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The Potential for Inflating Earnings through the Expected Rate of Return on Defined Benefit Pension Plan Assets

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SYNOPSIS: Using a sample of firms over the period of 1991 through 2005, we examine the opportunity that exists for firms to inflate earnings through the expected rate of return (ERR) assumption associated with defined benefit pension plans. The evidence suggests that, on average, the ERR is not overstated relative to several benchmarks, including contemporaneous actual returns, historical cumulative actual returns, and expected future returns based on asset allocation within the pension. We also find that actual changes in the ERR are infrequent and typically have less than a 1 percent impact on annual operating income. We also estimate that a 0.5 percent change (50 bps) in the ERR will result in a cumulative effect on operating income over a five-year period of approximately 0.5 percent or less for the majority of firms. When we examine firms with the highest ERRs or with the greatest opportunity to inflate earnings, again, we find that the ERR is not overstated relative to several benchmarks. Although we do not observe pervasive inflating of reported income through the ERR during our sample period, we do find that for some firms, small increases in ERR can have a material impact on reported earnings. Our results provide evidence related to the pervasiveness, materiality, and impact of overstated earnings through the ERR, which helps regulators assess the costs and benefits of eliminating this discretion in financial reporting.

Keywords: pensions; expected rate of return; quality of findings; relevance versus reliability; managerial discretion.

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INTRODUCTION

Given the business failures since the beginning of this century, interested observers closely scrutinize managers' use of reporting discretion permitted by accounting standards. One setting that has drawn the attention of both the media and academics has been the accounting for pensions, including management's choice of the long-term expected rate of return on defined benefit plan assets (ERR).[1] A reason that the ERR has attracted attention is because management's choice of a higher ERR lowers pension expense, and thereby increases the firm's reported net income without affecting its underlying cash flows. As a result, concerns have arisen regarding the allowance of managers to choose the ERR because the discretion provides an opportunity to inflate earnings.

Inflating earnings through the choice of a higher ERR can arise because management either has an unintentional upward bias of expected long-term returns to the pension assets or wants to intentionally increase earnings. An unintentional upward bias could arise from management's overconfidence in their investment or forecasting ability (Malmendier and Tate 2005, 2008; Ben-David et al. 2007; Hribar and Yang 2010). Alternatively, most definitions of earnings management include an opportunistic choice by managers when given both the opportunity and the incentive to influence reported earnings. Regardless of managers' intent, inflated ERRs concern regulators if the discretion allowed by accounting standards significantly affects reported income and stakeholders do not unwind the impact on earnings.[2]

Research, including Bergstresser et al. (2006), Comprix and Muller (2006), and Lee and Zhang (2009), provide evidence that is consistent with management responding to various incentives for earnings management through the choice of the ERR. These studies assist regulators in allocating resources to monitor firms for possible earnings management. However, regulators that are considering limiting managerial discretion also need to assess the costs of reducing relevant information to stakeholders against the benefits of preventing unreliable financial statements (Healy and Wahlen 1999). The purpose of this study is to assist regulators and others in that assessment by providing evidence of the potential for pervasive and materially inflated reported earnings attributable to managers' choices of the ERR.

This research is timely, given that the International Accounting Standards Board (IASB) issued its exposure draft on pension accounting on April 29, 2010, and took public comments on the draft until September 6, 2010. The IASB currently aims to finalize the amendments to the draft as early as May 2011. The new policies will directly affect companies around the globe. The Financial Accounting Standards Board (FASB) also plans to address the ERR, but is letting the IASB lead this initiative in a joint effort to address pension accounting.[3]

While the flexibility to choose an ERR gives managers the opportunity to overstate reported earnings, the FASB's intention in allowing the choice was to reduce the impact of short-term

[1] See Bogle (2005), Borrus and Dwyer (2004), Schultz (2004), and Buffett (2007). Buffett (2007) states that "many companies continue to choose an assumption that allows them to report less-than-solid 'earnings.'"

[2] Commentators have also expressed concern that firms allocate a greater percentage of pension assets to equity in order to justify higher ERRs. Gold (2005) describes a positive bias in the valuation of a company created by pension accounting rules because investors fail to discount earnings sufficiently for risk. He argues investors cannot determine the appropriate risk of a firm's pension portfolio because of the smoothing process inherent in pension accounting and the lack of transparency in pension disclosures. As a result, the market does not appropriately discount the higher, but inherently riskier, earnings stream arising from a greater proportion of pension assets allocated to equities. The requirements to disclose asset allocation under ASC 715-20 should help the market assess the pension risk more effectively.

[3] Pension accounting has also captured the attention of U.S. securities regulators, as the Securities and Exchange Commission (SEC) publicly warned firms in 2002 that ERRs greater than 9 percent would attract attention and demand explanation, which was followed by the initiation of investigations into the assumptions used by six companies with large pension plans (*HR Insight*, a newsletter from PricewaterhouseCoopers [2003]).

volatility associated with actual pension plan performance and to better reflect managers' expectations of pension plans' long-term contribution to the performance of the firm.[4] For example, Hann et al. (2007) find evidence consistent with financial statements becoming less value relevant if firms are required to report net income based on fair-value pension accounting because of the volatility associated with actual returns to pension assets. In addition, managerial discretion in setting the ERR provides investors with a forecast of management's long-term expectations of the returns to the firm's pension assets. Eliminating this discretion may remove information relevant to investors in assessing the ability of the firm's executives and pension fund managers.

The trade-off between the relevance and reliability of financial information is central to the debate surrounding many accounting standards. Despite evidence suggesting that some firms manage earnings through the ERR, several aspects of ASC 715-30 limit a manager's ability to pervasively or materially inflate earnings through the ERR relative to discretionary choices inherent in other standards.[5] First, ASC 715-30 requires firms to set the ERR at the beginning of the year, whereas other managerial choices are typically made throughout the year. Because managers must establish the ERR before knowing the realization of pre-managed earnings, changing the ERR to meet specific earnings targets in a particular year or quarter is more difficult than using other discretionary accounting choices available to managers. Once a manager sets the ERR at the beginning of the year, it cannot be subsequently adjusted to address surpluses or shortages in other quarterly or annual earnings.[6]

Second, ASC 715-30 limits a manager's ability to inflate earnings over long-term horizons because the financial statements gradually incorporate the difference between expected and actual returns to pension assets over time, if the difference becomes sufficiently large. This smoothing process, however, does not prevent firms from potentially using the ERR to inflate earnings over shorter periods (e.g., a year).[7]

Third, ASC 715-30 requires firms to disclose the actual return on pension assets in the footnotes. The disclosure reduces the ability of managers' choices to mislead stakeholders because stakeholders can adjust reported earnings to reflect the pension plan's actual performance, provided the necessary information is clearly displayed and users of financial statements have knowledge of the relevant issues (Amir 1993; Hirst and Hopkins 1998; Hirshleifer and Teoh 2003; Picconi 2006).[8]

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[4] The benefits from discretion are not unique to the choice of the ERR. The FASB has enacted many standards that provide managers with discretion in order to reduce short-term volatility (e.g., classification of marketable securities) or convey relevant information to stakeholders (e.g., bad debt reserves, valuation allowance accounts) and, as a consequence, has created the potential to overstate earnings through these accounting standards (McNichols and Wilson 1988; Frank and Rego 2006). For further discussion of the value of discretion in accounting, see Pollock (2005).

[5] For reporting periods ending after September 15, 2009, FASB's Accounting Standards Codification (ASC) became effective. As a result, Statement of Financial Accounting Standard No. 87 is found primarily within ASC 715-30 Compensation-Retirement Benefits, Defined Benefit Plans-Pensions.

[6] ASC 715-30-35-68 states, "Measurement of net periodic pension cost for both interim and annual financial statements shall be based on the assumptions used for the previous year-end measurement unless more recent measurements of both plan assets and obligations are available or a significant event occurs, such as a plan amendment, that would ordinarily call for such measurements." We confirmed with FASB that this statement implies the ERR should be set at the end of the previous year. However, the rule does not prevent opportunistic managers with weak monitoring by auditors to define the meaning of "significant events" broadly.

[7] Under ASC 715-30, the smoothing of the difference between a firm's expected return and actual return on plan assets is called the "corridor method." It should be noted that the smoothing process works both ways—during periods when actual returns exceed the expected returns, the smoothing process will dampen earnings. For a more detailed discussion of the pension accounting, including the corridor method, see *Financial Reporting and Analysis* by Revsine et al. (2005).

[8] The disclosure of actual returns to the pension assets will help stakeholders determine any bias in the reported earnings, but is not sufficient to help them assess the risk associated with pension returns. Asset allocation information, which is now provided, helps stakeholders assess the risk associated with future pension earnings (Gold 2005; Coronado and Sharpe 2003).

Finally, all managerial choices in accounting are subject to the scrutiny of the external auditors. While scandals over the last decade have investors questioning the efficacy of auditors, the ability of auditors to verify the ERR is strengthened relative to other managerial choices, because most pensions hold primarily publicly traded securities with information from active markets to help assess the reasonableness of the ERR.

Although the reasons listed above suggest that inflating earnings using the ERR is more difficult than some other discretionary accounting choices, concerns over a manager's ability to boost income through the ERR have been debated since the FASB issued the original standard, Statement of Financial Accounting Standards (SFAS) No. 87, in 1985. The public's concern over the ERR appears to peak following short-term declines in asset prices, when the ERR overstates income for pension assets relative to the actual return. Following the bond market decline between 1990 and 1993, Blankley and Swanson (1995) examine 300 firms with defined benefit plans from 1987 to 1993 and conclude that the "evidence does not support widespread manipulation of expected returns in order to manage earnings." However, Amir and Benartzi (1998) examine ERRs from 1988–1994 and find that ERRs are only weakly associated with factors that ASC 715-30 outlines as appropriate determinants for choosing the ERR, suggesting that other factors, including managerial bias or abuse, may be related to the choice of the ERR. More recently, the decline in the equity market from 2000 to 2002 preceded renewed concerns related to inflated ERRs. Bergstresser et al. (2006), Comprix and Muller (2006), and Lee and Zhang (2009) examine samples covering this more recent time period and provide evidence consistent with firms reporting higher ERRs under conditions when management has incentive to inflate earnings.

In light of the studies that provide evidence consistent with some managers inflating earnings through the ERR, the objective of this study is to provide information relevant for assessing the opportunity and potential for pervasive and materially inflated earnings due to the ERR assumption. In that regard, we extend Blankley and Swanson (1995) using a larger, more comprehensive sample that covers a longer period of time (1991 through 2005) and incorporates the years examined in the prior studies that find evidence of earnings management.

We begin our analyses by providing evidence on the relation between ERRs and benchmarks of expected long-term economic performance of the pension assets.[9] Given the advantages and disadvantages of various benchmarks, we provide univariate analyses for three economic benchmarks: contemporaneous actual returns, historical actual returns, and expected future returns based on pension asset allocation. Collectively, these benchmarks incorporate historical returns, anticipated returns, and asset allocation, all factors which ASC 715-30 suggests should influence the ERR assumption. For each benchmark, we perform several analyses to provide a complete picture of the difference between the benchmarks and the ERR. First, we examine the distribution of the differences between the three benchmarks and the ERR to assess the frequency of overstated reported earnings due to the ERR. Second, we examine the impact of the difference between the benchmarks and ERR on operating income for each firm to assess the materiality of higher reported earnings due to the ERR. Third, we examine firms with extreme ERRs to see if firms with the highest forecasts of long-term returns are overly optimistic.

We follow our analyses of ERR levels with an analysis of changes in the ERR. While the levels analyses provide a perspective on how ERRs, over time, compare to the benchmarks, our analyses of the changes in ERR provide evidence relevant in assessing the timing of a manager's decision to change the ERR and its potential impact on earnings. We follow the analyses of changes with univariate analyses that examine whether firms with the greatest opportunity to affect operating

[9] Because prior research and public discussion center on boosting earnings through the ERR, we also focus on the prevalence and materiality of overstated earnings. Therefore, our analysis is generally one-directional and does not focus on the pervasiveness or materiality of understated earnings due to the ERR.

income through the ERR inflate the ERR relative to other firms. We conclude with estimates of the impact of different ERR assumptions on reported operating income.

Consistent with prior research, we document that, on average and at the median, the ERR does not increase reported earnings relative to our benchmarks. The mean and median difference between the contemporaneous actual rate of return on plan assets (ARR) and the ERR is positive and significant. While this result does not indicate that firms do not manage earnings through the ERR, it does imply that reported earnings are lower, on average, than would be reported if firms used actual returns instead of the ERR assumption. We also find that from 1998 through 2002, annualized historical actual rates of return over seven-year time horizons exceed the current ERR for a majority of the firms, but the current ERR, on average, is lower than the seven-year historical actual returns once the market downturn of 2000–2001 is fully incorporated. Using firm-level asset allocation data for a subsample of our firms to estimate future expected returns, we find the median implied equity returns are consistently between 10.7 percent and 11.8 percent over this time period, which is never significantly higher than the historical ten-year equity returns. To assess the materiality of overstated or biased earnings due to the ERR, we also examine the impact of the differences between the benchmarks and ERR on operating income. We find that the use of these three benchmarks would consistently lead to higher operating income, not lower income, being reported for the majority of firms.

In the analyses of the changes in the ERR, we find that only 25 percent of the firm-year observations exhibit a change in the ERR in either direction, and only 8 percent of the firm-year observations reflect an increase in the ERR. In addition, the magnitude of the increase in the ERR in absolute terms is typically one percentage point or less, and only 11 percent of the observations that increase the ERR result in a boost to operating income of more than 3 percent (i.e., 0.8 percent of all firm-years). When examining the firms with the greatest opportunity to increase operating income through the ERR, we find that these firms do not have higher ERRs than other firms and the ERRs, on average, are less than the three benchmarks.

Through our research design, we cannot, nor do we intend to, reject that a subset of managers with specific incentives potentially use the ERR, in conjunction with other accounting choices, to manage earnings in economically significant ways.[10] Instead, the combined evidence from our multiple analyses leads to the conclusion that managers' choices of ERRs, instead of economic benchmarks, in order to materially boost reported earnings is not pervasive in frequency or magnitude across the large cross-section of firms in our sample. This conclusion is bolstered by our estimates that different ERR assumptions, including increasing the ERR by 50 bps, would result in less than a 0.50 percent increase in operating income for the majority of firms.

The paper proceeds as follows. In the second section, we discuss the data and report our empirical analyses. We conclude in the third section.

EMPIRICAL ANALYSES

The ERR Relative to Benchmarks and the Impact on Reported Earnings

In order to provide information related to the opportunity to inflate earnings for our sample of firms, we provide descriptive statistics for the ERR, its relation to various benchmarks, and the impact of any deviation from the benchmark on reported earnings. Because pervasiveness is subjective and each benchmark has unique advantages and disadvantages, we perform our analyses using three separate benchmarks to shed light on the frequency and magnitude of overstated income

[10] Prior literature mentioned herein provides evidence consistent with firms opportunistically choosing the ERR in response to specific earnings management incentives. Our research focus in this paper, however, is to assess the opportunity and potential impact of ERRs to inflate earnings.

due to the ERR assumption. We begin our analyses by comparing the ERR to the pension's contemporaneous actual rate of return (ARR). This benchmark allows us to retain the most firm-year observations with defined benefit plans, but it is limited by its short-term focus compared to the long-term perspective of the ERR. This benchmark also assumes that managers have perfect foresight in predicting annual returns to pension assets. In contrast, our second benchmark, the annualized historical actual rate of return (HARR), assumes managers have no foresight. The HARR incorporates the effect of past returns on managers' expectations, as recommended by ASC 715-30, but data are more limited because of the longer horizons used to calculate HARR. The third benchmark, a future estimated rate of return (FERR), incorporates contemporaneous pension asset allocation, but our sample is reduced further because asset allocation data are available for only a small subset of the firms.

The ERR Relative to Contemporaneous Actual Returns (ARR)

Our initial sample of 22,050 firm-years (2,997 firms) consists of all domestic, non-subsidiary firms in Compustat from 1991 through 2005 that report defined benefit plan assets in the current and prior years, an ERR, and an actual dollar return on plan assets.[11] We combine the annual industrial and core earnings files from Compustat, as well as hand-collect data for observations in 1998–2002 to address data limitations on the actual return in the industrial Compustat tapes during this time period.[12,13]

Table 1 reports descriptive statistics on the levels of ERR and ARR for each year in our initial sample. We find that the mean (median) ERR has been consistent over the sample period, ranging from a high of 8.99 percent (9 percent) in 1991 to a low of 8.02 percent (8.25 percent) in 2005.[14] The average and median ERRs have dropped steadily since 2001, which is consistent with managers incorporating the decline in the equity and bond markets that began in 2000 and continued through 2002. Figure 1 provides the distribution of ERRs across the sample period. The distributions remain fairly constant over time, with a range of approximately two percentage points from the tenth to the 90th percentile. The 90th percentile is consistently at 10 percent from 1991 through 2000, when it begins a steady decline, to 8.84 percent in 2005, and the tenth percentile declines from approximately 8.00 percent for 1991–1999 to 7.00 percent by 2005. Even during 1995–1999, when the average ARR is consistently greater than 11 percent, the median ERR did not change and the mean ERR and the distribution of ERRs remained lower than or equal to the

[11] Our sample consists of 93 percent of all domestic, non-subsidiary firm-years with defined benefit plan assets available in Compustat from 1991–2005. Compustat reports the ERR as missing if the firm reports a range of ERRs or if the ERR for foreign plans and U.S. plans differs. Although only 20 percent of the firms on Compustat report defined benefit plan assets in 2005, the market value of those firms constitutes nearly two-thirds of the total market capitalization in 2005.

[12] We calculate the ARR as the actual dollar return on pension assets divided by average pension assets for the year. Average pension assets are calculated as (Beginning of year value of pension assets plus End of year value of pension assets less Actual dollar return on pension assets) divided by two. This calculation of ARR assumes that net contributions and withdrawals occur in the middle of the year. Our measure of ARR differs from the measure of ARR reported in Amir and Benartzi (1998) and Comprix and Muller (2006), as their measure uses average plan assets for the year, including the actual return in the denominator.

[13] From 1991–1997, actual returns data comes from Compustat's industrial, full coverage, and research files (data333). After 1997, data333 is not the actual return on plan assets. From 1998–2002, the data comes from Compustat's S&P Core Earnings Annual file (PBARAT). We have checked the accuracy of the data from Compustat's S&P files by examining the annual reports of several firms, and we also hand-collect actual returns from companies' annual reports from 1998–2002.

[14] Blankley and Swanson (1995) report similar results for their smaller sample of firms from the inception of SFAS 87 in 1987 through 1993, with annual mean ERRs ranging from 8.9 percent to 9.1 percent, and annual median ERRs at 9.0 percent. Amir and Benartzi (1998) report similar medians and slightly higher means from 1988–1994.

TABLE 1

Descriptive Statistics Related to Expected Rate of Return (ERR) and Actual Rate of Return (ARR)

Year	n	Mean ERR	Median ERR	Mean ARR	Median ARR	Mean ARR − ERR	Median ARR − ERR	Median Impact of ARR − ERR on Operating Income[a]
1991	1,458	8.99%	9.00%	16.85%	17.12%	7.85%	8.19%	4.87%
1992	1,508	8.95%	9.00%	8.39%	8.15%	−0.56%	−0.63%	−0.32%
1993	1,558	8.80%	9.00%	10.72%	10.15%	1.92%	1.34%	0.71%
1994	1,551	8.75%	9.00%	1.26%	0.34%	−7.49%	−8.48%	−5.65%
1995	1,520	8.78%	9.00%	18.76%	19.74%	9.98%	10.97%	6.18%
1996	1,519	8.80%	9.00%	12.31%	12.62%	3.51%	3.69%	2.33%
1997	1,513	8.82%	9.00%	17.29%	17.79%	8.47%	8.84%	6.23%
1998	1,394	8.87%	9.00%	11.08%	11.64%	2.21%	2.70%	1.50%
1999	1,356	8.88%	9.00%	13.08%	13.12%	4.20%	4.16%	3.06%
2000	1,422	8.86%	9.00%	4.77%	3.72%	−4.09%	−4.91%	−2.92%
2001	1,411	8.76%	9.00%	−5.22%	−5.44%	−13.98%	−14.33%	−14.48%
2002	1,528	8.47%	8.50%	−8.05%	−8.76%	−16.52%	−17.28%	−16.03%
2003	1,509	8.19%	8.50%	15.76%	16.90%	7.58%	8.63%	5.18%
2004	1,463	8.10%	8.30%	9.86%	9.89%	1.76%	1.75%	1.02%
2005	1,340	8.02%	8.25%	8.85%	8.05%	0.83%	−0.10%	−0.03%
1991–2005	22,050	8.67%	8.75%	9.05%	9.45%	0.38%***	0.81%***	0.34%***

*** Statistically significant at $p < 0.01$.

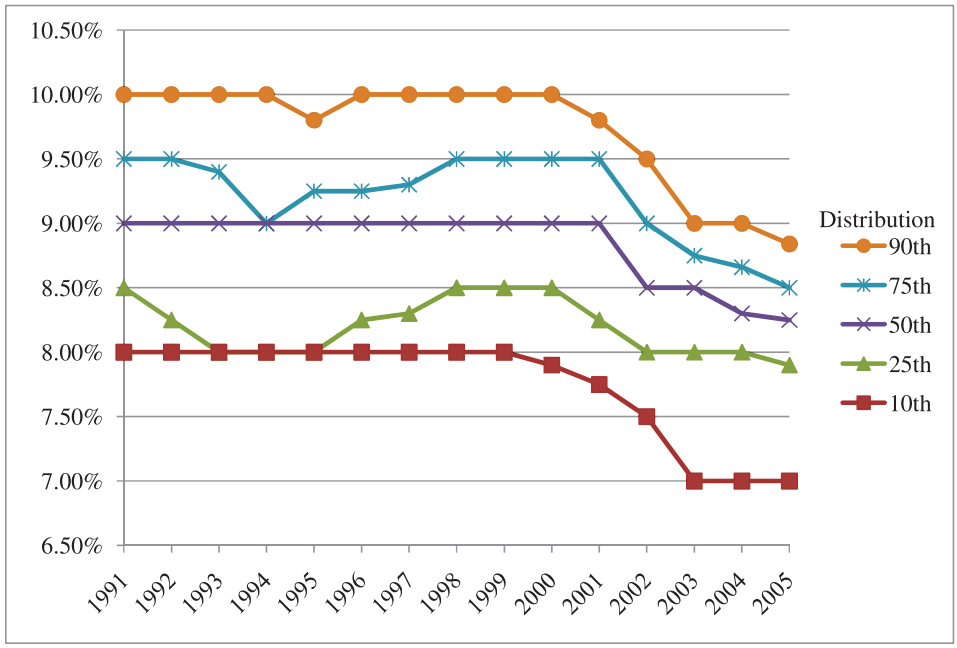
[a] This column is based on 21,971 observations, which have the additional constraint that operating income is available. This table provides descriptive statistics related to the expected return rate of return (ERR) and the actual rate of return (ARR) for defined benefit pension plans and the differences between ARR and ERR (ARR − ERR). The sample for 1991–2005 consists of all firm-years on Compustat that report defined benefit pension plan assets in the current and prior year, an ERR, and the actual dollar return to the pension assets. We calculate the ARR as the actual dollar return on pension assets divided by average pension assets for the year. Average pension assets for the year are calculated as (Beginning of year value of pension assets plus End of year value of pension assets less Actual dollar return on pension assets) divided by two. This calculation of ARR assumes that net contributions and withdrawals occur in the middle of the year. The Median Impact on Operating Income is calculated as (ARR − ERR) multiplied by the average pension assets for the year and divided by the absolute value of operating income.

observed distribution in 1991. Consistent with the long-run nature of the ERR mandated by ASC 715-30, the overall picture is one of a stable distribution of the ERR from 1991 through 2005.

To help assess the potential for a positive bias associated with the ERRs chosen by firms, we calculate the difference between ARR and ERR for each firm-year. While the annual differences fluctuate with the ARR, we find that the average firm's ARR outperforms the ERR in two-thirds of the years. The mean (median) difference in rates of returns are positive in ten (nine) out of 15 years, and the mean (median) difference over the entire sample period is 0.38 percent (0.81 percent) and significantly different from zero. With the exceptions of 2001 and 2002, the results suggest that the average firm is not systematically overestimating the ERR relative to the actual return performance of the pension plans. Even if some firms are managing earnings through the ERR, there does not appear to be evidence of a widespread upward bias through the ERR that makes ERRs, on average, higher than the actual returns observed in the plans.

In addition to reporting the average difference in ARR and ERR, we also examine the impact of the difference on a firm's operating income. Large differences between the ARR and ERR may not have a material impact on reported income if total pension assets are small relative to the

FIGURE 1
The Distribution of the Expected Rate of Return on Pension Assets from 1991–2005



This figure shows the distribution of expected rates of returns on pension assets (ERR) for firms from 1991–2005. The ERRs range from 10 percent to 7 percent.

operating income of the firm. To compute the impact on operating income, we multiply the difference in the rates of returns (ARR − ERR) by the average level of pension assets for the year and divide by the absolute value of operating income. The average level of pension assets is calculated as one-half of the sum of the pension assets at the beginning of the year and the end of the year less the actual dollar return on pension assets. The median impact is 0.34 percent and significantly different from zero, which suggests that the majority of firms actually report lower operating income than if the firms reported actual returns.[15] One exception, however, is the period from 2000 through 2002, which includes the only consecutive years where the ERR exceeds the ARR. Consistent with managers incorporating historical actual returns into the choice of ERR, both the mean and median ERR drop from 2002 through 2005. While the impact of the difference between the ARR and ERR on operating income has substantial variation from year to year, the overall median impact suggests that, over time, operating income would have been higher using actual returns, which is not consistent with systematically inflated ERRs.

Finally, we examine a subset of observations with the highest ERRs, which we define as 10 percent or higher (not tabulated).[16] We find that 2,128 firm-year observations (9.7 percent of

[15] We report the median impact because the means are influenced by outliers; however, the mean impact on operating income is also positive and significant.

[16] We chose 10 percent as "extreme" based on the distribution of the sample (i.e., the top 10 percent) and recent SEC commentary suggesting that the SEC will consider any reported ERR above 9 percent as "controversial," and that such a rate requires additional justification by the firm (*HR Insight*, a newsletter from PricewaterhouseCoopers [2003]).

sample) report an ERR of 10 percent or higher, with the number of firms peaking in 1991, and only three firms still reporting an ERR of 10 percent or greater in 2005. For these firm-year observations with an ERR of 10 percent or greater, the mean and median differences between ARR and ERR are 0.80 percent and 0.95 percent, respectively, which implies that the ARR exceeds the ERR in the majority of these cases. Overall, firms choosing the highest ERRs do not appear to have consistently overestimated the ERR relative to the contemporaneous ARR.

The ERR Relative to Historical Actual Rates of Return (HARR)

ASC 715-30 suggests that the ERR should reflect actual returns experienced by the plan.[17] We have already observed in Table 1 that, on average, the contemporaneous actual rate of return is greater than the ERR in most years. In Table 2, we focus on historical returns and report the mean and median differences between the cumulative historical actual rates of return (HARR) over three-year, seven-year, and ten-year rolling periods and the ERR. For every firm-year, we calculate the HARR by computing the cumulative actual return over every available preceding three-, seven-, and ten-consecutive-year period, and then calculating the annualized return over the corresponding horizon. If firms boost earnings through an inflated ERR relative to historical returns, then the spread between HARR and ERR will be negative. We also compute the impact of the difference between HARR and ERR on operating income using the same framework discussed earlier (in the section, "The ERR Relative to Contemporaneous Actual Returns") for differences between ARR and ERR.

Table 2 reports the means, medians, and standard deviations of the differences between HARR and ERR for each year and pooled for each period, along with the measure of impact on operating income. The mean and median differences and the median impact for the seven- and ten-year returns pooled over time are positive and significant at a minimum of a 0.05 level. The three-year returns pooled over time vary. The mean (median) difference is negative and significant (insignificant), while the median impact is positive and significant. The difference between HARR and ERR for the three-year rolling periods becomes negative beginning in 2002, while the differences for the seven- and ten-year rolling periods turn negative in 2003.[18] This pattern suggests that if managers use historical returns to estimate the ERR, it is not until 2003 when long-term averages indicate that the ERR is overstated relative to historical returns.[19] By 2005, however, the ten-year HARR is again greater than the ERR for the average firm in the sample. In addition, the standard deviations of the HARRs monotonically decline as the horizon increases, consistent with the long-term smoothing of actual returns that the ERR is supposed to represent under ASC 715-30.

Figure 2 graphs the percentage of firms that have positive differences between HARR and ERR over time for the three-, seven-, and ten-year rolling periods from 1998 through 2005. The difference between the three-year HARRs and the ERR is positive for approximately 90 percent of the firms through 2000 and then begins to drop dramatically with the market downturn during 2000–2002, when the S&P 500 fell by more than 37 percent. In 2001, over 60 percent of the firms still had a positive difference between the three-year HARR and the ERR. From 2002–2005, however, the ERR exceeds the three-year HARR for most of the firms in the sample. Similarly, a

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[17] ASC 715-30-35-47.

[18] The annual mean and median differences and the median impact are all significant at a 0.01 level, except the mean and median differences over ten years reported for 2004.

[19] For readers concerned that the results are driven by the time period included in the analyses, we note the following: (1) ASC 715-30 was effective in 1986, but Compustat only provides data on actual and expected returns to pension assets as of 1991 and, therefore, we have included the population with available data; and (2) even if the actual returns to pension assets were available for earlier time periods, we do not expect different results because the average annual S&P 500 return from 1981 to 1990 is 15 percent, which exceeds the 13 percent average annual return from 1991 to 2005.

TABLE 2

The Difference between Annualized Historical Actual Rates of Return (HARR) over Three-Year, Seven-Year, and Ten-Year Horizons and Current Year ERR

Mean, Median, and Impact on Operating Income for HARR − ERR[a]

	Three-Year HARR − ERR			Seven-Year HARR − ERR			Ten-Year HARR − ERR		
Year	Mean	Med.	Impact[b]	Mean	Med.	Impact[b]	Mean	Med.	Impact[b]
1994	3.26%	3.16%	2.33%						
1995	−1.99%	−2.04%	−1.32%						
1996	1.60%	1.70%	1.02%						
1997	2.04%	2.21%	1.49%						
1998	7.90%	8.43%	8.70%	3.84%	3.95%	4.20%			
1999	5.10%	5.31%	5.10%	2.88%	2.94%	3.29%			
2000	5.08%	5.35%	5.29%	3.53%	3.64%	4.00%			
2001	0.80%	0.65%	0.51%	2.58%	2.57%	2.97%	2.87%	2.90%	3.28%
2002	−4.44%	−4.60%	−4.78%	2.01%	2.12%	1.95%	0.88%	0.89%	0.70%
2003	−11.31%	−11.80%	−12.08%	−1.73%	−1.74%	−1.70%	−0.47%	−0.46%	−0.29%
2004	−7.22%	−7.15%	−6.23%	−1.02%	−0.95%	−0.73%	0.20%	0.32%	0.16%
2005	−2.02%	−1.91%	−1.28%	−2.06%	−2.09%	−1.91%	1.19%	1.35%	0.99%
All Years	−0.15%***	0.11%	0.05%***	1.27%**	1.36%***	0.80%***	0.92%**	0.83%***	0.62%***
Obs.	12,595			5,505			2,757		
(STD)	6.47%			3.51%			2.45%		

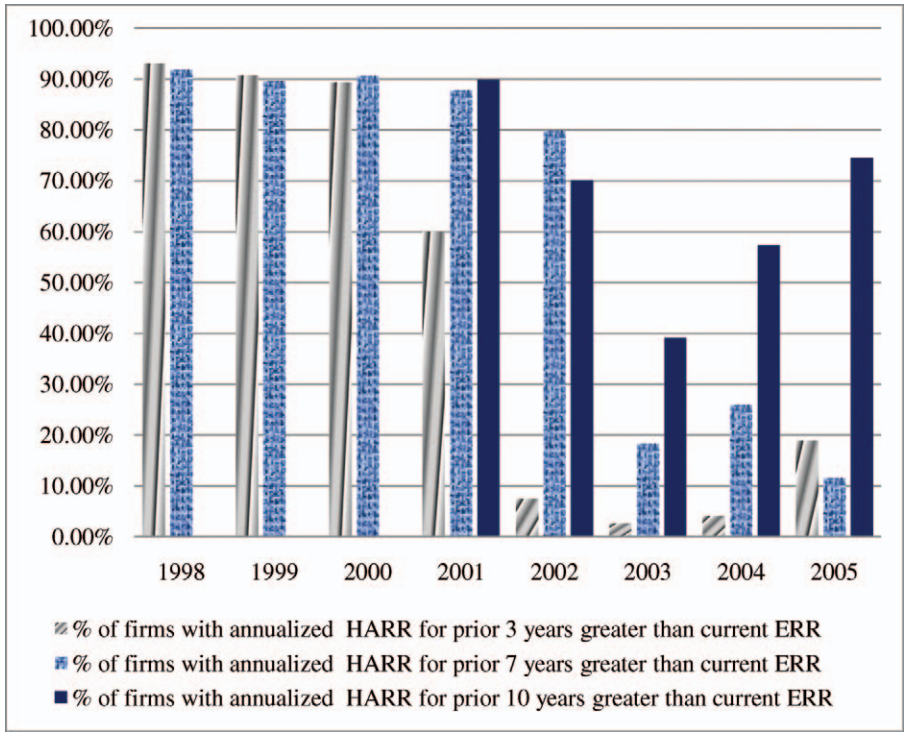
, * Statistically different from zero at the 0.05 and 0.01 levels, respectively.

[a] The annual results for the mean and median differences and the median impact on operating income are all significant at a 0.01 level except the mean and median differences over ten years in 2004.

[b] These columns are based on slightly fewer observations, which have the additional constraint that operating income is available.

This table reports the mean difference between annualized historical actual rates of return (HARR) for the three-year, seven-year, and ten-year rolling periods and the current year ERR. The HARR is calculated as the cumulative actual return over the preceding three-year, seven-year, and ten-year windows and then annualized over the corresponding horizon. The mean and median difference in returns (HARR − ERR) is reported for each year, along with the median impact of (HARR − ERR) on operating earnings, as described in the notes to Table 1. The standard deviation (STD) is the standard deviation of the mean returns across the sample period.

FIGURE 2
The Percentage of Firms Where HARR Exceeds ERR for 1998–2005



This figure shows the percentage of firms for 1998–2005 with the annualized three-, seven-, and ten-year historical actual rates of return (HARR) greater than the current year ERR. The ten-year HARR is not available prior to 2001 because actual return data for our sample begins in 1991.

majority of the firms have a seven-year HARR that exceeds the ERR through 2002, but then the ERR exceeds the seven-year HARR for 2002–2005 for most firms. When comparing the ten-year HARRs to the ERR, however, only in 2003 does the ERR exceed the HARR over a ten-year horizon for more than 50 percent of the firms. These results are consistent with the smoothing mechanism provided in ASC 715-30, as the ERR will exceed historical and actual returns in some years, while lagging those returns in periods of poorer performance.

In untabulated tests, we also examine firms with extreme ERRs (i.e., greater than or equal to 10 percent). We find that firms with the extreme ERRs have significantly more positive differences between HARR and ERR than the other firms for all three rolling time periods. Contrary to public concern, firms with the highest ERRs had even higher historical actual rates of return at the time relative to their ERRs.

The ERR Relative to Expected Returns Based on Asset Allocation

In addition to historical returns, ASC 715-30 suggests that the ERR should be related to the long-term future expected returns.[20] Expected returns will be determined by the asset allocation

[20] ASC 715-30-35-47.

within the pension plan and the expected returns to the asset classes. Both of these measures are difficult to capture, as firm-level asset allocation data during our sample were not easily accessible and expected returns across asset classes may vary by firm. We obtain firm-specific asset allocation data for 1991–2004 from a private source and match the asset allocation data to our sample.[21] We are able to match 3,930 firm-years from 1991–2004 (19 percent of the sample), but eliminate 208 firm-years because the total percentage of equity, bonds, and cash is less than 75 percent. Table 3 provides the asset allocation to equity, bonds, and cash over time for the final subsample of 3,622 firm-years. The allocation to equities has increased over the 14-year period, while the allocation to bonds and cash has decreased.[22]

To provide perspective on how ERRs compare to future expected returns based on the pensions' asset allocation, we compute the future estimated rate of return (FERR) as the expected return for equity, bonds, and cash multiplied by the percentage of assets allocated to each asset class. For expected equity returns, we use the S&P 500 annual return averaged over the prior ten years. For expected bond returns and returns to cash, we use the average monthly ten-year Treasury Bond yields and the monthly three-month Treasury Bill yields, respectively, over the given year.[23] In Table 3, we report the median FERR, the difference between FERR and ERR, and the impact of the difference on operating income. In addition, Table 3 reports the percentage of firms with a positive difference between FERR and ERR and the median implied equity return.

The median FERR across time remains above 10 percent until 2003, when it drops to 8.5 percent, which corresponds to the median ERR at that time. The median differences between FERR and ERR and the impact of the difference on operating income are positive in all 14 years and when the observations are pooled across the sample period. These results suggest that ERRs are generally not inflated relative to future expected returns and, on average, there does not appear to be a systematic upward bias in reported earnings for firms due to the choice of ERR. With the exception of 2003, in every other year of the sample period, at least 86 percent of the firms had a FERR greater than their ERR. In untabulated results, we also find that 91 percent of the firm-years with ERRs equal to or greater than 10 percent have a FERR that exceeds the ERR. This result suggests that firms with the highest ERRs can generally justify the ERR based on future expected returns and asset allocation.

An alternative approach for benchmarking the ERR assumptions, given asset allocations and bond yields, is to estimate the implied equity return. This approach removes any concern that our measure of expected returns for equity is biased upward due to the sample period. We calculate the implied equity return from the ERR using the allocation data and our estimates of returns for bonds and cash, and find that the median implied return on equity remains between 10.7 percent and 11.8 percent throughout the sample period.[24] Although ten-year Treasury Bond yields drop to just over 4 percent in the later years, the median implied return on equity remains below 12 percent, which could be justified given the reported S&P 500 ten-year average returns over this time period.[25]

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[21] We use a private database of pension information also used in Frank (2002). Mary Margaret Frank thanks Money Market Directories for providing the asset allocation data.

[22] For comparison purposes, the allocation to equity for our sample of firms is similar in both magnitude and trend as the allocation to equity reported by *Pensions and Investments* (*P&I*) for the largest 1,000 defined benefit pension plans.

[23] We use the ten-year average to capture long-term expected returns as intended by ASC 715-30. Using the Treasury Bond yield is conservative to the extent a pension's allocation to bonds is invested in corporate bonds or higher yield securities. To address concerns about the bull market from 1995–1999 biasing equity returns upward, please see footnote 19.

[24] The implied equity return is calculated as [ERR − (% allocated to bonds ∗ expected bond return) − (% allocated to cash ∗ expected cash return)] divided by the percent allocated to equity. The 90th and 95th percentiles of implied equity returns for the entire sample are 14 percent and 16 percent, respectively.

[25] Annual equity returns data downloaded from: http://pages.stern.nyu.edu/~adamodar/

TABLE 3

Future Estimated Rates of Return (FERR) and Implied Equity Returns Based on Pension Plan Asset Allocation

Defined Benefit Plan Asset Allocation from 1991–2004

	Expected Returns			Subsample with Pension Asset Allocation Data from Private Database								
Year	S&P Ten-Year Average Return	Ten-Year Treasury Bond Yield	Three-Month Treasury Bill Rate	n	Median Allocation to Equity	Median Allocation to Bonds	Median Allocation to Cash	Median FERR	Median FERR − ERR	Percent of Firms with FERR − ERR > 0	Median Impact on Operating Income[a]	Median Implied Equity Return
1991	14.63%	7.86%	5.54%	118	55.00%	35.00%	4.00%	11.19%	2.13%	86%	1.89%	10.66%
1992	18.17%	7.01%	3.52%	322	56.00%	35.00%	4.00%	12.98%	3.76%	89%	3.92%	11.50%
1993	16.78%	5.87%	3.07%	315	59.00%	33.00%	3.00%	11.98%	2.91%	90%	3.48%	11.83%
1994	15.53%	7.09%	4.37%	312	60.00%	33.00%	3.00%	11.85%	2.78%	91%	3.15%	10.91%
1995	15.03%	6.57%	5.66%	193	60.00%	32.00%	3.00%	11.55%	2.52%	88%	2.31%	10.82%
1996	15.62%	6.44%	5.15%	344	64.50%	30.00%	2.00%	12.09%	2.95%	92%	3.34%	10.97%
1997	16.05%	6.35%	5.20%	255	67.00%	29.00%	1.00%	12.62%	3.52%	95%	4.31%	10.87%
1998	18.86%	5.26%	4.91%	345	65.00%	29.00%	1.00%	14.10%	5.05%	95%	6.47%	11.35%
1999	20.06%	5.65%	4.78%	173	65.00%	28.00%	1.00%	14.80%	5.79%	93%	6.77%	11.15%
2000	18.99%	6.03%	6.00%	326	67.00%	28.00%	1.00%	14.68%	5.39%	97%	7.61%	11.00%
2001	18.39%	5.02%	3.47%	273	65.00%	30.00%	1.00%	13.68%	4.44%	95%	7.41%	11.54%
2002	14.16%	4.61%	1.63%	336	66.00%	28.55%	1.00%	10.73%	1.82%	88%	2.36%	11.41%
2003	11.18%	4.01%	1.03%	162	65.00%	30.00%	0.00%	8.52%	0.03%	51%	0.01%	11.21%
2004	13.04%	4.27%	1.40%	148	66.33%	26.25%	0.00%	9.97%	1.41%	94%	1.55%	11.08%
All	16.50%	5.88%	4.05%	3,622	64.00%	30.00%	1.00%	12.25%	3.18%***	90%	3.68%***	11.18%

*** Statistically different from zero at $p < 0.01$.

[a] This column is based on 3,509 observations, which have the additional constraint that operating income is available.

Subsample: Equity includes domestic, foreign, and private equity and mutual funds. Bonds include domestic and foreign bonds, guaranteed investment contracts, and general insurance annuities. Mortgages, real estate, and other categories are not included above; therefore, their return is assumed to be zero.

The table reports an estimate of the future estimated rates of return (FERR) and the implied equity returns using a subsample of firm-years with asset allocation data from a private database. FERR is calculated as the expected return for equity, bonds, and cash multiplied by the percentage of assets allocated to each asset class. For expected equity returns, we use the S&P 500 annual total return averaged over the prior ten years. For expected bond returns, we use the monthly ten-year Treasury Bond yield averaged over the given year. For expected returns to cash, we use the monthly three-month Treasury Bill yield averaged over the given year. The Implied Equity Return is calculated as [ERR − (% allocated to bonds * expected bond return) − (% allocated to cash * expected cash return)] divided by the percent allocated to equity. Also reported in the table is the median difference between FERR and the ERR and the median impact of FERR − ERR on operating income.

Changes in the ERR and the Impact on Earnings

In the prior univariate analyses, we compared the distribution of observed level of ERRs with several benchmarks to gauge whether firms appear to systematically overstate earnings through the choice of ERR. We concluded that the level of the ERR is not significantly higher than contemporaneous actual, cumulative historical actual, and future estimated rates of return for most firms. While the prior analyses provide insights into the pervasiveness of overstated earnings due to the ERR, it is still possible for managers to provide a short-term boost in reported earnings, irrespective of whether the ERRs are overstated relative to expected long-term economic returns. Therefore, we examine the frequency, magnitude, and materiality of actual and hypothetical changes in the ERR to assess the extent to which managers may provide a short-term increase to reported earnings through the ERR.

Actual Changes in the ERR

ASC 715-30 provides guidance to firms in setting the ERR, with a focus on the long-term nature of the estimate. The accounting rules are designed to reduce the volatility associated with reporting actual annual returns and, therefore, the spirit of ASC 715-30 would suggest less frequent and smaller changes to the ERR relative to actual returns. Table 4 reports the frequency of changes to the ERR over our sample period and the magnitude of the actual changes that occur.

With the exception of 2002 and 2003, Panel A of Table 4 reports that less than one-third of the firms change the ERR in either direction in any given year.[26] Firms increase the ERR in less than 8 percent of all observations, and reductions in the ERR are twice as likely as an increase to the ERR. In addition, we observe nearly one-quarter or more of the firms reducing the ERR each year from 2002 through 2005 following poor performance in actual returns. This response to deteriorating market conditions is in contrast to the response of firms during the bull market from 1995–1999, when only 10 to 12 percent of the firms increased the ERR each year. The substantial increase in the number of firms that lower the ERR beginning in 2002 also corresponds to the timing of the negative difference between the benchmark rates of return and the ERR reported in Tables 2 and 3. In untabulated results, we also find that, on average, firms which increase the ERR continue to have an ERR after the increase that is lower than the ARR, HARR, and FERR benchmarks. These results are consistent with the prior ERRs understating measures of economic returns.

Impact on Earnings from Increases in the ERR

Although increases to the ERR occur in less than 8 percent of the observations, changes to the ERR may still have a significant impact on reported income, depending on the magnitude of the change and the sensitivity of income to such changes. Panel B of Table 4 reports the magnitude and impact on operating income for actual increases in the ERR. Only 11 percent of the 1,538 positive changes to ERR increase its level by more than one percentage point in absolute terms (100 bps), while more than 60 percent of the increases are one-half of a percentage point (50 bps) or less. However, even small increases in the ERR can materially boost operating income if a firm's operating income is small relative to the pension plan assets. Therefore, Panel B also reports the impact of the

[26] While changes to the ERR occur in only 25 percent of the firm-years in our sample, Frank and Rego (2006) report that 92 percent of firms with a valuation allowance account related to deferred tax assets change that account from the prior year (2,107 out of 2,290). According to ASC 740, the valuation allowance account captures managers' expectation of future long-term profitability. Both the ERR and the valuation allowance account allow managers substantial discretion in assessing managers' long-term expectations and create an opportunity to manage earnings, but managers' affect earnings relatively infrequently with changes in the ERR when compared to the valuation allowance account.

increases on operating income. Using a threshold for materiality of 3 percent, 173 of the firm-year observations where ERR increased resulted in a material boost in operating income, which corresponds to 11 percent of the increases and 0.9 percent of the total observations where changes occur.[27] We also report in Panel B the results using materiality thresholds of 1 percent and 0.5 percent.

Impact on Earnings from Hypothetical Decreases in the ERR

Managers can also avoid a reduction in earnings by delaying decreases in the ERR until later periods. To assess the impact of potential delayed decreases on earnings, we examine the effect of 0.25, 0.50, and 1.0 percentage point decreases in the absolute level of the ERR on the 14,499 firm-years that did not change the ERR, and report the results in Panel C of Table 4.[28] Again using a materiality threshold of 3 percent, a reduction in the ERR of one percentage point (100 bps) would cause a "material" reduction in operating earnings in 17 percent of the 14,499 observations, while a reduction of one-half of a percentage point would materially affect only 7 percent of the observations. While changes in the ERR of typical magnitude may not have a material impact for the average firm, the potential for earnings management using the ERR exists given that for just over one out of five firms, a change in the ERR of 0.5 percent (50bps) would impact operating income by more than 1 percent.

To summarize our univariate analyses of the changes in ERR, the changes appear to follow market performance, with a more dramatic response to bear versus bull markets. Actual increases in the ERR occur in less than 8 percent of the firm-year observations, and only 11 percent of those increases (0.9 percent of the total sample) generate a boost to operating income greater than 3 percent. While the evidence suggests that most firms did not materially inflate earnings through increases in the ERR, the evidence also reveals that one in six (14) firms that did not change their ERR would lower operating income by at least 3 percent with a 1 percent (0.5 percent) decrease in the ERR.

Firms with the Greatest Ability to Affect Operating Income through the ERR

Although firms, on average, do not appear to systematically overstate pension returns relative to contemporaneous, historical, and future estimated returns, a firm with significant plan assets relative to operating income may still materially boost reported earnings by choosing an inflated ERR. We analyze the opportunity to overstate earnings through the ERR by looking more closely at the firms with operating performances that are most sensitive to the choice of the ERR. In this analysis, we sort firms annually into quintiles based on their opportunity to overstate earnings through the ERR (i.e., the sensitivity of the firm's operating income to the return on total plan assets). We calculate a firm's sensitivity as total pension plan assets divided by the absolute value of operating income.[29] The larger a firm's pension plan assets are relative to its operating income, the greater impact the manager's choice of ERR has on a firm's operating income.

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[27] Although using ERR changes to meet specific earnings thresholds is difficult due to the reasons set forth earlier in the paper, we also examine whether actual increases in the ERR resulted in a firm experiencing earnings growth or positive net income. Of the 1,538 observations where firms increased the ERR, in only 13 (four) cases did the increase in ERR result in earnings growth (positive net income) that would not have occurred without the increase in ERR.

[28] We choose hypothetical decreases in the ERR of 0.25, 0.50, and 1.0 percentage points (25, 50, and 100 bps) because these decreases are the three most common decrease intervals, accounting for 16 percent, 29 percent, and 15 percent of the decreases in the sample, respectively.

[29] Bergstresser et al. (2006) use a similar measure. They use the ratio of pension assets over operating income and eliminate firms with negative operating income, while we use the absolute value of operating income. Our sensitivity measure is also used earlier in our study to compute the impact that the differences between the ERR and the benchmarks have on operating income, as reported in Tables 1–4.

TABLE 4

Changes in the Long-Term Expected Rate of Return and the Impact of the Changes in ERR

Panel A: Changes in ERR

Year	n	Percent of Firms with No Change ERR	Percent of Firms with Increase in ER	Percent of Firms with Decrease in ERR
1992	1,443	82.24%	5.16%	12.59%
1993	1,478	72.33%	5.14%	22.53%
1994	1,489	76.76%	8.39%	14.84%
1995	1,453	80.59%	10.81%	8.60%
1996	1,448	83.63%	10.01%	6.35%
1997	1,411	82.99%	11.13%	5.88%
1998	1,157	79.86%	10.98%	9.16%
1999	1,295	77.76%	12.66%	9.58%
2000	1,350	79.41%	13.26%	7.94%
2001	1,345	80.22%	7.68%	12.02%
2002	1,323	55.18%	3.25%	41.57%
2003	1,435	56.17%	3.14%	40.70%
2004	1,429	69.14%	6.16%	24.71%
2005	1,331	70.10%	4.06%	25.85%
1992–2005	19,397	74.75%	7.93%	17.32%

Panel B: Impact on Operating Income from Actual Increases in the Level of ERR

		Impact on Operating Income from an Increase in the ERR				
		> 0 but $\leq 0.5\%$	$> 0.5\%$ but $\leq 1\%$	$> 1\%$ but $\leq 3\%$	$> 3\%$	Total
Increase in ERR	> 0 but $\leq 0.25\%$	292 (19%)	56 (4%)	42 (3%)	15 (1%)	405 (26%)
	$> 0.25\%$ but $\leq 0.5\%$	272 (18%)	111 (7%)	104 (7%)	44 (3%)	531 (35%)
	$> 0.5\%$ but $\leq 1\%$	148 (10%)	83 (5%)	132 (9%)	71 (5%)	434 (28%)
	$> 1\%$	49 (3%)	32 (2%)	44 (3%)	43 (3%)	168 (11%)
	Total	761 (49%)	282 (18%)	322 (21%)	173 (11%)	1538

Panel C: Impact on Operating Income from Hypothetical Decreases in Level of the ERR

		Impact on Operating Income from a Hypothetical Decrease in the ERR			
		< 0 but $\geq -0.5\%$	$< -0.5\%$ but $\geq -1\%$	$< -1\%$ but $\geq -3\%$	$< -3\%$
Hypothetical Decrease in ERR	0.25% (25 bps)	11,944 (82%)	1,304 (9%)	869 (6%)	382 (3%)
	0.5% (50 bps)	8,481 (58%)	2,710 (19%)	2,246 (15%)	1,062 (7%)
	1% (100 bps)	5,094 (35%)	2,855 (20%)	4,140 (29%)	2,410 (17%)

(continued on next page)

TABLE 4 (continued)

Panel A provides the percentage of firms with changes in the long-term expected rate of return (ERR) for defined benefit plan assets each year and over the sample period. The sample consists of all firm-years on Compustat from 1992 to 2005 that report defined benefit pension plan assets and ERR for the current and prior year.
Panel B provides the impact of actual increases in the ERR on operating income, and Panel C provides the impact of hypothetical decreases to the ERR on operating income. The impact on operating income is calculated as the change in ERR multiplied by average pension assets for the year over the absolute value of operating income, where average pension assets are calculated as described in the notes to Table 1.

In Table 5, we report median statistics for the quintiles, with firms in the fifth quintile containing the firm-years with the largest sensitivity measures (operating income is more sensitive to pension returns). Not surprisingly, the most sensitive quintiles have larger pension assets, as shown by the monotonic increase in median pension assets across the quintiles (Row 2).[30] The fifth quintile's sensitivity is driven by substantially smaller operating income relative to the other quintiles (Row 3). These firms also have a smaller return on assets (Row 4), which suggests that their poor operating performance appears to be due to less efficient use of assets rather than firm size alone.

We focus our discussion on the top quintile because the ERRs for these firms have the greatest potential to affect profitability relative to the other quintiles with fewer plan assets and larger operating income. Although the median ERR in Quintile 5 is 9 percent, the ERR is no different from in Quintiles 3 and 4. An allocation to riskier assets could explain these similar ERRs, as the top three quintiles report higher allocations to international equities compared to the other two quintiles (Rows 6–8).[31] When we examine the benchmark rates of return relative to the ERR (Rows 9–13), we find that the median difference between the benchmarks and the ERR is always positive and significant or insignificant.

Rows 14–16 of Table 5 provide the average absolute change in the level of ERR that firms in each quintile require to boost operating income by 3 percent, 1 percent, and 0.5 percent, respectively. Whereas firms in the most sensitive quintile require a change of only nine basis points (bps) in the ERR (Row 16, Quintile 5) to generate a relatively small increase in earnings (0.5 percent), these firms require an increase of 0.54 percent (54 bps) in the ERR to materially increase operating income by 3 percent (Row 14, Quintile 5). As a comparison, Panel B of Table 4 reports that *actual* increases to the ERR of greater than 0.5 percent (50 bps), which generate a 3 percent increase in earnings, occur in less than 1 percent of the total observations over 14 years (0.59 percent = (71 + 43)/19,397). As expected, the magnitude of the required change in ERR increases (decreases) as the firms in the quintiles are less (more) sensitive to the ERR.

In a similar spirit, Rows 17–19 of Table 5 provide the average absolute change in the level of ERR that firms in each quintile require to boost reported earnings per share (EPS) by $0.10, $0.05, and $0.01, respectively. Again, firms in the most sensitive quintile require a change of only ten basis points (bps) in the ERR (Row 19, Quintile 5) to generate a $0.01 increase in EPS, but would require an increase of 99 basis points in the ERR for a $0.10 change in EPS (Row 17, Quintile 5). As expected, the magnitude of the required change in ERR increases (decreases) as the firms in the quintiles are less (more) sensitive to the ERR.

[30] We use 21,971 observations for this analysis, which is consistent with the number of observations reported in the "Median Impact of ARR – ERR on Operating Income" column in Table 1. We lose observations relative to the other columns in Table 1 because firms must have both plan assets from the prior year and operating income available.

[31] The highest quintile also reports a higher allocation to private equity than the other quintiles, but the mean is still less than 1 percent for this quintile.

TABLE 5

Descriptive Statistics of Benchmarks across Pension Sensitivity Quintiles

Medians across Pension Sensitivity Quintiles All Years, n = 21,971	Pension Sensitivity Quintiles 1	2	3	4	5
1. Median Pension Sensitivity (Pension Assets/Absolute (Operating Income)	0.15	0.44	0.96	1.85	5.56
2. Median Average Pension Assets (BOY + (EOY − RETPLNA))/2: $ Million)	$11.22	$38.92	$80.63	$128.32	$181.97
3. Median Operating Income ($ Million, absolute values)	$76.59	$83.38	$85.81	$72.90	$38.46
4. Median ROA	7.41%	7.18%	8.43%	7.62%	5.55%
5. Median ERR	8.50%	8.75%	9.00%	9.00%	9.00%
6. Median Percent Equity	60.60%	62.00%	65.00%	65.00%	63.00%
7. Median Percent Domestic Equity	50.00%	50.00%	51.00%	51.00%	50.00%
8. Median Percent International Equity	0.00%	0.00%	5.00%	5.00%	5.00%
9. Median (ARR − ERR)	0.17%*	0.59%*	1.04%*	1.20%*	1.31%*
10. Median HARR3 − ERR (n = 12,595)	0.13%**	0.34%	0.50%	0.49%**	−0.71%
11. Median HARR7 − ERR (n = 5,505)	1.72%*	1.85%*	1.70%*	1.70%*	0.48%*
12. Median HARR10 − ERR (n = 2,757)	0.78%*	0.99%*	0.79%*	0.90%*	0.70%*
13. Median FERR − ERR (n = 3,507, but n in each quintile varies)	3.61%*	3.19%*	3.06%*	3.30%*	3.07%*
14. Median Change in ERR needed for 3 percent impact on operating income	19.02%	6.52%	3.08%	1.60%	0.54%
15. Median Change in ERR needed for 1 percent impact on operating income	6.34%	2.17%	1.03%	0.53%	0.18%
16. Median Change in ERR needed for 0.5 percent impact on operating income	3.17%	1.09%	0.51%	0.27%	0.09%
17. Median Change in ERR needed for $0.10 impact on Earnings per Share	22.48%	6.64%	3.12%	1.76%	0.99%
18. Median Change in ERR needed for $0.05 impact on Earnings per Share	11.24%	3.32%	1.56%	0.88%	0.50%
19. Median Change in ERR needed for $0.01 impact on Earnings per Share	2.25%	0.66%	0.31%	0.18%	0.10%

*, ** Indicate statistically different from zero at the 0.01 and 0.10 levels, respectively.

This table provides medians for the difference between the benchmarks and the ERR by pension sensitivity quintiles computed by year. Pension sensitivity is computed as average pension assets divided by the absolute value of operating income. Average pension assets are calculated as (Beginning of year value of pension assets plus End of year value of pension assets less Actual dollar return on pension assets) divided by two. The Median Change in ERR in Rows 14–16 refers to the absolute change (basis points) in the level of ERR necessary to increase or decrease operating income by the 3 percent, 1 percent, and 0.5 percent levels. The Median Change in ERR in Rows 17–19 refers to the absolute change (basis points) in the level of ERR necessary to increase or decrease Earnings per Share by $0.10, $0.05, and $0.01 levels, respectively.

In summary, our examination of firms that are highly sensitive to the choice of the ERR reveals that the majority of these firms do not have higher ERRs compared to the broader cross-section, have benchmark returns that exceed their ERRs, on average, and are no more likely to increase their ERRs than other firms. While the operating income for these firms by definition is more sensitive to changes in the ERR, the magnitude of the change required to make a $0.10 increase in EPS does not appear to occur with regular frequency in our sample, but the change required to make a $0.01 increase in EPS does.

Materiality of the Difference in ERR on Operating Income over Time

Our final analysis provides estimates of the long-term effect of different ERRs on operating income in order to provide evidence on the materiality of the ERR decision. Specifically, we calculate the cumulative effect of a 0.5 percent (50 bps) change in the level of ERR on firms' operating income over five years. Using a hypothetical change in the ERR allows us to examine the cumulative effect of a different ERR on operating income over five years for the largest sample of firms.

We split the sample into three periods in order to examine if there are differences in the effect of the change to ERR on operating income during different economic conditions: 1991–1995, 1996–2000, and 2001–2005. For each five-year time period, we keep all firms with operating income and plan assets available for all five years. For each firm-year, we multiply plan assets by 0.5 percent to get the annual difference in operating income and then sum the differences over the five-year period. We then sum the operating income for each firm over the same five-year window, and divide the sum of the difference in operating income from the hypothetical change in the ERR by the sum of the actual operating income. The measure captures in percentage terms the difference in operating income for the firm cumulatively over five years if it had used an ERR that was 50 basis points different from its actual ERR. Table 6 shows that from 1991–1995, the median firm would have had its operating income changed by 0.49 percent over this five-year period. Only 10 percent of the firms would have affected their cumulative operating income by 2.37 percent or more during this same time period. These results are consistent across the three time periods, even though actual pension returns, operating income, and plan assets varied across the time periods. Overall, the results in Table 6 provide evidence that few firms with defined benefit pension plans would have materially different cumulative operating income (greater than 3 percent) if the reported ERRs differed by 0.5 percent.

Robustness Tests

While the results above suggest that managers do not pervasively overstate earnings through the ERR relative to economic benchmarks, it is possible that such behavior could be concentrated in firms with a higher percentage of pension assets allocated to equities. If the future expected return

TABLE 6

Cumulative Effects of Hypothetical Change of 0.5 Percent in the ERR over Five Years on Operating Income

	The Sum of (0.5% * Plan Assets) over Five Years/The Sum of Operating Income over Five Years		
	1991–1995	**1996–2000**	**2001–2005**
Mean	0.94%***	0.82%***	0.54%***
90th Percentile	2.37%	2.54%	2.55%
75th Percentile	1.11%	1.15%	1.08%
Median	0.49%	0.54%	0.43%
25th Percentile	0.20%	0.21%	0.16%
10th Percentile	0.06%	0.07%	0.05%

*** Statistically different from zero at $p < 0.01$.
This table provides estimates of the cumulative effect of a 0.5 percent (50 bps) change in the ERR on a firm's cumulative operating income over five years in order to assess the materiality of the ERR decision.

on equities is more difficult to predict and, therefore, more difficult to audit than the return on bonds, then managers could allocate additional pension assets to equity because it would enable greater discretion in establishing an ERR that would inflate earnings. To examine if greater allocation to equity is related to overstating the ERR, we analyze the ERR for three groups based on the percentage of equity in the pension: HIGH (Equity $\geq$ 80 percent), MIDDLE (40 percent $<$ Equity $<$ 80 percent), and LOW (Equity $\leq$ 40 percent).

In untabulated results, we find that the median percentage of equity in the HIGH, MIDDLE, and LOW groups is 88.0 percent, 64.0 percent, and 19.5 percent, respectively, and the corresponding median ERR is 9.0 percent, 9.0 percent, and 8.5 percent, respectively. While the percentage of equity in the pensions differs substantially across the groups, it is interesting to note that there is little difference in their ERRs.

If managers increase the allocation to equity in order to create a setting in which it is easier to overstate the ERR, then we would expect that the differences between the benchmarks (ARR, HARR3, and FERR) and the ERR will be smaller for the HIGH group. Contrary to this prediction, we find that the median differences between the benchmark returns and the ERR for firms in the LOW group are always smaller than the HIGH and MIDDLE groups, and the HIGH and MIDDLE groups consistently report positive median differences. This evidence suggests that firms with more pension assets allocated to equity do not use the uncertainty of equity returns combined with the discretion allowed in ASC 715-30 to systematically inflate ERRs.

CONCLUSION

This paper provides evidence on the opportunity and impact of using the ERR to inflate earnings, which informs the debate surrounding whether to allow managerial discretion when determining the ERR. Although we do not dispute that the management of firms with defined benefit pension plans can choose an ERR that inflates reported earnings, our analyses provide insights into the potential for pervasive and materially overstated earnings that arise in this setting. We believe that the opportunity for managers to use the ERR to manipulate earnings and deceive investors is limited given: (1) the actual return on plan assets is disclosed in the footnotes, (2) ASC 715-30 imposes limits on the difference between the actual and expected return on plan assets, (3) the decision to change the ERR is typically made at the beginning of the year, thereby preventing *ex post* adjustments to reach specific performance benchmarks, and (4) the auditors have more readily available public information from actively traded markets with which to assess the validity of the estimate.

We find ERRs, on average, do not systematically bias upward or overstate earnings relative to benchmark rates of return. We also find that changes in the ERR are infrequent and have limited impact on operating income for most firms. Although we conclude that using different ERRs would not have a material effect for the majority of firms with defined benefit pension plans, changes in the ERR can have a material impact on reported earnings for the subset of firms where reported income is more sensitive to the choice of ERR. Finally, we estimate the cumulative effects on operating income from changing ERRs by 50 basis points.

As the IASB's pension project proceeds, regulators should consider that alleged abuses of managerial discretion in setting the ERR have centered on a subset of managers with specific incentives. Despite rhetoric in the business press and elsewhere, the ERRs chosen by firms have, on average, been consistent with a variety of benchmarks used to evaluate the reasonableness of observed ERR levels. Therefore, regulators may want to focus on concerns other than managers' discretionary choice of the level of ERR, such as the appropriate level and transparency of pension disclosures, the consequences of increased volatility in reported earnings if actual returns to pension assets flow through the income statement, and the appropriate way to help investors assess the risk

of the pension portfolio. In the end, regulators must balance the cost of reducing information to stakeholders against the benefit of preventing opportunistic behavior by managers when deciding on the optimal amount of managerial discretion in financial reporting. In today's world, as the pace of change and globalization creates a complex, heterogeneous, and dynamic marketplace, managerial judgment is an important component of accounting standards.

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