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Michael McAleer

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Earnings Mergers and Acquisitions Under Pension Disclosure Standards*

Jun Cai**

Department of Economics and Finance
City University of Hong Kong
Hong Kong, China

Yiyi Qin

Department of Economics and Finance
City University of Hong Kong
Hong Kong, China

Anxing Wang

School of Finance
Shanghai University of Finance and Economics
Shanghai, China.

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Abstract

We examine whether managers alter earnings management behavior, in the case of mergers and acquisitions, following the introduction of new pension disclosure standards under SFAS 132R, effective December 15, 2003. We find managers do set lower rate of return (ERR) assumptions on pension assets under the new pension accounting standards. However, managers also become more sensitive to opportunities to boost reported earnings by inflating ERR. Managers more actively exploit such opportunities when pension assets are large relative to earnings measures, i.e., when potential gains from earnings management are large.

Keywords: defined benefit pension plans, earnings management, mergers and acquisitions, pension assumptions, disclosure standards

JEL: G34, J32, M41.

1. Introduction

Earnings management in the time leading up to major corporate investment decisions such as mergers and acquisitions (MAs) has received considerable attention from both academic researchers and practitioners. Prior research on earnings management focuses on accounting accrual related measures (Jones, 1991; Dechow, Sloan, and Sweeney, 1995; Healy and Whalen, 1999; Sloan, 1996; Subramanyam, 1996; Xie, 2001; Francis et al., 2005). In addition to accrual-based manipulation, firms can manage earnings by altering real activities (Roychowdhury, 2006; Gunny, 2010; Zang, 2012). Managers, in fact, prefer real earnings management activities over accrual-based earnings management because real management activities are less likely to be detected by auditors and regulators (Graham et al., 2005). In the post Sarbanes–Oxley Act (SOX) period, managers shifted away from accrual to real earnings management following highly publicized accounting scandals (Cohen, et al., 2008).

More recently, Bergstresser et al. (2006) suggest that managers use pension accounting to boost reported corporate earnings. In particular, for those firms with large pension assets relative to various operating income or operating asset measures, managers can actually opportunistically inflate the assumed rate of returns on pension assets (ERR) leading to inflated reported earnings. Expected returns on pension assets are treated as a negative pension expense or income under pension accounting. All else being equal, a higher assumed ERR results in higher reported earnings. This tactic of earnings management is important because pension income has become a major component of net income for firms with defined benefit pension programs (Picconi, 2006).[1, 2] Bergstresser et al. (2006) suggest that these activities are prevalent when firms conduct mergers and acquisitions, because firms' incentives to boost reported earnings are strong.

Pension accounting is technically complex. Pension accounting standards have undergone several significant changes over the years. In this paper, we examine whether firms alter their manipulation behavior via assumed ERRs, in the case of mergers and acquisitions, in response to an important change in pension accounting standards, SFAS 132R, instituted by

[1] For example, Zion and Carache (2002) estimate that aggregate profits for S&P 500 firms with defined benefit pension plans would decline by as much as $44 billion in 2003 if these firms lower their ERR rate assumptions to 6.5 percent.

[2] Pension assets are substantial, averaging roughly 1/6 of total firm value. Among about 2,000 firms that sponsor defined benefit plans, average total plan assets exceed $1,500 billion and average total projected benefit obligations exceed $1,600 billion.

the Financial Accounting Standard Board (FASB). This statement requires a description of investment strategies and the basis used to determine the expected long-term return on assets, ERR. It also requires annual disclosure of the percentage composition of major categories of pension plan asset allocations to equities, bonds, real estate, and other assets. This asset allocation is a key determinant of ERR. Therefore, asset allocation disclosure can potentially constrain the ability of firms to manage earnings.

Our work is related to two streams of research. First, a number of prior studies examine earnings management among acquiring firms and its implication on stock market and operating performance surrounding merger and acquisition activities (DeAngelo, 1986 and 1990; Perry and Williams, 1994; Erickson and Wang, 1999; Louis, 2004; Gong, Louis, and Sun, 2008).[3] Evidence from prior research indicates the importance of accounting earnings in appraising the price of the acquiring firm's stock, particularly the most recent earnings. The acquiring firm has an incentive to increase accounting earnings prior to the merger in order to raise the market price or the appraised price of its stock. These early studies typically employ various accrual based earnings management measures.

Second, changes in accounting standards lead firms to alter their behavior. A number of studies (Mittelstaedt et al., 1995; Graham et al., 2005; Bens and Monahan, 2008; Choudhary et al., 2008; Zhang, 2009; Amir et al., 2010) examine the impact of accounting standards that mandate *recognition*. Amir et al.'s (2010) work is related to pension accounting. They find that firms move pension assets from equity to bond categories under SFAS 158, which requires the immediate incorporation of funding status into the balance sheet. Chuk (2013) focuses on accounting standards mandating *disclosure*, as opposed to *recognition*. Chuk (2013) examines the economic consequences of the mandated disclosures of pension asset composition and investment strategy required under SFAS 132R. In particular, Chuk (2013) finds that when disclosure of asset composition in financial statements was first initiated under SFAS 132R, firms whose pre-SFAS 132R ERR assumptions are higher than justified by their pension asset composition do increase their asset allocation to high-risk securities and/or reduce their ERR assumptions.

Our work contributes to the literature by studying whether managers alter their earnings management behavior in response to the change in pension accounting standards when their

[3] Rangan (1998); Teoh, Welch, and Wong (1998a,b); Shivakumar (2000); DuCharme et al. (2004); and Ball and Shivakumar (2008) study earnings management when firms conduct initial public offerings (IPO) or seasoned equity offerings (SEO). Cohen and Zarowin (2010) study accrual-based and real earnings management activities around seasoned equity offerings.

firms undertake merger and acquisition activities. We summarize our major results as follows. We examine linear regressions of firm-year assumed returns on the log of seven pension sensitivity measures, controlling for current and lagged actual returns from pension assets. Our pension sensitivity measures refer to the ratios of pension assets *PA* or pension liabilities to earnings measures such as ordinary income before depreciation *OIBDP*. The larger the pension sensitivity ratios are, the stronger the effects from inflated ERRs on reported earnings. Managers thus have stronger incentives to manipulate earnings. We confirm the early results that *ERR* is sensitive to the ratio of pension assets or pension liabilities to earnings measures. We construct an indicator variable *DMA* to capture the acquiring firms' acquisition activities and another indicator variable *D132R* to capture the effect of SFAS 132R. *DMA* takes the value of one for fiscal years during which an acquisition takes place and zero otherwise. *D132R* takes the value of one for fiscal years after December 15, 2003 and zero otherwise.

The estimated coefficient (*t-statistic*) on *DMA* is 0.164 (5.35) while the estimated coefficient (*t-statistic*) on *D132R* is -0.834 (-6.46). As expected, acquiring firms tend to set ERRs an average 0.164% higher during fiscal years when acquisitions take place. The new disclosure requirement under SFAS 132R constrains all firms to set ERRs an average 0.834% lower. The estimate (*t-statistic*) on the interactive term *DMA*×*D132R* is -0.125 (-2.94). This suggests that when an acquisition transaction takes place in the post-SFAS 132R period, firms tend to set ERRs 0.125% lower than they would in the pre-SFAS 132R period. Therefore, SFAS 132R appears to constrain firms to set a lower ERR when firms have stronger incentives to manage earnings, as in the case of an imminent acquisition.

Our most interesting find pertains to the impact of acquisition activities and SFAS 132R on the slope of regressing *ERR* on the log of pension sensitivity variables. Using pension sensitivity variable *PA/OIBDP* as an example, the estimated coefficient (*t-statistic*) on log(*PA/OIBPD*)×*DMA* is 0.054 (2.23) while the estimated coefficient (*t-statistic*) on log(*PA/OIBPD*)×*D132R* is 0.159 (4.56). This suggests that managers are more sensitive to earnings management opportunities when firms engage in mergers and acquisitions. Managers also become more sensitive to such opportunities in the post-SFAS 132R period. In other words, SFAS 132R requires firms to disclose pension asset allocations and investment strategies. This constrains firms to lower their ERR assumptions in the post-SFAS 132R period, because firms need to align their ERR assumptions with their asset allocations. However, firms become more sensitive in exploiting earnings management opportunities by boosting ERR when pension assets are large relative to earnings, i.e., when the effect of such manipulations is stronger.

The final question is whether managers become more sensitive when firms engage in

mergers and acquisitions after SFAS 132R is in place. The estimated coefficient (*t-statistic*) on log(*PA/OIBPD*)×*DMA*×*D132R* is -0.039 (-1.06). In other words, the estimate has a negative sign but is not significant. There is a small tendency for managers to become less sensitive to exploiting earnings management opportunities when they engage in merger and acquisition activities after SFAS 132R is implemented. But this effect is not statistically different from zero.

The new disclosure requirements under SFAS 132R make it difficult for firms to set arbitrarily high ERRs because investors will challenge ERR assumptions if they are not in line with the firm's allocation of pension assets to equities, bonds, and other assets. We examine the relation between *ERR* and percentage of pension assets allocated to equities *EQUITY*. Earlier studies (Amir and Benartzi, 1998; Bergstresser et al., 2006) find mixed results regarding the correlation between the expected rate of return and the proportion of equities in pension funds. Using both an ordinary least square and instrumental variable approach, we find a significant and positive relation between *ERR* and *EQUITY*. We also find that mandatory contributions serve as a good instrument for *ERR*. Firms tend to set higher ERRs when they face mandatory contributions. Firms have incentives to boost their reported earnings because the impact from mandatory contributions on stock price is negative (Franzoni, 2009).

We have considered a number of robustness checks. In particular, we examine confounding effects for the following three events. First, the SEC issued warnings to firms making ERR assumptions above nine percent in December 2002 and launched investigations on six firms adopting such assumptions in 2004.[4] Second, FASB released SFAS 158 to be effective after December 2006. The key requirement of the statement is that firms should immediately incorporate their funding status into the balance sheet. This essentially replaces SFAS 87 allowing firms to gradually incorporate their funding status. Early studies focus on the valuation effect of SFAS 158. (Yu, 2013). Third, Congress passed the Sarbanes–Oxley Act (SOX) in July 2002, which had a far reaching impact on corporate America. Cohen et al. (2008) show that the passage of SOX resulted in a reduction in earnings management. Engel et al. (2007) report that SOX also affected merger and acquisition activities. We design empirical methodology to isolate these confounding effects taking place during our sample period from 1992 to 2015. We find that these confounding effects do change our conclusions.

Our work is also related to a number of early studies on the management of pension assumptions and actuarial choices (Blankley and Swanson, 1995; Amir and Benartzi, 1998; Asthana, 1999). In particular, Amir and Benartzi (1998) argue that if managers' pension

[4] See Footnote 9 of Chuk (2013) regarding the details of the six firms and the stock market reaction.

assumptions are unbiased, cross-sectional differences in expected returns can only be explained by differences in the riskiness of companies' portfolios. Glaum (2009) provides a detailed review of value relevancy and earnings management in pension accounting.

The rest of the paper proceeds as follows. Section 2 describes data sources, sample period, and variable definitions. Section 3 presents summary statistics. Section 4 provides empirical evidence on the effect of mergers and acquisitions and SFAS 132R on assumed returns on pension assets. Section 5 carries out a robustness check. Finally, Section 6 concludes the paper.

2. Data Sources, Sample Period, and Variable Definitions

Data Sources

The data for U.S. equity markets are from the CRSP and COMPUSTAT merged files. Market value and shares outstanding are from CRSP. Annual pension related variables, such as plan assets and projected benefit obligations, are taken from COMPUSTAT. Other accounting data items, such as ordinary income before depreciation and total assets, are from the CRSP and COMPUSTAT merged files. We use NYSE, AMEX, and NASDAQ firms, excluding financial firms with 4-digit SIC codes between 6000 and 6999. The merger and acquisition data items, such as acquiring firms' domicile nations, CUSIPs, and effective dates, are from Thomson One.

Sample Period and FASB Statements

Our initial sample period covers January 1988 to August 2015. We begin the sample in 1988 because SFAS 87 imposed new standards on pension reporting after December 1986. Under SFAS 87, accumulated benefit obligations determine recognition of minimum liability. SFAS 87 dictates a smoothed model for pension accounting rather than a fair or market-value model. Under SFAS 132, effective after December 1997, firms are no longer required to report separate pension items for over- and under-funded plans. Under SFAS 158, effective after December 2006, firms are required to incorporate fair value funding status, or the difference between plan assets and projected benefit obligations, in their consolidated statements. Minimum pension liability adjustments associated with accumulated benefit obligations under SFAS 87 are no longer required.

Our focus is SFAS 132R, effective after December 15, 2003. Among new disclosure requirements, SFAS 132R requires the following additional information about plan assets: (i) Data on the allocation of assets and percentages by value and by major category, including equity securities, debt securities, real estate, and all other assets as of the applicable measurement date. Mutual funds are considered equity securities. (ii) A narrative description of investment policies and strategies, including target asset allocation percentages, if used, or ranges for each major category of plan assets and other factors pertinent to an understanding of the plan's investment policies or strategies. (iii) A narrative description of, and the basis used to determine, the overall expected long-term investment return assumptions. Specific disclosure of the expected long-term rate of return by individual asset category is not necessary. Instead, a description of the significant considerations used by the plan to determine long-term investment return assumptions is required.

Variable Definitions

The variables we employ can be categorized into three groups: pension variables, market and accounting variables, and indicator variables. Pension-plan related variables include assumed rate of returns on pension assets (*ERR*), actual rate of returns on pension assets (*ARR*), plan assets (*PA*), projected benefit obligations (*PBO*), accumulated benefit obligations (*ABO*), funding status (*FS*), two measures of mandatory contribution (*MC1* and *MC2*), and percentage of pension assets allocated to equities (*EQUITY*). Service cost (*SERV*) and minimum pension liabilities (*MPL*) are used to calculated *MC1* and *MC2*. The details of the construction of these variables are provided in Appendix A.

Our primary variable is assumed rate of return on pension assets *ERR.* This item is missing prior to June 1991 on COMPUSTAT's pension dataset. *ARR* is calculated as actual return on plan assets divided by beginning of the fiscal year plan assets (PA_{-1}). *PA* refers to funds set aside to meet a firm's obligations. Plan assets increase due to capital gains on existing assets as well as from the difference between firm contributions and benefit payouts. *PBO* is the present value of employees' projected future benefits, which requires firms to make several actuarial assumptions. *FS* is the difference between *PA* and *PBO*.[5]

Market and accounting variables include ordinary income before depreciation (*OIBDP*), ordinary income after depreciation (*OIADP*), income before extraordinary items (*IB*), net

[5] Appendix A of Picconi (2006) offers a clear overview of pension accounting items.

income (*NI*), total assets (*AT*), sales (*SALE*), fiscal year-end market value (*ME*), market-to-book ratio (*MB*), price-earnings ratio (*PE*), return on assets (*ROA*), return on equity (*ROE*), and sales growth (*SALG*).

The indicator variable *DMA* takes the value of one for a fiscal year when a merger and acquisition took place and zero otherwise. There are some cases in which an acquiring firm attempts to purchase more than one target firm or obtain additional shares from the same target firm. In this case, the indicator variable *DMA* applies to the first acquisition. This will only affect the summary statistics on merger and acquisition characteristics such as percentage of shares sought. It does not affect other variables or the empirical results. The indicator variable *D132R* takes the value of one for fiscal years after December 15, 2003, when SFAS 132R became effective and zero otherwise. The indicator variable *D158* takes the value of one for fiscal years after December 15, 2006, when SFAS 158 became effective and zero otherwise. The indicator variable *D9PCT* is equal to one if *ERR* is larger than nine percent and zero otherwise.

3. Summary Statistics

Sample Firms and Merger and Acquisition Transactions

We begin with COMPUSTAT annual pension data from January 1988 to August 2015. Our initial sample covers 28,957 firm-year observations from 2,319 firms with non-missing *PA*s and *PBO*s and other accounting items on the CRSP and COMPUSTAT merged files. Our primary variable *ERR* is not available prior to June 1991. We also require current and lagged actual returns on pension assets be available. These two restrictions reduce our sample size to 18,697 firm-year observations, from 1,747 firms during the June 1992 to August 2015 period.

At the same time, we obtain a total of 685,160 global merger and acquisition transactions during the June 1992 to August 2015 period from Thomson One. Among them, 211,512 transactions are conducted by 77,981 unique U.S. acquiring firms. We merge these transactions with our pension sample. We also require that (i) the fiscal year-end stock price (*PRCC_F*) of the acquiring firms be higher than $10, and (ii) ordinary income before depreciation (*OIBDP*) and ordinary income after depreciation (*OIADP*) be positive so that we

can calculate the log of pension sensitivity variables.[6] Our final sample covers 15,193 firm-year observations from 1,582 firms, with a total of 1,147 firms conducting 5,320 merger and acquisition transactions. The target firms include non-U.S. firms, but the majority (71%) are from the U.S. The minority 3.6%, 3.2%, and 2.9% of target firms are from the United Kingdom, Canada, and Germany, respectively. The final sample period is from June 1992 to August 2015.

Summary Statistics

Table 1 provides summary statistics, including the number of firm-year observations, mean, median, 25th percentile values, 75th percentile values, and standard deviations. Table 1 also reports pairwise correlations for selected variables. The summary statistics are calculated from pooled firm-year observations.

Panel A of Table 1 summarizes basic statistics for pension variables and indicator variables. The first column shows that the average assumed rate of return on pension assets *ERR* is 8.29% and the average actual rate of return on pension assets *ARR* is 9.26%. Average pension assets *PA* and pension liabilities *PBO* are $1,391 and $1,524 million, respectively. Our primary measures of pension sensitivity are *PA/OIBDP* and *PA/OIADP*. The average ratios are 1.25 and 3.88, respectively. The average ratios of *PA/IB* and *PA*/*NI* are larger, at 6.71 and 6.64, respectively. The average ratio calculated from liability based pension sensitivity variables *PBO/OIBDP* and *PBO/OIADP* are 1.36 and 4.22, similar to the average ratio obtained from pension asset based measures.

Panel B of Table 1 compares market and accounting statistics for firms that do and do not conduct mergers and acquisitions during our sample period. Based on total assets (*TA*), sales (*SALE*), and market value (*ME*) in the first three rows, firms that conducted MAs are much larger in size. Broadly speaking, firms that conducted MAs are roughly twice as large as firms that did not. Valuations are similarly based on either book-to-market ratio (*BM*) or price earnings ratio (*PE*). Profitability measures (*ROA*, *ROE*) indicate that MA and non-MA firms are also similar. Sales growth (*SALG*) is faster for MA firms than for non-MA firms.

The last four rows in Panel B of Table 1 report descriptive statistics for merger and acquisition characteristics including percentage sought in the transaction (*SOUGHT*), percentage acquired (*PCTACQ*), percentage owned after the transaction (*POSTOWN*), and

[6] Our results are similar when we require the price be higher than $5.

value of the transaction (*VALUE*). The average deal value for our sample is $661 million. These data indicate that the transaction amounts of corporate mergers examined in this study are substantial, and, therefore, the economic benefits of managing earnings prior to the merger are significant.

Panel C of Table 1 shows that *ERR* has a highly significant correlation between 0.21 and 0.33 with the log of seven pension sensitivity variables. The correlation of *ERR* with *ARR* is 0.31. The pair-wise correlations among the log of seven pension variables range from 0.81 to 0.97. Therefore, our empirical analysis will focus on the log of *PA/OIBDP* and *PA/OIADP*. Panel C further shows that *ERR* has a highly significant negative correlation of -0.52 with *D132R*. *ARR* also has a highly significant negative correlation of -0.29 with *D132R*. *EQUITY* has a highly significant correlation of 0.49 with *ERR*.

4. Empirical Evidence

Cross-Sectional and Time-Series Patterns of Assumed Returns and Actual Returns

We begin the empirical analysis by tabulating the cross-sectional and time-series patterns of assumed returns and actual returns on pension assets. In Table 2, we first partition all firm-year observations into two groups: acquiring firms and non-acquiring firms. Then for each group, we summarize, by fiscal year, the mean values of assumed returns *ERR*, changes in *ERR*, and the number and fraction of increase, no change, and decrease in *ERR* relative to the previous fiscal year.

Panel A of Table 2 shows that for acquiring firms, increases are more common from 1995 to 2000. The average change in *ERR* (ΔERR) are all positive during these six years. In contrast, decreases in assumed returns are more common from 2001 to 2015. The average ΔERR are all negative during these 15 years. This pattern is reflected in the number and fraction of cases when ΔERR is negative. The fraction of decrease cases ($\Delta ERR<0$) moves from 0.15 in 2001 to 0.36 in 2015. Panel B of Table 2 indicates that for non-acquiring firms, a similar pattern is observed, in general. Increases in *ERR* are more common from 1995 to 2000, while decreases in *ERR* are more common from 2001 to 2015. But there are some noticeable differences. For example, the number of increase cases from 2005 to 2013 for acquiring firms in Panel A is similar in magnitude to the number of increase cases for non-acquiring firms in Panel B. But the total number of firm-year observations for each year from 2005 to 2013 is much larger for non-acquiring firms than for acquiring firms. This results in the fraction of

increase cases ($\Delta ERR>0$) for acquiring firms to be larger than the fraction of decrease cases for non-acquiring firms for each year from 2005 to 2013. The preliminary evidence suggests that managers opportunistically inflate ERR when firms engage in merger and acquisition activities.

The time-series patterns for both acquiring and non-acquiring firms are clear. Assumed returns have steadily decreased, especially after the 2002 fiscal year. In fact, the average change in assumed returns ΔERR is largest in 2002, at -0.31% and -0.32%, respectively, for acquiring and non-acquiring firms in Panels A and B of Table 2. At the same time, the actual returns *ARR* are much higher in 2002 than in 2001 for both acquiring and non-acquiring firms. Therefore, the large drop in *ERR*s in 2002 cannot be attributed to the drop in overall stock and bond market returns. Our hypothesis is that the introduction of SFAS 132R plays a significant role in the significantly lower *ERR* assumptions in 2002, but also in all subsequent years.

Assumed Returns and Pension Sensitivity Variables

We now examine linear regressions of firm-year assumed returns on the log of various pension sensitivity measures. In all model specifications, we control for the contemporaneous and lagged actual returns on plan assets.[7] We include 30 industry dummy variables in the regressions. Standard errors are corrected for clustering at both the firm level and fiscal year level (Petersen, 2009; Thompson, 2011). The regression takes the following form:

$$ERR_{i,t} = \alpha_0 + \alpha_1 \log(Y_{i,t}) + \alpha_2 ARR_{i,t} + \alpha_3 ARR_{i,t-1} + \sum INDUSTRY + \varepsilon_{i,t}$$

$$= \alpha_0 + \alpha_1 \log(Y_{i,t}) + CONTROLS_{i,t} + \varepsilon_{i,t}, \quad (1)$$

where *Y*, in each column of Table 3, is alternatively assigned the value of one of the following pension sensitivity variables: *PA/OIBDP*, *PA/OIADP*, *PA/IB*, *PA/NI*, and *PA/AT*. *CONTROLS* refer to *ARR*, ARR_{-1}, and *INDUSTRY*. Additional lagged ARRs are not significant.

Column 1 of Table 3 shows that the estimated coefficient α_1 on the log of the first pension sensitivity variable *PA/OIBDP* is 0.247, with a t-statistic of 12.53. From summary statistics in Panel A of Table 1, the 25th percentile and 75th percentile *PA/OIBDP* are 0.346

[7] We also consider contemporaneous and lagged returns on the S&P 500 Index and yields on 10-year U.S. Treasury bonds. These two variables are not significant.

and 1.481, respectively. This implies that a movement from the 25th percentile of log pension sensitivity (log(0.346)) to the 75th percentile (log(1.481)) would be associated with a 0.36% increase in the assumed return.[8] At the 75 percentile of pension sensitivity, a 0.36% increase in the assumed return raises a firm's reported earnings by 0.53%. The estimated α_1 and α_2 coefficients (*t-statistic*) on current and lagged actual returns are 0.062 (3.10) and 0.057 (4.52), respectively. Table 2 also explores a number of other pension sensitivity variables. Column 2 uses *PA/OIADP* as a pension sensitivity measure. The estimated coefficient (*t-statistic*) is 0.217 (12.39). Columns 3-5 use *PA/IB*, *PA/NI*, and *PA/AT*. Overall, Table 3 generates similar estimates with similar significance levels, using alternative pension sensitivity measures. Therefore, for subsequent analysis, we focus on the first two pension sensitivity measures which are directly related to firms' abilities to boost their earnings figures via inflated assumptions on returns from their pension assets.

Assumed Returns and Merger and Acquisition Effects

In many corporate mergers, the acquiring firm buys the target firm with its stock. The acquiring firms have strong incentives to increase their stock prices pre-merger.[9] This will reduce the number of shares they need to deliver to target firms, thereby, effectively reducing the possibility of earnings dilution and erosion of control and lowering the cost of acquiring the target firm (Erickson and Wang, 1999). On the other hand, there are potential litigation costs associated with pre-merger earnings management (Ball and Shivakumar, 2008; Gong et al., 2008). In addition, the target firms' management have the resources to hire accountants and investment bankers to evaluate the acquirer's financial statements. They have strong incentives to assure acquiring firms' earnings are free of material management. Using an accrual based measure, Erickson and Wang (1999) and Louis (2004) find that acquiring firms manage earnings upward in the period prior to the merger agreement. Gong et al. (2008) report a positive association between acquiring firms' pre-merger abnormal accruals and post-merger announcements in stock-based transactions.

[8] 0.247×(log(1.481)-log(0.346)) = 0.36. A pension sensitivity of 1.481 times 0.36% is 0.53%.

[9] The Thomson One Merger and Acquisition Dataset does not contain information on method of payment. Therefore, we cannot test the hypothesis that firms have stronger incentives to manage earnings via inflated ERRs in stock- based acquisitions than in cash-based acquisitions.

We examine whether managers tend to set higher ERRs to boost their reported earnings for the fiscal year during which firms engage in merger and acquisition activities by running the following regressions:

$$ERR_{i,t} = \alpha_0 + \alpha_1 \log(Y_{i,t}) + \alpha_2 \log(Y_{i,t}) \times DMA_{i,t} + \alpha_3 DMA_{i,t} + CONTROLS_{i,t} + \varepsilon_{i,t}, \quad (2)$$

where *DMA* is an indicator variable that is set equal to one when the firm acquires another firm in that year and zero otherwise. This indicator variable is meant to capture firms' incentives to inflate reported earnings during the fiscal year when an acquisition is taking place. The regression also includes the interactive term log(*Y*)×*DMA*. The interaction term allows the effect of this incentive to vary with the log of pension sensitivity variables.

The estimation results appear in Table 4. When we use *PA/OIADP* as a measure of pension sensitivity, the estimate (*t-statistic*) for *DMA* is 0.054 (1.56). This implies that acquiring firms assume a return that is 0.054% higher than non-acquiring firms in the same industry, although the significance level is below 10%. The estimate (*t-statistic*) for the interactive term log(*Y*)×*DMA* is 0.065 (2.71). This implies that for each additional point of log sensitivity, this effect is 0.065% higher. The result using *PA/OIADP* as a measure of pension sensitivity is similar.

Table 4 also reports the estimated results from using the acquiring firm sample and the non-acquiring firm sample, respectively. Columns 2-3 show that the slope coefficients (*t-statistic*) on log(*PA/OIADP*) are 0.238 (10.84) and 0.188 (9.83), respectively, for acquiring and non-acquiring firms. We implement the formal Chow (1960) test to examine the null hypothesis that the slope coefficients are the same for the two samples. The test statistic (*p-value*) is 5.92 (0.02). The formal Chow (1960) test statistic (*p-value*) is 3.10 (0.08) when we use *PA/OIBDP* as a measure of pension sensitivity. These results suggest that managers in acquiring firms are more sensitive than managers in non-acquiring firms to the opportunity to boost reported earnings via pension assumptions, particularly by increasing assumed returns on pension assets.

Assumed Returns and SFAS 132R Effects

Pension accounting involves many assumptions in calculating pension liabilities and expenses. The most controversial is using *ERR* (Zion and Carache, 2005). Prior to SFAS 132R,

firms often inflated ERRs. *ERR* times pension assets is part of negative pension expenses. Therefore, the direct effect of a higher ERR is higher reported earnings, which can be as large as $44 billion in 2003 (Zion and Carache, 2002). The new requirement under SFAS 132R to disclose asset allocation and describe investment strategies imposes restrictions on managers' discretions in making ERR assumptions because firms now need to justify ERR in their asset allocations. Chuk (2013) finds that firms that use inflated ERRs prior to SFAS 132R actually increase their asset allocation to higher-risk securities after SFAS 132R. In addition, firms that use inflated ERRs prior to SFAS 132R actually decrease their ERRs after the implementation of SFAS 132R.

Here we study the impact of SFAS 132R on managers' incentives to set a higher ERR when pension assets are large relative to firms' earnings. Our work differs from that of Chuk (2013) in a number of important ways. First, we examine pension assumption management within the context of mergers and acquisitions. Second, in addition to examining the overall level of ERR assumptions during the pre- and post-SFAS 132R period, we also examine whether managers are more sensitive to earnings management opportunities before and after SFAS 132 is in effect. Specifically, we run the following regression:

$$ERR_{i,t} = \alpha_0 + \alpha_1 \log(Y_{i,t}) + \alpha_2 \log(Y_{i,t}) \times D132R_{i,t} + \alpha_3 D132R_{i,t} + CONTROLS_{i,t} + \varepsilon_{i,t}, \quad (3)$$

where *D132R* is an indicator variable set equal to one for fiscal years that end after December 15, 2003 and zero otherwise. This indicator variable is meant to capture whether firms' lower their ERR assumptions after the new requirement in SFAS 132R is in effect. The regression also includes the interactive term log(*Y*)×*D132*. The interactive term allows us to examine whether managers become more aggressive in exploiting earnings management opportunities when the effect of such management is stronger, i.e., when the ratio of pension assets to earnings is higher.

Table 5 provides a summary of the regression results. The results pertaining to the pension sensitivity variable *PA/OIADP* show that the estimate (*t-statistic*) for *D132R* is -1.757 (-11.89). This translates into a 1.757% decline in ERR assumptions after SFAS 132R became effective. The estimate (*t-statistic*) for the interactive term log(*Y*) ×*D132* is 0.138 (5.13). This implies that for each additional point of log sensitivity, the effect is 0.138% higher. In other words, although firms lower their level of ERR assumptions after SFAS 132R is in place, firms become much more sensitive to exploiting opportunities to increase ERR when pension assets

are large relative to earnings. The results from using pension sensitivity variable *PA/OIBDP* are similar. Again, the evidence clearly indicates that firms become more sensitive to earnings management opportunities after SFAS 132R is in place, although firms did significantly cut their ERR assumptions.

The next two columns in Table 5 summarize the estimating results from using the pre- and post-SFAS 132R sample, respectively. In the case of pension sensitivity measure *PA/OIADP*, the slope coefficients (*t-statistic*) are 0.154 (8.30) and 0.209 (11.89), respectively. The formal Chow (1960) test statistic (*p-value*) is 5.62 (0.02), strongly rejecting the null hypothesis that the slope coefficients from pre- and post-SFAS 132R periods are the same. The results from pension sensitivity measure *PA/OIBDP* are close. The formal Chow (1960) test statistic (*p-value*) is 5.23 (0.02). In summary, these results suggest that after SFAS 132R became effective, (i) managers significantly cut their ERR assumptions, and (ii) managers are more sensitive to opportunities to boost reported earnings via pension assumptions, in particular, by increasing assumed return on pension assets.

Assumed Returns, Mergers and Acquisitions, and SFAS 132R Effects

In this section, we begin to investigate managers' incentives to manipulate earnings when firms engage in merger and acquisition activities and how the incentives change before and after FASB implemented new pension accounting disclosure standards in SFAS 132R. We run the following regression incorporating the effects associated with *DMA*, *D132R*, and their interactions:

$$\begin{aligned} ERR_{i,t} = {} & \alpha_0 + \alpha_1 \log(Y_{i,t}) + \alpha_2 \log(Y_{i,t}) \times D132R_{i,t} + \alpha_3 D132R_{i,t} + \\ & \alpha_4 \log(Y_{i,t}) \times DMA_{i,t} \times D132R_{i,t} + \alpha_5 \log(Y_{i,t}) \times DMA_{i,t} + \\ & \alpha_6 DMA_{i,t} \times D132R_{i,t} + \alpha_7 DMA_{i,t} + CONTROLS_{i,t} + \varepsilon_{i,t}. \end{aligned} \quad (4)$$

Since Equation (4) contain a few dummy variables, we implement the variance inflation factor (VIF) analysis for Equation (4) as in Hair et al. (2010). Our analysis does not reveal severe multi-collinearity problem. Recent work by Jensen and Ramirez (2013) points out the limitation of the traditional VIF tests though.

Our main results from Equation (4) are as follows. First of all, the estimated coefficient (*t-statistic*) on *DMA* is 0.164 (5.35) while the estimated coefficient (*t-statistic*) on *D132R* is -0.834 (-6.46). As expected, acquiring firms tend to set a higher ERR during the fiscal year when an acquisition is taking place. The new disclosure requirement under SFAS 132R constrains firms to set a lower ERR. The estimate (*t-statistic*) on the interactive term *DMA*×*D132R* is -0.125 (-2.94). This suggests that when an acquisition transaction takes place during the post-SFAS 132R period, firms tend to set a lower ERR than they do in the pre-SFAS 132R period. In fact, firms set ERR 0.125% lower in the post-SFAS 132R period.

Second, the estimated coefficient (*t-statistic*) on log(*PA/OIBPD*)×*DMA* is 0.054 (2.23) while the estimated coefficient (*t-statistic*) on log(*PA/OIBPD*)×*D132R* is 0.159 (4.56). This indicates that managers are more sensitive to earnings management opportunities when firms engage in mergers and acquisitions. Managers also become more sensitive to such opportunities in general (i.e., even without merger and acquisition transactions) during the post-SFAS 132R period. The question is whether managers become more sensitive when firms engage in mergers and acquisitions after SFAS 132R is in place. The estimated coefficient (*t-statistic*) on log(*PA/OIBPD*)×*DMA*×*D132R* is -0.039 (-1.06). In other words, the estimate has a negative sign but is not significant. There is a small tendency for managers to become less sensitive to exploiting earnings management opportunities when they engage in merger and acquisition activities after SFAS 132R became effective. But this effect is not statistically different from zero. The result using *PA*/*OIADP* as the pension sensitivity measure is essentially the same.

To summarize our findings, firms set a higher ERR when there is an acquisition taking place. Firms set a lower ERR after SFAS 132R is in place. The effect on *ERR* is stronger from SFAS 132R than from the acquisition transaction. Firms also become more conservative in setting a higher ERR in the case of an imminent acquisition transaction after SFAS 132R is in place. We confirm earlier evidence that firms are more sensitive to exploiting earnings management opportunities facing an acquisition transaction. We provide new evidence that firms also become more sensitive to identifying earnings management opportunities after SFAS 132R is in place, despite the fact that firms respond to SFAS 132R requirements and set a lower ERR in general. The sensitivity effect associated with SFAS 132R is stronger than the sensitivity effect associated with acquisition transactions.

Determinants of Equity Allocation

Managers have incentives to set high ERRs when firms undertake merger and acquisition activities. Managers need to justify their higher ERRs by allocating more of a firms' pension assets to equities. Earlier studies (Amir and Benartzi, 1998; Bergstresser et al., 2006) report a mixed outcome regarding the relation between *ERR* and percentage of pension assets allocated to equity (*EQUITY*). This section investigates the possibility that managers shift pension assets toward equity in order to justify high ERRs.

The first three columns in Table 7 report the OLS regressions of *ERR* on current and lagged actual returns from pension assets:

$$EQUITT_{i,t} = \alpha_0 + \alpha_1 ERR_{i,t} + \alpha_2 MC\_s_{i,t} + \alpha_3 DMA_{i,t} +$$

$$\alpha_4 D132R_{i,t} + CONTROLS_{i,t} + \varepsilon_{i,t}, \qquad (5)$$

where *EQUITY* is the percentage of pension assets allocated to equity and *MC_s* is a mandatory contribution measure. We employ two measures of mandatory contributions. First, according to Moody's (2006), mandatory pension contributions equal the sum of (i) the portion of pension expense earned by employees during the current period, i.e., service cost *SERV*, and (ii) the amortization of any funding shortfall. Therefore, our primary measure of mandatory contribution, *MC1*, is:

$$MC1_{i,t} = \begin{cases} SERV_{i,t} + (ABO_{i,t} - PA_{i,t})/30 & \text{if } PBO_{i,t} > PA_{i,t} \\ 0 & \text{if } PBO_{i,t} \leq PA_{i,t,} \end{cases}$$

where the funding shortfall, *ABO – PA*, is amortized over a 30-year period before 2006. Under the Pension Protection Act of 2006, firms must fully fund their pension plans within seven years.[10, 11] An alternative measure, *MC2*, follows Campbell, Dhaliwal, and Schwartz Jr. (2012):

$$MC2_{i,t} = \begin{cases} SERV_{i,t} & \text{if } PBO_{i,t} > PA_{i,t} \\ 0 & \text{if } PBO_{i,t} \leq PA_{i,t.} \end{cases}$$

[10] Notice that FASB determines funding status using projected benefit obligations, *PBO*, but the mandatory contribution is based on accumulated benefit obligations, *ABO*.

[11] Our results are essentially the same if we use a seven-year amortization schedule.

We scale the two mandatory contribution measures by total assets to obtain *MC1_s* and *MC2_s* and we use these scaled measures in the regressions. Panel A of Table 1 reports the mean values of *MC1_s* and *MC2_s* as 0.317% and 0.282% of total assets, respectively.

Column 1 in Table 7 shows that the OLS regression slope from *ERR* (*t-statistic*) is 7.414 (17.15). The estimates from *ARR* and ARR_{-1} are also highly significant. The two mandatory contribution measures are not significantly related to *EQUITY*. Interestingly, from Column 2, the estimated coefficient (*t-statistic*) for *D132R* is 2.932 (2.58). This indicates that managers allocate more pension assets to equities after SFAS 132R became effective. Since managers often set *ERR* and *EQUITY* simultaneously, in Columns 4 to 7 we employ two-stage least squares (2SLS) to investigate the relation between *ERR* and *EQUITY*. In the first stage, we use *MC1_s* (*MC2_s*), *DMA*, and *D132R* as the instruments for *ERR*. Columns 4 and 6 show that the estimates on *MC1_s* and *MC2_s* are 0.564 (7.60) and 0.669 (7.70), respectively. Mandatory contribution measures serve as good instruments for *ERR* as does the indicator variable *D132R*. Firms set higher ERRs when they face mandatory contributions and after SFAS 132R became effective. In the second stage, we regress *EQUITY* on predicted (instrumented) *ERR* or *ERR_HAT*. Columns 5 and 7 show that the estimated coefficients (*t-statistic*) from *ERR_HAT* are 3.989 (2.39) and 5.646 (3.50), respectively. Therefore, managers tilt more pension assets towards equity when they set higher ERRs.

5. Robustness Analysis

There are a few confounding events that take place during our sample period that might also lead to similar findings. In this section, we examine three important events. The first is that in December 2002, the SEC issued public warnings that it might challenge firms assuming ERRs above nine percent.[12] The second is that FASB issued SFAS 158, which became effective after December 15, 2006. SFAS 158 requires firms to immediately incorporate funding status into the balance sheet. Prior to SFAS 158, firms are allowed to keep part of their funding status as off-balance sheet items. The third event is that in July 2002, the Sarbanes–Oxley Act (SOX) became effective. The SOX legislation mandates a series of changes in corporate financial reporting and corporate governance for public companies.

[12] See Bloomberg Businessweek Magazine, 2004.

The Nine Percent ERR Assumptions

To deal with the confounding event resulting from the SEC public warning, we first construct a sample that eliminates *ERR*s that are above nine percent. Then we create an indicator variable (*D9PCT*) for those observations with *ERR*s larger than nine percent. The pension sensitivity variable is *PA/OIADP*. Columns 1 in Panel A of Table 8 report the estimates for the main Equation (4) using the omitted observation approach. *ERR*s are higher than nine percent for 2,485 firm-years observations, or 16% of all firm-year observations. The sample size now becomes 12,708. The estimates essentially mirror those estimates using the full sample of 15,193 firm-year observations. Columns 1 in Panel B of Table 8 summarize the estimation when we add log(*Y*)×*ROBUST* and *ROBUST* in a simple model specification that does not involve additional interactive terms to reduce the multi-collinearity problem:

$$ERR_{i,t} = \alpha_0 + \alpha_1 \log(Y_{i,t}) + \alpha_2 \log(Y_{i,t}) \times DMA_{i,t} + \alpha_3 \log(Y_{i,t}) \times D132R_{i,t} +$$

$$\alpha_4 \log(Y_{i,t}) \times ROBUST_{i,t} + \alpha_5 DMA_{i,t} + \alpha_6 D132R_{i,t} +$$

$$\alpha_7 ROBUST_{i,t} + CONTROLS_{i,t} + \varepsilon_{i,t}, \qquad (6)$$

where *ROBUST* is assigned to be the indicator variable *D9PCT*. It is not surprising to see that the estimate (t-statistic) on *D9PCT* is 1.259 (35.91). The interesting outcome is from log(*PA*/*OIADP*)×*D9PCT*. The corresponding estimate (*t-statistic*) is -0.137 (-5.08). In other words, firms are less sensitive to the size of pension assets relative to earnings when they set their ERRs significantly higher than nine percent. SAFS 132R's effect on *ERR* remains strong. The estimate (t-statistic) for *D132R* is -0.565 (-4.44) while the estimate (*t-statistic*) for log(*PA*/*OIADP*)×*D132R* is 0.181 (7.15).

SFAS 158

Similarly, to examine the confounding effect of SFAS 158, Columns 2 in Panel A of Table 8 show the results eliminating firm-year observations after December 15, 2006. The sample size reduces to 9,303. Our results regarding the merger and acquisition effects and SFAS 132R's effects on *ERR* are again similar to those from the full sample of 15,193 firm-year observations. Columns 2 in Panel B of Table 8 report the estimation when we add log(*Y*)×*ROBUST* and *ROBUST* in a simple model specification that does not involve additional

interactive terms, as in Equation (6). Now *ROBUST* refers to the indicator variable *D158*. The pension sensitivity variable is *PA/OIADP*. The estimate (*t-statistic*) on the indicator variable *D158* is -0.516 (-3.75). The estimate (*t-statistic*) on log(*PA/OIADP*)×*D158* is 0.028 (1.20). Firms set even lower ERRs from 2006 to 2015, taking into account the fact that *D132R* controls for the overall low levels of *ERR*s from 2003 to 2015. Also, there is no evidence of firms being additionally sensitive to the ratio of pension assets to earnings during the 2006-2015 period.

Sarbanes–Oxley Act

The enactment of the Sarbanes–Oxley Act in July 2002 is a significant event for corporate America. SOX mandates a series of changes in corporate financial reporting and corporate governance for public companies in response to several high-profile financial scandals. Here we highlight three important provisions of the Act that are relevant to our study. First, Section 302 requires the company's chief executive officers and chief financial officers to certify the accuracy of company financial statements. Second, Section 404 addresses management's responsibility to establish sound internal controls and assess the effectiveness of these controls. Third, SOX sets more stringent standards for audit committee membership.

However, a major difficulty in evaluating SOX is that it applies to the majority of publicly traded firms (Leuz, 2007; Leuz and Wysocki, 2016). It is difficult to separate the effects of SOX from other contemporaneous events. In our case, SFAS 132R was issued in December 2003, just one and half years after the passage of SOX in July 2002. We, therefore, focus on cross-sectional differences in the way SOX affects firms. In particular, we obtain indicator variables from SOX Section 302 Disclosure Controls. The data source is AuditAnalytics from WRDS. The Section 302 indicator variables include (i) whether firms' disclosure controls are effective; (ii) whether a material weakness existed in firms' disclosure controls; and (iii) other disclosure control weaknesses in accounting rule applications, financial fraud irregularities and misrepresentation, and errors in accounting application. We also obtain indicator variables from SOX Section 404 Internal Controls. The Section 404 indicator variables include (i) whether firms' internal controls on financial reporting is effective and (ii) the number of material weaknesses in the internal controls identified. We use *ROBUST* to denote those variables related to the SOX legislation and estimate the following basic model:

$$ERR_{i,t} = \alpha_0 + \alpha_1 \log(Y_{i,t}) + \alpha_2 \log(Y_{i,t}) \times ROBUST_{i,t} + \alpha_3 ROBUST_{i,t} + CONTROLS_{i,t} + \varepsilon_{i,t}. \quad (7)$$

After merging with the pension data, the number of firm-year observations is significantly reduced to between 7,000 and 8,500. None of these SOX related variables are significant in the simple regression specified in Equation (7). Therefore, our findings of strong effects on *ERR* from SFAS 132R, issued in December 2003, cannot be attributed to the SOX legislation.[13]

Other Variables

In addition to SOX legislation related variables, we also consider the following five variables that might affect firms' earnings management: institutional ownership, number of analysts following, corporate governance measures, auditing fees, and big-4 auditing firms. A number of early studies show that these variables are related to the transparency of firms (Lang and Maffett, 2011; Lang, Lins, and Maffett, 2012). Again, we examine whether cross-sectional differences in these variables affect *ERR* in a simple regression in Equation (7). Institutional ownership has a significantly negative correlation of -0.17 with *ERR*. But institutional ownership is not significant in the regression. The corporate governance measure has a significant correlation of -0.31 with *ERR*, but it is not significant in the regression either. Number of analysts following has a significant positive correlation of 0.14 with institutional ownership but does not show any reliable patter in the regressions. The average auditing fees are approximately 0.11% of total assets in our sample and have a significantly negative correlation of -0.15 with *ERR*. In the simple regression from Equation (7), the estimated coefficient on auditing fees variable is -0.385 (-2.55). But the estimated coefficient on the interactive term log(*PA/OIBDP*)×*ROBUST* is not significant, where *ROBUST* is assigned to be the auditing fee. The indicator variable that captures whether firms' auditing is performed by big-four firms is not significant either. Overall, our evidence shows that other variables that may potentially affect the level of *ERR* and managers' sensitivity to managing ERRs cannot change the strong results from SFAS 132R.

6. Conclusions

[13] Doyle et al. (2007) and Ashbaugh-Skaife et al. (2008) study the relation between internal control deficiency and accrual quality.

In this paper, we study the impact of pension accounting standard changes on earnings management via pension assumptions. In particular, by inflating the assumed rate of returns on pension assets ERR, management can significantly increase reported earnings when there are strong incentives to boost stock prices as in the case of imminent acquisition activities. We examine whether firms' earnings management behavior alters after SFAS 132R, requiring a higher level of disclosure of pension asset allocation and investment strategies, became effective. Our basic approach is to regress *ERR* on (i) indicator variables that capture merger and acquisition activities and the introduction of SFAS 132R; (ii) the log of pension sensitivity variables such as the ratio of pension assets to ordinary income before depreciation; and (iii) interactive terms between indicator variables and the log of pension sensitivity variables. A positive slope coefficient from the log of pension sensitivity variables indicates managers are sensitive to such earnings management opportunities. A positive slope coefficient from the interactive term suggests that such sensitivity varies with major corporate activities such as acquisitions and major changes in pension accounting standards.

We first confirm earlier findings that, on average, acquiring firms tend to set a higher ERR during the fiscal year an acquisition is taking place. Managers also become sensitive to earnings management opportunities when firms engage in mergers and acquisitions. Then we show that the new disclosure requirements under SFAS 132R do, in general, constrain firms to set lower ERRs after SFAS 132R is in place. However, managers become more sensitive to opportunities to boost reported earnings by inflating ERRs during the post-SFAS 132R period. The slope coefficient on the interactive term, log of pension sensitivity variable times an indicator variable that captures the post-SFAS 132R sample period, is positive and highly significant. Despite the fact that managers have less discretion in setting ERRs in the post-SFAS 132R era, they actively exploit such opportunities when pension assets are large relative to earnings measures, i.e., when potential gains of earnings management are large.

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TABLE 1 Summary Statistics

Panel A: Basic Statistics for Pension Variables and Indicator Variables

Variable	Mean	25%	Median	75%	Std. Dev.	Obs.
Assume rate of return on pension assets, *ERR* (%)	8.285	7.800	8.500	9.000	1.126	15,193
Actual rate of return on pension assets, *ARR* (%)	9.257	7.239	8.251	9.749	5.000	15,193
Pension assets, *PA*	1391	42	176	722	5424	15,193
Pension liabilities, *PBO*	1524	49	204	803	5929	15,193
PA/OIBDP, when *OIBDP* > 0	1.245	0.346	0.788	1.481	1.719	15,193
PA/OIADP, when *OIADP* > 0	3.884	0.492	1.148	2.275	146.747	15,193
PA/IB, when *IB* > 0	6.706	0.872	2.155	4.472	84.918	14,242
PA/NI, when *NI* > 0	6.641	0.850	2.103	4.386	85.388	14,023
PA/AT	0.158	0.048	0.104	0.201	0.178	15,193
PBO/OIBDP, when *OIADP* > 0	1.364	0.424	0.870	1.616	1.834	15,193
PBO/OIADP, when *OIADP* > 0	4.216	0.595	1.271	2.491	147.720	15,193
Scaled mandatory contribution one, *MC1_s=MC1/AT* (%)	0.317	0.000	0.178	0.479	0.422	12,921
Scaled mandatory contribution two, *MC2_s=MC2/AT* (%)	0.282	0.000	0.157	0.423	0.380	15,193
Indicator for SAFS 132R, *D132R*	0.538	0.000	1.000	1.000	0.499	15,193
Indicator for firm-year when acquisitions take place, *DMA*	0.350	0.000	0.000	1.000	0.477	15,193
Equity Allocation, *EQUITY* (%)	56.825	49.900	60.000	67.400	16.650	7,538

Panel B: Market, Accounting, and Merger and Acquisition Information for Acquiring Firms

Variable	Mean	25%	Median	75%	Std. Dev.	Obs.
Total assets (*AT*, million $)	13368	904	2746	8829	46898	5,320
Sales (*SALE*, million $)	9916	907	2498	7319	26365	5,320
Market value (*ME*, million $)	11568	838	2614	8795	24491	5,320
Book-to-market ratio (*BM*)	2.928	1.482	2.166	3.339	2.650	5,252
Price-earnings ratio (*PE*)	23.367	13.465	17.832	23.729	23.867	5,000
Return on assets (*ROA*,*OIADB/AT*)	0.111	0.072	0.102	0.141	0.056	5,320
Return on equity (*ROE*, *NI/BE*)	0.148	0.077	0.124	0.187	0.157	5,252
Sales growth (*SALG*)	0.109	0.022	0.083	0.167	0.176	4,725
Fiscal year-end stock price (*PRCC_F*, $)	40.651	23.000	35.050	52.000	23.994	5,320
PCTACQ (%)	88.514	100.000	100.000	100.000	27.120	5,044
SOUGHT (%)	88.024	100.000	100.000	100.000	27.802	5,083
POSTOWN (%)	90.875	100.000	100.000	100.000	25.216	5,087
VALUE (million $)	661	23	86	301	3794	2,847

Panel C: Market and Accounting Information for Non-Acquiring Firms

Variable	Mean	25%	Median	75%	Std. Dev.	Obs.
Total assets (*AT*, million $)	6114	483	1556	4973	18054	9,873
Sales (*SALE*, million $)	4563	465	1368	4014	11564	9,873
Market value (*ME*, million $)	4988	389	1221	3776	12581	9,873
Book-to-market ratio (*BM*)	2.488	1.180	1.691	2.715	2.581	9,713
Price-earnings ratio (*PE*)	23.145	12.671	16.572	22.776	26.040	9,023
Return on assets (*ROA*,*OIADB/AT*)	0.101	0.063	0.088	0.127	0.058	9,873
Return on equity (*ROE*, *NI/BE*)	0.124	0.061	0.097	0.159	0.166	9,713
Sales growth (*SALG*)	0.070	-0.004	0.054	0.126	0.165	8,160
Fiscal year-end stock price (*PRCC_F*, $)	33.862	19.000	28.125	42.090	21.178	9,873

Panel D: Pairwise Correlations

	ERR	*ARR*	Log *(PA/OIBDP)*	Log *(PA/OIADP)*	Log *(PA/IB)*	Log *(PA/NI)*	Log *(PA/AT)*	Log *(PBO/OIBDP)*
ARR	0.31**							
Log*(PA/OIBDP)*	0.30**	0.10**						
Log*(PA/OIADP)*	0.29**	0.10**	0.97**					
Log*(PA/IB)*	0.30**	0.11**	0.90**	0.93**				
Log*(PA/NI)*	0.30**	0.11**	0.89**	0.91**	0.98**			
Log*(PA/AT)*	0.33**	0.12**	0.93**	0.88**	0.81**	0.81**		
Log*(PBO/OIBDP)*	0.22**	0.05**	0.96**	0.94**	0.87**	0.86**	0.88**	
Log*(PBO/OIADP)*	0.21**	0.05**	0.93**	0.97**	0.89**	0.88**	0.82**	0.97**

	ERR	*ARR*	*DMA*	*D132R*	*MC1_s*	*MC2_s*
ARR	0.31**					
DMA	-0.02**	-0.01				
D132R	-0.52**	-0.29**	0.07**			
MC1_s	0.01	-0.07**	0.01	0.28**		
MC2_s	0.10**	-0.04**	0.01*	0.12**	0.96**	
EQUITY	0.49**	0.29**	-0.01	-0.01	0.10**	0.13**

The sample consists of U.S. firms on the NYSE/AMEX/NASDAQ and the CRSP and COMPUSTAT merged files during the June 1992 to August 2015 period. Panel A reports summary statistics that are constructed using pooled firm-year observations. Panel A first reports summary statistics for assumed return on pension assets (*ERR*), actual returns on pension assets (*ARR*), pension assets (*PA*), and pension liabilities measured by

projected benefit obligations (*PBO*). *ARR* is dollar returns on pension assets scaled by beginning of the fiscal year pension assets. Panel A then reports summary statistics for seven pension sensitivity variables: the ratios of *PA* to *OIBDP*, *PA* to *OIADP*, *PA* to *IB*, *PA* to *NI*, *PA* to *AT*, *PBO* to *OIBDP*, and *PBO* to *OIADP*. Mandatory contributions include two measures, *MC1* and *MC2*, following Moody's (2006) and Campbell, Dhaliwal, and Schwartz Jr. (2012), respectively. *MC1*_s and *MC2*_s scale two mandatory contribution measures by total assets. The indicator variable *D132R* takes the value of one for fiscal years after December 15, 2003 when SFAS became effective and zero otherwise. The indicator variable *DMA* takes the value of one for fiscal years when an acquisition takes place and zero otherwise. *EQUITY* measures the percentage of pension assets allocated to equities. Panel B reports market, accounting, and merger and acquisition information for acquiring firms. Panel C reports market and accounting information for non-acquiring firms. The details of the construction of the variables are listed in Appendix A. Panel D of the table also reports the pair-wise correlation coefficients for selected variables. * and ** indicate significance at the 5% and 10% levels, respectively.

TABLE 2 Assumed Returns on Pension Assets Sorted by Calendar Year and by Whether the Firm Conducts Mergers and Acquisitions

Panel A: Assumed Returns Sorted by Fiscal Year for MA Firms

Fiscal Year	Obs.	*ERR*	*ΔERR*	*ARR*	Number of *ΔERR>0*	Number of *ΔERR=0*	Number of *ΔERR<0*	Fraction of *ΔERR>0*	Fraction of *ΔERR=0*	Fraction of *ΔERR<0*
1993	142	9.03	-0.19	11.53	6	100	36	0.04	0.70	0.25
1994	163	8.99	-0.05	2.43	10	132	21	0.06	0.81	0.13
1995	187	9.01	0.03	19.51	15	159	13	0.08	0.85	0.07
1996	205	9.01	0.02	13.67	18	173	14	0.09	0.84	0.07
1997	223	9.11	0.08	18.91	31	185	7	0.14	0.83	0.03
1998	221	9.13	0.03	9.22	28	178	15	0.13	0.81	0.07
1999	177	9.06	-0.00	9.09	22	138	17	0.12	0.78	0.10
2000	187	9.18	0.09	8.61	31	145	11	0.17	0.78	0.06
2001	171	9.18	-0.02	9.07	13	132	26	0.08	0.77	0.15
2002	166	8.74	-0.31	9.45	5	80	81	0.03	0.48	0.49
2003	182	8.46	-0.31	9.93	4	82	96	0.02	0.45	0.53
2004	239	8.24	-0.13	8.92	8	161	70	0.03	0.67	0.29
2005	250	8.07	-0.11	8.16	16	151	83	0.06	0.60	0.33
2006	284	8.05	-0.04	8.17	34	191	59	0.12	0.67	0.21
2007	282	7.99	-0.03	7.80	35	184	63	0.12	0.65	0.22
2008	235	7.90	-0.07	7.61	31	144	60	0.13	0.61	0.26
2009	191	7.79	-0.09	8.62	19	113	59	0.10	0.59	0.31
2010	214	7.73	-0.11	8.26	21	121	72	0.10	0.57	0.34
2011	257	7.46	-0.18	7.59	22	125	110	0.09	0.49	0.43
2012	239	7.30	-0.25	7.44	14	102	123	0.06	0.43	0.51
2013	218	7.08	-0.16	6.90	18	94	106	0.08	0.43	0.49
2014	278	6.84	-0.13	6.52	38	142	98	0.14	0.51	0.35
2015	14	6.78	-0.13	6.27	0	9	5	0.00	0.64	0.36

Panel B: Assumed Returns Sorted by Fiscal Year for non-MA Firms

Fiscal Year	Obs.	*ERR*	*ΔERR*	*ARR*	Number of *ΔERR>0*	Number of *ΔERR=0*	Number of *ΔERR<0*	Fraction of *ΔERR>0*	Fraction of *ΔERR=0*	Fraction of *ΔERR<0*
1993	449	8.87	-0.10	11.40	20	343	86	0.04	0.76	0.19
1994	460	8.82	-0.04	1.45	43	343	74	0.09	0.75	0.16
1995	438	8.87	0.05	19.64	60	344	34	0.14	0.79	0.08
1996	447	8.91	0.04	12.86	53	370	24	0.12	0.83	0.05
1997	417	8.93	0.05	17.86	52	340	25	0.12	0.82	0.06
1998	330	8.95	0.03	9.22	39	262	29	0.12	0.79	0.09
1999	320	9.03	0.03	8.74	35	260	25	0.11	0.81	0.08
2000	284	9.01	-0.00	8.65	35	223	26	0.12	0.79	0.09
2001	286	8.97	-0.01	8.26	28	223	35	0.10	0.78	0.12
2002	298	8.66	-0.32	9.29	8	154	136	0.03	0.52	0.46
2003	330	8.33	-0.28	9.32	11	181	138	0.03	0.55	0.42
2004	387	8.26	-0.06	8.79	27	268	92	0.07	0.69	0.24
2005	429	8.15	-0.08	8.14	15	301	113	0.03	0.70	0.26
2006	413	8.03	-0.11	7.89	23	274	116	0.06	0.66	0.28
2007	381	8.04	-0.01	7.76	34	296	51	0.09	0.78	0.13
2008	322	8.02	-0.06	7.69	17	233	72	0.05	0.72	0.22
2009	339	7.90	-0.11	9.01	26	197	116	0.08	0.58	0.34
2010	357	7.73	-0.14	8.07	29	207	121	0.08	0.58	0.34
2011	354	7.55	-0.21	7.63	14	180	160	0.04	0.51	0.45
2012	361	7.19	-0.30	7.14	13	137	211	0.04	0.38	0.58
2013	387	7.05	-0.21	6.78	27	172	188	0.07	0.44	0.49
2014	346	6.98	-0.09	6.53	47	180	119	0.14	0.52	0.34
2015	25	6.36	-0.23	6.05	2	12	11	0.08	0.48	0.44

Panels A sorts observations of assumed returns on pension assets (*ERR*) by fiscal year for acquiring firms. Panel B sorts observations of *ERR* by fiscal year for non-acquiring firms. Panels A and B report the number of observations, the mean value of *ERR*, the mean value of changes in *ERR* relative to the previous fiscal year (Δ*ERR*), number of cases when Δ*ERR* is positive, zero, and negative, and fraction of cases when Δ*ERR* is positive, zero, and negative, respectively. Panels A and B also report the mean values of actual returns on pension assets (*ARR*). *ARR* is dollar returns from pension assets scaled by the beginning of the fiscal year pension assets (PA_{-1}).

TABLE 3 Assumed Returns and Pension Sensitivity Variables

Model	1	2	3	4	5
	PA/OIBDP	*PA/OIADP*	*PA/IB*	*PA/NI*	*PA/AT*
Log*(Pension sensitivity)*	0.247	0.217	0.203	0.201	0.279
	(12.53)**	(12.39)**	(12.61)**	(12.72)**	(12.94)**
ARR	0.062	0.063	0.061	0.061	0.060
	(3.10)**	(3.13)**	(3.04)**	(3.01)**	(3.08)**
ARR_{-1}	0.057	0.058	0.056	0.056	0.055
	(4.52)**	(4.45)**	(4.53)**	(4.46)**	(4.50)**
Observations	15,193	15,193	14,242	14,023	15,193
R^2	0.267	0.262	0.257	0.257	0.280
Industry dummy	Yes	Yes	Yes	Yes	Yes

The table reports the estimation results for the slope coefficients from regressing assumed rate of returns on pension assets (*ERR*) on the log of pension sensitivity variables and current and lagged actual returns on pension assets (*ARR* and ARR_{-1}). Pension sensitivity variables include the ratios of *PA* to *OIBDP*, *PA* to *OIADP*, *PA* to *IB*, *PA* to *NI*, and *PA* to *AT*. Actual returns on pension assets *ARR* are dollar returns from pension assets scaled by the beginning of the fiscal year pension assets (PA_{-1}). Industry dummies are included. * and ** indicate significance at the 5% and 10% levels, respectively. Firm and fiscal year two-way clustered *t*-statistics are reported.

TABLE 4 Assumed Returns and Mergers and Acquisitions

Model	1	2	3
	Full Sample	1991-2002	2003-2015
Log(*Pension sensitivity*)	0.195	0.238	0.188
	(9.61)**	(10.84)**	(9.83)**
Log(*Pension sensitivity*)×*DMA*	0.065		
	(2.71)**		
DMA	0.054		
	(1.56)		
ARR	0.063	0.047	0.055
	(3.12)**	(3.44)**	(4.13)**
ARR_{-1}	0.058	0.043	0.037
	(4.55)**	(3.87)**	(3.81)**
Chow test			5.92**
			(0.02)
Observations	15,193	5,320	9,873
R^2	0.264	0.515	0.474
Industry dummy	Yes	Yes	Yes

In Columns 1-2, the table reports the estimation results for the slope coefficients from regressing assumed rate of return (*ERR*) on pension assets on the log of pension sensitivity ratios (*PA/OIADP*), interactive terms of the log pension sensitivity ratios with merger and acquisition indicator variable (log(pension sensitivity)×*DMA*), merger and acquisition indicator variable (*DMA*), and current and lagged actual returns on pension assets (*ARR* and ARR_{-1}). The indicator variable *DMA* takes the value of one for fiscal years when an acquisition takes place and zero otherwise. In Columns 2-3, the table splits the entire sample into the acquisition (MA) and non-acquisition (Non-MA) firm samples and estimates the model separately. The table also reports the Chow statistic (*p*-value) for testing the null hypothesis that the difference in slope coefficients from the two sub-samples are the same. Industry dummies are included. * and ** indicate significance at the 5% and 10% levels, respectively. Firm and fiscal year two-way clustered *t*-statistics are reported.

TABLE 5 Assumed Returns and Pension Disclosure Standards

Model	1	2	3
	Full Sample	1991-2002	2003-2015
Log(*Pension sensitivity*)	0.119	0.154	0.209
	(6.03)**	(8.30)**	(11.89)**
Log(*Pension sensitivity*)×*D132R*	0.138		
	(5.13)**		
D132R	-1.757		
	(-11.89)**		
ARR	0.053	0.024	0.148
	(4.12)**	(4.41)**	(9.78)**
ARR_{-1}	0.039	0.018	0.102
	(4.08)**	(3.82)**	(9.11)**
Chow test			5.62**
			(0.02)
Observations	15,193	7,026	8,167
R^2	0.490	0.138	0.484
Industry dummy	Yes	Yes	Yes

In Column 1, the table reports the estimation results for the slope coefficients from regressing assumed rate of return (*ERR*) on pension assets on the log of pension sensitivity ratios (*PA/OIADP*), interactive terms of the log pension sensitivity ratios with *D132R* that captures the effect of SFAS 132R (log(pension sensitivity)×*D132R*), *D132R*, and current and lagged actual returns on pension assets (*ARR* and ARR_{-1}). The indicator variable *D132R* takes the value of one for fiscal years after December 15, 2003 when SFAS 132R became effective and zero otherwise. In Columns 2-3, the table splits the sample into pre- and post-SFAS 132R periods and estimates the model separately. The table also reports the Chow statistic (*p*-value) for testing the null hypothesis that the difference in slope coefficients from the two sub-samples are the same. Industry dummies are included. * and ** indicate significance at the 5% and 10% levels, respectively. Firm and fiscal year two-way clustered *t*-statistics are reported.

TABLE 6 Assumed Returns, Mergers and Acquisitions, and Pension Disclosure Standards

Model	1	2
	PA/OIBDP	*PA/OIADP*
Log(*Pension sensitivity*)	0.135	0.111
	(5.04)**	(4.94)**
Log(*Pension sensitivity*)×*D132R*	0.159	0.139
	(4.56)**	(4.42)**
D132R	-0.834	-0.898
	(-6.46)**	(-6.74)**
Log(*Pension sensitivity*)×*DMA*×*D132R*	-0.039	-0.026
	(-1.06)	(-0.73)
Log(*Pension sensitivity*)×*DMA*	0.054	0.056
	(2.23)**	(2.64)**
DMA×*D132R*	-0.125	-0.094
	(-2.94)**	(-2.20)**
DMA	0.164	0.143
	(5.35)**	(5.04)**
ARR	0.036	0.037
	(2.87)**	(2.90)**
ARR_{-1}	0.032	0.033
	(3.23)**	(3.26)**
Observations	15,193	15,193
R^2	0.412	0.405
Industry dummy	Yes	Yes

The table reports the estimation results for the slope coefficients from regressing *ERR* on the log of pension sensitivity ratios (*PA/OIBDP* and *PA/OIADP*), interactive terms (log(pension sensitivity)×*DMA*, log(pension sensitivity)×*D132R*, log(pension sensitivity)×*DMA*×*D132R*), indicator variables and interactive terms (*DMA*, *D132R*, and *DMA*×*D132R*), and current and lagged returns on pension assets (*ARR* and ARR_{-1}). Industry dummies are included. * and ** indicate significance at the 5% and 10% levels, respectively. Firm and fiscal year two-way clustered *t*-statistics are reported.

TABLE 7 Equity Allocation and Assumed Returns

Model	1	2	3	4	5	6	7
	Dependent Variable *EQUITY*						
	OLS			2SLS			
				First Stage	Second Stage	First Stage	Second Stage
ERR	7.414	7.499	7.369				
	(17.15)**	(16.50)**	(16.19)**				
ERR_HAT					3.989		5.646
					(2.39)**		(3.50)**
ARR	0.475	0.443	0.476		1.696		1.706
	(3.15)**	(2.86)**	(3.16)**		(6.18)**		(6.63)**
ARR$_{-1}$	0.453	0.485	0.451		1.401		1.333
	(2.70)**	(2.69)**	(2.71)**		(6.91)**		(6.74)**
MC1_s		-0.603		0.564			
		(-0.61)		(7.60)**			
MC2_s			0.503			0.669	
			(0.45)			(7.70)**	
DMA		-0.002	-0.127	0.023		0.014	
		-(0.01)	(-0.30)	(0.62)		(0.38)	
D132R		2.932	2.992	-0.866		-0.822	
		(2.58)**	(2.51)**	(-7.63)**		(-7.69)**	
Observations	7,538	6,804	7,538	6,804	6,804	7,538	7,538
R^2	0.268	0.266	0.268	0.108	0.135	0.107	0.140
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The table examines the relation between assumed returns *ERR* and percentage of pension assets allocated to equities *EQUITY*. The first three columns report the OLS estimation results for the slope coefficients from regressing *EQUITY* on *ERR*, *ARR*, ARR_{-1}, scaled mandatory contributions (*MC1_s* or *MC2_s*), two indicators variables (*DMA* and *D132R*), and industry dummies. The next four columns report the two-stage least square (2SLS) regression results. In the first stage, *ERR* is regressed on mandatory contribution measures (*MC1_s* or *MC2_s*), *DMA*, *D132R*, and industry dummies to obtain *ERR_HAT*. In the second stage, *EQUITY* is regressed on *ERR_HAT*, *ARR*, and ARR_{-1}, and industry dummies. * and ** indicate significance at the 5% and 10% levels, respectively. Firm and fiscal year two-way clustered *t*-statistics are reported.

TABLE 8 Robustness Analysis: The Nine Percent Assumed Returns and SFAS 158

Panel A: Excluded Observations Approach

Model	1	2
	ERR<9%	Fiscal Year End < 20061215
Log(*Pension sensitivity*)	0.049	0.137
	(2.27)**	(6.55)**
Log(*Pension sensitivity*)×*D132R*	0.198	0.071
	(6.59)**	(2.78)**
D132R	-0.518	-0.610
	(-3.87)**	(-10.58)**
Log(*Pension sensitivity*)×*DMA*×*D132R*	-0.027	0.051
	(-0.79)	(1.08)
Log(*Pension sensitivity*)×*DMA*	0.057	0.052
	(2.69)**	(2.44)**
DMA×*D132R*	-0.041	-0.116
	(-1.03)	(-3.04)**
DMA	0.113	0.134
	(5.27)**	(4.53)**
ARR	0.041	0.017
	(2.73)**	(3.16)**
ARR_{-1}	0.034	0.017
	(2.96)**	(3.80)**
Observations	12,708	9,303
R^2	0.322	0.249
Industry dummy	Yes	Yes

Panel B: Indicator Variables Approach

Model	1	2
	ERR < 9%	Fiscal year end < 20061215
Log(*Pension sensitivity*)	0.068	0.114
	(3.51)**	(5.20)**
Log(*Pension sensitivity*×*DMA*)	0.029	0.044
	(1.44)	(1.96)**
Log(*Pension sensitivity*)×*D132R*	0.181	0.107
	(7.15)**	(4.08)**
Log(*Pension sensitivity*)×*D9PCT*	-0.137	
	(-5.08)**	
Log(*Pension sensitivity*)×*D158*		0.028
		(1.20)
DMA	0.067	0.097
	(3.10)**	(4.18)**
D132R	-0.565	-0.577
	(-4.44)**	(-7.66)**
D9PCT	1.259	
	(35.91)**	
D158		-0.516
		(-3.75)**
ARR	0.032	0.034
	(2.61)**	(2.99)**
ARR_{-1}	0.027	0.029
	(2.93)**	(3.38)**
Observations	15,193	15,193
R^2	0.527	0.427
Industry dummy	Yes	Yes

The first column in Panel A exclude the observations with *ERR* larger than nine percent. The next column in Panel A exclude observations with fiscal year after December 15, 2006. The table reports the estimation results for the slope coefficients from regressing *ERR* on the log of pension sensitivity variables (*PA/OIADP*), interactive terms (log(pension sensitivity)×*DMA*, log(pension sensitivity)×*D132R*, log(pension sensitivity)×*DMA*×*D132R*), two indicator variables and interactive terms (*DMA*, *D132R*, and *DMA*×*D132R*), and current and lagged returns on pension assets (*ARR* and ARR_{-1}). Panel B adds two indicator variables *D9PCT* and *D158* in the regressions that include all firm-year observations. *D9PCT* takes the value of one when *ERR* is larger than nine percent and zero otherwise. *D158* takes the value of one for fiscal years after December 15, 2006 and zero otherwise. Industry dummies are included. * and ** indicate significance at the 5% and 10% levels, respectively. Firm and fiscal year two-way clustered *t*-statistics are reported.

Appendix A: Construction of Pension Variables, Market and Accounting Variables, Merger and Acquisition Characteristics, and Dummy Variables

This appendix provides the definitions, references, and details of data items used to construct the pension variables, market and accounting variables, merger and acquisition characteristics, and dummy variables.

Variable Name	COMPUSTAT Items or Definitions
Pension Variables	
Assume rate of return on plan assets (*ERR*)	*ERR=PPROR*
Actual rate of return on plan assets	*ARR = PPROA/PA*$_{-1}$ dollar return on plan assets divided by beginning of the fiscal year plan assets
Plan assets (*PA*)	*PA* = pension plan assets + underfunded pension plan assets = *PPLAO* + *PPLAU*
Plan benefit obligations (*PBO*)	*PBO* = projected benefit obligations + underfunded projected benefit obligations = *PBPRO* + *PBPRU*
Funding status (*FS*)	*FS* = plan assets – projected benefit obligations = *PA* – *PBO*
Accumulated benefit obligations (*ABO*)	*ABO* = accumulated benefit obligations + underfunded accumulated benefit obligations = *PBACO* + *PBACU*
Service cost (*SERV*)	*SERV* = pension plans service cost = *PPSC*
Mandatory contributions (*MC*1)	*MC*1= service cost + minimum pension liabilities/30 = *SERV* + *MPL*/30 if *PBO* > *PA*; *MC1*= 0 if otherwise. *MPL* = minimum pension liabilities = *ABO* – *PA* if *PBO* > *PA*; *MPL* = 0 if otherwise.
Mandatory contributions (*MC*2)	*MC*2 = service cost = *SERV* if *PBO* > *PA*; *MC2* = 0 if otherwise.
Market and Accounting Variables	
Ordinary income before depreciation	*OIBDP*
Ordinary income after depreciation	*OIADP*
Income before extraordinary items	*IB*
Net income	*NI*

Total assets	*AT*
Sales	*SALE*
Market value (*ME*)	Market value fiscal year-end *ME* = *PRCC_F* × *CHSO*
Book-to-market ratio (*MB*)	*MB* = *ME/BE, if BE > 0* *BE* = Total assets – liabilities – book value of preferred stocks + balance sheet deferred taxes and investment tax credit = *AT – LT – PSTKL + TXDITC*
Price-earnings ratio (*PE*)	*PE* = *ME/NI*, if *NI* > 0
Return on assets (*ROA*)	*ROA* = *OIADP/AT*
Return on equity (*ROE*)	*ROE* = *NI/BE, if BE > 0*
Sales growth (*SALG*)	*SALG* = $SALE/SALE_{-1}$ – 1.0
<u>Merger and Acquisition Characteristics</u>	
Percentage sought	*SOUGHT*
Percentage acquired	*PCTACQ*
Percentage owned after transaction	*POSTOWN*
Value of the transaction	*VALUE*
<u>Indicator Variables</u>	
Indicator variable for MA firms (*DMA*)	*DMA* = 1, if merger and acquisition happened in the fiscal year = 0, otherwise
Indicator variable for SFAS 132R (*D132R*)	*D132R* = 1, if fiscal year-end > 20031215 = 0, otherwise
Indicator variable for *ERR* larger than nine percent	*D9PCT* = 1, if *ERR* > nine percent = 0, otherwise
Indicator variable for SFAS 158	*D158* = 1, if fiscal year-end > 20061215 = 0, otherwise