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

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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* (△*UPC*):

$$\triangle UPC = (Prior\ Year\ Pension\ Cost - Current\ Year\ Pension\ Cost)/\ Prior\ Year\ Pension\ Cost \tag{1}$$

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, △*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.

$$\triangle EPS = (Prior\ Year's\ EPS - Current\ Year\ EPS)\ /\ Absolute\ Value\ of\ Prior\ Year's\ EPS \tag{2}$$

If △*EPS* is positive and earnings decline, firms may then have chosen actuarial assumptions that would increase reported earnings by decreasing pension costs. Conversely, if △*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: For financially distressed firms, the unexpected change in pension costs (△UPC) decreases with a decrease in EPS (△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 (△*EPS*) is used as a proxy to capture the direction of smoothing for the individual discount rate (△*DR*), the expected rate of return on plan assets (△*ERR*), and the salary progression rate (△*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 (△*DR*) and the change in EPS (△*EPS*).

H2b: For financially distressed firms, there is a positive correlation between the unexpected change in the expected rate of return on plan assets (△*ERR*) and the change in EPS (△*EPS*).

H2c: For financially distressed firms, there is a negative correlation between the unexpected change in the salary progression rate (△SPR) and the change in EPS (△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 (3)

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.

$$FDratio = (PBO - Fair\ Value\ of\ Pension\ Assets) / Fair\ Value\ of\ Pension\ Assets \qquad (4)$$

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 ($\triangle UPC$) is a function of the change in EPS ($\triangle EPS$) 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 ($\triangle EPS$), the bonus plan incentives (*Bonus1* and *Bonus2*), 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:

$$\Delta UPC = \alpha_0 + \alpha_1 \Delta EPS + \alpha_2 \Delta DR + \alpha_3 \Delta ERR + \alpha_4 \Delta SPR + \varepsilon_1 \qquad \text{(E-1)}$$
Expected sign   +   +   +   -

$$\Delta DR = \beta_0 + \beta_1 \Delta EPS + \beta_2 \Delta BondR + \beta_3 Bonus1 + \beta_4 Bonus2 + \beta_5 DEratio + \beta_6 CashFlow + \beta_7 FDratio + \varepsilon_2$$
Expected sign   +   ?   +   -   +   +   +
$$\text{(E-2)}$$

$$\Delta ERR = \eta_0 + \eta_1 \Delta EPS + \eta_2 \Delta ActR + \eta_3 Bonus1 + \eta_4 Bonus2 + \eta_5 DEratio + \eta_6 CashFlow + \eta_7 FDratio + \varepsilon_3$$
Expected sign   +   ?   +   -   +   +   +
$$\text{(E-3)}$$

$$\Delta SPR = \delta_0 + \delta_1 \Delta EPS + \delta_2 \Delta AvgIN + \delta_3 Bonus1 + \delta_4 Bonus2 + \delta_5 DEratio + \delta_6 CashFlow + \delta_7 FDratio + \varepsilon_4$$
Expected sign   +   ?   +   -   +   +   +
$$\text{(E-4)}$$

where:
Endogenous variables
$\triangle UPC$ =   unexpected pension costs.

$\triangle DR$	=	Change in the discount rate.
$\triangle ERR$	=	Change in the expected rate of return on plan assets.
$\triangle SPR$	=	Change in the salary progression rate.

Exogenous variables

| $\triangle EPS$ | = | Change in EPS to decide the direction of earnings smoothing. |
$\triangle BondR$	=	Change in the 30-year, treasury constant maturity bond rate.
$\triangle ActR$	=	Change in the actual rate of return on plan assets.
$\triangle AvgIN$	=	Change in the 5-year moving average of inflation rate.
$Bonus1$	=	Dummy variable equal to 1 if pre-tax income $>$ the lower bound.
$Bonus2$	=	Dummy variable equal to 1 if the lower bound $>$ pre-tax income.
$DEratio$	=	Debt equity ratio.
$CashFlow$	=	Equal to 1 if firm had $\geqq$ 2 years of inclining cash flows.
$FDratio$	=	Funding ratio.
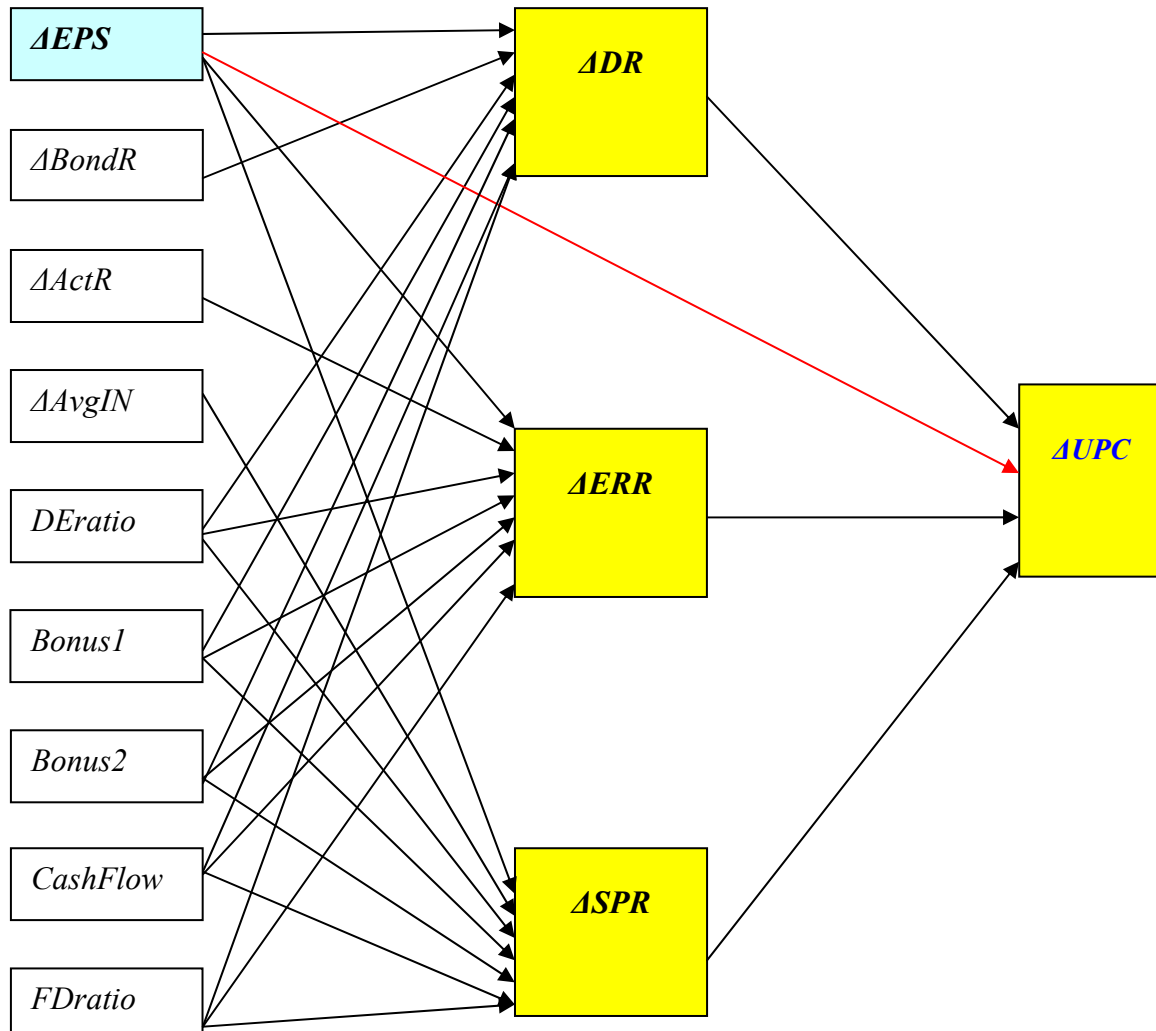
Figure 1. The conceptual model.

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.

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Variables in the system are categorized as endogenous and exogenous. The endogenous variables include unexpected pension costs ($\triangle UPC$), change in the discount rate ($\triangle DR$), change in the expected rate of return on plan assets ($\triangle ERR$), and change in the salary progression rate ($\triangle SPR$). The exogenous variables are the change in the earnings per share ($\triangle EPS$), change in the 30-year, treasury constant maturity bond rates ($\triangle BondR$), change in the actual rate of return on plan assets ($\triangle ActR$), change in the moving average rate of inflation ($\triangle AvgIN$), *Bonus1*, *Bonus2*, Debt-Equity ratio (*DEratio*), Cash Flows (*CashFlow*), and the funding ratio (*FDratio*).

E1 is used to test the simultaneous predictions of

(a) the earnings-smoothing hypothesis that consists of the change in earnings per share $\triangle EPS$ (that α_1 is positive), and

(b) the discount rate ($\triangle DR$), the expected rate of return on plan assets ($\triangle ERR$), and the salary progression rate ($\triangle SPR$) assumptions (that α_2 is positive, α_3 is positive, and α_4 is negative).

E2-E4 are used to test the simultaneous predictions of the three pension actuarial incentive hypotheses relative to their respective benchmarks,

(a) 30-year treasury constant maturity bond rate ($\triangle BondR$),

(b) actual rate of return on plan assets ($\triangle ActR$),

(c) moving average of inflation rate ($\triangle AvgIN$), and

(d) across a variety of incentives that consists of the debt covenant (*DEratio*), bonus plan(*Bonus1* & *Bonus2*), cash flow (*CashFlow*) and funding status (*FDratio*) incentives.

$\triangle EPS$ was introduced into four equations to capture the pooled sample firm's direction of earnings smoothing across the eight variables shown in Table 1.

Table 1. Hypothesized effects of EPS change ($\triangle EPS$) on three pension actuarial assumptions, bonus-plan, debt-covenant, cash flows, and funding status incentives.

	$\triangle EPS$ (+)	$\triangle EPS$ (-)
Discount rate ($\triangle DR$)	Increase	Decrease
Expected rate of return on plan assets ($\triangle ERR$)	Increase	Decrease
Salary progression rate ($\triangle SPR$)	Decrease	Increase
Bonus1 (*Bonus1*)	Increase	Decrease
Bonus2 (*Bonus2*)	Decrease	Increase
Debt covenants (*DEratio*)	Increase	Decrease
Cash flows (*CashFlow*)	Increase	Decrease
Funding status (*FDratio*)	Increase	Decrease

4. Empirical results

4.1 Sample selection and descriptive statistics

4.1.1 Sample selection

Most studies in positive accounting research examine samples of firms that include both healthy and financially distressed firms (Watts and Zimmerman, 1978; Healy, 1985; Skinner, 1993). These studies assume implicitly that earnings management incentives have the same effect on the accounting choices of financially distressed firms as those of financially healthy firms. Studies using samples partitioned according to the firm's financial condition have

emerged and suggest that different incentives affect accounting choices in financially distressed firms (DeAngelo *et al.*, 1994; Peliter-Rivest, 1999).

Following DeAngelo *et al.* (1994) and Lau (1987), this research examines financially distressed firms that survived bankruptcy rather than firms that filed for bankruptcy. In order to be selected in the sample, firms must be considered financially distressed, which involves satisfying the following requirements:

(a) Have at least three consecutive years of negative net income, or

(b) Exhibit negative pre-tax operating income and reduced cash dividends the year before the first loss year or during one of the three loss years.

However, these criteria do not apply to firms that do not pay dividends at all, firms with less than 100 employees, or firms that do not have a defined benefit pension plan. Aside from these exceptions, some other companies may also be excluded, including either highly regulated industries (such as public utilities), financial institutions (such as banks or insurance firms), or real estate investment trusts. The basis for their exclusion is that they face a number of complexities in their financial disclosures, which may reduce their comparability. The approach in this study is not to limit the sample to firms that subsequently went bankrupt but rather to focus on a broader concept of financial distress, as portrayed by a reduction in dividends, for which managers acknowledged their firms' financial difficulties.

As the provisions of SFAS No. 87 were made effective for all companies for fiscal years beginning after December 15, 1988, this study restricts itself to the fiscal years 1988-2002, prior to the implementation of the full effects of the Sarbarnes-Oxley Act (2002). Information regarding financial variables and funding level is obtained from footnotes to annual reports. COMPUSTAT began reporting actuarial assumptions in 1991; assumptions prior to 1991 (1988-1990) are taken from other databases such as Lexis/Nexis. The pension footnote data is obtained from the National Accounting Automated Research System (NAARS) on-line database.

To estimate the unexpected pension cost (UPC), a pooled cross-sectional sample of firm-year data, over a 15-year period (1988-2002) encompassing the SFAS No. 87 adoption, are collected and analyzed. The initial sample consisted of 86 firms that met the selection criteria. Public utilities, financial institutions (11 firms) and companies that did not provide complete data (27 firms) were excluded, leaving 48 firms (or 587 firm-year observations). The industry composition of the final sample is summarized in Table 2 below:

Table 2. Industry clustering of the sample (N = 48).

SIC code	Industry	No. of Firms
1000 to 1999	Mining and construction	1
2000 to 3999	Manufacturing	36
4000 to 4899	Transportation and communication	4
5000 to 5999	Sales	3
7000 to 9099	Services	4
Total		48

4.1.2 Descriptive statistics

Descriptive statistics for the final sample are presented in Table 3. The mean of the total assets is \$14,613.25 million, whereas the median of the total assets is \$1,779.61 million, indicating that the sample consists of large firms.

Table 3. Descriptive statistics for the sample of financially distressed firms
(N = 48) (in million of dollars).

	Min	Max	Median	Mean	SD
Total assets	0.1859	370,782.00	1,779.61	14,613.25	54,713.76
Net income	0.1046	3,579.00	-2.17	49.44	662.88
PBO	2.0685	92,243.00	408.45	4,460.34	15,972.15
Number of employees [g]	-0.0499	350.00	5.75	27.89	67.86

Note: [g] Number of employees is in thousands.

Figure 2 shows the average discount rates, the expected rates of return on plan assets, and the salary progression rates over 15 years. Some relationships are apparent from the graph. First, for all years, the mean expected rates of return on plan assets are higher than the mean discount rates, and the mean salary progression rates are much lower than the mean discount rates.

To assess the appropriateness of the discount rates chosen, the study has followed the methodology used by Blankley and Swanson (1995). The mean discount rates obtained from the sample were plotted in Figure 3 against yields on the three benchmark rates: the PBGC (Pension Benefit Guarantee Corporation, hereafter PBGC) rates, Moody's AAA corporate bond yield, and 30-year treasury constant maturity bond rates. PBGC rates are often criticized by actuaries and auditors as being too conservative, but Moody's AAA corporate bond is considered more aggressive (Blankley and Swanson, 1995). Therefore, it is reasonable to choose the discount rate that lies somewhere between these first two, the 30-year treasury constant maturity bond rate. Figures 4 to 6 demonstrate the three specific pension rate assumptions and benchmark comparisons.

This study uses the actual rates of return on plan assets and the moving average of inflation rates as benchmarks against which to measure the quality of the expected rates of return on plan assets and the salary progression rates, respectively (see Figures 5 and 6).

To briefly summarize several observations in Figures 3 to 6:

(a) The discount rates (*DR*) were generally higher than PBGC and the 30-year Treasury Constant Maturity Bond rates (*BondR*) over the period chosen in this study. After 1992, the discount rates (*DR*) were even higher than Moody's AAA corporate bond yield except in the years of 1995 and 2000. In general, firms tend to use the most aggressive discount rates.

(b) As Figure 5 indicates, for most years there is a significant difference between the expected and actual rate of return on plan assets (*ERR*). The *ERR* is relatively stable over time (at a 50th percentile median of 9% in each of the years 1988-2001), while the actual return is more volatile (ranging from 1.097% in 1990 to 15.7% in 1995), as would be expected. Firms overstating their expected return can easily justify the use of a higher expected return given the requirements of SFAS No. 87 and its emphasis to reduce the fluctuations in the rate of return on plan assets (Blankley and Swanson's (1995)). However, a trade-off exists between the reduction of variability and greater flexibility for managers in terms of earnings management.

(c) Firms tend to leave the salary progression rates (*SPR*) unchanged more often than would be expected if they were complying with the requirement of SFAS No. 87 that it reflects current economic conditions (Blankley and Swanson, 1995).

Panel A: Mean pension rates.

YEAR	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Discount Rate (DR)	8.688	8.472	8.608	8.359	8.189	7.405	8.069	7.424	7.609	7.276	6.894	7.547	7.358	7.127	6.642
Expected Rate of Return (ERR)	9.047	9.034	9.102	9.037	9.043	8.815	8.661	8.716	8.827	8.879	8.903	8.817	8.879	8.882	8.611
Salary Progression Rate (SPR)	5.633	5.763	5.689	5.582	5.300	4.745	4,745	4,608	4.609	4.483	4.398	4.455	4.385	4.348	3.987

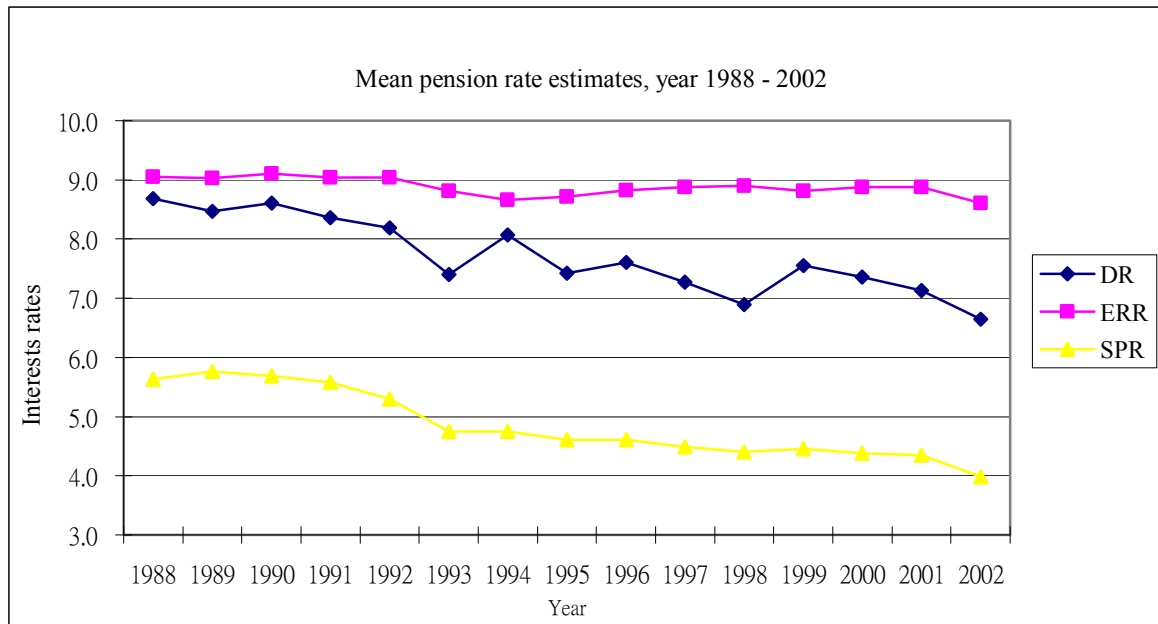Panel B: Chart of mean pension rate assumptions by year.

Figure 2. Mean pension rate estimates, year 1988 - 2002.

Panel A: Interest rates by year.

YEAR	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Discount Rate (DR)	8.688	8.472	8.608	8.359	8.189	7.405	8.069	7.424	7.609	7.276	6.894	7.547	7.358	7.127	6.642
Moody's AAA Corporate Bond	9.710	9.258	9.322	8.769	8.140	7.219	7.879	7.590	7.370	7.262	6.532	7.042	7.623	7.083	6.492
30-Year Treasury Rate	8.959	8.449	8.608	8.136	7.667	6.598	7.370	6.884	6.701	6.606	5.578	5.866	5.943	5.493	5.425
PBGC Rate	7.174	6.841	6.864	6.545	6.150	5.358	5.788	5.630	5.327	5.482	4.808	4.894	5.113	4.670	5.334

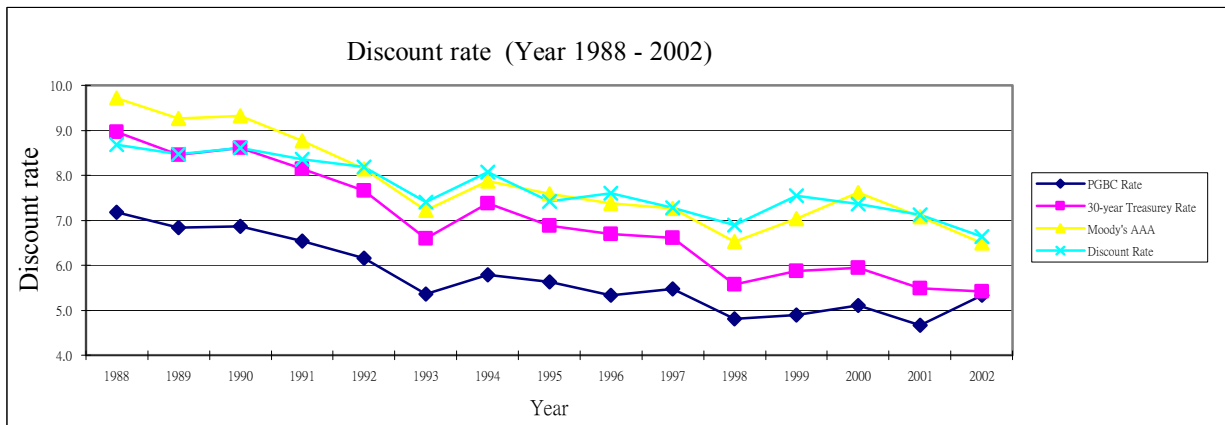Panel B: Chart of interest rates.

Figure 3. Discount rate and benchmark comparisons, year 1988 - 2002.

Panel A: Comparison of discount rates and 30-year treasury rates by year.

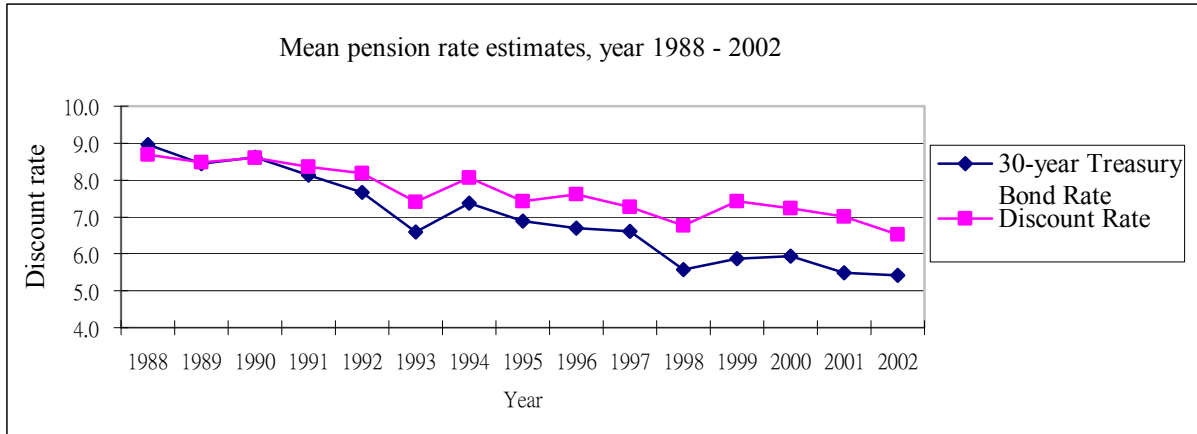| YEAR	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Discount Rate (DR)	8.688	8.472	8.608	8.359	8.189	7.405	8.069	7.424	7.609	7.276	6.894	7.547	7.358	7.127	6.642
30-year Treasury	8.959	8.449	8.608	8.136	7.667	6.598	7.370	6.884	6.701	6.606	5.578	5.866	5.943	5.493	5.425

Panel B: Chart of interest rates.

Figure 4. Comparison of discount rate and 30-year treasury constant maturity rate, year 1988 - 2002.

Panel A: Comparison of expected and actual rates of return on plan assets by year.

YEAR	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Expected Rate of Return (ERR)	9.047	9.034	9.102	9.037	9.043	8.815	8.661	8.716	8.827	8.879	8.903	8.817	8.879	8.882	8.611
Actual Return of Return (ARR)	8.383	13.480	1.097	13.890	8.597	10.821	1.331	15.700	11.153	14.334	7.733	7.959	8.521	8.832	10.747

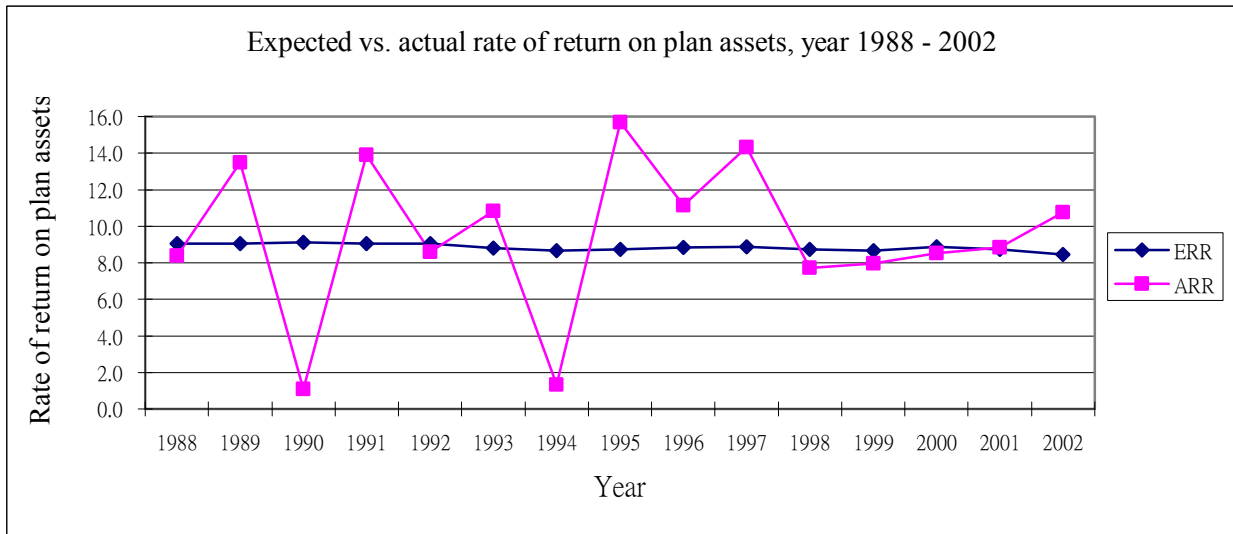Panel B: Chart of rates of return on plan assets.

Figure 5. Comparison of expected and actual rate of return on plan assets, year 1988 - 2002.

Panel A: Comparison of salary progression rate estimate and 5-year moving average of inflation rate by year.

YEAR	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Salary Progression Rate (SPR)	5.633	5.763	5.689	5.582	5.300	4.745	4,745	4,608	4.609	4.483	4.398	4.455	4.385	4.348	3.987
Moving Average Inflation Rate	3.328	3.500	3.606	3.974	4.442	4.316	4.092	3.648	3.132	2.868	2.730	2.448	2.364	2.478	2.458

Panel B: Chart of salary progression rate estimate and 5-year moving average of inflation rate.
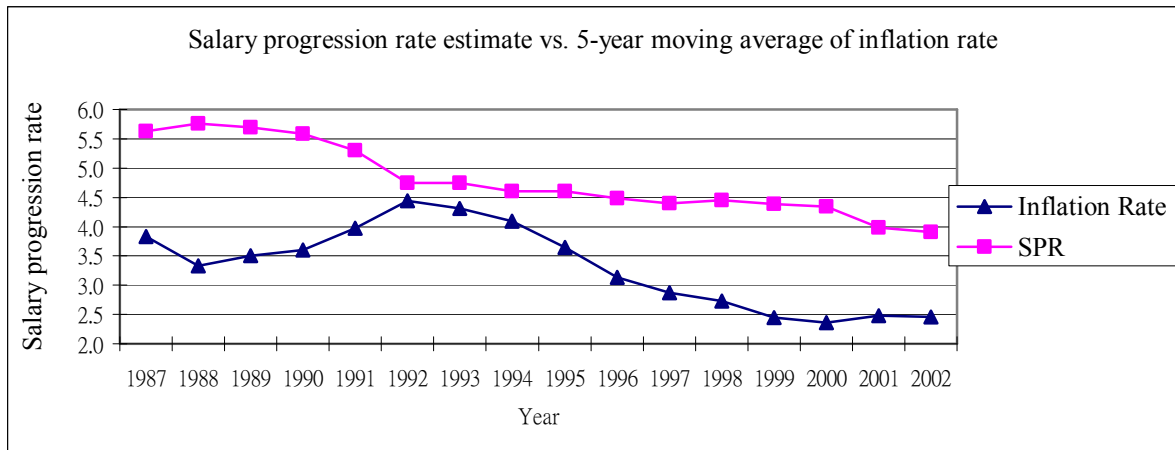

Figure 6. Comparison of salary progression rate estimate and 5-year moving average of inflation rate, year 1988 - 2002.

Table 4 reports the frequency and magnitude of rate changes. For all three rates, changes in 1993 are more frequent and much larger than found by Blankley and Swanson (1995) who used figures from earlier years.

Table 4. Descriptive data regarding the distribution of pension rates, year 1988 - 2002.

Discount Rate (DR)	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
10th percentile	8.00	7.50	7.70	7.575	7.00	6.50	7.00	7.00	7.104	7.00	6.50	6.79	6.75	6.423	6.25
25th percentile	8.00	8.00	8.00	8.00	8.00	7.00	8.00	7.025	7.50	7.00	6.75	7.50	7.148	6.925	6.50
50th percentile (median)	8.825	8.50	8.50	8.40	8.00	7.50	8.25	7.50	7.50	7.25	6.80	7.50	7.50	7.25	6.75
75th percentile	9.00	9.00	9.00	9.00	8.55	7.75	8.50	7.75	7.75	7.50	7.00	8.00	7.65	7.50	6.75
90th percentile	10.00	9.50	9.50	9.00	9.00	8.075	8.75	8.00	8.00	7.85	7.50	8.00	7.975	7.50	7.00

ERR	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
10th percentile	8.00	7.70	8.00	7.56	7.85	7.75	7.00	7.68	7.30	7.72	7.705	7.65	7.75	7.795	7.70
25th percentile	8.05	8.50	8.50	8.50	8.475	8.00	8.00	8.008	8.50	8.50	8.50	8.50	8.25	8.425	8.20
50th percentile (median)	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	8.80
75th percentile	10.00	9.50	9.50	9.60	9.55	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.00
90th percentile	10.24	10.06	10.80	11.00	10.50	10.00	10.00	10.00	10.00	9.85	9.93	9.60	10.00	10.00	9.50

SPR	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
10th percentile	4.93	5.00	4.99	4.70	4.35	4.00	4,00	3.80	3.175	3.00	3.025	3.00	3.00	4.257	3.05
25th percentile	5.00	5.00	5.00	5.00	5.00	4.50	4.50	4.00	4.00	4.40	4.00	4.00	4.00	2.478	4.00
50th percentile (median)	6.00	600	600	5.80	5.25	5.00	5.00	4.75	4.95	4.75	4.50	4.50	4.50	2.478	4.50
75th percentile	6.05	600	6.025	6.00	6.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	2.478	5.00
90th percentile	6.78	6.95	6.50	6.50	6.03	5.50	5.50	5.50	5.50	5.14	5.00	5.45	2.364	5.525	5.00

4.2 Tests for the earnings-smoothing hypothesis

The first research question addressed whether financially distressed firms manipulate their pension costs as an earnings smoothing technique. The earnings-smoothing hypothesis implies that firms that exhibit positive earnings changes (EPS > 0) should report higher earnings by manipulating the pension actuarial assumptions to achieve lower pension costs.

As can be seen from Table 5, EPS is significant in two of the four equations: the unexpected pension costs equation and the expected rate of return equation. The findings presented in Table 5 are consistent with this prediction. The statistical tests support that pension costs are used to smooth earnings ($p = 0.0413$) in the unexpected pension costs equation.

4.3 Tests for the hypotheses of pension rate assumptions

The second research question asked which actuarial assumptions are used to manage earnings in financially distressed firms by examining three pension actuarial incentives: the discount rate, the expected rate of return on plan assets, and the salary progression rate.

4.3.1 Discount rate (△DR)

As the discount rate increases, the pension costs increase. In the testing of the discount rate hypothesis, $\triangle EPS$ has a mixed effect on the discount rate. As can be seen from the structural form of the parameters, $\triangle EPS$ is positive at 0.075249 but not significant with a p-value of 0.0843. However, as can be seen from Table 5, the direct effect of a change in the discount rate on pension costs is positive at 0.651752 and significant with a p-value of 0.0082. Thus, if the discount rate is changed independently of the other endogenous variables, the pension costs will also change.

4.3.2 Expected rate of return on plan assets (△ERR)

The expected rate of return on plan assets is tested to determine whether it is used to change pension costs, and in turn used to smooth earnings. As can be seen from Table 5, the hypothesis is supported. The structural form of the parameter estimate is positive and significant (at a value of 0.152773 and a p-value of 0.0007). However, the direct effect of a change in the rate of return on plan assets on pension cost is positive but not significant (at a value of 0.062842, with a p-value of 0.7939). Thus, if the rate of return on plan assets is changed independently of the other variables, the change in the rate of return is not significant in changing the pension costs.

4.3.3 Salary progression rate (△SPR)

The salary progression rate should reflect merit, productivity, promotion and inflation increases. The salary progression rate hypothesis is not supported in the structural form of the parameters. The interpretation of $\triangle EPS$ indicates there is no significant relationship between the changes in the salary progression rate and $\triangle EPS$. From the structural form of the parameters, $\triangle EPS$ is negative at -0.019044 and not significant.

4.3.4 The simultaneity of the equations

In examining the simultaneity of the equations, the effect of the discount rate, the expected rate of return on plan assets, and salary progression rate are straightforward: a higher discount rate and expected rate of return on plan assets or a lower salary progression rate would reduce pension costs. Since the salary progression rate has an opposite effect to the discount rate and the rate of return on plan assets, managers may use the two of three pension rates together to manipulate pension costs, and/or the salary progression rate to offset each other and stabilize pension costs.

Table 5. Results from simultaneous equations.
Hypotheses for 587 financially distressed firm-year observations during 1988-2002
Dependent variable.

Independent Variable	$\triangle UPC$			$\triangle DR$			$\triangle ERR$			$\triangle SPR$		
	Coeff.	t-value	t-prob.	Coeff.	t-value	t-prob.	Coeff.	t-value	t-prob.	Coeff.	t-value	t-prob.
$\triangle DR$	0.651752	2.653	0.0082				0.143584	3.334	0.0009	-0.121857	-2.778	0.0056
$\triangle ERR$	0.062842	0.261	0.7939	0.123425	3.108	0.0020				-0.040286	-0.947	0.3440
$\triangle SPR$	-0.606558	-1.929	0.0542	-0.108572	-2.754	0.0061	-0.033037	-0.803	0.4221			
Intercept		0.825	0.4099		-2.171	0.0303		2.295	0.0221		1.170	0.2425
$\triangle EPS$	0.127169	2.045	0.0413	0.075249	1.729	0.0843	0.152773	3.413	0.0007	-0.019044	-0.415	0.6786
$\triangle BondR$				-0.001573	-0.041	0.9672						
$\triangle ActR$							0.111355	2.794	0.0054			
$\triangle AvgIN$										-0.015845	-0.388	0.6983
Bonus1				-0.007601	-0.197	0.8438	0.003827	0.096	0.9238	-0.012510	-0.308	0.7580
Bonus2				-0.040257	-0.941	0.347	-0.0922	-2.086	0.0374	-0.134318	-3.005	0.0028
DEratio				-0.048042	-1.233	0.2182	-0.03255	-0.805	0.4210	0.049216	1.200	0.2306
CashFlow				0.062355	1.531	0.1262	-0.05611	-1.326	0.1855	-0.01685	-0.393	0.6948
Funding				0.270915	6.464	0.0000	0.114417	2.555	0.0109	-0.122247	-2.691	0.0073

System Weighted R^2 = 0.1565

Notes: * The structural form of four Simultaneous equations:

$$\Delta UPC = \alpha_0 + \alpha_1 \Delta EPS + \alpha_2 \Delta DR + \alpha_3 \Delta ERR + \alpha_4 \Delta SPR + \varepsilon_1$$

$$\Delta DR = \beta_0 + \beta_1 \Delta EPS + \beta_2 \Delta BondR + \beta_3 Bonus1 + \beta_4 Bonus2 + \beta_5 DEratio + \beta_6 CashFlow + \beta_7 FDratio + \varepsilon_2$$

$$\Delta ERR = \eta_0 + \eta_1 \Delta EPS + \eta_2 \Delta ActR + \eta_3 Bonus1 + \eta_4 Bonus2 + \eta_5 DEratio + \eta_6 CashFlow + \eta_7 FDratio + \varepsilon_3$$

$$\Delta SPR = \delta_0 + \delta_1 \Delta EPS + \delta_2 \Delta AvgIN + \delta_3 Bonus1 + \delta_4 Bonus2 + \delta_5 DEratio + \delta_6 CashFlow + \delta_7 FDratio + \varepsilon_4$$

In interpreting the structural form of the discount rate equation, some direct effects can be observed. An independent change in the rate of return on plan assets results in a positive and significant effect on the change in the discount rate. This indicates that as the discount rate is increased, managers are also increasing the rate of return on plan assets. Additionally, managers also decrease the change in salary progression rate as the discount rate is increased. However, the effect in the change in $\triangle EPS$ is not significant.

When examining the structural form of the expected rate of return on plan assets equation, using either the direct effect of a change in the discount rate or the salary progression rate on the change in the rate of return on plan assets, results in a significant effect in the change in $\triangle EPS$. The results indicate that when the discount rate is increased, managers are also increasing the expected rate of return on plan assets and offsetting the salary progression rate to magnify the effect of pension costs in an attempt to smooth earnings.

From the above analysis, it appears that isolated changes in actuarial assumptions are not made. A significant relationship has been found supporting the concept that managers of distressed firms will manipulate more than one actuarial assumption to achieve their desired goals of smoothing pension costs.

4.4 Earnings management across a variety of incentives

4.4.1 Debt covenant incentives (DEratio)

It is costly to violate debt covenants. Therefore, managers have an incentive to reduce the likelihood of technical default on debt covenants by increasing earnings when they are close to violating their debt contracts. On the basis of this assumption, this study has assumed that the larger a firm's debt-equity ratio, the more likely its managers are to increase earnings by manipulating the three pension actuarial assumptions. As can be seen from Table 5, the debt-equity ratio is not significant in all equations and the results do not support the debt covenant hypothesis.

4.4.2 Bonus plan incentives (bonus1 and bonus2)

Bonus1 represents managers in a position to receive a bonus. Managers will maximize their bonus at the point where reported earnings are equal to the upper bound. *Bonus2* represents managers not in a position to receive a bonus based on accounting net income. This variable controls for situations in which actual pre-tax earnings are below the lower bound of the bonus plan.

Bonus1 should have a positive relationship with the discount rate and the rate of return on plan assets to support the bonus plan hypothesis, but a negative relationship with the salary progression rate.

In examining the direct effects of the *Bonus1* variable, *Bonus1* is negative and not significant in the discount rate equation (-0.007601, $p = 0.8438$), positive and not significant in the rate of return on plan assets equation (0.003827, $p = 0.9238$) and negative and not significant in the salary progression rate equation (-0.012510, $p = 0.7580$). This fails to support the bonus hypothesis. But, the signs of the parameter estimates on both the rate of return on plan assets and the salary progression rate are as hypothesized.

In the hypothesized direction, *Bonus2* should have a negative relationship with the discount rate and the rate of return on plan assets, and a positive relationship with the salary progression rate.

Experimentally, *Bonus2* is negative and not significant in the discount rate equation (-0.040257, $p = 0.3470$), negative and significant in the rate of return on plan assets equation (-0.092204, $p = 0.0374$) and negative and significant in the salary progression rate equation (-0.134318, $p = 0.0028$).

In interpreting the direct effects, if the *Bonus2* variable is negative, the salary progression rate is decreasing. Thus, as the pre-tax earnings move below the minimum bonus range, managers still tend to maximize earnings with the salary progression rate. This does not support the bonus hypothesis. The signs of the parameter estimates of both the discount rate and the rate of return on plan assets are, however, as hypothesized.

4.4.3 Cash flows incentives (*CashFlow*) and *funding status incentives* (*FDratio*)

In the Healy and Palepu (1990) model, declining cash flows indicate that a firm will change their actuarial assumptions. Thus, firms with a declining cash flow position will take measures to reduce the required contribution.

In the hypothesized direction, *CashFlow* should have a positive relationship with the discount rate and the rate of return on plan assets, and a negative relationship with the salary progression rate. However, as it can be seen from Table 5, none of the three pension incentives are supported.

Higher discount rates reduce pension obligations, enhance the funding status of the plan, and reduce lump-sum payments. Thus, firms with large pension liabilities have incentives to decrease the reported pension liabilities by increasing the discount rate, the expected rate of return on plan assets, and/or decreasing the salary progression rate. Therefore, a positive relationship between funding ratios and the discount rate and the rate of return on plan assets are hypothesized. Similarly, a negative relationship between the funding ratio and the salary progression rate is expected in this study.

The hypothesized funding ratio (*FDratio*) variable is significant in all of the three pension assumptions. The results indicate that companies with pension plans that are more fully funded have higher discount rates, higher expected rate of return on plan assets, and a lower salary progression rate than companies with less amply funded plans.

5. Implications and limitations

5.1 Implications

The findings correspond to conclusions made by Healy and Wahlen (1999) who suggested that the contributions of future research on earnings management are as follows:

> *"Future contributions are less likely to come from …... Instead, I believe that contributions will come from documenting its extent and magnitude for specific accruals, from reconciling conflicting findings on the effect of earnings management on stock prices and resource allocation in the economy, and from identifying factors that limit earnings management."*

First, this study exceeds some limitations of prior research by highlighting the need for joint estimation to detect earnings management. To examine whether managers manipulate earnings, a model of the potential management of the three pension actuarial rates in the absence of earnings management is developed. This research begins with linear equations consistent with prior work and then extends this research in a unique manner by demonstrating the potential interaction between these equations.

Second, knowing that financially distressed companies may take advantage of accounting incentives to manage earnings, this research investigates possible pension actuarial incentives based on three actuarial assumptions; the discount rate, the expected rate of return on plan assets, and the salary progression rate, in the presence of the other related incentives found in the company's bonus plans, debt covenants, cash flows, and funding status.

Finally, in the aggregate model solved using 3SLS, two common explanations are found for earnings manipulation: the dependence of three pension-related actuarial incentives, and the independence of four earnings smoothing incentives. The interdependence of three of the

seven modelled choices is important, namely, the discount rate, the expected rate of return on plan assets, and the salary progression rate. All three behave as if they can be used to manipulate pension costs, and discretion in each of these choices depends on the levels of the other two. In contrast, the remaining four earnings management incentives, namely, the bonus plan, debt covenant, cash flow, and funding status incentives, appear to be determined independently from each other and from the three pension rates.

The findings on the first research question, whether pension costs are used to manage earnings, are consistent with Bartov (1993) in that managers can recognize accounting income to smooth inter-temporal earnings changes and with Ali and Kumar (1993) who show greater influence of earnings management incentives on reported pension costs under SFAS No. 87 than Accounting Principles Board No.8 (APB No. 8) because of the opportunities in distressed companies to avoid violating debt covenant and to increase managers' compensation.

The findings on the first research question, that is, whether pension costs are used to manage earnings, are consistent with Bartov (1993) in the respect that managers can recognize accounting income to smooth inter-temporal earnings changes; and with Ali and Kumar (1993) who show greater influence of earnings management incentives on reported pension costs under SFAS No. 87 than Accounting Principles Board No.8 (APB No. 8). This difference arises because of the opportunities that exist in distressed companies to avoid violating debt covenant and to increase managers' compensation.

The second research question asked which actuarial assumptions are used to achieve these pension costs; it appears that the three pension assumptions are not being manipulated independently of each other. Managers may use the discount rate and the rate of return on plans assets together to manage the pension costs, and the salary progression rate is used, perhaps, secondarily, to offset the total pension costs.

The funding status plays an important role in changing these three pension actuarial assumptions. Additionally, by extending the one-stage investigation by Blankley and Swanson (1995), which involved investigation of the reliability in the three pension estimates required under SFAS No. 87 from 1993 to 2002, it is discovered that these three assumptions are also related to funding status. Therefore, this provides another incentive for companies with scarce cash reserves to reduce pension costs and keep in line with pension contributions.

In summary, financially distressed firms jointly determine at least two of the three pension actuarial assumptions and use a multitude of independent accounting choices to manage earnings.

5.2 Limitations

This study is subject to a number of limitations. First, previous studies have used either one of two approaches, the first being a "portfolio" approach by examining a proxy for the sum of all accruals' discretionary components to test for earnings management. Alternatively, some previous research adopted a "representative" approach, examining a proxy for a single accrual's discretionary component. This study uses the latter for a period prior to the effects of the Sarbanes-Oxley Act which because of its many requirements may limit the degree and scope of financial reporting flexibility.

Second, although financially distressed companies have relatively more incentives to portray better earnings than healthy companies, accounting choices do not have the same effect for both (Murphy and Zimmerman, 1993; DeAngelo et al., 1994; Peltier-Rivest, 1999). Future research could focus on financially prosperous companies, extending the work of Peltier-Rivest (1999) which involves a comprehensive analysis of prior studies according to the firms' financial condition.

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

Aharony, J., Lin, C.J., Loeb, M.P. (1993) Initial public offerings, accounting choices, and earnings management. Contemporary Accounting Research, 10(1), 61-81.

Ali, A., Kumar, K.R. (1993) Earnings management under pension accounting standards: SFAS 87 versus APB 8. Journal of Accounting, Auditing and Finance, 8 (4), 427-446.

Alster, N. (1993) Dark lining to a silver cloud. Forbes, 152(11), 137-138.

Barnea, A., Ronen, J., Sadan, S. (1975) The implementation of accounting objectives: An application to extraordinary items. The Accounting Review, 50(1), 58-68.

Bartov, E. (1993) The timing of asset sales and earnings manipulation. The Accounting Review, 68(4), 840-855.

Blankley, A.I., Swanson, E.P. (1995) A longitudinal study of SFAS 87 pension rate assumptions. The Accounting Horizons, 9(4), 1-21.

Bowen, R.M., DuCharme, L., Shores, D. (1995) Stakeholders' implicit claims and accounting method choice. Journal of Accounting and Economics, 20(3), 255-295.

Bryan-Low, C. (2003) Gloom lifting for pension plans. Wall Street Journal, N.Y. (Aug.15), C1.

Burgstahler, D.C., Dichev, I.D. (1997) Earnings management to avoid earnings decreases and losses. Journal of Accounting and Economics, 24 (1), 99-126.

Curtis, N. (1989) Transaction to new accounting rules: The case of FAS 87. Accounting Horizons, 3(4), 40-48.

DeAngelo, H., DeAngelo, L., Skinner, D.J. (1994) Accounting choice in troubled companies. Journal of Accounting and Economics, 17(1-2), 113-143.

DeAngelo, L.E. (1986) Accounting numbers as market valuation substitutes: A study of management buyouts of public stockholders. The Accounting Review, 61(3), 400-420.

DeAngelo, L.E. (1988) Managerial competition, information costs, and corporate governance: The use of accounting performance measure in proxy contests. Journal of Accounting and Economics, 63(1), 3-36.

Dechow, P.M., Sloan, R.G., Sweeney, A.P. (1995) Detecting earnings management. The Accounting Review, 70(2), 193-225.

DeFond, M.L., Jiambalvo, J. (1994) Debt covenant effects and manipulation of accruals. Journal of Accounting and Economics, 17(1-2), 145-176.

Francis, J.R., Reiter, S.A. (1987) Determinants of corporate pension funding strategy. Journal of Accounting and Economics, 9(1), 35-59.

Healy, P.M. (1985) The effect of bonus schemes on accounting decisions. Journal of Accounting and Economics, 7(1-3), 85-107.

Healy P. M., Palepu, K.G. (1990) Earnings and risk changes surrounding primary stock offers. Journal of Accounting Research, 28(1), 25-48.

Healy, P.M., Wahlen, J.M. (1999) A review of the earnings management literature and its implications for standard setting. Accounting Horizons, 7(1-3), 85-107.

Herdman, R. K., Neary, R.D. (1990) What are America's top companies doing about pension? Financial Executive, 6(1), 10-13.

Imhoff, E. A. Jr. (1981) Income smoothing: An analysis of critical issues. Quarterly Review of Economics and Business, 21(3), 23-42.

Jones, J.J. (1991) Earnings management during import relief investigations. Journal of Accounting Research, 29(2), 193-228.

Karagol, E. (2002) External debt and economic growth relationship using the simultaneous equations. METU VI. International Economics Research Conference, 11-14th September 2002, Ankara.

Kwon, S.K. (1994) Economic determinants of the assumed interest rate in pension accounting. Advances in Accounting, 12(1), 67-86.

Lau, A.H.L. (1987) A five-state financial distress prediction model. Journal of Accounting Research, 25(1), 127-138.

McKinnon, J.D. (2003) Bush to push plan easing pension-fund burdens; move could be a boon for some big companies, help stimulate economy. Wall Street Journal, New York, N.Y. (Jul. 8), A2.

McNichols, M., Wilson, P.G. DeAngelo, L. (1988) Evidence of earnings management from the provisions for bad debts. Journal of Accounting Research, 26(1), 1-40.

Morgenson, G. (2004) Pennies that aren't from heaven. New York Times, (Nov. 7), 7-8.

Moses, D.O. (1987) Income smoothing and incentives: Empirical tests using accounting changes. The Accounting Review, 62(2), 358-377.

Murphy, K.J., Zimmerman, J.L. (1993) Financial performance surrounding CEO turnover. Journal of Accounting and Economics, 16(1-3), 273-315.

Norton, C. (1989) Transition to new accounting rules: The case of FAS 87. Accounting Horizons, 3(4), 40-48.

Peltier-Rivest, D. (1999) The determinants of accounting choices in troubled companies. Quarterly Journal of Business and Economics, 38(4), 28-44.

Ronen, J., Sadan, S. (1981) Smoothing Income Number: Objective, Means, and Implications. Reading. Addison-Wesley Publishing Co., Mass.

Schipper, K. (1989) Commentary on earnings management. Accounting Horizons, 3(4), 91-102.

Senteney, D.L., Strawser, J.R. (1990) An investigation of the association between financial statement effects and management's early adoption of SFAS No. 87. Review of Business and Economic Research, 25(12), 12-22.

Skinner, D.J. (1993) The investment opportunity set and accounting procedure choice. Journal of Accounting and Economics, 16(4), 407-445.

Subramanyam, K.R (1996) The pricing of discretionary accruals. Journal of Accounting and Economics, 22(1-3), 250-282.

Sweeney, A.P. (1994) Debt covenant violations and managers' responses. Journal of Accounting and Economics, 17(3), 281-308.

Thomas, J.K. (1988) Corporate taxes and defined benefit pension plans. Journal of Accounting and Economics, 10(3), 199-237.

Watts, R.L., Zimmerman, J.L. (1986) Positive accounting theory. Prentice-Hall Inc., Englewood Cliffs, New Jersey.

Watts, R.L., Zimmerman, J.L. (1990) Positive accounting theory: A ten-year perspective. The Accounting Review, 65(1), 131-156.

Weishar, J. K. (1997) A cross-sectional evaluation of the ability of authoritative standards to influence the use of defined benefit pension plan actuarial assumptions as an income smoothing technique. Ph.D. Dissertation. University of Arkansas.

White, G.E. (1970) Discretionary accounting decisions and income normalization. Journal of Accounting Research, 8(2), 260-173.

Winklevoss, H.E. (1993) Pension Mathematics with Numerical Illustrations (2nd Edition). University of Pennsylvania Press, Philadelphia, Pennsylvania.

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