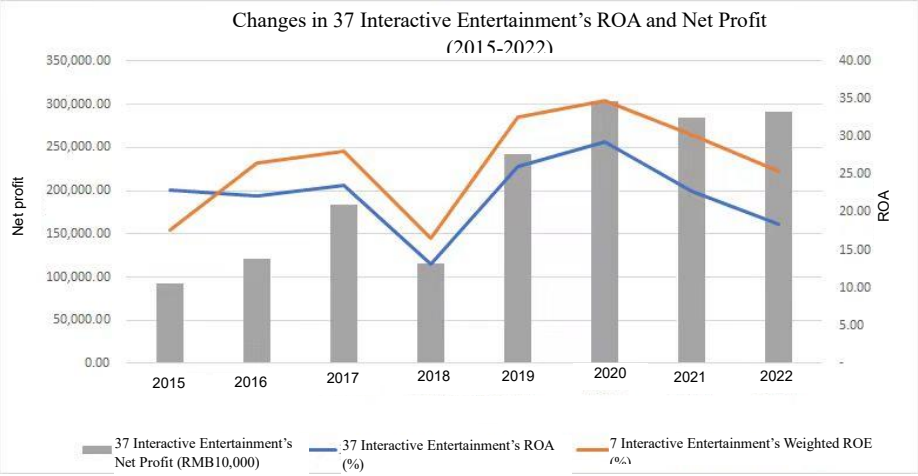
Number of Newly Issued Game Licences



In March 2018, China released the *Plan for Deepening the Reform of the Party and State Institutions*, according to which the business, press, and publishing management responsibilities that originally fell under the jurisdiction of the former National Radio and Television Administration (including the examination and approval of game licences) were entrusted to the Publicity Department of the Central Committee of the Communist Party of China. On March 29, 2018, the former National Radio and Television Administration issued the *Notice on Important Matters for Game Application and Approval*, affecting game approval due to institutional reform. Subsequently, the approval of domestic online games was suspended from April to December 2018, when it resumed. Figure 1.3 shows that the number of newly approved games soared in the second half of 2016 and remained at a high level throughout 2017. After licence issuance resumed, the number of approved online games each month declined significantly, with only 1,300 games released in 2019 and 2020. In terms of the distribution of new online games, the reform of the licence approval system has undoubtedly had a profound impact on the entire game industry, causing concerns in the market.

Figure 1.4

Changes in 37 Interactive Entertainment's ROA and Net Profit, 2015–2022



The reform of the game licence approval system has also had a significant impact on the business performance of 37 Interactive, as shown in Figure 1.4. As shown in Figure 1.4, 37 Interactive Entertainment's net profit and ROA both saw a sharp decline in 2018. It is therefore essential to fully understand the impact mechanism of this policy shock on enterprises to formulate countermeasures to contribute to the healthy growth of enterprises in the future. To this end, scientific methods should be used to comprehensively analyse the impact of the reform of the licence approval system on business operations and determine how different business strategies can enhance enterprises' ability to withstand risk shocks.

1.2 Research Questions

To fully understand the impact of policy shocks on the business operations of enterprises and explore how to effectively prevent it in the process of new business development, it is essential to elucidate how diversification strategies impact enterprises' ability to withstand risk shocks during specific risk events. Using a quasi-natural experiment, this thesis examined the effect of the reform of the game licence approval system as a policy shock on business performance and explored whether diversification strategies can effectively enhance enterprises' ability to withstand shocks from two dimensions. First, the DID method was used to determine whether the 2018 licence approval system reform led to a decline in the performance of game enterprises. Because this reform is a purely exogenous event, the interaction between business performance and the impact of reforms can be excluded. In addition, as the licence system reform only targets game products, it only has a direct impact on the game industry, while other software enterprises are not affected by the policy. Taking other software enterprises as the control group, we used the DID method to examine how this policy shock impacted the performance of game enterprises. Second, this thesis examined how diversification strategies impacted enterprises' ability to withstand shocks. Based on the above questions, we used the extent of enterprises' diversification as a moderator to examine the level of change in performance, if any, after the policy shock among enterprises with different degrees of diversification. We considered three types of diversification: product, industrial, and international. Product diversification means that game enterprises develop different types of games at the same time;

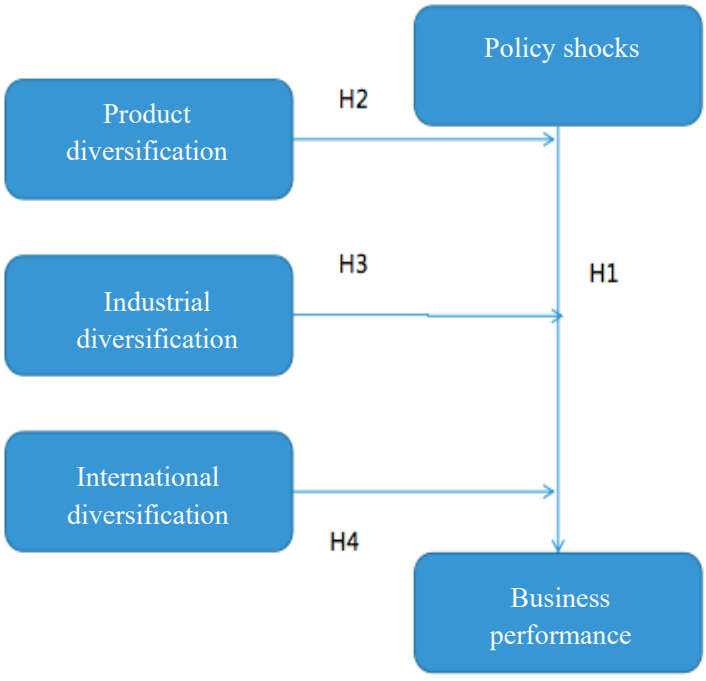
industrial diversification means that game enterprises focus on both game development and other activities; and international diversification refers to game enterprises operating in overseas markets. Studies have generally classified product diversification and industrial diversification into a single category, whereas we considered them as two types of diversification, as different types of game products are directly affected by the reform. At the business level, as activities other than game development are not directly affected by the reform, in theory, enterprises with more business lines should be less affected than other enterprises. Therefore, for the specific risk event studied in this thesis, the effects of product and industrial diversification are expected to be different.

This thesis used China's reform of the game licence approval system in 2018 as a quasi-natural experiment to determine the effect of this policy shock on enterprises and the anti-risk effect of diversification strategies. To this end, this thesis focused on the following key questions: (1) Does the reform of the game licence approval system weaken the fundamentals and operating conditions of game enterprises? (2) Does the number of products offered by game enterprises impact their ability to withstand this policy shock? (3) Does the business scope of enterprises impact their ability to withstand this policy shock? (4) Can overseas market expansion mitigate the negative impact of this policy shock on business performance? If so, what is the impact of overseas market expansion? To answer these questions, the event study method commonly used in economic research, especially to assess economic policies, was adopted. When a policy is introduced, its effect is determined by comparing

changes in independent variables before and after the policy. For the quantitative analysis, the diversification index was used as a moderating variable. First, we analysed the effect of the policy shock on business performance, then used diversification indicators to observe their effect on the impact of the focal risk event. We expect that the larger is the extent of diversification, the weaker is the negative effect of the policy shock on business performance, indicating that diversification enhances enterprises' ability to withstand shocks.

Figure 1.5

Research Framework



1.3 Main Contributions and Research Significance

The literature on corporate diversification strategies has mainly focused on their impact on performance. In contrast, this thesis examined the effect of related business strategies on enterprises' risk resistance, that is, whether diversification can reduce the decline in business performance in the face of exogenous shocks. It also explored the diversification strategies of enterprises from the three aspects of product category, business scope, and target market, by combining financial data and market data on game products.

The findings of the thesis are of theoretical and practical importance. First, the research reported in this thesis constitutes an important addition to the relevant literature on diversification strategies. Although the literature has extensively discussed diversification strategies, business performance, and operational risks, few studies have examined major risk shocks such as restrictive policies. A major reason for enterprises to diversify is risk dispersion, but research on risk diversification has often focused on fluctuations in business performance over a long period, ignoring how enterprises respond to specific risk events. Although controlling overall volatility is the long-term goal of enterprises, the impact of a single risk also warrants monitoring. Indeed, because long-term fluctuations are composed of many risk shocks, studying shocks at a more micro level can help enterprises better control long-term risks. Therefore, studying the effect of diversification strategies on enterprises' ability to cope with a single risk event can help us to more accurately understand the effect of diversification on business risk. Furthermore, research on volatility has often ignored major negative shocks. Although major economic policy reforms,

such as tax reform and regulatory system reform, are rare, they have a significant impact on enterprises because of their broad scope and high intensity, and because enterprises often lack measures to deal with such rare events, which deserves in-depth exploration. The research reported in this thesis contributes to the study of the links between policy shocks, diversification strategies, and business performance, and has theoretical value.

Second, this thesis has reference value for policy practice at the national level and strategic choices at the enterprise level. At the national policy level, China's reform of the game licence approval system is targeted at the healthy growth of the game industry and at better serving economic and social development. When formulating similar policies, their objectives can only be achieved by fully considering their positive and negative effects. If there is no forward-looking understanding of the potential effects of a policy, it may deviate from its goal and even have disastrous consequences. This thesis quantitatively assessed the effect of the reform of the licence approval system and comprehensively dissected its impact on business performance, which has great reference value for policy formulation in the future.

At the enterprise level, enterprises choose a diversification strategy to obtain long-term benefits and achieve risk diversification. However, most enterprises do not clearly understand the effect of diversification. This thesis used econometric methods to scientifically evaluate the effects of three diversification strategies commonly used by enterprises, revealing that diversification strategies do not improve business performance in peacetime. In addition, related diversification does not help enterprises disperse risks in

specific areas; only unrelated diversification can help enterprises achieve risk diversification. These findings are of great importance for the strategic operational choices of enterprises.

Chapter II Literature Review

This thesis focused on the impact of a policy shock (i.e., the reform of the licence approval system) on business performance and the impact of diversification strategies on enterprises' ability to withstand risk shocks. Scholars have conducted many studies in related fields and have come to important conclusions. As an important business strategy, diversification has received great attention from academia and has become a key research topic in economics and management. Scholars have explored why enterprises choose a diversification strategy and its impact on business performance and operational risk.

2.1 Diversification Strategy

Enterprises that adopt a diversification strategy selectively enter new industries to occupy more markets and expand into new markets, or to avoid the risk of having operations in a single industry. Scholars have generally identified two kinds of diversification strategies: product and international. Product diversification means that enterprises develop different products at the same time. International diversification refers to enterprises selling their products or services in markets other than their home market. Enterprises can achieve international diversification through exports, overseas M&As, franchise rights, the establishment of subsidiaries, and other means. By establishing businesses in different countries, enterprises can increase their business value by increasing their operational flexibility. According to the relevance of different business lines, product diversification is classified into related diversification and

unrelated diversification. Related diversification means that the different products developed by enterprises are related and belong to the same or similar areas, while unrelated diversification means that enterprises branch out into different areas.

Enterprises diversify their products for several reasons. Staudt (1954), an expert in strategic management, pointed out that the reasons why enterprises choose a diversification strategy include achieving stable development and growth by improving resource efficiency and meeting diversified consumer demand. He also suggested that enterprises can avoid taxes and protect their leading position in the industry through diversification. From the perspective of resource endowments, enterprises may choose to diversify to establish joint subsidies for different operations, share resources, and obtain greater market share, to access more business resources and ultimately improve their competitive advantage. Gribbin (1976) argued that diversification can help enterprises gain a competitive edge by enabling each product to compete in different industries, thus improving business performance. In addition, enterprises can grow, resist risks, and achieve business cooperation through diversification (Ansoff, 1958).

Research has shown that choosing a diversification strategy is determined by many factors. For example, Jiang (2006) suggested that whether an enterprise chooses a diversification strategy and its level of diversification are affected by its scale, industry, market entry date, and other factors. In addition, managers' demographic variables, for example sex, age, and education level, influence the choice of diversification strategy. Chen and Sun (2008)

showed that the more educated an entrepreneur is, the larger is the extent of diversification of the corresponding enterprise. Entrepreneurs with a technical background are more likely than others to diversify, while having a financial background negatively affects the likelihood of choosing a diversification strategy. The greater the number of enterprises run by managers, the higher the level of diversification of enterprises. Compared with female managers, male managers are more likely to engage in diversification. In addition, the diversification strategy of enterprises is directly affected by the government (Chen et al., 2007; Liu, 1997). For example, Zhang et al. (2005) concluded that in state-owned enterprises (SOEs), the percentage of shares owned by the state affects the level of diversification. Using data from Italian enterprises, Majocchi and Strange (2012) studied the determinants of the international diversification strategy adopted by enterprises. They found that in addition to enterprise size and industry, corporate ownership structure affects international diversification decisions. The higher the proportion of state or family ownership, the lower the level of international diversification.

2.2 Diversification Strategy and Business Performance

While numerous researchers have studied how diversification strategy affects business performance, the conclusions are inconsistent. Numerous scholars have theoretically explained how product diversification strategies positively affect business performance. Rumelt (1974) was the first to use a big sample of enterprises to quantitatively examine the connection between diversification strategy and business performance using statistical methods. He classified diversification strategies and posited the correlation hypothesis,

suggesting that diversification strategies with limited correlation positively affect business performance (Rumelt, 1974, 1982). Since then, numerous works have studied the link between diversification strategy and business performance. Penrose (2009) showed that enterprises can expand their business activities and achieve economies of scope through diversification, improve their resource utilisation efficiency, and in turn improve their business performance. Weston (1970) and Chandler (1993) both argued that diversified enterprises can maximally exploit economies of scale and obtain more benefits than other enterprises because they have more profitable business lines.

Internationally diversified enterprises can better exploit their economies of scope and scale to improve their performance. First, diversification into global markets offers an opening to exploit economies of scale and scope. By adopting an internationalisation strategy to build a strong position outside their home market, enterprises are able to effectively increase the size of their potential markets. According to Grant et al. (1988), the benefits of economies of scale exceed those of product diversification. Second, diversification into global markets generates more incentives for enterprises, providing them with more opportunities to learn and thus the possibility of achieving greater competitiveness than purely domestic enterprises. By standardising the production, sales, distribution, and service processes of their products, enterprises learn to minimise costs in overseas markets, thus adding value to consumers, and influence their R&D behaviour, thereby affecting long-term performance. Therefore, diversification into global markets can promote innovation and help enterprises adapt to a complex and changing environment

(Ghoshal, 1987; Kogut, 1983). In addition, as countries differ with respect to factor endowments, without an effective market, these differences will result in different resource costs between countries. Through international diversification, enterprises can distribute their production chains globally in a way that ensures that each production link is based in the least expensive location, thereby reducing the average marginal cost of production worldwide (Kogut, 1985), which can lead to higher profit margins or larger market shares relative to purely domestic production.

Geringer et al. (1989) showed that the diversification strategy of multinationals is positively correlated with their business performance. Delios and Beamish (1999) studied the link between international diversification and business performance based on 399 Japanese manufacturers and revealed a positive, linear correlation between them. In other words, enterprises continually benefit from internationalisation, with a higher level of internationalisation leading to better performance. Errunza and Senbet (1981, 1984) used multinational enterprises as a sample and showed that excess value is positively correlated with their degree of transnationalisation. They attributed this finding to global divergence, which provides broad markets for investors, allowing them to avoid barriers to international capital flows. Similarly, Morck and Yeung (1991) revealed that enterprise value was positively correlated with internationalisation. Using Chinese listed manufacturing enterprises, Xue and Zhou (2007) showed that product diversification does not directly affect business performance, but diversification indirectly affects business performance by affecting enterprise size. In addition, they examined the product

diversification-international diversification link and found that these two strategies can complement each other.

The positive association between diversifying and business performance proposed by Rumelt (1974) has been questioned by many scholars. Although product diversification can enhance business performance by improving competitiveness and creating an internal capital market, because of the principal–agent problem, diversification can increase internal coordination and management costs, leading to "diversification at a discount" in practice. Using Tobin's Q as an indicator of business performance, Lang and Stulz (1994) investigated the influence of the level of product diversification on business performance, finding a significant negative correlation between the two. This indicates that enterprise value declines significantly with an increase in the level of diversification. Similarly, Berger and Ofek (1995) studied the impact of diversification strategies on enterprises through an innovative approach and found a loss of approximately 13%–15% in real enterprise value when comparing the real value of diversified enterprises with the sum of the value of their business divisions, suggesting that diversification reduces enterprise value. Daley et al. (1997) studied the economic effects of business divestitures and found that increasing the concentration of business operations and decreasing the extent of diversification can improve business performance, thereby overcoming the negative effect of diversification on business operations. Desai and Jain (1999) obtained similar results, showing that enterprises that divest their assets to increase the concentration of their business operations can generate up to 47% earnings.

Similarly, some studies have reported an inverse correlation between international diversification and business performance. Although this strategy helps enterprises expand into new markets and increase revenue, multinational business operations in a larger geographic area will increase management costs. As such, the link between international diversification and business performance depends on the magnitude of benefits and costs, a topic that has attracted academic attention (Markusen, 1995). For example, Collins (1990) studied the international diversification of US enterprises by comparing the earnings performance of non-diversified enterprises, enterprises diversified in developing countries, and those diversified in developed countries. The results showed that international diversification does not improve enterprise performance; in fact, the performance of enterprises diversified in developing countries is worse than that of their counterparts. This finding not only questions the effectiveness of international diversification but also implies that international diversification depends on the geographic area involved, and that there are no generalised conclusions. Denis et al. (2002) explored the link between international diversification and enterprises' market capitalisation and found that, when all other variables remain constant, enterprises' market capitalisation declines as international diversification deepens. The negative correlation was also supported by Geringer et al. (2000) using Japanese enterprises, concluding that the effect of diversification on business performance varies over time and that international diversification negatively affects business performance. Click and Harrison (2000) concluded that the value of multinational enterprises is discounted by 8.6%–17.1% relative to that of domestic enterprises when using Tobin's Q as a proxy for enterprise value.

Click and Harrison (2000) further examined why enterprises choose to become multinationals, showing that the proportion of an enterprise that the management owns is inversely related to the probability that the enterprise will become a multinational. Therefore, they argued that managers who own a small share of the enterprise can build a huge multinational enterprise for private gain, at the expense of shareholders.

The negative relationship between internationalisation and business performance is mainly owing to the high sunk costs of entering new markets. According to classical FDI (Foreign Direct Investment) theory, enterprises face many challenges when entering international markets. Indeed, enterprises need to set up entirely new production subsidiaries, which is expensive and will reduce their competitiveness. Furthermore, the newly established subsidiaries require time to adapt to the local market and gradually improve their business efficiency in a learning-by-doing process, which also increases the average cost of production. As international enterprises established in different geographic regions face cultural diversity, they are likely to encounter problems in communication, coordination, and motivation (Barkema et al., 1996). Furthermore, the complexity of internal management increases with market heterogeneity, leading to increased costs for business owners to monitor management decisions, thereby further increasing the cost of international diversification.

A nonlinear relationship between the level of diversification and business performance has also been suggested. Grant et al. (1988) were the first to propose this, suggesting that there exists an inverted U-shaped relationship

between diversification and business performance, indicating moderate diversification is conducive to improving business performance, whereas excessive diversification negatively affects it. However, the authors only focused on the correlation between industrial diversification and business performance and failed to prove the causal relationship between them. Using American and European multinationals, Geringer et al. (1989) showed that there exists an inverted U-shaped relationship between international diversification and business performance. Ramaswamy (1995) used data from American pharmaceutical enterprises to study the connection between multinational operations and business performance. The results confirmed the inverted U-shaped relationship between international diversification and business performance. Ramaswamy also determined the inflection point of this relationship, leading to the optimal level of diversification. Lu and Beamish (2004) proposed and verified an S-shaped relationship between business performance and the level of international diversification. Specifically, when the level of international diversification is low, the relationship is U-shaped. When the level is moderate, the relationship is inverted U-shaped. When the level of international diversification exceeds a certain threshold, there is a negative correlation between international diversification and business performance. Denis et al. (2002) argued that product diversification and international diversification influence each other, suggesting that these two types of diversification are complementary rather than alternatives. On average, internationally diversified enterprises experience a discount in the value of their assets relative to domestic enterprises operating within the same sector. Moreover, the results of multivariate analysis showed that after considering

other factors that can influence excess value, international diversification leads to discounts that are similar in magnitude to those of industrial diversification. Specifically, the discount of enterprises with industrial diversification but no international diversification is 0.20; that of enterprises with global diversification but no industrial diversification is 0.18; and that of enterprises with both industrial and global diversification is 0.32. Hitt et al. (1997) showed that there exists an inverted U-shaped relationship between business performance and the level of international diversification; i.e., business performance increases, then stabilises, and then declines with the increasing level of international diversification.

Diversification strategies reduce enterprise value due to increased agency costs. The principal–agent problem is one of the most important problems in economics. The value orientation of enterprise owners and managers is not necessarily consistent. Whereas shareholders seek to maximise their value as one of the goals of corporate decision-making, managers' goals may be different. Indeed, managers often act for their own benefit, which can be to the detriment of shareholders. Therefore, enterprises must implement mechanisms to incentivise managers to serve the goal of maximising the interests of owners, which is often accompanied by additional costs. These problems become more pronounced as the business structure becomes more complex, in turn increasing agency costs. The cost associated with principal–agent problems was confirmed by Scharfstein and Stein (2000), who found that the rent-seeking behaviour of department managers subverts the internal capital

market and leads to inefficient investments, and that diversification further increases this cost.

Another important reason why diversification strategies reduce operational efficiency is that they increase the inefficiency of resource allocation. Rajan et al. (2000) studied the resource allocation process among different departments in diversified enterprises. Their model showed that with the diversification level increasing, resource allocation becomes more distorted, resulting in a flow of resources to the least efficient departments, inefficient investments, and loss of enterprise value. Similarly, Jensen (1986) found a higher level of investment in negative cash flow projects among diversified enterprises than among non-diversified enterprises, proving the great inefficiency of resource allocation among business lines within enterprises. Meyer et al. (1992) reinforced the argument that diversified enterprises suffer greater losses due to subsidies to poorly managed sectors, while relatively independent sectors suffer smaller losses.

2.3 Impact of Diversification Strategies on Operational Risk

In their operating process, enterprises face risks related to market, finance, policy, law, natural disasters, and other aspects. By introducing different products or entering different markets, enterprises can reduce their dependence on a single product or market, disperse their operational risks, and ensure stable business performance. Using the book value of debt, Glaser and Muller (2010) found that the distress risk and equity volatility of diversified enterprises are lower, showing that diversification can reduce operational risks.

Zhang and Gao (2020) analysed M&As conducted by Chinese listed companies domestically and internationally, examined the impact of diversification strategies on enterprises' business risks, and explored the underlying mechanisms. They found that international diversification can help enterprises withstand the impact of domestic single market volatility, thus reducing structural risks.

Compared with domestic enterprises, international diversification can reduce the risk level faced by enterprises in many aspects. First, international diversification offers a multinational market base to enterprises, allowing them to respond to the aggressive actions of their rivals (Hamel & Prahalad, 1985; Kim & Mauborgne, 1988), thereby reducing their likelihood of facing challenges from competitors. Second, being established in multiple markets enables enterprises to reduce the effects of unfavourable changes in wage and interest rates as well as commodity and raw material prices in a country by allowing them to easily relocate production and sourcing to other, more favourable national markets (Kogut, 1983, 1985). Global market fragmentation frees enterprises from the vagaries of supply and demand in national markets, smoothing out fluctuations in income streams. Overall, decentralisation in an international market gives enterprises the operational flexibility to reduce volatility in earnings and profits. The above discussion shows that international diversification has unique advantages that can simultaneously bring more benefits to enterprises and mitigate their risks.

When domestic and foreign markets face imperfectly correlated demand shocks, transnational commercial deployment contributes to stabilising the

aggregate demand faced by enterprises, differentiating according to different national markets, and achieving imperfectly correlated income flows between countries (Kogut, 1985; Rugman, 1976), thereby stabilising total income. These advantages make international diversification an effective way to reduce business risks. Using the investment portfolio method, Rugman (1976) and Casson (1999) clearly demonstrated the effect of international diversification on corporate risk. They argued that international diversification disperses market risk and stabilises cash flows. Relevant studies (e.g., Eckert et al., 2010; Jacquillat & Solnik, 1978) have also shown that in fully integrated capital markets with sufficiently low transaction costs, investors can benefit more from international diversification by investing in internationally diversified portfolios.

The above analysis shows that moderate diversification not only improves performance but also reduces risk, forming a combination of high return and low risk. Bettis and Hall (1982) found that strongly correlated diversification strategies have a negative risk–return relationship; unrelated diversification strategies have a positive risk–return relationship; and limited correlated diversification strategies have no relationship. These results suggest that the link between risk and return differs across types of product diversification strategies. Bettis and Mahajan (1985) expanded the study of Bettis and Hall (1982), showing that although it is difficult for uncorrelated diversification to achieve favourable risk–return performance, correlated diversification also does not guarantee this outcome. Nevertheless, they found that related diversification can simultaneously reduce risk and improve returns. Some scholars have challenged the idea that international diversification

reduces risk and enhances income stability. Hennart (2007) argued that it is difficult to significantly reduce non-systemic risk by decentralising to different countries because enterprises usually concentrate their overseas sales activities geographically, institutionally, and culturally. Therefore, they often have similar business cycles, so income streams from these countries are correlated and cannot achieve the purpose of risk diversification. In addition, Hennart pointed out that international diversification brings a series of operational risk issues caused by higher internal transaction costs, foreign debt and foreign exchange risks, government regulations, and international trade regulations, among others, which can increase systemic risk. Therefore, international diversification can lead to a net increase in risk.

Lubatkin and Chatterjee (1994) focused on diversification and stock volatility and found a U-shaped relationship between the two for both systematic and non-systematic risks. Wu and Zhang (2015) tested whether diversification affects enterprises' financial risk. Taking Chinese listed companies as their research object, they found that diversification increases the financial risk of enterprises and cannot lead to effective risk diversification. They suggested that the main reason for this finding is that Chinese enterprises are less mature than other enterprises and unable to make the most effective diversification decisions, which reduces their operational efficiency.

With recent increasing attention in academia to various types of risk shocks, scholars are increasingly focusing on the effect of diversification on enterprises' ability to withstand shocks. Many scholars have argued that in terms of performance, diversified enterprises are less affected than non-

diversified enterprises by risk shocks. For example, Aivazian et al. (2019) used the asset price crisis in the IT industry in the US in 2000–2001 as a natural experiment to prove that product diversification can hedge against risks. Their research showed that the 2000–2001 asset price crisis brought great risks to enterprises in non-IT industries, leading to a reduction in their investment levels and value. However, when the crisis spread from the IT industry to other industries, diversified enterprises were better able to withstand the economic shock than non-diversified enterprises. In addition, Rajan et al. (2000) showed that competition for capital between sectors and the efficiency of top management in selecting the right investments in diversified enterprises during a financial crisis increase enterprise value. Matvos and Seru (2014) also suggested that diversified enterprises can significantly reduce the impact of financial shocks by redistributing resources within different sectors. Giroud and Mueller (2015) argued that for diversified enterprises, if there exists a positive impact on investment opportunities, total productivity will increase due to the allocation of resources across the enterprise. Similarly, Volkov and Smith (2015) found a substantial improvement in the relative value of diversified enterprises during recessions. Kuppuswamy and Villalonga (2016) showed that during the 2007–2009 financial crisis, the value of diversification increased because business groups were better able to allocate their internal capital. They further argued that diversification constitutes a strong guarantee for investors.

2.4 Policy Uncertainty and Business Performance

Enterprises face different types of risks during their operating process. Depending on whether such risks are affected by the enterprise's own behaviour,

this thesis divides risks into external and internal risks. Internal risks are caused by the enterprise's own decision errors, such as lack of product competition due to outdated production technology or waste of raw materials due to poor management, which leads to higher production costs. External risks arise from external factors that are not controlled by enterprises, such as the changing external environment (e.g., survival of the fittest accompanied by new technologies, strengthening of government regulations, changes in government industrial policies, international market fluctuations, international trade barriers, and changes in the international financial environment), which affect business income and lead to operational risks. In recent years, international policy risks have increasingly become the focus of academic research. For instance, Wang et al. (2019) studied the impact of changes in China's environmental protection policies on enterprises. Using the change in the sewage charge policy as a natural experiment, they found that tighter environmental policies dampen job growth in industrial enterprises.

Chen and Wang (2016) assessed the effect of tax policy changes by examining the influence of the VAT in lieu of business tax reform on specialisation using data from Chinese listed companies from 2008 to 2014. They used the DID method to study the change in the business scope of enterprises affected by the VAT in lieu of business tax reform before and after the reform. The results showed that many previously self-sufficient enterprises began to branch out into related areas of business after the reform, which increased their revenue, suggesting that the tax reform promotes specialisation in related fields and increases business revenue. They also found that some

service enterprises benefited from greater outsourcing of their activities to other players after the reform, proving once again that the VAT in lieu of business tax reform facilitates specialisation.

Liu et al. (2019) studied the effect of mixed ownership reform of Chinese SOEs. Using enterprises' total factor productivity (TFP) as the dependent variable, they found that the ownership reform significantly improves productivity. They further compared the effects of different degrees of ownership reform and found that mixed ownership reform more substantially influences efficiency than fully privatised reform does, while non-state-controlled mixed reform has a more limited effectiveness in increasing TFP and only affects certain industries.

The degree of diversification (an important risk mitigation strategy) has been shown to be strongly correlated with economic policy uncertainty (EPU). Hoang et al. (2021) found that EPU was positively associated with the diversification of Chinese enterprises between 2001 and 2007. The positive effect of EPU on diversification was significant only for large and medium-sized enterprises, with high EPU leading to greater diversification. Their results also showed that EPU affected the diversification of SOEs more than that of non-SOEs. When EPU was high, enterprises with a large number of equity analysts and equity reports increased their diversification. Furthermore, diversification positively mitigated the risks associated with economic policy and improved business performance. Their results were robust to alternative specifications of EPU and enterprise diversification and did not change when taking steps to account for endogeneity.

2.5 Literature Review

The literature on diversification strategies has primarily focused on the way in which diversification influences enterprises' performance and operational risk levels in the long term, paying little attention to the impact of major restrictive policies. Furthermore, the literature on diversification and enterprises' ability to withstand risks has mainly focused on macroeconomic shocks, paying less attention to policy shocks. With scientific and technological advances and the development of society, new forms of enterprises are constantly emerging. As related industries often involve innovative technologies and new business models, the legal framework may not be fully established or adapted to the rapidly changing market environment, and relevant regulations and regulatory measures may be immature or unclear. With the development of industry, to regulate the economic order and maintain fair competition, authorities have the option of enacting new laws or policies to standardise the management of emerging industries. In this process, the original business model of enterprises may become obsolete if it violates the new law, requiring adjustments to meet the requirements of this new law, thereby creating huge operational risks for enterprises. Because of their low frequency, policy shocks have received limited attention in academia. However, compared with other risk events, major policy shocks usually strongly affect the entire economy or an entire industry, leading to disruptive and destructive effects. Therefore, it is essential to systematically study whether major policy risk events affect business operations and identify feasible adaptation strategies. Moreover, research on diversification strategies has focused on product diversification and

international diversification, but has failed to further distinguish between diversification involving different industries and product diversification within the same industry. Based on a quasi-natural experiment and using the reform of the game licence approval system in 2018, this thesis examined the impacts of product, industrial, and international diversification on enterprises' ability to withstand risk shocks. We also analysed how to prevent the effect of such major policy changes.

Chapter III Research Hypotheses and Model Setting

Based on a quasi-natural experiment, this work investigated the impact of a policy shock (i.e., the reform of the game licence approval system in 2018) on business performance and explored whether diversification strategies can effectively enhance the ability of enterprises in the Chinese game industry to withstand this policy shock. The study focused on two dimensions: the DID method was used to test for the presence of a significant decline in the performance of game enterprises before and after the licence approval system reform, and to study how the strategy of diversification affects the ability of enterprises to withstand shocks. In terms of diversification strategies, this study explored the impacts of product, industrial, and international diversification on enterprises. Therefore, the study was divided into four parts: the first part identified the effect of the policy shock on the performance of game enterprises; the second part studied whether product diversification can reduce this effect; the third part examined whether industrial diversification can help enterprises mitigate the adverse impact of the policy shock; and the fourth part explored whether international diversification can help enterprises lessen the deleterious effect of the policy shock.

3.1 Research Hypotheses

The reform of the game licence approval system directly affects enterprises by restricting the supply capacity of new products, which reduces the number of products that enterprises can operate in the market. In general, an increase in the supply of new products is beneficial for enterprises to maintain

their competitiveness and increase their profitability (Sok & O'Cass, 2015; Sorescu & Spanjol, 2008). Innovative products bring more positive consumption experience and utility to customers. By continuously offering new products, enterprises can create greater benefits for consumers, enhance customer loyalty, and enjoy higher reputation benefits, thereby increasing sales, gaining more stable market share, and improving their performance. In addition, the introduction of new products can enable enterprises to continuously innovate product categories, functions, attributes, and technologies, create product differentiation advantages, develop new businesses, expand into new markets, and attract new customers to improve their performance.

As mentioned in Research Background (Section 1.1), the reform of the game licence approval system implemented in 2018 brought two main changes. First, the number of online games approved plummeted after the reform. Between April and November 2018, licence approval was suspended and few new games were launched during this period. After licence approval resumed, more than 1,300 games were released in 2019 and 2020, representing an 80% drop from 2017. Second, the licence application time for online games has increased, often taking 8–18 months in 2019 and beyond. In terms of the operation of the game industry, the reform of the game licence approval system has had a profound impact on game enterprises. In practice, the reform leads to a reduction in the supply of new games in the game industry, resulting in a decline in income for game enterprises. Licence approval also lengthens the R&D cycle of games, increasing costs for game enterprises. The reform of the game licence approval system directly reduces the supply of new games, thus

limiting the channels for enterprises to continuously introduce new products to increase sales and establish product advantages. The above analysis reveals that the reduction in new game products is not favourable for improving business performance. Compared with normal times, this reform is likely to negatively impact the game enterprise performance. Therefore, we hypothesise as follows:

Hypothesis 1: Reform of the game licence approval system negatively affects the performance of game enterprises.

With the licence approval reform, the production of new games has been reduced. As enterprises that adopt product diversification have a greater variety of games and are more attractive to users, they can improve their performance by exploiting the performance potential of various games. However, product diversification also has negative effects, as the reform of the licence approval system lengthens the R&D cycle of games, and early investments cannot generate income in the short term, which will raise the average R&D cost of enterprises. The more game products offered by enterprises simultaneously, the greater their initial investments, and the more obvious the increase in average cost; therefore, the reform of the licence approval system may reduce business performance through a cost effect. In addition, research has shown that unrelated diversification can increase enterprises' risk hedging ability (Kuppuswamy & Villalonga, 2015). For the policy shock studied in this thesis, game product diversification is a type of related diversification, affecting the production of all game products. Therefore, it is difficult for enterprises to disperse risks through product diversification in the game industry. As product diversification cannot help enterprises solve the problem of limited supply of

new game products and increases their average R&D cost, this strategy is unlikely to improve business performance. Therefore, we hypothesise as follows:

Hypothesis 2: Game product diversification cannot reduce the impact of the licence approval system reform on business performance.

By simultaneously operating a variety of business lines, enterprises can obtain mutual subsidies, share resources between different business lines, and achieve greater market share to improve their competitive advantage and business performance by obtaining more operating resources (Weston, 1970). Regarding the policy impact studied in this thesis, the reform of the game licence approval system only affects the supply of new products in the game industry, whereas other industries are not directly affected. Therefore, the reform only directly affects the income of game enterprises, whereas other enterprises still have relatively stable income after the reform. Furthermore, enterprises involved in multiple business sectors can reallocate some resources to other industry lines following a risk shock, thereby enhancing the overall efficiency of resource utilization. Additionally, funds generated from other business sectors can be reinvested into the gaming industry, thereby improving the resilience of the enterprise. Therefore, enterprises whose business income is not related to games should be less affected by the policy shock. As such, we propose the following hypothesis:

Hypothesis 3: Industrial diversification can mitigate the influence of the licence approval system reform on business performance.

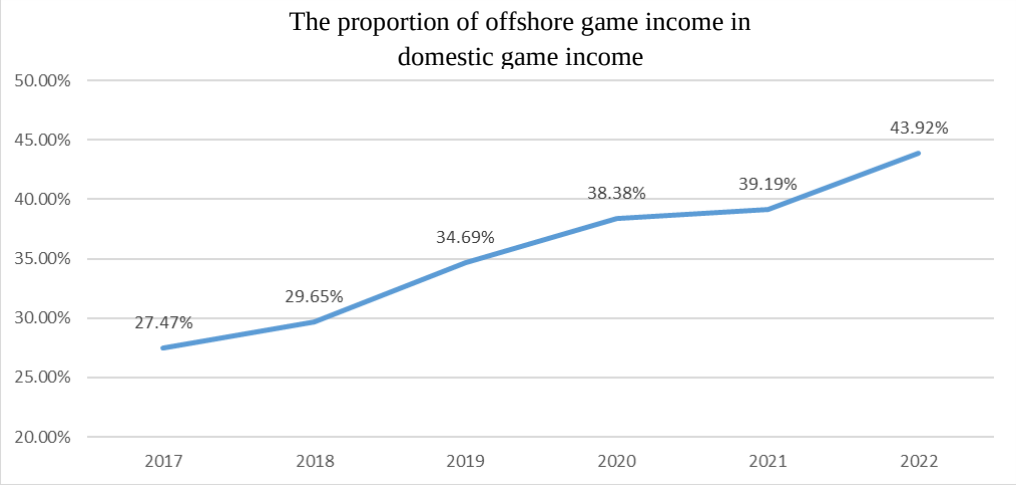
By expanding the scope of target markets, enterprises can achieve economies of scale and scope (Caves, 1971; Hymer, 1976; Kobrin, 1991), while learning from their operating experience in foreign markets increases their knowledge base and capabilities (Barkema & Vermeulen, 2001; Zahra et al., 2000). Moreover, multinational operations can diversify operational risks (Kim, 1993) to achieve economic benefits. The reform of the licence approval system only affects the domestic distribution of games, while foreign distribution is not restricted. Therefore, this reform only affects the domestic business income of game enterprises, not their foreign business income. Throughout the development process of the Chinese online gaming market, domestic game companies have adapted to local market trends and established themselves in the mobile gaming sector. Within a few years, they became competitive, with domestically developed games accounting for nearly 80% of the domestic market share. In 2018, China began reforming its game approval system, prompting domestic gaming companies to increase their investment in international development and embark on overseas expansion. As they expanded into vast overseas markets, domestic gaming companies leveraged their competitive advantages in the mobile gaming sector to achieve significant breakthroughs, resulting in a substantial increase in overseas gaming revenue that year. In 2020, the global outbreak of the COVID-19 pandemic led to a surge in demand for online entertainment, driving simultaneous growth in both domestic and overseas gaming markets. Chinese gaming companies took advantage of this opportunity and experienced a second wave of substantial growth in overseas gaming revenues. As shown in Figure 3.1, according to data compiled by the China Audio-Video and Digital Publishing Association's Game

Committee, the proportion of overseas gaming revenue to domestic gaming revenue has been steadily increasing since 2018. By 2022, revenue from overseas gaming enterprises had reached more than 40% of their total domestic revenue, making the overseas market an extremely important source of income for Chinese gaming companies. If the policy change negatively affects the performance of game enterprises, enterprises with a large volume of overseas business may be less affected. Therefore, the greater the percentage of foreign business income, the lower the impact on business performance. In addition, international diversification can mitigate the effect of this reform on business performance. As such, we propose the following hypothesis:

Hypothesis 4: Enterprises that go global can mitigate the effect of the licence approval system reform on business performance, such that the higher the proportion of overseas business income, the smaller the impact on performance.

Figure 3.1

Proportion of Overseas Game Income in Domestic Game Income



The above four hypotheses were tested using econometric methods with real data.

3.2 Model Identification and Model Setting

Academic research based on the event analysis method has developed rapidly in recent years, especially policy evaluation based on the DID method, which has become common in economic research. Because of their exogenous nature, policy events provide ideal quasi-natural experiments for evaluating economic effects, making it convenient to observe changes in research objects before and after the implementation of a policy using the DID method. The DID method is intuitive: researchers first observe changes in the group to which the policy applies (i.e., the treatment group) before and after the implementation of the policy; second, they observe changes in the group not affected by the policy (i.e., the control group) following the policy's enactment. The difference in changes between the two groups represents the policy effect. The DID method is standard for evaluating important policy effects because of its intuitive understanding and simplicity. Zhou and Chen (2005) were the first in China to use the DID method for policy evaluation. They analysed the effect of China's reform of rural taxes and fees on income growth for farmers using county-level economic data and found that the reform contributed more than 40% to farmers' income growth. Chen and Xiong (2015) used the DID method to study the effectiveness of the industrial policy of establishing national export processing zones in China based on microdata from Chinese industrial enterprises from 1998 to 2007. They found that the creation of such zones increased the export volume of the enterprises involved. Liu et al. (2016) used the DID method to

test whether China's SOE ownership reform affects production efficiency. Wang et al. (2019) applied the 2003 sewage charge revision event as a quasi-natural experiment and analysed the impact of environmental policy changes on enterprises using the DID method.

This thesis used the DID method to study the change in business performance before and after the policy shock (i.e., the reform of the licence approval system), and explored the effects of strategies of diversification on the degree of change in business performance. In practice, many factors can affect business performance, such as macroeconomic trends, industry trends, and different operational strategies, which have a considerable impact on business operations; external policy shocks are therefore only one of many factors. As such, this thesis focused on how to identify the policy effect of the reform of the licence approval system.

We first explain how we identified the effect of this policy shock on business performance through econometric methods. We cannot directly compare changes in business conditions before and after the policy shock, because even without the policy shock, business performance will change. Therefore, we compared the policy effect using the following two variables: the actual performance of an enterprise after the reform, and the performance of the enterprise without the reform. In other words, to show the impact of the policy shock, we compared the actual situation with a fictitious ideal situation. However, because this hypothetical situation does not exist, we could not obtain relevant results through direct observation. Therefore, we applied statistical methods to make statistical inferences about this ideal situation based on

reasonable assumptions. The DID method was a suitable analytical method for such statistical inferences. Indeed, its key principle is to select a control group unaffected by the policy that is similar to the treatment group affected by the policy. Assuming that the treatment and control groups change similarly under natural conditions, we were able to infer how much the treatment group would change in the absence of the policy shock according to the natural changes in the control group. We then determined the effect of the policy shock on the treatment group.

We adopted the following identification methods. First, we selected application software enterprises other than game enterprises as the control group. Because the business models of these two types of enterprises are similar, it was assumed that they would experience similar performance growth after controlling for the main variables. At the same time, as the reform of the licence approval system only affects game enterprises and has no direct effect on other enterprises, software enterprises were used as the control group to identify the effect of the policy shock using the DID method. Specifically, after controlling for the characteristics of each enterprise and industry, if there is no policy effect, game enterprises and other Internet enterprises should have the same performance trend; conversely, the policy effect should lead to different changes in performance between the two types of enterprises. Therefore, by comparing the performance of non-game enterprises before and after the reform, we could infer the benchmark performance of all enterprises without the policy shock; then, by comparing the performance changes in game enterprises with the benchmark performance, we could obtain the policy effect on business

performance. As the reform was implemented in 2018, the policy effect on the performance of game enterprises in 2019 was expressed by the following formula:

$$\Delta = E(R|2019, game, actual) - E(R|2019, game, nopolicy) \quad (3.1)$$

where R indicates business performance, $E(R|2019, game, actual)$ is the actual performance of game enterprises after the implementation of the policy, and $E(R|2019, game, nopolicy)$ is the performance of game enterprises in the absence of the policy shock. As $E(R|2019, game, nopolicy)$ cannot be observed directly, we used the following method to estimate this variable:

$$\begin{aligned}\Delta = {} & E(R|2019, game, actual) - E(R|2019, game, nopolicy) \\ = {} & E(R|2019, game, actual) - E(R|2017, game) \\ & - [E(R|2019, game, nopolicy) \\ & - E(R|2017, game)] \\ = {} & E(R|2019, game, actual) - E(R|2017, game) \\ & - [E(R|2019, nongame) - E(R|2017, nongame)]\end{aligned} \quad (3.2)$$

where $E(R|2017, game)$ is the income growth rate of game enterprises pre-reform; $E(R|2019, nongame)$ is the income growth rate of non-game enterprises post-reform; and $E(R|2017, nongame)$ is the income growth rate of non-game enterprises pre-reform. The following assumption was used:

$$E(R|2019, game, nopolicy) - E(R|2017, game) =$$

$$[E(R|2019, nongame) - E(R|2017, nongame)] \quad (3.3)$$

Equation (3.3) indicates that without any policy shock, the treatment and control groups should have the same growth rate. Using this substitution, we decomposed the impact of the policy shock on the treatment group into two steps. The first step in the differential process was to calculate the changes in performance of the treatment and control groups separately. The second step was to compare the differences in performance changes between the treatment and control groups.

However, when conducting this research, we had many observations before and after the policy shock. As a result, the DID process described above was used with the following regression:

$$R_{i,t} = c + \alpha * policy_t + \beta * game_i + \delta * policy_t game_i + \phi X_{i,t} + \varepsilon_{i,t} \quad (3.4)$$

where $R_{i,t}$ is the performance of enterprise i at time t. $policy_t$ is the policy dummy variable. As the policy effect occurred in the second quarter of 2018, $policy_t$ takes a value of 0 before the second quarter of 2018 and a value of 1 after the second quarter of 2018, and does not change over time. $game_i$ is the industry dummy variable, taking a value of 1 for enterprises belonging to the game industry and 0 for other enterprises. $X_{i,t}$ is a vector of control variables, including all indicators that can affect the business situation of an enterprise.

In Equation (3.4), α represents the change in performance over time across all industries under normal circumstances, and β represents the average performance gap between game and non-game enterprises. The interaction term between $policy_t$ and $game_i$ is the key variable of this study and the core DID variable. Its coefficient δ represents the impact of the new policy on game enterprises. If δ is less than 0, it indicates that the policy reduces the performance of game enterprises. According to the similarity of industry classification, we used enterprises most similar to game enterprises as the control group. In the Wind industry classification, there are three subcategories within the Wind software category: Wind home entertainment software, Wind system software, and Wind application software. Game enterprises belong to the Wind home entertainment software subcategory. System software belongs to core IT services and is primarily used to support the development and operation of application software. Its operation and profit model differ greatly from those of the user-oriented game industry and application software. Additionally, in terms of sample size, fewer than 10 enterprises belong to the system software subcategory, while the number of application software enterprises reaches hundreds. Therefore, we selected enterprises belonging to the Wind application software subcategory as the control group. Both the control and treatment enterprises were software development enterprises, with strong similarities in terms of underlying technology, product development, and product operations. Therefore, we assumed that the control and treatment groups would show similar performance development trends after controlling for the main variables.

After determining the impact of the policy shock on game enterprises using Equation (3.4), we tested whether different diversification strategies would change the impact of the policy shock. To explore the effect of diversification strategies on enterprises' ability to withstand shocks, we used the DID method for regression based on the following model:

$$R_{i,t} = c + \alpha * policy_t + \beta * div_i + \delta * policy_t div_i + \phi X_{i,t} + \varepsilon_{i,t} \quad (3.5)$$

where div_i is a dummy variable representing diversified enterprises, taking a value of 1 for diversified enterprises and 0 for other enterprises. In this research, we assigned values to the diversification dummy variables according to the diversification strategy adopted by enterprises and explored the effect of the corresponding diversification strategy on enterprises. $policy_t$ is the policy dummy variable. In the regression, β represents the difference in performance between diversified and non-diversified enterprises. Specifically, after controlling for X, if there is no policy change, the performance of diversified enterprises will be better than that of non-diversified enterprises at any time by β. δ is the difference in performance between diversified and non-diversified enterprises caused by the policy shock, that is, the actual effect of the policy on the performance of diversified enterprises.

Equation (3.5) and Equation (3.4) differ in that the sample used for the regression in Equation (3.4) included only game enterprises. In the regression in Equation (3.5), we used diversified (non-diversified) enterprises as the treatment (control) group, to examine the difference in performance changes

between the two groups after the policy shock and infer whether diversification strategies affect enterprises' ability to withstand risk shocks.

Chapter IV Research Data

4.1 Sample Selection and Data Sources

In this work, Chinese listed game enterprises were used as the benchmark research sample. At present, Chinese game enterprises are mainly listed on the Shanghai Stock Exchange, the Shenzhen Stock Exchange (A shares), and Hong Kong Exchanges and Clearing (H shares). We selected game enterprises based on the standard industry classification of the Wind Data Terminal. After screening, we obtained 33 A-share listed enterprises and 23 H-share listed enterprises. Because Hong Kong-listed enterprises do not have strict information disclosure standards, many H-share enterprises do not disclose their financial data quarterly like A-share enterprises. We identified six H-share game enterprises with complete financial data. However, the disclosure of industry data for H-share listed enterprises is different from that of A-share listed enterprises. For example, Tencent classifies the game industry as value-added services and does not list its income separately. Therefore, we excluded H-share listed enterprises from the sample. In addition, we excluded enterprises listed after 2017 and those with special treatment (ST) status due to problems in their operations. Because there are no uniform disclosure standards for enterprise diversification data, we were unable to obtain diversification data for all enterprises. Therefore, we selected different research samples based on the data available when studying different issues.

We focused on A-share listed game enterprises. Their financial data came from the GTA and Wind databases, from which we collected basic information on their balance sheets, profit statements, and main business

revenues from different regions and industries. We obtained information about the game products listed by the sample enterprises from the two major application store platforms, Apple Store and Google Play. The game product data of game enterprises on the two platforms came from the Yilan database, which provides the name of game products and classifies these products according to a unified standard, with two levels of classification (i.e., first-level and second-level categories) available. However, the products listed on the above two platforms are only mobile app games running on Android and IOS systems, and there are no detailed data on other types of game products such as PC games and web games. Therefore, the game product data we obtained could not fully cover all enterprises' products. Because some enterprises mainly offer PC games, the product data used in this study only included selected game enterprises. In summary, to study product diversification, we identified two flaws in the data: the data did not cover all enterprises and they did not cover all products of the selected enterprises. Nevertheless, the data used in this study are the only data available to study product-level corporate strategy in current diversification research. Furthermore, due to the large number of mobile games and the high proportion of income, this research is representative and offers valuable conclusions for future use. To ensure that the diversification strategies adopted by enterprises were not affected by the policy shock and to guarantee the exogenous nature of the core explanatory variables, we only used data on game products launched in 2017 and before for this research. To test Hypotheses 2–4, we focused on game enterprises as our research object.

4.2 Variable Definition and Measurement

We used econometric methods to quantify the impact of diversification strategies on enterprises' ability to withstand shocks. First, we define the variables for the quantitative analysis and the diversification strategy indicators. Unlike previous studies on the effects of diversification strategies on business operations, using the volatility of financial indicators as the dependent variable, we focused on a single policy shock and explored the change in business performance caused by this policy shock, using business performance as the dependent variable. To measure diversification strategies, we conducted our quantitative analysis in three aspects: product diversification, industrial diversification, and international diversification.

4.2.1 Dependent Variables

ROA is the standard metric of profitability. In this study, we used *ROE* and *ROA* to measure business performance. Tobin's Q is often used as a measure of business performance, but this metric indicates how market value differs from book value, including the assessment of capital market value. If the capital market is ineffective, that is, market value cannot effectively reflect changes in actual profitability, Tobin's Q cannot fully reflect changes in business operations. As we focused on the effect of the policy shock on enterprises' operations and fundamentals, it was reasonable to use *ROA* and *ROE* as dependent variables.

ROA was defined as net profit divided by total assets, and *ROE* was defined as net profit divided by net assets.

4.2.2 Core Explanatory Variables

The core explanatory variables were the policy dummy variable, the industry dummy variable, and the diversification index. We studied the impacts of product diversification, industrial diversification, and international diversification on enterprises' ability to withstand shocks. Most studies have not distinguished between product diversification and industrial diversification, and enterprises producing different types of products have generally been treated as being involved in different industries and classified as industrial diversification. Moreover, enterprises generally only disclose income data from different industries, which does not further distinguish between industrial diversification and product diversification. However, because of the particularity of products in the game industry, we conducted a more in-depth analysis of the categories of game products to further explore the effect of product diversification.

In terms of the product diversification indicator, online game product data follow various classification standards. Online games can be divided into web games and terminal games based on the presentation form; computer games and mobile games based on the carrier; and strategy games, simulation games, war games, and other types of games based on content. However, there is no database or corresponding classification system covering all online game products, so we quantified the extent of product diversification using the game product data obtained from Google Play and Apple Store. The game products on the platforms are classified according to a unified standard. There are two levels of classification: the first-level category and the second-level category. For example, Siegelord, a game product offered by 37 Interactive Entertainment,

belongs to the Strategy category according to the first-level classification and to the 4XMarch-Battle category according to the second-level classification. In this study, the game product categories were determined by the number of first-class categories involved, and the product diversification index was calculated accordingly.

Regarding the industrial diversification index, the literature on industrial diversification has generally used the number of industries involved to determine the presence of industrial diversification. Listed enterprises disclose their main business and level of income from different main operations in their financial reports. We measured the industrial diversification index according to the main business income disclosed by the sample enterprises. In empirical research, indicators such as business units or the Herfindahl index (H index) (Xue & Zhou, 2007) are generally used to measure. We used the H index of an enterprise's business income based on the following formula:

$$H_i = 1 - \sum_j \left(\frac{X_{i,j}}{Y_i}\right)^2 \tag{4.1}$$

where $X_{i,j}$ is the business income earned by enterprise i in industry i, and Y_i is the total business income earned by enterprise i. If an enterprise's income comes entirely from a single industry K, $X_{i,k} = Y_i$; therefore, $H_i = 0$. With the gradual increase in the number of industries in which an enterprise participates, the cumulative value gradually approaches 0, so H_i approaches 1. Therefore, the value of the H index is between 0 and 1. The higher the value of the index, the greater the level of diversification. However, there is no uniform

standard for classifying an enterprise's main business when the enterprise discloses it. For example, the main business of Perfect World disclosed in its 2017 annual report included mobile online games, PC online games, TV dramas, cinema, console games, artist brokers and variety shows, other main activities related to film and television, and other main activities related to games and other activities. The income disclosed by Bingchuan Network came from four categories, Longwu, Expedition OL, Invincible Legend, and others. The lack of disclosure standards poses challenges for classifying industrial diversification. When analysing the level of industrial diversification of game enterprises, we classified all game products and enterprises containing "games" and "online games" in their business names as game industries, and classified all game products such as Bingchuan Network as game industries, without special treatment for other industries. The number of industries was calculated according to the original classification of enterprises.

Regarding the international diversification indicator, all A-share listed enterprises disclose their main business income by region in their financial reports, but there is no uniform disclosure standard. For example, Perfect World only divides its income sources into domestic and overseas, while Ciwen Media divides its income sources into Central, East, North, Northeast, Northwest, Overseas, South, and Southwest China. Overseas income in the classification also differs. In this study, all income containing the terms of "overseas," "foreign," "export," and "Hong Kong, Macao, and Taiwan" in the classification field was classified as overseas income, and the rest was classified as domestic income. We then calculated the proportion of overseas income based on the

information disclosed in financial reports, and divided enterprises into internationally diversified enterprises and non-internationally diversified enterprises according to this proportion. Enterprises do not disclose the income of each industry and region separately, they only disclose the share of total income from different regions. Therefore, we did not distinguish between game industry income and non-game industry income and only focused on the total income of enterprises.

4.2.3 Control Variables

The main control variables were as follows. (1) Enterprise size (*ln_asset*), calculated as the logarithm of total assets. There is a close link between business scale and profitability. In general, the larger the business scale, the lower the rate of return. In this study, there was also a correlation between business scale and diversification strategy, because the more industries the enterprise participates in, the larger its scale. Therefore, if we did not consider business scale, it could lead to biased estimates of the effect of diversification strategies. (2) Sales expenses (*ln_sale*), calculated as the logarithm of sales expenses. Because sales expenses reflect the direct costs of an enterprise to increase its performance, the increase in sales expenses can promote performance improvement, so the level of sales expenses is also an important factor in determining business performance. (3) Leverage ratio (*lev*), calculated as the ratio of total liabilities to total assets. The leverage ratio measures the change in the financing ability of enterprises. Kuppuswamy and Villalonga (2015) showed that because diversified enterprises are more likely than non-diversified enterprises to obtain external financing, their leverage growth is

greater than that of non-diversified enterprises. We used the leverage ratio as a control variable of financing ability in the regression to directly examine the effect of diversification strategies on profitability after controlling for the causes of financing constraints.

The main variables used in our regression are presented in Table 4.1.

Table 4.1

Definition of Variables

Variable	Description	Definition
ROA	ROA	Net profit divided by total assets
ROE	ROE	Net profit divided by net assets
policy	Policy dummy variable	0 before the second quarter of 2018 and 1 after the second quarter of 2018
game	Industry dummy variable	1 for enterprises in the game industry and 0 for those in non-game industries
product_num	Product diversification indicator	Number of game categories
product_div	Product diversification dummy variable	1 if the number of game categories is greater than 3, and 0 if the number of game categories is less than or equal to 3
oversea	International diversification dummy variable	1 if the proportion of overseas income is greater than 10%, and 0 otherwise
indu	Industrial diversification dummy variable	1 if the H index is greater than 0.4, and 0 if it is less than or equal to 0.4
H	Industrial diversification indicator	Calculated based on the income share of different industries
overseainc	Proportion of overseas income	–
ln_asset	Logarithm of total assets	–
ln_sale	Logarithm of sales expenses	–
lev	Leverage ratio	Total liabilities divided by total assets

For the diversification dummy variables, as few enterprises in our sample were not diversified, to balance the sample size of diversified and non-diversified enterprises, we used a number of product types greater than 1 as the critical value, and we used a value greater than 0 for the H index and the share of overseas income as the critical value. Our main conclusions remained unchanged when we used other critical values.

4.3 Descriptive Statistics

Table 4.2 presents the basic situation of the diversification strategy of game enterprises. We used game product data from 22 A-share enterprises obtained from Google Play and Apple Store. Of these 22 enterprises, the maximum number of game products was 228 and the minimum was 5, and the maximum number of product categories was 6 and the minimum was 1.

Table 4.2

Basic Situation of the Diversified Strategy of Game Enterprises

	Number of products	Product category	Number of main operations	H index	Share of overseas income
M	52.46	2.75	5.91	0.50	15.57
SD	57.46	1.41	2.98	0.25	20.60
Minimum	5	1	2	0.00	0.01
Maximum	228	6	15	0.86	69.96

We obtained industry classification data from 33 game enterprises, among which the maximum number of main operations was 15 and the minimum was 2, with a mean value of 5.91. The maximum value of the H index was 0.86 and the minimum value was 0, with a mean value of 0.5. We obtained income data from 30 game enterprises by region, of which the largest proportion of overseas income was 69.96% and the smallest was close to 0, with a mean value of 15.57%.

Table 4.3:

Correlation Coefficients of Gaming Companies' Diversification Strategies

	Product Diversification	Product Diversification	International Diversification
Product Diversification	1	-0.06	-0.2
Product Diversification	-0.06	1	0.42
International Diversification	-0.2	0.42	1

Table 4.3 displays the correlation coefficients between product diversification, industrial diversification, and international diversification strategies of gaming companies. It can be observed that there is a strong positive correlation between international diversification and industrial diversification. However, the correlation between product diversification strategy and the other two strategies is relatively weak.

Table 4.4

Descriptive Statistics of the Main Variables

	ln_asset	*ln_sale*	*ROA*	*ROE*	*lev*
M	22.24	18.41	0.04	0.06	0.27
SD	0.75	1.51	0.09	0.13	0.15
Minimum	20.22	13.95	–0.70	–1.10	0.02
Maximum	24.48	22.83	0.38	0.54	0.66

The descriptive statistics for the other variables are presented in Table 4.4. The maximum value of *ln_asset* was 24.48, the minimum value was 20.22, and the mean value and standard deviation were 22.24 and 0.75, respectively. The distribution of business scale was relatively concentrated, and the degree of dispersion was not large. *ln_sale* had a maximum of 22.83 and a minimum of 13.95. *Lev* was between 2% and 66%, with an average of 27%. The *ROA* of game enterprises was between –70% and 38%, with a mean of 4%. The maximum and minimum values of *ROE* were 54% and –110%, respectively. The mean and variance were 6% and 13%, respectively.

Chapter V Empirical Results and Analysis

We used the reform of the game licence approval system in 2018 as a quasi-natural experimental setting to study the impact of this major policy shock on enterprises. In this chapter, we report a quantitative analysis of our research hypotheses presented above. This chapter is divided into five parts. The first part focuses on whether the policy shock has a substantial impact on the performance of game enterprises. The second to fourth parts study the effects of product, industrial, and international diversification on enterprises' ability to withstand risk shocks. The last part presents the robustness tests. The benchmark regression in the first four parts focuses on quarterly data from 2017 to 2019. In the fifth part, we expand the time range and modify the criteria for dividing diversified enterprises to evaluate the robustness of our main regression outcomes.

5.1 Impact of the Policy Shock on Game Enterprises

The reform of the licence approval system reduces the supply of game products, but has no direct impact on other software enterprises. Therefore, in theory, the performance of game enterprises should be worse than that of non-game enterprises after the policy shock. We plot the impact of the policy shock on game enterprises based on intuitive observation in Figure 5.1.

Figure 5.1

Difference in ROA Between Game Enterprises and Non-Game Enterprises

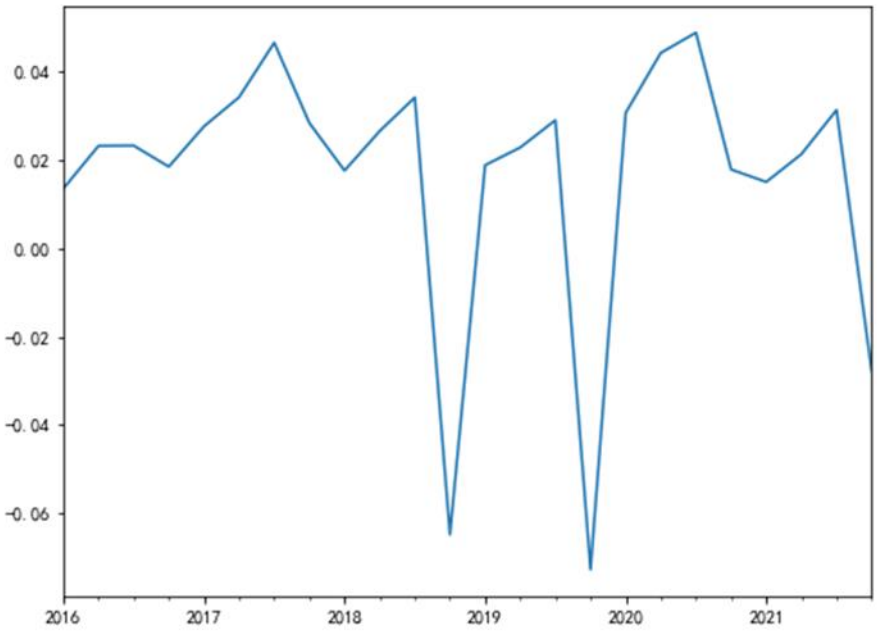


Figure 5.1 compares the *ROA* of the control and treatment groups. The broken line in the figure represents the difference in average *ROA* between game enterprises and non-game enterprises. Figure 5.1 shows that before the policy shock, the rate of return of non-game enterprises was always lower than that of game enterprises. However, after the shock, the difference shows a downward trend; especially in the third and fourth quarters of 2018, immediately after the shock, the rate of return of game enterprises was significantly lower than that of non-game enterprises, and the relative size of the two rates of return reversed. This shows that after the policy shock, the earnings of game enterprises relative

to non-game software enterprises decreased, which is consistent with our hypothesis that the policy shock negatively affects the performance of game enterprises.

Table 5.1

Impact of the Policy Shock on Game Enterprises

Explanatory variable	Dependent variable: *ROA*				Dependent variable: *ROE*			
game	0.03***	0.027***	0.03***	0.026***	0.04***	0.034***	0.038***	0.033***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
policy	0.006	0.005	0.003	0.003	0.005	0.004	0.001	0.001
	(0.0)	(0.0)	(0.0)	(0.0)	(0.01)	(0.01)	(0.01)	(0.01)
*game**	–0.03***	–0.03***	–0.031***	–0.032***	–0.038***	–0.038***	–0.04***	–0.041***
policy	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
ln_asset	–	0.004**	–0.006**	–0.005**	–	0.007**	–0.007	–0.006
	(–)	(0.0)	(0.0)	(0.0)	(–)	(0.0)	(0.0)	(0.0)
ln_sale	–	–	0.01***	0.012***	–	–	0.014***	0.017***
	(–)	(–)	(0.0)	(0.0)	(–)	(–)	(0.0)	(0.0)
lev	–	–	–	–0.073***	–	–	–	–0.085***
	(–)	(–)	(–)	(0.01)	(–)	(–)	(–)	(0.02)
Obs.	1,236	1,236	1,236	1,236	1,236	1,236	1,236	1,236
adj. R^2	0.02	0.02	0.05	0.08	0.01	0.01	0.04	0.05
F value	9.11	7.97	15.12	19.02	5.71	5.4	10.5	11.72

Note. The corresponding regression equation is as follows: $R_{i,t} = c + \alpha * policy_t + \beta * game_i + \delta * policy_t game_i + \phi X_{i,t} + \varepsilon_{i,t}$

Standard errors are reported in parentheses.

$^{*}p < .10$. $^{**}p < .05$ $^{***}p < .01$.

To further illustrate this problem, we used Equation (3.4). We selected 70 software enterprises as the control group and 33 game enterprises as the treatment group. The selection criterion for the control group was that software enterprises and game enterprises belong to the same category according to the Wind industry classification. Table 5.1 presents the policy effect on the

performance of game enterprises. Using DID regression, we found that (1) the coefficients of the industry dummy variable were significant and positive, indicating that the business performance of game enterprises was better than that of software enterprises. Their *ROA* was about 2.6 to 3 pp higher than that of software enterprises on average, and their *ROE* was about 3.3 to 4 pp higher than that of software enterprises. (2) The coefficients of the policy dummy variable were not significant, indicating that there was no significant change in the performance of all enterprises before and after the policy shock, and that no other event could significantly change their business performance during this period. (3) The coefficient of the interaction term was significant and negative, indicating that the performance of game enterprises declined compared with the control group after the policy shock. When *ROA* served as the dependent variable, the DID coefficient ranged from –0.03 to –0.032, significant at the 1% level, meaning that the performance of game enterprises declined by approximately 3 pp compared with that of software enterprises after the shock. When *ROE* served as the dependent variable, the DID coefficient ranged from –0.038 to –0.041, significant at the 1% level, confirming the significant negative impact of the licence approval system reform on the performance of game enterprises.

The above research results show that under normal circumstances, the performance of game enterprises is better than that of non-game enterprises. After the policy shock, the overall performance of all enterprises was not significantly affected, but the performance of game enterprises declined relative to that of non-game enterprises, with a decline similar to the original

performance gap between the two types of enterprises. However, the change in relative performance does not mean that the performance of game enterprises declined solely because of the policy shock; it may also be linked to the growth in performance of non-game enterprises during this period. To rule out this possibility, we tested the stationarity of the performance of the control group.

To show that the profit trend of the control enterprises was stable during the study period, we focused on the control group for the regression, using the following equation:

$$R_{i,t} = c + \alpha * policy_t + \phi X_{i,t} + \varepsilon_{i,t} \quad (5.1)$$

In addition to the main control variables, Equation (5.1) includes the policy dummy variable, measuring the change in an enterprise's overall performance before and after the policy shock; see Table 5.2 for the results. In the first row, the coefficients of the policy dummy variable were not significant, indicating that the performance of non-game enterprises did not change significantly after the shock. These results confirm our previous results that the difference in performance between game and non-game enterprises after the shock was due to the decline in performance of game enterprises.

The analysis in this section shows that after controlling for other possible determinants of business performance, the reform of the licence approval system negatively affected the income of game enterprises. The results of our empirical analysis supported Hypothesis 1.

Table 5.2

Control Group Stationarity Test

Explanatory variable	Dependent variable: *ROA*		Dependent variable: *ROE*	
policy	0.0 (0.0)	–0.0 (0.0)	–0.002 (0.0)	–0.003 (0.0)
ln_asset	– –	–0.01*** (0.0)	– –	–0.016*** (0.0)
ln_sale	– –	0.012*** (0.0)	– –	0.017*** (0.0)
lev	– –	–0.065*** (0.01)	– –	–0.068*** (0.02)
Obs.	840	840	840	840
adj. R^2	0.0	0.05	0.08	0.12
F value	4.23	4.33	5.26	31.0

Note. Standard errors are reported in parentheses.

* $p < .10$. ** $p < .05$. *** $p < .01$.

5.2 Impact of Product Diversification on Game Enterprises

The previous section proved that the reform of the licence approval system negatively affected the performance of game enterprises. This section explores whether product diversification can help enterprises mitigate this negative impact. We studied the impact of product diversification based on Equation (3.5), using the product diversification dummy variable, *product_div*, as a measure of this diversification strategy. The regression used in this section was as follows:

$$R_{i,t} = c + \alpha * policy_t + \beta * product_{div_i} + \delta * product_{div_i} * policy_t + \phi X_{i,t} + \varepsilon_{i,t} \quad (5.2)$$

We focused on product data from 22 game enterprises and determined whether these enterprises adopted a product diversification strategy according to the number of game product categories. In the analysis, we classified enterprises with more than three product categories as diversified enterprises, and those with three or fewer product categories as non-diversified enterprises. The regression results are in Table 5.3.

Table 5.3

Impact of Product Diversification on Game Enterprises

Explanatory variable	Dependent variable: *ROA*				Dependent variable: *ROE*			
product_div	0.068** (0.01)	–0.225** (0.19)	–0.174*** (0.19)	–0.412*** (0.2)	0.09*** (0.01)	–0.495*** (0.26)	–0.419*** (0.26)	–0.577*** (0.28)
policy	–0.013* (0.01)	–0.014** (0.01)	–0.016*** (0.01)	–0.016*** (0.01)	–0.016* (0.01)	–0.017** (0.01)	–0.02** (0.01)	–0.02** (0.01)
*policy *product_div*	–0.013*** (0.01)	–0.014** (0.01)	–0.016*** (0.01)	–0.016*** (0.01)	–0.016* (0.01)	–0.017** (0.01)	–0.02** (0.01)	–0.02** (0.01)
ln_asset	– –	0.013 (0.01)	–0.005 (0.01)	0.003 (0.01)	– –	0.02*** (0.0)	–0.014*** (0.0)	–0.015*** (0.0)
ln_sale	– –	– –	0.019*** (0.0)	0.024*** (0.0)	– –	– –	0.028*** (0.01)	0.031*** (0.01)
lev	– –	– –	– –	0.131*** (0.05)	– –	– –	– –	–0.087 (0.06)
Obs.	264	264	264	264	264	264	264	264
adj. R^2	0.01	0.02	0.07	0.09	0.01	0.02	0.08	0.08
F value	4.69	3.51	7.22	7.03	3.39	4.02	8.37	6.58

Note. Standard errors are reported in parentheses.

* $p < .10$. ** $p < .05$. *** $p < .01$.

Table 5.3 shows the effects of product diversification on the ability of game enterprises to mitigate risks. It can be observed that with the gradual inclusion of control variables, the model's goodness of fit significantly improves.

Particularly, the inclusion of the logarithm of sales expenses has the most significant impact on enhancing the model's performance. Sales expenses represent direct expenditures made by enterprises to improve performance, reflecting the resources invested by enterprises to enhance performance. In the gaming industry, investment in sales expenses plays a significant role in expanding a company's player base and increasing gaming revenue, showing a clear correlation with enterprise benefits. Therefore, after adding sales expenses as a control variable, the behavior of gaming companies can be more accurately described, leading to better fit for the dependent variables representing enterprise performance.

Next, in the first row, the coefficient of the multivariate dummy variable was significant and positive in Columns 1 and 5, but after adding the control variables, the regression results in Columns 4 and 8 became significant and negative. These results may be due to the omission of control variables related to diversification decision-making, leading to biased results in Columns 1 and 5. According to the data in Columns 4 and 8, after controlling for other variables, the coefficients of the product diversification dummy variable showed that diversification significantly reduced the rate of return of enterprises, when using *ROA* and return on net assets as dependent variables. This shows that for game enterprises, product diversification cannot improve their overall performance. This result confirms the diversification discount proposed by Lang and Stulz (1994). That is, product diversification leads to a decrease in operational efficiency and business performance due to increased agency costs and other factors.

Currently, there is no consensus in the academic community on the reasons for the diversification discount, but it can generally be classified into three explanations: agency theory explanation, inefficient internal capital market theory explanation, and optimal diversification theory explanation (Xin Zhao, 2005). Among them, for the gaming industry, the explanation based on the theory of inefficient internal capital markets is more applicable. This theory suggests that the inefficient allocation of internal capital is the fundamental reason for the diversification discount. Specifically in the gaming industry, different types of games exhibit significant differences in development and operation. Gaming companies typically specialize in their own areas of expertise. If a gaming company hastily adopts a product diversification strategy and simultaneously develops and operates games in multiple categories, it is akin to entering a completely new field where existing experience and management practices cannot be easily applied. This may lead to loss of economies of scale and resource misallocation due to factors such as unreasonable market judgments, asynchronous strategic execution, asymmetric internal information, and agency conflicts between shareholders and managers, ultimately resulting in project failures. For products with high market uncertainty such as games, achieving optimal resource allocation among numerous game categories requires a high level of management and decision-making capabilities. This theory not only explains the reasons for the diversification discount in general enterprises but also elucidates why not all enterprises experience a diversification discount. Although most enterprises find it challenging to achieve optimal resource allocation internally, those with exceptional management capabilities can establish efficient internal capital

markets. Through rational resource allocation, they can achieve a diversification premium and attain outstanding performance. In addition, the coefficients of the policy dummy variable in the second row of Table 5.3 were significant and negative, again showing the negative impact of the reform on the performance of game enterprises and further verifying Hypothesis 1.

Next, we focus on the regression coefficients of the DID term. After adding all control variables, using *ROA* as the explanatory variable, the coefficient of the interaction term between the policy dummy variable and the product diversification dummy variable was –0.016, significant at the 1% level, indicating that the *ROA* of diversified enterprises was 1.6 pp lower than that of non-diversified enterprises due to the policy shock. When using *ROE* as the explanatory variable, the coefficient of the DID term was –0.02, significant at the 5% level, indicating an additional 2 pp reduction in the *ROE* of diversified enterprises relative to that of non-diversified enterprises due to the policy shock. The above analysis shows that the policy shock reduced the performance of game enterprises and that the product diversification strategy further reduced their business performance.

Our results for the product diversification strategy of game enterprises indicate that product diversification not only reduces business performance in peacetime but also further reduces the profitability of enterprises after a shock. That is, product diversification leads to a discount in both peacetime and shock periods. The focal policy shock targets the entire game industry, the diversification of this industry cannot help enterprises disperse their business risks. Moreover, after the impact occurs, the total number of game approvals is

restricted. The more game products a company simultaneously develops, the greater the sunk costs it bears. The impact on the company's performance will be more severe. Therefore, product diversification strategies in the gaming industry exhibitsdiversification discounst after the occurrence of regulatory shocks, just as they do during normal times.

5.3 Impact of Industrial Diversification on Game Enterprises

This section examines the impact of industrial diversification. The main difference between this section and the previous section is that the previous section examined product diversification within the game industry, while this section studies diversification between different industries. Compared with product diversification, industrial diversification involves less correlation between different industries, so this section and the previous section can be regarded as discussing unrelated diversification and related diversification, respectively.

To examine the effect of industrial diversification, the industrial diversification dummy variable, *indu*, replaced *product_div* in Equation (3.5), using the following regression:

$$R_{i,t} = c + \alpha * policy_t + \beta * indu_i + \delta * policy_t * indu_i + \phi X_{i,t} + \varepsilon_{i,t} \quad (5.3)$$

where *indu* is the industrial diversification dummy variable, taking a value of 1 for diversified enterprises and 0 for non-diversified enterprises, based on the H index. If the H index is greater than 0.4, the enterprise is considered a diversified enterprise, and *indu* is equal to 1. If the H index is less than or equal to 0.4, the enterprise is considered not diversified, and *indu* is equal to 0.

Table 5.4

Impact of Industrial Diversification on Enterprises

Explanatory variable	Dependent variable: *ROA*					Dependent variable: *ROE*				
indu	-0.018** (0.01)	-0.017** (0.01)	-0.026*** (0.01)	-0.029*** (0.01)	-0.03*** (0.01)	-0.027*** (0.01)	-0.026*** (0.01)	-0.039*** (0.01)	-0.038*** (0.01)	-0.039*** (0.01)
policy	-0.014* (0.01)	-0.016** (0.01)	-0.026*** (0.01)	-0.028*** (0.01)	-0.028*** (0.01)	-0.019 (0.01)	-0.022* (0.01)	-0.037*** (0.01)	-0.037*** (0.01)	-0.036*** (0.01)
*policy *indu*	0.01 (0.01)	0.009 (0.01)	0.016* (0.01)	0.016** (0.01)	0.015** (0.01)	0.017 (0.01)	0.014 (0.01)	0.024** (0.01)	0.023** (0.01)	0.017** (0.01)
ln_asset	- -	0.012*** (0.0)	-0.011*** (0.0)	-0.011*** (0.0)	0.005*** (0.0)	- -	0.02*** (0.0)	-0.014*** (0.0)	-0.015*** (0.0)	0.011*** (0.0)
ln_sale	- -	- -	0.021*** (0.0)	0.022*** (0.0)	0.018*** (0.0)	- -	- -	0.031*** (0.0)	0.03*** (0.0)	0.024*** (0.0)
lev	- -	- -	- -	-0.054*** (0.01)	-0.057*** (0.01)	- -	- -	- -	0.037** (0.02)	-0.016** (0.01)
overseainc	- -	- -	- -	- -	-0.0 ** (0.0)	- -	- -	- -	- -	-0.0 *** (0.0)
Obs	396	396	396	396	360	396	396	396	396	360
adj. R^2	0.02	0.05	0.3	0.32	0.32	0.01	0.07	0.35	0.35	0.35
F value	3.08	5.44	29.59	27.71	27.76	2.69	6.95	37.27	31.34	32.31

Note. Standard errors are reported in parentheses.

* $p < .10$. ** $p < .05$. *** $p < .01$.

Table 5.4 shows the impact of industrial diversification on enterprises. We first focus on the regression results in Column 1. When *ROA* was used as the dependent variable, in the benchmark regression model without control variables, the coefficient of the industrial diversification dummy variable was –0.018, significant at the 5% level, suggesting that industrial diversification reduced average business performance. The *ROA* of enterprises with industrial diversification was 1.8 pp lower than that of enterprises without industrial

diversification. The coefficient of the policy dummy variable was –0.014, significant at the 10% level, suggesting that the rate of return of enterprises decreased by 1.4 pp after the policy shock. The coefficient of the DID term was 0.01, but it was not significant. After adding the control variables, the coefficient of the industrial diversification dummy variable was significant and negative. From the fourth column and the ninth column, we can see that the *ROA* of diversified enterprises was about 2.9 pp lower than that of non-diversified enterprises, and their *ROE* was about 3.8 pp lower than that of non-diversified enterprises, indicating that in normal times, industrial diversification also leads to a discount. When the control variables are sufficient, the coefficient of the interaction term between the industrial diversification dummy variable and the policy dummy variable became significant. When *ROA* was used as the dependent variable, the coefficient of the DID term was 0.016 and significant; when *ROE* was used as the dependent variable, the coefficient of the DID term was 0.023, also significant. These observations clarify that after the shock, diversified enterprises performed better than non-diversified enterprises. The *ROA* of enterprises that adopted industrial diversification was about 1.6 pp higher than that of enterprises that did not adopt industrial diversification, and their *ROE* was about 2.3 pp higher. Due to the strong correlation between international diversification and industrial diversification levels, to eliminate the regression results bias caused by omitted variables, this study added the proportion of overseas revenue in the fifth and tenth columns of the regression to control for international diversification. Due to limitations in international diversification data, the sample for this regression is the same as the sample for international diversification. The main regression results showed no significant

changes. These results show that industrial diversification can significantly increase game enterprises' ability to withstand risks. Because other industries are not directly affected by the reform, although industrial diversification can reduce business performance in peacetime, it can help enterprises stabilise their overall performance and disperse risks after the reform.

5.4 Impact of International Diversification on Game Enterprises

We used the below regression equation to examine the effect of international diversification:

$$R_{i,t} = c + \alpha * policy_t + \beta * oversea_i + \delta * policy_t * oversea_i + \phi X_{i,t} + \varepsilon_{i,t} \quad (5.4)$$

where *oversea* is the international diversification dummy variable, taking a value of 1 for diversified enterprises and 0 for non-diversified enterprises, based on the proportion of overseas income. If the proportion of overseas income is greater than 0.1, the enterprise is considered a diversified enterprise, and *oversea* is equal to 1. If the proportion is less than or equal to 0.1, the enterprise is considered not diversified, and *oversea* is equal to 0.

Table 5.5

Impact of International Diversification on Enterprises

Explanatory variable	Dependent variable: *ROA*					Dependent variable: *ROE*				
oversea	-0.015* (0.01)	-0.022** (0.01)	-0.021*** (0.01)	-0.018** (0.01)	-0.017* （0.01）	-0.008 (0.01)	-0.018 (0.01)	-0.017 (0.01)	-0.021* (0.01)	-0.02* (0.01)
policy	-0.021*** (0.01)	-0.022*** (0.01)	-0.024*** (0.01)	-0.024*** (0.01)	-0.024*** (0.01)	-0.024** (0.01)	-0.026*** (0.01)	-0.028*** (0.01)	-0.028*** (0.01)	-0.028*** (0.01)
*policy * oversea*	0.028** (0.01)	0.028** (0.01)	0.019** (0.01)	0.019** (0.01)	0.017 (0.01)	0.038** (0.02)	0.038** (0.02)	0.025* (0.01)	0.025* (0.01)	0.025* (0.01)
ln_asset	- (-)	0.013*** (0.0)	-0.007* (0.0)	-0.007* (0.0)	0.013 (0.02)	- (-)	0.02*** (0.01)	-0.009* (0.01)	-0.01* (0.01)	-0.013* (0.01)
ln_sale	- (-)	- (-)	0.019*** (0.0)	0.02*** (0.0)	0.012*** (0.0)	- (-)	- (-)	0.028*** (0.0)	0.027*** (0.0)	0.021*** (0.01)
lev	- (-)	- (-)	- (-)	-0.043*** (0.02)	0.08** (0.02)	- (-)	- (-)	- (-)	0.04* (0.02)	-0.016 (0.04)
H	- (-)	- (-)	- (-)	- (-)	-0.045*** (0.02)	- (-)	- (-)	- (-)	- (-)	-0.06*** (0.02)
Obs	360	360	360	360	360	360	360	360	360	360
adj. R^2	0.02	0.06	0.29	0.3	0.31	0.03	0.07	0.33	0.33	0.33
F value	3.43	5.94	28.3	25.16	26.12	4.34	7.26	33.95	28.99	31.23

Note. Standard errors are reported in parentheses

* $p < 0.10$. ** $p < .05$. *** $p < .01$.

Table 5.5 shows the effect of internationalisation on enterprises' ability to withstand risks. The results in Column 1 show that enterprises' *ROA* decreased by 2.1 pp after the policy shock, significant at the 1% level, which is concordant with previous studies. The coefficient of *oversea* was –0.015, indicating that the *ROA* of enterprises with international diversification was 1.5 pp lower than that of enterprises without international diversification. That is, international diversification led to a drop in *ROA* of 1.5 pp. After including the

control variables, the impact of international diversification on business performance remained significant, resulting in a decline in *ROA* of between 1.5 and 2.2 pp. Although some of the regression results for *ROE* were not significant, they were negative and significant at the 10% level after adding the control variables. The above finding is consistent with the findings of Collins (1990) and Denis et al. (2002), showing that international diversification can lead to a decline in corporate performance, resulting in the emergence of a diversification discount. As games are not merely collections of gameplay rules but also vehicles for cultural content, game products developed by domestic gaming companies inherently enjoy cultural advantages in their local markets. When venturing abroad, Chinese gaming companies encounter numerous cultural barriers and must introduce game products tailored to the local cultural environment. Moreover, they face additional management costs associated with cross-border operations. Consequently, they demonstrate a notable discount in international diversification..

Although international diversification led to a decline in business performance, when considering the combined effects of internationalisation and the policy shock, we found that internationalisation reduced the impact of the policy shock on enterprises. In Column 1 of Table 5.5, the coefficient of the interaction term between the policy dummy variable and the international diversification dummy variable was 0.028, significant at the 5% level, suggesting that the rate of return of enterprises with overseas operations fell 2.8 pp less than that of enterprises without overseas operations after the shock. This result is intuitive. The reform of the licence approval system studied in this

thesis only applies to mainland China and has no impact on game enterprises in other countries and regions, so it will not affect their income in other countries and regions. Therefore, the stable overseas income of enterprises can offset the negative impact of the reform on their domestic income to some extent, thereby helping enterprises stabilise their earnings. In summary, international diversification affects the performance of game enterprises from two aspects, namely, the negative impact in peacetime and the positive impact of the reform. These two aspects should be fully considered to evaluate the overall impact of the reform. After adding the control variables, the *ROA* of enterprises with overseas operations decreased by 1.9 pp less than that of enterprises without overseas operations. Using *ROE* as the dependent variable, the results were similar. Data in Column 8 showed that the *ROE* of enterprises with overseas operations decreased by 2.5 pp less than that of enterprises without overseas operations. Therefore, international diversification and industrial diversification had similar effects, confirming the conclusion of Kuppuswamy and Villalonga (2015). The regression in the fifth and tenth columns includes the H-index to control for the effect of industrial diversification on the impact of international diversification. The regression results are highly robust.

It is worth noting that if a shock occurs, the net benefit of international diversification will represent a premium. Table 5.5 also shows that international diversification reduced the *ROA* of non-diversified enterprises by 1.8 pp, while the *ROA* of diversified enterprises decreased by 1.9 pp less after the shock. Therefore, after the shock, the *ROA* of international diversified enterprises was 0.1 pp higher than that of non-diversified enterprises. This gap widened to 0.4

pp (0.025 minus 0.021) for *ROE*. That is, enterprises can ensure higher returns during a crisis by reducing their usual returns, to achieve risk diversification.

To better understand international diversification, we also examined the marginal effect of the level of international diversification on enterprises' ability to withstand shocks. In the regression, we used the proportion of overseas income instead of the international diversification dummy variable to quantitatively examine the link between international diversification and business performance:

$$R_{i,t} = c + \alpha * policy_t + \beta * overseainc_i + \delta * policy_t * overseainc_i + \phi X_{i,t} + \varepsilon_{i,t} \quad (5.5)$$

where *overseainc* is the share of overseas income, β represents the effect of a 1 pp increase in overseas income on an enterprise's overall performance, and δ represents the effect of a 1 pp increase in overseas income on the policy effect. See Table 5.6 for the regression results.

Table 5.6

Marginal Impact of International Diversification on Enterprises

Explanatory variable	Dependent variable: *ROA*				Dependent variable: *ROE*			
overseainc	–0.0 (0.0)	–0.0** (0.0)	– 0.001*** (0.0)	–0.0** (0.0)	–0.0 (0.0)	–0.0 (0.0)	–0.0 (0.0)	–0.0* (0.0)
policy	–0.018*** (0.01)	–0.02*** (0.01)	–0.023*** (0.01)	–0.023*** (0.01)	–0.02** (0.01)	–0.023** (0.01)	–0.027*** (0.01)	–0.027*** (0.01)
policy * *overseainc*	0.001* (0.0)	0.001** (0.0)	0.0* (0.0)	0.0* (0.0)	0.001* (0.0)	0.001* (0.0)	0.001* (0.0)	0.001* (0.0)
ln_asset	– (–)	0.013*** (0.0)	–0.007* (0.0)	–0.007* (0.0)	– (–)	0.021*** (0.0)	–0.009* (0.0)	–0.01* (0.0)
ln_sale	– (–)	– (–)	0.019*** (0.0)	0.02*** (0.0)	– (–)	– (–)	0.028*** (0.0)	0.027*** (0.0)
lev	– (–)	– (–)	– (–)	–0.043*** (0.02)	– (–)	– (–)	– (–)	0.039* (0.02)
Obs.	360	360	360	360	360	360	360	360
adj. R^2	0.01	0.05	0.29	0.3	0.02	0.06	0.33	0.33
F value	2.5	5.47	28.34	25.21	2.82	6.57	33.85	28.92

Note. Standard errors are reported in parentheses.

* $p < .10$. ** $p < .05$. *** $p < .01$.

In the 1st row of Table 5.6, the results are significant and negative, suggesting that an increase in the proportion of overseas income reduced overall performance. From a numerical perspective, when the proportion of overseas income increased by 1 pp, business performance declined significantly, with a decline of less than 0.1 pp. For the DID coefficient, although the coefficient was close to 0 and difficult to compare accurately when *ROA* was the dependent variable, the coefficient was significantly different from 0, indicating that increasing overseas income can enhance the ability of enterprises to withstand policy shocks. The results for *ROE* showed that after the policy shock, a 1 pp increase in overseas income would result in a decrease of about 0.1 pp in *ROE*,

which is greater than the discount brought by diversification in normal times. Our marginal analysis again showed that international diversification brings a premium in times of crisis that exceeds the discount in normal times. By spreading their operations across different regions, enterprises can substantially reduce the policy effect on a single region, thereby maintaining stable income.

5.5 Robustness Tests and Discussion of Results

Herein, we present the results of robustness tests performed on our regression results. We extended the sample period to the 2016–2020 period and then reran our regression analysis.

Table 5.7

Impact of the Policy Shock on Game Enterprises

Explanatory variable	Dependent variable: *ROA*				Dependent variable: *ROE*			
game	0.03*** (0.01)	0.027*** (0.01)	0.03*** (0.01)	0.026*** (0.01)	0.04*** (0.01)	0.034*** (0.01)	0.038*** (0.01)	0.033*** (0.01)
policy	0.006 (0.0)	0.005 (0.0)	0.003 (0.0)	0.003 (0.0)	0.005 (0.01)	0.004 (0.01)	0.001 (0.01)	0.001 (0.01)
game policy*	–0.03*** (0.01)	–0.03*** (0.01)	– 0.031*** (0.01)	–0.032*** (0.01)	–0.038*** (0.01)	–0.038*** (0.01)	–0.04*** (0.01)	–0.041*** (0.01)
ln_asset	– (–)	0.004** (0.0)	–0.006** (0.0)	–0.005** (0.0)	– (–)	0.007** (0.0)	–0.007 (0.0)	–0.006 (0.0)
ln_sale	– (–)	– (–)	0.01*** (0.0)	0.012*** (0.0)	– (–)	– (–)	0.014*** (0.0)	0.017*** (0.0)
lev	– (–)	– (–)	– (–)	–0.073*** (0.01)	– (–)	– (–)	– (–)	–0.085*** (0.02)
Obs.	1,749	1,749	1,749	1,749	1,749	1,749	1,749	1,749
adj. R^2	0.02	0.02	0.05	0.08	0.01	0.01	0.04	0.05
F value	9.11	7.97	15.12	19.02	5.71	5.4	10.5	11.72

Note. Standard errors are reported in parentheses. * $p < .10$. ** $p < .05$. *** $p < .01$.

Table 5.8

Impact of Product Diversification on Game Enterprises

Explanatory variable	Dependent variable: *ROA*				Dependent variable: *ROE*			
product_div	0.059***	–0.22	–0.171	–0.376*	0.078***	–0.475*	–0.401	–0.528*
	(0.01)	(0.18)	(0.18)	(0.2)	(0.01)	(0.26)	(0.25)	(0.28)
policy	–0.012**	–0.012**	–0.015***	–0.016***	–0.014*	–0.015*	–0.019**	–0.02**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
policy * *product_div*	–0.012**	–0.012**	–0.015***	–0.016***	–0.014*	–0.015*	–0.019**	–0.02**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
ln_asset	–	0.012	–0.004	0.002	–	0.025**	–0.0	0.004
	(–)	(0.01)	(0.01)	(0.01)	(–)	(0.01)	(0.01)	(0.01)
ln_sale	–	–	0.017***	0.022***	–	–	0.026***	0.029***
	(–)	(–)	(0.0)	(0.0)	(–)	(–)	(0.01)	(0.01)
lev	–	–	–	–0.112**	–	–	–	–0.07
	(–)	(–)	(–)	(0.05)	(–)	(–)	(–)	(0.06)
Obs.	432	432	432	432	432	432	432	432
adj. R^2	0.01	0.02	0.07	0.09	0.01	0.02	0.08	0.08
F value	4.69	3.51	7.22	7.03	3.39	4.02	8.37	6.58

Note. Standard errors are reported in parentheses. * $p < .10$. ** $p < .05$. *** $p < .01$.

The main regression results are reported in Tables 5.7–5.10. Regarding the impact of the policy shock, after increasing the research sample, the average performance of game enterprises was still higher than that of non-game enterprises, and the coefficient of the DID term was still significant and negative. Therefore, our main conclusions remained robust. After increasing the sample period, the results for Hypothesis I remained unchanged: the average performance of game enterprises was better than that of non-game enterprises. The policy shock decreased the performance of game enterprises relative to that of non-game enterprises, demonstrating the negative impact of the policy shock on the performance of game enterprises. The findings of our empirical analysis for product diversification and industrial diversification were also robust. The coefficient of the DID term was close to the coefficient in the benchmark

regression, providing evidence that product diversification has a negative impact on business performance in peacetime and after a shock, and game enterprises cannot reduce the negative impact of the policy shock through product diversification.

Table 5.9

Impact of Industrial Diversification on Enterprises

Explanatory variable	Dependent variable: *ROA*				Dependent variable: *ROE*			
indu	–0.019***	–0.019***	–0.03***	–0.031***	–0.03***	–0.03***	–0.046***	–0.044***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
policy	–0.016*	–0.019**	–	–0.03***	–0.022*	–0.029**	–0.044***	–0.043***
	(0.01)	(0.01)	0.029***	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
			(0.01)					
policy *	0.012	0.011	0.018**	0.019**	0.02	0.019	0.03**	0.029**
indu	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	–	0.01***	–	–0.015***	–	0.017***	–0.021***	–0.022***
ln_asset	–	(0.0)	0.015***	(0.0)	–	(0.0)	(0.0)	(0.0)
			(0.0)					
ln_sale	–	–	0.023***	0.024***	–	–	0.034***	0.033***
	–	–	(0.0)	(0.0)	–	–	(0.0)	(0.0)
lev	–	–	–	–0.041***	–	–	–	0.06***
	–	–	–	(0.01)	–	–	–	(0.02)
Obs.	652	652	652	652	652	652	652	652
adj. R^2	0.03	0.06	0.31	0.32	0.03	0.07	0.32	0.34
F value	5.68	9.83	49.88	43.07	6.8	11.93	53.56	46.98

Note. Standard errors are reported in parentheses.

* $p < 0.10$. ** $p < .05$. *** $p < .01$.

The results regarding the effect of industrial diversification after increasing the sample size are shown in Table 5.9. Although the results of the DID term were not significant before adding *lev* and *ln_sale*, the results were significant and positive when adding the control variables, providing evidence

that industrial diversification can improve business performance after the policy shock. Although industrial diversification reduces business performance in peacetime, it can effectively alleviate the decline in business performance after the policy shock. This conclusion was robust.

Table 5.10

Impact of International Diversification on Enterprises

Explanatory variable	Dependent variable: *ROA*				Dependent variable: *ROE*			
oversea	–0.016***	–0.022***	–0.022***	–0.021***	–0.014	–0.022*	–0.023**	–0.027***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
policy	–0.013**	–0.017**	–0.021***	–0.022***	–0.017*	–0.022**	–0.028***	–0.027***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
*policy *oversea*	0.031***	0.03***	0.021**	0.022**	0.047***	0.047***	0.033**	0.029**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
ln_asset	–	0.016***	–0.008**	–0.009**	–	0.022***	–0.013**	–0.013**
	(–)	(0.0)	(0.0)	(0.0)	(–)	(0.01)	(0.01)	(0.01)
ln_sale	–	–	0.022***	0.022***	–	–	0.032***	0.031***
	(–)	(–)	(0.0)	(0.0)	(–)	(–)	(0.0)	(0.0)
lev	–	–	–	–0.026	–	–	–	0.08***
	(–)	(–)	(–)	(0.02)	(–)	(–)	(–)	(0.02)
Obs.	592	592	592	592	592	592	592	592
adj. R^2	0.01	0.05	0.29	0.29	0.01	0.05	0.3	0.31
F value	2.22	8.11	45.36	38.35	2.82	8.73	46.97	42.52

Note. Standard errors are reported in parentheses.

* $p < .10$. ** $p < .05$. *** $p < .01$.

The results regarding the effect of international diversification are presented in Table 5.10. In the second row, the average performance of internationally diversified enterprises was worse than that of non-diversified enterprises. However, in the third row, the coefficients of the DID term were

significant and positive, indicating that international diversification can help enterprises resist the impact of the policy shock and disperse their risks.

Table 5.11

Robustness Tests

Explanatory variable	H3		H4	
	ROA	*ROE*	*ROA*	*ROE*
indu	–0.029***	–0.039**		
	(0.01)	(0.01)		
oversea			–0.021***	–0.027***
			(0.01)	(0.01)
policy	–0.022***	–0.026**	–0.022***	–0.027***
	(0.01)	(0.01)	(0.01)	(0.01)
*policy *indu*	0.012*	0.013*		
	(0.01)	(0.01)		
*policy *oversea*			0.022***	0.029**
			(0.01)	(0.01)
ln_asset	–0.012***	–0.017***	–0.009***	–0.013***
	(0.0)	(0.01)	(0.0)	(0.01)
ln_sale	0.024***	0.033***	0.022***	0.031***
	(0.0)	(0.0)	(0.0)	(0.0)
lev	–0.038**	0.063***	–0.026	0.08***
	(0.02)	(0.02)	(0.02)	(0.02)
Obs.	396	396	360	360
adj. R^2	0.29	0.31	0.28	0.3
F value	33.74	36.21	32.75	35.72

Note. Standard errors are reported in parentheses.

* $p < .10$. ** $p < .05$. *** $p < .01$.

To demonstrate the rationality of our grouping of enterprises when setting the diversification dummy variables, we used different critical values to classify game enterprises and reran the regression. The results are reported in Table 5.11. Columns 1 and 2 show the results regarding the effect of industrial diversification when using a critical value of 0.3 for the H index, while Columns 3 and 4 show the results regarding the effect of international diversification when using a critical value of 20% for the proportion of overseas income. Our regression results remained robust.

Comparing the regression results for the three diversification strategies, we found that industrial diversification and international diversification had similar effects. Specifically, they both implied a diversification premium after the policy shock, whereas product diversification was the opposite. This finding is related to the relevance of diversification strategies. As mentioned, product diversification is a type of related diversification, while industrial diversification and international diversification are unrelated diversification. There is a major difference between related and unrelated diversification in terms of risk diversification capability, as mentioned by Kuppuswamy and Villalonga (2015). They divided enterprises into related and unrelated diversification enterprises according to their industry codes and studied the premium difference between the two groups. Their results showed a higher premium for unrelated diversified enterprises than for related diversified enterprises during a crisis.

The main diversification mechanism to reduce risk is risk diversification. From an asset portfolio perspective, risk diversification requires simultaneously

holding a large number of assets with weak or negative correlation (Markowitz, 1991). When an asset loses, this can be compensated by the return on enterprise assets. If the assets held have a strong positive correlation, the value of all assets will move in the same direction at the same time, which cannot reduce the volatility of total assets. This is also true for the diversification strategy of enterprises; risk diversification can only be achieved through unrelated diversification. Different diversification strategies have different benefits and anti-risk effects.

First, “product diversification” refers to diversification within the same industry, which is a type of related diversification. In normal times, the effect of product diversification depends on whether it goes beyond economies of scale. In the sample selected in this study, enterprises had entered a state of diseconomies of scale. Indeed, the results showed that the coefficient of the product diversification dummy variable was significant and negative, indicating that product diversification by game enterprises led to a large decline in business performance, showing an obvious diversification discount. After the policy shock, the extent of the decline in performance was further accentuated. Therefore, for game enterprises, whether pursuing performance or risk control goals, product diversification is not the best choice.

In contrast, industrial diversification and international diversification are not affected by the reform and were therefore regarded as unrelated diversification in the study. Indeed, the reform of the licence approval system only concerns the game industry, but has no impact on other industries such as animation, film, and television. If enterprises enter these industries through

industrial diversification, when the performance of the game industry is limited, the lower the proportion of game industry income, the smaller the impact on the overall performance of enterprises. Therefore, industrial diversification can help enterprises reduce the impact of the policy shock. In addition, the reform of the licence approval system only applies to mainland China and has no effect on the products of game enterprises in overseas countries and regions. Therefore, when domestic game income declines, the higher the proportion of foreign game income, the smaller the impact on the overall performance of enterprises. Only through extensive diversification can enterprises effectively cope with the impact of risks in a specific field. Comparing the marginal effects of industrial diversification and international diversification, we found that international diversification did not only lead to a lower diversification discount in peacetime but also produced a more obvious performance pull effect after the policy shock, which constitutes a better diversification strategy in the face of potential risks.

Our findings on industrial diversification and international diversification are similar to the conclusions of Kuppuswamy and Villalonga (2015). Under normal circumstances, diversification strategies will lead to a discount, but during a crisis, these strategies will generate a premium. It is important to note that due to the unpredictable nature of policy shocks, a company's choice of diversification strategy cannot be the sole determinant of its performance. This is particularly true for companies that have already moved beyond economies of scale, as diversification strategies often yield lower returns during normal times, resulting in a diversification discount. For enterprises aiming for short-term high performance or led by entrepreneurs with

a speculative bent, concentrating on a single market during periods of policy stability might be the best option. However, for those seeking stable performance or led by risk-averse entrepreneurs, exploring non-correlated diversification strategies could be a strategic move worth considering.

Chapter VI Conclusions and Implications

6.1 Research Conclusions

Focusing on the reform of China's game licence approval system in 2018, we used the DID method to comprehensively examine the effects of diversification strategies on enterprises' ability to withstand risk shocks. Taking software enterprises as the control group, we studied the effect of the policy shock on the performance of game enterprises. After controlling for the main variables, the profitability of software enterprises remained stable after the shock, while the profitability of game enterprises declined dramatically after the shock. This demonstrates the negative effect of the reform on the game industry.

This conclusion is intuitive, because the reform of the licence approval system has seriously limited the supply of new game products, and the performance growth of game enterprises is highly dependent on this supply. Indeed, online games, as cultural and entertainment products, are not necessities for national consumption, similar to movies, TV dramas, or music. Users are willing to consume entertainment products such as online games because these products provide them with pleasure as a form of sensory experience, but this also leads to high demand for new online game products. However, pleasant sensory experiences fade easily, making the life cycle of cultural and entertainment products relatively short; for example, movies at the box office experience concentrated growth in the first 1–2 months after release. The life cycle of online games is relatively long, but most online games experience a sharp decline in user numbers and income scale 6 months after market launch as user interest decreases. Game enterprises must constantly create new games

to compensate for the decline in income from existing games. Furthermore, the stimulation of users' sensory experience gradually decreases. Therefore, all cultural and entertainment products must constantly offer new ideas and stimulating sensory experiences, and online games are no exception. Regarding the development of the game industry, with the continuous iteration of game products, exciting audiovisual experiences and innovative game play are the key drivers to attract new users and increase their willingness to pay. This also requires game enterprises to constantly create new games and bring new growth. Therefore, the reform of the game licence approval system directly leads to a reduction in the number of new games launched by game enterprises, which directly affects their income.

Additionally, the duration of the licence application process for online games has increased, reducing the R&D efficiency of game products and increasing the R&D cost of a single product. The online game industry is an asset-light industry, and most of its product R&D investments are spent on R&D team salaries. The R&D cost of a single online game is affected by three main factors: the size of the R&D team, the salary level, and the R&D cycle. Among these factors, if the reform of the licence approval system is not considered, the R&D cycle generally lasts between 12 and 24 months. According to the requirements of the game licence reform, game enterprises must provide all game text and image scripts, as well as game demonstration videos, test accounts, and passwords, when applying for a licence. These materials can only be provided after the content of the game is completed. Therefore, game enterprises generally apply for a licence in the middle and at the end of the game

project's development. Before the reform of the game licence approval system, most game enterprises had to wait 3–6 months after submitting an application for a licence. At this stage, they could make the necessary changes and improvements to the game. Therefore, the overall R&D cycle was not affected by the licence application. With the reform, the game licence application cycle has increased to 8–18 months, which far exceeds the time needed for game development at the middle and late stages. Therefore, even if the development of game products is completed, enterprises must wait for licence approval, forcing the R&D team to enter a long period of inactivity. The R&D cycle of a single online game has also increased to 12–24 months, an extension of 3–12 months or even longer. When the number, size, and salary level of the R&D team remain unchanged, lengthening the R&D cycle significantly increases the R&D cost of online games. It is not uncommon for small game enterprises to go bankrupt because they cannot afford the cost of waiting. Therefore, the reform of the game licence approval system reduces business performance by reducing the supply of new game products and increasing the R&D cost of games.

We further explored whether the diversification strategy of enterprises can help them reduce the impact of the policy shock. Product, industrial, and international diversification reduced the profitability of enterprises in peacetime, generating a diversification discount. However, in the face of the policy shock, the three diversification strategies had different effects. Specifically, product diversification not only generated a diversification discount in peacetime but also further reduced business performance after the shock. Industrial

diversification and international diversification generated a diversification discount in peacetime. In addition, operations in other industries and regions not covered by the policy could help enterprises effectively reduce the impact of the policy shock..

6.2 Recommendations and Implications

As a type of cultural and entertainment product, online games can enrich people's daily leisure and entertainment activities. In 2023, for the first time, the Chinese game industry achieved a turnover of more than 300 billion RMB. The game industry has therefore become a major industry essential to the development of the Chinese economy. Online games have also contributed to the development of computer chips, artificial intelligence, and other cutting-edge technologies, promoting Chinese culture and strengthening its influence overseas.

Although the importance of the game industry has been widely recognised by all sectors of society and games as entertainment products are gradually being accepted, the regulatory structure and policy environment are not yet mature and have been developing and adjusting for a long time, significantly affecting the development of this industry. Over the past decade, there have been many major adjustments and changes to regulatory policies related to online games. In 2013, the newly revised Law on the Protection of Minors was implemented and various anti-addiction measures were strengthened. In 2015, the game licence approval system was officially introduced, requiring all online games to first have a licence before being

officially launched. Since then, the game industry has entered access management mode. In 2017, the *Interim Measures for the Administration of Online Games* were issued, enforcing real-name registration. In 2018, the game licence approval system was reformed, with licence approval discontinued in stages, resulting in a sharp decline in the total number of licences issued. In 2023, the new *Guidelines on Administrative Measures for Online Games* were released, which shocked the industry again. After a long period of development and practice, the standardisation and maturity of current regulations and policies have been greatly improved, which has also positively influenced the regulation of the ecology of the industry. However, games are content products with long production cycles and substantial R&D investments and are therefore policy-sensitive and vulnerable to serious policy shocks.

Relevant policies and systems in the game industry are generally reformed to standardise its management and maintain high-quality and sustainable development, not to curb or thwart its development. However, based on its development and the findings of this thesis, relevant policy adjustments have seriously affected the game industry, especially the reform of the licence approval system in 2018, which had a considerable negative impact on the entire industry. Indeed, this reform caused a sharp decline in the operating efficiency of many game enterprises, forcing small enterprises and studios to transform or close their doors. This situation shows that the implementation of similar regulatory models and policy reforms can be improved. We propose the following real-world policy recommendations.

(1) Continue to implement rational industry regulations for continued healthy development

To date, the regulatory policies of the online game industry have undergone several rounds of revision and improvement and have effectively supported the development of the industry, purified its environment, and achieved remarkable results in managing harmful cultural content and protecting the mental and physical health of young people. To further encourage the healthy development of the game industry, regulatory policies should follow the current direction, to further strengthen scientific management, standardise industrial order, optimise operation ecology, protect the rights and interests of users, and protect minors. In addition, policies should promote positive qualities such as truth and kindness, guide the orderly development of game enterprises, and give full play to them, to meet people's needs for a better life.

(2) Establish a policy communication mechanism to reduce the impact of policy shocks on business operations

Games are different from traditional publications. Compared with publications such as books and magazines, game development costs are higher and development cycles are longer. Moreover, due to fierce competition in the booming game market, game enterprises are particularly sensitive to policy shocks. In 2018, the industry experienced a significant shock due to the suspension of licence approval. To avoid similar situations, regulators should improve the stability and predictability of policies, study the effects of policies in depth, control unnecessary policy adjustments, and establish a transition

mechanism during the policy adjustment period to create stable expectations for game enterprises. In addition, regulators should establish a policy communication mechanism, fully communicate with industry players before the introduction and implementation of policies, and solicit opinions on a broader scale. This will not only improve the scientific nature of policies but also enable game enterprises to obtain sufficient information to cope with possible policy changes, plan development strategies, and avoid business difficulties due to policy uncertainty.

(3) Improve the licence approval system, enrich the supply of online games, and promote the healthy development of the industry

Currently, game publishing is subject to pre-approval, and a full review of online games is conducted before they enter the market. The approval process is cumbersome and time-consuming, and the number of licences issued after final approval is far from meeting market demand. At present, only a few countries in the world have adopted a licence approval system, which aggravates the Matthew effect on the market, leads to the control of key resources by a few enterprises, affects market supply, offers little choice to players, and focuses on a few specific game products, thus forming a de facto monopoly. This situation does not contribute to the healthy development of the game industry. Therefore, regulators should fully consider the special nature of the game industry, further improve the licence approval system, improve the efficiency of licence approval, accelerate the issuance frequency, shorten the issuance cycle, increase the number of issuances, provide abundant choices to the market, stimulate the innovation ability of game enterprises to the greatest

extent, and encourage them to further improve their games and services, for a thriving game industry.

(4) Develop a game classification system to achieve long-term pre-management

As of now, China has yet to implement a game classification system, and the current licence approval model has limitations such as unclear standards and long wait times for approval, which cannot guide young people in accessing and using game products appropriately. The state's current management of gaming for teenagers mainly focuses on restricting access, primarily through the real-name identification system of online games, entry thresholds for players, and strict control of their gaming time and duration, which are post-management measures. With current technological development, the penetration of online games among the young population is constantly increasing. Relying solely on post-release moderation to restrict and regulate the behaviour of minors is ineffective and cannot contribute to the healthy development of the game industry. Therefore, creating a game classification system suitable for China's current situation is a key way to improve the management system of the Chinese game industry. This type of system has existed for many years in Europe, the US, Japan, and South Korea, where the game industry is more mature, and has played a key role in protecting teenagers from game that might negatively influence them. The implementation of a game classification system can improve both the efficiency and standards of game approval. Such a system can prevent teenagers from playing bad games, encourage game enterprises to pay attention to the social effects of games, develop high-quality age-appropriate

games, and ultimately establish a mechanism for long-term pre-management to ensure the positive impact of games on society.

In addition, for enterprises in the game industry, we offer the following recommendations for the management and development of the game industry.

(1) Adhere to positive cultural values and prevent harmful content from damaging the game industry

Game enterprises should uphold positive cultural values, actively fulfil their social responsibilities, pay attention to social benefits, disseminate positive ideas in game content, community activities, and other aspects, shape the public's positive perception of game products, and prevent harmful content from damaging the industry and affecting its normal development. Game enterprises should also optimise the anti-addiction mechanism in online games, prevent game addiction among adolescents, guide their game behaviour through healthy and positive content and activities, create a safer and beneficial game environment for teenagers, and contribute positively to society as a whole.

(2) Create high-quality original games and a good ecology for the game industry

The game licence approval system primarily aims to optimise the supply of games, enhance their quality, and encourage game enterprises to develop excellent original games. Game enterprises should therefore follow the regulatory principles in terms of development strategy, focus on quality, build core competitiveness with high-quality content, compete in terms of quality rather than quantity, and jointly shape the good ecology of the game industry.

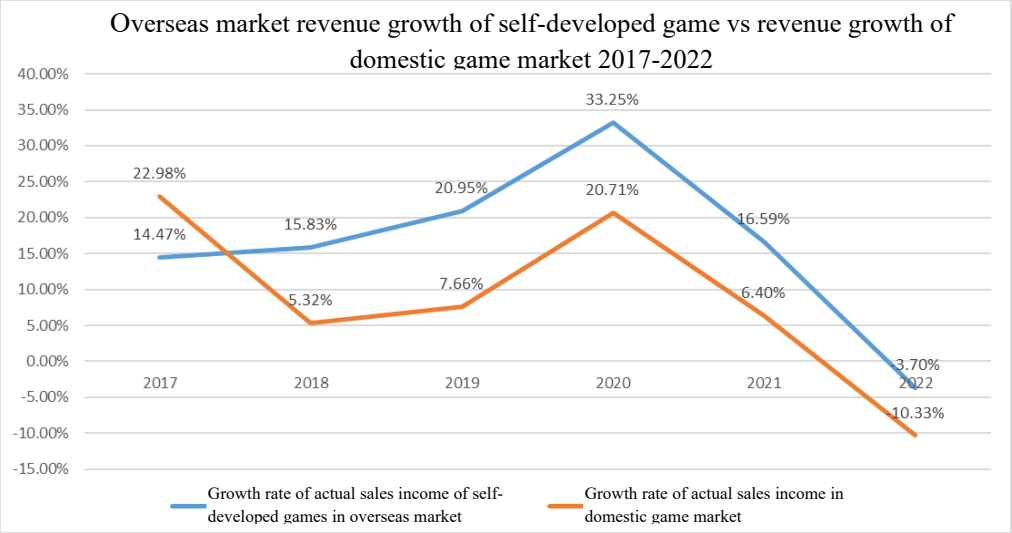
(3) Expand into unrelated diversified areas to better withstand risks

Facing possible policy shocks, game enterprises should improve their organisational structure and consider using diversification strategies to increase their ability to withstand risks. Studies have shown that in the game industry, diversification, whether related or unrelated, can eventually lead to a diversification discount, thereby reducing the performance of game enterprises. However, industrial diversification and international diversification can stabilise business performance and significantly enhance enterprises' ability to withstand risks in the face of policy shocks. Therefore, when game enterprises face policy risks, they should take the initiative to expand into other industries or regions, to deal with these risks more effectively.

(4) The potential of overseas markets has surged in recent years and is currently widely adopted by the industry

Figure 6.1

Overseas Revenue Growth of Self-Developed Game Market Versus Revenue Growth of Domestic Game Market, 2017–2022

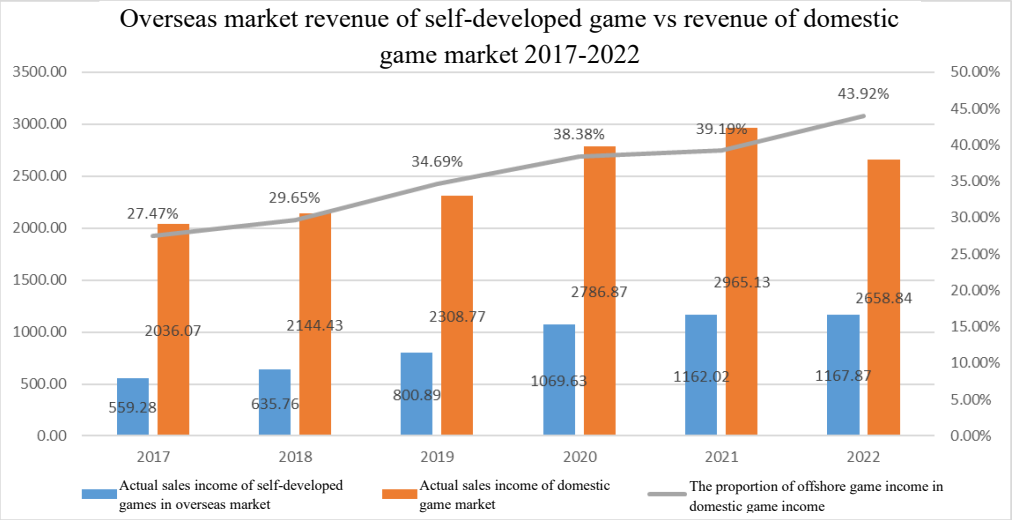


The research findings indicate that international diversification exhibits a strong resilience to risk shocks. Therefore, we recommend that enterprises adopt international diversification. This recommendation is in line with the current development of the game industry, as international diversification has become a common choice among game enterprises. Per the China Game Industry Committee, in 2017, before the reform of the licence approval system, overseas income from self-developed online games was USD8.276 billion (about RMB55.928 billion), approximately 27.47% of domestic game income. After the reform, Chinese game enterprises increased their investment in overseas expansion, leading to a rapid increase in overseas income from self-developed games, which typically grows faster than domestic game income, as shown in Figure 6.1. In 2022, overseas income from self-developed games

increased to USD17.346 billion (about RMB116.787 billion), with a 5-year compound growth rate of 15.95%, or about 43.92% of domestic game income, which increased by 16.45 pp compared with 2017, as shown in Figure 6.2. The overseas market has therefore become an indispensable part of the Chinese game industry.

Figure 6.2

Overseas Revenue of Self-Developed Game Market Versus Revenue of Domestic Game Market, 2017–2022



We focused on the game industry to empirically study the impact of diversification strategies on enterprises' response to policy shocks. The game industry and the music, literature, film and television drama, live broadcast, entertainment, and other industries belong to the content and cultural and creative industries and have many common characteristics. Therefore, our

research conclusions and recommendations can also serve as a reference for other content industries. First, in terms of external risks, the other content industries mentioned above also face serious policy risks. Taking the live broadcast industry as an example, with the rapid development of network live broadcasting in recent years, relevant management policies have been introduced. Policy documents such as *Regulations on the Management of Network Live Broadcasting Services*, *Guidelines on Strengthening the Standardized Management of Network Live Broadcasting*, *Guidelines on Further Standardizing the Profit-Making Behavior of Network Live Broadcasting to Promote the Healthy Development of the Industry*, and *Code of Conduct for Network Anchors* have been issued one after another to regulate the industry, such as network culture business licensing, qualification requirements for network live broadcasting, real-name identification of network anchors, and account classification management. With the introduction of policies and management measures, the network live broadcast industry has experienced shocks, leading to its restructuring. Second, in terms of supply and demand, games, music, literature, films and television dramas, live broadcasts, and entertainment shows are all cultural and entertainment products that must continue to engage users through continuous product iteration. As mentioned, the life cycle of cultural and entertainment products is relatively short, so business income is closely related to the supply of content. In addition, the cost of entertainment R&D increases with greater market access, which directly affects business income. For the content and cultural and creative industries, high returns are only possible if enough products enter the market. Therefore,

after the implementation of a new policy, the business performance of content industries and cultural and creative industries will be greatly affected.

Despite the above similarities, the game industry also has some peculiarities. Essentially, game products are complex products of cultural content and game rules, which need to overcome fewer cultural barriers when promoted in other countries and regions than in the domestic market, so cross-regional promotion is easy. For entertainment products such as films and TV dramas, literature, and entertainment shows, the emphasis on culture, language, history, and customs is different, and their localisation cost is higher than for games. Therefore, among China's current content and cultural and creative industries, only the game industry can generate a high proportion of overseas income. As such, the results of this thesis on the game industry may not apply to other industries. Non-game enterprises in other cultural industries are advised to take their own business situation into account when choosing diversification strategies.

6.3 Limitations and Future Research Directions

As a complex systems engineering problem, business management involves a large number of influencing factors, making it difficult for any model to consider all variables and perform a comparative study. One can only emulate reality to a certain degree given limited resources. Although we did our best, due to space and data limitations, this thesis has some limitations in terms of variable selection, sample data, and regulatory research.

First, in terms of variable selection, we used business performance as the dependent variable, the policy dummy, the industry dummy, and the diversification indicators as explanatory variables, and internal indicators such as business scale as control variables. However, in practice, the performance of game enterprises is also affected by other factors. For example, external factors like changes in gamer preferences, the external economic environment, social and cultural cognition, and new game technologies also directly impact the performance of game enterprises. Therefore, the explanatory power of the model could be enhanced by incorporating these factors into the model design.

Second, in terms of sample data, we used the financial data of listed enterprises for our analysis, which do not cover all game enterprises in the industry. Because listed game enterprises are often large, our research conclusions may not apply to small and medium-sized game enterprises. Furthermore, we did not include game enterprises listed in Hong Kong in our sample because of their different financial disclosure standards from enterprises listed in mainland China.

In the future, we will comprehensively consider macroeconomic and intergenerational cultural changes, as well as other factors, to further improve the accuracy of our model. To fully understand the game industry, we will also expand the scope of data collection to include game enterprises listed in Hong Kong and conduct an in-depth case analysis of small and medium-sized game enterprises. In addition, we will closely analyse the implementation process of regulatory policies, to provide more targeted suggestions for the growth of game enterprises and the improvement of regulatory policies. Through these efforts,

we hope to provide more valuable insights into the continued prosperity and development of the game industry.

References

Aivazian, V. A., Rahaman, M. M., & Zhou, S. (2019). Does corporate diversification provide insurance against economic disruptions? *Journal of Business Research*, *100*, 218–233.

Ansoff, H. I. (1958). A model for diversification. *Management Science*, *4*(4), 392–414.

Bakke, T. E., & Gu, T. (2017). Diversification and cash dynamics. *Journal of Financial Economics*, *123*(3), 580–601.

Barkema, H., & Vermeulen, F. (2001). Learning through acquisitions. *Academy of Management Journal*, *44*(3), 457–476.

Barkema, H. G., Bell, J. H., & Pennings, J. M. (1996). Foreign entry, cultural barriers, and learning. *Strategic Management Journal*, *17*(2), 151–166.

Berger, P. G., & Ofek, E. (1995). Diversification's effect on enterprise value. *Journal of Financial Economics*, *37*(1), 39–65.

Bettis, R. A., & Hall, W. K. (1982). Diversification strategy, accounting determined risk, and accounting determined return. *Academy of Management Journal*, *25*(2), 254–264.

Bettis, R. A., & Mahajan, V. (1985). Risk/return performance of diversified enterprises. *Management Science*, *31*(7), 785–799.

Casson, M. (1999). The organisation and evolution of the multinational enterprise: an information cost approach. *MIR: Management International Review*, 77–121.

Caves, R. E. (1971). International corporations: The industrial economics of

foreign investment. *Economica*, *3*8(149), 1–27.

Chandler Jr, A. D. (1993). *The visible hand*. Harvard University Press.

Chen, C. M., & Sun, J. H. (2008). Entrepreneurs' background characteristics and diversification strategy choice: An empirical study based on panel data of Chinese listed enterprises. *Management World*, *5*, 124–133 + 187–188.

Chen, X. Y., & Huang, J. (2007). Government intervention, diversification and business performance. *Management World*, *1*, 92–97.

Chen, Z., & Wang, Y. (2016). Does "business tax in lieu of value-added tax" promote division of labor: Evidence from Chinese listed enterprises. *Management World*, *3*, 36–45 + 59.

Chen, Z., & Xiong, R. X. (2015). Comparative advantage and the effect of industrial policy: evidence from a quasi-experiment of export processing zones. *Management World*, *8*, 67–80.

Click, R. W., & Harrison, P. (2000). Does multinationality matter? Evidence of value destruction in US multinational corporations. Evidence of Value Destruction in US Multinational Corporations (February 2000).

Collins, J. M. (1990). A market performance comparison of US enterprises active in domestic, developed and developing countries. *Journal of International Business Studies*, *21*, 271–287.

Daley, L., Mehrotra, V., & Sivakumar, R. (1997). Corporate focus and value creation evidence from spinoffs. *Journal of Financial Economics*, *45*(2), 257–281.

Delios, A., & Beamish, P. W. (1999). Geographic scope, product diversification, and the corporate performance of Japanese firms. *Strategic Management Journal*, *20*(8), 711–727.

Denis, D. J., Denis, D. K., & Yost, K. (2002). Global diversification, industrial diversification, and enterprise value. *The Journal of Finance*, *57*(5), 1951–1979.

Desai, H., & Jain, P. C. (1999). Business performance and focus: Long-run stock market performance following spinoffs. *Journal of Financial Economics*, *54*(1), 75–101.

Eckert, S., & Trautnitz, G. (2010). A commentary on risk reduction by geographic diversification. *Multinational Business Review*, *18*(4), 95–113.

Errunza, V. R., & Senbet, L. W. (1981). The effects of international operations on the market value of the enterprise: Theory and evidence. *The Journal of Finance*, *36*(2), 401–417.

Geringer, J. M., Beamish, P. W., & DaCosta, R. C. (1989). Diversification strategy and internationalization: Implications for MNE performance. *Strategic Management Journal*, *10*(2), 109–119.

Geringer, J. M., Tallman, S., & Olsen, D. M. (2000). Product and international diversification among Japanese multinational enterprises. *Strategic Management Journal*, *21*(1), 51–80.

Ghoshal, S. (1987). Global strategy: An organizing framework. *Strategic Management Journal*, *8*(5), 425–440.

Giroud, X., & Mueller, H. M. (2015). Capital and labor reallocation within firms. *The Journal of Finance*, *70*(4), 1767–1804.

Glaser, M., & Müller, S. (2010). Is the diversification discount caused by the book value bias of debt? *Journal of Banking & Finance*, *34*(10), 2307–2317.

Grant, R. M., Jammine, A. P., & Thomas, H. (1988). Diversity, diversification, and profitability among British manufacturing companies, 1972–1984. *Academy of Management Journal*, *31*(4), 771–801.

Gribbin, J. D. (1976). The conglomerate merger. *Applied Economics*, *8*(1), 19–35.

Hamel, G., & Prahalad, C. K. (1985). Do you really have a global strategy? *The International Executive*, *27*(3), 13–14.

Hennart, J. F. (2007). The theoretical rationale for a multinationality–performance relationship. *Management International Review*, *47*, 423–452.

Hitt, M., Harrison, J., Ireland, R. D., & Best, A. (1998). Attributes of successful and unsuccessful acquisitions of US enterprises. *British Journal of Management*, *9*(2), 91–114.

Hoang, K., Nguyen, C., & Zhang, H. (2021). How does economic policy uncertainty affect corporate diversification? *International Review of Economics & Finance*, *72*, 254–269.

Hymer, S. H. (1976). *The international operations of national firms, a study of direct foreign investment.* MIT Press.

Jacquillat, B., & Solnik, B. (1978). Multinationals are poor tools for diversification. *The Journal of Portfolio Managemen*t, *4*(2), 8–12.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review*, *76*(2), 323–329.

Jiang, F. X. (2006). Research on the determinants of diversification of Chinese listed enterprises. *Management World*, *5*, 128–135.

Kim, W. C., Hwang, P., & Burgers, W. P. (1993). Multinationals' diversification and the risk-return trade-off. *Strategic Management Journal*, *14*(4), 275–286.

Kim, W. C., & Mauborgne, R. A. (1988). Becoming an effective global competitor. *The Journal of Business Strategy*, *9*(1), 33.

Kobrin, S. J. (1991). An empirical analysis of the determinants of global integration. *Strategic Management Journal*, *12*(S1), 17–31.

Kogut, B. (1983). Foreign direct investment as a sequential process. The multinational corporation in the 1980.

Kogut, B. (1985). Designing global strategies: Comparative and competitive value-added chains. *Sloan Management Review (pre-1986)*, *26*(4), 15.

Kuppuswamy, V., & Villalonga, B. (2016). Does diversification create value in the presence of external financing constraints? Evidence from the 2007–2009 financial crisis. *Management Science*, *62*(4), 905–923.

Lang, L. H., & Stulz, R. M. (1994). Tobin's q, corporate diversification, and business performance. *Journal of Political Economy*, *102*(6), 1248–1280.

Liao, L., Liao, G. M., & Shen, H. B. (2009). Operational risk, promotion incentives and business performance. *China Industrial Economics*, *8*, 119–130.

Liu, L. (1997). Thoughts on diversification. *Enterprise Management*, *7*, 34–35.

Liu, Y., Zhang, X. C., & Lan, X. Y. (2016). The impact of mixed ownership reform of state-owned enterprises on total factor productivity: An empirical study based on PSM-DID method. *Public Finance Research*, *10*, 63–75.

Liu, Z. Y., Wang, C. F., Peng, T., & Guo, J. (2017). Policy uncertainty and corporate risk-taking: Opportunity anticipation effect or loss aversion effect. *Nankai Business Review*, *6*, 15–27.

Lu, J. W., & Beamish, P. W. (2004). International diversification and business performance: The S-curve hypothesis. *Academy of Management Journal*, *47*(4), 598–609.

Lubatkin, M., & Chatterjee, S. (1994). Extending modern portfolio theory into the domain of corporate diversification: Does it apply? *Academy of Management Journa*l, *37*(1), 109–136.

Majocchi, A., & Strange, R. (2012). International diversification: The impact of ownership structure, the market for corporate control and board independence. *Management International Review*, *52*, 879–900.

Markowitz, H. M. (1991). Foundations of portfolio theory. *The Journal of Finance*, *46*(2), 469–477.

Markusen, J. R. (1995). The boundaries of multinational enterprises and the

theory of international trade. *Journal of Economic Perspectives*, *9*(2), 169–189.

Matvos, G., & Seru, A. (2014). Resource allocation within enterprises and financial market dislocation: Evidence from diversified conglomerates. *Review of Financial Studies*, *27*(4), 1143–1189.

Meyer, M., Milgrom, P., & Roberts, J. (1992). Organizational prospects, influence costs, and ownership changes. *Journal of Economics & Management Strategy*, *1*(1), 9–35.

Morck, R., & Yeung, B. (1991). Why investors value multinationality. *Journal of Business*, 165–187.

Penrose, E. T. (2009). *The theory of the growth of the enterprise*. Oxford University Press.

Rajan, R., Servaes, H., & Zingales, L. (2000). The cost of diversity: The diversification discount and inefficient investment. *The Journal of Finance*, *55*(1), 35–80.

Ramaswamy, K. (1995). Multinationality, configuration, and performance: A study of MNEs in the US drug and pharmaceutical industry. *Journal of International Management*, *1*(2), 231–253.

Ren, S. G., Zheng, J. J., Liu, D. H. & Chen, X. H. (2019). Does emission trading mechanism improve total factor productivity? Evidence from Chinese listed enterprises. *China Industrial Economics*, *5*, 5–23.

Rugman, A. M. (1976). Risk reduction by international diversification. *Journal of International Business Studies*, 75–80.

Rumelt, R. (1974). *Strategy, structure and performance*. Harvard University Press.

Rumelt, R. P. (1982). Diversification strategy and profitability. *Strategic Management Journal*, *3*(4), 359–369.

Scharfstein, D. S., & Stein, J. C. (2000). The dark side of internal capital markets: Divisional rent-seeking and inefficient investment. *The Journal of Finance*, *55*(6), 2537–2564.

Sok, P., & O'Cass, A. (2015). Examining the new product innovation–performance relationship: Optimizing the role of individual-level creativity and attention-to-detail. *Industrial Marketing Management*, *47*, 156–165.

Sorescu, A. B., & Spanjol, J. (2008). Innovation's effect on enterprise value and risk: Insights from consumer packaged goods. *Journal of Marketing*, *72*(2), 114–132.

Staudt, T. A. (1954). Program for product diversification. *Harvard Business Review*, *32*(6), 121–131.

Stein, J. C. (2003). Agency, information and corporate investment. *Handbook of the Economics of Finance*, *1*, 111–165.

Volkov, N. I., & Smith, G. C. (2015). Corporate diversification and firm value during economic downturns. *The Quarterly Review of Economics and Finance*, *55*, 160–175.

Wang, Y., Xie, T. T., & Hao, C. H. (2019). How do rising environmental costs affect corporate employment growth?—An empirical study based on the

revised policy of sewage charges. *Nankai Economic Studies*, *4*, 12–36.

Weston, J. F. (1970). Diversification and merger trends. *Business Economics*, 50–57.

Wu, G. D., & Zhang, H. L. (2015). Does diversification reduce corporate financial risk? Evidence from Chinese listed enterprises. *Journal of Central University of Finance & Economics*, *8*, 94–101.

Xin Zhao. (2005). Corporate Diversification and Diversification Discount: Theoretical Extension and Empirical Explanation Based on Chinese Reality. Doctoral Dissertation, Fudan University, Shanghai.

Xue, Y. Z., & Zhou, J. (2007). Product diversification, internationalization and corporate performance: Empirical evidence from Chinese listed manufacturing companies. *Nankai Business Review*, *3*, 77–86.

Zahra, S. A., Ireland, R. D., & Hitt, M. A. (2000). International expansion by new venture firms: International diversity, mode of market entry, technological learning, and performance. Academy of Management journal, 43(5), 925-950.

Zhang, Y., Liu, W., & Gong, L. T. (2005). An empirical study on diversification and business performance of Chinese listed enterprises. *Journal of Financial Research*, *9*, 122–136.

Zhou, L. A., & Chen, Y. (2005). The policy effect of China's rural tax and fee reform: An estimation based on difference-in-differences model. *Economic Research Journal*, *8*, 44–53.