ISSN: 2688-9323

Research on Audit Risk Control of State-owned Capital Overseas Investment based on Game Theory

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Abstract

The "Belt and Road" initiative involves the supervision and audit of my country's overseas investment and overseas state-owned assets. This initiative prompts this paper to review the current status and existing problems of overseas state-owned assets supervision, and propose that audit institutions should innovate the way of auditing and supervising overseas assets of state-owned holding companies from the perspective of incomplete information static supervision game, and give full play to the synergistic effect of state audit and internal audit. This paper uses game analysis to theoretically reveal the behavior motives and game equilibrium results of state-owned enterprises, intermediary departments, and regulatory departments, and explains the choice behavior of each actor and its interaction mechanism under a given institutional arrangement. It points out that regulatory institutional arrangements have and its significance, and with the help of the conclusion of the game analysis, it gives some enlightenment and suggestions for the accounting supervision of listed companies in our country.

Keywords

Game; State-owned Capital; Overseas Investment Audit.

1. Introduction

In 2013, General Secretary Xi Jinping put forward the initiative of jointly building the "Silk Road Economic Belt" and the "21st Century Maritime Silk Road", aiming to build a community of shared future featuring mutual benefit, mutual trust and mutual assistance, and stimulate the economic vitality of countries along the route [1]. The proposal of the "Belt and Road" initiative satisfies the actual needs of my country to reconstruct the regional pattern of opening up and promote the coordinated development of the east and west. It can improve the level of opening up, strengthen regional cooperation, optimize the structure of economic development, and promote the process of socialist modernization.

From the perspective of the stock market, at the end of 2020, my country's foreign direct investment stock was 2.58066 billion US dollars, which was 86.3 times the stock at the end of 2002, and its share in the global foreign direct investment outflow stock increased from 0.4% in 2002 to 6.6%, ranking from NO.25 climbed to No.3 in 2021, in the face of multiple challenges such as the complex and severe international environment and the spread of the domestic epidemic, the industry's foreign direct investment will be 936.69 billion yuan, a year-on-year increase of 2.2% (equivalent to 145.19 billion US dollars, a year-on-year increase of 9.2%). Among them, my country's foreign investment and cooperation throughout the year showed rapid growth in investment from countries along the route. , The number of large-scale foreign contracted projects has increased, and the construction of overseas economic and trade cooperation zones has achieved remarkable results.

ISSN: 2688-9323

As of the end of 2021, the overseas economic and trade cooperation zones included in the statistics of the Ministry of Commerce are distributed in 46 countries, with a cumulative investment of 50.7 billion US dollars, paid taxes and fees of 6.6 billion US dollars to the host country, created 392,000 local jobs, and effectively promoted mutual benefit and win-win cooperation and rapid growth, but it also brings unavoidable development challenges. From the analysis of the external environment, the countries along the “Belt and Road” are mainly emerging economies and developing countries, and there are thousands of differences in regime forms, ecological environments, national cultures and religious beliefs among them [2]. Overseas investment poses security risks. From the analysis of internal conditions, my country has just completed 40 years of reform and opening up, and it has only been more than ten years since China joined the WTO. State-owned enterprises started late in overseas investment, lack of experience, lack of supervision and other disadvantages, and lack of risk identification, control and response capabilities. In order to ensure the safety of overseas state-owned assets, how the regulatory system escorts state-owned assets is particularly critical. The safety and integrity of the overseas assets of state-owned enterprises is not only related to the safety of people's property, but also affects the effectiveness of state-owned enterprises' "going out", which in turn affects the steady and efficient implementation of the "Belt and Road" initiative. As the cornerstone of national governance, auditing should pay attention to the implementation of major national strategies and the protection of state-owned assets. Based on the background of the "Belt and Road Initiative", this article analyzes the current situation of state-owned enterprises' overseas assets supervision and auditing, analyzes the reasons, analyzes the risk points, explores the state-owned enterprises' overseas assets audit mode, and escorts the state-owned enterprises' overseas assets [3].

At the same time, the "14th Five-Year Plan" pointed out that supporting enterprises to participate in the reshaping of the global industrial chain and supply chain, promoting domestic and foreign industrial coordination, guiding the stable and orderly development of foreign investment and cooperation, and promoting the "going out" of Chinese products, services, technologies, brands, and standards " and other tasks; optimize investment structure and layout, improve overseas production and service networks, encourage diversified investment methods, and innovate multi-party cooperation models.

Under the "Belt and Road" initiative, state-owned capital must take on the role of building a community of interests, a community of destiny, and a community of responsibilities, and realize policy communication, facility connectivity, unimpeded trade, financial integration, and people-to-people bonds. Deeply integrated into the "Belt and Road" "Construction. The amount of state-owned capital overseas investment will continue to increase, the scope of investment will continue to expand, and the risks faced will become more complex [4]. This poses a challenge to how to better play the role of audit in ensuring the implementation of major national decision-making arrangements and maintaining national economic security. In this context, it is of great practical significance to discuss the coordination of internal and external audits of state-owned capital overseas investment under the "Belt and Road" initiative.

2. Literature Review

Looking at the existing literature, the research on the audit risk of China's foreign direct investment under the background of "the Belt and Road Initiative" is mainly divided into three aspects: first, the influence of the characteristics of the host country. Existing studies have pointed out that the host country government’s management efficiency, macro-governance capabilities, national economic and financial risks, and the development of host country parks are all important factors that affect China’s foreign direct investment in countries along the “Belt and Road” (Hui Fang and Yujie Song, 2019; Jinye Li and Xiaomin Shen, 2019; Yongchao

ISSN: 2688-9323

Song and Huayuan Li, 2019) [5]. Second, the impact of China's own characteristic factors. Studies have pointed out that factors such as the stage of development characterized by economic aggregate, China's tax policy (including the uncertainty of tax policy), and changes in total factor productivity all affect China's foreign relations with countries along the "Belt and Road". Direct important factors (Yabin Zhang, 2016; Wenran Zhao, 2017; Yinmo Chen et al., 2019) [6]. Third, the supervisory influence of the audit subject. Gradually build a coupling linkage mechanism with national audit as the main body, internal audit and independent audit coordination, from audit risk, national audit governance and other aspects.

Regrettably, although the existing studies observe the problem from different angles and focus on different key issues, the current research still focuses on the promotion effect of the “Belt and Road” initiative in China’s foreign direct investment, including the discussion of the traditional influencing factors [7]. Without touching on the analysis of the mechanism of action of the Belt and Road Initiative.

This paper believes that it is possible to comprehensively consider the interests of all parties involved, and introduce a game framework to analyze the behavioral motivations of state-owned enterprises, intermediary departments, and regulatory departments, as well as the game equilibrium results. Effective countermeasures are put forward to obtain an equilibrium solution, thereby guiding the behavior of participants and controlling the occurrence of game behavior from the perspective of policy formulation.

3. Game Analysis of State-owned Enterprises, Auditors and Regulatory Agencies Based on Financial Fraud in Overseas Investment

3.1. The Game between State-owned Enterprises and External Auditors

3.1.1. The Hypothesis of the Game

First, state-owned enterprises overseas investment companies attempt to maximize their own economic interests through financial fraud; second, overseas investment companies have only two strategic options: to conduct financial fraud or not to conduct financial fraud; third, external audit The auditor also has only two options: to collude with the company on financial fraud or to refuse to collude; fourth, the costs and benefits of various strategic choices of overseas investment companies and external auditors can be estimated.

3.1.2. Game Model Construction

Table 1. Game model (1)

External auditor / State-owned enterprises	Collusion (probability p)		No collusion (probability 1-p)	
	Regulatory authorities discover fraud (probability t)	Regulatory authorities have not found fraud (probability 1-t)	Audit finds fraud (probability r)	Audit detects no fraud (probability 1-r)
Fraud (probability q)	(E-A,e-a)	(E,e)	(0,-D-C)	(E,-D-C)
Not Cheated(probability 1-q)	(0,0)	(0,0)	(0,-C)	(0,-C)

Assume that the probability of state-owned enterprises committing financial fraud is q, and the probability of not committing fraud is (1-q). Assuming that the probability of external auditors colluding with state-owned enterprises is p, the probability of not colluding is (1-p). In the case of external auditors colluding with state-owned enterprises, the probability that the supervisory department discovers the fraud is t, and the probability of not discovering it is (1-t). In the case that the external auditors do not collude, the probability that the external auditors

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discover the state-owned enterprises' fraud is r, and the probability of not discovering it is (1-r). Assume that E is the illegal income obtained by the state-owned enterprises' fraud, A is the punishment of the state-owned enterprises' fraud discovered by the regulatory department, C is the cost of supervising the state-owned enterprises when the external auditor does not cooperate, and D is the external auditor's refusal to issue The loss suffered by the standard audit report, e is the excess income obtained by the auditor due to fraud and collusion, and a is the punishment of the auditor after being investigated by the regulatory department for collusion. According to the above variables, the game model is established as in Table 1.

3.1.3. Game Analysis

Expected benefits of external auditors: $E(_{\text{external auditors}}) = pe + Dpq + Cp - tapq - Dq - C$.

Find the derivative of p: $q=e+C/ta-D$.

The expected return of listed companies: $E(_{\text{state-owned enterprises}}) = q(E + Erp – Atp - Er)$.

Find the derivative of q: $P=(1-r)E/At - Er$.

Analysis conclusions: first, the higher the supervision cost (C) of external auditors, the greater the probability (q) of financial fraud of listed companies; The lower the probability (q) of state-owned enterprises' fraud; third, the higher the probability (t) of regulatory agencies finding state-owned enterprises' fraud, the lower the probability (p) of external auditors colluding; fourth, the lower the probability (p) of external auditors and listed companies. Excess earnings from financial fraud collusion (e) are not directly related to auditor collusion.

3.2. The Game between the Company's Management and Internal Auditors

3.2.1. The Hypothesis of the Game

First, the management of State-owned enterprises has a tendency to implement self-interested behaviors through financial fraud; second, the management has only two strategic choices, that is, to engage in financial fraud and not to engage in financial fraud; third, the future corporate governance reform requires that the internal audit Internal auditors are set under the audit committee, directly led by the governance layer, and aim to protect the interests of shareholders; fourth, internal auditors have only two options, that is, to collude with the management on financial fraud or refuse to collude; fifth, the management The costs and benefits of various strategic choices with internal auditors can be estimated.

3.2.2. Game Model Construction

Assuming that the probability of the management's financial fraud is s, the probability of no fraud is (1-s). Assuming that the probability of internal auditors colluding with management is p, the probability of not colluding is (1-p). In the case of internal auditors colluding with the management, the probability of the governance layer discovering the fraud is w, and the probability of not discovering it is (1-w). In the situation where the internal auditor chooses not to collude, the probability that the internal auditor finds management fraud through auditing is x, and the probability of not discovering it is (1-x). Let E be the income obtained by the management due to the self-interested behavior of fraud, A be the penalty after the management's fraud is discovered by the company's governance layer, C be the cost of supervising the management when the internal auditor refuses to cooperate, and D be the internal auditor's loss due to his refusal to collude with the company's management, e is the excess income obtained by the auditor due to the collusion, and a is the punishment of the internal auditor after being investigated and dealt with by the management because of the collusion. The game model established by the above variables is as follows:

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Table 2. Game model (2)

Internal auditor / Company management	Collusion (probability p)		No collusion (probability 1-p)	
	Regulatory authorities discover fraud (probability w)	Regulatory authorities have not found fraud (probability 1-w)	Audit finds fraud (probability x)	Audit detects no fraud (probability 1-x)
Fraud (probability s)	(E-A,e-a)	(E,e)	(0,-D-C)	(E,-D-C)
Not Cheated(probability 1-s)	(0,0)	(0,0)	(0,-C)	(0,-C)

3.2.3. Game Analysis

Expected benefits of internal auditors: $E_{(\text{internal auditor})} = pe + Dps + Cp - waps - Ds - C$.

Find the derivative of p: $s=e + C/wa - D$.

Management's expected return: $E_{(management)}=s (E + Exp - Awp - Ex)$.

Find the derivative of s: $p= (1- x) E/Aw-Ex$

Analysis conclusions: First, the higher the supervision cost (C) of internal auditors in listed companies, the greater the probability (s) of management fraud; Second, the greater the level of punishment (a) imposed by governance on colluding internal auditors, the lower the probability (s) that management will engage in financial fraud; third, the higher the probability (w) that governance will find management The lower the probability (p) that the auditor chooses to collude with the management; fourth, there is no direct correlation between the excess income (e) obtained by the internal auditor and the management for financial fraud and the probability (p) of the auditor colluding Relationship.

3.3. The Game between State-owned Enterprises and Regulatory Authorities

3.3.1. The Hypothesis of the Game

First, the only goal of regulatory agencies is to supervise the financial fraud of enterprises; second, listed companies always try to maximize their own economic interests through financial fraud; third, listed companies have only two strategic options: financial fraud and financial fraud. No financial fraud; Fourth, under various strategic choices, the costs and benefits of listed companies and regulatory authorities are public information.

3.3.2. Game Model Construction

The game between regulatory authorities and listed companies is a matter of mixed strategies. Regulatory authorities do not have absolute supervision or absolute non-regulation. The best strategy is random supervision, so that listed companies cannot discover the rules and dare not easily engage in financial fraud. . The best way for a state-owned enterprises is to randomly choose whether to cheat or not, making it difficult for the regulatory authorities to detect, and then achieve the purpose of profiting from it. Assume that the probability of listed companies committing financial fraud is p, and the probability of no fraud is (1-p). Assume that the probability of supervision by the supervisory department is u, and the probability of no supervision is (1-u). If the supervisory department takes the initiative to intervene in the supervision, it is assumed that the probability of discovering the financial fraud of the state-owned enterprises is r, and the probability of not discovering the fraud is (1-r). Under the condition that the supervisory department does not take active supervision, it is assumed that the probability of a state-owned enterprises being reported is q, and the probability of not being reported is (1-q). Let E be the illegal income obtained by the state-owned enterprisesdue to fraud, A be the punishment of the state-owned enterprises after the fraud is discovered, C be the cost of active supervision by the supervisory department, and D be the negative social impact of the state-owned enterprises being reported. According to the above variable settings, the model is constructed as follows:

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Table 3. Game model (3)

Regulatory authorities / State-owned enterprises	Collusion (probability p)		No collusion (probability 1-p)	
	Regulatory authorities discover fraud (probability r)	Regulatory authorities have not found fraud (probability 1-r)	Reported (probability q)	Not reported (probability 1-q)
Fraud (probability p)	(E-A,A-C)	(E,-C)	(E,-D)	(E,0)
Not Cheated(probability 1-p)	(0,-C)	(0,-C)	(0,-D)	(0,0)

3.3.3. Game Analysis

Expected benefits of oversight: $E_{(\text{supervisory department})} = Apru + Dqu - Cu - Dq$.

Find the derivative of u: $p=C - Dq/Ar$.

Expected Return of Listed Companies: $E_{(\text{state-owned enterprises})} = Ep - Apru$

Find the derivative of p: $\mu=E/Ar$

Analysis conclusions: first, the higher the supervision cost (C), the greater the financial fraud probability (p) of the state-owned enterprises; second, the greater the supervision department's punishment (A) for the fraudulent state-owned enterprises, the greater the social impact (D) The larger the value, the lower the fraud probability (p) of listed companies; third, the higher the illegal income (E) obtained by listed companies through financial fraud, the higher the possibility (u) of supervision by regulatory authorities; The greater the punishment (A) of the company, the higher the possibility of fraud detection (r), and the lower the possibility of supervision by the supervisory department (u).

4. Conclusion and Suggestions

Through data inspection, it proves the conclusion that the continuous financial fraud of listed companies can be reduced through the timely intervention of regulatory authorities in my country's capital market. On the one hand, the test results reflect that the self-interested behavior of the management has increased the risk of financial fraud in listed companies, and the role of external auditors in the supervision of financial fraud is not significant. Combining game theory analysis and empirical testing, the following suggestions are drawn:

First, reduce the cost of supervision and maintain timely supervision of listed companies to reduce the probability of fraud. To form a long-term mechanism for effective supervision, the most important measure is to change the shortcomings of the current formalization of internal control operation and evaluation of listed companies, change the supervision model that emphasizes inspection and neglect control, and relieve the huge pressure of substantive supervision through internal control supervision and evaluation, fundamentally strengthen the information disclosure and information reporting mechanism of listed companies.

Second, increase the punishment for fraudulent companies. Severe penalties not only show the determination of the regulators to deal with the financial fraud of listed companies, but also serve as a deterrent to potential violators.

Third, listed companies should implement corporate governance more actively, strengthen the leadership of internal audit and improve the design of management incentives. Regarding the audit committee, internal auditors, and management compensation and incentives, regulators should pay special attention to the function of independent directors. Notify listed companies with unreasonable governance structures and mechanisms and require rectification within a time limit, and improve and implement the supervision and exit mechanism for independent directors' participation in the capital market for independent directors who have not actively acted, reversing the current weakening of independent directors' functions situation.

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Fourth, standardize the business relationship between listed companies and external auditors, continue to improve the independence and professional capabilities of external auditors, and actively play the role of external auditors in the supervision of listed companies' financial fraud. It is necessary to improve the channel setting of external auditors for financial fraud and violations of listed companies at the regulatory level, and form a good faith protection mechanism. It is also necessary to severely punish the external auditors involved in fraud and conspiracy while severely punishing fraudulent listed companies.

Acknowledgments

This study was funded by the National Undergraduate Innovation and Entrepreneurship Training Program of Anhui University of Finance and Economics in 2021,"Research on thedevelopment prospect and utility of part-time workers under the background of post-epidemicbased on the empirical analysis of VAR model" (Grant No. 202110378183).

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