DO CHANGES IN PENSION PLAN ACCOUNTING STANDARDS RESULT IN BETTER MARKET VALUATION?

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ABSTRACT

This study investigates if changes in U.S. accounting standards result in a better assessment of firms' pension commitments as reflected in stock prices. Fama and French three factor (1993) model results reveal that the market inefficiently incorporates defined benefit pension plan information for the three accounting standard related periods. In contrast to Franzoni and Marín (2006), and Fama and French (1993), the returns were estimated starting the fourth month after the end of fiscal year t. The results suggest that investors are not paying enough attention to the implications of the underfunding for future earnings and cash flows. Apparently, the changes in accounting standards do not alter the way investors evaluate this type of obligation. Hedge-portfolio tests are performed to verify if there is an opportunity to outperform the market by identifying weaknesses in the incorporation of information. Tests' results corroborate that the market overprices firms that have severely negative funding status.

INTRODUCTION

Pension plan systems have been growing fast after the post World War II period. As a result, pension plan obligations have become a major concern for management, regulators, and the government. Through the years, the Financial Accounting Standards Board (FASB) has demonstrated preoccupation with respect to pension plan information disclosures, as demonstrated by the changes in disclosure requirements in the last decades. Efforts to enhance the relevance and understandability of reported pension information also include the enactment of ERISA (Employee Retirement Income System Act of 1974) and the "Pension Protection Act of 2006", the issuance of Statement of Financial Accounting Standards (SFAS) No. 36, SFAS No. 87, SFAS No.132, and most recently, the SFAS No. 158. SFAS No. 158, effective for fiscal years ending after December 15, 2008, provides new pension disclosure requirements intended to address previous shortcomings. Before the issuance of SFAS No. 158, pension plan information concerning the pension plan status was reported in the notes to the financial statements. One of the most important changes of this statement is the presentation of pension plan status in the balance sheet.

A severely underfunded pension plan has future implications in cash flows and earnings. As a result, it is important for investors to assess the pension plan status before making investment decisions. By moving this information from the notes to the financial statements to the balance sheet, the intention of the FASB is to improve and create awareness of the importance of pension plan status information. Evidence from various studies suggests that the information content of selected items included in the financial statements is relevant or has impact on stock prices. Studies about pension plan information suggest different results as to markets evaluation or incorporation of this information. This study examines the incorporation of defined benefit (DB) pension plan information for three different accounting standard related periods between 1980 and 2005. For these accounting standard related periods pension information was presented in the notes to the financial statements.

The work in this article proceeds as follows: first, there is a presentation of the relevant literature regarding this topic. Second, after the literature review, there is a description of the sample selection procedure, data analysis and methodology. Finally, a summary of the empirical findings is presented followed by some concluding remarks.

LITERATURE REVIEW

As formally stated by the efficient market hypothesis (EMH), asset prices in financial markets should reflect all available information. Fama, Fisher, Jensen and Roll (1969) introduced the term "efficient market" into the economics literature and defined it as a market that "adjusts rapidly to new information". While approaching the twenty-first century the arguments about market efficiency were challenged and its dominance started to be less universal. Becheey, Gruen and Vickery (2000) argue that evidence suggests, that the EMH cannot explain some important and worrying features of asset market behavior.

As for pension plan information, a review of the literature suggests that the market may be inefficient incorporating this information. Apparently, the market overvalues firms with severely underfunded pension plans. Franzoni and Marín (2006) argue that investors do not anticipate the impact of the pension liability on future earnings, and that they are surprised when the negative implications of underfunding ultimately materialize. Godwin and Key (1998) assess market reaction to the Pension Benefit Guarantee Corporation (PBGC) list of the 50 firms with the largest underfunding by calculating abnormal returns around PBGC press release dates using standard event study methodology. Their results suggest that maybe the market had access to the information before the announcement or that investors inefficiently incorporate this news information.

Phillips and Moody (2003) examine the relationship between pension plan funding levels and capital structure and provide statistically significant empirical support for the pecking order theory of capital structure. Results suggest that more highly levered firms experience lower profitability and are constrained by a larger dividend payout. In addition, these firms have exhausted their internal resources of financing by underfunding their pension plans, most likely to the extent legally possible. The study demonstrates that underfunding occurs principally due to a firms' incapacity to fully fund.

Livnat (1984), examines whether unfunded vested benefits and unfunded past service costs possess any information content. The author argues that these findings suggest that neither of the disclosures tested was sufficiently informative but they improved the information content of the earnings disclosure. Feldstein and Seligman (1981) examine empirically the effect of unfunded pension liabilities on corporate share prices and discuss the implications of these estimates for national saving, the decline of the stock market for periods preceding the study, and the rationality of corporate financial behavior. The authors state that it would be more accurate to say that the data is consistent with the conclusion that shareholders accept the conventional measure as the best available information and adjust prices accordingly.

DATA AND METHODOLOGY

In order to test these predictions a sample comprised of all the firm-years with available data on the Compustat Annual Industrial and Research files for NYSE, AMEX, and NASDAQ firms is used. The sample period is the end of fiscal year 1980 to end of fiscal year 2005. The study only includes firms that sponsor DB pension plans. Firms' monthly returns were obtained from the Center for Research and Security Prices (CRSP), Monthly Stock database.

The variables of interest correspond to different accounting items over the years. Consequently, this accounting data is constructed differently for different periods in the time span that is studied. There are two breaks in the way Compustat informs the data related to pension plans. These breaks result from

changes in accounting standards. The first break is caused by the accounting standard SFAS 87. It affects the way pension data is presented starting fiscal years beginning after December 15, 1986. The second break, effective for fiscal years beginning after December 15, 1997, is caused by SFAS 132.

In order to measure the funding status of the pension plans, the procedure used by Franzoni and Marín (2006) is used. To solve the problem of the impact that the same dollar amount of underfunding has depending on the size of the firm, the funding status needs to be appropriately normalized. Funding status is defined as the difference between the fair value of pension assets (*FVPA*) and the pension benefit obligation (*PBO*). They choose to divide the funding status by market capitalization (*Mkt Cap*) at the end of the fiscal year when the pension items are measured. As them, this variable is labeled funding ratio (*FR*). This variable is computed as follows:

$$FR_{t-1} = FVPA_{t-1} - PBO_{t-1} / Mkt\ Cap_{t-1} \hspace{4cm} (1)$$

After calculating the *FR*, firms-years are classified by accounting standard period. Then, firms are sorted into three sets of portfolios by period and by *FR*. Firms sponsoring DB pension plans are classified as underfunded and overfunded. Eleven portfolios were formed for each accounting standard period. The first ten portfolios include only underfunded firms (*FR*<0) in a given year. The eleventh portfolio includes overfunded firms (*FR*≥0).

Monthly portfolio return series are created in each group starting the four month after the end of fiscal year $t-1$ to the third after the end of fiscal year t. The Fama and French (1993) three-factor model is used to calculate each portfolio's excess return. Portfolios are tested for risk-adjusted returns by running time-series regressions of portfolio returns on the returns on different factors, including the market. Discrepancies in returns among portfolios could be explained by different factor loadings. In formula, the time-series regression (Fama-French three-factor model) for the portfolios is expressed:

$$R_{it} = \alpha_i + b_i\,EXM_t + h_i\,HML_t + s_i\,SMB_t + \varepsilon_{it} \hspace{3cm} (2)$$

where R_{it} is the portfolio excess return. The EXM, HML and SMB factors are constructed as in Fama and French (1993). EXM is the factor that represents the market portfolio minus the risk free rate. The HML factor represents a portfolio long in high book to market (B/M) and short in low B/M firms. The last factor, SMB represents a portfolio long in small and short in large companies. The factor data was retrieved from the Kenneth French Data Library.

Finally, statistical tests are performed to verify if there are statistically significant differences between the risk-adjusted returns of the different portfolios. As in Sloan (1996) and Xie (2001), hedge-portfolio tests are performed to verify if there is an opportunity to outperform the market by creating investment strategies that focus in exploiting the market failure to incorporate pension plan information.

Aggregate Funding Status Historical Trends

It is important to look at the historical evolution of the DB pension plan elements to observe any trends that can help in the analysis. Figure 1 reports the time series of the aggregate funding level for all the companies in Compustat with available pension items. The funding level is the difference between the aggregate *FVPA* and *PBO*.

As can be observed from Figure 1, an aggregate underfunding appears, for the first time in our sample, in 1994. Starting in 1996 the funding status of DB pension plans started to improve and in 1997, concurring with the bull market of the second half of the 1990's, pension plan assets grew more than benefits, and peaked in 1999 at about $163 billion. On March of 2000, the Internet bubble exploded causing stock

prices to decrease and as a result, the fair value of pension assets dropped. In 2001, the gap between the *PBO* and the *FVPA* appears reaching almost $85 million. Major economic events effects arose from September 11, 2001 attacks, with initial impact causing global markets to drop sharply. Then, on 2002, a surplus appears, reaching about $754 million in aggregate overfunding. However, the volatility in the markets is reflected in years to come. In 2003, another aggregate underfunding appears. This is in contrast to an aggregate overfunding of $1.3 billion in 2004. This is the highest aggregate overfunding for the whole sample period. For 2005, the last year in the sample, another aggregate underfunding appears. It represents the biggest change in funding status. It reaches almost $1.5 billion dollars in deficit on a year-to-year basis.
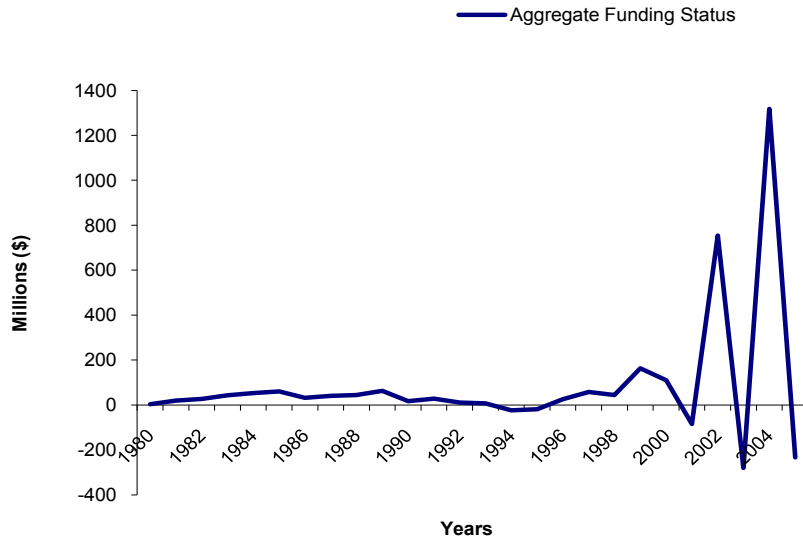

Figure 1. Aggregate Pension Plan Status. The graph reports the difference between aggregate assets (FVPA) and aggregate benefits (PBO) for the companies in the sample.

Descriptive Statistics per Period

Table 1 reports descriptive statistics of the eleven portfolios created according to accounting standard period and *FR*. The characteristics are measured at the end of fiscal year *t* – 1 relative to portfolio formation. The difference in the level of average *FR* between the most underfunded portfolio and the least underfunded is noticeable in each period. Panel A shows that for the most underfunded firms (portfolio one) in this period the average *FR* is about -131%. In contrast, for the least underfunded firms (portfolio 10) the average level of *FR* is about -0.1%. The average *FR* for the portfolio that contains overfunded firms (portfolio eleven) is about 9%. The most underfunded firms have higher levels of long-term debt ratio (*LTDR)*. A consistent decrease in *LTDR* is observed through portfolio ten. The average size of the firms increases almost consistently, where smaller firms are concentrated in the most underfunded portfolio. Interestingly, firms in portfolio eleven have the second smallest average size of all the portfolios. As for B/M, value firms are concentrated in the most underfunded portfolio. Portfolio 11 also has value firms but to a lesser degree.

Panel B shows the results for the period between 1987 and 1997. For the most underfunded firms (portfolio one) the average *FR* is about -117%. In contrast, for the least underfunded firms (portfolio 10) the average level of *FR* is about -0.1%. The average *FR* for the portfolio that contains overfunded firms (portfolio eleven) is about 7.3%. The most underfunded firms have high levels of *LTDR*. An almost consistent decrease in *LTDR* is observed through portfolio ten. The second most underfunded portfolio

has on average the smallest firms. In contrast, the overfunded firms are the biggest. As for B/M, value firms are concentrated in the most underfunded portfolio. Portfolio 11 also has value firms but to a lesser degree.

Panel C shows the results for the period between 1998 and 2005. For the most underfunded firms (portfolio one) the average *FR* is about -945%. In contrast, for the least underfunded firms (portfolio 10) the average level of *FR* is about -0.1%. The average *FR* for the portfolio that contains overfunded firms (portfolio eleven) is about 12%. The most underfunded firms have the highest levels of *LTDR* among portfolios. The most underfunded portfolio has on average the smallest firms. In contrast, the least underfunded firms are the biggest. As for B/M, value firms are concentrated in the most underfunded portfolio. Portfolio 11 also has value firms but to a lesser degree.

Table 1: Descriptive Statistics per Accounting Standard Period

	Most									**Least**	**Over**
	1	2	3	4	5	6	7	8	9	10	11
					Panel A: Period 1980-1986						
FR	-1.31	-0.20	-0.10	-0.05	-0.03	-0.02	-0.01	-0.007	-0.003	-0.001	0.09
LTDR	2.08	1.42	0.94	0.87	0.78	0.71	0.62	0.70	0.52	0.37	1.24
Size	133.38	318.16	311.14	239.62	337.84	261.50	290.22	392.72	397.02	310.64	812.93
B/M	1.49	1.43	1.33	1.45	1.21	1.13	0.98	0.86	0.82	0.69	1.16
Firms	156	156	176	183	183	196	189	197	188	184	8511
					Panel B: Period 1987-1997						
FR	-1.17	-0.09	-0.05	-0.03	-0.02	-0.01	-0.01	-0.006	-0.003	-0.001	0.073
LTDR	103.15	1.07	0.85	0.74	0.56	0.49	0.46	0.41	0.39	0.38	2.15
Size	2,013	1,803	2,087	1,998	2,395	1,981	2,061	2,424	2,580	3,735	2,593
B/M	23.37	0.81	0.79	0.79	0.72	0.68	0.63	0.63	0.57	0.50	0.90
Firms	707	817	829	845	848	865	881	877	872	855	9,496
					Panel C: Period 1998-2005						
FR	-9.45	-0.13	-0.07	-0.04	-0.03	-0.02	-0.01	-0.007	-0.004	-0.001	0.12
LTDR	41.24	1.13	0.91	0.64	0.56	0.44	0.38	0.40	0.44	0.41	2.71
Size	3,420	5,023	5,007	5,135	8,299	7,174	7,909	8,846	8,460	13,014	9,093
B/M	23.02	0.75	0.69	0.70	0.64	0.58	0.54	0.54	0.51	0.47	6.21
Firms	800	1,023	1,047	1,042	1,066	1,058	1,055	1,066	1,049	1,039	4,190

In the fourth month after the end of fiscal year t, firms with available data at the end of fiscal year t-1 are assigned to a set of ten portfolios according to the deciles of the distribution of FR. The stocks in portfolios one through ten have underfunded DB pension plans. Firms in portfolio eleven contain firms with overfunded pension plans. FR is the difference between the fair value of plan assets (FVPA) and the projected benefit obligation (PBO) in fiscal year ending in year t – 1, divided by the market capitalization at the end of fiscal year t – 1. Presented are the average of the annual averages of the FR of the companies in each portfolio; the average of the annual averages of the LTDR of the companies in each portfolio (long-term debt in fiscal year ending in year t – 1, divided by the market capitalization at the end of fiscal year t – 1); the average of the annual averages of the market capitalization (in millions of dollars) of the companies in each portfolio at the end of fiscal year t - 1; the average of the annual averages of the book-to-market ratio (B/M) of the companies in each portfolio at the end of fiscal year t – 1; and the average of the annual number of firms in each portfolio. The sample covers formation periods from April 1981 to April 2006.

EMPIRICAL RESULTS

Risk-Adjusted Returns

Table 2 reports the alphas for the sets of portfolios of firms that sponsor DB pension plans for the three accounting standard periods. Panel A shows the results of portfolios for the period between 1980 and 1986. Portfolios four, seven and nine through eleven have positive and significant alphas. This may indicate undervaluation because the market is inefficiently incorporating this information. This evidence suggests that the market tends to undervalue firms with relatively lower levels of underfunding. Undervaluation is also observed for overfunded firms.

Table 2: Three Factor Model Results for the Three Accounting Standard Periods

	Most under									Least under	Over
	1	2	3	4	5	6	7	8	9	10	11
					Panel A: Period 1980-86						
					Alphas						
Alphas	0.00	0.026	-0.001	0.010*	0.005	0.006	0.008*	0.005	0.014*	0.014*	0.010*
	(-0.03)	(1.20)	(-0.34)	(2.50)	(1.30)	(1.21)	(2.91)	(0.76)	(5.45)	(3.69)	(11.31)
					Factor Loadings and R^2						
EXM	0.012	-0.002	0.012	0.006	0.009	0.011	0.008	0.01	0.009	0.014	0.009
	(4.84)	(-0.27)	(7.27)	(3.65)	(6.70)	(7.53)	(11.60)	(10.01)	(8.25)	(5.92)	(37.72)
HML	0.002	0.003	0.008	0.001	-0.002	0.004	0.001	0.005	-0.002	0.002	0.001
	(0.38)	(0.58)	(3.42)	(0.33)	(-0.97)	(1.72)	(0.32)	(1.78)	(-1.05)	(1.19)	(2.13)
SMB	0.01	0.024	0.01	0.011	0.01	0.01	0.009	0.011	0.01	0.013	0.007
	(1.30)	(1.73)	(5.33)	(6.52)	(8.07)	(4.24)	(5.56)	(3.61)	(5.34)	(5.99)	(13.73)
R2	0.22	0.07	0.45	0.47	0.56	0.52	0.64	0.42	0.68	0.58	0.95
Firm-years	525	553	546	553	560	560	560	560	560	560	560
					Panel B: Period 1987-97						
					Alphas						
Alphas	-0.015*	-0.004	0.001	0.002	0.006*	0.005*	0.006*	0.007*	0.008*	0.012*	0.005*
	(-4.42)	(-1.45)	(0.41)	(0.89)	(2.85)	(4.04)	(4.65)	(6.87)	(6.10)	(5.90)	(7.56)
					Factor Loadings and R^2						
EXM	0.01	0.01	0.011	0.01	0.011	0.01	0.01	0.007	0.01	0.01	0.009
	(8.86)	(26.67)	(19.64)	(21.70)	(22.03)	(17.13)	(23.47)	(29.50)	(19.82)	(20.06)	(43.29)
HML	0.008	0.005	0.001	0.003	0.004	0.002	0.002	0.002	0.002	0.003	0.003
	(6.23)	(4.69)	(3.75)	(3.49)	(4.88)	(2.93)	(3.28)	(2.47)	(1.91)	(3.75)	(7.97)
SMB	0.011	0.009	0.01	0.008	0.007	0.006	0.006	0.006	0.005	0.007	0.005
	(8.59)	(9.11)	(11.07)	(0.00)	(7.25)	(7.55)	(9.85)	(12.68)	(7.06)	(5.06)	(20.05)
R2	0.6	0.79	0.85	0.81	0.83	0.79	0.88	0.88	0.88	0.83	0.96
Firm-years	1573	1562	1573	1562	1573	1562	1551	1573	1573	1573	1573
					Panel C: Period 1998-2005						
					Alphas						
Alphas	-0.020*	-0.003	0.001	0.003	0.004	0.006*	0.009*	0.012*	0.014*	0.016*	0.007*
	(-5.35)	(-1.36)	(0.40)	(1.57)	(1.77)	(2.69)	(5.39)	(4.79)	(6.19)	(7.36)	(3.82)
					Factor Loadings and R^2						
EXM	0.01	0.009	0.008	0.008	0.008	0.007	0.008	0.008	0.008	0.009	0.007
	(15.27)	(14.08)	(13.77)	(13.76)	(11.90)	(9.34)	(11.22)	(4.79)	(8.33)	(15.43)	(10.48)
HML	0.009	0.007	0.005	0.004	0.004	0.005	0.003	0.008	0.002	0.002	0.004
	(15.27)	(11.23)	(5.59)	(6.31)	(6.87)	(6.70)	(5.09)	(7.87)	(2.40)	(5.17)	(9.11)
SMB	0.011	0.007	0.006	0.006	0.005	0.005	0.004	0.003	0.002	0.004	0.003
	(10.04)	(11.05)	(6.34)	(8.80)	(8.67)	(6.70)	(5.22)	(3.31)	(1.95)	(6.16)	(5.85)
R2	0.77	0.83	0.82	0.85	0.83	0.75	0.79	0.69	0.71	0.84	0.81
Firm-years	888	888	888	888	888	888	888	888	888	888	888

*In the fourth month after the end of fiscal year t, firms with available data at the end of fiscal year t-1 are divided in deciles according to FR. The stocks in the first portfolio are the most underfunded and the stocks in the tenth portfolio are the least underfunded. In addition, in the fourth month after the end of fiscal year t, stocks with positive FR at the end of fiscal year t – 1 are assigned to portfolio eleven. FR is the difference between the fair value of plan assets (FVPA) and the projected benefit obligation (PBO) in fiscal year ending in year t – 1, divided by the market capitalization at the end of fiscal year t – 1. Panel A reports the results for the portfolios formed for the accounting standard period from 1980-1986. Panel B reports the results for the portfolios formed for the accounting standard period from 1987-1997. Panel C reports the results for the portfolios formed for the accounting standard period from 1998-2005. The constant (alpha) from a time-series regression of portfolio excess returns on the three Fama and French factors is presented for each set of portfolios. The factors are the market excess return (EXM), the return on HML portfolio, and the return on the SMB portfolio. The slopes and the R^2 from these regressions are also presented. The sample period is from the fourth month after the end of fiscal year 1980 to 2006. T-statistics are presented in parentheses. * denotes significance at the 0.05 level, based on a two-tailed t-test for the time-series (26 years) of annual average returns.*

This may indicate undervaluation because the market is inefficiently incorporating this information. In addition, portfolio eleven, the portfolio of overfunded firms, portrays undervaluation. Evidence suggests that the market inefficiently overvalues firms with relatively higher levels of underfunding and tends to undervalue firms with relatively lower levels of underfunding. The most underfunded portfolio has the higher loadings for HML and SMB. This is expected since firms in this portfolio have high B/M and are small.

Panel C shows the results of portfolios for the period between 1998 and 2005. The results show that portfolio one has a significantly negative intercept; an indication of overvaluation for firms that have severely underfunded pension plans. Portfolios six through ten have positive and significant alphas. Apparently, the market undervalues these firms because the market inefficiently incorporates pension information. For portfolio eleven, the portfolio for overfunded firms, reveals undervaluation. Evidence suggests that the market inefficiently overvalues firms with relatively higher levels of underfunding and tends to undervalue firms with relatively lower levels of underfunding. Not surprisingly, the most underfunded portfolio has the higher loadings for HML and SMB. This is expected since firms in this portfolio have high B/M and smaller than the firms in other portfolios are.

Hedge-Portfolio Tests

The risk-adjusted returns estimated using the Fama and French (1993) three-factor and four-factor models indicate that investors may be overpricing firms with severely underfunded pension plans. In addition, the results indicate that investors may be underpricing stocks with relatively lower levels of underfunding. In order to verify if there are statistically significant differences between diverse sets of portfolios, hedge portfolio tests were performed.

Table 3 reports the results for the hedge portfolio tests for the three sets of portfolios. For the period between 1980 and 1986 a portfolio hedge that is long in least underfunded firms (portfolio ten) and short in the most underfunded firms (portfolio one) was formed. The strategy may be profitable for the next year after portfolio formation. For the second and third period, results are not significant. These results are consistent with the market overpricing severely underfunded firms in the portfolio formation year (year t). The second comparison is between portfolios one and eleven. This comparison is between the portfolio that contains firms with severely underfunded pension plans and firms that are adequately funded. For this strategy, results are not significant in each of the three years after portfolio formation. The last comparison for these portfolios is between portfolios ten (least underfunded firms) and eleven (overfunded firms). For this strategy, results are not significant in each of the three years after portfolio formation. These results may indicate that this type of strategy may not be efficient.

For the period between 1987 and 1997, the same strategies are used. A portfolio hedge that is long in the least underfunded firms (portfolio ten) and short in the most underfunded firms (portfolio one) was formed. The strategy may be profitable for the next year after portfolio formation. For the second and third period, results are not significant. The results are consistent with the market overpricing severely undefunded firms in the portfolio formation year (year t). The second comparison is between portfolios one and eleven. The strategy may be profitable only for the next year after portfolio formation and not for the other years. The last comparison is between portfolios ten (least underfunded firms) and eleven (overfunded firms). For this strategy, results indicate that this type of strategy may not be efficient.

Finally, for the set of portfolios for the period between 1998 and 2005, a portfolio hedge that is long in the least underfunded firms (portfolio ten) and short in the most underfunded firms (portfolio one) is formed. The hedge portfolio yields positive returns for each of the three years. These results are consistent with the market overpricing severely underfunded firms in the portfolio formation year (year t). The second comparison is between portfolios one and eleven. The results suggest this strategy may not

be efficient. The last comparison for this set of portfolios is between portfolios ten (least underfunded firms) and eleven (overfunded firms). For this strategy, results are significant in each of the three years after portfolio formation but results indicate that this strategy may not be efficient.

Table 3: Hedge Portfolio Tests for *FR* Portfolios per Accounting Standard Period

Portfolio Ranking	**Average Returns Per Portfolio**								
	Panel A: FR Period 1980-86			Panel B: FR Period 1987-97			Panel C: FR Period 1998-2005		
	Year t+1	Year t+2	Year t+3	Year t+1	Year t+2	Year t+3	Year t+1	Year t+2	Year t+3
1	0.000	-0.001	0.000	-0.002	-0.002	0.000	-0.003	-0.002	0.001
	(-0.02)	(-0.08)	(0.06)	(-0.01)	(-0.04)	(0.25)	(-0.01)	(0.17)	(0.40)
2	0.008	0.008	0.007	0.007	0.006	0.006	0.007	0.007	0.008
	(0.06)	(0.03)	(-0.06)	(-0.14)	(-0.10)	(-0.03)	(-0.19)	(-0.01)	(0.25)
3	0.009	0.007	0.009	0.009	0.007	0.008	0.009	0.008	0.009
	(0.06)	(-0.17)	(0.17)	(0.01)	(-0.40)	(0.26)	(-0.26)	(-0.17)	(0.15)
4	0.013	0.130	0.140	0.009	0.007	0.008	0.010	0.009	0.009
	(0.10)	(0.02)	(0.10)	(-0.04)	(-0.42)	(0.17)	(-0.21)	(-0.21)	(-0.01)
5	0.010	0.010	0.011	0.012	0.011	0.010	0.012	0.011	0.012
	(-0.14)	(0.06)	(0.05)	(-0.17)	(-0.26)	(-0.10)	(-0.01)	(-0.17)	(0.08)
6	0.110	0.120	0.120	0.012	0.011	0.011	0.012	0.011	0.011
	(-0.20)	(0.02)	(0.07)	(-0.20)	(-0.28)	(0.05)	(-0.27)	(-0.23)	(0.07)
7	0.012	0.010	0.011	0.014	0.012	0.013	0.014	0.013	0.012
	(-0.14)	(-0.20)	(-0.060)	(-0.28)	(-0.39)	(-0.190)	(-0.27)	(-0.25)	(-0.19)
8	0.140	0.013	0.012	0.014	0.011	0.011	0.016	0.015	0.015
	(-0.24)	(-0.08)	(-0.06)	(-0.21)	(-0.61)	(-0.040)	(-0.14)	(-0.32)	(-0.04)
9	0.017	0.016	0.016	0.016	0.014	0.014	0.016	0.015	0.014
	(-0.06)	(-0.07)	(-0.03)	(-0.24)	(-0.39)	(-0.08)	(-0.29)	(-0.06)	(-0.25)
10	0.150	0.013	0.012	0.017	0.014	0.014	0.019	0.016	0.016
	(-0.35)	(-0.15)	(-0.06)	(-0.44)	(-0.59)	(-0.02)	(-0.41)	(-0.46)	(-0.04)
11	0.014	0.013	0.014	0.012	0.011	0.011	0.006	0.005	0.005
	(-0.80)	(-0.47)	(0.16)	(-0.69)	(-1.02)	(-0.08)	(-0.74)	(-0.51)	(-0.17)
Panel D: Portfolio Hedge									
Comparison	*Period 1980-86*			*Period 1987-97*			*Period 1998-2005*		
1 and 10	0.15*	0.01	0.01	0.019*	0.02	0.01	0.02*	0.02*	0.02*
	(11.48)	(1.03)	(0.84)	(2.90)	(1.17)	(0.98)	(3.77)	(2.91)	(2.25)
1 and 11	0.014	0.01	0.01	0.014*	0.01	0.01	0.01	0.01	0.01
	(1.43)	(1.36)	(1.29)	(2.49)	(1.26)	(1.02)	(1.79)	(1.31)	(0.69)
10 and 11	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.01*	-0.01*	-0.01*
	(0.23)	(0.00)	(0.21)	(-1.37)	(-0.33)	(-0.32)	(-3.43)	(-2.73)	(-2.56)

Time-series means (t-statistics) of the average monthly returns for each accounting standard period FR portfolio in three years after portfolio formation are calculated. Panel A shows the returns for portfolios formed for the period 1980-86. Panel B shows the returns for portfolios formed for the period 1987-97. Panel C shows the returns for portfolios formed for the period 1998-2005. The stocks in portfolio one (ten) have higher (lower) levels of underfunding. Firms with overfunded plans are assigned to portfolio eleven. Panel D presents the hedge between portfolios one and ten, one and eleven, and ten and eleven. * denotes significance at the 0.05 level, based on a two-tailed t-test for the time-series (26 years) of annual average returns.

CONCLUSIONS

This study investigates if changes in accounting standards result in a better assessment of firms' pension commitments as reflected in stock prices. This study contributes to the recent discussion by the FASB

and the release of SFAS No. 158 about the incorporation and importance of more DB pension plan information in the financial statements.

The results suggest, the changes in accounting standards, as required for DB pension plan information, do not reflect or result in a better assessment by investors of firms' valuation as reflected in stock prices by accounting standard period. To the contrary, evidence suggests that as the disclosures, availability of information increase, the opportunities to exploit markets inefficiencies become greater. This may signify that the efforts made by regulators do not result in a better assessment of a firms' value or that the efforts to better present this information may have failed. This may be due to investors having problems in understanding the complex pension accounting calculations and disclosures or the inability to incorporate timely and efficiently the information.

The results are consistent with Franzoni and Marín (2006). Their results suggest that investors are not paying enough attention to the implications of the current underfunding for future earnings and cash flows. In addition, Godwin and Key (1998) find that stock prices do not react to additional publications that point out severely underfunded pension plans. Particular to this study is the integration of hedge portfolio tests. The investment strategies suggest that for the three accounting standard related periods strategies to benefit from market inefficiencies may be profitable in some cases. The identified inefficiencies may result from market's inability to integrate information and to identify future consequences related to these long-term commitments. Alternatively, as Sloan (1996) argues, investors appear to be "fixating" just on earnings figures.

Investors, regulatory bodies, accounting standard setters, analysts and researchers may benefit from this study. However, some limitations are pointed out. First, the results of this study are based on the Fama and French (1993) factor model, therefore, are affected by the measurement error introduced by the estimation model. Matching methods may outperform factor models because they match firms based on characteristics that are more specific.

Results suggest that the market is inefficient incorporating pension plan information. The Fama and French model (1993) may have affected the results because of the measurement error introduced by the estimation model. Instead, other methodologies, like matching methods, may give more insight to this respect. This study concentrates on accounting periods in which firms were required to present pension plan status information in the notes to the financial statements. Starting on December of 2006 (after SFAS No. 158), publicly traded firms are required to present information related to pension plan status in the financial statements. Future studies can examine if the changes in disclosure requisites imply information that investors incorporate in stock prices.

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