An Examination Of The Economic Impact Of Pension Rate Reductions On Future Pension Expense, Earnings, And Cash Flows: A Simulation

Alan I. Blankley (Email: blanklai@muohio.edu), Miami University
Philip G. Cottell (Email: cottelpg@muohio.edu), Miami University
Richard H. McClure (Email: mcclurrh@muohio.edu), Miami University

Abstract

In this paper, we develop a two-period analytical model of pension cost, which allows us to simulate pension expense and the associated earnings impact. These estimates are important because they provide information to the market, and because they are useful in estimating future cash flows or for other analytical purposes. This is especially true now, because the economic environment has deteriorated to a point that many investors perceive increased uncertainty with respect to pension plans and the effect they have on future income. Some plan sponsors have not been faced with pension plan losses for over a decade or longer, having enjoyed reduced or eliminated "funding holidays" as a result of high returns to pension plan assets. Given the current economic climate, however, these results (boosts to earnings due to pension credits and reduced or eliminated funding requirements) may change abruptly. In fact, several authors in the popular financial press have speculated on the impact of such fundamental changes in pension assets, liabilities, and estimates.

We simulate the potential results for two periods in the future based upon percentiles drawn from a sample of 1,116 firms taken from Compustat. We compute projected pension expense for the 25th percentile firm, the median firm, and the 75th percentile firm by varying the discount rates, expected rates of return, and actual asset return assumptions.

Our results indicate that while the pension expense effect is large in both periods across small, mid-sized and large firms, large firms show the greatest increase in pension expense. Interestingly, however, the earnings impact is the smallest for large firms in both periods, and is not material in period one for both large and mid-sized firms. It is material for small firms. Firms with smaller pension plans appear to have the greatest earnings drag both one and two years into the future. In period two, all firms face significantly greater expense and earnings reductions, although again, smaller firms face the greatest impact. In addition, all firms face significantly increased cash funding requirements in order to prevent funding ratios (plan assets scaled by pension liabilities) from deteriorating. These funding requirements appear in period one, and increase in period two. These results suggest not only future earnings reductions from pension rate changes, but also a potential cash flow impact as well.

Readers with comments or questions are encouraged to contact the authors via email.

1.0 Introduction

In this paper, we develop a two-period analytical model of pension cost, which allows us to simulate pension expense and the associated earnings impact. To simulate the expense, we develop point estimates for pension expense using a variety of different rate assumptions,[1] and we partition these projections based on the relative size of the pension plan.

These estimates are important because they provide information to the market, and because they are useful in estimating future cash flows or for other analytical purposes. This is especially true now, because the economic environment has deteriorated to a point that many investors perceive increased uncertainty with respect to pension plans and the effect they have on future income.

We simulate the potential results for two periods in the future based upon percentiles drawn from a sample of 1,116 firms taken from Compustat. We compute projected pension expense and the earnings impact for a hypothetical firm representing the 25^{th} percentile, the 50^{th} percentile, and the 75^{th} percentile by varying the discount rates, expected rates of return, and actual asset return assumptions.

Our results indicate that while the pension expense effect is large in both periods across small, mid-sized and large firms, large firms show the greatest increase in pension expense. Interestingly, however, the earnings impact is the smallest for large firms in both periods, and it is the greatest for small firms. Firms with smaller pension plans have the greatest earnings drag both one, and two years into the future. In addition, all firms face significantly increased cash funding requirements in order to prevent funding ratios (plan assets scaled by pension liabilities) from deteriorating. These results suggest that not only will pension rate changes bring about future earnings reductions, but they will also lead to a likely cash flow impact as well.

The rest of the paper is organized as follows. In the next section, we develop the background and rationale for the study. Then we present the analytical model and present the results of our simulation.

2.0 Background and Rationale

With the decline in the interest rate environment and market losses over the past two years, firms sponsoring defined benefit pension plans find themselves facing actuarially-driven, future earnings declines. This is because, in response to the decline in interest rates and plan losses, firms are likely to decrease their expected rate of return and discount rate assumptions. The popular press has reported this likelihood several times over the last year. In the *Wall Street Journal*, for instance, Brown and Weil (2001) reported on a Bear Stearns study of corporate earnings which suggested that declining pension assets and reduced interest rate assumptions would result in a six-fold increase in pension costs and a 5% decline in earnings. Similar articles alleging large, future earnings declines attributable to losses on pension assets and reductions in the expected rate of return also appeared in the Wall Street Journal (again), USA Today, Money magazine, and Smart Money.[2] These articles focused on companies who had reported large amounts of pension income, and the likelihood that these companies would find their earnings reduced as the rate of return assumption fell and pension expense increased or pension credits decreased.[3] The general theme of these articles was that certain firms had been able to mask poor performance in their core operations in the 1990s by reporting large amounts of pension income, and that this situation was likely to be reversed soon. Also, in the December 2001 addition of *Fortune*, Warren Buffet specifically singled out the pension

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[1] The pension rates varied include the discount rate, the expected rate or return on plan assets, and the actual rate of return on plan assets.

[2] See Brown, K. and J. Weil. 2001. Lift's off: Pension costs threaten earnings, *Wall Street Journal* (November 13): C1-C2; Krantz, M. 2002. Flap exposes tricks of accounting trade, *USA Today*, (February 11); Bulkeley, W. 2002. IBM's overfunded pension plan won't pump up bottom line as much this year as it has in past, *Wall Street Journal*, (March 15); Frederick, J. 2002. The trouble with earnings, *Money*, (March): 76; Laise, E. 2002. Fuzzy math. *Smart Money* (July): 27;

[3] All the articles mentioned above focus on IBM as an example of a company that had a large portion of its earnings attributable to pension income, although the *Smart Money* article also cites Verizon and Qwest as examples as well. IBM reported $1.45 billion in worldwide net periodic pension income out of $10.95 billion in pre-tax income, or 13.25%. After netting costs associated with its defined benefit and defined contribution plans, IBM recognized $841 million in pension income on its Income Statement in 2001, or 7.68% of pre-tax income (IBM 2002).

expected rate of return assumption as being set too high, and went on to suggest that companies not reducing this rate could face future litigation for misleading investors (Buffet 2001).

Most of the attention in the financial press has been focused on the expected rate of return, in part because the rates are high and the distribution is wider compared to the other rate assumptions,[4] and in part because the effect of high rates is relatively easy to interpret. In an economic environment of low returns or losses, maintaining a high expected rate of return seems counter-intuitive and suggestive of managerial earnings manipulation, a technique to artificially bolster earnings. What attracts less attention, however, is the effect of discount rate reductions on future pension expense. Yet the discount rate has a powerful effect. A general rule-of-thumb is that pension costs change by four to seven percent for each ¼ point change in the discount rate (Blankley and Swanson 1995; Kwon 1994; Winklevoss 1993). Blankley and Swanson (1995) found that in declining interest rate environments, firms tended to lower their discount rates regardless of whether their discount rate was above or below benchmark interest rates. Over the past year, the yield on an index of high quality corporate bonds compiled by *Barron's* had fallen by nearly 30 basis points, from 7% to 6.72%. That being the case, we expect to see firms lower their discount rates over the simulation horizon, although reductions are likely to be small. Given the economic environment – pension plan losses, calls for firms to reduce expected rates of return, and lower high-grade bond yields – it seems likely that firms will respond by reducing both rates. The combined effect of discount rate reductions and lowered expected returns could have a significant impact on reported earnings.

Finally, although there is no direct cash flow impact from changes in pension estimates, we believe there is likely to be a significant, indirect effect on cash flows brought about by actuarial changes and declining market returns. Firms sustaining losses on their plan assets will find the relative balance between pension assets and liabilities disrupted. This imbalance would be exacerbated by discount rate reductions which increase the liability.[5] Thus, the firm may either be compelled to increase funding, or may voluntarily increase funding in order to maintain a desired funding ratio. A firm that had an overfunded plan two years ago, may, as a result of lower actuarial estimates and plan losses, find the plan underfunded now, and may therefore decide to make additional contributions to the plan.

3.0 The Study

In order to estimate pension expense, we develop an analytical, two-period model presented below. Given the fact that pension expense is the net of several components, and that each of these components is derived from, or heavily influenced by, actuarial assumptions, we built the model to derive the individual components of pension expense based upon their particular required assumptions using starting data from Compustat. Each component of pension expense was developed so that it was sensitive to changes in the particular rate affecting it. We discuss each component below, then present the complete model.

3.1 Service Cost

The term in equation (2) below represents service cost. Service cost is the present value of benefits earned by employees during the current period based on future salary levels. These benefits will be paid out as an annuity to employees after retirement. In order to account for the transaction, SFAS no. 106 requires that this annuity be discounted to its present value using a discount rate representing the weighted-average interest rate on a hypothetical portfolio of high quality, zero-coupon bonds whose maturities match the future benefit payments.

[4] In our sample, the average expected rate of return for 2000 was 8.83% (median 9%, Std. Deviation 1.038), while the mean discount rate was just under 7.46% (median 7.5%, Std. Deviation .639).

[5] To illustrate, assume a firm has a $2,400 balance in both plan assets and PBO at the start of period one. Its funding ratio (plan assets/PBO) at that time is equal to 1. If the firm maintains a discount rate of 7.5% and earns a 5% return on plan assets, then, ignoring benefit payouts, it must make a $318 contribution in order to maintain a funding ratio of 1 at the end of period one. If the firm sustains a loss of 5% on plan assets during the period, rather than earning 5%, its contribution must go up to $558 (a 75.5% increase in contribution). If, however, the firm also lowers the discount rate to 7% and sustains the 5% loss, its required contribution increases to $942 (a 196% increase in contribution), in order to maintain its beginning funding ratio.

$$(2) \qquad Service\ Cost_i = \left[\frac{\sum_{j=1}^{TA} \frac{ASCA_j}{(1+DR(i))^j}}{(1+DR(i))^{TBR-1}} \right]$$

(All terms are defined under the presentation of the complete model below.)

The two necessary starting values for service cost calculation are the discount rate and ASCA(j), which represents the annual firm-wide service cost annuity benefit. To obtain the discount rate, we simply took the mean discount rate (7.5%) from our sample.

To obtain the firm-wide service cost benefit, however, we could not use the appropriate descriptive from the sample. Using the median service cost, for example, would allow us to calculate pension expense for the median firm in year 0 (the base year), but it would not allow us to capture the influence the discount rate has on service cost when it (the discount rate) changes. In other words, by using median service costs, we could project service costs into the future using some predictive technique, but these projections would be insensitive to future discount rate changes. To counter this problem, we built the model so that service cost in period 0 was derived equal to the median service cost for our sample. We did this by using term (2) above, applying a discount rate of 7.5%, and then deriving the value of ASCA(i) based upon the following rearrangement:

$$(2.1) \qquad ASCA(i) = \frac{SC(1+DR)^{TBR-1}}{\sum_{j=1}^{TA} \frac{1}{(1+DR(j))^j}}$$

Thus, we were able to derive the amount of the annuity benefit, which, when discounted first over the stream of future payments starting at the retirement date, then from the retirement date to the present as a single sum, gave us the median service cost from our sample. We applied this procedure for the 25^{th} and 75^{th} percentile firms as well.

3.2 Interest Cost

We also applied a similar procedure to obtain the Projected Benefit Obligation (PBO), which is a key component of the Interest Cost calculation. Since we needed the PBO to be sensitive to changes in the discount rate, we derived $FVRA_j$ (the firm-wide value of the retirement annuity) from the following equation by using a discount rate of 7.5%, and setting PBO equal to the 25^{th} percentile PBO, the median PBO, and the 75^{th} percentile PBO from our sample, respectively, then solving for $FVRA_j$.

$$(1) \qquad \text{PBO} = \left[\frac{\sum_{j=1}^{TA} \frac{FVRA_j}{(1+DR(i))^j}}{(1+DR(i))^{TBR}} \right]$$

Once $FVRA_j$ was known, we were able to find the value of PBO under different discount rate estimates. Then, after obtaining estimates of the PBO, we obtain the interest cost component under the various rate assumptions by multiplying the term by a vector of different discount rates. We vary the discount rate from 6% - 8.5%.

(2) $$\text{Interest Cost} = [DR(i)] * \left[\frac{\sum_{j=1}^{TA} \frac{FVRA_j}{(1+DR(i))^j}}{(1+DR(i))^{TBR}} \right]$$

3.3 Expected Return on Plan Assets

The expected return on plan assets in dollars is calculated as the expected rate of return, which we treat as a vector of rates multiplied by the market-related asset value, a rolling five-year average of the fair value of plan assets. We vary the expected rates of return for period one from 5% - 9% and again in period two from 5% - 8%. The following term represents the expected return on plan assets:

(4) $$[ERR(i)] x \left[\frac{\sum_{j=-4}^{0} FVPA_j}{5} \right]$$

3.4 Amortization Components

From our sample, we were able to determine that 85% of the sample had unrecognized prior service cost. Since such a large number of firms reported it, we determined it was necessary to include it in the calculation of pension expense, but it is not possible or necessary to derive it. Since it is not affected by the varying rate assumptions, we simply used the 25^{th} percentile value of unrecognized prior service cost for the 25^{th} percentile firm. We did this for the 50th and 75^{th} percentiles as well.

The more important amortization component to estimate was the amortization of unrecognized gains or losses. This component captures the difference between the expected return (in dollars) and the actual return on plan assets as well as any changes wrought in the PBO by changes in actuarial assumptions like the discount rate. The beginning balance for each period is then compared to a "corridor," defined by the FASB as being 10% of the greater of the PBO or the market-related asset value. If the balance in the unrecognized gains or losses is within the corridor, no amortization is needed, but if it exceeds the corridor, then the amount by which it exceeds the corridor is amortized over the average remaining service period of the firm's employees, which we assumed to be 20 years. Our calculation of the amortization of unrecognized gains or losses was based on the following term:

(5)

$$AMORTGL(i){=}IF(UGL(i) > CORR(i), \frac{UGL(i) - CORR(i)}{ASL(i)},$$
$$IF(UGL(i) < CORR(i) * -1, -1 * \left[\frac{-1 * CORR(i) - UGL(i)}{ASL(i)} \right], 0))$$

The initial balance obtained for the unrecognized gains and losses account was the amount from our sample for each percentile. To that amount, changes brought about from applying changes in rates flowed into and through the account as appropriate to influence pension expense. The complete model is presented below:

$$(6)\quad PEXP(i)=\left[\frac{\sum_{j=1}^{TA}\frac{ASCA_j}{(1+DR(i))^j}}{(1+DR(i))^{TBR-1}}\right]+DR(i)*\left[\frac{\sum_{j=1}^{TA}\frac{FVRA_j}{(1+DR(i))^j}}{(1+DR(i))^{TBR}}\right]-\left[ERR(i)\right]*\left[\frac{\sum_{j=-4}^{0}FVPA_j}{5}\right]+\frac{UnPSC(i)}{ASL}+/-AMORTGL(i)$$

Where,

PEXP(i)	= Pension expense at period i
DR(i)	= Discount Rate at period i
$ASCA_j$	= Annual Firm-wide Service Cost
TA	= term of the annuity payments, assumed to be 20 years
TBR	= Time remaining before retirement in years, assumed to be 20 years
$FVRA_j$	= Firm-wide value of the retirement annuity at time j
ERR(i)	= Expected rate of return at period i
$FVPA_j$	= Fair value of pension plan assets at period j
UnPSC(i)	= Unrecognized Prior Service Cost at period i
ASL	= Average service life of employees remaining, assumed to be 20 years
AMORTGL(i)	= Amortization of Unrecognized Gains or Losses for period i

4.0 Results

4.1 Pension Expense

In order to gauge the effect of changing discount rates and expected rates of returns, we generated hypothetical firms from values of each of the variables at the 25th, 50th, and 75th percentile points in our sample.[6] Therefore the calculations in the simulations do not represent a single firm in the sample, but rather a compilation of these values.

Tables 1-3 report the results for period one and period two for the 25th, 50th, and 75th percentile hypothetical firm, respectively. It is no surprise that, depending on the combination of discount rate and expected rate of return chosen, pension expense varies widely. Table 1 indicates that for firms with small plans (25th percentile firm), the projected pension expense in period one ranges from $311 thousand to $1.5 million (Panel A), which represents a range extending from a 59.6% decrease in pension expense to a 221% increase.

In order to estimate the income effect, we took the projected pension expense as a percentage of pre-tax, pre-pension expense income. We took the period 0 value for pre-tax income from Compustat, then added back the projected pension cost under each rate assumption combination. To simplify matters, we assumed no growth in income over periods one and two. Table 1, Panel B indicates that pension expense for the hypothetical small firm could range from 8.8% of income to 43.4% in period one, depending on the combination of rates used.

Because it is necessary to identify period one point estimates before estimating period two results, we assume a ½ point reduction in the discount rate and a 1-point reduction in the expected rate of return for period one. Thus, the period one discount rate used to determine period two results was 7%, and we assumed the expected rate of return fell from 9% in period zero to 8% in period one. In addition, the actual rate of return in period one will affect period two pension expense in two ways. First, any losses sustained will reduce plan assets, so the amount multiplied by the expected rate of return shrinks, which reduces the expected dollar return, which in turn increases pension expense. Second, the difference between the expected return (in dollars) and the actual return would increase the period one unrecognized gains or losses account, which would then be amortized in period two if it exceeded the corridor. For period two results, we assumed that, starting in period one, the actual rate of returned

[6] Initial values serving as input into the model included the PBO and service cost, as explained above, the fair value of plan assets, unrecognized prior service cost, unrecognized gains or losses, benefit payments from the plan, and contributions to the plan. All variables were taken from Compustat except benefits and contributions, which are not available on Compustat. We collected these items manually from each firm's 10K filing.

declined from 8.5% in period 0 to -10.0% in period one. We assumed a 10% loss based on an average portfolio of 1/3 bonds and 2/3 equity, whose equity returns match the S&P 500 (approximately -15%) and bond yields of 6%. Making these assumptions allows us to project period two results.

Table one, panel C indicates that in period two, small firm pension expense ranges from $521 thousand to $2.7 million, which represents a 57% decline to a 120% increase over period one, respectively. Panel D indicates that, in period 2, pension expense as a percent of income ranges from 13.9% to 45.7%.

Table 2 indicates results for firms with mid-size plans (50th percentile firm). For these firms, pension expense in period one ranges from $681 thousand to $9.5 million, which represent a 78% decline and a 210% increase, respectively, depending on the rate assumptions used. The projected income affect ranges between 1.2% to 14.52% in period one. In period two, results indicate that pension expense could range from $1.4 million to $10.3 million (panel C), which represents 2.46% to 15.6% of pre-tax, pre-pension cost income, respectively. For both periods, no matter which rate combination is used, projected pension expense for firms with mid-sized plans is a significantly smaller percent of income than it is for firms with smaller plans.

Table 3, panel A indicates that for firms with large plans (75th percentile), the projected expense ranges from a credit of $1.9 million to expense of $34.9 million in period one. This reflects _.72% of income and 11.4% of income respectively. In period two, pension expense increases, ranging from $522 thousand to $37.8 million, depending on the rate combinations used. The projected impact on income ranges from .19% to 12.2%.

Table 4 reports the results of periods 1 and 2 point estimates. In panel A, we report period one results for small, mid-sized, and large firms using a discount rate of 7% and an expected rate of return of 8%, as well as a 10% loss on plan assets. It is interesting to note that while large firms face the greatest incremental increase in pension expense as a result of rate declines (small = 63.3%, mid-sized = 80.3%, and large= 167.5% increase), they have the lowest income effect. Pension expense as a percent of income is 4.6% for large firms, 7.3% for mid-sized firms, and 27.7% for small firms. The incremental effect of pension cost on income – that is, the amount by which pension expense increases, and hence, lowers income, attributable to the decline in rates – is only 2.9% for large firms and 3.2% for mid-sized firms, but it is 10.7% for small firms. Our results indicate that smaller firms will face a much greater drag on income than mid-sized or larger firms. The effect of the combined rate declines on income is material only to smaller firms.[7] This is because the rate reductions we assume for our estimates are relatively modest, and also because the SFAS no. 87 smoothing provisions keep a large portion of the effect off the income statement in period one. These effects begin to appear in period two.

We projected period two results (panel B) using another ½ point reduction in the discount rate and 1 point reduction in the expected rate of return estimates. We further assumed another 10 percent loss on plan assets.[8] Results indicate a dramatic incremental increase in pension cost. Pension expense is nearly 400% greater for large firms than it would have been had rates been held constant from period 0 (nearly 300% for mid-sized firms and 229% for small firms). Interestingly, pension expense increases are greatest for large firms (84.5% increase), as they were in period one, but again, the income impact is smallest for large firms. Pension expense as a percent of income is 8.2%, 11.4%, and 37.8% for large, mid, and small firms, respectively. As might be expected, the income impact gets much greater in the second year of declining pension rates, partly because the amortization of pension plan losses appears in period two, partly because the liability increases directly as a result of the decline in discount rates, increasing both service cost and interest cost,[9] and partly because we assume no growth in income.

Results indicate that any income effect attributable to increased pension cost is likely to be relatively modest for large and mid-sized firms in period one, but highly material for small firms. In period two, the income

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[7] We base this judgment on the 5% of pre-tax income materiality heuristic common in the literature. See Pany and Wheeler (1989a &b), and Leslie (1985), for example.

[8] This assumption does not affect pension expense in period two, but does have a significant impact on our cash flow projections.

[9] This result may seem counter-intuitive. As the discount rate declines, interest cost goes up because the PBO increases as a result of the discount rate decline. So, even though the rate decreases, the base against which it is applied increases by more than enough to offset the rate reduction effect.

effect increases across all percentiles, so that both pension expense itself, and the incremental pension expense attributable to two years of rate declines and asset losses are material for all firms.

4.2 Cash Flow Projections

As we discussed above, the pension rates themselves have no direct effect on cash flows; in other words, these rates do not determine funding requirements. On the other hand, discount rate changes may indirectly impact cash flows, particularly when coupled with losses in plan assets. As assets decline due to losses, and the liability increases due to discount rate reductions, the firm's funding ratio (fair value of plan assets scaled by PBO) could decline significantly and abruptly. Firms may have a policy of maintaining a particular ratio, or they may wish to avoid the political cost associated with deteriorating pension economics, or, if the asset decline is sufficient, may be compelled to increase funding to comply with the Retirement Protection Act of 1994.

We examined the potential cash flow effect first by calculating the funding ratio for each percentile firm examined for both periods. Table 5 reports the rate estimates used for each period as well as the projected asset and liability balances for each period and the accompanying funding ratios. These projections also include assumptions of a 10% loss on plan assets for both periods 1 & 2. Furthermore, the projections take into account benefit payments and cash contributions appropriate to each percentile, so the cash necessary to restore the funding ratio to one is an incremental cash flow.

What is immediately noticeable is that, under our relatively modest rate decline assumptions, funding ratios deteriorate dramatically between period 0 and period one, and then again between period one and period two. For each size classification, the funding ratio declines by approximately 50% over the 2 year projection. By the end of period two, small firms will need an additional cash flow of nearly $20 million, mid-sized firms will need approximately $80.6 million, and large firms will need close to $305 million.

5.0 Conclusion

In this paper we investigated the likely effect pension rate assumption changes will have on future pension expense, earnings, and cash flows using a two-period model for pension expense. We found that for all firms, pension expense is likely to increase significantly over the next two years. This is especially true for the largest firms. Even though the expense increases significantly, the effect on income remains comparatively modest for large firms, at about 5% in period one and 8.2% in period two. The income impact is somewhat greater for mid-sized firms (7.3% of income in period one and 11.4% of income in period two), and the greatest for small firms (27.7% in period one and 37.8% in period two). These results suggest that if exogenous economic conditions fail to improve significantly over the next two years, and firms respond by lowering their pension rate estimates to adequately reflect those conditions, then there will be a large drag on earnings, especially among smaller firms.

We also examined the potential cash flow impact of the decline in the discount rate coupled with pension plan losses. There is no direct correlation between changes in the pension discount rate and funding requirements, as the two are not coupled under existing statutes or practice, but there may be an indirect correlation. As plan assets decline due to investment losses and liabilities increased due to downward adjustments in the discount rate, the funding ratio (plan assets scaled by the PBO) could deteriorate dramatically. In order to prevent the ratio from deteriorating, or to prevent the political or social cost associated with this deterioration, firms may voluntarily decide to increase funding, which would then place an additional burden on cash from operating activities. We examined this potential cash flow effect and found that, even under our relatively modest rate decline assumptions, funding ratios deteriorate dramatically between period 0 and period one, and then again between period one and period two, which could lead to additional contributions of close to $20 million for small firms by the end of period two, $80 million for mid-sized firms, and $305 million for large firms.

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TABLE 1

Effect of Changes in Expected Rates of Return and Discount Rates on Pension Expense For 25th Percentile Firm

Panel A: Period one Pension Expense

	Expected Rate of Return				
Discount Rate	**9.00**	**8.00**	**7.00**	**6.00**	**5.00**
8.50	311,060	540,888	770,716	1,000,543	311,060
8.00	524,185	754,012	983,840	1,213,668	524,185
7.50	754,326	984,154	1,213,982	1,443,809	754,326
7.00	1,002,138	1,231,966	1,461,794	1,691,621	1,002,138
6.50	1,268,066	1,497,893	1,727,721	1,957,548	1,268,066
6.00	1,552,253	1,782,080	2,011,908	2,241,736	1,552,253

Panel B: Pension expense as a percent of Pre-tax Income in Period one

	Expected Rate of Return				
Discount Rate	**9.00**	**8.00**	**7.00**	**6.00**	**5.00**
8.50	8.81%	14.38%	19.31%	23.71%	27.65%
8.00	14.00%	18.97%	23.40%	27.37%	30.95%
7.50	18.98%	23.41%	27.38%	30.96%	34.20%
7.00	23.74%	27.67%	31.22%	34.44%	37.37%
6.50	28.25%	31.75%	34.92%	37.81%	40.45%
6.00	32.53%	35.63%	38.45%	41.04%	43.43%

Panel C: Period two Pension Expense (assuming Period one Expected Rate = 8%, Discount Rate = 7%, Actual Return = -10%)

	Expected Rate of Return				
Discount Rate	**9.00**	**8.00**	**7.00**	**6.00**	**5.00**
8.50	521,097	759,156	997,214	1,235,273	1,473,331
8.00	734,222	972,280	1,210,339	1,448,397	1,686,456
7.50	964,363	1,202,422	1,440,480	1,678,539	1,916,597
7.00	1,212,175	1,450,234	1,688,292	1,926,351	2,164,409
6.50	1,478,102	1,716,161	1,954,219	2,192,278	2,430,336
6.00	1,762,290	2,000,348	2,238,407	2,476,465	2,714,523

Panel D: Pension expense as a percent of Pre-tax Income in Period two
(assuming Period one Expected Rate = 8%, Discount Rate = 7%, Actual Return = -10%)

	Expected Rate of Return				
Discount Rate	**9.00**	**8.00**	**7.00**	**6.00**	**5.00**
8.50	13.93%	19.08%	23.65%	27.73%	31.39%
8.00	18.57%	23.19%	27.32%	31.03%	34.37%
7.50	23.05%	27.19%	30.91%	34.27%	37.31%
7.00	27.35%	31.05%	34.40%	37.43%	40.20%
6.50	31.46%	34.77%	37.77%	40.51%	43.01%
6.00	35.37%	38.32%	41.01%	43.47%	45.74%

TABLE 2

Effect of Changes in Expected Rates of Return and Discount Rates on Pension Expense For 50th Percentile (Median) Firm

Panel A: Period one Pension Expense

	Expected Rate of Return				
Discount Rate	**9.00**	**8.00**	**7.00**	**6.00**	**5.00**
8.50	680,807	1,656,665	2,632,532	3,608,380	4,584,238
8.00	1,525,970	2,501,828	3,477,685	4,453,543	5,429,401
7.50	2,438,860	3,414,717	4,390,575	5,366,432	6,342,290
7.00	3,422,139	4,397,997	5,373,855	6,349,712	4,325,570
6.50	4,477,666	5,453,523	6,429,381	7,405,238	8,381,096
6.00	5,606,126	6,581,984	7,557,841	8,533,699	9,509,556

Panel B: Pension expense as a percent of Pre-tax Income in Period one

	Expected Rate of Return				
Discount Rate	**9.00**	**8.00**	**7.00**	**6.00**	**5.00**
8.50	1.20%	2.87%	4.49%	6.05%	7.57%
8.00	2.65%	4.28%	5.85%	7.37%	8.84%
7.50	4.17%	5.75%	7.27%	8.74%	10.17%
7.00	5.76%	7.28%	8.76%	10.18%	7.17%
6.50	7.40%	8.87%	10.30%	11.68%	13.02%
6.00	9.10%	10.52%	11.89%	13.22%	14.52%

Panel C: Period two Pension Expense (assuming Period one Expected Rate = 8%, Discount Rate = 7%, Actual Return = -10%)

	Expected Rate of Return				
Discount Rate	**9.00**	**8.00**	**7.00**	**6.00**	**5.00**
8.50	1,413,264	2,415,841	3,418,418	4,420,996	5,423,573
8.00	2,258,426	3,261,004	4,263,581	5,266,159	6,268,736
7.50	3,171,316	4,173,893	5,176,471	6,179,048	7,181,626
7.00	4,154,596	5,157,173	6,159,750	7,162,328	8,164,905
6.50	5,210,122	6,212,699	7,215,277	8,217,854	9,220,432
6.00	6,338,582	7,341,160	8,343,737	9,346,315	10,348,892

Panel D: Pension expense as a percent of Pre-tax Income in Period two (assuming Period one Expected Rate = 8%, Discount Rate = 7%, Actual Return = -10%)

	Expected Rate of Return				
Discount Rate	**9.00**	**8.00**	**7.00**	**6.00**	**5.00**
8.50	2.46%	4.14%	5.75%	7.32%	8.83%
8.00	3.88%	5.50%	7.07%	8.60%	10.07%
7.50	5.36%	6.94%	8.46%	9.94%	11.37%
7.00	6.91%	8.43%	9.91%	11.34%	12.72%
6.50	8.51%	9.99%	11.41%	12.80%	14.14%
6.00	10.17%	11.59%	12.97%	14.30%	15.60%

TABLE 3

Effect of Changes in Expected Rates of Return and Discount Rates on Pension Expense For 75th Percentile Firm

Panel A: Period one Pension Expense

	Expected Rate of Return				
Discount Rate	**9.00**	**8.00**	**7.00**	**6.00**	**5.00**
8.50	(1,931,300)	2,519,896	6,971,092	11,422,289	15,873,485
8.00	1,375,833	5,827,029	10,278,225	14,729,421	19,180,617
7.50	4,931,975	9,383,171	13,834,367	18,285,563	22,736,759
7.00	8,742,713	13,193,909	17,645,106	22,096,302	26,547,498
6.50	12,809,292	17,260,488	21,711,684	26,162,880	30,614,076
6.00	17,126,923	21,578,119	26,029,316	30,480,512	34,931,708

Panel B: Pension expense as a percent of Pre-tax Income in Period one

	Expected Rate of Return				
Discount Rate	**9.00**	**8.00**	**7.00**	**6.00**	**5.00**
8.50	-0.72%	0.92%	2.50%	4.04%	5.52%
8.00	0.50%	2.10%	3.65%	5.15%	6.60%
7.50	1.78%	3.34%	4.85%	6.31%	7.73%
7.00	3.12%	4.64%	6.10%	7.53%	8.91%
6.50	4.51%	5.98%	7.41%	8.79%	10.14%
6.00	5.94%	7.36%	8.75%	10.10%	11.40%

Panel C: Period two Pension Expense (assuming Period one Expected Rate = 8%, Discount Rate = 7%, Actual Return = -10%)

	Expected Rate of Return				
Discount Rate	**9.00**	**8.00**	**7.00**	**6.00**	**5.00**
8.50	522,092	5,064,015	9,605,938	14,147,861	18,689,784
8.00	3,829,224	8,371,147	12,913,070	17,454,993	21,996,916
7.50	7,385,366	11,927,289	16,469,212	21,011,135	25,553,058
7.00	11,196,105	15,738,028	20,279,951	24,821,874	29,363,797
6.50	15,262,683	19,804,606	24,346,529	28,888,452	33,430,375
6.00	19,580,315	24,122,238	28,664,161	33,206,084	37,748,007

Panel D: Pension expense as a percent of Pre-tax Income in Period two for 75th Percentile Firm (assuming Period one Expected Rate = 8%, Discount Rate = 7%, Actual Return = -10%)

	Expected Rate of Return				
Discount Rate	**9.00**	**8.00**	**7.00**	**6.00**	**5.00**
8.50	0.19%	1.83%	3.42%	4.95%	6.44%
8.00	1.39%	2.99%	4.54%	6.04%	7.50%
7.50	2.65%	4.21%	5.72%	7.18%	8.60%
7.00	3.96%	5.48%	6.95%	8.38%	9.76%
6.50	5.32%	6.80%	8.23%	9.62%	10.97%
6.00	6.73%	8.16%	9.55%	10.90%	12.21%

TABLE 4

Pension Expense Results Assuming Specific Discount rates, Expected Rates, and Actual rates of Return

Panel A: Period one Results

	25th Percentile	**50th Percentile**	**75th Percentile**
Period one Pension Expense holding rates constant from pd 0 to pd. 1	754,326	2,438,860	4,931,975
Period one Pension Expense Assuming Period one DR = 7%, ERR = 8%	1,231,966	4,397,997	13,193,909
Incremental % Increase in Pen. Exp. due to rate adjustments	63.32%	80.33%	167.52%
Percent Increase in Pension Expense from Pd. 0	59.88%	43.74%	147.02%
Pre-tax, pre-pension Income	4,451,966	60,397,997	284,633,909
Pension Expense as % of Pre-tax, Pre-pension Income	27.67%	7.28%	4.64%
Incremental Effect on Pre-tax, pre-pension income due to rate adjustments	10.73%	3.24%	2.90%

Panel B: Period two Results, assuming Period one DR = 7%, ERR = 8%, and a 10% loss on plan assets in Period one

	25th Percentile	**50th Percentile**	**75th Percentile**
Period two Pension Exp. holding rates and returns constant from pd 0 to pd. 2	593,723	1,828,816	2,447,796
Period two Pension Exp. Assuming Period two DR = 6.5%, ERR = 7%	1,954,219	7,215,277	24,346,529
Incremental % Increase in Pen. Exp. due to rate adjustments	229.15%	295.85%	393.65%
Percent Increase in Pension Expense from Pd. 1	58.63%	64.06%	84.53%
Pretax, pre-pension Income (Held constant from Pd. 1)	4,451,966	60,397,997	284,633,909
Pension Expense as % of Pretax, Pre-pension Income	37.77%	11.41%	8.23%
Incremental Effect on Pretax, pre-pension income due to rate adjustments	26.29%	7.56%	6.56%

TABLE 5

Simulation Results for Pension Asset, Liability, and Funding Measures And Potential Cash Flows

Panel A: Results for 25th Percentile Firm

Period	Beg Balance	0 (Empirical)	1 (Projected)	2 (Projected)
Discount Rate		7.50%	7.00%	6.50%
Expected Rate of Return		9.00%	8.00%	7.00%
Actual Rate of Return		8.50%	-10.00%	-10.00%
PBO	25,350,000	26,944,750	33,583,605	41,032,559
% Chg			24.64%	22.18%
Fair Value of Plan Assets	25,080,000	25,983,800	23,385,420	21,046,878
% Chg			-10.00%	-10.00%
Funding Ratio	0.99	0.96	0.70	0.51
% Chg			-27.79%	-26.34%
Add'l Cash Required to Bring Fratio to 1	270,000	960,950	10,198,185	19,985,681

Panel A: Results for 50th Percentile Firm
(assumes annual pension contributions of $901,000 and benefit payments of $5,308,500)

Period	Beg Balance	0 (Empirical)	1 (Projected)	2 (Projected)
Discount Rate		7.50%	7.00%	6.50%
Expected Rate of Return		9.00%	8.00%	7.00%
Actual Rate of Return		8.50%	-10.00%	-10.00%
PBO	100,080,151	105,952,166	126,893,280	161,656,537
% Chg		5.87%	19.76%	27.4%
Fair Value of Plan Assets	105,780,000	110,363,800	94,919,920	81,020,428
% Chg		4.33%	-13.99%	-14.64%
Funding Ratio	1.06	1.04	0.75	0.50
% Chg		-1.45%	-28.19%	-33.00%
Add'l Cash Required to Bring Fratio to 1	0	0	31,973,360	80,636,109

Panel C: Results for 75th Percentile Firm
(assumes annual pension contributions of $4,814,000 and benefit payments of $23,395,400)

Period	Beg Balance	0 (Empirical)	1 (Projected)	2 (Projected)
Discount Rate		7.50%	7.00%	6.50%
Expected Rate of Return		9.00%	8.00%	7.00%
Actual Rate of Return		8.50%	-10.00%	-10.00%
PBO	421,100,001	442,337,101	526,652,823	670,870,714
% Chg		5.04%	19.06%	27.38%
Fair Value of Plan Assets	473,700,000	495,383,100	427,263,390	365,955,651
% Chg		4.58%	-13.75%	-14.35%
Funding Ratio	1.12	1.12	0.81	0.55
% Chg		-0.44%	-27.56%	-32.76%
Add'l Cash Required to Bring Fratio to 1	0	0	99,389,433	304,915,063