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A study of the value relevance impact of SFAS 158 on firms with defined benefit pension plans

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Abstract

Purpose **–** This study investigates the financial reporting effects of the defined benefit pension plan (DBPP) Statement of Financial Accounting Standard 158 (SFAS 158). In particular, we compare the pre- and post-SFAS 158 value relevance of financial statements for firms with defined benefit pension plans.

Design and methodology – To make preliminary comparisons we use our sample of DBPP firms to estimate incremental adjusted R-squares for book value vis-à-vis net income and regress them on an SFAS 158 indicator variable. In addition, we use multivariate models to compare the pre- and post-SFAS 158 information quality of net income and book value for our entire universe of firms (DBPP and others).

Findings – Results of tests suggest that the value relevance and information quality of book value (net income) increased (decreased) for DBPP firms after the implementation of SFAS 158.

Originality and value – This study adds to the current body of literature by providing additional analysis on accounting for defined benefit pension plans.

Paper type – research paper.

Keywords: defined benefit pension plans, value relevance, SFAS 158.

1. Introduction and literature

This article is one in a series of studies that investigates the financial reporting effects of the defined benefit pension plan (DBPP) Statement of Financial Accounting Standard 158 (SFAS 158). A central objective of SFAS 158 was to improve the transparency of pension accounting financial reporting and an important provision of SFAS 158 was that firms with defined benefit pension plans recognize net pension obligations (the funded status) on the balance sheet (FASB, 2006). This study evaluates the effectiveness of 158 in achieving this objective. (Prior Statement of Financial Accounting Standard 87 only required footnote disclosure (FASB, 1985).)

Financial reports are intended to convey value relevant information to users and the prescribed content and organization of these reports are central considerations for accounting standard setting bodies. An important aspect of this charge is whether information should be recognized in the statements proper or disclosed in the notes.

Prior studies have used various contexts to compare the relative informational impact on stock prices between information recognized in the statements and those found in note disclosures. For example, Harper *et al.* (1991) document that banks, when making lending decisions, assign greater weight to liabilities that are recognized on the balance sheet rather than those disclosed in the notes. Imhoff *et al.* (1993) investigate the ability of financial statement users to use lease note disclosures to capitalize operating leases and find that the assimilation of note disclosure information is conditional on the group characteristics of financial statement users. In particular, although investors appear to use note disclosures to capitalize off-balance sheet operating leases, they find no such relation for compensation committees. Niu and Xu (2009) examine Canadian firms and provide evidence that investors value employee stock options differently before and after the implementation of amended Canadian Accounting

Standard CICA HB 370.[1] They find that pre (post) 370 disclosed (recognized) option expenses measured according to their fair market values are negatively (positively) associated with returns and explain that after the amendment of HB 370, which required recognizing and measuring employee stock options according to their fair market value, investors were better able to translate the incentive effect of stock options into firm value.

As these studies suggest, the decision of whether to recognize or disclose accounting transactions is non-uniform and unique to the economic factors that affect their measurement. Nevertheless, an important function of research is to provide both standard setters and their users value relevant information from which to draw meaningful inferences. It is within such a context-specific framework that this study investigates the question of whether SFAS 158 was incrementally useful to investors for valuing companies with DBPPs.

Implemented in 2006 by the Financial Accounting Standards Board, the central intent of the *Employers' Accounting for Defined Benefit Pension and Other Postretirement Plans* Statement of Financial Accounting Standard (SFAS) 158 was to enhance reporting quality for DBPPs (FASB, 2006). Companies were required to comply with SFAS 158 by the end of fiscal year ending after December 15, 2006.

In a recent post-SFAS 158 study, Houmes and Boylan (2009) report an inverse relation between the rate used to discount estimated future benefits and the level of short- and long-term financial risk. They theorize that the post-SFAS 158 increase in liabilities from the recognition of the under-funded status of plans on the balance sheet creates incentives for managers of firms with high financial risk to reduce the present value of future obligations (and, by extension, the corresponding liability to be reported on the balance sheet) with higher discount rates. In a

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[1] CICA 3870 mandated that Canadian companies recognize the fair market value of option expense effective on or after January 1, 2004. Prior to this change, companies were required only to disclose options' fair market value in the notes.

follow-up study, Houmes *et al.* (2011) use event study methodology to document *short-window* abnormal returns around dates relevant to the implementation of SFAS 158. Although inconclusive, results provide some preliminary evidence that, at least on a short-term basis, investors perceived the increasing likelihood of implementing SFAS 158 to be price relevant. This study extends these findings by comparing the pre- and post-SFAS 158 effectiveness of the balance sheet and income statement to explain the market value of the firm.

Although SFAS 158's long awaited implementation imposed significant changes in pension accounting, its main emphasis from a financial reporting perspective was on the balance sheet as firms were required to recognize liabilities from under-funded pension plans rather than disclose them in the notes. In contrast, the effect of SFAS 158 on net income was less pronounced as firms continued to smooth pension costs over years and report the effect under other comprehensive income. We conjecture, therefore, that increases in reporting quality from SFAS 158 will be greater for the balance sheet. Our results support this assertion.

2. Sample and methodology

Many prior studies have evaluated the impact of financial reports on firm value (Collins *et al.*, 1997; Lev and Thiagarajan, 1993; Lev and Zarowin, 1999; Biddle *et al.*, 1995). Using a similar methodology, we examine the incremental explanatory effect of book value and net income on DBPP firms' market value of equity for years before and after 2006, the year of the implementation of SFAS 158. To conduct tests we use panel data obtained from the Compustat files of North American firms from years 1990 to 2009. After eliminating firms with insufficient data to estimate our models, we obtain an overall sample consisting of 214,227 firm year observations. Out of this overall sample, the total number of observations with defined benefit

plans is 37,152. We conjecture that since the recognition emphasis of SFAS 158 is on the balance sheet, the explanatory power of a firm's book value should relative to the income statement increase. Using our sample of DBPP firms only, our preliminary analysis compares the pre- and post-SFAS 158 informational value of book value incremental to net income in explaining a firm's market value of equity. In the spirit of prior value relevance research, we employ the following methodology. For each of the 20 years of our study, we obtain the adjusted R squares from the following models with the dependent variable, market value of equity (MVE_{it}), defined as firm i's end of fiscal year t price times the number of common shares outstanding and the independent variables, net income measured as the income before extraordinary items (NI_{it}) and book value measured as stock holder's equity (BV_{it}) both for firm i at end of year t.

$$MVE_{it} = a_0 + a_1 NI_{it} + a_2 BV_{it} + \varepsilon_{it} \quad \text{(equation 1)}$$

$$MVE_{it} = \delta_0 + \delta_1 NI_{it} + \varepsilon_{it} \quad \text{(equation 2)}$$

$$MVE_{it} = \gamma_0 + \gamma_1 BV_{it} + \varepsilon_{it} \quad \text{(equation 3)}$$

For each year the respective incremental R squares for book value and net income are obtained by subtracting from the overall model (equation 1) the R square from the net income model (equation 2) and R square from the book value model (equation 3). Prior studies document that positive earnings are more highly correlated with returns than losses, reflecting the tendency for accounting standards to accelerate losses and defer gains. To control for the asymmetric timeliness of earnings, we obtain R squares for all firms (net income and net losses) and net income firms only. We report these incremental R squares in Tables 1 and 2, respectively.

(Insert Tables 1 and 2 here)

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To assess the post-SFAS 158 changes in incremental R squares, we regress the incremental R squares for book value and net income on a dummy variable equal to 1 for fiscal years after the 2006 implementation year and 0 otherwise (*SFAS*). That is:

$$INCBV_t = a_0 + a_1 SFAS + \varepsilon_{it} \qquad \text{(equation 4)}$$

$$INCNI_t = \delta_0 + \delta_1 SFAS + \varepsilon_{it} \qquad \text{(equation 5)}$$

For each dependent variable, *INCBV$_t$* and *INCNI$_t$*, a statistically significant positive (negative) coefficient for the SFAS 158 dummy would suggest a post-SFAS 158 increase (decrease) in the incremental value relevance of book value and net income.

To provide further insight, we also compare book value between firms with and without DBPPs. We do the same with net income. In particular, we separate our overall sample of firms between pre-implementation years (1990 – 2006) and post-implementation years (2007 – 2009). For each period we then regress *MVE$_{it}$* on a dummy variable equal to 1 if a DBPP firm and 0 otherwise (*DBPP*) and variables *BV$_{it}$*, *NI$_{it}$*, and interaction terms between our *DBPP* dummy and book value and net income variables, i.e., *BV$_{it}$XDBPP* and *NI$_{it}$XDBPP*. These equations are depicted as follows:

> **Comment [SG1]:** I am confused as to what you are regressing, besides MVE on a dummy variable.

$$MVE_{it} = a_0 + a_1 DBPP_{it1} + a_2 BV_{it} + a_3 NI_{it} + a_4 BV_{it} XDBPP + a_4 NI_{it} XDBPP + \varepsilon_{it}$$
(equation 6)

A significantly positive (negative) coefficient on the post-SFAS 158 sample's *BV$_{it}$XDBPP*

($NI_{it}XDBPP$) interaction term would provide evidence of the increased (decreased) informational value of book value (net income) on post-implementation financial reports.

3. Results

For both the all firms and positive income only samples, our incremental book value model (equation 4) shows a significantly positive coefficient for our SFAS 158 dummy. Hence, incremental book value R squares have increased after the implementation of SFAS 158. For the incremental net income model (equation 5), however, estimates are negative for the all firms sample and insignificant for the positive earnings only sample.

(Insert Table 3 here)

Table 4 shows results of models comparing the informativeness of book value and net income for DBPP and non-DBPP firms during the pre- and post-SFAS 158 implementation periods. For both samples, and as expected, the coefficients for BV_{it} and NI_{it} are significant and positive. The stand alone dummies $DBPP$ also are positive. Hence, relative to other firms, DBPP firms have higher market values. For the pre-SFAS 158 sample, the coefficient on the $BV_{it}XDBPP$ interaction term is negative (-.200, p = .000). In contrast, the coefficient is positive in the post-SFAS 158 sample (.036, p = .048), which suggests that there has been a post implementation improvement in the informational value of the balance sheet relative to non-DBPP companies. In contrast, the coefficients on the $NI_{it}XDBPP$ interaction terms in the pre- and post-SFAS 158 periods are positive (1.007, p = .000) and negative (-3.396, p = .000), respectively, suggesting a post-SFAS 158 decline in the informational quality of earnings of DBPP firms. Taken together these findings suggest that SFAS 158 may have had its intended effect of increasing the reporting quality of the balance sheet. Results also provide evidence,

albeit marginal, of a decline in the informational value of the income statement.

(Insert Table 4 here)

4. Discussion and conclusion

This study compares the pre- and post-SFAS 158 relative and incremental value relevance of book value and net income. We also compare the pre- and post-158 informational value of book value and net income. Results suggest that the reporting quality of the balance sheet increased after SFAS 158. For net income, however, our findings provide evidence of a decline in quality. We attribute these findings to the balance sheet emphasis of SFAS 158 in the form of recognizing the defined benefit pension's funding status.

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                            Table 1
    Incremental Value Relevance of Earnings and Book Value for
    Defined Benefit Pension Plan Firms: Net Income and Net Loss
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(1) MVE$_{it}$ = a_0 + a_1NI_{it} + a_2BV_{it}+ ε_{it}
(2) MVE$_{it}$ = δ_0 + δ_1NI_{it} + ε_{it}
(3) MVE$_{it}$ = γ_0 + γ_1BV_{it}+ ε_{it}
N = 20

Year	Adjust. R Sq. All (1)	Adjust. R Sq. Income (2)	Adjust. R Sq. Book Value (3)	Incr. Book Value (1-2)	Incr. Income (1-3)	N
90	0.844	0.776	0.703	0.068	0.141	1656
91	0.741	0.512	0.598	0.229	0.143	1709
92	0.746	0.450	0.630	0.296	0.116	1706
93	0.760	0.438	0.691	0.322	0.069	1646
94	0.815	0.785	0.694	0.030	0.121	1665
95	0.738	0.697	0.650	0.041	0.088	1636
96	0.827	0.817	0.666	0.010	0.161	1766
97	0.764	0.735	0.671	0.029	0.093	1752
98	0.696	0.508	0.647	0.188	0.049	1866
99	0.715	0.642	0.638	0.073	0.077	1921
2000	0.676	0.622	0.559	0.054	0.117	1972
2001	0.155	0.077	0.130	0.078	0.025	1982
2002	0.680	0.173	0.591	0.507	0.089	2013
2003	0.784	0.445	0.690	0.339	0.094	2028
2004	0.859	0.635	0.760	0.224	0.099	2007
2005	0.861	0.611	0.787	0.250	0.074	2035
2006	0.882	0.779	0.811	0.103	0.071	2056
2007	0.805	0.698	0.738	0.107	0.067	1973
2008	0.631	0.203	0.573	0.428	0.058	1904
2009	0.709	0.189	0.699	0.520	0.010	1859

Variable Definitions:
MVE_{it} is firm i's year t market value of equity.
NI_{it} is firm i's year t income before extraordinary items.
BV_{it} is firm i's year t common stockholder's equity.

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                          Table 2
   Incremental Value Relevance of Earnings and Book Value for
       Defined Benefit Pension Plan Firms: Net Income Only
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(1) MVE$_{it}$ = a_0 + a_1NI_{it} + a_2BV_{it}+ ε_{it}

(2) MVE$_{it}$ = δ_0 + δ_1NI_{it} + ε_{it}

(3) MVE$_{it}$ = γ_0 + γ_1BV_{it}+ ε_{it}

N = 20

Year	Adjust. R Sq. All (1)	Adjust. R Sq.Net Income (2)	Adjust. R Sq. Book Value (3)	Incr. Book Value (1-2)	Incr. Net Income (1-3)	N
90	0.891	0.890	0.718	0.001	0.173	1330
91	0.787	0.778	0.605	0.009	0.182	1283
92	0.895	0.895	0.628	0.000	0.267	1350
93	0.844	0.820	0.710	0.024	0.134	1350
94	0.826	0.809	0.691	0.017	0.135	1460
95	0.748	0.725	0.645	0.023	0.103	1430
96	0.845	0.845	0.687	0.000	0.158	1548
97	0.809	0.807	0.677	0.002	0.132	1507
98	0.692	0.573	0.637	0.119	0.055	1539
99	0.728	0.673	0.636	0.055	0.092	1546
2000	0.711	0.696	0.556	0.015	0.155	1589
2001	0.168	0.163	0.140	0.005	0.028	1447
2002	0.850	0.826	0.701	0.024	0.149	1517
2003	0.792	0.573	0.769	0.219	0.023	1594
2004	0.894	0.877	0.791	0.017	0.103	1702
2005	0.893	0.851	0.814	0.042	0.079	1726
2006	0.893	0.839	0.821	0.054	0.072	1793
2007	0.890	0.882	0.750	0.008	0.140	1644
2008	0.827	0.795	0.606	0.032	0.221	1345
2009	0.717	0.256	0.708	0.461	0.009	1351

Variable Definitions:

MVE_{it} is firm *i*'s year *t* market value of equity.

NI_{it} is firm *i*'s year *t* income before extraordinary items.

BV_{it} is firm *i*'s year *t* common stockholder's equity.

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                          Table 3
 Regression of Incremental Book Value and Net Income R Squares on
 Post-SFAS 158 Time Dummy for All Firms and Net Income Firms Only
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(4) $INCBV_t = a_0 + a_1SFAS + \varepsilon_{it}$

(5) $INCNI_t = \delta_0 + \delta_1SFAS + \varepsilon_{it}$

N = 37,152

N = 20	Net Income and Net Loss Firms		Net Income Only	
Variables	(a) $INCBV_t$	(b) $INCNI_t$	(a) $INCBV_t$	(c) $INCNI_t$
SFAS	.190 (.056)	-.049 (.032)	.132 (.043)	.004 (.904)
Adj. R Square	.136	.178	.157	.008

Variable Definitions:

$INCBV_t$ is the incremental R square for book value.

$INCNI_t$ is the incremental R square for net income.

$SFAS$ is a post SFAS 158 dummy equal to 1 for years after 2006.

Comment [SG2]: Why is there an 'a' after the subscript?

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                           Table 4
 Pre- and Post-SFAS Regression of Market Value of Equity on Book
         Value and Net Income: DBPP Firms versus Others
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(6) MVE$_{it}$ = a_0 + a_1 DBPP$_{it1}$+ a_2 BV$_{it}$ + a_3NI$_{it}$ + a_4BV$_{it}$ XDBPP + a_4 NI$_{it}$ XDBPP + ε_{it}

(equation 6)

N = 214,227

Variables	Pre-SFAS 158 N = 177,075	Post SFAS 158 N= 37,152
DBPP	373.314 (.000)	2315.395 (.000)
BV$_{it}$	1.766 (.000)	1.135 (.000)
NI$_{it}$	4.305 (.000)	5.376 (.000)
BV$_{it}$ XDBPP	-.200 (.000)	.036 (.048)
NI$_{it}$ XDBPP	1.007 (.000)	-3.395 (.000)
Adj. R Square	.565	.727

Variable Definitions:

DBPP is a dummy equal to 1 for defined benefit pension plan firms.

BV$_{it}$ is firm *i*'s end of fiscal year *t* stockholder's equity.

NI$_{it}$ is firm *i*'s end of fiscal year t income before extraordinary items.

BV$_{it}$XDBPP is the interaction term between stockholder's equity and the DBPP dummy.

NI$_{it}$ XDBPP is the interaction term between income before extraordinary items and the DBPP dummy.

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