

Game Theory Among Reimburse Applier, Financial Audit and Internal Audit in Universities

YUE Xima^{[a],*}

^[a]Division of Finance, Jiangsu University of Science and Technology, Zhenjiang, China.

*Corresponding author.

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Abstract

The authenticity of economic affairs in universities directly affects the accuracy and authority of budget and balance of universities. Incomplete university financial management system and lacking of internal audit supervision affects the optimal allocation of resources, which are related to the cause of the implementation and development. In this paper, we analyzed reimbursement, financial Audit and internal audit in universities in view of game theory and discussed the mechanism of economic behaviors between reimbursement and supervision processes.

Key words: University; Financial audit; Internal audit; Game model

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1. ISSUING PROBLEM

University financial audit is the foundation of various financial management works. The authenticity of economic affairs directly affects the accuracy and authority of university budget and decision. It affects the optimal allocation of university resources, and is related

to the implementation and development of various routines.

In 2016, Jiangsu government inspected 25 providential universities. During the inspection, it was found that some universities do not have strict expenditure audit on research funding, which brings to over-standard reimbursement, payments to non-group members in transverse projects, overrunning budget and over-paid service fee. All above reflect incomplete financial management universities, in addition to inefficient internal audit. In this paper, we analyzed reimbursement, financial Audit and internal audit in universities in view of game theory and discussed the mechanism of economic behaviors between reimbursement and supervision processes.

2. GAME THEORY ANALYSIS AMONG REIMBURSE APPLIER, FINANCIAL AUDIT AND INTERNAL AUDIT

2.1 Game Hypothesis

During reimbursing, economic behavior main bodies exist between reimburse applier and financial auditor, in which applier purses maxima amount of reimbursement and auditor purses standard review process and time-saving (Zhao, 2015). For appliers, there are two strategies: legible or illegible reimbursement; auditors also have two choices: strict review or lax review.

2.2 Game Model Construction

Assuming that probability of illegible reimbursement is q , for legible is $1-q$; probability of lax review is p , therefore $1-p$ is for strict review. In condition of illegible reimburse and lax review, probability of being detected by internal audit is t , thus for undetected is $1-t$. For auditors, in condition of strict review, probability of detected illegible reimburse is r , undetected is $1-r$. Set M

as extra benefit from illegible reimburse, F as potential punishment for illegible reimburse from auditors, for example blacklist, A as punishment for detected illegible reimburse from internal audit department, for example loss of reputation and promotion chance, S as financial

auditor cost, m as extra benefit from lax review, such as improved interpersonal relationships, potential benefit transport and so on. Set as a punishment for auditor from internal audit. Constructed game model is shown in Table 1.

Table 1
Mode L of Game Between Reimburse Applier and Financial Auditor

Financial audit Reimburse applier	Lax audit p		Strict audit $1-p$	
	Internal audit detected t	Internal audit non- detected $1-t$	Audit detected r	Audit non-detected $1-r$
Illegible reimburse q	$(M-A, m-a)$	(M, m)	$(-F, -S)$	$(M, -S)$
Legible reimburse $1-q$	$(0,0)$	$(0,0)$	$(0, -S)$	$(0, -S)$

2.3 Game Analysis

From Table 1, financial auditor's expected profit is $E_{\text{Auditor}} = pqm - pqt a - S + Ps$. Take the derivative of lax audit probability, p , and set it to 0, which leads to extremum of auditor's expectation. Here we have Equation (1).

$$\text{Set } \partial E_{\text{Auditor}} / \partial p = qm - qta + S,$$

$$\text{Thus } q = S / (ta - m). \quad (1)$$

The Equation (1) indicates that: Firstly, higher audit cost of financial auditor, S , the larger illegible reimbursement probability, q , will be, that is high difficulty and cost of audit make it more difficult to find problems, as well as increased illegible motivation. Secondly, the greater punishment for illegible reimbursement, a , the less illegible reimburse, q , will be. Thirdly, the greater profit, m , that auditor will get from lax review, the larger probability of illegible reimbursement, q , will be.

For same reason, table 1 indicates that expected profit of reimbursement applier follows Equation (2). Take the derivative of probability of illegible reimbursement, q , and set it to 0, that is the extremum of expectation. Here we get Equation (3).

$$E_{\text{applier}} = q[pt(M-A) + p(1-t)M + (1-p)r(-F) + (1-p)(1-r)M], \quad (2)$$

$$p = (rF + rM - M) / (rF + rM - tA). \quad (3)$$

Equation (3) suggests that firstly the greater illegible reimburse probability, t , the smaller lax review probability, t , will be. Secondly, extra profit of auditor from lax review, m , is indirectly related to probability of lax review, p . Thirdly, the greater probability of auditor detecting illegible reimbursement, r , the more probable lax review, p , will be. It concludes that if financial auditors have a strong ability to find illegible part, they will form mindset which leads relaxed vigilance and lax review.

3. CONCLUSION AND COUNTERMEASURE

The workload and complexity of financial auditors in universities are highly related to the degree of normality of staff reimbursement and the extent of internal audit

on internal auditors. Lacking of responsibility becomes a breeding ground for corruption. Financial audit is the first defense line against economic crime. Legible reimbursement behavior, rigor financial audit, effective internal audit seriously affect the efficiency and authority of the financial management of colleges and universities. In this paper, from profits of reimbursement personnel, financial auditors and internal auditors, game model among reimburse appliers, financial auditors and internal auditors is constructed from game theory. We analyzed the mechanism of the economic behavior among the various subjects in the process of financial reimbursement. By analyzing the game behavior of reimbursement personnel, financial auditors and internal audit through the model, we provide following countermeasures and suggestions:

(a) Strengthen the training of financial auditors in colleges and universities. Reduce the cost of supervision. Maintain the timely supervision of reimbursed personnel and reduce the probability of illegible reimbursement. It is necessary to change the formalization condition of current internal control operation and evaluation, pay more attention to the audit and supervision of financial foundation work, change the supervision mode of "more inspection and less control", and form a long-term effective supervision mechanism. In addition, actively take use of information technology, financial data and internal audit module to achieve the exchange and disclosure system, which makes a more timely supervision for internal audit department. Also, incapable financial auditors, as well as deeply hidden financial fraud, results increased supervision costs. Therefore colleges and universities should actively strengthen the training to improve financial audit personnel professional quality and skills, enhance the financial audit staff supervision services, and reduce the probability of illegible reimbursement.

(b) Increase strength of penalties to illegible reimbursement appliers. Severe punishment not only shows determination of university governance to manage reimbursement appliers' financial fraud, but also forms a potential deterrent force to potential

violator. It is necessary to actively establish the credit file for reimbursing personnel. By establishing the reimbursement credit file, it is able to standardize the college reimbursement behavior, to improve the efficiency of the allocation of college education resources, and to promote the standardization of economic operation and the comprehensive ability of education and scientific research.

(c) Standardize the internal management system of colleges and universities to improve the implementation of the system and prevent profit transportation. Standardize business relations between reimbursement personnel and financial audit personnel, and continuously enhance the independence and professional competence of financial auditors, and actively use the supervision function of financial auditor in illegible reimburse and financial fraud. In the regulatory level, it is necessary to improve the establishment claim route for financial auditors to claim illegible reimburse and to form an effective protection system. While strictly punishing illegible reimburse appliers, seriously investigate the financial staff who reviews the case intentionally laxly to prevent profit transportation.

(d) Strengthen standardization education to reimburse appliers and financial auditors. In reimbursement of universities, since extra profit, m , of auditor from lax review is not directly related to the probability of lax review, p , it is necessary to strengthen standardization

education on financial staff. Explain and go through this process scientifically to improve financial auditors' knowledge and to clarify profit relationships. In addition, in reality, China's college reimbursement appliers are lacking of knowledge on financial policy and financial system. Resulting irregular behavior in process of reimbursement has increased the burden of financial audit, as well as hidden dangers to internal and external audit supervision. Thus strengthening standardization education of reimbursement not only improve efficiency and standard usage of funding, but also reduce reimbursement cost.

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