

# NONFINANCIAL PERFORMANCE MEASURES AND EARNINGS MANAGEMENT

Hassan R. HassabElnaby\*  
Assistant Professor  
College of Business Administration  
University of Toledo  
2801 West Bancroft St.  
Toledo, OH 43606  
USA

Emad Mohammad  
Assistant Professor  
DeGroote School of Business  
McMaster University  
1280 Main Street West  
Hamilton, Ontario L8S 4M4  
Canada

Amal A. Said  
Assistant Professor  
College of Business Administration  
University of Toledo  
2801 West Bancroft St.  
Toledo, OH 43606  
USA

**Current Draft: January 7, 2008**

Data availability: All data used in this study are available from public sources identified in the paper.

## **Nonfinancial Performance Measures and Earnings Management**

### **ABSTRACT**

We examine the earnings management implications of using nonfinancial performance measures in executive compensation contracts. We argue and test that when a manager's compensation is based on financial and nonfinancial performance measures, he/she has less incentive to manipulate earnings to maximize the compensation. Using panel data covering the period 1992-2005, we compare earnings management behavior for a sample of firms that used both financial and nonfinancial measures to a matched sample of firms that based their performance measurement solely on financial measures. We consider the effect of the match between the use of nonfinancial measures and firm characteristics on earnings management behavior. The results are mainly consistent with a reduction in earnings management behavior for those firms that rely on nonfinancial performance measures in their compensation contracts.

# **Nonfinancial Performance Measures and Earnings Management**

## **I. INTRODUCTION**

Executive compensation has been the subject of extensive academic research (Murphy (1999)). Since most performance measures in executive compensation contracts use accounting information, accounting researchers have examined the impact of these contracts on earnings management. Most studies document a persistent evidence of earnings management. Recently, companies have started introducing nonfinancial performance measures into executive compensation contracts. A growing body of literature examines the choice to adopt and the role of nonfinancial performance measures in executive compensation contracts (e.g., Banker, Potter, and Srinivasan (2000); Bushman, Indjejikian, and Smith (1996); Core, Guay, and Verrecchia (2003); Ittner and Larcker (1997); Ittner and Larcker (1998)). Although many studies have examined the predictive value of nonfinancial measures, none had examined their effect on earnings management behavior. Our study fills that void in the literature.

Given the recent trend towards using nonfinancial performance measures in compensation contracts, it is important to understand how the use of nonfinancial performance measures affects earnings management behavior. This is the first study that we are aware of that examines the role, if any, of using nonfinancial performance measures on earnings management. The positive effects of using nonfinancial measures as manifested in decreasing managers' motivation to manipulate earnings have implications on the effectiveness of using performance measurement system that incorporates both nonfinancial and financial measures of performance.

We examine earnings management behavior as reflected in artificial earnings management (i.e., upward manipulation of discretionary accruals and performance matched discretionary accruals) and in real earnings management (i.e., cutting discretionary

expenditures). We predict that the inclusion of nonfinancial measures in compensation contracts reduces earnings management activities. We assume that managers' compensation is based on both financial and nonfinancial performance measures, and that managers manipulate earnings upwards to maximize the compensation based on financial measures.

We make three arguments as to why the introduction of nonfinancial performance measures into executive compensation contracts will reduce earnings management behavior. First, since the adoption of nonfinancial performance measures improves current and future performance (e.g., Said, HassabElnaby, and Wier (2003)), current financial performance metrics will improve. Thus, managers will have less incentive to manage earnings. Second, when firms introduce nonfinancial measures into compensation contracts, the weight placed on financial measures in compensation contracts is reduced by construction. The lower weight on financial measures reduces the magnitude of the compensation based on them. Assuming a non-zero cost of earnings management, the relative benefit to the cost of earnings management is reduced, and in return rational managers will involve less in managing earnings. As the weights placed on financial measures are reduced to the point where the benefits of earnings management are less than its cost, managers will not manage earnings at all. Third, with the introduction of nonfinancial performance measures, managers need to exert efforts to improve these measures. Given the allocation of effort problem, the marginal cost of managerial effort to manage earnings in order to improve the financial performance measure will increase, and thus the benefit over cost of managing earnings will decrease.

Using a sample of firms that used nonfinancial performance measures in their compensation contracts (and a matching sample) during the period 1992-2005, we document lower magnitude of earnings management behavior for these firms relative to firms that rely

solely on financial performance measures in their executive compensation contracts. These results complement prior research on the implications of using nonfinancial measures by reducing agency problem and providing better alignment of interests between management and shareholders.

The paper proceeds as follows. The next section reviews related literature and develops the hypotheses investigated in this study. The third section presents sample selection and research design. Section four presents the results, and section five concludes.

## **II. PRIOR LITERATURE AND HYPOTHESES DEVELOPMENT**

### **Earnings Management and Compensation Contracts**

The major motivation for our investigation lies within the boundaries of agency theory. Research in economics models the firm as a set of contracts among individuals, assuming that individuals act to maximize their own utility (Fama (1980); Fama and Jensen (1983); Jensen and Meckling (1976)). Gordon (1964), in an early attempt to derive a positive theory of accounting, assumes that management selects accounting procedures to maximize its own utility, thus suggesting that management acts in its own self-interest.

The potential conflict of interest between managers and non-manager equity owners has been extensively investigated in the finance literature. Analyzing this conflict, Jensen and Meckling (1976) indicate that as managers' percentage ownership of the residual claims of a firm decreases, increases in the value of those residual claims have less effect on managers' wealth. An objective of accounting reporting is to provide information that helps shareholders to assess the performance of the management. However, managers use their knowledge about the business and its opportunities to select reporting methods, estimates, and disclosures that might not accurately reflect their firms' underlying economics (Healy and Wahlen (1999)). Moreover,

asymmetric information between managers and outside parties about the firm, its prospects, and incentives and opportunities might induce managers to manipulate earnings.

Positive accounting theory (Watts and Zimmerman (1986)) attempts to explain earnings management, largely in terms of agency costs. Within the agency cost framework, management compensation agreements are designed to motivate managers to maximize firm value by aligning their interests with those of stockholders (Smith and Watts (1982)). Therefore, within the agency cost framework, management compensation agreements are viewed as devices to overcome the conflict between management and stockholders, and thus minimize agency costs.

Prior researchers have provided evidence on the influence of bonus contracts on earnings management behavior. For example, Healy (1985) shows that income decreasing accruals are more likely when the upper or lower bound of the bonus contract is binding, while income increasing accruals are more likely when neither is binding. Using business unit-level data within a single corporation, Guidry, Leone, and Rock (1999) support Healy's bonus plan hypothesis. Holthausen, Larcker, and Sloan (1995) and Gaver, Gaver, and Austin (1995) also confirm the existence of upwards and downwards earnings management around the upper bound, suggesting that managers have incentives to manage earnings around a target to maximize bonus payments. Balsam (1998) finds a significant positive relation between discretionary accruals and cash compensation, suggesting that firms reward managers efforts to manage earnings upwards. Matsunaga and Park (2001) evidence indicates that CEO bonuses provide managers with incentives to meet analyst earnings forecasts and the earnings for the same quarter of the prior year.

In conclusion, management compensation contracts are designed to motivate managers to maximize firm value and align the interests of managers with stockholders (Smith and Watts

(1982)). However, managers choose reporting strategies that maximize their own expected compensation, taking into account the effect of earnings reports on investors' perceptions and subsequently management's compensation (Goel and Thakor (2003)).

### **Nonfinancial Measures in Compensation Contracts**

Economics, agency and contingency theories suggest that the choice of the appropriate managerial accounting techniques depends on circumstances surrounding the firm (Gordon and Miller (1976); Hayes (1977); Otley (1980)). Traditionally, firms have used financial measures to reward managerial performance, where compensation plans formally tie compensation to measures of firm value such as earnings per share, net income, and operating income (Ittner, Larcker, and Rajan (1997); Murphy (2001)).

The agency theory and the informativeness principle (Banker and Datar (1989); Feltham and Xie (1994); Holmstrom (1979)) suggest that nonfinancial performance measures should be included in the executive compensation contracts if they provide incremental and/or relative information about manager's actions over and above that conveyed by financial measures. Ittner et al. (1997) argue that nonfinancial measures should be included in the compensation contract because they convey information about desired managerial actions. Such inclusion would motivate managers to act in the best interest of shareholders. Thus, nonfinancial performance measures are used in situations where various enhancing actions of managers are either missing from or not fully captured by financial performance measures. Since the nonfinancial measures are forward-looking, using them in compensation contracts induces short-horizon managers to take actions that reflect the long-term interests of shareholders (Sedatole, Kulp, and Dikolli (2003); Hemmer (1996)).

Recently, the use of nonfinancial measures, such as customer satisfaction, employee

satisfaction, productivity, product quality, and market share, in addition to financial measure has increased tremendously.<sup>1</sup> This trend in the use of nonfinancial performance measures in compensation contracts triggered a wave of empirical research on the use of nonfinancial measures and its performance consequences. One stream of research examines the ability of nonfinancial measures in predicting future financial performance. This literature generally documents that nonfinancial measures are leading indicators of financial performance and that they are incrementally value-relevant beyond the information contained in accounting measures (Amir and Lev (1996); Banker et al. (2000); Banker and Mushruwala (2001); Behn and Riley (1999); Hirschey, Richardson, and Scholz (2001); Ittner and Larcker (1996); Nagar and Rajan (2001); Riley, Pearson, and Trompeter (2003)).

Another stream of research examines the use of nonfinancial measures for compensation purposes. Specifically, Davila and Venkatachalam (2004) and Srinivasan, Sayrak, and Nagarajan (2003) test whether nonfinancial measures provide incremental explanatory power over financial measures in explaining cross-sectional variation in executive compensation. Finally, researchers investigate factors influencing the relative weights placed on the nonfinancial measures and the performance consequences of the use of nonfinancial measures (Said et al. (2003); HassabElnaby, Said, and Wier (2005)).

### **Earnings Management and Nonfinancial Measures**

Our study links the earnings management research with the literature on the use of nonfinancial measures in compensation contracts. Specifically, we examine the impact of adopting and using nonfinancial performance measures in compensation contracts on managers' earnings management behavior. The extant literature provides a persistent evidence of earnings

---

<sup>1</sup> For example, Ittner et al. (1997) report that 114 of the 317 firms in their sample employ nonfinancial measures in evaluating CEO performance.

management behavior in response to executive compensation contracts, specially the bonus component, that are based on financial performance measures. We attempt to examine whether the adoption and use of nonfinancial performance measures in compensation contracts is associated with such behavior.

Empirical evidence shows that nonfinancial measures are associated with an improvement in current (and future) financial performance (e.g., Said et al. 2003). Since manager's earnings-based compensation is tied to financial performance, the enhancement in financial performance will be reflected, at least, on managers' ability in reaching their bonus targets and the bonus component of compensation. Therefore, the need to manage earnings is reduced given the favorite financial consequences of using nonfinancial measures.

In addition, as firms introduce nonfinancial measures into compensation contracts, the weight placed on financial measures in compensation contracts is reduced by construction. The lower weight on financial measures reduces the magnitude of the compensation based on these measures. Assuming a non-zero cost of earnings management, rational managers would weigh the benefits and the costs of earnings management.<sup>2</sup> Managers would not manage earnings when the weights placed on financial measures are reduced to the point that drives down the benefits of earnings management below its cost.

Finally, managers have to exert efforts in improving the nonfinancial measures with the introduction of nonfinancial measures. Given the problem of allocation of effort, the marginal cost of managerial effort to manage earnings to improve the financial performance measure will increase, and thus the benefit of managing earnings. Based on the above arguments, we hypothesize that the magnitude of earnings management decreases for firms that rely on nonfinancial measures. The hypothesis stated in the alternative form is:

---

<sup>2</sup> The cost we refer to here is the cost of managerial effort rather than the cost to the firm.

H1: The propensity to manage earnings is negatively related to the use of nonfinancial measures.

### **III. SAMPLE AND RESEARCH DESIGN**

#### **Sample Selection Procedures**

We use proxy text files contained in Lexis/Nexis to develop a sample of firms that we judge to be using nonfinancial measures for 1992 through 2005. We identify the sample by searching these files using keywords such as “non-financial or nonfinancial,” “customer satisfaction,” “employee satisfaction or employee morale or employee motivation,” “quality,” “process improvement,” “re-engineering or reengineering,” “new product development,” “diversity,” “market share,” “productivity or efficiency,” “safety,” “innovation,” “operational measure or operational performance,” and “strategic objectives.” We read the compensation committee report to confirm that the keyword(s) are used in the appropriate context. Consistent with Gore, Matsunaga, and Yeung (2004), we discard financial services firms (SIC codes 6000-6999) and require firms to be included in Compustat. Therefore, we match our samples from Lexis/Nexis to Compustat to acquire the data necessary to calculate earnings management and compensation variables. Consistent with (Carter, 2006) we eliminate partial year (new or exiting) executives, as compensation in those years may be affected by hiring bonuses or retirement.

[Insert Table 1]

Table 1 provides a description of the sample selection process and industry distribution. Our sample consists of 953 firm-years that used nonfinancial performance measures in compensation contracts and satisfied the sample selection criteria for the period 1992-2005. Approximately 57.3 percent of the firms using nonfinancial measures come from durable (301 firms) and nondurable (245 firms) manufacturing firms while the lowest percentage (4.6%)

comes from the Mining and Construction industry (SIC 10-19). Eighteen percent of our sample is from Transportation and Utilities (SIC 40-49). Approximately twenty percent of our sample firms are from the Wholesalers and Retailers industry (SIC 50-59) and Consumer and Business Services (SIC 70-89).

### **Earnings Management Proxies**

We measure earnings management in two forms: artificial earnings management (*AEM*) and real earnings management (*REM*). We estimate all our earnings management models cross-sectionally by two-digit SIC code to control for industry-wide changes in economic conditions while allowing the coefficients to vary across time.

#### ***Artificial Earnings Management Proxies***

We proxy for artificial earnings management (*AEM*) by two accruals measures: discretionary accruals (*AEM<sub>ADA</sub>*) and performance-matched discretionary accruals (*AEM<sub>PMADA</sub>*). We use the absolute value of accruals to measure the magnitude of earnings management.

For discretionary accruals (*AEM<sub>ADA</sub>*) we employ a modified version of Jones' (1991) model as in Dechow, Sloan, and Sweeney (1995). Consistent with prior research (e.g., Defond and Jiambalvo (1994)), we define total accruals as the difference between net income before extraordinary items and operating cash flow. We obtain total accruals directly from the statement of cash flows.

$$TAC_{it} = IBXI_{it} - CFO_{it} \quad (1)$$

Where: *TAC* is total accruals; *IBXI* is the income before extraordinary items and discontinued operations (Compustat data item# 18); *CFO* is the operating cash flows (Compustat data item # 308). Then, we estimate the following regression:

$$TAC_{it}/A_{it-1} = \beta_1 (I/A_{it-1}) + \beta_2 (\Delta REV_{it}/A_{it-1} - \Delta AR_q/A_{it-1}) + \beta_3 (PPE_{it}/A_{it-1}) + e \quad (2)$$

Where:  $A$  is total assets (Compustat data item # 6);  $\Delta REV$  is the change in net revenues (Compustat data item # 12);  $\Delta AR$  is the change in accounts receivables (Compustat data item # 2); and  $PPE$  is gross property, plant, and equipment (Compustat data item # 7). We scale all variables in the discretionary accruals model by lagged total assets to reduce heteroscedacity (Gaver et al. (1995)). We obtain the ordinary least squares estimates of  $\beta_1$ ,  $\beta_2$ , and  $\beta_3$  from model (2) and then use them to estimate nondiscretionary accruals as follows:

$$NDAC_{it} = \hat{a}_1(1/A_{it-1}) + \hat{a}_2 (\Delta REV_{it} - \Delta AR_{it}) + \hat{a}_3 PPE_{it} \quad (3)$$

Where:  $NDAC$  is estimate of nondiscretionary accruals. Finally, discretionary accruals ( $AEM_{ADA}$ ) are estimated as the difference between total accruals and the fitted nondiscretionary accruals as:

$$AEM_{ADA} = TAC_{it} - NDAC_{it} \quad (4)$$

We estimate performance-matched discretionary accruals ( $AEM_{PMADA}$ ) as in Kothari, Leone, and Wasley (2005). We estimate the discretionary accruals as above and match each sample firm with a control firm on the basis of the two-digit SIC code and lagged return on assets. We estimate the discretionary accruals for the control sample, and calculate performance-matched discretionary accruals as the difference between the discretionary accruals for each sample firm and the discretionary accruals for its matching firm.

### ***Real Earnings Management Proxies***

Real earnings management is management actions that deviate from normal business practices, undertaken with the primary objective of meeting certain earnings thresholds (Roychowdhury (2006)). Roychowdhury finds that managers manipulate real activities to avoid reporting annual losses and to meet other earnings thresholds, such as analysts' earnings forecasts. We use the reduction of discretionary expenditures such as R&D and advertising

expenses as a proxy for real earnings management. We estimate real earnings manipulations as the abnormal level of discretionary expenses ( $REM_{EXP}$ ), as the error term of the following model:

$$EXP_{it}/A_{it-1} = \alpha_1*(1/A_{it-1}) + \alpha_2*(REV_{it}/A_{it-1}) + \varepsilon_t \quad (5)$$

Where:  $EXP$  is the discretionary expenditures, defined as the sum of advertising expenses (Compustat data item # 45) and  $R\&D$  expenses (Compustat data item # 46).

### **Nonfinancial Performance Metrics**

We use two measures to capture the effect of nonfinancial performance portfolios on earning management. The first measure ( $NFPM$ ) captures the adoption of nonfinancial measures in compensation contracts. We use a zero-one dummy variable to represent whether the firm does or does not use nonfinancial performance measures in bonus contracts. To apply the dummy nonfinancial proxy, we match each firm with a control firm on the basis of the 2-Digit SIC code and lagged return on assets. Therefore,  $NFPM$  is measured as a dummy variable that equals one for firms that use nonfinancial performance measures, in compensation contracts and zero otherwise.

Economic, agency and contingency theories suggest that the choice of appropriate managerial accounting techniques depends on circumstances surrounding the firm (Gordon and Miller (1976); Hayes (1977); Otley (1980)). The second measure ( $FIT\_NFPM$ ) captures the fit between the use of nonfinancial performance measures and firm characteristics. Prior research indicates that the adoption of nonfinancial measures is an endogenous choice, with net benefits varying depending upon several firm characteristics (HassabElnaby et al. 2005; Said et al. 2003). **To control for endogeneity**, we use the fitted values of the dependent variable from regressing the dummy variable for adoption of nonfinancial performance measures on five firm characteristics that explain the choice to adopt nonfinancial performance measures

(HassabElnaby et al. (2005); Said et al. (2003)). These characteristics are the extent of innovation-oriented strategy, firm size, financial noise, industry regulation, and the level of financial distress. The fitted values from the firm characteristics model represent the extent to which the firm should adopt nonfinancial measures of performance (HassabElnaby et al. (2005)). The fitted values are reasonably good approximation of the extent to which firms have actually adopted nonfinancial measures of performance.<sup>3</sup>

### **Earnings Management Control Variables**

Earnings management literature suggests a relation between some additional variables and earnings management. We control for other factors identified in the literature to be associated with earnings management to reduce potential correlated omitted variables problems. Prior research in earnings management suggests that size and growth opportunities are related to earnings management. The inclusion of the size variable, *SIZE*, in earnings management is motivated by the political cost theory (Watts and Zimmerman (1978)). We measure *SIZE* as the natural log of total sales for the year. In addition, higher growth firms are more likely to manage earnings (Pincus and Rajgopal (2002)). We use the market-to-book (*M/B*) as a proxy for growth opportunity, measured as the market value of equity plus book value of debt divided by book value of assets at the beginning of the period.

Dechow (1994) finds that cash flows from operations are negatively correlated with total accruals. Therefore, we include cash flows from operations scaled by lagged total assets (*CFO*) as a control variable. Leverage (*LEV*) is related to managers' earning behavior. The more debt a firm has, the more likely it is to manage earnings to reduce the probability of financial distress in the presence of debt contracts (Pincus and Rajgopal (2002)). We use total debt scaled by total

---

<sup>3</sup> We corrected the standard errors (heteroscedastic errors) in the second stage *FIT\_NFPM* model to obtain consistent estimates of the coefficients and unbiased results of the t-tests.

assets to measure financial leverage. Managers also have incentives to manage earnings when their bonus plans (*BONUS*) are tied to earnings (Healy (1985); Holthausen et al. (1995)). Therefore, we expect a positive association between the existence of a bonus plan and earnings management. The bonus plan is measured as annual bonus scaled by beginning of period total assets.

Monitoring environment affects earnings management decision. Monitoring is considered a restriction on managers' ability to opportunistically manage earnings. We use a dummy variable (*AUD*) that equals 1 if a firm's auditor is a Big Accounting firm. We expect a negative relationship between earnings management and Auditor. Two other earnings management thresholds are identified in the literature: a loss and a decrease in earnings from the previous period. If managers are close to reporting either, they have incentives to manage earnings upward (Degeorge, Patel, and Zeckhauser (1999)). We define both situations as losses represented by two variables: a dummy variable (*LS*) that takes a value of one if the firm would have reported a loss prior to earnings management and a corresponding interaction variable. Loss is even more serious if the firm trades on a major exchange; therefore, the loss variable is multiplied by one for firms listed on NYSE (*LSL*).<sup>4</sup> We expect a positive association between both these variables and earnings management.

Recent studies provide evidence of a decrease in earnings management after the introduction of Sarbanes-Oxley Act (Cohen, Dey, and Lys (2005)). Therefore, we include a dummy variable (*SOX*) equal to one for observations after the introduction of SOX, and zero otherwise. We expect a negative association between SOX and earnings management. We also include the

---

<sup>4</sup> Prior research suggests that firms listed on NASDAQ and AMEX have more incidents of earning management (Dechow et al. (1995)). Therefore, we use only firms listing on NYSE for the major stock exchange.

regulatory environment (*REG*) as a control variable. Firms operating in regulated industries behave differently (Smith and Watts (1982)). Regulation constrains managers' actions, presumably making earnings management more difficult (Warfield, Wild, and Wild (1995)). Therefore, we use a dummy variable (*REG*) to denote regulated industries (gas and electric utility, SIC=49). *REG* equals one for firms operating in a regulated industry and zero otherwise.

Table 2 provides the descriptive statistics for the nonfinancial performance firms and the matching sample. We provide the univariate statistics for the proxies of artificial earnings management ( $AEM_{ADA}$  and  $AEM_{PMADA}$ ), real earnings management ( $REM_{EXP}$ ), and earnings management control variables (*SIZE*, *M/B*, *CFO*, *LEV*, *BONUS*, *AUD*, *LS*, *LSL*, *SOX* and *REG*). The absolute discretionary accruals ( $AEM_{ADA}$ ) are greater for control firms, but the difference is not statistically significant (p-value = .14). However, the performance-matched discretionary accruals ( $AEM_{PMADA}$ ) are significantly greater for control firms (p-value < 0.05). Also, our real earnings management proxy, abnormal discretionary expenditures ( $REM_{EXP}$ ), is significantly greater for control firms (p-value < 0.01). These results are consistent with lesser earnings management by firms adopting nonfinancial performance measures in their executive compensation contracts. However, univariate results do not control for other factors that explain earnings management and the choice to adopt nonfinancial performance measure in compensation contract. Below we turn to the multivariate analysis to address these two issues.

[Insert Table 2 here]

## **Empirical Models**

To examine the earnings management consequences of adopting nonfinancial performance measures, we regress our measures of earnings management on our measure for the adoption of nonfinancial measures and control variables for earnings management suggested in

prior research as in the following model:

$$\begin{aligned}
 AEM \text{ or } REM = & \alpha_0 + \alpha_1 NFPM \text{ or } FIT\_NFPM + \alpha_2 SIZE + \alpha_3 B/M + \alpha_4 CFO + \alpha_5 LEV + \alpha_6 \\
 & BONUS + \alpha_7 AUD + \alpha_8 LS + \alpha_9 LSL + \alpha_{10} SOX + \alpha_{11} REG + \xi
 \end{aligned} \tag{6}$$

where: *AEM* is one of the two artificial earnings management measures: (1) discretionary accruals (*AEM<sub>ADA</sub>*), and (2) performance-matched discretionary accruals (*AEM<sub>PMADA</sub>*). *REM* is the abnormal level of discretionary expenses (*REM<sub>DEXP</sub>*). *NFPM* is a proxy for the use of nonfinancial measures in compensation contracts and is measured as a dummy variable that equals one for firms that adopted nonfinancial performance measures, and zero otherwise. Since *NFPM* captures the cross-sectional variation in earnings management for firms that use nonfinancial measures, we expect it to be negative in the above regression. *FIT\_NFPM* is the fitted values from regressing the dummy nonfinancial proxy on firm characteristics. We also expect a negative coefficient for *FIT\_NFPM*. *SIZE*, *B/M*, *CFO*, *LEV*, *BONUS*, *AUD*, *LS*, *LSL*, *SOX* and *REG* are earnings management control variables identified in prior research and discussed earlier.

## IV. RESULTS

### Single-Stage Equation Modeling Approach

Tables 3 presents the results of estimating the model in equation 6, where the independent variable of interest is *NFPM*. The dependent variables are artificial earnings management proxies (absolute discretionary accruals, *AEM<sub>ADA</sub>* and performance-matched discretionary accruals, *AEM<sub>PMADA</sub>*) and real earnings management proxy (abnormal discretionary expenditures, *REM<sub>EXP+I</sub>*). Although the coefficients for *NFPM* are negative, as expected, the relation is only significant using performance discretionary accruals, while it is insignificant

using absolute values of discretionary accruals and discretionary expenses as a proxy for real earnings management.

[Insert Table 3 here]

### **Dual-Stage Equation Modeling Approach**

In contrast to the single-stage equation modeling approach, the dual-stage equation approach considers the match between the use of nonfinancial measures and firm characteristics. Therefore, in the dual-stage equation approach, we explicitly vary the contextual factors, environmental factors, and strategic plans across firms. Specifically, we regress in the first stage the *NFPM* as a measure of using nonfinancial measures on variables that reflects unique firm characteristics identified earlier. Next, we use the fitted values from the regression *FIT\_NFPM* to estimate the research model in equation 7. Table 4 provides the results of the second stage by regressing our measures of artificial and real earnings management on the use of nonfinancial measures captured by *FIT\_NFPM*. In general, the results of the dual-stage modeling approach provide significant results compared to the single-stage modeling approach.

[Insert Table 4 here]

The results of estimating artificial earnings management and real earnings management are reported in Table 4. Consistent with our expectations, the coefficients for *FIT\_NFPM* are negative and significant using both discretionary accruals ( $p < 0.001$ ) and performance discretionary accruals ( $p < 0.055$ ) as proxies for artificial earnings management. In addition, the coefficient for *FIT\_NFPM* is negative and significant using discretionary expenditures ( $p < 0.076$ ) as a proxy for real earnings management. The results in table 4 indicate that, after controlling for other variables that affects earnings management, *FIT\_NFPM* decreases as firms use nonfinancial performance measures in compensation contracts.

[Insert Table 6 here]

Overall, the results of the single-stage analysis and the dual-stage analysis indicate that firms that use nonfinancial performance measures to compensate their managers experience less earnings management than firms that rely only on financial measures in their compensations. In addition, comparing the single-stage and dual stage analyses suggest the need to consider the endogeneity in using nonfinancial measures in compensation contracts.<sup>5</sup>

## V. SUMMARY AND CONCLUSIONS

Earnings management is an area of much interest among researchers and practitioners. The widespread failure in financial reporting has largely been blamed on motivations to manage earnings. Managers have incentives to manipulate earnings for many reasons including compensation. Reward systems based solely on earnings and other financials have been criticized for encouraging managers to sacrifice long-run performance to increase short-term financial results. To overcome the short-run orientation of financial performance measures, firms are implementing compensation plans that supplement financial metrics with additional nonfinancial measures such as the balance scorecard. Although researchers have argued for the potential of nonfinancial measures, there is limited empirical evidence examining the earnings management consequences of using nonfinancial performance measures. This is one of the first studies to empirically examine the relation between the use of nonfinancial performance measures in compensation contracts and earnings management behavior.

---

<sup>5</sup> We used the fitted *values* from the first stage as independent variables in the second stage to mitigate problems with inconsistency in parameter estimates due to correlation between regressor terms (e.g. NFPI) and the true (unobservable) error in the earnings model. Moreover, we use the negative and positive *residuals* (Ittner, Lanen and Larcker 2002) from the first stage as independent variables in the second stage to identify the fit between the adoption of NFPM and other characteristics of the firm, and to test whether firms with better fit have lower earnings management. We find that firms that match their firm characteristics to use nonfinancial measures manage their earnings less.

This study investigates whether using nonfinancial measures aligns the goals of managers with those of the firm and reduces managers' earnings management behavior. The study compares earnings manipulation behavior for firms that use nonfinancial measure to those that rely only on financial measures in their compensation contracts. Using a sample of firms that used nonfinancial measures and a control sample of firms that did not rely on nonfinancial measures in their compensation during the period 1992-2005, the study provides justifications for the managerial accrual choices as explained by the adoption and use of nonfinancial performance measures.

Our findings support the contention that firms that employ a combination of financial and nonfinancial performance measures have significantly lower levels of earnings management. The results of the single-stage modeling provide partial support for the earnings management consequences of using nonfinancial performance measures in compensation contracts. Specifically, there is strong evidence indicating a negative relation between the use of nonfinancial measures and performance discretionary accruals (artificial earnings management). We find conclusive evidence that the use of nonfinancial measures for firms that matches their use of nonfinancial measures to their firm characteristics reduces both artificial and real earnings management. Overall, the results indicate that the association between the use of nonfinancial measures and earnings management is contingent on the firm's operational and competitive characteristics.

The results in this study require careful interpretation. The results reflect a more general voluntary disclosure phenomenon. In our sample, the firms chose whether to use and whether to disclose the use of nonfinancial performance measures, whether to link them to managers' incentives, and determine their own corporate governance structures. As pointed out in Core

(2001), the simultaneous choice of disclosure, incentives and corporate governance structure is an interesting question for future research. Another limitation is our use of the zero-one dummy variable to represent whether the firm does or does not use nonfinancial in bonus contracts. This approach would assume that all nonfinancial are equally effective across firms. However, different weights assigned to nonfinancial in executive compensation contracts can yield different results (Ittner and Larcker (2003)). For instance, a firm that places a 25% weight on quality will likely invest more resources in achieving this goal than a firm that places a 5% weight on the same measure, thereby potentially having different earnings management pattern. Thus, future research may consider the weight assigned to nonfinancial in the executive compensation contracts.

Future research should more closely examine the specific type of nonfinancial that contributes to less earning management. For instance, are there certain combinations of nonfinancial and financial measures that optimize the efficacy of nonfinancial and lead to lees earnings management? Also, are there certain combinations of nonfinancial attributes and weights that best maximize the inherent potential of nonfinancial? Another avenue for future research is to experimentally test the effect of nonfinancial on earnings management to better determine and understand the causal relationship between the combined strategies and managerial choices. Finally, future research may examine the role, if any, of using nonfinancial performance measures on the quality of earnings as explained by earnings manipulation behavior.

## REFERENCES

- Amir, Eli, and Baruch Lev. 1996. Value-Relevance of Nonfinancial Information: The Wireless Communications Industry. *Journal of Accounting and Economics* 22 (1-3):3-30.
- Balsam, Steven. 1998. Discretionary Accounting Choices and CEO Compensation. *Contemporary Accounting Research* 15 (3):229-252.
- Banker, Rajiv D., and Srikant M. Datar. 1989. Sensitivity, Precision, and Linear Aggregation of Signals for Performance Evaluation. *Journal of Accounting Research* 27 (1):21-39.
- Banker, Rajiv D., and Raj Mushruwala. 2001. The Importance of Components of Customer Satisfaction in Performance Evaluation. *Working paper (University of Texas at Dallas)*.
- Banker, Rajiv D., Gordon Potter, and Dhinu Srinivasan. 2000. An Empirical Investigation of an Incentive Plan That Includes Nonfinancial Performance Measures. *The Accounting Review* 75 (1):65-92.
- Behn, Bruce K., and Richard A. Jr. Riley. 1999. Using Nonfinancial Information to Predict Financial Performance: The Case of the U.S. Airline Industry. *Journal of Accounting Auditing & Finance* 14 (1):29-56.
- Bushman, Robert M., Raffi J. Indjejikian, and Abbie Smith. 1996. Ceo Compensation: The Role of Individual Performance Evaluation. *Journal of Accounting and Economics* 21 (2):161-193.
- Carter, Mary Ellen, Luann J. Lynch, and Sarah L. C. Zechman. 2007. The Relation between Executive Compensation and Earnings Management: Changes in the Post-Sarbanes-Oxley Era. *Review of Accounting Studies* Forthcoming.
- Cohen, Daniel A., Aiyasha Dey, and Thomas Z. Lys. 2005. Trends in Earnings Management in the Pre- and Post-Sarbanes Oxley Periods. Working paper. Northwestern University.
- Core, John. 2001. A Review of the Empirical Disclosure Literature: Discussion. *Journal of Accounting and Economics* 31 (1-3):441-456.
- Core, John E., Wayne R. Guay, and David F. Larcker. 2003. Executive Equity Compensation and Incentives: A Survey. *Economic Policy Review* (Federal Reserve Bank of New York 9):27-50.
- Core, John E., Wayne R. Guay, and Robert E. Verrecchia. 2003. Price Versus Non-Price Performance Measures in Optimal Ceo Compensation Contracts. *The Accounting Review* 78 (4):957-981.
- Davila, Antonio, and Mohan Venkatachalam. 2004. The Relevance of Non-Financial Performance Measures for CEO Compensation: Evidence from the Airline Industry.

- Review of Accounting Studies* 9 (4):443-464.
- Dechow, Patricia M. 1994. Accounting Earnings and Cash Flows as Measures of Firm Performance: The Role of Accounting Accruals. *Journal of Accounting and Economics* 18 (1):3-42.
- Dechow, Patricia M., Richard G. Sloan, and Amy P. Sweeney. 1995. Detecting Earnings Management. *The Accounting Review* 70 (April):193-225.
- Defond, Mark L., and James Jiambalvo. 1994. Debt Covenant Violation and Manipulation of Accruals. *Journal of Accounting and Economics* 17 (1-2):145-176.
- Degeorge, Francois, Jayendu Patel, and Richard Zeckhauser. 1999. Earnings Management to Exceed Thresholds. *The Journal of Business* 72 (1):1-33.
- Fama, Eugene F. 1980. Agency Problems and the Theory of the Firm. *Journal of Political Economics* (April):288-307.
- Fama, Eugene F., and Michael C. Jensen. 1983. Agency Problems and Residual Claims. *Journal of Law and Economics* 76 (2):327-349.
- Feltham, Gerald A., and Jim Xie. 1994. Performance Measure Congruity and Diversity in Multi-Task Principal/Agent Relations. *The Accounting Review* 69 (3):429-453.
- Gaver, Jennifer J., Kenneth M. Gaver, and Jeffrey R. Austin. 1995. Additional Evidence on Bonus Plans and Income Management. *Journal of Accounting and Economics* 19:3-28.
- Goel, Anand Mohan, and Anjan V. Thakor. 2003. Why Do Firms Smooth Earnings? *Journal of Business* 76 (1):151-192.
- Gordon, Lawrence A., and Danny Miller. 1976. A Contingency Framework for the Design of Accounting Information System. *Accounting, Organization and Society* 1:59-69.
- Gordon, Myron J. 1964. Postulates, Principles and Research in Accounting. *The Accounting Review* 64 (April):251-263.
- Gore, Angela K., Steven R. Matsunaga, and Eric Yeung. 2004. Financial Expertise and the Usefulness of Earnings: Evidence from the Cash Compensation of Chief Financial Officers. *Working paper*.
- Guidry, Flora, Andrew J. Leone, and Steve Rock. 1999. Earnings-Based Bonus Plans and Earnings Management by Business-Unit Managers. *Journal of Accounting and Economics* 26:113-142.
- HassabElnaby, Hassan, Amal A. Said, and Benson Wier. 2005. The Retention of Nonfinancial Performance Measures in Compensation Contracts. *Journal of Management Accounting*

*Research* 17:23-42.

- Hayes, David C. 1977. A Contingency Theory of Managerial Accounting. *The Accounting Review* 52:22-39.
- Healy, Paul M. 1985. The Effect of Bonus Schemes on Accounting Decisions. *Journal of Accounting and Economics* 7 (1-3):85-107.
- Healy, Paul M., and James M. Wahlen. 1999. A Review of the Earnings Management Literature and Its Implications for Standard Setting. *Accounting Horizons* 13 (December):365-383.
- Hemmer, Thomas. 1996. On the Design and Choice of 'Modern' Management Accounting Measures. *Journal of Management Accounting Research*:87-116.
- Hirschey, Mark, Vernon J. Richardson, and Susan Scholz. 2001. Value Relevance of Nonfinancial Information: The Case of Patent Data. *Review of Quantitative Finance and Accounting* 12 (3):223-235.
- Holmstrom, Bengt. 1979. Moral Hazard and Observability. *The Bell Journal of Economics* 10 (1):74-91.
- Holthausen, Robert W., David F. Larcker, and Richard G Sloan. 1995. Annual Bonus Schemes and the Manipulation of Earnings. *Journal of Accounting and Economics* 19 (1):29-74.
- Ittner, Christopher D., and David F. Larcker. 1996. Measuring the Impact of Quality Initiatives on Firm Financial Performance. *Advances in the Management of Organizational Quality* 1:1-37.
- . 1997. Quality Strategy, Strategic Control Systems, and Organizational Performance. *Accounting Organizations and Society* 22 (3-4):293-314.
- . 1998. Are Nonfinancial Measures Leading Indicators of Financial Performance? An Analysis of Customer Satisfaction. *Journal of Accounting Research* 36 (Supplement):1-35.
- . 2003. Coming up Short on Nonfinancial Performance Measurement. *Harvard Business Review* 81 (11):88-95.
- Ittner, Christopher D., David F. Larcker, and Madhav V. Rajan. 1997. The Choice of Performance Measures in Annual Bonus Contracts. *The Accounting Review* 72 (2):231-255.
- Jensen, Michael C., and William H. Meckling. 1976. Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics* 3:305-360.
- Kothari, S. P., Andrew J. Leone, and Charles E. Wasley. 2005. Performance Matched

- Discretionary Accrual Measures. *Journal of Accounting and Economics* 39:163-197.
- Matsunaga, Steven, and Chul Park. 2001. The Effect of Missing a Quarterly Earnings Benchmark on the Ceo's Annual Bonus. *The Accounting Review* 70:1-26.
- Murphy, Kevin J. 1999. Executive Compensation. In *Handbook of Labor Economics*, edited by O. Ashenfleter and D. Card. Amsterdam: North-Holland.
- . 2001. Performance Standards in Incentive Contracts. *Journal of Accounting and Economics* 30:245-278.
- Nagar, Venky, and Madhav V. Rajan. 2001. Revenue Implications of Product Quality Measures. *The Accounting Review* 76:495-513.
- Otley, David T. 1980. The Contingency Theory of Management Accounting: Achievement and Prognosis. *Accounting Organization and Society* 5:413-428.
- Pincus, Morton, and Shivaram Rajgopal. 2002. The Interaction between Accrual Management and Hedging: Evidence from Oil and Gas Firms. *The Accounting Review* 77 (January):127-160.
- Riley, Richard A. Jr., Timothy A. Pearson, and Greg Trompeter. 2003. The Value-Relevance of Nonfinancial Performance Variables and Accounting Information: The Case of the Airline Industry. *Journal of accounting and Public Policy* 22:231-254.
- Roychowdhury, Sugata. 2006. Earnings Management through Real Activities Manipulation. *Journal of Accounting and Economics* 42 (3):335-370.
- Said, Amal A., Hassan R. HassabElnaby, and Benson Wier. 2003. An Empirical Investigation of the Performance Consequences of Nonfinancial Measures. *Journal of Management Accounting Research* 15:193-223.
- Sedatole, Karen L., Susan C. Kulp, and Shane S. Dikolli. 2003. The Role of CEO and Investor Horizons in the Contracting Use of Forward-Looking Performance Measures. Working Paper. Harvard University.
- Smith, Clifford W. Jr., and Ross L. Watts. 1982. Incentive and Tax Effects of Executive Compensation Plans. *Australian Journal of Management* (7):139-157.
- Srinivasan, Dhinu, Akin Sayrak, and Nandu Nagarajan. 2003. Executive Compensation and Non Financial Performance Measures: A Study of the Major U.S. Airlines. *Working paper (University of Pittsburgh)*.
- Warfield, Terry D., John J. Wild, and Kenneth L. Wild. 1995. Managerial Ownership, Accounting Choices, and Informativeness of Earnings. *Journal of Accounting and Economics* 20 (1):61-91.

Watts, Ross L., and Jerold L. Zimmerman. 1978. Towards a Positive Theory of the Determination of Accounting Standards. *The Accounting Review* 53 (1):112-134.

———. 1986. *Positive Accounting Theory*. Edited by A. Rappaport, *Contemporary Topics in Accounting Series*. Eaglewood Cliffs, NJ: Prentice-Hall, Inc.

## APPENDIX A

### Variables Definitions

---

<i>AEM<sub>ADA</sub></i>	Artificial earnings management measured as the absolute value of discretionary accruals using the cross-sectional modified Jones (1991).
<i>AEM<sub>PMADA</sub></i>	Artificial earnings management measured as the performance-matched discretionary accruals as in (Kothari et al. 2005). We estimate the discretionary accruals using the cross-sectional modified Jones (1991).
<i>REM<sub>EXP</sub></i>	Real earnings management measured using the level of abnormal discretionary expenses, where expenses are defined as the sum of advertising expenses, R&D expenses, and SG&A (Roychowdhury 2006).
<i>NFPM</i>	Proxy for the use of nonfinancial measures in compensation contracts and is measured as a dummy variable that equals one for firms that adopted nonfinancial performance measures, and zero otherwise.
<i>FIT<sub>NFPM</sub></i>	Proxy for the use of nonfinancial measures in compensation contracts and is measured as the fitted values from regressing the dummy nonfinancial proxy on firm characteristics.
<i>SIZE</i>	Size measured as the natural log of total sales for the year.
<i>M/B</i>	Growth opportunities measured as the market value of equity plus book value of debt divided by book value of assets at the beginning of the period.
<i>CFO</i>	Cash flows from operations scaled by lagged total assets.
<i>LEV</i>	Leverage measured as total debt divided by total assets.
<i>BONUS</i>	Annual bonus scaled by beginning of period total assets.
<i>AUD</i>	Monitoring environment measured as an indicator variable that equals 1 if a firm's auditor is a Big Accounting firm, and zero otherwise.
<i>LS</i>	Dummy takes a value of 1 if the firm would have reported a loss without earnings management.
<i>LSL</i>	LS * 1 if the firm is listed on the New York Stock Exchange.
<i>SOX</i>	Dummy takes a value of 1 for observations after the introduction of SOX, and zero otherwise.
<i>REG</i>	Regulatory environment variable measured as a dummy variable that equals 1 if the firm is a utility firm (gas and electric utility, 2-digit SIC code 49), and zero otherwise.

**Table 1****Sample Selection Process and Industry Distribution****Panel A: Sample Selection Process**

<b>Firm type</b>	<b>Firm-Years</b>
Firms disclosing the use of nonfinancial measures <sup>a</sup>	3,106
Minus the following observations:	
Financial information are not available to calculate earnings management variables	1,597
Firms in Financial Services Industries (SIC codes 60-69)	196
No match exist on two SIC code	<u>360</u>
<i>Firms in nonfinancial performance measure sample</i>	953

<sup>a</sup> From Proxy text files contained in Lexis/Nexis for the period 1992-2005.

**Panel B: Industry Distribution**

<b>Industry</b>	<b>Two-Digit SIC</b>	<b>Count (Firm-Year)</b>	<b>Percentage</b>
Mining and Construction	10-19	44	4.6
Manufacturing (non-durables)	20-29	301	31.6
Manufacturing (durables)	30-39	245	25.7
Transportation and Utilities	40-49	171	17.9
Wholesalers and Retailers	50-59	97	10.1
Consumer and Business Services	70-89	96	10.0
Total		953	100

**TABLE 2**  
**Descriptive Statistics for Sample Firms<sup>a</sup>**

Variables <sup>b</sup>	Nonfinancial Sample			Matching Sample		
	Mean <sup>c</sup>	Median	Std. Dev.	Mean	Median	Std. Dev.
<i>AEM<sub>ADA</sub></i>	0.066	0.040	0.121	0.072	0.044	0.092
<i>AEM<sub>PMADA</sub></i>	<b>-0.005</b>	<-0.000	0.169	<b>0.010</b>	0.003	0.104
<i>REM<sub>EXP</sub></i>	<b>-0.004</b>	<-0.0003	0.059	<b>0.005</b>	<-0.0004	0.057
<i>SIZE</i>	<b>7.907</b>	7.897	1.582	<b>7.031</b>	6.857	1.450
<i>M/B</i>	<b>3.398</b>	2.471	2.860	<b>3.183</b>	2.437	3.316
<i>CFO</i>	0.118	0.114	0.095	0.118	0.109	0.109
<i>LEV</i>	0.642	0.458	0.829	0.630	0.411	0.872
<i>BONUS</i>	<b>0.431</b>	0.173	0.734	<b>0.600</b>	0.217	0.966

<sup>a</sup> Based on a sample of 953 firm-year observations that adopt nonfinancial performance measures and a control sample of 953 firm-year observations during the period 1992-2005.

<sup>b</sup> All variables are defined in Appendix A.

<sup>c</sup> Means of variables with significant differences between the two groups at the 10% level or better are in bold face.

**TABLE 3**

**Regression Results for Earnings Management as a Function of Using Nonfinancial Performance Measures: Single-Stage Analyses<sup>a, b</sup>**

Variable	Discretionary Accruals <i>AEM<sub>ADA</sub></i>		Performance Discretionary Accruals <i>AEM<sub>PMADA</sub></i>		Discretionary Expenditures <i>REM<sub>EXP</sub></i>	
	Standardize Coefficient	<i>p</i> -value	Standardize Coefficient	<i>p</i> -value	Standardize Coefficient	<i>p</i> -value
<i>NFPM</i>	-0.008	0.377	<b>-0.002</b>	<b>0.0471</b>	-0.008	0.382
<i>SIZE</i>	0.062	0.070	0.160	<0.001	0.056	0.107
<i>M/B</i>	0.175	<.0001	0.238	<0.001	0.033	0.316
<i>CFO</i>	0.068	<.019	0.061	<0.035	-0.013	0.717
<i>LEV</i>	-0.107	<.001	-0.148	<0.001	-0.011	0.394
<i>BONUS</i>	0.064	0.022	0.054	0.046	0.026	0.380
<i>AUD</i>	-0.053	0.036	0.004	0.860	-0.001	0.960
<i>LS</i>	0.445	<.0001	0.521	<0.001	0.306	<0.001
<i>LSL</i>	-0.065	0.043	-0.110	<0.001	-0.075	0.22
<i>SOX</i>	0.008	0.764	0.005	0.826	0.020	0.467
<i>REG</i>	-0.026	0.377	0.141	<0.001	0.016	0.611
F-Value	28.61	<.0001	56.84	<0.001	9.85	<.0001
Adj. R-Square	0.189		0.070		0.362	
No. of Observations Used	1305		1303		1082	

<sup>a</sup> Based on a sample of 953 firm-year observations that rely on nonfinancial measures and a control sample of 953 firm-year observations during the period 1992-2005.

<sup>b</sup> All variables are defined in Appendix A.

**TABLE 4**

**Regression Results for Artificial Earnings Management as a Function of Use of Nonfinancial Performance Measures: Dual-Stage Analyses <sup>a,b</sup>**

Variable	Discretionary Accruals <i>AEM<sub>ADA</sub></i>		Performance Discretionary Accruals <i>AEM<sub>PMADA</sub></i>		Discretionary Expenditures <i>REM<sub>EXP</sub></i>	
	Standardize Coefficient	<i>p</i> -value	Standardize Coefficient	<i>p</i> -value	Standardize Coefficient	<i>p</i> -value
<i>FIT NFPM</i>	-0.490	<0.001	-0.210	0.055	-0.377	0.076
<i>SIZE</i>	0.589	0.002	0.441	0.002	0.479	0.226
<i>M/B</i>	0.051	0.393	0.159	0.007	-0.074	0.705
<i>CFO</i>	0.008	0.842	0.036	0.334	-0.150	0.596
<i>LEV</i>	-0.121	0.004	-0.084	0.049	-0.013	0.168
<i>BONUS</i>	0.054	0.149	0.094	0.011	0.115	0.586
<i>AUD</i>	-0.018	0.566	0.021	0.509	0.017	0.407
<i>LS</i>	0.530	<0.001	0.521	<0.001	0.317	<0.001
<i>LSL</i>	-0.005	0.910	-0.153	<0.001	-0.012	0.673
<i>SOX</i>	0.018	0.568	-0.001	0.977	0.067	0.221
<i>REG</i>	-0.167	0.002	0.060	0.161	-0.031	0.280
F-Value	30.07	<0.001	34.42	<0.001	11.12	<0.001
Adj. R-Square	0.308		0.134		0.372	
No. of Observations Used	719		718		621	

<sup>a</sup> Based on a sample of 953 firm-year observations that rely on nonfinancial measures and a control sample of 953 firm-year observations during the period 1992-2005.

<sup>b</sup> All variables are defined in Appendix A.

