ASSET GROWTH AND THE CROSS-SECTION OF STOCK RETURNS BEFORE AND AFTER SFAS 158

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WORKING PAPER
September 26, 2011

Abstract

The Financial Accounting Standards Board addressed part of the issues related to pension plan disclosures by moving the pension plan status from the footnotes to the balance sheet. The objective of this study is to examine if disclosures related to defined benefit pension plans presented according to accounting standards before and after SFAS 158 are efficiently incorporated into stock prices. To attain this objective this study documents how investors assess asset growth before and after the issuance of SFAS 158. Cooper, Gulen and Schill (2008) find that a firms' annual asset growth rate emerges as an economically and statistically significant predictor of the cross-section of U.S. stock returns. If this new standard is in fact impacting the decisions made by investors, then a change in total assets caused by the plan status may influence those decisions. Fama and French three-factor (1993) and four-factor tests are used to perform tests of markets efficiency. Results indicate that after the issuance of SFAS 158 the mispricing is less severe and that smaller firms seem to have the highest levels of funding but the deepest mispricing.

Keywords: SFAS 158, pension plans, assets growth

1. Introduction

An efficient capital market is expected to function as a means to efficient pricing of real investment. As information about acquisitions or disposals of assets is available, efficient markets should adequately adjust stock prices. Studies suggest that events, such as acquisitions, public equity offerings, public debt offerings, and bank loans initiations, have a tendency to be followed by periods of abnormally low returns. In contrast, events associated with asset contraction, such as spinoffs, share repurchases, debt repayments, and dividend initiations, tend to be followed by periods of abnormally high returns. Furthermore, other studies find a negative relation between different types of corporate investment (i.e. capital investment, accruals, sales growth and the raising of capital) and the cross-section of returns (Cooper, Gulen and Schill 2008).

Pension related accruals are among the different types of accruals that a company may have. During the past decades, pension plan accruals have been the center of many debates and discussions because of the implications that the pension plan status (PPS) may have on the financial stability of a company and on the future savings of employees. 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 reliability 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 SFAS 36, SFAS 87, SFAS 132, and most recently, the SFAS 158 (Employers' Accounting for Defined Benefit Pension and Other Postretirement Plans). SFAS 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 158, pension plan information concerning the PPS was reported in the notes to the financial statements. One of the most important changes of this statement is the presentation of PPS in the balance sheet. Under the new statement an underfunded (overfunded) pension plan will report a net pension liability (net pension asset) on 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 PPS 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 PPS information.

The principal objective of this study is to examine the attention that investors pay to balance sheet information in the particular case of defined benefit pension plan (DBPP) sponsors and how new accounting rules may impact their assessment of accounting information. To attain this objective this study documents how investors assess asset growth before and after the issuance of SFAS 158. Cooper et al. (2008) find that a firms' annual asset growth rate emerges as an economically and statistically significant predictor of the cross-section of U.S. stock returns. If this new standard is in fact impacting the decisions made by investors, then a change in total assets caused by the plan status may influence those decisions. Shaw (2008) argues that SFAS 158 significantly changes the balance sheet reporting for DBPP. Coronado, Mitchell, Sharpe and Nesbitt (2008) state that the increased attention to pension disclosures misuse may have influenced the way investors evaluate pensions since the appearance of SFAS 158. The findings of their study suggest that the changes in pension disclosures will help investors make better decisions.

In concurrence with Coronado et al. (2008), this study finds that investors mispricing of firms that sponsor DBPP is less severe for the period after SFAS 158. These results may support the notion that the FASB moved in the right direction by including the impact of pension plan funding in the balance sheet. Fama and French three-factor model (1993) and Carhart (1997) four-factor results support this conclusion.

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.

2. Related literature

Pensions

Previous studies find evidence that suggest that before SFAS 158 investors inefficiently used information related to PPS (Godwin and Key, 1998; Franzoni and Marín, 2006). Other studies consider managers' choice to overfund or underfund their plans (Moody and Phillips, 2003), the association of PPS and capital expenditures (Rauh, 2006), earnings management and

pensions (Coronado and Sharpe, 2003; Bergstresser, Desai and Rauh, 2006; Asthana, 2008), the incorporation of pension disclosures in investment decisions (Chen, Yao, Yu and Zhang, 2010), and the association between systematic equity risk and the risk of pension plans (Jin, Merton, Bodie, 2006).

Shaw (2008) argues that SFAS 158 significantly changes the balance sheet reporting for DBPP. Coronado et al. (2008) state that the increased attention to pension disclosures misuse may have influenced the way investors evaluate pensions since the appearance of SFAS 158 and that it will influence investors' decisions.

Recent studies evaluate the impact of SFAS 158. Boylan and Houmes (2010) evaluate the impact of SFAS 158 and the use of higher discount rates to lower the pension benefit obligations and pension liabilities with the intention of portraying a better financial position. Chen et al. (2010) examine the differences in the use of pension disclosures depending on the level of sophistication of users. They find that the level of sophistication is related to the incorporation of information. Beaudoin, Chandar and Werner (2010) study whether the recognition of pension asset and liability amounts under SFAS 158 is incrementally value relevant in its first year of adoption versus the same amounts previously disclosed to both equity investor and rating decision makers. Findings suggest that DBPP information is used in the same way before and after the issuance of SFAS 158.

The FASB changed the disclosures related to pensions based on the belief that moving the information from the footnotes to the financial statements will gain the attention of investors and other users. Obviously, they assume that footnotes were not good enough to satisfy the objective of creating awareness of the impact of pension plans and decided to move PPS information to the balance sheet. Then, we expect that information users efficiently use the information in the balance sheet and that the recognized amounts are reliable and useful. Studies that examine the efficiency of the markets in using information presented in the balance sheet find interesting and contrasting results (Foster, Jenkins and Vickers, 1986; Sloan, 1996). Particularly, those related to long-term commitments (Harper, Mister and Strawser, 1987; Chen, Kim and Nance, 1992; Hirshleifer, Hou, Teoh and Zhang, 2004; Ahmed, Kilic and Lobo, 2006; Bradshaw, Richardson and Sloan, 2006). Some of these studies find that the type of debt issuance and changes in debt ratings impacts investors' perceptions and decisions.

Balance sheet items and accruals in general

There are several studies that examine accruals and their relation to earnings and returns. Sloan (1996) examines whether stock prices reflect information about future earnings enclosed in the accrual and cash flow components of current earnings. The results suggest that the persistence of earnings performance is shown to depend on the relative sizes of the cash and accrual components of earnings. The author argues that stock prices act as if investors do not identify correctly the different implications of the cash and accrual components. The author states that the apparent inefficiency of investors does not necessarily imply investors' irrationality or the existence of unexploited profit opportunities. Instead, the author explains that the information acquisition and processing costs associated with implementing the strategy outlined by the study might be time consuming or significant.

An extension to Sloan (1996) study was published after a decade. Richardson, Sloan, Soliman and Tuna (2005) study the accrual reliability to earnings persistence. They implement a

model that shows that less reliable accruals lead to lower earnings persistence. In this study they develop a comprehensive balance sheet classification of accruals and rate each category in accordance to the reliability of the underlying accruals. The results suggest that the less reliable accruals lead to lower earnings persistence. In contrast, Francis and Smith (2005) revise preceding studies' conclusion that accruals are less persistent than cash flows. To accomplish their objective, they focus on two aspects of persistence: time specificity and persistence in firm specificity. They show that the inclusion of non-current-period transactions leads to a downward (upward) bias on the persistence of accruals (cash flows).

Furthermore, Muslu (2009) findings suggest that investors differentiate among the persistence of accrual types of different reliability levels as classified by Richardson et al. (2005). The author states that investors appear to accurately price accruals with higher reliability more than those less reliable. In addition, argues that investors can better understand the short-term implications of accrual types but not necessarily the long-term implications.

Hirshleifer et al. (2004) propose that the level of net operating assets measures the extent to which operating/reporting outcomes provoke excessive investor optimism. They argue that if investors with limited attention focus on accounting profitability, neglecting information about cash profitability, then net operating assets, measures the extent to which reporting outcomes provoke over-optimism. Their results reveal that net operating assets scaled by total assets, is a strong negative predictor of long-run stock returns.

In a recent study by Cooper et al. (2008), that examines firm-level asset investment effects in stock returns; findings suggest that asset growth rates are strong predictors of future abnormal returns. They find a strong negative relation among asset growth and stock returns. They argue that results support the notion that markets are inefficient. They show that the ability of asset growth to predict the cross-section of returns is due to its ability to reflect common return effects across components of a firm's total investment or financing activities.

Past studies concur with Copper et al. (2008). Studies related to asset expansion find that after events related to asset growth stock returns tend to be abnormally low. Some studies that show evidence supporting this notion are Asquith (1983), Loughran and Vijh (1997), Loughran and Ritter (1995) and Spiess and Affleck-Graves (1999).

The findings of these studies suggest that in the past some information presented in the financial statements has been inefficiently used. Others are more specific and present evidence that suggests that information about accruals, in some particular cases, is not used efficiently because of the costs of using the information or because of its reliability. Pension plan studies, in general, find that pension plan information is inefficiently used. Some argue that the disclosures and methods used to make the pension calculations are difficult to understand and subject to manipulation. Hence, it is important to evaluate if a change in pension accounting rules may have impact on the way investors use this information.

3. Research design

Hypotheses development

Based on the literature reviewed, the following testable predictions are developed:

1. *Ceteris paribus*, for firms that sponsors DBPP stock returns and asset growth are negatively related before SFAS 158 because the market inefficiently incorporates pension information.

2. *Ceteris paribus*, for firms that sponsors DBPP stock returns and asset growth are negatively related after SFAS 158 because the market inefficiently incorporates pension information.

To test these predictions a sample of firms that sponsor DBPP was used and two different approaches were used. The following sections expand on those matters.

3.2 Sample selection

The sample consists of firms that sponsor DBPP. It includes all firm years with available data on the Compustat Annual Industrial and Research files for NYSE, AMEX, and NASDAQ firms. The sample includes total assets information starting at the end of fiscal year 1999 and ending at the end of fiscal year 2010. Firms are included if they have at least two years of accounting data in order to correct for the survival bias induced by the way Compustat adds firms to its tapes (Banz and Breen 1986 and Franzoni and Marín 2006) and in order to be able to calculate the change in total assets. Firm returns were obtained from the Center for Research and Security Prices (CRSP), Monthly Stock database.

3.3 Methodology

This study examines the particular case of firms that sponsor DBPP and how the available financial information concerning pensions and the financial position of the firm (as represented by asset growth before and after SFAS 158) are incorporated by investors when making decisions.

Asset growth is used as the main test variable. This variable represents the year-to-year change in total assets. The firm asset growth rate for year *t* is estimated as a percentage change in Total Assets from year ending in calendar year *t-2* to fiscal year ending in calendar year *t-1*, as follows:

$$AG(t) = [Total\ Assets(t\text{-}1) - Total\ Assets\ (t\text{-}2)] \,/\, Total\ Assets\ (t\text{-}2) \qquad (1)$$

As in Cooper et al. (2008), firms are sorted into portfolios according to *AG(t)*. Raw returns are calculated for each portfolio in order to examine their performance at different horizons before and after portfolio formation. This study tests portfolios 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:

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

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 estimation sample starts in the seventh month after the end of fiscal year 1999 for any firm, and ends in the sixth month after the end of fiscal year 2010.

This study tests for momentum patterns in returns. Jegadeesh and Titman (1993) find evidence that past winners tend to outperform past losers in the following year. This relationship is tested in order to uncover evidence that may suggest that the most underfunded and levered firms tend to be past losers. Chan, Jegadeesh, and Lakonishok (1996), argue that momentum is a short-lived phenomenon. In order to test for the momentum factor, Carhart (1997) four-factor model is used. The regressions are estimated as follows:

$$R_{it} = \alpha_i + b_i EXM_t + h_i HML_t + s_i SMB_t + m_i UMD_t + \varepsilon_{it} \quad (3)$$

where UMD_t is the momentum factor. It is constructed as a long investment in past twelve month winners and short investment in past twelve month losers. Jegadeesh and Titman (1993) provide evidence for its inclusion. They found that past winners continue to gain extra returns over past losers within a one-year horizon.

4. Results

Descriptive statistics

At the end of June of each year *t* stocks are allocated into quintiles based on annual asset growth rates (defined in equation (1)) and portfolios are formed from July of year *t* to June of year *t*+1. The portfolios are held for 1 year and then rebalanced. In Table I we report formation-period summary statistics for various firm characteristics of the 5 portfolios. First, Panel A reports statistics for the sample period and for the periods before and after the issuance of SFAS 158. Panel B reports statistics per quintile for the whole sample period. Then, Panel C reports statistics for the period from 1997 to 2005, the period before SFAS 158. Finally, Panel D details statistics for the period from 2006 to 2010, the period after the issuance of SFAS 158.

In Panel A, the time-series average of yearly cross-sectional mean asset growth rates (*TA Growth*) for firms in the whole sample period is 12.16%. For the period before the issuance of the statement is 12.7% and 11.17% for the period after. For the period after SFAS 158, firms experienced high growth over the period from *t*−3 to *t*−2 (*TA Growth L2*). Over this period, firms grew on average 43.03%. In the period before issuance assets grew an average of 17.76%. For the period from 1997 to 2005 the time-series average of yearly cross-sectional mean capitalization (*MV*) is $7,631.75M and $9826.09 for the period from 2006 to 2010. In contrast, average *Leverage*, *ACCRUALS* and *FR* have higher values for the period before the issuance of the statement.

Panels B, C and D report statistics by period and by portfolio. The portfolio five firms are the high growth firms. While portfolio one firms are the low growth firms. First, Panel B reports statistics for the complete sample period. Portfolio one shows average annual negative growth of 17%. In contrast, growth for firms in portfolio five is substantial at 62%. High (low) growth rate firms tend to be firms that have also experienced high (low) growth over the year *t*−3 to *t*−2 period (*AT Growth L2*): Over this period, the high growth rate firms grew at 50%, whereas the low growth rate firms grew at 11%. The high growth rate firms are the second biggest firms in our sample, with a time-series average of yearly cross-sectional mean capitalization (*MV*) of $9,128.84M, and the lowest growth rate firms are the smallest of the sample with average capitalizations of $3,884.63M. In the year that we sort on growth, the high growth firms have higher *BM* equity ratios than do the low growth firms. The low growth firms have higher

leverage than high growth firms, 77% versus 31%. Also, we find that high growth firms tend to have higher earnings-to-price ratios (*EP*) and tend to be more profitable (*ROA*) than low growth firms. High growth firms also have higher levels of accruals (i.e., accounting income exceeds cash income) than do low growth firms and high growth firms have lower pension funding ratios (negative on average) than low growth firms (that have positive funding ratios on average).

Table I: Asset Growth Portfolios: Financial and Return Characteristics

At the end of June of each year *t* over 1997 to 2010, stocks are allocated into quintiles based on asset growth (TA Growth) defined as the percentage change in total assets from the fiscal year ending in calendar year *t-2* to fiscal year ending in calendar year *t-1*. The reports financial and return characteristics in the year prior to the portfolio formation date. *TA Growth L2* is the asset growth defined as the percentage change in total assets from the fiscal year ending in calendar year *t*−3 to fiscal year ending in calendar year *t*−2. *AT* is Compustat data item for total assets, in millions of $, from the fiscal year ending in calendar year *t*−1. Market value (*MV*), in millions of $, is calculated using the price and the number of shares outstanding at the end of June of year *t*. All accounting variables (book-to-market ratio (*BM*), earnings-to-price ratio (*EP*), leverage, return on assets (*ROA*), and *ACCRUALS* are calculated using Compustat data in the fiscal year ending in calendar year *t*−1. The numbers in each cell are time-series averages of yearly cross-sectional means. All numbers, with the exception of *AT* and *MV* are in decimal form, that is 0.10 is 10%. Details on the construction of these variables are provided in the Appendix.

Period/Portfolios	TA Growth	TA Growth L2	AT	MV	BM	EP	Leverage	ROA	Accruals	FR
Panel A: Three Main Period Divisions										
1997-2010	0.1216	0.2670	19489.00	7631.75	34.9988	-6.4632	0.3722	-0.0255	-0.0504	7.3642
1997-2005	0.1270	0.1776	13728.53	6443.45	33.4732	-9.1415	0.4054	-0.0771	-0.0366	11.4471
2006-2010	0.1117	0.4302	30126.48	9826.09	37.8161	-1.5225	0.3109	0.0696	-0.0758	-0.1756
Panel B: Portfolio Characteristics from 1997-2010										
1	-0.1689	0.1106	13439.32	3884.63	-27.1417	-34.9386	0.7674	-0.5640	-0.1092	40.1753
2	-0.0099	0.4369	14772.45	6564.67	-2.8261	-0.3657	0.2852	0.1068	-0.0247	0.5483
3	0.0479	0.1349	19294.85	8080.55	19.5547	-0.1283	0.2516	0.1126	-0.0164	-2.0029
4	0.1180	0.1462	23959.85	10500.13	38.0755	-1.8510	0.2449	0.1166	-0.0277	-0.6691
5	0.6210	0.5073	25978.51	9128.84	147.3286	4.9581	0.3122	0.0998	-0.0740	-1.2327
Panel C: Portfolio Characteristics from 1997-2005										
1	-0.1722	0.0905	6597.20	3074.37	-29.1505	-44.5712	0.9292	-0.8287	-0.1273	60.9110
2	-0.0080	0.1689	10921.41	5652.74	-3.8526	-0.3283	0.2947	0.1091	-0.0313	0.4515
3	0.0514	0.1267	15296.34	7040.85	29.8588	-0.1862	0.2589	0.1135	-0.0179	-3.1276
4	0.1242	0.1725	18763.66	9287.94	58.5346	-2.8904	0.2528	0.1145	-0.0350	-1.0541
5	0.6396	0.3300	17064.33	7161.93	111.9595	2.2060	0.2920	0.1048	0.0284	0.0402
Panel D: Portfolio Characteristics from 2006-2010										
1	-0.1628	0.1472	26081.46	5381.76	-23.4300	-17.2061	0.4687	-0.0768	-0.0756	1.8620
2	-0.0133	0.9257	21875.80	8246.76	-0.9327	-0.4350	0.2677	0.1025	-0.0126	0.7270
3	0.0416	0.1497	26680.65	10001.02	0.5218	-0.0217	0.2381	0.1111	-0.0136	0.0747
4	0.1064	0.0982	33552.59	12737.96	0.3055	0.0692	0.2304	0.1206	-0.0141	0.0418
5	0.5866	0.8338	42449.18	12763.10	212.6797	10.0345	0.3496	0.0905	-0.2632	-3.5846

Panel C starts by reporting the time-series average of yearly cross-sectional mean growth rates (*TA Growth*). Portfolio one shows average annual negative growth of 17.22%. In contrast, growth for firms in portfolio five is substantial at 63.96%. High (low) growth rate firms tend to be firms that have also experienced high (low) growth over the year *t*−3 to *t*−2 period (*AT Growth L2*): Over this period, the high growth rate firms grew at 33%, whereas the low growth rate firms grew at 9.05%. The high growth rate firms are not the largest firms in our sample, with a time-series average of yearly cross-sectional mean capitalization (*MV*) of $7,161.93M, but are larger than the lowest growth rate firms, which have capitalizations of $3074.37M. In the year that we sort on growth, the high growth firms have higher *BM* equity ratios than do the low

growth firms at 111.9595 versus -29.1505, respectively. The low growth firms have higher leverage than high growth firms, 92.92% versus 29.2%. Also, we find that high growth firms tend to have higher earnings-to-price ratios (*EP*) and tend to be more profitable (*ROA*) than low growth firms. High growth firms also have higher levels of than do low growth firms and high growth firms have lower pension funding ratios (*FR*) than low growth firms.

Panel D begins by presenting the time-series average of yearly cross-sectional mean *TA Growth*. Portfolio one shows average annual negative growth of 16.28%. In contrast, growth for firms in portfolio five is substantial at 58.66%. High (low) growth rate firms tend to be firms that have also experienced high (low) growth over the year $t-3$ to $t-2$ period (*AT Growth L2*). Over this period, the high growth rate firms grew at 83.38%, while the low growth rate firms grew at 14.72%. The high growth rate firms are the largest firms in our sample, with a time-series average of yearly cross-sectional mean capitalization (*MV*) of $12,763.1M. The lowest growth rate firms have the lowest capitalizations of $5,381.76M. Also, the high growth firms have higher *BM* equity ratios than do the low growth firms at 212.7 versus -23.43, respectively. The low growth firms have higher leverage than high growth firms, 46.87% versus 34.96%. Also, we find that high growth firms tend to have higher earnings-to-price ratios (*EP*) and tend to be more profitable (*ROA*) than low growth firms. High growth firms have lower levels of accruals than low growth firms. High growth firms are underfunded (*FR*) and low growth firms are the most overfunded, they have a *FR* of -358% versus 186.2%, respectively.

After forming the portfolios, time series of returns are estimated to each portfolio from July 1996 to June 2010. To examine the long-run return effects of sorting defined benefit pension plan sponsors on asset growth, we report the average growth rates, average funding ratio and the raw returns to the growth-sorted portfolios in Table II in event time (3 years prior to and 3 years following the date of portfolio formation).

First, Panel A reports average asset growth and it can be noted that for the three year period before portfolio formation, low growth portfolios portray a tendency to decelerate in terms of asset growth. On average they grew 50% from year -4 to year -3 prior portfolio formation. When they are approaching portfolio formation year they seem to grow at a slower pace and then after the portfolio formation year they portray a faster pace in asset growth. This is, they have an average growth of 11% the year before portfolio formation and then they start to grow until reach an average asset growth of more than 61%. On the contrary, portfolios two through five show a tendency to grow at a slower pace as time passes. It is important to note that these four portfolios experience the highest percentages in asset growth before portfolio formation year but seem to grow at a steadier and lower pace after portfolio formation year. Portfolio five has on average the highest growth the year before and after portfolio formation with more than 50% and 21% increase on average asset growth, respectively. In years –2, –1, and 1 the spread in annual growth rates between high and low growth firms is a significant 49%, 40% and 9%, respectively. This spread may be explained by higher returns to the high growth firms over this period relative to the low growth firms.

Panel B reports *FR* averages. Portfolio one had positive *FR* the year before and after portfolio formation and negative *FR* the rest of the periods. In contrast, portfolio five had negative *FR* the year before and positive after portfolio formation year. Portfolio one had the highest levels of *FR* before and after portfolio formation year but experienced negative *FR*, amongst the highest, for the second and third year before and after portfolio formation. Low growth firms seem to have the lowest levels of asset growth in the same periods they have the highest levels of overfunding (year -1 and 1). Interestingly, the highest growth firms have the

highest asset growth rate the period they experienced the highest underfunding (year -1) and the lowest asset growth in the period they have the highest overfunding. This gives the appearance as if investment is substituted by contributions to the pension plans. Rauh (2006) examines the effects of mandatory contributions to DB pension plans on capital and research and development expenditures. The author finds that pension sponsors decrease spending on capital expenditures in response to a reduction in internal resources caused by required pension contributions. The author also shows results for firms that do not sponsor DB pension plans. The evidence suggests that when required contributions are high DB sponsoring firms do not undertake capital investments, and non-sponsoring firms undertake in approximately 12 percent of total capital investment that those firms leave.

Table II: Asset Growth Quintile Portfolio Returns and Characteristics in Event Time

At the end of June of each year *t* over 1994 to 2010, stocks are allocated into quintiles based on asset growth rates defined as the percentage change in total assets from the fiscal year ending in calendar year *t*−2 to fiscal year ending in calendar year *t*−1. Equally-weighted portfolios are formed based on June(*t*) asset growth quintile cutoffs. The portfolios are held for 1 year, from July of year *t* to June of year *t*+1, and then rebalanced. Portfolio return statistics are reported every year for 6 years around the portfolio formation year (*t*) over the period of July 1994 to June of 2010. Panel A reports average annual asset growth rates. Panel B reports average annual funding ratios for the portfolios defined as fair value of pension assets − pension benefit obligation divided by market capitalization. In Panel C, the year −1 row reports the portfolio returns over July (*t*−1)–June (*t*) and year 1 reports the portfolio returns over July (*t*)–June (*t*+1). In Panel D, [−3,−1] ([1, 3]) is the cumulative portfolio return over the 3 years prior (after) the portfolio formation period. All numbers, with the exception of the *t*-statistics, are in decimal form, that is 0.1 is 10%.

PANEL A: Avg. Annual Asset Growth Rates						
Year	1	2	3	4	5	Spread
-3	0.5007	0.1888	0.1887	0.2110	0.3493	-0.1514
-2	0.1789	0.1712	0.1320	0.2166	0.6683	0.4893
-1	0.1106	0.4369	0.1349	0.1462	0.5073	0.3968
1	0.1273	0.0672	0.0839	0.1319	0.2134	0.0861
2	0.1256	0.0653	0.0915	0.0996	0.1235	-0.0021
3	0.6113	0.0610	0.0748	0.1171	0.1049	-0.5064
PANEL B: Avg. Funding Ratio (FR)						
Year	1	2	3	4	5	Spread
-3	-4.7172	0.1595	0.1279	-2.1521	0.1425	4.8597
-2	-4.2345	-0.1961	0.1569	-2.0721	0.3835	4.6180
-1	16.2806	0.3148	0.1605	0.1282	-0.1970	-16.4776
1	25.5883	-1.0835	-2.8038	0.5433	0.1891	-25.3993
2	-2.1200	2.6933	-1.4373	-1.7183	-0.0898	2.0303
3	-1.2878	0.9150	-2.0038	0.1800	2.4484	3.7362
PANEL C: Equally-Weighted Portfolio Average Monthly Returns						
Year	1	2	3	4	5	Spread
-3	-0.0820	-0.1163	-0.1279	-0.0983	-0.0966	-0.0145
-2	-0.0119	-0.0954	-0.0813	-0.0839	-0.0125	-0.0006
-1	-0.0973	-0.0743	-0.0839	-0.0643	-0.0171	0.0802
1	-0.0581	-0.0364	-0.0875	-0.0793	-0.0306	0.0275
2	-0.0677	-0.0732	-0.1015	-0.1445	-0.0583	0.0094
3	-0.0046	-0.0425	-0.0851	-0.0734	-0.0281	-0.0235
Panel D: Cummulative Return						
Sum (-3:-1)	-0.1913	-0.2859	-0.2931	-0.2465	-0.1261	0.0651
Sum (1:3)	-0.1304	-0.1520	-0.2741	-0.2973	-0.1169	0.0135

It is also important to note that in years –1 and 1, as reported in Panel C of Table II, the average monthly return spread between high and low growth firms is a significant 8% and almost

3%, respectively. This return performance dissipates in year 3 concurring with the year of the highest level of *FR* for high growth firms. These results appear in a scenario where all firms in the sample portray on average negative returns for the periods before and after portfolio formation.

Risk-Adjusted Results

We also report Fama and French (1993) three-factor and four-factor alphas for the asset growth quintile portfolios. The analysis concentrates on pricing errors from the three-factor and four-factor models. The null hypothesis is based on the initial assumption that these models explain expected returns associated with firm growth in an acceptable way. Thus, statistically significant nonzero intercepts from the models serve as preliminary evidence of mispricing that merits further examination in the paper.

Table III: Three-Factor and Four-Factor Model Regressions Results

At the end of June of each year *t* over 1996 to 2010, stocks are allocated into quintiles based on asset growth rates defined as the percentage change in total assets from the fiscal year ending in calendar year *t*−2 to fiscal year ending in calendar year *t*−1. Equal-weighted portfolios are formed based on June (*t*) asset growth quintile cutoffs. The portfolios are held for 1 year, from July of year *t* to June of year *t*+1, and then rebalanced. Panel A reports the constant (alpha) from a time-series regression of the equal-weighted portfolio excess return on the three Fama-French factors, which are the market excess return (EXM), the return on the HML portfolio, and the return on SMB portfolio. Panel B reports the constant (alpha) from a time-series regression of portfolio excess returns on four factors for both sets of portfolios. The factors are the market excess return (EXM), the return on HML portfolio, the return on the SMB portfolio and the return on a momentum portfolio (UMD).

Panel A: Fama-French Three Factor Model Results					
	1	**2**	**3**	**4**	**5**
Full Period					
Alphas	-0.1145	-0.0201	-0.0897	-0.1706	-0.0792
EXM	6.0551	-1.704	1.1158	-0.7352	0.8271
SMB	2.3409	1.3573	-6.2348	11.1821	-0.1518
HML	-2.5002	1.2184	4.4873	6.5816	3.1507
1997-2005					
Alphas	-0.1731	-0.0317	-0.1689	-0.2548	-0.1191
EXM	9.9084	-7.1563	4.2209	-0.1566	0.4222
SMB	2.0083	1.1298	-14.7585	13.5825	-0.2982
HML	0.3485	-0.9107	5.2919	9.4845	2.6902
2006-2010					
Alphas	-0.0645	0.0509	-0.0016	-0.0046	-0.0336
EXM	0.2671	-1.8522	1.0826	1.9751	0.1349
SMB	11.122	2.504	-0.4774	-1.7624	4.0885
HML	-5.1969	2.8606	1.2748	-1.9045	2.791
Panel B: Four-Factor Model Results					
	1	**2**	**3**	**4**	**5**
Full Period					
Alphas	-0.1017	-0.0204	-0.0913	-0.164	-0.0795
EXM	4.4357	-1.7017	-0.6239	-1.121	0.8381
SMB	0.6187	1.1796	-5.6229	11.3229	-0.157
HML	-2.3396	1.2442	2.5205	6.4079	3.1685
UMD	-2.2338	-0.0791	-4.0576	-0.9468	0.0274
1997-2005					
Alphas	-0.1819	-0.0402	-0.0707	-0.2444	-0.1583
EXM	11.0317	-7.6602	-2.3586	-0.7116	1.2249
SMB	2.6839	-2.4222	-13.7617	13.8072	-0.9214
HML	0.3035	-0.464	-0.7806	9.2224	4.1599
UMD	1.1642	-1.4869	-8.684	-0.6544	2.4913
2006-2010					
Alphas	-0.0593	0.0631	-0.0383	0.0044	-0.0335
EXM	-0.1254	-2.4246	0.4677	1.6916	-0.0339
SMB	6.8289	3.1812	1.4715	-1.3826	3.5316
HML	-6.4162	4.4192	-0.8068	-0.6802	2.6388
UMD	-2.3005	1.6134	-2.3524	0.5602	-0.5092

In Table III EW portfolio three-factor alphas are reported separately for all firms, for the period 1997-2005 and for the period 2006-2010. Panel A reports the results for the portfolios including all firms in the sample period. Low growth firms have a monthly alpha of -11% and high growth firms have an alpha of –7.9%, and the spread is almost 4%. Panel B reports the results for the period from 1997 to 2005. Low growth firms have a monthly alpha of -17% and high growth firms have an alpha of -12% and the spread is 5.4%. Finally, Panel C reports the results for the period from 2006 to 2010. Low growth firms have a monthly alpha of -6.5% and high growth firms have an alpha of -3.4% and the spread is almost 3.1%. Results reflect severe mispricing problems that are stronger for low growth firms. In all three segments, firms in the low growth portfolio are smaller (MV) and have the highest *FR*. Cooper et al. (2008) finds that pricing errors are the greatest for the smaller-sized firms. Franzoni and Marín (2006) find that overfunded firms are mispriced. However, the magnitude in mispricing seems to be smaller after the issuance of SFAS 158. For the period under SFAS 158 (from 2006-2010) the mispricing based on asset growth seems to reduce. We interpret these results as the positive impact of the new accounting rules in the way investors incorporate defined benefit pension plan information.

As a robustness test, risk adjusted monthly returns are estimated using the Carhart (1997) four-factor model, which includes a momentum factor. The results are similar to the three-factor alpha results.

5. Conclusions

This study investigates if investors efficiently incorporate DBPP information before and SFAS 158 by documenting how investors assess asset growth before and after the issuance of this standard. Cooper et al. (2008) find that a firms' annual asset growth rate appears to be an economically and statistically significant predictor of the cross-section of U.S. stock returns. If this new standard is in fact impacting the decisions made by investors, then a change in total assets caused by the plan status could influence those decisions.

In order to examine how investors incorporate pension information before and after the issuance of SFAS 158, a sample of U.S. public corporations was divided into two periods. These periods represent a period before and after the issuance of the statement. Firms were sorted into portfolios based on asset growth. Then, Fama and French three-factor (1993) and four-factor models were used to perform tests of markets efficiency. On the one hand, results indicate that for the period before the issuance of SFAS 158 the mispricing is severe. Castro-González (2010), Franzoni and Marín (2006) and Godwin and Key (1998) results reveal that the market inefficiently incorporates DBPP information when disclosed in the footnotes to the financial statements. On the other hand, results indicate that after the issuance of SFAS 158 the mispricing is less severe and that smaller firms seem to have the highest levels of funding but the deepest mispricing. In both segments, firms in the low growth portfolio are smaller (MV) and have the highest *FR*. Cooper et al. (2008) finds that pricing errors are the greatest for the smaller-sized firms. Franzoni and Marín (2006) find that overfunded firms are mispriced. However, the magnitude in mispricing seems to be smaller after the issuance of SFAS 158. For the period under SFAS 158 (from 2006-2010) the mispricing based on asset growth seems to reduce.

These results can be interpreted as the new accounting rules having a positive impact in the way investors incorporate defined benefit pension plan information. Coronado et al. (2008) suggest that the increased attention to pension disclosures misuse may have influenced the way

investors evaluate pensions since the appearance of SFAS 158. As Cooper et al. (2008) results suggest, asset growth captures complex linkages among returns and asset growth and, in this case, with pension plan funding. This motivates further study on how different components of asset growth may be associated with variation in return effects across firms with different funding ratios and sizes.

This study may benefit investors, regulatory bodies, accounting standard setters, analysts and researchers in their evaluation of financial data. However, some limitations are pointed out. First, the results of this study are based on the Fama and French (1993) factor and Carhart (1997) four-factor models, therefore, are affected by the measurement error introduced by the estimation models. Other tests may outperform factor models or help in corroborating the results. Fama-MacBeth (1993) regressions may help verify the specific elements in the composition of total assets that might be driving the changes in evaluation from the period before and after SFAS 158. For future research, these tests and also others should add value to these findings.

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