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行政院國家科學委員會專題研究計畫成果報告

獎酬契約中會計績效衡量指標與績效標準之研究

The Relation between Accounting Performance Measures and Performance Standards in the Design of Bonus Contracts

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中文摘要：

近年來，許多文獻探討會計資訊在高階主管獎酬契約中的使用，這些研究多藉由檢驗不同的績效衡量指標及績效標準在獎酬契約所佔的比重來探討會計資訊如何降低代理成本，而且多對績效衡量指標與績效標準分別加以探討。本研究用實證方式探討兩種績效衡量指標(會計報酬率與每股盈餘)和績效標準(產業績效與分析師預測)的關聯。研究結果發現高階主管獎酬契約中會計績效指標的選擇和其相對應的績效標準、產業環境、及公司的成長機會有關。

關鍵詞：績效衡量指標、績效標準、獎酬契約

Abstract:

In recent years, the use of accounting numbers in executive bonus contracts has been the subject of a number of studies. Existing studies have generally examined the weights placed on various performance measures and performance standards in CEO bonus contracts in order to evaluate the use of accounting information as a means of reducing agency costs. This study examines the choice between the two most common accounting-based measures, return on assets (or equity) and earnings per share and argue that the choice is dependent upon the standard for performance. The evidence from this study shows that the choice of accounting performance measures in CEO annual bonus contract is linked to the performance standards used and depends on the properties of performance standards, the industry environments, and the growth opportunities

Key words: Performance measure, performance standard, and incentive contract.

I. Introduction

Annual bonuses are an important component of managerial compensation in modern firms. In recent years, the use of accounting numbers in executive bonus contracts has been the subject of a number of studies. Murphy (2000) document that almost all companies rely on some measures of accounting performance in their incentive plans. However, the choice among various accounting performance measures has been relatively less studied in the literature.

Because of the contracting costs, CEO bonuses are generally limited to a relatively small number of accounting-based performance measures. In this paper, we examine the choice between the two most common accounting-based measures, return on assets (or equity) and earnings per share and argue that the choice is dependent upon the standard for performance.

Existing studies have generally examined the weights placed on various performance measures and performance standards in CEO bonus contracts in order to evaluate the use of accounting information as a means of reducing agency costs. For the most part studies have examined the two issues (performance measures and standards) separately. In this paper, we empirically evaluate the link between two types of common performance measures (accounting return measures and earnings per share) and two standards (industry performance and the analyst forecast).

Specifically, we hypothesize that firms that choose to use earnings per share will use the analyst forecast, while firms that choose to use relative performance evaluation (industry-profit) will use a return-based measure. We further hypothesize that the choice of standard depends upon the properties of the respective performance standards, the competitiveness of the industry, and the degree of uncertainty in the environment. Specifically, we predict that the use of earnings per share as a performance measure and the analyst forecast as a standard will be more common when analysts forecast better serves as a performance standard and when firms operate in “less noisy” environments with less competition.

We test these hypotheses by using data from proxy statements to determine the primary performance measure (accounting return versus earnings per share) for each sample firm’s CEO bonus plan. Because firms generally do not disclose the performance standard, we empirically evaluate the standards by estimating the weights on alternative performance standards (industry performance and the analyst forecast). Finally, we investigate the relation between the performance standards and the degree of noise and competition in the firm’s operating environment.

Section 2 provides a review of the theory underlying optimal compensation plan design and the empirical literature on CEO bonus plans in order to develop the hypotheses tested in this paper. In section 3 we describe the research design we use for our empirical tests, followed by a discussion of the results and conclusion.

II. Literature Review and Hypothesis Development

Agency theory suggests that optimal contracts relate changes in compensation to measures of performance in order to appropriately balance incentives to provide effort against the allocation of risk to the agent. The adjustment for the expected outcome reduces the risk premium on the agent by adjusting for noise in translating the agent's effort into the performance measure, as well as reducing the effects of industry and market-wide shocks that are out of the manager's control. In addition, Banker and Datar (1989), Lambert and Larcker (1987), Sloan (1993), and Bushman and Indjejikian (1993) point out that the weight placed on the performance measure in the optimal contract is a function of the noise in the performance measure, i.e., how well the performance measure reflects the manager's actions.

Much of the accounting literature has been devoted toward identifying the appropriate performance measure, and evaluating the weights placed on alternative performance measures. For example, several studies, such as Abdel-Khalik (1985), Clinch (1991), Gaver and Gaver (1998), and Natarajan (1996) have evaluated the weights on alternative measures of earnings, or components of earnings. Other studies, such as Baber, Janakiraman, and Kang (1996), Baber, Kang and Kumar (1998), Lambert and Larcker (1987), and Sloan (1993) have examined the relative weights placed on earnings and market returns in compensation plans.

Another, related strand of literature, has examined the role of expected performance. This literature, particularly Aggarwal and Samwick (1999), Antle and Smith (1985), Gibbons and Murphy (1990), and Janakiraman, Lambert, and Larcker (1992), has typically focused on adjustments for relative performance. Other studies, such as DeFond, Matsunaga, and Park (2002), Indjejikian and Nanda (2001), and Murphy (2000), examine the use of performance standards more generally.

The results of these studies are generally consistent with theory. The key issue in determining the performance measure and associated standard is the noise in the unexpected performance. In other words, in selecting the appropriate performance measure the principle needs to consider the potential noise in the standard. If there is a considerable amount of uncertainty regarding the "true" $E(x)$ for a given performance measure, the principle may choose to use another performance measure. Thus, the availability of a "good" standard could determine the choice of the performance measure.

Consider the common practice of using earnings per share as a performance measure. Analysts forecast earnings per share and thus the use of the analyst forecast as a target could lead the firm to use earnings per share as a performance measure. The consensus analyst forecast is an attractive standard because it provides an ex-ante target that aggregates information from different industry experts. Thus, we hypothesize that firms that use earnings per share as a performance measure in CEO bonus contracts are more likely to use the consensus analyst forecast as a performance standard.

An alternative approach is to use relative performance evaluation (RPE) to remove the industry- and market-wide shocks *ex post*. This avoids the problem of setting an *ex ante* target, and allows the manager's performance to be adjusted for the realizations of general economic conditions, as opposed to the expectations of general economic conditions. One implication of using an industry standard is that the earnings per share figure cannot be an effective performance measure. Thus, we expect the use of a return measure of performance to be associated with an industry standard benchmark. Thus, our second hypothesis is that firms that use a return-based performance measure are more likely to use an industry performance standard.

We next turn our attention to the factors that lead a firm to choose a particular performance measure/standard combination. As noted above, DeFond, Matsunaga and Park (2002) present evidence that firms are less likely to use the consensus analyst forecast when the operating environment is highly volatile and uncertain. However, using an *ex-post* industry standard also subjects the firm to contracting costs. For example, the contracting parties must agree upon the set of firms to include in the benchmark. In addition, relative performance evaluation can introduce noise from the accounting systems used by other firms. The contracting parties must agree upon the appropriate definition of earnings, with the knowledge that different firms may classify similar transactions in different ways. Finally, as noted by Aggrawal and Samwick (1999), the use of relative performance evaluation could introduce suboptimal incentives in a competitive environment. The choice of performance measures may also have incentive effects on CEO's actions through the manipulation of performance measures, such as decisions on downsizing the firm's assets or on financing activities.

III. Empirical design

To determine the primary performance measure for each sample firm's CEO bonus plan, we conduct this study by manually collecting information disclosed in proxy statement. We start with 1792 firms listed in the ExecuComp database in 2000 and extract performance measures from compensation committee reports in 2000 proxy statements. Among the 1792 firms, 459 firms provide no information about the performance measures used, 570 firms report only one performance measure used, 398 firms report 2 performance measures used, 184 firms report 3 performance measures used, and only 180 firms report more than 3 performance measures used in determining CEO annual bonuses. This is generally consistent with Murphy (2002) that because of the contracting costs, CEO bonuses are generally limited to a relatively small number of accounting-based performance measures. We also identify 378 firms that explicitly specify the use of earnings per share as a performance measures in CEO annual bonus plan and 260 firms that explicitly specify the use of either return on assets or return on equity as a performance measure.

Although firms will often disclose the performance measures included in the CEO's bonus contract, such as ROE, ROA, or earnings per share, they rarely disclose the

performance standard. Thus we cannot test the two hypotheses directly. Instead, we follow Janakiraman, Lambert and Larcker (1992), and DeFond, Matsunaga, and Park (2002), and empirically assess the performance standard by regressing changes in CEO cash compensation against the performance measure and performance standard.

We first run the following separate regression models with our subsamples of (1) firms using ROA as a performance measure, and (2) firms using EPS as a performance measure and examine the weights placed on the performance measures and the performance standards.

We then use our whole sample to formally test our hypotheses by adding a term that interacts the performance standard, consensus analyst forecast, with a dummy variable equal to 1 if a firm explicitly specifies the use of earnings per share as a performance measure and a term that interacts the performance standard, industry median return on assets/equity, with a dummy variable equal to 1 if a firm explicitly specifies the use of returns on assets/equity as a performance measure.

To examine the potential reasons that are driving the differences of the choice of return-based or EPS as performance measures among firms, we perform a logit analysis that regresses a dummy for the use of earnings per share as a performance measure on our measures of the properties of performance standards, the firms' industry environment, growth opportunities, and several control variables.

IV. Results and Concluding Remarks

Based on the sub-sample of firms using earnings per share as a performance measure, we find that changes in CEO cash compensation is positively related to firms' earnings per share, and negatively related to the consensus analyst forecasts. This suggests that when firms choose earnings per share as a performance measure, they also use analysts forecast as a performance standard. In other words, the boards use analyst forecasts to construct expected performance and evaluate CEO performance relative to analyst forecasts.

Based on the sub-sample of firms using return on assets/equity as a performance measure, we find that changes in CEO cash compensation is positively related to the industry adjusted return on assets, consistent with firms use industry accounting return as a performance standard when they choose accounting returns, ROA or ROE, as a performance measure. In addition, for these sub-sample firms, we do not find CEO compensation to be significantly associated with consensus analyst forecasts, suggesting that analyst forecasts are not used as a performance standard by firms choose accounting returns as a performance measure.

The logit analysis shows that the use of earnings per share as a performance measure is negatively associated with the absolute value of the forecast errors. In other words, if analysts are able to more accurately forecast earnings, then firms rely more on

analyst forecasts as a performance standard and increase the use of earnings per share as a performance measure. In addition, we find that the use of earnings per share as a performance measure is negatively associated with analyst forecast dispersion, measured by the standard deviation of analyst forecasts. This suggests that when earnings are less predictable or when analysts forecasts are less consensus, firms rely less on analyst forecasts as a performance standard as their noise increase and thus less likely to use earnings per share as a performance measure.

In addition to the properties of analyst forecasts as a performance standard, we also find that the use of earnings per share as a performance measure is associated with industry competitiveness. Specifically, we find a positive association on the probability of using EPS as a performance measure and Herfindahl-Hirschman Index. This suggests that when industries are more concentrated (less competitive), firms rely more on EPS as a performance measure because relative performance evaluation may provide suboptimal incentives and peer performance tend to be more noisy.

When examining the use of accounting return as a performance measure, we do not find the use of accounting return to be associated to the properties of analyst forecasts. We find that the use of accounting return as a performance measure is negatively associated with Herfindahl-Hirschman Index, suggesting that firms rely more on accounting returns as a performance measure when industry is more competitive. This is also consistent with DeFond and Park (1999) that competition is likely to enhance the usefulness of RPE. The usefulness of RPE then increases the use of accounting return as a performance measure. We also find that the use of accounting return as a performance measure is negatively associated with firm's growth opportunity. One explanation is that the use of ROA or ROE as a performance measure discourages managers to increase assets investment or expansion. Thus when a firm has greater growth opportunity, it is less likely to rely on ROA or ROE as a performance measure; on the other hand, accounting return becomes a desirable performance measure for mature firms.

In sum, the evidence from this study shows that the choice of accounting performance measures in CEO annual bonus contract is linked to the performance standards used and depends on the properties of performance standards, the industry environments, and the growth opportunities. This study contributes to the literature in several ways. First, it links accounting performance measure to performance standards in compensation arrangements. Second, the study provides additional insight into the factors that affect the design of CEO bonus contracts and the practical considerations involved in the choice of performance measures. Finally, it provides evidence to explain the heterogeneity observed in CEO bonus arrangements.

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