

## Financial Fraud from the Perspective of Game Theory

Peizhen Gong

Inner Mongolia University of Technology, China.

### Abstract

Financial problems are related to the lifeblood of an enterprise. With the continuous updating of the financial system, the cases of financial fraud only increase but not decrease. An important aspect of how to solve the problem of financial fraud is the audit interests of financial entities and certified public accountants. Only when both of them reach the dominant strategy can the situation of financial fraud be alleviated. This paper analyzes the causes of financial fraud from four aspects: the interest tendency of financial subject, the lack of independence of CPA audit, the lack of good professional ethics of financial personnel, and the imperfection of laws and regulations. It is proposed that the internal governance of enterprises should be strengthened, the professional ethics of enterprise personnel should be improved, and the laws and regulations system should be established and perfected.

### Keywords

Game; Financial Fraud; Motivation Analysis; Preventive Measures.

### 1. Introduction

In recent years, financial fraud is common in China and even in the world. Financial fraud involves a wide range of areas, scattered in different regions. Financial fraud not only affects the long-term development of enterprises and the economic interests of investors, but also affects the effective allocation of capital market. At present, China is in the critical period of economic development, how to prevent financial fraud is very important. This paper analyzes the problem of financial fraud from the perspective of game theory, analyzes the causes of financial fraud, and puts forward corresponding preventive measures.

### 2. Game analysis of financial subject and CPA audit

#### 2.1 Make assumptions

Hypothesis 1: the financial entity has the motivation and opportunity of fraud.

Hypothesis 2: there are only two choices for financial entities: fraud or no fraud.

Hypothesis 3: there are three situations in CPA: collusion with financial entity after finding fraud; refusing to collude with financial entity after finding fraud; failing to find fraud.

Hypothesis 4: both financial entities and CPA want to get the maximum profit.

#### 2.2 Construction model and preliminary analysis

Financial subject \ CPA	Find fraud		No fraud detected
	conspire	No conspiracy	
fraud	( E, B-C)	(-P, A-C)	(E, -C)
No fraud	(0, -C)	( 0 , -C)	(0, -C)

Note: e is the benefit of financial entity fraud. The benefit from CPA is collusion with financial entities. C is the cost paid by the CPA audit financial entity when fraud is found or not. P is a penalty for financial entities found to be fraudulent and refuse to be colluded by the CPA. A is a reward for

CPA to detect fraud and disclose its behavior after refusing to collude with financial entities. The probability of fraud is  $C$ , the probability of no fraud is  $1-C$ , the possibility of collusion is  $e$ , the probability of non collusion is  $1-e$ , the probability of fraud detection is  $D$ , and the probability of no fraud is  $1-D$ . All of the above variables are greater than zero. CPA's expected income:

$$EXP=d(ec(B-C)-e(1-c)C+(1-e)(A-C)c-C(1-e)(1-c))-C(1-d)=decB-decA+dcA-C$$

Derivative of  $e$ :  $exp=dcB-dcA=dc(B-A)$

Preliminary analysis: when  $D$  and  $C$  are constant, if  $b > A$ , then the above formula is an increasing function, that is, the higher the possibility of collusion between CPA and financial entities, the higher the expected earnings  $exp$ , and vice versa; if  $B < A$ , then the above formula is a minus function, that is, the higher the possibility of collusion between CPA and financial entities, the lower the expected income  $exp$ , and the higher the reverse.

Expected income of financial subject:  $EXP=dceE-Pdc(1-e)+(1-d)cE$ ,

For  $C$  derivative:  $exp=d(e-1)(P+E)+E$

Preliminary analysis: Suppose the financial entity is found to be financially fraudulent, and the CPA's penalty for refusing to conspire is equal to the revenue  $E$  that financial fraud may bring. Then  $exp= E(1+d(e-1))$ , so the bigger  $E$  is, the more likely the financial subject is to cheat  $c$ , and the more profits it will obtain. Assume that the probability of CPA finding fraud is  $1$ , and the probability of collusion with financial entities is  $0.5$ .  $Exp = 0.5(e-p)$ , if  $E > P$ , then  $exp > 0$ . As a result, when the likelihood of fraud by a financial entity increases, so does its expected earnings.

### 3. Motivation analysis of financial fraud based on Game Theory

#### 3.1 Interest tendency of financial subject

For listed companies, the benefits of financial fraud are often far greater than its costs. Through the above model analysis, we can see that: first of all, when the financial entity is fraudulent and the probability of being detected by CPA is  $1$ , if the income of fraud is greater than the cost of punishment, the more likely the financial entity is to cheat, the higher its expected profit. In today's securities market, no matter which company is facing strong competitive pressure, any listed company has the tendency to pursue high profits. From the punishment of China Securities Regulatory Commission in the past, we can see that compared with the actual profits, the punishment of financial fraud of listed companies is very small. Therefore, listed companies often engage in financial fraud in order to pursue higher profits. Secondly, for the listed companies, if the possible penalty is equal to the possible profits, the more likely the audit companies collude, the more likely the listed companies to cheat. Due to the lack of independence of audit institutions in China, some listed companies may collude with auditors on the condition that they provide certain benefits.

#### 3.2 CPA audit lacks independence

For audit institutions, if the parties find the financial fraud and fraud probability of listed companies, if the return generated by collusion exceeds the return that can be obtained in the report, then the higher the probability of collusion, the greater the expected return. At present, the independence of audit institutions in China is low and the supervision effect is small. Most of the external auditors are companies with certain profit-making purposes. Therefore, if the violation cost is low and there is little or no reward after reporting, auditors can collude with listed companies to obtain excess profits.

#### 3.3 Financial personnel lack of good professional ethics

Listed companies, regulators and industry self-discipline organizations do not pay enough attention to the follow-up education and professional ethics of financial personnel, which is one of the important factors leading to serious financial fraud of Listed Companies in China. At present, China's follow-up education for financial personnel is relatively low, and the evaluation of the results of follow-up education is even lower. In the case of low professional ethics and weak legal consciousness, the company can assist senior managers in financial fraud in order to obtain illegal benefits and satisfy the opinions of senior management.

### **3.4 Laws and regulations are not perfect and supervision is not strict**

At present, the financial regulation of listed companies is still in the regulatory level. Low status leads to low executive power and attention, and there are some loopholes. In addition, Chinese regulators still lack supervision of listed companies. There is a certain time lag in the administrative punishment of listed companies, which will lead to the idea of "first of all, violate the needs of the present stage, and ignore the punishment in the future". There is no doubt that this increases the motivation of listed companies to participate in financial fraud.

## **4. Measures to prevent financial fraud of listed companies based on Game Theory**

### **4.1 Strengthening the internal governance of enterprises**

To prevent the financial fraud of listed companies, we should first strengthen the internal control of enterprises. It can be improved from five aspects: control environment, risk assessment, control activities, information and communication and internal supervision: first, the enterprise should set up an audit committee. In order to provide the basis for enterprise decision-making, the director with rich experience and strong accounting professional knowledge should serve as the Audit Committee; the second is to build a risk assessment system. The third is to establish information communication platform. Fourth, the listed enterprises should set up internal supervision committee. Check the problems of internal control and evaluate the effectiveness of internal control.

### **4.2 Improve the professional ethics of enterprise personnel**

It is necessary to continuously carry out continuing education and professional ethics training for the financial personnel and senior management of the company. As far as continuing education is concerned, our country mainly adopts the way of online lectures and examinations, but this method can not improve the professional knowledge of financial personnel. The company can employ professional teachers to explain and summarize the problems encountered in daily work, and carry out inspection in the form of closed book examination. Cash rewards will be given to the personnel with excellent results and punishment will be given to unqualified personnel. In terms of professional ethics training, employees all know the professional ethics, but they don't pay attention to it. The company should conduct professional ethics training from time to time. When dealing with problems, they should constantly emphasize professional ethics, and senior managers should teach by example.

### **4.3 Establish and improve laws and regulations system**

At present, China's laws and regulations on enterprises and audit institutions are not strong punishment for violations. Even if enterprises and audit institutions violate the rules, the cost they pay is small, and the possibility of collusion between them is large, which leads to frequent financial fraud. Therefore, China should establish and improve the laws and regulations, increase the punishment, and establish a special regulatory body to inspect the financial reports and audit reports of audit institutions from time to time, so as to prevent the occurrence of financial fraud.

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