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The Expected Rate of Return on Pension Funds and Asset Allocation as Predictors of Portfolio Performance

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ABSTRACT: We examine the correlation between the expected rate of return on pension assets (ERR), as reported in the financial statements, and the composition of the pension portfolio, measured as the percent invested in equities (% Equity). Our evidence indicates that ERR and %Equity are related, but the relation is rather weak. We also examine whether ERR and %Equity are correlated with future returns on pension assets. Only %Equity is correlated with future pension returns. Our results suggest that the FASB should consider the enforcement rather than elimination of current disclosure requirements regarding pension asset composition.

Key Words: *Pension accounting, Pension asset allocation, Actuarial assumptions, Expected rate of return on pensions.*

Data availability: *Please contact the second author.*

I. INTRODUCTION

Statement of Financial Accounting Standards (SFAS) No. 87 (FASB 1985, para. 54d) requires corporations to disclose the long-term expected rate of return on pension assets (ERR) and the types of assets held in the pension portfolio (para. 54a). While all corporations disclose the ERR, only a few disclose information about the composition

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of assets in their pension funds. Furthermore, when asset allocation is disclosed, the disclosure is often vague. In an attempt to determine the extent of typical asset allocation disclosures, we reviewed the financial statements of 31 firms that were selected by the Association for Investment Management and Research (AIMR) for their excellence in corporate reporting during 1992.[1] We exclude four firms from this analysis because they do not sponsor a defined benefit pension plan. Of the remaining 27 companies, 24 provide no more than a statement indicating that pension assets consist of bonds and stocks. Surprisingly, only three firms of this AIMR elite group provide detailed asset allocation information, i.e., the percent invested in bonds, stocks, and other asset categories (see the appendix).

Recently, the Financial Accounting Standards Board (FASB) has issued Statement of Financial Accounting Standards (SFAS) No. 132 eliminating the requirement to disclose asset composition (FASB 1998). The Board has considered the claim that, in practice, asset composition and certain other pension disclosures "provide only limited useful information to users of financial statements" (FASB 1997, para. 46). The Board has also considered the recommendation of the American Institute of Certified Public Accountants (AICPA) Special Committee on Financial Reporting, which states that "standard setters should search for and eliminate less relevant disclosures" (FASB 1998, para. 17). Given the prevalent practice of vague pension asset composition disclosures and the need to control the cost of preparing and disseminating financial disclosures, the FASB has decided to eliminate asset composition disclosures and to retain the disclosure of the ERR (FASB 1998, para. 49).

In this study, we examine the relevance of disclosures of pension asset composition and of the ERR.[2] Because the financial statement disclosures of pension fund asset composition are vague, pension asset composition information is taken from a proprietary database that is described later. We adopt the Exposure Draft's notion that relevant information is useful in forecasting pension benefits or costs in future periods (FASB 1997, para. 24; 1998, para. 25). We implement this approach by investigating the ability of both ERR and pension asset composition information to predict the return on pension assets.[3] The predictability of return on pension assets is a reasonable vehicle for evaluating the relevance of pension disclosures because the return is economically significant for many firms. For example, we find that the dollar aggregate return on pension assets is (on average) 46 percent of the aggregate earnings before extraordinary items for S&P 500 firms over the period 1991–1995. This suggests that the prediction of pension returns is likely to play a significant role in predicting earnings.[4]

We begin our tests by examining the correlation between the percentage of pension assets that are equity securities (%Equity) and the ERR.[5] If firms report an unbiased estimate of the ERR, then cross-sectional differences in the ERR should reflect cross-sectional differences in the riskiness of the pension portfolio. Everything else being equal, plan sponsors with more equity securities should use a higher ERR than sponsors with less equity securities. Similarly, the difference in ERRs between an all-equity portfolio and an all-debt portfolio should reflect the equity risk premium observed in the financial markets. We find

[1] We chose 1992 rather than a more recent year because 1992 is the latest year for which the AIMR reports are available in our library.

[2] In a related study (Amir and Benartzi 1998), we examine whether the asset composition of pension funds is affected by disclosure standards.

[3] Landsman (1986) and Barth (1991) adopt a different perspective; they assess the usefulness of pension data in explaining market values.

[4] White et al. (1994, 672–677) highlight the importance of analyzing pension performance in the context of estimation of future cash flows.

[5] If %Equity and ERR are highly correlated, then it does not really matter which one is disclosed.

that the correlation between %Equity and the ERR is relatively weak. In addition, the difference between the ERR of an all-equity fund and that of an all-debt fund is only 1 percent, much lower than the historical difference of 4.8 percent between the return on large company stocks and long-term bonds (Ibbotson 1996). It is also lower than the 2.5 percent differential that corporate pension sponsors reported as their long-term expectation in an independent survey conducted by Greenwich Associates (1995, 24).

Our primary tests focus on which of the two alternative measures—ERR or %Equity—better predicts pension investment performance. The results indicate that %Equity is positively correlated with the future actual return on pension assets and that the ERR is not significantly associated with the future actual return on pension assets. Interestingly, the FASB's Exposure Draft proposes elimination of the more relevant disclosure (%Equity). Our results indicate that pension asset composition is relevant information. While it is always hazardous to make any policy recommendation on the basis of a single study, our results suggest that the FASB should consider the enforcement rather than elimination of current disclosure requirements regarding pension asset composition.

We organize the study as follows. Section II provides background and reviews the relevant literature on the choice of estimation parameters. Section III describes the proprietary pension asset composition data that allows the conduct of our tests. Section IV presents results on the correlation between pension asset composition and ERR. Section V presents evidence that %Equity is a better predictor of returns on the pension portfolio than ERR. Section VI summarizes our findings and discusses policy implications for the disclosure changes the FASB is currently implementing

II. BACKGROUND AND LITERATURE REVIEW

The measurement of pension liabilities and annual expense under SFAS No. 87 (FASB 1985) depends on three parameters disclosed in the financial statements: the discount rate, the rate of compensation increase, and the expected long-term rate of return on pension assets. The first two parameters determine the present value of the accumulated and projected benefit obligation (ABO, PBO) and the service-plus-interest-cost components of the pension expense. The third parameter, ERR, determines the return on plan assets that offsets the service-plus-interest cost components of the pension expense. It is the expected, rather than the actual, return that affects reported income. For example, an increase in ERR will cause a decrease in net pension expense, and hence, an increase in reported net income. Differences between the assumed and actual returns do not enter the income statement unless they exceed a cutoff of 10 percent of the larger of the PBO or the fair value of pension assets. SFAS No. 87 requires that the ERR be determined on the basis of prior experience and performance expectations. Thus, the ERR is expected to be sensitive to changes in the expected rates of return on the various types of assets included in the fund's portfolio and changes in the portfolio composition.

A change in the ERR may have a significant effect on net income. Alster (1993) argues that firms increase pension credits by choosing a high ERR. For example, McDonnell Douglas increased its ERR from 8.3 percent to 9.3 percent in 1992, inflating its pension credit by $75 million (23 percent of net income). General Electric increased its ERR in 1991 from 8.5 percent to 9.5 percent and booked an after-tax pension credit of $380 million. Without this credit, GE's net income would have declined by 2.5 percent instead of the reported increase of 2.4 percent.

Prior research has confirmed the relation between actuarial assumptions and proxies for earnings management. For example, Feldstein and Morck (1983) find that firms select the pension discount rate to reduce both the level of pension underfunding and the level of

total debt relative to total assets. They conclude that firms do engage in strategic attempts to reduce their reported unfunded vested pension liabilities. Amir and Gordon (1996) show that firms select the discount rate and health care cost trend rate to manage the accumulated post-retirement benefit obligation reported under SFAS No. 106 (FASB 1990). They show that firms with relatively high leverage select more aggressive (obligation-reducing) estimation parameters to minimize the probability of violating debt covenants. They also find that firms reducing post-retirement benefits select more conservative (obligation-increasing) estimation parameters, possibly to decrease labor renegotiations costs.

Blankley and Swanson (1995) examine whether reported actuarial assumptions under SFAS No. 87 are biased. They find that the average pension discount rate was slightly overstated relative to either the average yield on high quality corporate bonds or the yield on 30-year government bonds. They also find that ERRs are rarely changed and that the average ERR matches actual returns over the 1990–1994 period. They conclude that "the overall evidence does not support the contention of widespread abuse of SFAS No. 87 implied in the business press" (3).

The prior pension studies that are related to our work have focused on whether managers set or change pension parameters to "manage" the content of their financial statements. There is some controversy about whether such management impairs or enhances the usefulness of financial statements (e.g., Dechow 1994, 5). In contrast, our study directly investigates the usefulness of pension disclosures to financial statement users. We focus on determining the usefulness of two variables—ERR and %Equity. ERR is potentially influenced by investment decisions (the composition of the pension portfolio) and reporting discretion (the disclosed expected return), while %Equity is only influenced by investment decisions. If ERR is not managed opportunistically, we would expect no difference in the ability of ERR and %Equity to predict future returns on pension assets. Opportunistic management of ERR would tend to make the ERR less useful for predicting future returns on pension assets.

III. DATA

Our main sample period consists of fiscal years 1991–1994. We chose this sample period because data on pension assumptions became available on Compustat starting in 1991. In addition to this sample period, we collected data from 1988 (the first fiscal year SFAS No. 87 was fully implemented) to 1990.

We obtained data on pension asset composition from the annual *Pensions and Investments* asset allocation survey. This survey includes data on the largest 1,000 pension funds, many of which are sponsored by private firms, unions and government entities rather than by publicly traded corporations. As indicated in table 1, we obtained complete pension asset composition data for approximately 300 publicly traded corporations per year, yielding 2,263 firm/year observations over fiscal years 1988–1994 (*Pensions and Investments* 1988–1994). We deleted 238 firm/year observations that specified more than 5 percent of their pension assets as "other." Because there is generally a return premium for equity investments over debt investments, some of our tests assume that future return on pension assets should be higher for equity portfolios than debt portfolios. The return on "other" assets depends on the types of investments that are included in the portfolio. Without detailed information on the types of investments in the "other" category, we cannot assess the expected future returns. We also deleted 64 observations of firms that were not covered by Compustat, resulting in a sample of 1,961 firm/year observations with complete pension asset allocation data.[6] The availability of the ERR further reduced our sample to 1,490

[6] Friedman (1983) obtained 1977 asset allocation data for 1,836 Compustat firms from Form 5500 filings.

TABLE 1
Sample Selection Criteria

Selection Criterion	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*ALL*
1. Publicly traded companies included in the *Pensions and Investments* survey of asset allocation	288	323	343	326	357	294	332	2,263
2. Less than 5% of assets are classified as "other"	274	286	31[illegible]	297	309	254	294	2,025
3. The corporation is covered by Compustat	246	290	315	302	272	238	298	1,961
4. The expected rate of reutrn on pension assets is available	205	236	250	215	204	175	205	1,490

observations.[7] The aggregate market value of pension assets for our sample is $331 billion as of 1992, representing 30.3 percent of the U.S. corporate defined benefit pension assets (Greenwich Associates 1995).

The ERR varies significantly across firms, as indicated in table 2. The ERR ranges between a low of 6.00 percent and a high of 13.00 percent. The mean ERR for pension funds during the sample period is 9 27 percent (ranging from 9.14 percent in 1994 to 9.45 percent in 1991). The median ERR is typically 9.00 percent. Most firms report ERRs

[7] We deleted many observations because Compustat codes the parameters as missing when a range for the estimate (e.g., pension discount rate) is provided instead of a point estimate.

TABLE 2
Distribution of the Expected Rate of Return on Pension Assets (ERR)
Percent of Firms in Specified ERR Range

Range of ERR	*1988 (n=205)*	*1989 (n=236)*	*1990 (n=250)*	*1991 (n=215)*	*1992 (n=204)*	*1993 (n=175)*	*1994 (n=205)*	*ALL (1,490)*
6.00–6.99%	0.49%	0.00%	0.00%	0.00%	0 00%	0.57%	0.49%	0.20%
7.00–7.99	7.80	4.66	4 80	3.26	3.92	4.57	1.95	4.40
8.00–8.99	22.44	22.46	22 40	19.07	22.06	25.15	25.36	22.60
9.00–9.99	40.97	44.92	42.80	43.72	46.08	45.71	53.66	45.30
10.00–10.99	21.95	19.49	22.40	25.11	21.57	21.15	18.05	21.40
11.00–11.99	5.86	6.78	5.60	6.98	4.90	2.29	0.49	4.80
12.00–13.00	0.49	1.69	2.00	1.86	1.47	0.56	0.00	1.20
Mean	9.21	9.29	9.31	9.45	9.28	9.17	9.14	9.27
Std. Error	1.02	0.97	0.98	0.95	0.93	0.84	0.74	0.93
Median	9.00	9.00	9.05	9.50	9.12	9.00	9.00	9.00

between 8 percent and 11.00 percent.[8] It is interesting to note that the annual standard error of the ERR decreases from year to year starting with 1.02 percent in 1988 (the first year after the adoption of SFAS No. 87) and ending with 0.74 percent in 1994.

We report changes in ERR over time in table 3. The sample includes different firms in each year so only firms with complete asset composition data for two consecutive years are included in table 3 (a total of 811 observations). Many firms were excluded from the analysis because they did not complete the *Pensions and Investments* survey on a consistent basis. For example, the 1989 sample includes only 123 firms because 82 of the original 205 firms in the 1988 sample did not complete the 1989 *Pensions and Investments* survey. The results indicate that most firms maintain a stable ERR over time. As shown in panel A of table 3, about three-quarters of the firms do not change the ERR from year to year. Over a longer period of time (1988–1994), about a third revise their ERR upward, a third revise downward and a third remain stable (see panel B of table 3).

Table 4 (panel A) includes descriptive statistics on the asset allocation of the pension funds in our sample. On average, U.S. pension funds invest about half their funds in domestic equities and an additional one-third in domestic fixed-income securities. The share of pension assets invested in domestic equities increased from 48.30 percent in 1988 to 52.47 percent in 1994. Investments in international equities increased from 2.25 percent in

[8] According to the 1990 *Accounting Trends and Techniques* (AICPA 1991), the median ERR is 9.00 percent and the range is from 6.00 percent to 11.50 percent. The actual annual rates of return during 1991–1995 were 13.6 percent, 7.5 percent, 9.3 percent, 0.6 percent and 16.3 percent, respectively (see Amir and Benartzi 1997, exhibit 1).

TABLE 3
Frequency of Changes in the Expected Rate of Return on Pension Assets[a]

Year	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*
Panel A: Relative to the Previous Year						
(n)	(123)	(165)	(147)	(140)	(117)	(119)
Decrease	8.9%	6.7%	8.2%	12.1%	17.9%	20.2%
No change	75.6	76.4	77.6	78.6	78.6	73.9
Increase	15.4	17.0	14.3	9.3	3.4	5.9
Panel B: Relative to 1988						
(n)	(123)	(116)	(99)	(95)	(86)	(91)
Decrease	8.9%	11.2%	13.1%	21.2%	29.1%	31.8%
No change	75.6	57.8	55.6	44.1	37.2	35.2
Increase	15.4	31.0	31.3	34.7	33.7	33.0

[a] The table presents the percentage of firms that increased, decreased or maintained their expected rate of return (ERR). Changes in ERR are presented relative to the previous year (panel A) or relative to 1988 (panel B). The number of observations is reported in parenthesis. Many firms were excluded from the analysis because they did not complete the *Pensions and Investments* survey on a consistent basis. For example, the 1989 sample includes only 123 firms because 82 of the original 205 firms in the 1988 sample did not complete the 1989 *Pensions and Investments* survey.

TABLE 4
Composition of Pension Assets[a]

Panel A: All Observations

Asset Category (n=)	*1988 (205)*	*1989 (236)*	*1990 (250)*	*1991 (215)*	*1992 (204)*	*1993 (175)*	*1994 (205)*	*ALL (1,490)*
Cash Equivalent	11.39%	9.06%	10.04%	6.47%	5.01%	4.26%	3.98%	7.35%
Domestic Bonds	26.62	28.82	30.38	31.46	34.21	31.35	29.55	30.30
Intl. Bonds	0.34	0.37	0.36	0.27	0.27	0.48	0.56	0.37
GICs[b]	3.78	3.71	3.63	1.83	2.01	1.80	1.87	2.72
Annuities	0.67	0.65	1.15	0.55	0.33	0.53	0.39	0.63
Domestic Stocks	48.30	49.68	45.64	51.00	50.00	51.99	52.47	49.70
Intl. Stocks	2.25	2.81	2.95	3.34	3.75	4.79	6.36	3.68
Real-Estate Equity	4.76	3.86	4.30	3.91	3.33	3.18	3.16	3.82
Mortgages	0.29	0.12	0.49	0.30	0.35	0.47	0.79	0.39
Mortgage-Backed	0.75	NA	NA	NA	NA	NA	NA	0.10
Oil & Gas Partner.	0.01	0.03	0.07	0.08	0.03	0.07	0.07	0.05
LBOs[c]	0.05	0.09	0.08	0.07	0.02	0.10	0.06	0.07
Venture Capital	0.54	0.52	0.50	0.39	0.31	0.45	0.42	0.45
Private Placement	0.09	0.07	0.19	0.13	0.08	0.10	0.04	0.10
Other Investments	0.17	0.21	0.21	0.21	0.28	0.40	0.31	0.25

Panel B: Observations with Less Than 20% in Equity

(n=)	*(14)*	*(9)*	*(19)*	*(7)*	*(8)*	*(7)*	*(6)*	*(70)*
Cash Equivalent	23.29%	17.22%	25.68%	32.43%	7.13%	3.14%	18.67%	19.81%
Domestic Bonds	48.57	53.11	48.05	35.29	79.38	80.57	58.83	55.29
Intl. Bonds	0.36	0.00	0.68	0.00	0.00	0.71	0.00	0.33
GICs[b]	11.43	19.11	13.37	20.14	1.00	1.86	3.17	10.96
Annuities	0.93	1.33	1.37	4.00	0.00	0.00	0.00	1.13
Domestic Stocks	9.29	6.11	4.95	5.57	10.50	5.71	9.00	7.09
Intl. Stocks	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.01
Real-Estate Equity	3.07	1.89	3.84	1.86	0.88	1.29	1.67	2.46
Mortgages	0.43	0.00	1.26	0.14	0.00	5.43	8.17	1.69
Mortgage-Backed	1.50	NA	NA	NA	NA	NA	NA	0.30
Oil & Gas Partner.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LBOs[c]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

(Continued on next page)

TABLE 4 (Continued)

Panel B: Observations with Less Than 20% in Equity (Continued)

Asset Category (n=)	*1988 (14)*	*1989 (9)*	*1990 (19)*	*1991 (7)*	*1992 (8)*	*1993 (7)*	*1994 (6)*	*ALL (70)*
Venture Capital	1.14	1.22	0.37	0.43	1.13	0.86	0.50	0.79
Private Placement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Investments	0.00	0.00	0.42	0.00	0.00	0.43	0.00	0.16

[a] Pension asset composition data is from the annual *Pensions and Investments* survey. Asset categories are not identical across time, resulting in missing (NA) values.
[b] GICs are guaranteed investment contracts.
[c] LBOs are typically high risk equity investments in highly leveraged firms.

1988 to 6.36 percent in 1994, reflecting increased investment globalization. The share of domestic bonds in the pension funds increased from 26.62 percent in 1988 to 29.55 percent in 1994.[9] Of the allocation to bonds, investments in noninvestment-grade (junk) bonds are negligible. During 1991–1994 the amount allocated to junk bonds was 0.19 percent, 0.25 percent, 0.25 percent and 0.18 percent, respectively (not reported in the table). Thus, the existence of bonds that are possibly riskier than stocks has no effect on our analysis. To compensate for the higher allocations to stocks, investments in cash equivalents and real estate equities decreased from 11.39 percent and 4.76 percent in 1988 to 3.98 percent and 3.16 percent in 1994.

Panel B of table 4 describes the asset allocation of pension funds with less than 20 percent invested in equity securities. Very few firms (as few as six firms in 1994 and as many as 19 in 1990) allocate less than 20 percent of their pension assets to equity securities. Interestingly, these firms do not attempt to offset their low equity exposure via venture capital and other risky assets, but rather they have very little invested in venture capital and private placements. Therefore, the percentage of equity investments is a reasonable proxy for portfolio risk, as firms with relatively fewer equities do not favor other risky investments.

Pension asset composition varies significantly across plan sponsors. While some plan sponsors have no equities in the pension portfolio, others have equities only. The median %Equity is 52.50 percent, 57.00 percent and 62.00 percent for 1988, 1991 and 1994, respectively. The standard error of the %Equity is 16.91 percent, 15.85 percent, and 14.88 percent for 1988, 1991 and 1994 (not reported in a table). Over time, firms have shifted more funds to equity investments, reducing differences in asset composition across firms.

IV. THE ASSOCIATION BETWEEN ASSET COMPOSITION AND ERR

If the ERR is an unbiased expectation of the return on the pension portfolio, there should be a positive correlation between the percentage of equity in the fund and the disclosed ERR. Firms with high equity exposure take relatively more risk and are expected

[9] Benartzi and Thaler (1995) provide an explanation for the observed split of roughly 60 percent equities and 40 percent fixed income securities.

to earn higher returns.[10] Consequently, we first analyze the relation between ERR and %Equity via a nonparametric portfolio analysis. We divide our annual samples into deciles, according to the firm's %Equity, and calculate the average ERR for each decile. Panel A of table 5 presents the decile information for each year 1988–1994 and the pooled sample. We use the information for the first and tenth deciles to estimate the implied equity risk premium for each year and the pooled sample. These equity risk premiums are displayed in the last line of panel A in table 5. The pooled sample reveals that the difference between the average ERR for the first and the tenth decile is only 0.39 percent, and that the difference in equity allocation between these two deciles is 58 percent. These differences are consistent with an average risk premium of 0.67 percent, significantly lower than the historical risk premium observed in financial markets (see Ibbotson 1996).[11]

Panel B of table 5 reports the Pearson and Spearman correlations between the %Equity and the ERR for each year and the pooled sample. The correlations are calculated at the individual firm level rather than the portfolio level. For the first five years of our sample period (1988–1992), the Pearson correlations are small and insignificantly different from zero (at the 0.10 level). Spearman rank correlations are also close to zero and generally insignificant at the 0.10 level. For the last two years of our sample (1993–1994), the Pearson (Spearman) correlations are 0.35 and 0.31 (0.27 and 0.21) and are significantly different from zero at the 0.01 level.

We also examine the relation between changes in %Equity between 1988 and each of the years 1989–1994 and year-to-year changes in the ERR over the same six years. Results, which are not reported in a table here, indicate a weak and statistically insignificant relation between changes in the %Equity and changes in the ERR.

Next, we use a multivariate regression model to investigate the cross-sectional variance in the ERR. There are several reasons for exploring a multivariate model. First, while many firms allocate all their pension funds between equities and bonds, certain firms allocate funds to venture capital, LBOs, private placements, and other investments. Assuming that

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[10] We conducted the following experiment: First, using data from 1926 to 1995, we created five portfolios using the Lehman Brothers Aggregate Bond Index and the S&P 500 index. The %Equity increases from 0 percent in portfolio No. 1 to 100 percent in portfolio No. 5. The following table shows that as %Equity increases, both the average return and its standard deviation increase monotonically. Thus, %Equity is correlated with standard proxies for risk.

%Equity	*Average Return*	*Std. Deviation*	*Minimum Return*
0%	5.80%	6.83%	−8.10%
25	7.48	8.03	−12.27
50	9.15	11.49	−22.65
75	10.83	15.80	−33.02
100%	12.51%	20.42%	−43.40%

[11] To calculate the implied risk premium based upon all observations, consider the following system of two equations where RE represents the return on equities and RB represents the return on bonds:

$$0.181RE + 0.819RB = 9.10 \quad \text{1st Decile (low \%Equity)}$$
$$0.761RE + 0.239RB = 9.49 \quad \text{10th Decile (high \%Equity)}$$

Solving these equations yields RB = 8.98% and RE = 9.65%, a risk premium of 0.67%.

TABLE 5
Association Between the Percentage Invested in Equities (%Equity) and the Expected Rate of Return (ERR)

Decile of %Equity	*1988 (n=205)*		*1989 (n=236)*		*1990 (n=250)*		*1991 (n=205)*		*1992 (n=204)*		*1993 (n=175)*		*1994 (n=205)*		*ALL (n=1,490)*	
	Equity	*ERR*	*Equity*	*ERR*	*Equity*	*ERR*	*Equity*	*ERR*	*Equity*	*ERR*	*Equity*	*ERR*	*Equity*	*ERR*	*Equity*	*ERR*
Panel A: Mean %Equity and ERR																
Less	14.4%	9.07%	18.4%	9.17%	9.8%	9.29%	23.2%	9.36%	20.4%	9.39%	21.4%	8.59%	22.1%	8.62%	18.1%	9.10%
2	34.4	9.58	37.4	9.10	32.0	9.01	39.1	9.43	38.6	8.97	42.4	8.81	44.9	8.96	38.4	9.12
3	43.6	9.21	43.6	9.02	40.7	9.29	48.0	9.34	46.3	9.24	50.9	9.27	53.9	9.18	46.3	9.23
4	48.4	8.93	48.2	9.29	45.9	8.94	52.4	9.57	51.3	9.15	55.0	9.21	57.4	9.10	51.0	9.17
5	50.8	9.15	52.1	9.39	49.9	9.46	54.8	9.78	54.3	9.49	58.1	8.88	59.8	8.93	54.0	9.31
6	54.8	9.00	56.0	9.48	53.5	9.15	58.9	9.52	57.5	9.23	60.5	9.55	62.4	9.25	57.4	9.30
7	57.9	9.06	58.6	9.41	56.9	9.82	61.5	9.45	61.0	9.32	63.7	9.31	65.9	9.32	60.7	9.41
8	61.5	9.07	63.0	9.28	60.1	9.26	64.2	9.35	64.0	9.32	67.8	9.30	68.4	9.39	63.6	9.28
9	66.2	9.16	68.6	9.47	63.9	9.52	67.8	9.27	68.2	9.20	70.8	9.47	71.3	9.22	68.1	9.33
More	74.2	9.83	76.3	9.30	74.5	9.44	76.6	9.52	76.1	9.60	76.1	9.45	79.2	9.38	76.1	9.49
Implied Equity Risk Premium[a]	1.27%		0.22%		0.23%		0.30%		0.38%		1.57%		1.33%		0.67%	

Panel B: Correlation Coefficients between %Equity and ERR[b]

Type	*Corr.*	*p-val.*	*Corr.*	*p-val.*	*Corr.*	*p-val.*	*Corr.*	*p-val.*	*Corr.*	*p-val.*	*Corr.*	*p-val.*	*Corr.*	*p-val.*	*Corr.*	*p-val.*
Pearson	0.08	0.25	0.07	0.25	0.06	0.30	0.07	0.29	0.11	0.11	0.35	0.00	0.31	0.00	0.12	0.00
Spearman	0.06	0.39	0.08	0.19	0.10	0.09	0.01	0.86	0.12	0.08	0.27	0.00	0.21	0.00	0.11	0.00

[a] The implied equity risk premium is the difference between the ERR of the top and bottom deciles, divided by the difference between the %Equity of the top and bottom deciles. In 1988, for example, the difference in ERR was 0.76% (9.83% − 9.07%) and the difference in %Equity was 59.8% (74.2% − 14.4%), resulting in an implied equity risk premium of 1.27% (0.76%/59.8%).

[b] The correlation coefficients are calculated at the individual firm level rather than the portfolio level

these investments are, on average, riskier than common equities and bonds, such investments should have a positive (on average) influence on the ERR. In addition, the requirements of SFAS No. 87 imply a positive relation between the ERR and lagged actual return on plan assets. Managers of firms that earned relatively high returns on their pension portfolio in the past may argue that these high returns justify a high ERR. Consequently, these mangers are more likely to select a relatively high ERR than managers with lower actual returns. While it is puzzling how portfolio managers can sustain abnormal performance in efficient markets, the evidence in Hendricks et al. (1993) suggests that "hot hands" do persist.

Based on the above discussion, we use the following regression model to examine the relation between the ERR and asset allocation:

$$ERR_{it} = \alpha_{0t} + \alpha_{1t}\%Equity_{it} + \alpha_{2t}\%Risky_{it} + \alpha_{3t}Act\_Ret_{it} + \epsilon_{it}. \quad (1)$$

The variable $\%Risky_{it}$ represents firm i's investment in risky assets, such as venture capital, LBOs (high risk equity investments in highly leveraged firms), private placements, and investments classified as "others" at time t. Act_Ret_{it} represents the actual return on plan assets in year t. The ERR is typically determined at the end of the reporting period and affects the assumed return in the following period. Consequently, Act_Ret_{it} represents lagged actual return over the preceding year.

If ERR is a weighted average of expected returns on equity, bonds and other risky investments, the slope coefficient on %Equity (α_{1t}) represents the consensus equity risk premium at time t. Similarly, the slope coefficient on %Risky represents the consensus risk premium at time t on risky investments, such as private placements and venture capital. We expect all regression coefficients to be positive. In particular, we expect α_{2t} to be larger than α_{1t}.

Table 6 presents estimation results for equation (1). The regression intercepts range from 8.01 in 1993 to 9.27 in 1991, while the pooled model's intercept is 8.61.[12] The coefficients on %Equity are all positive, as expected, and significantly different from zero at the 0.10 level or better (one-tailed test) in all years but 1988. However, the equity risk premium implied by these coefficients ranges between 0.50 percent in 1988 and 1.88 percent in 1993, while the pooled model implies an equity risk premium of 1.06 percent.[13] This implied risk premium is significantly below the equity risk premium of 4.8 percent observed in financial markets over the last seven decades (Ibbotson 1996). The implied risk premium is also lower than the 2.5 percent differential that corporate pension sponsors reported as their long-term expectation in an independent survey conducted by Greenwich Associates (1995). Again, it seems that ERRs are determined by factors other than the portfolio risk. We obtain similar coefficients when %Equity is the sole explanatory variable in the regressions (not reported in the table).

The coefficients on %Risky (α_{2t}) are positive in all models except for 1991. The coefficient is significant at the 0.10 level (one-tailed test) in 1993, 1994 and the pooled model, while the pooled model suggests a risk premium of 3 percent. The coefficients on Act_Ret are not significant at the 0.10 level (one-tailed test) except in 1994. The lack of significance

[12] The pooled model includes yearly dummy variables (not reported) to allow yearly intercepts to vary.
[13] Reported regression coefficients were rounded up to the nearest percentage point.

TABLE 6
Association Between the ERR, Pension Asset Composition and Lagged Pension Returns (Regression Analysis)[a]

Year[b]	$Intercept_{it}$ (+)	$\%Equity_{it}$ (+)	$\%Risky_{it}$ (+)	$\%Act\_Ret_{it}$ (?)	$Adj\text{-}R^2$ n
1988	8.83	0.01	0.02	0.01	0.00
(t-statistic)	(28.51)	(1.15)	(0.42)	(0.35)	n=165
1989	8.87	0.01	0.03	−0.00	0.00
(t-statistic)	(30.97)	(1.69)	(0.75)	(−0.14)	n=207
1990	8.95	0.01	0.02	0.01	0.00
(t-statistic)	(42.93)	(1.54)	(0.58)	(0.74)	n=218
1991	9.27	0.01	−0.01	−0.01	0.00
(t-statistic)	(32.90)	(1.69)	(−0.34)	(−1.14)	n=208
1992	8.71	0.01	0.03	0.00	0.01
(t-statistic)	(30.08)	(2.23)	(0.58)	(0.13)	n=197
1993	8.01	0.02	0.04	0.00	0.11
(t-statistic)	(28.90)	(4.78)	(1.53)	(0.23)	n=171
1994	8.41	0.01	0.06	0.02	0.08
(t-statistic)	(41.70)	(3.47)	(1.90)	(1.66)	n=198
ALL	8.61	0.01	0.03	0.00	0.04
(t-statistic)	(74.93)	(6.39)	(2.28)	(0.45)	n=1,366

[a] Variables are defined as follows: ERR = the expected rate of return on pension assets (dependent variable); %Equity = the percent of pension funds in domestic and international equities; %Risky = the percentage of pension funds allocated to LBOs (high risk equity investments in highly leveraged firms), venture capital and private placements; %Act_Ret = the actual rate of return on pension assets over the preceding year (annual return divided by the average of the beginning and ending plan assets). The sample size was reduced from 1,490 observations to 1,378 because 112 observations were missing rate of return information.

[b] Observations with a studentized residual above |3| were deleted, resulting in a pooled sample of 1,366 observations (and total year-by-year observations of 1,364). We report OLS coefficients with t-statistics in parentheses. The pooled regression includes yearly dummy variables (not reported).

suggests that pension returns over the preceding period are not associated with current expected rates of returns on pensions.[14]

One of the most notable features of the regression models, whose estimates are displayed in table 6, is their relatively poor explanatory power. Table 6 reveals that the adjusted

[14] It is possible that the relation between ERR and %Equity is stronger for large pension funds than for small pension funds. The reason is that large funds have to invest in a diversified portfolio, given their size. Thus, two large funds with the same allocation to equities will have virtually the same risk and return profile. Small funds, on the other hand, can invest in specialized categories such as biotech stocks. Thus, two small funds with the same allocation to equities might have different risk and return profiles depending on the specific type of equities they elect. For small funds, %Equity is not a good proxy for risk and expected returns. However, we do not expect the size of the pension portfolio to affect any of our results because all the firms in our sample are relatively large. Nevertheless, we divided our sample to three sizes of portfolios according to the dollar amount in the pension assets, and repeated the analysis in tables 5 and 6 for each size subsample. The results are similar across the three subsamples, although the association between ERR and %Risky is stronger in smaller firms. We also repeated the analysis for different levels of funding (low, medium and high funding ratios). The results are almost identical across funding levels.

R^2 is 0.01 or less in the years from 1988 through 1992. The adjusted R^2 for 1993 is 0.11 and 1994 is 0.08. In summary, the evidence clearly indicates that past pension returns and pension asset composition explain a very modest portion of the variation in ERR.

V. ASSET ALLOCATION vs. ERR: WHICH DISCLOSURE BETTER PREDICTS FUTURE PENSION RETURNS?

We evaluate the ERR and pension asset composition by their usefulness in predicting future returns on pension assets. Pension returns constitute a significant portion of the firm's income so predicting pension returns is a key step in earnings prediction. To perform the prediction tests, we collected actual pension returns over 1990–1995 for all firms in the *Pensions and Investments* survey.[15] We define the actual rate of return as the actual dollar return, deflated by the average of the beginning and ending pension assets. We limit the analysis to firms with December fiscal year-ends. Since our asset composition data is generally collected between the months of September and December, this restriction ensures that the measurement of asset composition precedes the measurement of actual returns. Had we measured asset composition subsequent to the measurement of actual returns, it would have been unclear whether asset composition drives returns or vice versa.

We begin our tests with a portfolio analysis. Specifically, we divide each annual sample to quintiles according to the reported ERR (panel A of table 7) and according to the firm's %Equity (panel B of table 7). For each quintile, we calculate the actual return on pension assets over the next one through five years. We use overlapping time periods in the calculation of average returns For example, in calculating two-year pension returns, we pool together pension returns over 1991–1992, 1992–1993, 1993–1994, and 1994–1995. To ensure that we do not overstate the t-statistics, the t statistics are based on nonoverlapping periods. For example, the calculation of the t-statistics in the two-year window is based on the pooled 1991–1992 and 1993–1994 data. Similarly, the t-statistics in the three-, four- and five-year windows are based on the 1991–1993, 1991–1994 and 1991–1995 data, respectively. If ERRs and asset composition provide information about future pension returns, then firms that select higher ERRs and firms that invest more heavily in equities should experience higher actual returns over increasingly long windows.

As shown in panel A of table 7, firms with high ERRs often earn lower returns than firms with low ERRs. For example, firms in the first ERR quintile (20 percent of the firms with the lowest ERR) earn, on average, 12.75 percent on their pension portfolio in the subsequent year. In contrast, firms in the fifth quintile (20 percent of the firms with the largest ERRs) earn, on average, 11.19 percent in the subsequent year. Over a five-year period (1991–1995), low-ERR firms earned 11.36 percent on the pension portfolio, whereas high-ERR firms earned slightly less, 10.73 percent. Thus, we can not reject the null hypothesis that the pension returns of low-ERR firms are equal to (or larger than) the pension returns of high-ERR firms. In summary, it seems as though ERR cannot be used to predict future pension returns.

We repeat the analysis forming quintile portfolios based on asset allocation (%Equity). As panel B of table 7 shows, asset allocation explains cross-sectional variation in future actual pension returns. For example, using a one-year return window, firms with the lowest allocation to equities (quintile 1) earn, on average, 10.91 percent in the subsequent year, whereas firms with the largest allocation to equities (quintile 5) earn, on average, 12.28 percent. The difference between the portfolios is significant at the 0.10 level (one-tailed

[15] We did not collect actual returns for 1988 and 1989, because during that period some firms included foreign plans in the returns and others did not.

TABLE 7
Mean Future Rates of Return on Pension Assets by ERR and Asset Allocation

	Mean Rate of Return on Pension Assets Over[a]				
	One Year (n=811)	*Two Years (n=635)*	*Three Years (n=496)*	*Four Years (n=335)*	*Five Years (n=174)*
Panel A: Quintiles are Based on the Beginning ERR[b]					
Quintile 1 (Low)	12.75%	9.92%	10.13%	9.50%	11.36%
Quintile 2	11.44	9.48	8.63	9.59	11.82
Quintile 3	10.76	8.99	10.09	9.25	11.24
Quintile 4	12.70	9.97	10.63	9.91	11.66
Quintile 5 (High)	11.19	9.68	10.15	9.57	10.73
t-test: 5 vs. 1[c]	−1.58	−0.28	0.71	0.81	−0.98
Panel B: Quintiles are Based on the Beginning %Equity[b]					
Quintile 1 (Low)	10.91%	9.11%	9.10%	8.71%	10.60%
Quintile 2	11.56	9.52	9.66	9.54	10.92
Quintile 3	12.12	9.66	10.25	9.55	11.47
Quintile 4	12.57	9.77	10.18	9.76	11.62
Quintile 5 (High)	12.28	10.33	10.65	10.47	12.09
t-test: 5 vs. 1[c]	1.45	2.74	3.50	4.35	3.40

[a] The sample consists of firms with December fiscal year-ends included in the *Pensions and Investments* survey and that had available pension assets and actual returns. One-year returns are measured over 1991–1995; two-year returns are measured over 1991–1992, 1992–1993, 1993–1994 and 1994–1995 (overlapping periods). Longer windows are defined in a similar way.

[b] The rate of return is defined as the mean annual return, deflated by the average of the beginning and ending market value of pension assets. ERR is the expected rate of return as reported in the financial statements, and %Equity is the percentage of pension assets invested in domestic and international equities.

[c] A t-test of the null hypothesis that quintile No. 5 has a smaller or equal return on pension assets than quintile No. 1. The t-statistics are based on nonoverlapping periods. For example, the calculation of the t-statistics in the two-year window is based on the pooled 1991–1992 and 1993–1994 data.

test). Moreover, as the return window increases, firms with higher %Equity earn significantly higher returns. For example, over 1991–1995, firms with low %Equity earned 10.60 percent, while firms with high %Equity earned 12.09 percent, significantly higher at the 0.01 level (t = −3.40). Finally, returns on all quintiles exhibit a monotone increase as %Equity increases, providing more credence to the results.

To examine whether the results of our portfolio analysis are affected by omitted correlated variables, we extend our portfolio analysis by conducting a multivariate regression analysis. We design a prediction model where future pension returns are regressed on current values of ERR, %Equity, lagged returns, and the size of the pension fund (Size). In addition, period indicators are included but not reported. We use the following specification:

$$\text{Act\_Ret}_{it+1} = \beta_0 + \beta_1 \text{ERR}_i + \beta_2 \%\text{Equity}_{it} + \beta_3 \text{Act\_Ret}_{it} + \beta_3 \text{Size}_{it} + \eta_{it}. \quad (2)$$

Actual return over future periods is calculated over one- to five-year windows similar to the method reported in table 7. The sample size varies from 167 observations to 802, depending on the length of the window. Eleven of the 802 observations had a studentized residual above three in absolute value, and they were deleted to reduce the effect of outliers. To ensure that we do not overstate the t-statistics, the t-statistics are based on nonoverlapping periods as in table 7. Finally, we supplement the *adjusted* R^2 with *incremental* R^2 values, defined as the difference between (1) the R^2 obtained with period indicators and the explanatory variables minus (2) the R^2 obtained with period indicators alone.

The results, which are reported in table 8, indicate that, regardless of the return window, ERRs are not associated with future pension returns. In contrast, allocation to equities is associated with future returns. The coefficients on %Equity are all positive and significant at the 0.10 level or better (one-tailed test). The incremental R^2 increases with the return window, suggesting that risk measures such as %Equity are better predictors of long-term rather than short-term returns. Finally, controlling for past pension returns and the size of the pension portfolio has little effect on our analysis.

TABLE 8
Predicting Rates of Return on Pension Assets: Regression Analysis

Dependent Variable is Act_Ret_{it+k} *(the actual rate of return on pension assets over the next k years*[a]*)*	*Coefficient Estimates (t-values) for the Following Dependent Variables*[b,c]						
	n	*Adj-R^2*	*Incr. R^2*[d]	ERR_{it}	$\%Equity_{it}$	Act_Ret_{it}	$Size_{it}$
k = One Year	791	0.77	0.02	0.14	0.04	−0.24	0.19
				(0.99)	(4.34)	(−7.03)	(0.66)
k = Two Years	622	0.54	0.03	0.05	0.03	0.02	0.00
				(0.06)	(2.51)	(0.75)	(−0.17)
k = Three Years	481	0.64	0.03	0.12	0.03	−0.05	0.15
				(0.52)	(2.19)	(−0.83)	(0.89)
k = Four Years	323	0.09	0.07	0.08	0.03	0.00	0.04
				(0.69)	(2.46)	(0.44)	(0.02)
k = Five Years	164	0.14	0.14	−0.11	0.01	−0.15	−0.29
				(−0.82)	(1.57)	(−4.14)	(−0.99)

[a] The sample consists of December year-end firms that were included in the *Pensions and Investments* survey with available data. One-year returns are measured over 1991–1995; two-year returns are measured over 1991–1992, 1992–1993, 1993–1994 and 1994–1995 (overlapping periods), three-, four- and five-year windows are calculated in a similar manner. The sample size varies from 802 observations (one-year window) to 167 observations (five-year window).

[b] The actual rate of return on pensions (Act_Ret) is defined as the mean annual return, deflated by the average of the beginning and ending market value of pension assets. ERR is the expected rate of return as reported in the financial statements. %Equity is the percentage of pension assets invested in domestic and international equities. Size is the LOG_{10} of pension assets. Period indicators are included but not reported.

[c] We report OLS coefficients with t-statistics in parentheses. The t-statistics are based on nonoverlapping periods. For example, the calculation of the t-statistics in the two-year regression is based on the pooled 1991–1992 and 1993–1994 data. Observations with a studentized residual above three in absolute value are deleted, reducing the one-year sample from 802 observations to 791 and the five-year sample from 167 observations to 164.

[d] We supplement the adjusted R^2 with an incremental R^2, defined as the difference between (1) the R^2 obtained with period indicators and our explanatory variables minus (2) the R^2 obtained with period indicators only.

VI. SUMMARY AND CONCLUSIONS

In this study, we assess the relevance of certain pension disclosures to financial statements' users. Consistent with the FASB's definition of a "relevant" pension disclosure, we adopt the approach that users of financial statements desire pension information that is useful in forecasting the cost of future pension benefits. Therefore, we focus on the ability of the expected rate of return on pension assets (ERR) and the percent of pension assets invested in equity securities (%Equity) to predict future returns on the pension portfolio. Given the magnitude of pension returns relative to net income, predicting pension returns is likely to help forecasting net income.

We begin with an examination of the correlation between asset allocation (%Equity) and ERR. If firms report an unbiased estimate of the ERR, then cross-sectional differences in the ERR should reflect cross-sectional differences in the riskiness of the pension portfolio. This implies that plan sponsors with more equity securities should use a higher ERR than sponsors with less equity securities. Using proprietary data on asset composition over the 1988–1994 period, we find that the correlation between the percentage of equities in the pension fund and the ERR is rather weak. In addition, the difference between the ERR of an all-equity fund and that of an all-debt fund is only 1 percent, far smaller than the historical risk premium observed in U.S. financial markets.

Next, we examine which of the two measures—ERR or allocation to equities—is a better predictor of pension investment performance. The results indicate that asset composition is a better predictor of returns on the pension portfolio than the ERR. In particular, we find that among current values of asset compositions, ERRs, pension returns, and the size of the pension fund, asset composition is the only variable with significant prediction power for future pension returns. Moreover, we find that ERR is not at all correlated with future returns on the pension portfolio.

Recently, financial analysts have argued that some pension disclosures, including asset composition disclosures, should be omitted from the financial statements because they provide little information to financial statement users. Based on discussions and comment letters from financial analysts, the FASB has maintained that these pension disclosures tend to be too general and thus are not helpful to users. Our study clearly shows that asset composition is more useful than ERR, current pension return, and the size of the pension fund in predicting long-term pension returns. Without asset composition data, it is difficult to assess the appropriateness of the ERR and adjust reported earnings accordingly.[16] The FASB is actually rewarding companies for providing incomplete asset allocation data by eliminating the required disclosures. Our results indicate that the FASB should consider clarifying and enhancing the disclosure of pension asset composition rather than eliminating this disclosure requirement.

[16] Amir and Benartzi (1997) show how such an adjustment to earnings can be made using asset allocation data.

APPENDIX

Pension Asset Composition Disclosures by Firms that Received the AIMR Award for Excellence in Corporate Reporting[17]

Company	*Asset Allocation as Disclosed in the 1992 Annual Report*
1. Allied Signal	58% equities and 42% fixed income securities.
2. Ashland Oil	Listed stocks, bonds and annuity contracts.

(Continued on next page)

APPENDIX (Continued)

Company	*Asset Allocation as Disclosed in the 1992 Annual Report*
3. Atlantic Richfield	Stocks and bonds.
4. Ball Corporation	Fixed income securities and common stocks.
5. Browning-Ferris Industries	Commercial paper, common stocks and mutual funds.
6. Capital Holding Corporation	No disclosure of asset allocation.
7. Chevron	Common stocks, bonds, cash and real estate.
8. Cummins Engine	Equity securities, corporate and government obligations.
9. Delta Woodside	No disclosure of asset allocation.
10. Gannett	Insurance contracts, common stocks, bonds and government debt.
11. H. B. Fuller	Listed equity securities and a guarantee contract.
12. Harsco Corporation	Equity and fixed income securities.
13. Honeywell	Fixed income investments and equity securities.
14. Ingersoll-Rand	Balanced between equities, cash and debt securities.
15. MCN Corporation	Equity and fixed income securities.
16. Mellon Bank Corporation	19% cash, 5% corporate debt, 10% company stock and 66% other common stocks.
17. Panhandle Eastern Corporation	Common stock and fixed income securities.
18. PepsiCo	Equities and corporate and government debt.
19. Philips Petroleum	Annuities, commingled funds, real estate, stocks and bonds.
20. Rohm & Haas	Common stocks and debt securities.
21. Sara Lee Corporation	Equities, corporate and government debt and real estate.
22. Schering-Plouch Corporation	Stocks and bonds.
23. UAL Company	Government and corporate debt and equities.
24. Union Pacific Corporation	31% in fixed income securities and 69% in equity securities.
25. Valero Energy	No disclosure of asset allocation.
26. VF Corporation	Common stocks, corporate and government debt.
27. Washington Mutual Savings	Listed common stocks, government and corporate debt and annuities.

[17] This table presents the pension asset composition disclosures in the 1992 annual reports of the indicated companies. The sample consists of firms that were selected by the Association for Investment Management and Research (AIMR) for their excellence in corporate reporting. Four firms that do not have a defined benefit pension plan were excluded

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