Available online at www.sciencedirect.com
SCIENCE DIRECT®
ELSEVIER
J. Eng. Technol. Manage. 23 (2006) 4–17
Journal of ENGINEERING AND TECHNOLOGY MANAGEMENT JET-M
www.elsevier.com/locate/jengtecman

Audit error

Joel S. Demski [a,*], Hans Frimor [b], David E.M. Sappington [c]

[a] *Fisher School of Accounting, University of Florida, P.O. Box 117166, Gainesville, FL 32611-7166, United States*
[b] *Department of Business & Economics, University of Southern Denmark, Campusvej 55, DK-5230 Odense M, Denmark*
[c] *Department of Economics, Warrington College of Business, University of Florida, P.O. Box 117140, Gainesville, FL 32611-7140, United States*

Available online 20 March 2006

Abstract

We study a setting in which a manager can exaggerate the observed measure of his performance, e.g., engage in window dressing or adopt unusually aggressive accounting. To limit such behavior, the firm's owner can adopt an accounting system that is less prone to manipulation. However, such a system also reduces the information content of the observed performance measure. We identify conditions under which the firm's owner will intentionally adopt an accounting system that admits self-interested manipulation by the manager in order to secure a more informative performance measure.

JEL classification: M41; M11; D82

Keywords: Endogenous; Intentional audit error; Imperfect accounting; Earnings manipulation

1. Introduction

Auditors serve the important role of limiting the incidence of serious errors in financial reports, whether the errors are intentional or unintentional. One might suspect that, ideally, these errors should be minimal and auditors should achieve exceptionally low error rates. In this article, we demonstrate that the optimal error rate for an auditor may be substantially above zero, even when there are no direct costs of reducing the error rate.

Although this conclusion may seem counter-intuitive, it follows from the following simple logic. One way to reduce an auditor's error rate is to adopt a financial measure that is audited

* Corresponding author. Tel.: +1 352 273 0212; fax: +1 352 392 7962.
E-mail address: joel.demski@cba.ufl.edu (J.S. Demski).

0923-4748/$ – see front matter
doi:10.1016/j.jengtecman.2006.02.001

more easily. The drawback to such a policy is that a measure that is easily audited may produce relatively little of the information that is critical for planning and control purposes. On balance, a more informative measure that unavoidably introduces a higher audit error rate can be preferable to a less informative measure with a lower audit error rate. To illustrate this more general observation, notice that cash flow is audited much more easily than is the typical income measure, where forecasts and judgments are essential in assessing, say, depreciation expense, warranty claims, and pension obligations. However, income may provide far better information than cash flow about key activities within an organization. Consequently, an income measure may be preferable to a cash flow measure even when use of the income measure introduces a relatively high audit error rate.[1]

We develop this conclusion formally as follows. Section 2 considers a simple benchmark setting that provides the basis for our analysis. Section 3 analyzes a straightforward extension of the benchmark setting. Section 4 employs the preceding analyses to demonstrate our main conclusion formally. Section 5 provides an illustrative example. Section 6 reviews the implications of our findings.

2. The benchmark setting

We analyze a setting where the owner of a firm (the principal) seeks to induce the firm's manager to deliver productive effort (e_p) because increased productive effort increases the firm's expected output. For simplicity, the manager's productive effort is either high ($e_p = \bar{e}_p$) or low ($e_p = 0$), and the principal seeks to induce the manager to deliver high productive effort. The principal cannot observe the level of productive effort the manager supplies.

The principal is risk neutral. The manager displays constant absolute risk aversion, with utility measure $-e^{-rx}$ for cash equivalent x. The cash equivalent is the difference between the manager's financial compensation, I, and his effort cost, $c_p(e_p)$. The high level of productive effort is costly for the manager, while the low level of productive effort is not (so $c_p(\bar{e}_p) > c_p(0) = 0$). r is the manager's measure of risk aversion. The higher is r, the more averse is the manager to risk, and thus the greater is the amount he must be paid to accept an actuarially fair financial gamble.

The manager's compensation (I) is assumed to be a linear function of measured performance, y. Formally, $I = \alpha + \beta y$, where α is a fixed payment the principal makes to the manager and $\beta \geq 0$ is the corresponding piece rate, which reflects the rate at which the manager's compensation increases as his measured performance increases. The performance measure reflects the sum of two random variables, $\tilde{y} = \tilde{\mu} + \tilde{\varepsilon}$. The first random variable, $\tilde{\mu}$, is binary (so $\tilde{\mu} \in \{\mu_H, \mu_L\}$, with $\mu_H > \mu_L$) and reflects the mean of the performance variable. The second random variable, $\tilde{\varepsilon}$, is a normally distributed random variable with mean 0 and variance σ^2. This variable captures the noise in the performance variable.

Initially suppose the high mean (μ_H) of the performance variable arises if and only if the manager delivers the high level of productive effort ($e_p = \bar{e}_p$). In this benchmark setting, the manager's compensation is a normally distributed random variable with mean $\alpha + \beta\mu_H$ and

[1] Demski et al. (2004) provide a complementary explanation for why a less accurate audit process may be preferable to a more accurate audit process. In their analysis, a manager will sometimes devote more effort to productive activities and less effort to manipulating the accounting measure when the measure is more easily manipulated, and thus less accurate in equilibrium.