OTHER COMPREHENSIVE INCOME AND THE COST OF DEBT CAPITAL

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Abstract

The purpose of this paper is to examine the association between the cost of debt and other comprehensive income (OCI) and its components for a sample of US firms. The empirical analysis is conducted on a sample of 4,350 firm-years observations for the period 2008–2018. In conducting the analysis, we first run the models using ordinary least squares (OLS) regressions and correcting for heteroskedasticity using White (1980) standard errors. Then, we compute the F-statistic using a Wald test. The main results indicate that the separate disclosure of foreign currency translation adjustments, pension adjustments, available-for-sale marketable securities, and derivative securities and/or foreign currency hedging adjustments and the total OCI provide information that is relevant for the cost of debt. Our results will benefit creditors, standard setters, and regulators when examining the effect of each component of OCI on the cost of debt capital. Our study enriches the recent stream of research that investigates the usefulness of decomposing other comprehensive income into its components. This paper contributes to the accounting literature on the value relevance of OCI to the users of the financial statements by showing the effect of OCI on the cost of debt capital. This study supplements and extends the prior research, which documents the value relevance of OCI to the cost of equity capital.

Keywords: Cost of Debt, Comprehensive Income, Value Relevant, Financial Reporting

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1. INTRODUCTION

Holthausen and Watts (2001) call for research, which investigates whether the form and content of the financial statements are influenced by the demands of debtholders as opposed to equity investors. Ball, Robin, and Sadka (2008) state that this is an important issue in accounting and deserves more attention. This paper seeks to shed light on this issue by exploring the impact of other comprehensive income (OCI) and its components on the cost of debt capital.

Positive accounting theory stipulates that investors value the information contained in the financial statements. Research for example has shown that high-quality accounting information can lessen the degree of information asymmetry between investors (shareholders and bondholders) and managers of the firm and, as a result, lower the firm's cost of debt and equity capital. While there is an extensive stream of research on the incremental value added by OCI in explaining equity returns, there is limited empirical evidence in the literature on the effect of comprehensive income and/or its components on the cost of debt. Based on prior research which shows that disclosure of OCI enhances investors' judgments (Hirst & Hopkins, 1998) and is beneficial in mitigating earnings

management (Lin & Rong, 2012), we conjecture that OCI impacts the cost of debt capital. Prior research has shown that OCI provides additional information beyond net income for security markets. In addition, prior research has also shown that net income is associated with the cost of debt capital.

Our study is based on the premise that lenders consider accounting information released by firms in their estimate of the interest that should be charged (cost of debt) to their borrowers. Standard and Poor's (S&P) uses the accounting information in establishing the rating of debt. This practice suggests that firms have an incentive to disclose financial information, particularly those with a positive impact on their cost of debt, i.e, which leads to lower interest charges by the lenders (Sengupta, 1998).

Statement of Financial Accounting Standards (SFAS) No. 130 mandates that firms report comprehensive income and its components in the financial statements (Financial Accounting Standards Board [FASB], 1997] . Under SFAS No. 130, US firms must display the components of comprehensive income either in the face body of the income statement or in a separate statement called "comprehensive income". Comprehensive income consists of two major components: net income and other comprehensive income (OCI). OCI includes gains and losses that do not enter into the calculation of net income but that affect shareholders' equity, except those resulting from investments by owners and distribution by owners (FASB, 1997, para. 8). Specifically, OCI results from transactions related to one or more of the following: foreign currency translation; available-for-sale marketable securities; minimum required pension liability; and derivative securities and/or foreign currency hedging transactions.

The comprehensive income and its components have been linked to equity valuation (Ohlson, 1995; Stark, 1997; Zoubi, Salama, Hossain, & Alkafaji, 2016; Cao & Dong, 2020). For example, Ohlson (1995) shows that the value of a firm is a function of the net book value and abnormal earnings. We use this relationship to provide some evidence on the usefulness of OCI disclosures for the cost of debt. These disclosures are crucial since the different components of OCI are separately identified which allows creditors to estimate the risk associated with each and their impacts on the cost of debt. Hence, OCI and its components may provide information that is relevant to the cost of debt. We examine whether information about the separate components of comprehensive income is value relevant for bondholders. We address this issue by examining the relevance of the OCI items using an approach developed by Francis, LaFond, Olsson, and Schipper (2005).

Our first test examines the value relevance of the aggregate OCI to the cost of debt. Our second test examines the value relevance of each component of OCI to the cost of debt. Our third test examines the value relevance of the four components of OCI taken together to the cost of debt. We are unaware of any prior research, which examines these questions. For our research, we use a sample of listed US firms where disclosure of comprehensive income has been required by SFAS No. 130.

Our evidence on the value relevance of the OCI items suggests that separate disclosure of foreign currency translation adjustments, pension adjustments, available-for-sale marketable securities, and derivative securities and/or foreign currency hedging adjustments is useful. To be exact, we find evidence, which suggests that the total OCI and some of the individual OCI items provide information that is relevant for the cost of debt. Our results are robust to the inclusion of outliers.

Our paper contributes to the limited literature on the value relevance of OCI to creditors. As we mention above, several studies examine the information content of OCI for security return. However, the recent paper by Bao, Billett, Smith, and Unlu (2020) is the only study, that we are aware of, which examines the implications of comprehensive income volatility on debt pricing. Our study is different from that of Bao et al. (2020) in terms of the dependent variable of interest. Specifically, while they examine the impact of the *volatility* of OCI on the cost of debt, we investigate the effect of the *degree* of OCI on the cost of debt. Examining the relationship between the degree of OCI and debt pricing is important for at least two reasons. First, debt is a major source of external financing for US firms. Second, not only the volatility but also the accounting complexity embedded in OCI may make it challenging for debtholders to fully understand and price the information contained in OCI (Barth, Beaver, & Landsman, 1996; Hodder, Hopkins, & Wahlen, 2006; You & Zhang, 2009).

There are several theoretical arguments for and against comprehensive income reporting. Specifically, proponents of comprehensive income (Hirst & Hopkins, 1998; Maines & McDaniel, 2000; Chambers, Linsmeier, Shakespeare, & Sougiannis, 2007) argue that, unlike net income which excludes some revenue/expense items from financial statements, comprehensive income includes all transactions that affect the firm's net assets and, as a result, it captures the true current economic value of the firm and provides investors with valuable insights in terms of future earnings prospects. Thus, investors and creditors who utilize comprehensive income data are better able to predict future net income/cash flow and estimate firm value.

The rest of this paper is structured as follows. In Section 2, we review the relevant literature and develop the hypotheses. Section 3 describes the research design. Section 4 describes the sample and data. Section 5 reports the results, and finally, Section 6 concludes the paper.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Research by Ball (2001) among others suggests that information in the financial statements should have an impact on the bondholders. Therefore, the impact of OCI on the cost of debt capital should be significant. Prior research also shows that the financial statements affect the cost of equity capital.

Empirical studies examining the usefulness of OCI for security markets generate mixed results. For example, studies by Hirst and Hopkins (1998), Maines and McDaniel (2000), Biddle and Choi (2006), and Chambers et al. (2007) find that OCI is useful

for assessing firm value and priced by the stock markets. More recently, Graham and Lin (2018) document that OCI components contain valuable information and are associated with future performance. However, Cheng, Cheung, and Gopalakrishnan (1993), Dhaliwal, Subramanyamm, and Trezevant (1999), and O'Hanlon and Pope (1999) among others find little value-added in OCI (for a good review, please see Black, 2016). Rees and Shane (2012) suggest that the mixed results in prior studies on comprehensive income could be due to the use of a small sample size and the self-section bias. A more recent study by Bao et al. (2020) provides evidence that OCI is useful to debt investors. Specifically, based on Merton's (1974) real options framework, Bao et al. (2020) construct a measure of incremental OCI volatility and examine its impact on the likelihood of default, credit ratings, and the cost of debt. Based on two different samples from Compustat and DealScan, the results indicate that the volatility of OCI has implications for the price of debt.

Prior research has documented that accounting information supplied by firms affects the cost of capital. For example, Easley and O'hara (2004) demonstrated that the degree of precision of accounting information affects the cost of capital. The higher the degree of precision of the information, the lower the cost of capital. Lambert, Leuz, and Verrecchia (2007) show that the quality of the figures in the income statement has a major influence on the cost of capital. A high-quality earning report increases the coordination between the firm and its investors. Consequently, information risk is reduced which will lead to a lower cost of capital.

Furthermore, the information contained in the financial statements, and in particular, the statement of net income and comprehensive income, influences the cost of capital. The cost of capital consists of two components: cost of equity and cost of debt. Many studies examine the impact of comprehensive income on stock returns. For example, Francis, LaFond, Olsson, and Schipper (2004) examine the relation between the cost of equity capital and earnings attributes (accrual quality, persistence, predictability, smoothness, value relevance, timeliness, and conservatism) using a sample of 3,197 firms covering the period 1997–2001. Their results show that the individual attributes of earnings explain the cross-sectional variation in the cost of equity. Bao et al. (2020) found that the volatility of other comprehensive income affects a firm's default, bankruptcy, credit ratings, and cost of debt.

Barth, Konchitchkib, and Landsman (2013) examine the association between the cost of capital and earnings. Their results indicate that earnings transparency is negatively associated with the cost of capital. In light of prior research that documents that OCI is value relevant (Biddle & Choi, 2006; Brown & Sivakumar, 2003; Ertimur, Livnat, & Martikainen, 2003), we examine the incremental information provided by OCI and/or its components to the cost of debt. One of the components of OCI is pension adjustments (PEN), which represents the excess of additional pension liability over the unrecognized prior service costs (FASB, 2006). Biddle and Choi (2006) find a relationship between pension adjustments and stock returns supporting the assertion that pension adjustments may affect the cost of capital. Hence, we predict an association between pension adjustments and the cost of debt capital.

The second component of OCI is the changes in exchange rates between the subsidiary's currency and the parent's currency that affect the foreign subsidiary's net assets (FASB, 1997). Louis (2003) argues that those gains and losses reflect changes in economic conditions of the subsidiary (e.g., changes in interest rates and inflation rates), and this, in turn, will lead to foreign currency translation adjustments (gains or losses) that US GAAP mandates to be recognized as one of the components of OCI (FASB, 1997). Louis (2003) and Chambers et al. (2007) find that foreign currency translation gains and losses are significantly related to security returns. Based on this line of argument and findings, we predict an association between foreign currency translation gains and losses and the cost of debt capital.

The third component of OCI is the change in the fair value of available-for-sale securities that leads to recognizing unrealized gains or losses (FASB, 2007). Hirst and Hopkins (1998) contend that management can manage earnings through the timing of sales of marketable securities, thereby affecting cash flows and/or firm performance. Therefore, such disclosures will enable debtholders to assess the degree of earnings management and will affect the cost of debt capital. Prior research (Ahmed & Takeda, 1995; Chambers et al., 2007) shows a relationship between unrealized gains and losses associated with available-for-sale securities and stock returns. Moreover, Kanagaretnam, Mathieu, and Shehta (2009) show that the change in the fair value of the available-for-sale investments component is positively related to stock returns. We, therefore, anticipate a significant relationship between unrealized gains and losses of available-for-sale securities and the cost of debt capital.

The fourth component of OCI is the gains and losses on derivative instruments that are used to hedge exposures to cash flow risk and changes in the fair value of a recognized asset or liability. These gains and losses are reported as part of OCI and are expected to have a strong relationship with the cost of debt capital.

The last component of OCI is the residual part that is reported by firms as "other." This item represents the unrealized gains and losses on many items other than the four components discussed above. Consistent with the findings of Chambers et al. (2007), we do not make any prediction about this component of OCI because of its variable nature. Therefore, we do not examine the effect of this component on the cost of debt.

While we can argue, based on previous studies, that the components of OCI are value relevant, each of the above studies examines the incremental information content of the components of OCI above that provided by an aggregate net income. We suggest, based on the arguments made by various researchers (Lipe, 1986; Ohlson & Penman, 1992; Wild, 1992), that one should examine the impact of OCI and/or its components on the cost of debt.

Ball et al. (2008) suggest that, compared to stockholders, bondholders value the information contained in the firm's financial statements more. Specifically, their study shows that the information

included in the financial statements is more influenced by the demand of the bondholders than by the demand of equity holders. Therefore, OCI and its components should have an impact on the bondholders thereby affecting the cost of debt, stated in the null form, our first null hypothesis is:

$H1_0$: There is no relationship between OCI and the cost of debt.

We test this hypothesis against the alternative that there is a relation between OCI and the cost of debt. Hypothesis 1 (*H1*) states that OCI provides incremental information which explains the cost of debt above that provided by other variables, shown by previous studies to affect the cost of debt.

$H2_0$: There is no relationship between each component of OCI and the cost of debt.

Hypothesis 2 (*H2*) indicates that each component of OCI individually provides incremental information which explains the cost of debt above that provided by other variables, shown by previous studies to affect the cost of debt.

$H3_0$: There is no relationship between all the components of OCI taken together and the cost of debt.

Hypothesis 3 (*H3*) indicates that all the components of OCI taken together provide incremental information, which explains the cost of debt above that provided by other variables, shown by previous studies to affect the cost of debt.

3. METHODOLOGY

Hypothesis 1 (*H1*) states that OCI provides additional information in explaining the cost of debt beyond those variables that are known to affect the cost of debt. Following prior studies on the cost of debt (Kaplan & Urwitz, 1979; Palepu, Healy, & Bernard, 2000), we control for the effect of other variables such as financial leverage, firm size, return on assets, interest coverage, and earnings volatility. In addition, we utilize the same regression technique used in prior research on the implications of OCI (Dhaliwal et al., 1999; Biddle & Choi, 2006; Chambers et al., 2007; Bao et al., 2020).

Specifically, to examine the relationship between the cost of debt and the total OCI (*H1*), the following model was developed:

$$COSDT_{i,t} = \alpha + \beta_1 OCI_{i,t} + \beta_2 ROA_{i,t} + \beta_3 SIZE_{i,t} + + \beta_4 LEVE_{i,t} + \beta_5 SDNI_{i,t} + \beta_6 IINTC_{i,t} + e_t \quad (1)$$

where:

$COSDT_{i,t}$ = ratio of interest expense in year *t+1* to average interest-bearing debt outstanding during years *t* and *t+1* for firm *i* consist with Fortin and Pittman (2007), Francis et al. (2005), and Causholli and Knechel (2012).

$OCI_{i,t}$ = ratio of total other comprehensive income for year *t* to the market value of equity at the beginning of year *t* for firm *i*.

$ROA_{i,t}$ = ratio of net income to total assets for year *t* for firm *i*.

$SIZE_{i,t}$ = log of firm's total assets in year *t*.

$LEVE_{i,t}$ = ratio of interest-bearing debt to total assets in year *t* for firm *i*.

$SDNI_{i,t}$ = standard deviation of firm *i*'s net income before extraordinary items.

$IINTC_{i,t}$ = ratio of operating income to interest expense in year *t* for firm *i*.

e_t = a random disturbance term.

If creditors perceive other comprehensive income to be value relevant for the cost of debt, then the coefficient of other comprehensive income (β_1) should be significant. In the regression above, the coefficient of OCI captures the OCI effect on the cost of debt. We interpret this coefficient as a measure of the cost of capital effect of OCI. This implies that OCI provides incremental information which explains the cost of debt above that provided by other variables shown by previous studies to affect the cost of debt.

Hypothesis 2 (*H2*) states that each component of OCI is associated with the cost of debt. To examine whether each component of OCI individually provides useful information in explaining the cost of debt, the following model is developed.

$$COSDT_{i,t} = \alpha + \beta_1 OCICOMP_{i,t} + \beta_2 ROA_{i,t} + + \beta_3 SIZE_{i,t} + + \beta_4 LEVE_{i,t} + \beta_5 SDNI_{i,t} + \beta_6 IINTC_{i,t} + e_t \quad (2)$$

where:

$OCICOMP_{i,t}$ = any one of the four components of OCI (i.e., $CIPEN_{i,t}$ = unrealized gain and loss for pension adjustment, $CICUP_{i,t}$ = unrealized gain and loss from foreign currency translation adjustment, $CIDER_{i,t}$ = derivatives gain and loss, and $CISEC_{i,t}$ = unrealized gain and loss from available for sale securities). All other variables are defined in Model 1 above.

Model 2 includes one component of OCI at a time (i.e., in place of $OCICOMP_{i,t}$, we use $CIPEN_{i,t}$, $CICUR_{i,t}$, $CIDER_{i,t}$, or $CISEC_{i,t}$). A statistically significant coefficient of β_1 for any of these components of OCI would indicate that a particular component has information content in explaining the cost of debt.

To test *H3*, we estimate the following regression model:

$$COSDT_{i,t} = \alpha + \beta_1 ROA_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEVE_{i,t} + \beta_4 SDNI_{i,t} + \beta_5 IINTC_{i,t} + \beta_6 CIPEN_{i,t} + \beta_7 CICUR_{i,t} + + \beta_8 CIDER_{i,t} + \beta_9 CISEC_{i,t} + e_t \quad (3)$$

All the variables are defined above. To examine whether the four components of OCI jointly have incremental information content for the cost of debt beyond those variables that are known to affect the cost of debt (i.e., *H3*), we follow Biddle et al. (1995) by conducting the F-test to check if the coefficients of $CIPEN_{i,t}$, $CICUR_{i,t}$, $CIDER_{i,t}$, and $CISEC_{i,t}$, are equal to zero. Specifically, in conducting the analysis, we first run the model using ordinary least squares (OLS) regressions and correcting for heteroskedasticity using White (1980) standard errors. Then, we compute the F-statistic using a Wald test. If the F-statistic for the four coefficients taken together is significant, we can conclude that the four components of OCI jointly add information to the other variables in explaining the cost of debt ($COSDT_{it}$).

4. DATA AND DESCRIPTIVE STATISTICS

Our sample covers 11 years, *t* = 2008–2018. A firm is included in the year *t* sample if data are available for all the variables for that year. Our sample, used to estimate the three models, consists of all 2008 through 2018 firm-years that have Compustat data needed to calculate OCI and its components, cost of debt, leverage, size, ROA, interest coverage, total assets, and net income. Financial institutions were removed from the sample due to the complex nature of their business. Consistent with prior studies, OCI and its components are scaled by market value at the beginning of the period. We treat outlier observations for all the variables in the following manner. Any value for the observations below 1st percentile and above 99th percentile were removed from the sample. The final sample consists of 4,350 firm-year observations. As presented in Table 1 (see Appendix), our sample firms have mean and median values of the market value of equity of $10,800 million and $2,155 million, respectively, and mean and median of total assets are $16,170 and $2,661 million, respectively. The sample firms of our study are very much similar to those studies that examine the value relevance of other comprehensive income.

Table 1 also reports the mean, median, lower quartile, upper quartile, 10th percentile, and 90th percentile for the sampled firms used to estimate the models. All the firms in our sample reported at least one component of OCI (i.e., *CIPEN*, *CICUR*, *CIDER*, and/or *CISEC*). Summary information reported in Table 1 shows a mean (median) cost of debt (*COSDT*) of 7.03% (6.33%), with 90% of the sample having a cost of debt between 3.67% and 10.03%. We find that the mean (median) of OCI is -0.0044 (0.0011) and they are smaller than that of net income (*NIMKT*) at 0.011 (0.0533). The differences in mean values look similar to those of the median. However, the 25-percentile figure for OCI is -0.0079 and it is much lower than one for *NIMKT* of 0.0281. Furthermore, the 75th percentile and 90th percentile of OCI are smaller than those of *NIMKT*. It suggests that the other comprehensive income reported by the sample firms is relatively much smaller than that of net income.

We find that the mean of foreign currency translation adjustments (*CICUR*) is positive with a value of 0.214%. On the other hand, the means of pension adjustments (*CIPEN*), gains and losses on derivative instruments (*CIDER*), and unrealized gains and losses on securities available-for-sale (*CISEC*) are negative.

The data shows that as other comprehensive income increases from the 10th percentile (-0.0495) to 75th percentile (0.0122) to the 90th percentile (0.0319), the cost of debt increases for those percentiles (0.0367, 0.0503, 0.0791, and 0.1030. This is evidence of the relation between other comprehensive income and the cost of debt.

Pearson correlation coefficients, among the various variables used in this study, and the corresponding p-values in parentheses below the correlation coefficients are reported in Table 2 (see Appendix) for the full sample. The correlation between cost of debt (*COSDT*) and OCI is positive (r = 0.0394) and significant at the 1% level or better (p-values = 0.0087).

Furthermore, the correlations between COSDT and three components of OCI are significant: *CICUR* (0.0.0524), *CIPEN* (0.0303), and *CISEC* (0.0278). However, the correlation between *COSDT* and *CIDER* (-0.0036) is not significant. It can be inferred that OCI and three out of the four components (*CICUR*, *CIPEN*, and *CISEC*) have significant impacts on the cost of debt of the sample firms. It seems that the largest impact of the OCI components comes from the changes in foreign currency translation adjustments. Our univariate tests in the form of correlation coefficients support our assertions. However, to draw a stronger conclusion about the association between the cost of debt, other comprehensive income, and its components, multivariate tests should be conducted. In addition, the correlations between *COSDT* and the control variables (*LEVE*, *ROA*, *IINTC*, *SDNI*, and *SIZE*) are significant, consistent with the results of prior studies.

5. RESULTS OF TESTING HYPOTHESES

Our test of *H1* examines the association between total OCI and the cost of debt (Subsection 5.1). Our first test examines whether OCI explains variation in the *COSDT*; calculated as the ratio of firm *i* interest expense in year *t+1* to average interest-bearing debt outstanding during years *t* and *t+1*.

5.1. Results of testing Hypothesis 1

To test *H1*, which examines the association between other comprehensive income and cost of debt, regression Model 1 is estimated using pooled data for the full sample, the results of which are presented in Table 3 (see Appendix). The coefficient estimates and t-statistics for the OCI and the control variables are reported in Table 3.

As predicted, the coefficient on OCI is positive and significant at the 1% level of significance (0.0301, t-statistic of 2.67). The coefficient on OCI measures the information content of other comprehensive income for the cost of debt (*COSTD*). The significant coefficient of OCI indicates there is a significant impact of OCI on *COSTD*.

The coefficients of the control variables *SIZE* and *LEVE* are negative and significant at the 1% level of significance (t-value of -15.18 and -6.72, respectively). The coefficient on *SDNI* is positive but insignificant at the 1% level of significance while the coefficients of *ROA* and *IINTC* are negative. The adjusted R-squared for Model 1 is 6.99% for the final sample. The F-statistics show that Model 1 is significant. In summary, the above findings indicate that other comprehensive income affects the cost of debt, incremental to return on assets, size, leverage, earnings volatility, and interest coverage.

5.2. Results of testing Hypothesis 2

To examine whether each component of OCI individually provides useful information in explaining the cost of debt, Model 2 was estimated four times by including one component of OCI at a time (i.e., $CIPEN_{i,t}$, $CICUR_{i,t}$, $CIDER_{i,t}$, or $CISEC_{i,t}$). A statistically significant coefficient for any of these

components would indicate that a particular component has information content in explaining the cost of debt.

The results of estimating Model 2 are presented in Table 4 (see Appendix). The results of Model 2 for pension adjustment (*CIPEN*), reported in Panel A of Table 4, show that the coefficient of *CIPEN* (t-value = 2.05) is positive and significant at the 5% level of significance in explaining the cost of debt for the final sample. The control variables *ROA*, *SIZE*, *LEVE*, and *IINTC* are significantly related to *COSDT*. However, *COSDT* is insignificantly related to *SDNI*. Furthermore, the explanatory power (adjusted R-squared = 6.93%) of Model 2 when *CIPEN* is included and significant at the 1% level (F-value = 54.93) of significance. The results suggest that *CIPEN* affects the cost of debt, controlling for five factors known to affect the cost of debt.

The results for the currency translation adjustments (*CICUR*), reported in Panel B, Table 4, indicate that the coefficient of *CICUR* (0.077) is significant (t-value = 3.67) at a better than 1% level of significance. The association between the *COSDT* and the control variables is similar to those reported above. The results also show that the explanatory power of Model 2, when *CICUR* was included, is 7.09% and significant (F-value = 56.25).

Furthermore, the results of testing the security gains/loss, reported in Table 4, Panel C show that the coefficient of *CISEC* (-0.049) is significant (t-value = -1.77) at the 10% level of significance. All the control variables, except *SDNI*, are significantly associated with the *COSDT*. The results also show that the explanatory power of Model 2, when *CICUR* was included, is 7.09% and significant at the 1% level of significance or better (F-value = 53.93). However, the results of Model 2, when *CIDER* was included as an explanatory variable, show that the coefficient of *CIDER* is insignificant at any conventional level. Hence, derivatives gain/loss do not affect the cost of debt. Therefore, we are able to reject the null hypotheses that there is no relationship between the cost of debt and three components of OCI (*CICUR*, *CIPEN*, and *CISEC*). Thus, we find evidence that the components of OCI affect *COSDT*.

In summary, the above findings indicate that foreign currency translation adjustments, pension adjustments, and securities adjustments affect the cost of debt capital, incremental to financial leverage, size, return on assets, interest coverage, and earnings volatility.

Our evidence on the incremental value relevance of the OCI items suggests that the separate disclosure of the components of OCI is useful to the credit market. To be exact, we find evidence that three of the four individual OCI items provide information that is incremental value relevant above the control variables.

5.3. Results of testing Hypothesis 3

Hypothesis 3 (*H3*) predicts that the components of OCI taken together have incremental information content beyond the five-control variables that are believed to affect *COSDT*. The results of Model 3 which tests *H3*, reported in Table 5 (see Appendix), show that the coefficients of three of the components of OCI: *CICUR* (t-value = 3.39), *CIPEN* (t-value = 1.69), *CISEC* (t-value = -1.72) are significant at better than 10% level of significance in explaining *COSDT*. The overall explanatory power (adjusted R-squared = 7.21%) of Model 3 is significant at better than the 1% level (F-value = 37.60) of significance.

To test whether the four components of OCI jointly provide incremental information content beyond that provided by the five control variables (*ROA*, *SIZE*, *LEVE*, *SDNI*, and *IINTC*), the F-statistics of the four OCI components were computed using Wald-test as outlined by Biddle et al. (1995). The results of the F-statistics indicate that the four components of OCI jointly provide value-relevant incremental information (F-value = 4.5647) and are significant at less than 1% level for the overall sample. These results suggest that the four components of OCIt, taken together, controlling for other variables, affect the cost of debt.

In general, the results of testing *H3* are consistent with those of testing *H2*. Both sets of results are consistent with the hypothesis that the OCI components explain the changes in the cost of debt.

6. CONCLUSION

Prior research addresses the incremental information content of other comprehensive income above net income for security return. Prior research also examines the predictive ability of other comprehensive income. Mostly, the findings of the prior studies indicate that other comprehensive income and its components provide additional information in explaining security returns/prices above net income. However, to the best of our knowledge, the paper by Bao et al. (2020) is the only study that examines the implications of comprehensive income volatility on debt pricing. However, our study is different from that of Bao et al. (2020) in that we examine the impact of the degree of OCI on debt pricing while Bao et al. (2020) examine the impact of the volatility of OCI on the cost of debt. Specifically, we complement the study of Bao et al. (2020) by examining the effect of other comprehensive income and its components on the cost of debt after controlling for other variables, namely, financial leverage, size, return on assets, interest coverage, and the standard deviation of net income that is believed to affect the cost of debt.

Using a sample of US firms, our results show that the components of OCI (individually or collectively) affect the cost of debt capital. We find that three out of the four OCI components are individually significant in explaining movements in the cost of debt. Our results also show that there is an association between the sum of OCI and the cost of debt. These findings support the argument that lenders consider other comprehensive income information when determining the interest rate to charge (cost of debt).

A limitation of our study is that we use U.S. firms only. To the extent that different accounting rules (e.g., IFRS vs. GAAP) may influence the reporting of OCI, our results may not apply using samples of firms from other countries. Therefore, future research may examine the relationship between OCI and the cost of debt using non-US firms.

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APPENDIX

Table 1. Descriptive statistics for variables in regressions

Variable	*Mean*	*Median*	*10th Pctl*	*Lower quartile*	*Upper quartile*	*90th Pctl*
OCI	-0.0044	0.0011	-0.0495	-0.0079	0.0122	0.0319
COSDT	0.07037	0.0633	0.0367	0.0503	0.0791	0.1030
ASSETS	16170	2661	329	846	9145	27766
LEVE	0.2285	0.2034	0.0318	0.1036	0.3156	0.4360
ROA	3.8338	4.2510	-2.4155	1.5290	7.5710	11.464
INTCOV	16.1216	5.6440	0.9009	2.4546	12.2501	27.3911
SDNIBE	0.0386	0.0433	-0.0258	0.0153	0.0770	0.1168
SIZE	3.4507	3.4251	2.5180	2.9274	3.9612	4.4435
MKT	10800	2158	211	671	6812	20380
NIMKT	0.0117	0.0533	-0.0502	0.0281	0.0754	0.1097
CICUR	0.0002	**0**	-0.0153	0	0.0069	0.0200
CIPEN	-0.0041	**0**	-0.0181	-0.0025	0.0015	0.0091
CIDER	-0.0003	**0**	-0.0028	-0.0001	0.0001	0.0023
CISEC	-0.0001	**0**	-0.0007	0	0	0.0006

Table 2. Pearson correlations

	COSDT	*OCI*	*LEVE*	*ROA*	*IINTC*	*SDNI*	*SIZE*	*CICUR*	*CIPEN*	*CIDER*	*CISEC*
COSDT	1	0.0398	-0.1106	-0.0577	0.0552	-0.0538	-0.2369	0.0524	0.0303	-0.0036	-0.0278
		(0.0087)	(0.0001)	(0.0001)	(0.0003)	(0.0004)	(0.0001)	(0.0005)	(0.0456)	(0.8116)	(0.0478)
OCI		1	-0.0294	0.0630	-0.0036	0.0581	-0.0058	0.6569	0.7363	0.2516	0.3633
			0.0523	<0.0001	0.8126	0.0001	0.7048	<0.0001	<0.0001	<0.0001	<0.0001
LEVE			1	-0.1236	-0.1190	-0.1508	0.0531	-0.0242	-0.0291	-0.0078	0.0109
				<0.0001	<0.0001	<0.0001	0.0005	0.1108	0.0553	0.6093	0.4735
ROA				1	0.1475	0.9672	0.0957	0.0426	0.0523	-0.0032	0.0149
					<0.0001	<0.0001	<0.0001	0.0049	0.0006	0.8330	0.3256
IINTC					1	0.1471	-0.0531	0.0028	-0.0104	-0.0014	0.0041
						<0.0001	0.0005	0.8560	0.4925	0.9247	0.7891
SDNI						1	0.1089	0.0483	0.0416	-0.0036	0.0113
							<0.0001	0.0014	0.0060	0.8139	0.4573
SIZE							1	0.0070	-0.0046	0.0220	-0.0262
								0.6439	0.7627	0.1476	0.0843
CICUR								1	0.1815	0.0327	0.0322
									<0.0001	0.0309	0.0340
CIPEN									1	-0.0052	0.0576
										0.7333	0.0001
CIDER										1	-0.0489
											0.0013
CISEC											1

Table 3. Annual regressions of cost of debt on total other comprehensive income

Independent variable	*Predicted sign*	*Coefficient estimate*	*t-value*	*p-value*
Intercept	?	0.117	41.35	0
OCI	+	0.0301	2.67	0.007
ROA	?	-0.0002	-3.79	0
SIZE	-	-0.0119	-15.18	0
LEVE	+	-0.0229	-6.72	0
SDNI	+	0.0176	0.68	0.495
IINTC	-	0.0001	2.68	0.007
Adjusted R-squared	6.99%			
F-value	55.49			

Table 4. Results of testing the relationship between cost of debt on each of the OCI component (Part 1)

Independent variable	*Predicted sign*	*Coefficient estimate*	*t-value*	*p-value*
Panel A:				
Intercept	?	0.117	41.35	0.0001
ROA	?	-0.0004	-1.69	0.0958
SIZE	-	-0.012	-15.19	0.0001
LEVE	+	-0.0226	-6.58	0.0001
SDNI	+	0.0187	0.72	0.4697
IINTC	-	0.0001	2.68	0.0074
CIPEN	+	0.036	2.05	0.04
Adjusted R-squared	6.93%			
F-value	54.93			
Panel B:				
Intercept	?	0.117	41.33	0.001
ROA	?	0	-1.52	0.1292
SIZE	-	-0.012	-15.2	0.0001
LEVE	+	-0.022	-6.56	0.0001
SDNI	+	0.014	0.56	0.577
IINTC	-	0	2.57	0.01
CICUR	+	0.077	3.67	0
Adjusted R-squared	7.09%			
F-value	56.25			

Table 4. Results of testing the relationship between cost of debt on each of the OCI component (Part 2)

Independent variable	*Predicted sign*	*Coefficient estimate*	*t-value*	*p-value*
Panel C:				
Intercept	?	0.117	41.15	0.001
ROA	?	0	-1.65	0.1
SIZE	-	-0.011	-15.11	0
LEVE	+	-0.022	-6.6	0
SDNI	+	0.017	0.67	0.501
IINTC	-	0	2.65	0.008
CISEC	+	-0.049	-1.77	0.1
Adjusted R-squared	6.81%			
F-value	53.93			
Panel D:				
Intercept	?	0.117	41.33	0.001
ROA	?	0	-1.52	0.129
SIZE	-	-0.012	-15.2	0
LEVE	+	-0.022	-6.56	0
SDNI	+	0.0144	0.56	0.577
IINTC	-	0	2.57	0.01
CIDER	+	0.001	0.45	0.672
Adjusted R-squared	7.09%			
F-value	56.25			

Table 5. Results of testing the relationship between cost of debt and the components of OCI taken together

Independent variable	*Predicted sign*	*Coefficient estimate*	*t-value*	*p-value*
Intercept	?	0.117	41.19	0
ROA	?	0	-1.64	0.094
SIZE	-	-0.011	-15.11	0
LEVE	+	-0.022	-6.46	0
SDNI	+	0.016	0.65	0.518
IINTC	-	0	2.61	0
CICUR		0.073	3.39	0
CIPEN		0.026	1.69	0.092
CIDER		-0.008	-0.21	0.833
CISEC		-0.057	-1.72	0.085
Adjusted R-squared	7.21%			
F-value	37.6			