How Does the Market Value Expected Pension Asset Returns?

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Abstract

Statement of Financial Accounting Standards No. 87 – Employers' Accounting for Pensions (SFAS No. 87) and *Statement of Financial Accounting Standards No. 106 – Employers' Accounting for Postretirement Benefits other than Pensions* (SFAS No. 106) allow firms to compute the expected return on plan assets by multiplying rate of return assumptions by fair values or smoothed fair values (moving averages of fair values). In a market with rapid price changes, the smoothed fair value can be considerably different than the fair value. For example, during the strong bull market of the late 1990s, fair values could exceed smoothed fair values by more than 20 percent. Although several articles in the financial press have questioned rate of return assumptions, few articles acknowledge that firms also have discretion in choosing the asset base for the expected return calculation. This study examines the effect of using smoothed fair values instead of fair values and whether the market adjusts for these differences. We find that approximately half of our sample firms use some form of smoothed fair value in their expected return calculations. Further, we find that the market values pension and PRB expense to the same extent as non-retirement plan earnings and does not appear to adjust for firms using smoothed fair values instead of fair values or different rate of return assumptions.

Key Words: Disclosure; Valuation; Pensions and Postretirement Benefits.
JEL classification: M41; G14; J32.

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1. Introduction

Recent articles in the business press suggest that managers inflate the assumptions regarding the expected rates of return on pension assets (e.g., Buffett 2002). However, most commentators ignore that the rate has to be multiplied by a base, which may or may not reflect present market values. *Statement of Financial Accounting Standards No. 87 – Employers' Accounting for Pensions* (SFAS No. 87) and *Statement of Financial Accounting Standards No. 106 – Employers' Accounting for Postretirement Benefits other than Pensions* (SFAS No. 106) allow firms to compute expected return on plan assets by multiplying an assumed rate of return by the *market-related value* of plan assets, which can be the fair value (hereafter, referred to as FV) of plan assets or a moving average of fair values (hereafter, referred to as 'smoothed fair value' or SFV).[1] This creates the potential for differences across firms in the method used to calculate market-related values, which can result in cross-sectional differences in the effects of expected return on reported net income. The efficient markets hypothesis would generally suggest that markets adjust for differing accounting methods (see Beaver and Dukes 1972). However, other academic research suggests that pension or other postretirement benefit information may not be fully valued by the market (see Landsman and Ohlson 1990, Barth et al. 1992, and Amir and Gordon 1996). The purpose of this study is to examine the magnitude of this issue and evaluate whether the market adjusts for differences in the methods firms use to calculate expected returns.

One of the difficulties in studying market-related values is that firms are not required to disclose the method used to calculate market-related value amounts. Our study uses information disclosed in connection with *Statement of Financial Accounting Standards No. 132: Employers' Disclosure about Pensions and Other Postretirement Benefits* (SFAS No. 132) to estimate the

[1] The market-related value calculations of SFAS No. 87 are discussed in detail in section 2.1.

market-related value used by firms to compute expected returns. In 1998, SFAS No. 132 superseded the disclosure provisions of SFAS Nos. 87 and 106. The main purpose of SFAS No. 132 is to standardize and expand disclosures and to that end, it requires disclosure of expected return and a schedule reconciling the beginning and ending balances for both benefit obligations and plan assets. Prior to SFAS No. 132, this information was not required in pension and other post-retirement benefit plan footnote disclosures, making it impossible in most cases to estimate the market-related value of plan assets and compare it to fair value. With the availability of SFAS No. 132 disclosures, we now can estimate market-related values by dividing the expected return by the expected rate of return (since expected return is defined as the product of expected rate of return and market-related value of plan assets). In addition, the disclosure of unusual events such as divestitures and curtailments in the reconciliation of beginning and ending plan assets allows us to evaluate whether significant events distort the normal relation between fair value and market-related value. Thus, the adoption of SFAS No. 132 creates an opportunity to accurately estimate market-related values and to investigate cross-sectional differences in the market-related values used by firms to calculate expected returns on plan assets.

Investigating the usefulness of the recently mandated SFAS No. 132 disclosures is important in its own right in view of recent concerns regarding the volume and quality of financial statement disclosures and calls to eliminate or improve less relevant disclosures (AICPA 1994; FASB 1995). Additionally, research evidence regarding the value relevance of SFAS No. 132 disclosures in particular is important since the FASB recently issued an Exposure Draft (ED) titled, *Employers' Disclosures about Pension and Other Postretirement Benefits – an amendment of FASB Statements No. 87, 88, and 106 and a replacement of FASB Statement No. 132*. In it, the Board suggests that one objective of the ED is to improve the content and

organization of annual disclosures about defined benefit pension plans (FASB 2003, 1). Consequently, the ED calls for considerable information about firms' rate of return assumptions while proposing to eliminate the reconciliation of beginning and ending pension plan assets and obligations. Elimination of this information could reduce investors' ability to estimate and understand the effects of different market-related value methods on pension expense and net income.

We study this issue by examining a sample of firms with the largest pension and other post-retirement obligation amounts based on 1997 financial statement disclosures. Although the requirements of SFAS No. 132 apply to all firms with defined benefit pension plans, this paper focuses on the firms with the largest pension obligations. Hand, Landsman and Monahan (1997) find that the value-relevance of pension disclosures increases with the disclosures' magnitude and the size of the firm. Hand et al. (1997) argue that their result is "consistent with the simple economic argument that when the net benefits to both key producers and consumers of accounting disclosures (firms and investors) are high, pension disclosures are effective, but when they are low, they are ineffective." Therefore, by investigating a sample of firms with the largest pension obligations we are able to strengthen the power of our tests.

We analyze data for the years 1998 – 2001. These years are the first years during which SFAS No. 132 data are available. In addition, these years correspond to one of the largest stock market booms and subsequent busts in history. Given that the two methods for calculating market-related values result in substantial differences only when the fair values of plan assets change significantly over a short period of time, the 1998 - 2001 time period provides a unique opportunity for detecting any statistical associations between stock prices and the earnings effects of using these different methods..

We estimate both fair values and smoothed fair values on a firm-year basis. We find that over half of our sample firms appear to use some form of smoothed fair value in their expected return calculations. When we regress firm stock prices on variables that capture the differential earnings effects of using these two methods, we find that the market does not appear to adjust for firms using smoothed fair values instead of fair values. We also find evidence that the market generally values pension and PRB expense to the same extent as non-retirement plan earnings. Finally, our evidence also suggests that the market does not appear to adjust for different rate of return assumptions or adjust its assessment of future expected returns for actual investment experience. Collectively, the results indicate that the market ignores cross-sectional differences in the assumptions underlying expected returns despite the additional disclosures provided as a result of the issuance of SFAS No. 132.

The remainder of the paper is organized as follows. Section 2 provides background and reviews related prior research. Section 3 develops the theory and describes the research design. Section 4 reports the sample selection procedures and empirical results. Section 5 summarizes the study and its implications for practice and research.

2. Background and prior research

2.1 Pension and other postretirement benefit accounting

In 1985, the FASB passed SFAS No. 87 to require accrual accounting for defined benefit pension plans. The statement requires pension expense to be measured as service cost, plus interest cost on the projected benefit obligation, less actual return on plan assets, plus or minus amortization and deferral of items related to actuarial gains and losses, prior service costs, and transition assets and liabilities. The difference between the actual return on plan assets and

expected return on plan assets is deferred, which results in pension expense reflecting a calculated value of expected return.

SFAS No. 87 (par. 30) requires the expected return to be calculated by multiplying the market-related value of plan assets by an assumed long-term expected rate of return. In establishing the rate of return, firms should consider "the returns being earned by the plan assets in the fund and the rates of return expected to be available for reinvestment" (par. 45). The market-related value can be either the fair value of plan assets or a value that recognizes changes in market value over a period not to exceed five years (par. 30). Appendix B, Illustration 4 of SFAS No. 87 presents a method where the ending market-related value is computed by adding the expected return and 20% of the difference between the actual and expected returns for each of the last five years. Whether a firm uses the fair value of plan assets or the smoothed fair value, the expected return should consider the timing of contributions and benefit payments (SFAS No. 87 Implementation Guide, par. 24).

SFAS No. 87, par. 54 required firms to disclose service cost, interest cost, actual return, and the net total of the other components of pension cost. Firms also were required to disclose key assumptions (i.e. the discount rate, the salary growth assumption, and the expected rate of return), plan assets, projected benefit obligations, accumulated benefit obligations, and a reconciliation of funded status to amounts recognized on the balance sheet. Firms were not required to disclose the expected return, the market-related value, or an analysis of the change in plan assets during the year. Because the deferred return was usually netted against the amortization for transition assets (liabilities), prior service costs, and actuarial gains (losses),

investors could not always ascertain the amount of the expected return or whether it was computed with the fair value of plan assets or a smoothed fair value.[2]

SFAS No. 132 overcomes some of the limitations of SFAS No. 87 by requiring disclosure of expected return, the amount of transition asset, prior service cost, actuarial gain (loss) amortization included in pension cost, a reconciliation of beginning and ending plan assets, and a reconciliation of the beginning and ending projected benefit obligation, (par. 5). The reconciliation of the fair value of plan assets identifies separately the effects of actual return, employer contributions, participant contributions, benefits paid, foreign exchange gains, business combinations or divestitures, and plan settlements or curtailments. Firms were required to comply with SFAS No. 132 for fiscal years beginning after December 15, 1997.

Although firms are still not required to disclose the specific method used to calculate the market-related value of plan assets, investors can use SFAS No. 132 disclosures to estimate the market-related value by dividing the dollar amount of expected return by the expected rate of return. The market-related value then can be compared to the fair value of plan assets to determine the amount of smoothing taking place. In addition, the reconciliation of beginning and ending plan assets allows one to see how unusual events such as business combinations or settlements affect plan assets during the year. Without this information, an investor cannot isolate the effects of using a smoothed fair value method.

To illustrate the calculation of market-related value, we use an excerpt of General Electric's 1998 pension note, which is reproduced below (the complete 1998 pension footnote is reproduced in the appendix):

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[2] SFAS No. 106 rules for calculating expected returns are identical to those of SFAS No. 87. However, plans for postretirement benefits other than pensions (PRBs) generally do not have large amounts of assets since firm sponsors are not required to prefund their PRB plans and receive few tax benefits for prefunding. Consequently, the market-related value issue is primarily a pension issue.

The effect on operations of principal pension plans is as follows:

Effect on operations

(In millions)	1998	1997	1996
Expected return on plan assets	$ 3,024	$ 2,721	$ 2,587
Service cost for benefits earned (a)	(625)	(596)	(550)
Interest cost on benefit obligation	(1,749)	(1,686)	(1,593)
Prior service cost	(153)	(145)	(99)
SFAS No. 87 transition gain	154	154	154
Net actuarial gain recognized	365	295	210
Special early retirement cost	-	(412)	-
Total pension plan income	$ 1,016	$ 331	$ 709

Changes in the fair value of assets for principal pension plans follow.

Fair value of assets

December 31 (In millions)	1998	1997
Balance at January 1	$38,742	$33,686
Actual return on plan assets	6,363	6,587
Employer contributions	68	64
Participant contributions	112	120
Benefits paid	(1,838)	(1,715)
Balance at December 31	$43,447	$38,742

Actuarial assumptions

December 31	1998	1997	1996
Discount rate	6.75%	7.0%	7.5%
Compensation increases	5.0	4.5	4.5
Return on assets for the year	9.5	9.5	9.5

Experience gains and losses, as well as the effects of changes in actuarial assumptions and plan provisions, are amortized over the average future service period of employees.

Using GE's disclosures, we can estimate the market-related value of plan assets for 1998 by dividing the rate of return (9.5%) into the expected return ($3,024), resulting in an estimate of $31,832. We are able to confirm the reasonableness of this number (and hence, of our estimation method) because GE is one of the few firms that voluntarily disclosed information about the

market-related value of their plan assets prior to its adoption of SFAS No. 132. We find that our estimate is within 0.1% of the actual market-related value used by GE to calculate expected return in 1998.

GE is also useful for demonstrating the effect of using a smoothed fair value instead of fair value for calculating expected returns. Based on the SFAS No. 87 Implementation Guide, the fair value for calculating GE's expected return would be $37,913. This amount is calculated as the fair value of GE's plan assets at the beginning of 1998 of **$**38,742 less average net benefits paid and contributions received during 1998 of $829 [.5 (employer contributions of $68, plus employee contributions of $112, less benefits paid of $1,838)]. When we multiply the 9.5% rate of return assumption by $37,913, we obtain an expected return of $3,602, which is 19% higher than the reported amount. In other words, by using a smoothed fair value, GE is effectively using an expected rate of return of 8% (the reported expected rate of return of $3,024 divided by the fair value of $37,913).

Lately, much has been made of some firms assuming expected rates of return that are too high. As this example shows, use of a smoothed fair value method can affect expected return as much as unrealistic rate assumptions. Further, because fair value was higher than smoothed fair value, the effective rate of return was lower than the reported rate of return. However, the effective rate of return will be higher than the reported rate of return when fair values fall below the smoothed fair values, as may have happened to many firms by the end of 2002.

2.2 Research on the market's valuation of pension or PRB information

Research generally suggests that the market uses pension or PRB information in establishing prices (see, for example, Landsman 1986; Barth 1991; Barth et al. 1992, or Amir 1996). Additionally, Brown (2002) suggests that the stock market is able to identify when

assumptions are being used that are not justified by the firm's operating environment and discounts the effect of those assumptions on the disclosed accounting numbers. The Brown (2002) study focuses on the market's valuation of the reported projected benefit obligation (PBO) and is at odds with other results which suggest that the information is not fully valued.

Landsman and Ohlson (1990) examine whether the market fully values net pension assets (liabilities) disclosed in notes under SFAS No. 36 from 1979 to 1982. The authors form a zero net investment portfolio based on the relative funding level after controlling for the market to book and earnings to price ratios. They find that their investment strategy leads to abnormal returns over a five year period, suggesting that the market underreacts to the pension information.

Barth et al. (1992) use SFAS No. 87 pension cost component disclosures from 1986 to 1988. They regress firm market value on income, disaggregated into non-pension and pension components. Their results suggest that the market can separate value relevant components of pension expense, such as actual return and interest cost, from irrelevant components, such as transition asset (liability) amortization. However, the results also show that 1) the market values early-adopter pension components less than on-time adopters, 2) the service cost component coefficient does not have the appropriate sign, and 3) the market does not consistently view the difference between the expected and actual returns as transitory. Barth et al. (1992) could not examine the issue related to market-related values because a reconciliation of beginning and ending plan assets was not provided under SFAS No. 87 and fewer than 25% of their sample firms reported the information necessary to obtain the amount of the expected return (p. 33, note 6).

Amir and Gordon (1996) conclude that firm values are consistent with the stock market taking reported OPEB liabilities at face value without adjusting for differences in assumptions. More recently, a study by Coronado and Sharpe (2003) suggests that in some years the market values components of pension expense instead of funded status. Coronado and Sharpe (2003) attribute the problem to investors' inability to distinguish pension gains from core operating earnings. They suggest that because the FASB requires companies to smooth changes in the value of pension plan assets into earnings over time, investors may value pension earnings in the same way as more persistent operating earnings (partially because it is difficult to disentangle the two). The authors suggest that naively valuing pension earnings, rather than taking into account pension net asset positions, could lead to nontrivial valuation errors.

The prior studies have led to mixed results regarding how investors value pension and PRB information. Some of the mixed results could be due to omitted variables (PRBs, book values, or negative earnings), choice of scale (shares or market value), or the form of the pension or PRB variables included in the models. Multicollinearity issues also arise in most of the studies. For example, the pension variables in the Barth et al. (1992) study are highly correlated and may be causing the wrong sign on service cost. In the Coronado and Sharpe (2003) study, funded status and pension EPS are highly correlated, and both variables are never significant in the same model (see tables 3 and 5). Choi et al. (1997, 366) and Davis-Friday et al. (1999, 418) provide detailed discussions of problems with collinearity when combining PRB and pension information. In our research design, we attempt to address problems caused by omitted variables, the choice of scale and multicollinearity.

3. Empirical predictions and research design

3.1 Empirical model and predictions

To assess whether the market sees through choices regarding expected return or incorporates new information about plan assets, we begin with the following model:

$$MVE_{it} = \beta_{0t} + \beta_{1t} BV_{it} + \beta_{2t} NI_{it} + \varepsilon_{it} \quad (1)$$

where MVE denotes the market value of equity, BV is the book value of common equity, NI is net income before extraordinary items, and *i* and *t* denote firms and years. Including book value in the valuation model is consistent with the theoretical work of Ohlson (1995) and empirical work on financial distress (Barth et al. 1998) and correlated omitted variables (Collins et al. 1999).

We then disaggregate net income into its non-pension income and pension expense components, which yields:

$$MVE_{it} = \beta_{0t} + \beta_{1t} BV_{it} + \beta_{2t} NPNI_{it} + \beta_{3t} PENEXP_{it} + \varepsilon_{it} \quad (2)$$

where NPNI is non-pension net income before extraordinary items, PENEXP is after-tax pension and PRB expense, and all remaining variables are as defined in equation (1). The pension expense (PENEXP) reflected in the income statement consists of the accrued costs of the pension plan (service cost, interest cost, amortization of previous gains and losses as well as one-time charges for plan amendments or changes in actuarial assumptions) less the expected return on plan assets. Under SFAS No. 87, firms disclosed the actual return on plan assets, but not the deferred (unexpected return) or expected return, so pension studies conducted prior to the issuance of SFAS No. 132, like Barth et al. (1992), had to estimate these amounts. We are able to use the SFAS No. 132 disclosures to ascertain the valuation implications of the components of pension expense.

We decompose the pension costs further into the portion reported in earnings and four different "normalized" estimates of the expected return. The models take the following general form:

$$MVE_{it} = \beta_{0t} + \beta_{1t} BV_{it} + \beta_{2t} NPNI_{it} + \beta_{3t} PENEXP_{it} + \beta_{4t} DIFF_{ijt} + \varepsilon_{it} \quad (3)$$

where $DIFF_{ijt}$ is for j=1, the product of the fair value of plan assets (measured as the market value of plan assets at the beginning of the year adjusted for contributions, benefits, paid, divestitures, acquisitions, and settlements) and the reported rate of return assumption, less the reported expected return; for j=2, the product of the fair value of plan assets and a normalized rate of return assumption, less the reported expected return; for j=3, the actual return less the reported expected return; and for j=4, the product of the year end fair value of assets and a normalized expected rate of return assumption less the reported expected return; all remaining variables are as defined in equation (2).

DIFF1 assesses whether the market adjusts for firms using a smoothed fair value versus a fair value method. If the market adjusts for differing methods, then the coefficient on DIFF1 should equal the coefficient on net income. If the market adjusts for differing methods and differing rate of return assumptions then DIFF2 should equal the coefficient on net income. Following the logic of Barth et al. (1992, 33) some form of expected return should be viewed as permanent and any difference between expected return and actual return should be viewed as transitory. Consequently, DIFF3 should be positive but significantly less than the coefficient on net income. DIFF4 examines whether the market adjusts expected return projections for all changes to the fair value of plan assets during the year, including investment performance. If such adjustments are made, then DIFF4 should equal the coefficient on net income.

3.2 Empirical test specifications

In operationalizing the above models, we include a variable for negative earnings because prior research (Hayn 1995; Beaver and Engel 1996) indicates that the market prices losses differently than profits. Inclusion of this variable is particularly important in this context because many of the firms that have large pension and PRB plans had losses during the time period studied. The operationalized full model is:

$$MVE_{it} = \beta_{0t} + \beta_{0*t} * Neg + \beta_{1t} BV_{it} + \beta_{2t} Pos * NPNI_{it} + \beta_{2*t} Neg * NPNI_{it} + \beta_{3t} PENEXP_{it} + \beta_{4t} DIFF_{ijt} + \varepsilon_{it} \quad (4)$$

where Neg is an intercept adjustment for firms with negative earnings, Pos*NPNI is a slope adjustment for firms with positive non-pension net income, Neg*NPNI is a slope adjustment for firms with negative non-pension net income and all remaining variables are as defined in equation (3). We also control for industry effects by including industry dummy variables in the above model (coefficients for industry dummy variables are not reported in tables).

3.3 Source and Measurement of variables

We hand collect data relating to pension cost and rate of return assumptions from firms' 1998 and 2000 footnotes. Specifically, for each year 1998-2001, we collect the reported expected return on plan assets, service cost, interest cost, fair value of plan assets, the actual return on plan assets, employer and employee contributions, benefits paid, and the expected rate of return on plan assets. It is important to note that for firms with foreign pension plans and/or PRB plans, the assumed rates of return may differ substantially across domestic pension plans, foreign pension plans, and PRB plans. We consider the expected returns on foreign and

domestic pension plans and PRB plans separately in estimating market-related values of pension plan assets.

We compute the market-related value used for computing expected return by dividing the reported expected return by the rate of return assumption. We then compute the fair value of plan assets by adjusting the beginning fair value of pension assets for contributions, benefits paid, divestitures, acquisitions, and settlements. The difference between our estimate of market-related value and our calculation of fair value is assumed to be attributable to the use of moving average techniques allowable under SFAS No. 87 for calculating market-related values. Thus, larger differences should represent more extreme smoothing due to the use of moving averages calculations. Because of the substantial increase in the stock market from 1995 to 1999, we expect that the fair values will exceed market-related values computed with three to five-year moving averages.

We obtain book value, income before extraordinary items, share and stock price data from Compustat and CRSP. The variables used in the regression are defined as follows: *MVE* is the market value of equity three months after fiscal year end (share price x common shares outstanding three months after fiscal year end); *BV* is the book value of equity at fiscal year end; *NI* is net income before extraordinary items; *NPNI* is net income before extraordinary items, pension expense, and other postretirement benefit expense; *PENEXP* is pension and other postretirement benefit expense; and DIFF1 through DIFF4 are defined in equation (3).

3.4 Scale

To control for size, most prior pension and PRB studies scale all the variables in equation (4) by the number of shares outstanding to control for size. Brown et al. (2000) and Easton and Sommers (2003) suggest that scaling by shares does not remove all size effects and suggest

scaling by beginning or ending market value. We follow the prior pension literature and scale by shares in the tabulated results. However, when we scale by beginning market value, we reach similar conclusions.

3.5 Sample selection

To compile our sample, we first identified the top 200 non-financial and non-utility firms on Compustat based on each firms' 1997 projected benefit obligation (the year prior to the required adoption of SFAS No. 132). Consistent with Amir and Ziv (1997) and Khurana and Loudder (1994) we exclude financial institutions and utilities because additional accounting regulations in these industries may affect the relation between their stock prices and accounting variables. We also identified the top 200 non-financial and non-utility firms based on 1997 post-retirement benefit (PRB) obligations. We then cross-referenced the two lists to arrive at a beginning sample of 256 unique non-financial and non-utility firms with the largest pension and PRB obligations. The selection of a sample of firms with the largest pension and PRB obligations is consistent with Aboody, Barth and Kasznik (2003) who in their examination of the market's valuation of stock-based compensation expense form a sample of firms with the most substantial stock-based compensation plans.

Next we screened the beginning sample of firm-year observations for missing data and other data issues. First, we eliminate firm-years with missing data because of incomplete pension or PRB disclosures, missing data in Compustat, or because the firms were not incorporated during one or more of our sample years. Next, we eliminate firm-years with significant unusual events including bankruptcy and mergers or acquisitions. We also eliminate firms with acquisitions, divestitures, or settlements representing more than 25% of beginning plan assets. Consistent with Barth et al. (1992), we remove firm-years with negative

shareholders' equity. Finally, we remove firm-years for several other miscellaneous reasons including firms with two or fewer representatives in an industry and firms with unusually low stock prices (below $4 per share). The resulting final samples are 202, 208, 190, and 183 for the years 1998, 1999, 2000, and 2001, respectively. The aggregate value as of the end of 1998 of the projected benefit obligations for pension plans (PRB) for our final sample of firms is $789 billion ($236 billion), representing a significant portion of the outstanding private pension obligations in the country.

4. Results

4.1 Descriptive statistics

This study assumes that some firms are using a moving average method for calculating market-related values, and that this method smoothes the resulting expected return amount. To the extent that overall actual market values of pension plan assets are rising or falling from year to year, SFV calculations of plan assets will be either lower or higher than FV of plan assets, respectively. During our sample period of 1998 to 2001, overall equity market values rose substantially through 1999 and then began falling in value in 2000. Thus, we would expect that for sample firms using a SFAV method for calculating expected returns, estimates of the market-related value of plan assets should be lower than the FV of plan assets in 1998, 1999, and 2000. In 2001, concurrent with the declining value of equity markets, the amount by which FV exceeds market-related value should decline relative to prior years.

Figure 1 presents for our sample of firms a graph of mean ratios of FV of plan assets to SFV of plan assets (FV to SFV ratio). We group the firms into quartiles based on the average FV to SFV ratio over the four-year sample period and then compute mean FV to SFV ratios for

each quartile and sample year. Firms not using a SFV method should have a ratio near 1.0, representing the fact that an estimate of market-related value for these firms is the same as FV. Quartile 1 represents firms with the lowest ratio and hence firms that are likely not using a SFV method for calculating expected returns. Alternatively, firms using a SFV method should exhibit a ratio greater than 1.0 during our sample period (due to rising equity markets), with those using the longest period allowable for smoothing assets values (i.e., five years under SFAS 87) exhibiting the largest ratio values. Consistent with our expectations, the quartile mean values of the FV to SFV ratio are equal to or greater than 1.0 during our sample period, ranging from 1.0 in the lowest quartile to 1.17 in the highest quartile. Also consistent with our expectations, we find that for firms with ratios greater than 1.0 (i.e. SFV firms), the ratios remain high during the years 1998 – 2000 and then begin declining in year 2001. The fact the quartile 2 mean ratios are greater than one in 1998 to 2000 suggests that a large portion of our sample firms is using some form of a moving average method for calculating market-related values. The range of the quartile means for quartiles 2 through 4 suggests that firms may be using a variety of averaging methods.[3] Overall, this analysis suggests that our method of estimating market-related values of plan assets is reasonable and that our sample covers a time period during which there were measurable differences between FV and SFV methods for calculating market-related values.

To examine the effects of using SFV methods on the calculation of expected return, we evaluate a subsample of firms where the average FV to SFV value ratio exceeds 1.1 from 1998 to 2000. We also require the firms to have complete data for all four years. These procedures yield a sample of 54 firms, or approximately 30 percent of the firms with complete data. We then

[3] In addition to the FASB illustration's approach for smoothing plan assets described in section 2.1, our readings of actual disclosures indicates that other smoothing approaches are used. One approach uses the FASB method but averages the difference between expected and actual returns over three years instead of five. Another approach recognizes immediately only dividends and interest and averages all realized and unrealized gains over five years. In most cases, firms do not disclose that they are using an averaging method.

compute a new after-tax expected return using each firm's rate of return assumption and the FV amount instead of the SFV. Table 2 presents descriptive statistics by year for the reported expected return per share and the percentage difference in expected return from using FV instead of SFV.

The results in table 2 show that expected return can be a substantial component of earnings per share for most of the subsample. For each year, the mean after-tax expected return equals or exceeds $0.85 per share and the 95th percentile exceeds $2.50. The average increases in expected returns from using FV instead of SFV were 17.2% in 1998, 13.8% in 1999, 15.0% in 2000, and 5.8% in 2001. The 95th percentiles exceed 25% from 1998 to 2000 and 14% in 2001. The effect of using moving averages diminishes in 2001 because of the stock market declines in 2000. With the continued decline in the stock market in 2001 and 2002, SFV amounts could exceed FV amounts, thereby leading to higher instead of lower earnings.

Table 3 presents statistics on the distribution of final samples of firms for each sample year and for the total Compustat database for the year 1998. Our sample firms have the heaviest concentration in the machinery manufacturing (16%-17%), textiles, printing and publishing (10%-11%), metal fabrication (9%-11%), chemicals (8%-9%) and raw materials manufacturing (7%-9%) industries. Relative to the distribution of all Compustat firms across industries, our sample has a higher proportion of firms in the food, chemicals, manufacturing and metal fabrication industries and a lower proportion of firms in the computer, telecommunication, retail, and services industries. The lower proportional representation in the high-tech (computers, telecommunications) and services industries is reasonable given that these firms tend to be newer and typically rely less on defined benefit plans than do firms in the older manufacturing based industries.

Table 4 presents descriptive statistics for the variables used in our regression analyses and for other variables used to compute regression variables. Mean price per share declines for our sample from 1998 to 2000, and then increases slightly in 2001. This is in contrast with general market movements during this period that were rising until year 2000 and then began falling. The most likely explanation for the share price movement of our sample is that because our sample consists of firms with large pension plans, they represent more traditional manufacturing industries that did not experience the rapid price increases observed for high-tech and internet firms during this period. This explanation is consistent with our industry analysis in table 2. Another result of the general increase in equity markets during this period is that FV for our sample firms increased due to higher returns on plan assets. The mean fair value of plan assets increased from $16.01 per share in 1998 to $18.73 in 2000, and then declined along with equity markets in general to $15.71 in 2001. SFV showed a similar pattern, but lagged behind FV due to the smoothing effect of using a moving average valuation approach for calculating the market-related value of plan assets. The effect of equity market movements during this period can also be seen on pension expense, which declined from a mean of $0.21 per share in 1998 to $0.08 per share in 2000, and then rose again to $0.17 per share in 2001. Finally, consistent with general movements in the economy during this period, net income and non-pension income increased from 1998 until 2000, and then decreased sharply in 2001, which was the beginning on the economic recession in the US.

Table 4 also provides descriptive statistics for the DIFF variables that are used to test our primary research questions. Positive values for DIFF1 and DIFF2 indicate that expected returns calculated using FV are higher than expected returns based on SFV for our sample. This is consistent with the FV to SFV ratios presented in figure 1. Also consistent with figure 1, the

mean values of DIFF1 and DIFF2 decline in 2001 concurrent with declining equity markets during that year. DIFF3, the difference between actual return and reported expected return, is positive in 1998 and 1999, consistent with high actual returns earned by pension plans in those years, and then becomes negative in 2000 and 2001, when actual plan returns declined. Finally, DIFF4 exhibits similar characteristics, with large positive values in 1998 and 1999 declining to a negative value in 2001.

4.2 Regression Results

Table 5 presents results of our regression tests. Regression results are presented for six different models for each of our four sample years. Model 1 represents the basic book value and earnings model prior to breaking out any pension related variables. Model 2 reflects pension expense broken out as a separate variable. Models 3 through model 6 represent tests of the DIFF variables defined in our method section.

Model R^2s range from 0.52 in 2001 to 0.19 in 1999. The low R^2 in 1999 is consistent with prices becoming disconnected from accounting fundamentals during the equity market boom in the late 1990s. Coefficient values on NPNI_NEG are generally insignificant, which is consistent with a lack of association between negative earnings values and prices. For each year, NPNI_POS has a significant positive association with price in all models, while BV has a positive association only in years 1998 and 2001. This suggests that when equity markets were experiencing high positive returns during 1999 and 2000, equity prices may have become disconnected from book values. In models 2 through 6, PENEXP is generally significant and positively associated with price. Because we coded pension expense as negative, a positive coefficient on PENEXP indicates that larger pension expense is associated with lower equity prices. This result is consistent with Barth et al. (1992). Additionally, we performed an *F*-test of

differences between the coefficients for NPNI_POS and PENEXP. The test results indicate that that the coefficient values on these variables are not significantly different in three of our four sample years (*F* values of 0.53, 2.52, 5.56, and 2.43 for years 1998, 1999, 2000 and 2001, respectively). This evidence is generally consistent with the market valuing pension and other post retirement expenses similar to non-pension income.

Results of models 3 through 6 in general indicate no association between prices and our various formulations of DIFF variables. For the years 1999 – 2000, coefficients on each of the DIFF variables are insignificant. In 2001, the coefficients begin to exhibit a marginally significant negative association with price. However, an influential statistic analysis indicates that the significance is resulting largely from one influential observation. The lack of association between the DIFF variables and prices suggests that the market does not distinguish among various market-related value methods used by firms to estimate expected returns on plan assets. Further, the lack of significance for DIFF2 indicates that the market does not distinguish among the different rate of return assumptions used by firms.

5. Summary and conclusions

Recent reports in the popular financial press allege that managers manipulate expected returns through their choices of methods and assumptions. This paper examines whether the market sees through these choices by investigating the association between the market value of firms' common equity and pension and PRB disclosures required under Statement of Financial Accounting Standards No. 132, "Employers' Disclosures about Pensions and Other Postretirement Benefits." The FASB suggests that the disclosures required under SFAS No. 132, which amends SFAS Nos. 87, 88, and 106, should improve users' ability to evaluate pension and

other postretirement benefit information. However, we find that pension and PRB expense is valued by the market to the same extent as non-retirement plan earnings and the market does not appear to distinguish among the various assumptions used to measure expected returns. For example, the market does not appear to discern between expected returns calculated based on fair values and those based on smoothed fair values even though our evidence suggests that the use of a smoothed fair value can affect expected return calculations by as much as altering the rate of return assumption by one to three percent. Our results suggest that the market ignores cross-sectional differences in the assumptions underlying expected returns despite the additional disclosures provided as a result of the issuance of SFAS No. 132.

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Appendix
1998 General Electric Pension Footnote

5. PENSION BENEFITS

GE and its affiliates sponsor a number of pension plans. Principal pension plans are discussed below; other pension plans are not significant individually or in the aggregate.

PRINCIPAL PENSION PLANS are the GE Pension Plan and the GE Supplementary Pension Plan.

The GE Pension Plan provides benefits to certain U.S. employees based on the greater of a formula recognizing career earnings or a formula recognizing length of service and final average earnings. Benefit provisions are subject to collective bargaining. At the end of 1999, the GE Pension Plan covered approximately 470,000 participants, including 124,000 employees, 153,000 former employees with vested rights to future benefits, and 193,000 retirees and beneficiaries receiving benefits.

The GE Supplementary Pension Plan is a pay-as-you-go plan providing supplementary retirement benefits primarily to higher-level, longer-service U.S. employees.

The effect on operations of principal pension plans is as follows:

EFFECT ON OPERATIONS

(In millions)	1999	1998	1997
Expected return on plan assets	$ 3,407	$ 3,024	$ 2,721
Service cost for benefits earned (a)	(693)	(625)	(596)
Interest cost on benefit obligation	(1,804)	(1,749)	(1,686)
Prior service cost	(151)	(153)	(145)
SFAS No. 87 transition gain	154	154	154
Net actuarial gain recognized	467	365	295
Special early retirement cost	---	---	(412)
Total pension plan income	$ 1,380	$ 1,016	$ 331

(a) Net of participant contributions.

FUNDING POLICY for the GE Pension Plan is to contribute amounts sufficient to meet minimum funding requirements as set forth in employee benefit and tax laws, plus such additional amounts as GE may determine to be appropriate. GE has not made contributions since 1987 because the fully funded status of the GE Pension Plan precludes current tax deduction, and because any GE contribution would require payment of excise taxes.

Changes in the projected benefit obligation for principal pension plans follow.

PROJECTED BENEFIT OBLIGATION

December 31 (In millions)	1999	1998
Balance at January l	$ 27,572	$ 25,874
Service cost for benefits earned (a)	693	625
Interest cost on benefit obligation	1,804	1,749
Participant contributions	122	112
Actuarial (gain)/loss (b)	(2,790)	1,050
Benefits paid	(1,879)	(1,838)
Balance at December 31	$ 25,522	$ 27,572

(a) Net of participant contributions
(b) Principally associated with discount rate changes.

Changes in the fair value of assets for principal pension plans follow.

FAIR VALUE OF ASSETS

December 31 (In millions)	1999	1998
Balance at January 1	$ 43,447	38,742
Actual return on plan assets	8,472	6,363
Employer contributions	81	68
Participant contributions	122	112
Benefits paid	(1,879)	(11,838)
Balance at December 31	$ 50,243	$ 43,447

Plan assets are held in trust and consist mainly of common stock and fixed-income investments. GE common stock represented 9.8% and 7.5% of trust assets at year-end 1999 and 1998, respectively.

Compensation increases	5.0	5.0	4.5
Return on assets for the year	9.5	9.5	9.5

Experience gains and losses, as well as the effects of changes in actuarial assumptions and plan provisions, are amortized over the average future service period of employees.

Figure 1

Fair value to Smoothed Fair value Ratios by Quartile for Years 1998 - 2001

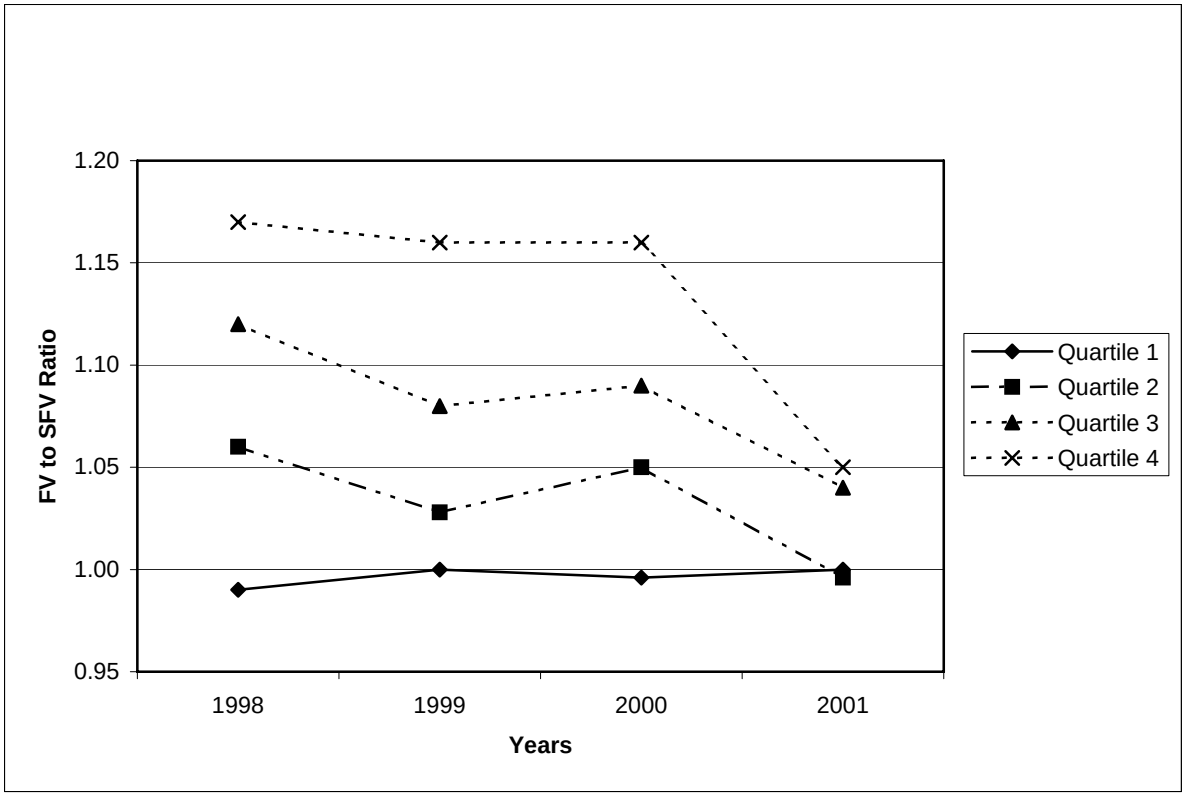

Table 1
Sample Selection Process

	Year			
	1998	1999	2000	2001
Beginning sample of 250 US firms with the largest projected benefit obligations (PBO) and 50 US firms with the largest other post retirement benefit obligation (PRB) at the end of fiscal 1998*	256	256	256	256
Remove firms with missing data::				
Firms with incomplete pension disclosures	12	10	10	10
Firms missing Compustat data	1	1	1	1
Firms not publicly incorporated during the entire sample period	8	2	0	0
Remove firms with significant unusual events:				
Firms in bankruptcy or financial distress	11	11	11	12
Firms involved in mergers or acquisitions	3	3	14	20
Firms with large contributions, settlements, or curtailments affecting plan assets	8	10	11	6
Remove firms with negative shareholders' equity	8	7	6	14
Remove firms with other data related issues	3	4	13	10
Final sample	202	208	190	183

* There is duplication among the firms with the largest PBO and PRB, resulting in 256 unique firms

Table 2
Effect of Using a Smoothed Fair Value Method on Expected Return

Year	Reported After-tax Expected Return per Share Mean (5^{th}, 50^{th}, and 95^{th} percentiles)	Difference from Using Fair value (as a % of Reported Expected Return) Mean (5th, 50th, and 95th percentiles)
1998	0.85 (0.08, 0.53, 2.58)	17.2% (6.2%, 16.1%, 33.0%)
1999	0.92 (0.06, 0.56, 2.75)	13.8% (1.8%, 13.9%, 27.5%)
2000	0.96 (0.06, 0.52, 2.75)	15.0% (4.4%, 15.2%, 25.4%)
2001	0.99 (0.06, 0.56, 2.86)	5.8% (-1.0%, 5.1%, 14.8%)

Table 3

Sample Distribution by Industry

Industry	SIC Codes	1998 Compustat Percent	1998		1999		2000		2001	
			N	Percent	N	Percent	N	Percent	N	Percent
1. Food	2000-2111	4.36	17	8.29	19	8.96	16	8.21	14	7.49
2. Textiles, printing and publishing	2200-2799	8.36	22	10.73	23	10.85	20	10.26	21	11.23
3. Chemicals	2800-2824, and 2840-2899	4.10	20	9.76	19	8.96	17	8.72	17	9.09
4. Pharmaceuticals	2830-2836	4.15	10	4.88	10	4.72	8	4.10	8	4.28
5. Extractive industries	2900-2999, and 1300-1399	6.99	12	5.85	11	5.19	11	5.64	9	4.81
6. Raw materials manufacturing	3000-3399	6.43	20	9.76	20	9.43	15	7.69	15	8.02
7. Metal Fabrication	3400-3569	5.83	19	9.27	21	9.91	20	10.26	21	11.23
8. Machinery manufacturing	3580-3659 and 3680-3999	13.48	34	16.59	34	16.04	34	17.44	32	17.11
9. Computers	7370-7379, 3570-3579, and 3660-3679	11.40	12	5.85	13	6.13	13	6.67	12	6.42
10. Transportation	4000-4799	4.10	9	4.39	9	4.25	10	5.13	9	4.81
11. Telecommunications	4800-4899	6.53	7	3.41	8	3.77	7	3.59	7	3.74
12. Retail	5000-5999	12.66	14	6.83	15	7.08	15	7.69	13	6.95
13. Services	7000-8999, except 7370-7379	11.60	6	2.93	6	2.83	4	2.05	5	2.67
Totals		100.00	202	100.00	208	100.00	190	100.00	183	100.00

Table 4
Descriptive Statistics

	1998 (N=202)			1999 (N=208)			2000 (N=190)			2001 (N=183)		
Variable	Mean	Median	Std Dev.	Mean	Median	Std Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
Price	46.78	45.12	25.32	42.20	37.16	28.13	37.34	34.88	20.27	39.77	37.45	21.67
BV	14.95	13.17	10.28	15.91	13.12	12.04	16.36	12.88	13.23	15.65	12.54	12.02
NI	2.08	1.91	2.59	2.32	1.96	2.71	2.31	2.09	2.14	0.83	1.32	3.81
NPNI	2.29	1.98	2.94	2.51	2.07	3.09	2.39	2.08	2.32	0.99	1.33	3.37
PENEXP	-0.21	-0.09	0.65	-0.19	-0.09	0.65	-0.08	-0.03	0.83	-0.17	-0.06	0.76
FV	16.01	7.70	22.61	17.57	9.19	24.96	18.73	9.98	27.89	15.71	8.22	21.52
SFV	14.84	7.12	21.24	16.57	8.27	23.78	17.5	8.23	26.60	15.38	7.90	21.46
DIFF1	0.07	0.03	0.14	0.06	0.02	0.15	0.07	0.03	0.15	0.02	0.01	0.08
DIFF2	0.08	0.03	0.16	0.07	0.02	0.18	0.07	0.03	0.16	0.02	0.01	0.12
DIFF3	0.46	0.15	1.44	0.68	0.30	1.50	-0.54	-0.18	1.88	-1.62	-0.83	2.35
DIFF4	0.17	0.06	0.28	0.17	0.08	0.28	0.06	0.02	0.21	-0.10	-0.04	0.25

Variable Definitions (note all variables are scaled by number of shares outstanding three months after fiscal year end:

PRICE	Share price three months after fiscal year end.
BV	Book value of equity at fiscal year end.
NI	Net income before extraordinary items.
NPNI	Net income before extraordinary items, pension expense, and other post-retirement benefit expense.
PENEXP	Pension and other post retirement benefit expense.
FV	Fair value of plan assets, measured as the market value of plan assets at the beginning of the year adjusted for contributions, benefits paid, divestitures, acquisitions, and settlements.
SFV	Smoothed fair value of plan assets, calculated by dividing expected rate of return assumption into the dollar value of expected return.
DIFF1	Difference between expected return based on fair value of plan assets during the year multiplied by expected rate of return and reported expected return.
DIFF2	Difference between expected return based on adjusted fair market value of plan assets during the year multiplied by normalized expected rate of return and reported expected return.
DIFF3	Difference between actual return and reported expected return.
DIFF4	Difference between expected return based on year end market value of plan assets multiplied by normalized expected rate of return and reported expected return

Table 5
Regression Results

Models by Year	Variables										
	INT	BV	NPNI_NEG _DUM	NPNI_ NEG	NPNI_POS	PENEXP	DIFF1	DIFF2	DIFF3	DIFF4	Adj. R^2
1998: (n=202)											
Model 1	36.46***	0.36**	2.37	-0.43	3.87***						0.37
Model 2	36.22***	0.36	2.57	-0.86	4.15**	6.10**					0.37
Model 3	36.48***	0.31*	2.02	-0.91	4.02***	6.89**	15.14				0.37
Model 4	36.41***	0.34**	2.04	-0.93	4.00***	5.89*		7.60			0.37
Model 5	36.16***	0.37**	2.69	-0.85	4.19***	6.15**			-0.68		0.37
Model 6	34.99***	0.40**	4.54	-0.69	4.81***	8.03**				-1.84	0.37
1999: (n=208)											
Model 1	28.16***	0.01	-22.83*	-2.90	2.82***						0.19
Model 2	27.35***	0.01	-16.95	-2.38	3.63***	9.10**					0.20
Model 3	27.31***	0.01	-16.86	-2.36	3.65***	9.11**	-0.96				0.20
Model 4	27.19***	0.01	-16.46	-2.27	3.73***	9.39**		-4.08			0.20
Model 5	26.51***	0.06	-16.31	-2.23	4.07***	9.90**			-8.43		0.20
Model 6	26.96***	0.03	-17.54*	-2.47	3.85***	9.14**				-1.07	0.20
2000: (n=190)											
Model 1	24.63***	0.03	0.49	-0.58	6.81***						0.42
Model 2	24.85***	0.06	-1.38	-0.77	6.64***	9.93***					0.44
Model 3	24.86***	0.05	-1.39	-0.77	6.64***	9.94***	0.29				0.44
Model 4	24.84***	0.06	-1.35	-0.76	6.64***	9.93***		-0.33			0.44
Model 5	24.86***	0.05	-1.39	-0.78	6.66***	9.99***			1.32		0.43
Model 6	24.72***	0.07	-1.00	-0.68	6.70***	9.97***				0.33	0.44
2001: (n=183)											
Model 1	16.84***	0.56***	-4.87	0.75*	7.14***						0.52
Model 2	16.01***	0.55***	-3.47	0.26	7.24***	3.65*					0.51
Model 3	16.28***	0.56***	-4.07	0.26	7.12***	3.39	-25.76*				0.52
Model 4	16.12***	0.57***	-3.89	0.23	7.16***	4.73**		-24.55**			0.52
Model 5	16.18***	0.54***	-3.96	0.31	7.22***	5.15**			-10.80*		0.52
Model 6	16.14***	0.51***	-3.66	0.41	7.25***	4.59**				-0.96	0.51

*, ** and *** signify that coefficients are significant at a p-value of .10, .05 and .01, respectively (two-tailed).

Variable Definitions (note all variables are scaled by number of shares outstanding three months after fiscal year end:

INT	Intercept.
BV	Book value of equity at fiscal year end.
NPNI_NEG_DUM	For model 1, dummy variable that takes the value of 1 when income is negative and zero otherwise. For all other models, dummy variable that takes the value of 1 when non-pension income is negative and zero otherwise.
NPNI_NEG	For model 1, the value of income when income is negative and the value of zero otherwise. For all other models, the value of non-pension income when non-pension income is negative and the value of zero otherwise.
NPNI_POS	For model 1, the value of income when income is positive and the value of zero otherwise. For all other models, the value of non-pension income when non-pension income is positive and the value of zero otherwise.
PENEXP	Pension and other post retirement benefit expense.
DIFF1	Difference between expected return based on fair value of plan assets during the year multiplied by expected rate of return and reported expected return.
DIFF2	Difference between expected return based on adjusted fair market value of plan assets during the year multiplied by normalized expected rate of return and reported expected return.
DIFF3	Difference between actual return and reported expected return.
DIFF4	Difference between expected return based on year end market value of plan assets multiplied by normalized expected rate of return and reported expected return