Incentive vs. punitive conditional audit policy

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ABSTRACT

While audit action is a prominent measure for reducing agency cost, it remains inconclusive how the previous audit experience has an effect upon current audit decision. Guo et al. (2005) conclude that it is unnecessary for the principal to use conditional audit in two-period audit policy, suggesting that the optimal audit policy in current period is to maintain the same audit probability as that in previous period. However, their analyses are based on punitive conditional audit. This paper modifies their model by introducing an incentive conditional audit regime. We find that, provided both audit cost and under-declaring benefit are moderate, the incentive conditional audit policy will dominate the punitive conditional audit policy and the conditional audit mechanism will be a desirable solution.

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1. Introduction

In practice, there are a variety of agency structures, and each one has its specific principal and agent(s). Because of the existence of private information held by the agent(s) and divergence of interest between the principal and the agent(s), agency cost has long been a major concern in setting a principal-agent relationship. Hence, it is a common phenomenon for the principal to take some kind of audit action upon the agent(s) to reduce the agency cost. Once the principal hires an auditor to audit the agent(s), it forms a three-tier agency (i.e., principal-auditor-agent) relationship.

The economics of a principal-supervisor (or auditor)-agent relationship has been broadly studied by prior research for a long time. Modeling an auditor as the one maximizing expected utility, Antle (1982) studies agency problems resulting from the agency structure of an owner-manager-auditor hierarchy. In the agency hierarchy of consumer-regulator-firm (regulated), Baron and Besanko (1984) analyze how the regulator makes optimal audit decisions on the regulated firm and sets the related pricing policy to maximize total social welfare of the parties concerned, including consumers as well as the regulated firm. Demski and Sappington (1987) examine the regulation problems between a self-

interested regulator and a self-interested firm under a setting where consumers (or Congress) can instruct the regulator's action and the latter can supervise the monopoly firm's operation. Meanwhile, based on a principal-agent model, Baiman, Evans, and Noel (1987) provide an insight into how a principal uses the information from the agent's report and hires a utility-maximizing auditor to mitigate the inefficiency caused by information asymmetry.

Furthermore, a number of studies also take into account the agency relationship that allows for the possibility of collusion between the auditor and the audited agent (Baiman, Evans, & Nagarajan, 1991; Kofman & Lawarree, 1993; Laffont & Martimort, 1999; Tirole, 1986). Tirole (1986) examines the effects of bribes in a hierarchical contract involving a principal, a supervisor and an agent. Baiman et al. (1991) address the issue of collusion between managers and auditors. Kofman and Lawarree (1993) propose an optimal audit contract when both an internal and an external auditor are available, assuming the internal auditor may collude but the external one not. In exploring the simultaneous use of two collusive supervisors, Laffont and Martimort (1999) show that competition between regulators will relax collusion-proof constraints and improve social welfare when regulators make collusive offers that are accepted by the agent.

In addition to the literature involving single-period audit model, there are a number of research examining the principal's auditing behavior in multiple-period scenarios (e.g., Chen, 2006; Chen & Liu, 2007; Greenberg, 1984; Landsberger & Meilijson, 1982). In the analysis of multiple-period audit policy, it is supposed to be

reasonable thinking for the policy maker to use conditional audit regime. A few laboratory experiments contribute to empirical evidence regarding the performance of audit rules used for multiple periods. For instance, Clark, Friesen, and Muller (2004) conduct an experiment to compare Past-Compliance Targeting (Harrington 1988) and Optimal Targeting (Friesen, 2003) with random auditing. They find Optimal Targeting generates the lowest inspection rates, but random auditing the highest compliance. Cason and Gangadharan (2006) undertake a laboratory experiment to analyze the conditional audit rule proposed by Harrington (1988), in which participants move between two inspection groups that differ in the probability of inspection and severity of fine. They find compliance behavior does not change as sharply as the model predicts. Because of the complexity and abundance involved in multiple-period audit models, it is not only difficult but impossible for any single research to explore and compare all possibilities. Even in a two-period audit, there still are lots of variants of audit models.

Using a two-period audit model, Guo, Tsay, and Liu (2005) analyze a punitive conditional audit regime and conclude that conditional audit mechanism may be unnecessary in achieving the principal's optimal audit policy. They argue, as nature states between two periods are mutually independent, the optimal audit policy for the second period can be independent of the audit result in the first period. However, their argument is essentially derived from punitive conditional audit, and it remains uncertain whether their conclusions hold under other conditional audit regime. Hence, in this paper, we extend the research on conditional audit by incorporating an incentive mechanism in our analytical model. Our analyses show that the incentive conditional audit policy will dominate the punitive conditional audit policy and the conditional audit mechanism will be a desirable solution, provided both audit cost and under-declaring benefit are moderate.

In next section, we characterize the model used in this paper. Section 3 presents the related analyses and results. Section 4 concludes our findings and discusses the implications of this research as well as its application in designing management mechanisms.

2. The model

In this paper, we examine a three-tier hierarchy comprising a principal, an auditor and a manager. The principal owns the vertical structure; the manager runs an operating unit with private information about its realized return; the auditor collects information for the principal. Following Tirole (1986), it is assumed that the principal lacks either the time or the knowledge necessary to supervise the manager, and that the auditor also lacks either the time or the resources required to run the vertical structure. It is further assumed that all players are risk neutral. Also, the auditor is considered to be independent and will not collude with the manager. In two-period audit scenario, nature is assumed to be the only one factor affecting the realized return, i.e., high return (R_H) or low return (R_L). In the paper, high (low) return is used to denote high (low) output, good (poor) operating income, or large (small) sales revenue, depending on transferring agreement (or regulation). Based on previous experience, the probability that the manager realizes a high return is p, and he realizes a low return with a probability of $1 - p$. The probability of high (low) return is the same in either period one or period two, and the realized return in period two is independent of that in period one. While the probability of high return is common information, the final realized return is the manager's private information. That is, the principal cannot learn the manager's realized return unless the former takes an action such as audit.

According to some kind of contract or regulation, the manager has to transfer a certain portion (α) of the return declared by him to the principal. In other words, the manager can reserve only the $1 - \alpha$ portion of the return. The mechanism brings about an incentive for the manager to under-declare the return. To deter the under-declaring behavior, the principal can employ an auditor at cost C to audit the return declared by the manager provided the latter declares a low return. If the auditor finds the under-declaration of return, the manager has to pay the principal a penalty of $\overline{P}$. Similar to Kofman and Lawarree (1993), we assume $\overline{P}$ is an exogenously given number, which may be interpreted as, for instance, a legally specified limit on liability. Also, $\overline{P}$ is assumed to be larger than $\alpha(R_H - R_L)$ for compensation and punishment. In the paper, the audit capability (or audit quality) of the auditor is denoted by the probability, r, that the under-declaration of return can be found by the auditor, and there remains a probability of $1 - r$ that the auditor will fail to find the under-declaration of return. Both C and r are common information of all parties involved. Meanwhile, we exclude the possibility of collusion between the auditor and the manager. If the model allows the possibility of the collusion, the principal will likely need to employ either a second supervisor or a "bounty-hunter" mechanism to ensure the effectiveness of the audit policy. In that case, the principal will have to increase monitoring cost to ensure the effectiveness of the audit policy. We expect that, under the model considering the collusion between the auditor and the manager, it will bring about a negative effect on the principal's net expected revenues. Due to the complication involved with collusion, we exclude the possibility of collusion in the model and focus on the comparison of the incentive conditional audit policy with the punitive one.

In a two-period audit decision, the audit policy for the second period can be dependent on the audit result in the first period; i.e. there exists the possibility of "conditional audit." It is assumed that the audit probability for the first period is A if the manager declares low return, but the audit probability for the second period will depend on the audit result in the first period. Conceptually, the conditional audit policy may be in a punitive or an incentive way. With respect to the punitive conditional audit, the principal can adopt different punitive ways. For example, upon discovering the manager's under-reporting in the prior period, the principal may increase audit probability in the current period or adjust up the under-reporting penalty. In contrast, the principal also can adopt incentive conditional audit in the way either reducing audit probability in the current period or decreasing possible penalty upon the manager without under-reporting record in prior period.

Guo et al. (2005) analyze the effect of the punitive conditional audit policy in the way of increasing audit probability in the current period upon the manager with under-reporting record in prior period. In their setting, if the under-declaration of return in period one is found and revealed by the auditor, the audit probability for the second period can be enhanced up to $A^+ (\equiv A + a$ where $a \geq 0)$ provided the manager declares low return once again in period two. As a result, Guo et al. (2005) conclude that, given the manager declares a low return, the principal will adopt random audit (i.e. $A = A^+ = \alpha(R_H - R_L)/r\overline{P}$ and $a = 0$) in period one or in period two (regardless of previous audit record) provided the manager's benefit of under-declaration is less than the expected penalty under complete audit; otherwise, the principal will consistently take complete audit (i.e., $A = A^+ = 1$ and $a = 0$) in both period one and period two. In either of the two cases, there is no application of conditional audit.

Extending the related issue, this paper considers an incentive conditional audit policy to examine the possibility of conditional audit. In period two, we allow the audit probability on the declaration of low return can be reduced to $A^- (\equiv A - a$ where $a \geq 0)$ if the