Pension Actuarial Incentives for Earnings Management

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Abstract

This study investigates whether financially distressed firms exploit the pension actuarial assumptions of the Statement of Financial Accounting Standards No. 87 (Employers’ Accounting for Pension) as a tool for earnings management. For a sample of 587 firm-year observations over the period of 1988-2002, the solution for detecting earnings management is the use of a system of four simultaneous equations. By using three-stage-least-square (3SLS), this study demonstrates that taking account of simultaneity is important for three of the seven modelled incentives, namely, the discount rate, expected rate of return on plan assets, and salary progression rate. All three behave as if they are used to manipulate pension costs, and discretion in each of these incentives depends on the levels of the other two. In contrast, the remaining four incentives are used as control variables in this study, namely: debt covenant, bonus plan, cash flow, and funding status incentives, which appear to be determined independently of the other incentives. The parameter estimates indicate that the discount rate and the expected rate of return on plan assets are used to manage earnings, and salary progression rate is used, perhaps secondarily, to offset the total pension costs. Therefore, managers of financially distressed firms may have smoothed reported earnings by jointly changing the pension rates to change the corresponding pension costs and cash requirements.

Keywords: Earnings management, pension, financial distress, three-stage-least-square (3SLS)

1. Introduction

The business community generally concedes that the manipulation of earnings in financial reporting is pervasive (Bartov, 1993; Morgenson, 2004). Studies that derive an accrual-based measure of earnings management generally fall into two categories: those deriving a single accrual, and those deriving an aggregate accrual. However, there is remarkably little evidence on earnings management using specific accruals (Healy and Wahlen, 1999). Therefore, this study explores the use of specific accruals, i.e. pension, to detect earnings management and presents evidence that managers of financially distressed firms may have smoothed reported earnings by jointly changing the pension rates to change the corresponding pension costs and cash requirements.

Small changes in the pension discount rate assumption made in regards to financial reporting make large differences in pension liabilities and pension funding, e.g. a one percent increase in the discount rate can easily reduce a company's pension liability by 10% or more (Winklevoss, 1993; Bryan-Low, 2003). Additionally, the fairness of this increase is difficult to challenge. Although the Statement of Financial Accounting Standards No. 87 (hereafter, SFAS No. 87), Employers’ Accounting for Pension, requires a standardized cost method for

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financial reporting, it does not require disclosure of all actuarial assumptions nor does it appear to have reduced all the volatility of pension costs (Norton, 1989; Herdman and Heary, 1990). Therefore, pension actuarial assumptions continue as potential earnings management tools.

Articles in the *Wall Street Journal* illustrate several examples of using the pension discount rate and rate-of-return on plan assets assumptions to manage corporate earnings as follows:

(a) GM, in 2002 SEC filings, detailed how sensitive its pension-funding status is to changes in assumptions about interest rates or market returns. A 0.25 percentage point increase in the discount rate it applies to future pension obligations would lead to a reduction of $120 million of GM’s pretax pension expense in the year 2002. It also would reduce GM’s total projected pension benefit obligations by $1.8 billion (McKinnon, 2003).

(b) Great Atlantic & Pacific Tea Co. calculates that a discount-rate increase of one percentage point would reduce its pension obligation by $9.3 million, or 6.37%, according to its financial filings (Bryan-Low, 2003).

(c) AT&T’s 1992 pension credits accounted for 7.6% of its net income, thanks in part to an upward revision in the rate-of-return on plan assets assumptions from 8.6% to 9%. If AT&T had lowered its expected return by just 0.4% to 8.2%, earnings growth for the year would have been just 9.2% instead of the 15.3% it recorded (Alster, 1993).

As a result of pension costs requiring a comprehensive actuarial assumption of future events, the discretion and uncertain nature of pension obligations can give financially distressed companies different opportunities for managing earnings (DeAngelo et al., 1994; Peltier-Rivest, 1999). These include the three pension rate assumptions required under SFAS No. 87: the discount rate, the expected rate of return on plan assets, and the salary progression rate. This study investigates these opportunities to manage earnings between the time period of 1988 to 2002, prior to the effects of the Sarbanes-Oxley Act, and in the presence of other incentives to manage earnings.

Two common explanations for earnings management are examined: the earnings smoothing hypothesis and the hypotheses of SFAS No. 87 pension actuarial assumptions. Earnings management is detected via a system of four simultaneous equations. Assuming that the proposed four simultaneous equations model, including pension actuarial assumptions and earnings smoothing across a variety of incentives, is appropriate, this study provides two advantages. First, if managers choose among the pension actuarial assumptions simultaneously, the system approach provides consistent estimates of the parameters. Second, the proposed model yields parameter estimates which translate into measures of the relative pension costs of exercising discretion over any of the three pension actuarial assumptions (discount rate \( DR \), expected rate of return on plan assets \( ERR \), and salary progression rate \( SPR \)) respectively.

The rest of this paper is organized as follows. Section 2 provides detailed motivation for the development of hypotheses. Section 3 formally develops the model and reviews the estimation techniques. The results of empirical analysis are described in Section 4. The implications and limitations of the study are presented in Section 5.

2. Motivation and formulation of hypotheses

2.1 Motivation

Despite the general perception that earnings manipulation in financial reporting is pervasive (Bartov, 1993; Morgenson, 2004), there is remarkably little evidence on earnings management using specific accruals. By examining specific accruals, researchers can provide
direct evidence for standard setters of areas where standards work well and where there may be room for improvement (Healy and Wahlen, 1999).

While anecdotes from the Wall Street Journal support the view that pension actuarial rates provide managers with an incentive to manage earnings, such anecdotal evidence fails to provide a solid basis for thinking systematically and productively about earnings management. This paper intends to present evidence on earnings management using specific accruals of which there is currently little evidence in this area. In order to detect the behavior of earnings management, this research demonstrates some tradeoffs in research design choices. This study adopts Schipper’s (1989) suggestions that several assumptions are needed to make the results of tests based on a single account interpretable. First, the chosen account must be a reasonable proxy for the construct being managed. Second, the chosen account must be both large enough to matter and at least partly truly discretionary. Choosing a purposely biased sample based on a single account will increase the likelihood of detecting earnings management. Based on examples from the Wall Street Journal on the use of pension actuarial assumptions to manage earnings, it can be concluded that pensions are a good candidate for discretionary accruals in the investigation of earnings management behavior. Furthermore, financially distressed firms should be chosen as the intended sample.

This paper illustrates that future research focusing on how the use of specific pension accruals are to be managed would be valuable. Furthermore, the results contribute to research in two ways: Firstly, in order to detect the behavior of earnings management, the solution is a system of four simultaneous equations. By using the three-stage-least-square (3SLS) method this research demonstrates that taking account of simultaneity is important for three pension actuarial rates. Secondly, whether the approach has the ability to detect earnings management amongst all the other influences present in the data relates to power. Choosing a purposely biased sample based on a single account will increase the likelihood of detecting earnings management. Thus, financially distressed firms in this study should be chosen as the sample of firms for which pensions have been found to be reasonably large relative to some measure of firm size.

2.2 Earnings smoothing hypothesis

Barnea et al. (1975) suggests smoothing to be a vehicle for management to convey its earnings expectations within GAAP. The earnings-smoothing hypothesis considers that earnings are manipulated to reduce fluctuations within limits considered normal for the firm (Ronen and Sadan, 1981; Bartov, 1993). If management has “target earnings” for financial reporting, the managers will try to increase their reported earnings when “actual earnings” are less than the target earnings, and vice-versa. Burgstahler and Dichev (1997) found that managers take actions to manage earnings upward to avoid reporting negative earnings, a decline in earnings, or if earnings fall short of market expectations.

The earnings-smoothing hypothesis can be tested by examining a proxy for either total accruals or a single accrual’s discretionary component. With respect to studies that examine discretionary accruals (Healy, 1985; DeAngelo, 1986; Jones, 1991; DeFond and Jiambalvo, 1994; Dechow et al., 1995; Subramanyam, 1996) and those deriving a single accrual, McNichols and Wilson (1988) attempted to measure the discretionary components based on the accruals’ components, such as bad debt expense, rather than total accruals, and argued that their model allowed them to directly estimate the discretionary accrual for bad debt expense, thus allowing them to determine abnormal earnings in the year the earnings management was predicted.

The evidence on which specific accruals and methods are utilized to manage earnings should help standard setters identify standards which would potentially require review. This study investigates a single accrual, pension costs, and this issue is important in conducting an
analysis to provide evidence of the existence of the discretionary accounting behavior of a financially distressed firm on the flexibility of pension actuarial assumptions.

Prior researchers (DeAngelo, 1986; Jones, 1991; Aharony et al., 1993) have used the change in the total accruals as the “abnormal” accruals. When using a single accrual (pension cost) to examine earnings smoothing in this study, the change in the pension costs from the prior year to the current year would be representative of the discretionary pension cost amount and would be considered as “unexpected pension costs” ($UPC$). First, the change in the pension costs from the prior year to the current year is discretionary and is considered to be reported as the unexpected change in pension costs ($\triangle UPC$):

$$\triangle UPC = \frac{(\text{Prior Year Pension Cost} - \text{Current Year Pension Cost})}{\text{Prior Year Pension Cost}}$$

With respect to the “smoothing target”, many different measures, from the operating income to earnings per share (Imhoff, 1981), have been assessed. The usage of the prior year earnings per share (EPS) as a proxy for “target earnings” has been done by Whit (1970), Moses (1987), DeAngelo (1988), Bartov (1993), Ali and Kumar (1993), and Weishar (1997). The change in EPS, $\triangle EPS$, is then defined as the change in the pre-tax annual ordinary income per share (prior year EPS minus the current year EPS). In this study, the prior year’s EPS is also assumed to be the “smoothing target” and the level around which unexpected earnings should be smoothed.

$$\triangle EPS = \frac{(\text{Prior Year’s EPS} - \text{Current Year EPS})}{\text{Absolute Value of Prior Year’s EPS}}$$

If $\triangle EPS$ is positive and earnings decline, firms may then have chosen actuarial assumptions that would increase reported earnings by decreasing pension costs. Conversely, if $\triangle EPS$ is negative and earnings increase, firms may have subsequently chosen actuarial assumptions that would decrease reported earnings by increasing pension costs. Specifically, the prior year EPS can be compared with the current year EPS to decide the (opposite) direction of earnings smoothing. Thus, the earnings-smoothing hypothesis ($H1$) can be stated as,

$$H1: \text{For financially distressed firms, the unexpected change in pension costs ($\triangle UPC$) decreases with a decrease in EPS ($\triangle EPS$).}$$

2.3 Pension actuarial incentive hypotheses

Under SFAS No. 87, firms are required to disclose three major assumptions: the discount rate, the expected rate of return on plan assets, and the salary progression rate. Each of these three assumptions influences the calculation of pension costs. An increase in either the discount rate or expected rate of return on plan assets will decrease the current period’s pension cost, and an increase in the salary progression rate will increase the current period’s pension cost (Curtis, 1989).

The change in earnings per share ($\triangle EPS$) is used as a proxy to capture the direction of smoothing for the individual discount rate ($\triangle DR$), the expected rate of return on plan assets ($\triangle ERR$), and the salary progression rate ($\triangle SPR$), respectively. Accordingly, the following hypotheses are advanced:

$H2a$: For financially distressed firms, there is a positive correlation between the unexpected change in the discount rate ($\triangle DR$) and the change in EPS ($\triangle EPS$).

$H2b$: For financially distressed firms, there is a positive correlation between the unexpected change in the expected rate of return on plan assets ($\triangle ERR$) and the change in EPS ($\triangle EPS$).
H2c: For financially distressed firms, there is a negative correlation between the unexpected change in the salary progression rate ($\Delta SPR$) and the change in EPS ($\Delta EPS$).

2.4 Earnings management across a variety of incentives

Incentives lie at the heart of earnings management. In the absence of certain incentives, managers would make accounting judgments and decisions solely with the intention of reporting operating performance fairly. Positive Accounting Theory identifies three incentives that help to explain accounting policy choices; these are the debt-equity incentive, the bonus incentive, and the size incentive (Watts and Zimmerman, 1986). In order to control for differences in the size of the pension plan, it is divided by the Projected Benefit Obligations (hereafter, PBO) at the beginning of that year. Bonus plan and debt covenant variables are used in this research because they are observable (Watts and Zimmerman, 1990).

In addition to a desire to decrease the variability of earnings through smoothing, extensive academic literature suggests earnings management may be due to the effect of income smoothing on cash flows. The cash flows incentive predicts that managers have incentives to choose income-increasing accounting choices to maximize the firm’s cash flows because stakeholders are likely to use reported accounting numbers to help assess the firm’s performance (Bowen et al., 1995). Senteney and Strawser (1990) and Norton (1989) found the funding status to have a role in the choice of adoption date for SFAS No.87. Funding status may affect the pension rate choice, particularly the discount rate. Therefore, apart from these two incentives, the implication of declining cash flows and funding status incentives are also included in this study as control variables.

2.4.1 Debt covenant incentives for earnings management

The debt-equity hypothesis suggests a positive relation between a firm’s debt-equity ratio and managers’ choice of earnings-enhancing activities. To avoid violation of debt covenants, managers of highly leveraged firms have incentives to make income-increasing discretionary accruals (Healy and Palepu, 1990; DeFond and Jiambalvo, 1994; DeAngelo et al., 1994; Sweeney, 1994). Bartov (1993) investigates whether or not managers manipulate earnings through the timing of asset sales. In his research, he examined an income smoothing hypothesis and a debt-equity hypothesis using the previous year’s earning per share as the target income measure and found support for both hypotheses. Peltier-Rivest (1999) also found that firms in financial distress (as indicated by successive losses and dividend reductions) have incentives to adopt income-increasing accounting choices to satisfy accounting-based debt covenant restrictions.

The findings from these studies provide empirical evidence supporting the validity of the debt-equity ratio as a proxy and control for the existence and prohibitiveness of debt covenant restrictions. Similarly, to test for the influence of pension rate assumptions in this study, the debt-equity ratio is used as a control variable in all three pension rate assumptions.

Debt-Equity ratio (DEratio) = Book Value of Long-Term Debt / Book Value of Equity  

H3: For financially distressed firms, there are directional correlations between debt-equity ratios (DEratio) and the three pension rates of SFAS No.87.

2.4.2 Bonus plan incentives for earnings management

The bonus-plan hypothesis assumes that managers maximize their compensation through earnings manipulation. Moreover, evidence supporting earnings management behavior is also provided both by Healy (1985) and McNichols and Wilson (1988). In a study of firms with formal annual bonus plans, Healy (1985) found that if earnings fall between the lower and upper bounds used for determining managerial compensation, managers will seek to improve
earnings by increasing accruals. Managers have strong incentives to accomplish certain earnings growth targets if their compensation is based on reaching these targets.

To test for the influence of the bonus-plan incentive, this research follows Healy (1985), McNichols and Wilson (1988) and Bartov (1993) who suggest that managers reduce earnings when actual earnings are outside the lower or upper bounds of the plan and enhance earnings otherwise. Therefore, controlling for the bonus-plan effect requires knowledge of the bounds of the plan. This research assumes that the lower and upper bounds of the plan are 10 and 20 percent of the firm’s net worth at the beginning of the year, respectively, and that the bonus is based on the pre-tax income (Healy, 1985; McNichols and Wilson, 1988; Bartov, 1993). Two dummy variables are required to translate the relationship into the bonus plan.

**H4:** For financially distressed firms, there are directional correlations between bonus compensation (Bonus1 & Bonus2) and the three pension rates of SFAS No.87.

Bonus1: Takes the value of one if the actual pre-tax income exceeds the lower bound and is zero otherwise.

Bonus2: Takes the value of one when the lower bound of the plan exceeds the actual pre-tax income and is zero otherwise.

### 2.4.3 Cash flow and funding status incentives for earnings management

Bowen et al. (1995) argued that stakeholders are likely to use reported accounting numbers to help assess a firm’s reputation. Therefore, the cash flow incentive predicts that managers choose earnings-increasing accounting choices to enhance its reputation. Following Healy and Palepu (1990), declining cash flows can be controlled as an indicator variable which is equal to one if the firm had two or more years of declining cash flows, or otherwise zero.

**H5:** For financially distressed firms, there are directional correlations between cash flows (CashFlow) and the three pension rates of SFAS No.87.

Using Blankley and Swanson’s (1995) regression model, which is consistent with prior studies by Francis and Reiter (1987), Thomas (1988), and Kwon (1994), they suggest that in the post-SFAS 87 environment, firms have selected pension rates in order to reduce cash funding. However, an association may also exist because the SFAS No. 87 footnote disclosures would influence perceptions of funding adequacy by employees and others.

For companies with pension plans possessing a Projected Benefit Obligation (hereafter, PBO) significantly greater than the fair value of the plan assets, there may be an incentive to choose a combination of a high discount rate, a high rate of return on plan assets and a low salary progression rate to improve their funding status. To determine whether pension rate assumptions are correlated with the funding status of a pension plan, the funding ratio assumes that managers in financially distressed companies are motivated to make the pension plan appear funded more abundantly by choosing a high discount rate, high expected rate of return on plan assets, or low salary progression rate. Therefore, to test the funding status, the funding ratio (FDratio) is defined, and is calculated by taking the plan liabilities minus the plan assets and dividing the result by the plan assets.

\[
FDratio = \frac{PBO - \text{Fair Value of Pension Assets}}{\text{Fair Value of Pension Assets}}
\]

**H6:** For financially distressed firms, there are directional correlations between the funding status (FDratio) and the three pension rates of SFAS No.87.
3. Research design

3.1 Diagram of conceptual model

In the conceptual model, the unexpected pension costs ($\Delta UPC$) is a function of the change in EPS ($\Delta EPS$) and the changes in three pension actuarial assumptions in the chosen study years. The changes in three pension actuarial assumptions are modeled as a function of their respective “expected” estimates, the changes in EPS ($\Delta EPS$), the bonus plan incentives ($Bonus_1$ and $Bonus_2$), the debt covenant incentives ($DEratio$), the cash flows incentives ($CashFlow$), and the funding status ($FDratio$).

With respect to the level around which unexpected earnings are smoothed, Watts and Zimmerman (1990) suggested that ideally abnormal accruals should be measured relative to what they would be without manipulation. In this study, the 30-year, treasury constant maturity bond rates ($BondR$) are used to capture the “expected” changes in the discount rate, the actual rate of return on plan assets ($ActR$) to capture the “expected” change in the rate of return on plan assets, and the moving average of inflation rate ($AvgIN$) to capture the “expected” change in the salary progression rate.

3.2 Proposed research estimation method

The joint earnings smoothing and pension actuarial incentives model utilizes a system consisting of four simultaneous equations for testing $H1-H6$. This system is necessary because a change in one equation may affect the entire system. Assuming that firms manage pension costs through three pension actuarial incentives, the trade-off (or joint relationships) between the pension-related rates is of interest. The simultaneous equation system provides a method for investigating these relationships. To address potential simultaneity, 3SLS is applied to all the equations of the model at the same time and simultaneously gives estimates of all the parameters. This method employs more information than the single equation techniques; it takes into account the whole structure of the model with all restrictions that this structure imposes on the values of the parameters. In addition, if the variables are determined simultaneously, then their earnings effects could be positively or negatively correlated. Additionally, because endogenous variables appear on both sides of the equations, the influence of an exogenous variable is both direct and indirect (Karagol, 2002).

Four simultaneous equations with expected signs:

\[ \Delta UPC = \alpha_0 + \alpha_1 \Delta EPS + \alpha_2 \Delta DR + \alpha_3 \Delta ERR + \alpha_4 \Delta SPR + \varepsilon_1 \]  
\begin{equation} \tag{E-1} \end{equation}

Expected sign: + + + -

\[ \Delta DR = \beta_0 + \beta_1 \Delta EPS + \beta_2 \Delta BondR + \beta_3 Bonus_1 + \beta_4 Bonus_2 + \beta_5 DEratio + \beta_6 CashFlow + \beta_7 FDratio + \varepsilon_2 \]  
\begin{equation} \tag{E-2} \end{equation}

Expected sign: + ? + - + + +

\[ \Delta ERR = \eta_0 + \eta_1 \Delta EPS + \eta_2 \Delta ActR + \eta_3 Bonus_1 + \eta_4 Bonus_2 + \eta_5 DEratio + \eta_6 CashFlow + \eta_7 FDratio + \varepsilon_3 \]  
\begin{equation} \tag{E-3} \end{equation}

Expected sign: + ? + - + + +

\[ \Delta SPR = \delta_0 + \delta_1 \Delta EPS + \delta_2 \Delta AvgIN + \delta_3 Bonus_1 + \delta_4 Bonus_2 + \delta_5 DEratio + \delta_6 CashFlow + \delta_7 FDratio + \varepsilon_4 \]  
\begin{equation} \tag{E-4} \end{equation}

Expected sign: + ? + - + + +

where:

Endogenous variables

$\Delta UPC$ = unexpected pension costs.
\[ \Delta DR = \text{Change in the discount rate.} \]
\[ \Delta ERR = \text{Change in the expected rate of return on plan assets.} \]
\[ \Delta SPR = \text{Change in the salary progression rate.} \]

**Exogenous variables**
\[ \Delta EPS = \text{Change in EPS to decide the direction of earnings smoothing.} \]
\[ \Delta BondR = \text{Change in the 30-year, treasury constant maturity bond rate.} \]
\[ \Delta ActR = \text{Change in the actual rate of return on plan assets.} \]
\[ \Delta AvgIN = \text{Change in the 5-year moving average of inflation rate.} \]
\[ Bonus1 = \text{Dummy variable equal to 1 if pre-tax income} > \text{the lower bound.} \]
\[ Bonus2 = \text{Dummy variable equal to 1 if the lower bound} > \text{pre-tax income.} \]
\[ DEratio = \text{Debt equity ratio.} \]
\[ CashFlow = \text{Equal to 1 if firm had} \geq 2 \text{ years of inclining cash flows.} \]
\[ FDratio = \text{Funding ratio.} \]

![Figure 1. The conceptual model.](image)

3SLS is used to estimate the parameters of Equations 1 to 4 (E1-E4) and therefore, all possible links between unexpected pension costs and three pension actuarial assumptions can be analyzed.
Third, many prior studies have explored various incentives for earnings management, but this research has attempted to minimize this by attempting to control only those that could be correlated with pension-related actuarial incentives. Other studies may take a broader view.

Finally, while the findings of this study indicate managers of finally distressed firms may have smoothed reported earnings by jointly changing the pension rates to cause a change in the corresponding pension costs and cash requirements, future research focusing on the effects of potential pension manipulation of financially distressed firms on the stock market, may provide some insight into the current degree of market efficiency.

References


