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組織設計內生化對於多工環境下誘因強度之影響 > 實驗證據

摘 要

本研究主要目的在以實驗的方法檢驗誘因契約種類與監督機制對於經理人誠實報導行為之影響。本研究採用實驗經濟學的研究方法，測試一個單期代理模型之一系列假說。八場實驗的結果有以下之重要發現：第一，不論受試者面對何種誘因契約，他們說謊的頻率並不如傳統代理理論所預期的那麼高。然而，受試者說謊的程度與大小會受到誘因契約、監督機制的存在與否以及公司利潤的影響。第二，誘因契約與監督機制共同影響經理人之誠實報導行為。最後，本研究提出一個新的誘因契約，並以實驗證明在所有誘因契約與監督機制存在與否的各種組合中，該新契約本身 (不需與監督機制搭配) 即可誘發最高的經理人誠實報導頻率，並產生次高的公司利潤。

關鍵詞: 代理模型, 溝通價值, 誠實, 誘因契約, 監督機制

The Effects of Endogenizing Organization Design on the Incentive Intensity

under Multitasking > Experimental Evidence

Abstract

The main purpose of this study is to experimentally examine the effects of incentive contract types and monitoring mechanism on manager's honesty in managerial reporting. This study adopts the experimental economics methodology to test a series of hypotheses derived from a simple one-period agency model. The experimental results from eight experiments reveal several important findings. First, no matter what contract the subjects face, they generally do not lie as often as the conventional agency theory predicts. However, the extent and magnitude of lying are affected by the contract types, the existence of monitoring mechanism, and firm's profitability. Second, contract types and monitoring mechanism *jointly* affect manager's honest reporting behavior. Finally, this study proposes a new incentive contract and experimentally shows that this new contract *alone* can induce the highest percentage of honest reporting and produce the second largest firm profit among all contract types with and without a monitoring mechanism.

Keywords: Agency model, Communication value, Honesty, Incentive contract, Monitoring mechanism

1. INTRODUCTION

In his seminal paper of summarizing

the contracting theory and accounting, Lambert (2001) indicates that much of the motivation for current accounting and auditing research relates to the control of incentive problems. In addition, Bushman and Smith (2001) also identifies that creating incentives to take actions is one of the three fundamental contracting roles for accounting information. In fact, during the past two decades, the design of incentive contract to motivate agent's effort contributing to the success of a company has received much attention in managerial accounting. Since empirical evidence has shown that incentive contracts do affect agent's behavior (Prendergast 1999) and an understanding of how incentive scheme should be designed constitutes a cornerstone of the theory of the firm (Baker, Jensen, and Murphy 1988), additional research should continue to shed light on unsolved issues related to the design of optimal incentive contract.

In general, most of prior agency studies in the area of incentive design have two distinct features. First, these studies focus on the role of performance measures in an optimal contracting framework under conditions of information asymmetry. The key characteristic is the *informativeness* of the performance measure about the agent's action. In particular, Banker and Datar (1989), Lambert and Larcker (1987), and Lambert (2001) emphasize that the informativeness of a performance measure should be a function of its sensitivity to the agent's actions and its noisiness. Second, these studies have indicated that communication is valuable to owner's production, marketing, and capital budgeting decisions because manager's reporting of his private information to the owner can reduce the costs of information asymmetry (Berg, Daley, Gigler, and Kanodia 1990; Christensen 1981, 1982; Melumad and Reichelstein 1987, 1989). However, the manager may maximize his personal wealth at the expense of not reporting honestly because of his self-interest and opportunistic behavior. In fact, conventional agency analyses assume all individuals are willing to lie to maximize their wealth. Therefore, an understanding of the design of efficient incentive mechanisms that can improve the value of communication becomes a critical issue to the managerial accounting studies.

One recent study that has examined agent's honesty in managerial reporting is Evans, Hannan, Krishnan, and Moser (2001). They investigate the role of honesty in a reporting setting in which the divisional manager has superior information that the top management needs to make efficient operating decision. In particular, Evans *et al.* (2001) intends to examine how manager's preferences for wealth and honesty affect their managerial reporting of private production costs (in the form of budget request). The empirical results from three experiments show that subjects generally do not lie more as the payoff of lying increases. In addition, paying a large fixed salary would potentially increase more honest reporting because manager's share of the total surplus increases. This result suggests

that the extent of manager's truthful reporting may depend on how the total surplus is divided between the manager and the firm.

Evans *et al.* (2001) concludes that contract type may affect subjects' extent of honesty, but does not explicitly examine how incentive contract design may affect the honesty of reporting. The main purpose of this study is to experimentally investigate the effects of incentive contract types and monitoring mechanism on manager's honesty in managerial reporting and firm profit. The experiments differ from Evans *et al.* (2001) in several ways. First, Evans *et al.* (2001) only looks at how the magnitude of bonus share may affect manager's reporting behavior and finds less honest reporting under a contract that provides a smaller fixed share of total surplus. In contrast, this study considers the joint effect of contract types and monitoring mechanism on manager's reporting strategy. Prior experimental studies in auditing have found that the existence of a monitoring mechanism shall positively affect manager's disclosure decisions (Dopuch and King 1992; Wallin 1992). However, Evans *et al.* (2001) ignores any monitoring or auditing in their experiments. Since all public firms are required to establish solid internal control system with internal auditors and hire external auditors for financial statements audits, an incorporation of a monitoring mechanism into the experiments should provide more insightful evidence about manager's honest reporting behavior. Second, Evans *et al.* (2001) measures the value of communication in terms of the surplus shared by the firm after a production decision. They find that an incentive contract which relies exclusively on manager's preferences for honesty can increase firm's profit. In this study, however, the value of communication is evaluated through manager's choice between undertaking a high-cost innovative investment and a low-cost established investment. In light of the growing importance of innovation to the success of a business enterprise, the measure of communication value used in this study is more relevant to firm's design of incentive contract and decision making. Finally, in each of Evans *et al.*'s (2001) three experiments, subjects repeat their budget requesting decision for ten periods. As compared to prior experimental economics studies, the length of the experimental periods seems to be not long enough for subjects to fully discern their best decisions. This study extends the length of periods from ten to twenty so that the subjects can be given a better chance to develop their best reporting strategy. Experimental economists have emphasized the importance of designing experiments as repeated trials so that subjects can become familiar with and understand the experimental situation through learning (Smith 1976).

Previous experimental economics research in the areas of incentive design and information disclosure has examined various issues. However, few attempts, if any, have ever been made to examine the effects of incentive contract types and

monitoring mechanism on individual's honest reporting. For example, King and Wallin (1991) shows that, when information receivers of information do not know whether information senders possess private information, the senders will not fully disclose their private information. In addition, King and Wallin (1995) indicates that, when a manager can balance the effects that disclosures may have on two sets of external information users (i.e., investors and opponent), he tends to partially disclose the truth. King and Wallin (1996) finds that managers will release good news when observed but delay bad news. However, since the threshold of separating good and bad news are changing over time, all news will be voluntarily disclosed by the end of the period. King (1996) concludes that information senders are more likely to report truthfully when their misrepresentations imposed costs on the information receivers of their report. In contrast, Sprinkle (2000) examines how an incentive-based incentive contract compare to a flat-wage incentive contract in motivating individual's learning and performance. A multiperiod cognitive task where the accounting system generates feedback that has both a contracting role and a belief-revision role was used. The results indicate that an incentive-based contract improves individuals' learning and performance only after considerable feedback and experience (this result may explain why many prior one-shot decision-making experiments show no incentive effects). This study contributes to the experimental economics literature in incentive contract and information disclosure by providing evidence on how different incentive contracts and the existence of a monitoring mechanism may affect individual's honesty in managerial reporting and firm profit.

2. Experimental Results

Three incentive contracts are tested in this study: a *flat-fee* contract (in which the manager is compensated by a fixed salary only), an *absolute-outcome* contract (in which the manager's salary includes a fixed component plus a share of the actual output value), and a *threshold* contract (in which the manager is paid by a fixed salary up to a pre-specified output threshold and a share of the incremental output beyond the threshold level). The experimental results from eight experiments reveal several important findings. First, no matter what incentive contract the subjects face, they generally do not lie as often as the conventional agency theory predicts. However, the extent and magnitude of lying may be affected by the contract types, the existence of monitoring mechanism, and firm's profitability. When there is no monitoring mechanism, the flat-fee and threshold contracts induce the subjects to lie more often than the absolute-outcome contract. Moreover, the threshold contract can induce substantially more honest reporting than the flat-fee contract, potentially because the threshold contract provides higher expected utility for subjects with high honesty personality. When there is a monitoring mechanism,

both the absolute-outcome and threshold contracts can encourage statistically equivalent level of honest reporting and significantly outperform the flat-fee contract. Second, contract types and monitoring mechanism jointly affect manager's honest reporting behavior, which in turn improves the value of communication. Third, subjects do sacrifice their wealth to make honest reports, and this tradeoff of preference between honesty and wealth is affected by the contract types. Finally, this study proposes two new incentive contracts: a *threshold-absolute* contract (the same as the threshold contract, except that the manager shares a portion of the absolute output) and a *threshold-relative* contract (the same as the threshold-absolute contract, except that the threshold is *ex post* determined by industry average). The experimental results indicate that the threshold-relative contract *alone* can induce the highest percentage of honest reporting and produce the second largest firm profit among all contract types with and without a monitoring mechanism.

REFERENCES

Ashton, A. 1991. Experience and error frequency knowledge as potential determinants of audit expertise. *The Accounting Review* 66 (April): 218-239.

Baiman, S and H. Evans. 1983. Pre-decision information and participative management control systems. *Journal of Accounting Research* 21 (Autumn): 371-395.

Baker, G., M. Jensen, and K. Murphy. 1988. Competition and Incentives: Practice vs Theory. *The Journal of Finance* 43 (July): 593-616.

Barron, J.N. and D.M. Kreps. 1999. *Strategic Human Resources*. NY: John Wiley.

Banker, R. D., and S. M. Datar. 1989. Sensitivity, precision, and linear aggregation of signals for performance evaluation. *Journal of Accounting Research* 27 (Spring): 21-39.

Benston, G. 1985. The self-serving management hypothesis: Some evidence. *Journal of Accounting and Economics* 7 (April): 67-83.

Berg, J., L. Daley, F. Gigler, and C. Kanodia. 1990. The value of communication in agency contracts: Theory and experimental evidence. *Research Monograph No. 16*. The Canadian Certified General Accountants' Research Foundation.

Bloomfield, R.J. 1997. Strategic dependence and the assessment of fraud risk: A laboratory study. *The Accounting Review* 72 (October): 517-538.

Brickely, J.A., C.W. Smith, and J.L. Zimmerman. 1996. *Organizational Architecture: A Managerial Economics Approach*. Boston: Irwin.

Bushman, R.M., E. Engle, J. Milliron, and A. Smith. 1998. An empirical investigation of trends in the absolute and relative use of earnings in determining CEO cash compensation. *Working paper*, University of Chicago.

Bushman, R.M. and A.J. Smith. 2001. Financial accounting information and corporate governance. *Journal of Accounting and Economics* 32 (December): 237-333.

Christensen, J. 1981. Communication in agencies. *The Bell Journal of Economics.* Vol. 12: 661-674.

Christensen, J. 1982. The determination of performance standards and participation.

Journal of Accounting Research 20 (Autumn): 589-603.

Darrough, M.N. and N.M. Stoughton. 1988. Managerial compensation: Linear-sharing vs. bonus-incentive plans under moral hazard and adverse selection. In *Economic Analysis of Information and Contracts: Essays in Honor of John E. Butterworth.* Edited by Feltham, Amershi, and Ziemba. Kluwer Academic Publishers: Boston.

Demski, J.S. and Feltham, G.A. 1978. Economic incentives in budgetary control systems. *The Accounting Review* 53: 336-359.

Demski, J.S. and R.A. Dye. 1999. Risk, return, and moral hazard. *Journal of Accounting Research* 37 (Spring): 27-55.

Dopuch, N. and R.R. King. 1992. Negligence versus strict liability regimes in auditing: An experimental investigation. *The Accounting Review* 67 (January): 97–120.

Dopuch, N., R.R. King, and J.W. Schatzberg. 1994. An experimental investigation of alternative damage-sharing liability regimes with an auditing perspective. *Journal of Accounting Research* 32 (Supplement): 103-139.

Dopuch, N., D.E. Ingberman., and R.R. King. 1997. An experimental investigation of multi-defendant bargaining in 'joint and several' and proportionate liability regimes. *Journal of Accounting and Economics* 23 (June): 189-221.

Dopuch, N., R.R. King, and J.W. Schatzberg. 2001. An experimental investigation of retention and rotation requirements. *Journal of Accounting Research* 39 (June): 93-117.

Efron, B. and R.J. Tibshirani. 1993. *An Introduction to the Bootstrap.* Chapman & Hall.

Einhorn, H.J. and R.M. Hogarth. 1985. Ambiguity and uncertainty in probabilistic inference. *Psychological Review* 92 (October): 433-461.

Evans, J.H., R.L. Hannan, R. Krishnan, and D.V. Moser. 2001. Honesty in managerial reporting. *The Accounting Review* 76: 537-559.

Ghosh, D. and M.R. Ray. 1992. Risk attitude, ambiguity intolerance and decision making: An exploratory investigation. *Decision Science.* Vol. 23, No. 2: 431-444.

Ghosh, D. and M.R. Ray. 1997. Risk, ambiguity, and decision choice: Some additional evidence. *Decision Science.* Vol. 28, No. 1: 81-104.

Gibbons, R. 1998. Incentives in organizations. *Journal of Economic Perspectives* 12: 115-132.

Holmström, B. 1979. Moral hazard and observability. *Bell Journal of Economics* 10 (Spring): 74-91.

Kanodia, C. 1993. Participative budgets as coordination and motivational devices. *Journal of Accounting Research* 31 (Autumn): 172-189.

Kaplan, S. and P. Stromberg. 1999. Financial contracting theory meets the real world: An empirical analysis of venture capital contracts. Working paper, University of Chicago.

King, R.R. 1996. Reputation formation for reliable reporting: An experimental investigation. *The Accounting Review* 71: 375-396.

King, R.R. 2002. An experimental investigation of self-serving biases in an auditing trust game: The effect of group affiliation. The Accounting Review 77: 265-284.

King, R.R. and D.E. Wallin. 1989. The

effects of antifraud rules and ex post verifiability on managerial disclosures. *Contemporary Accounting Research* 6: 859-892.

King, R.R. and D.E. Wallin. 1991. Voluntary Disclosures when seller's level of information is unknown. *Journal of Accounting Research* 29: 96-108.

King, R.R. and D.E. Wallin. 1995. Experimental tests of disclosure with an opponent. *Journal of Accounting and Economics* 19: 139-167.

King, R.R. and D.E. Wallin. 1996. Managerial incentives for disclosure timing: An experimental investigation. *Journal of Management Accounting Research* 8: 117-136.

King, R. R. and R. Schwartz. 1999. Legal penalties and audit quality: An experimental investigation. *Contemporary Accounting Research* 16 (Winter): 685–710.

King, R.R. and R. Schwartz. 2000. An experimental investigation of auditors' liability: Implications for social welfare and exploration of deviations from theoretical predictions. *The Accounting Review* 75 (October): 429-452.

Lambert, R.A. 2001. Contracting theory and accounting. *Journal of Accounting and Economics* 32 (December): 3-87.

Lambert, R.A. and D. Larcker. 1987. An analysis of the use of accounting and market measures of performance in executive compensation contracts. *Journal of Accounting Research* 25 (supplement): 85-125.

Maher, M.W. 1987. The use of relative performance evaluation in organizations. In W.J. Burns and R.S. Kaplan (Eds.), *Accounting & Management: Field Study Perspectives.* Boston, MA: Harvard Business School Press.

Matsumura, E. M. and R. R. Tucker. 1992. Fraud detection: A theoretical foundation. *The Accounting Review* 67 (October): 754–783.

Melumad, N. and S. Reichelstein. 1987. Centralization versus delegation and the value of communication. *Journal of Accounting Research* 25 (supplement): 1-18.

Melumad, N. and S. Reichelstein. 1989. Value of communication in agencies. *Journal of Economic Theory.* Vol. 47: 334-368.

Merchant, K.A. 1987. How and why firms disregard the controllability principle. In W.J. Burns and R.S. Kaplan (Eds.), *Accounting & Management: Field Study Perspectives.* Boston, MA: Harvard Business School Press.

Murphy, K.J. 1985. Corporate performance and managerial remuneration: An empirical analysis. *Journal of Accounting and Economics* 7 (April): 11-42.

Murphy, K.J. 1999. Executive compensation. In: A. Orley and C. David (Eds.), *Handbook of Labor Economics.* Vol. 3. North-Holland, Amsterdam.

Penno, M. 1984. Asymmetry of pre-decision information and managerial accounting. *Journal of Accounting Research* 22 (Spring): 177-192.

Prendergast, C. 1999. The provision of incentives in firms. *Journal of Economic Literature* 37 (March): 7-63.

Romano, J.P. 1989. Bootstrap and randomization tests of some nonparametric hypotheses. *The Annuals of Statistics* 17 (1): 141-159.

Smith, V. L. 1976. Experimental economics: Induced value theory. *American Economic Review* (May): 274–279.

Sprinkle, G.B. 2000. The effect of incentive contracts on learning and performance. *The Accounting Review* 75: 299-326.

Wallace, J. 1997. Adopting residual income-based compensation plans: Do you get what you pay for? *Journal of Accounting and Economics* 24 (December): 275-300.

Wallin, D. E. 1992. Legal recourse and the demand for auditing. *The Accounting Review* 67 (January): 121−147.

Wright, M.E. and R.A. Davidson. 2000. The effect of auditor attestation and tolerance of ambiguity on commercial lending decisions. *Auditing: A Journal of Practice and Theory* 19 (Fall): 67-81.

Yim, A. 2001. Renegotiation and relative performance evaluation: Why an informative signal may be useless. *Review of Accounting Studies* 6 (March): 77-108.

Yu, H.C. 2001. Experimental evidence of the impact of increasing auditors' legal liability on firms' new investments. *Contemporary Accounting Research* 18 (Fall): 495-528.