TRANSACTION-BASED LENDING AND REAL EARNINGS MANAGEMENT

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Abstract:

This study examines how lenders alter their behavior when faced with real earnings management (REM). We use the incremental R-square approach as in Kim and Kross (2005). As REM primarily affects the Income Statement, we find that lenders rely less on Income Statement ratios in making credit decisions in the presence of REM; however, they do not alter their reliance on Balance Sheet ratios when faced with REM. The findings of this paper could also help practitioners (borrowers and lenders) to understand how REM affects credit decisions.

Keywords Real Earnings Management, Transaction-based Lending, Debt Capital, Financial Statements

1. Introduction

Firms seeking financial capital to fund their investment opportunities have the option of issuing equity or debt. In the case of debt capital, a lender will require accounting information (financial statements) to evaluate credit risk. Of course, lenders face various risks, like interest rate risk, inflation risk, default risk, etc. One of these risks is information risk, and how lenders respond to it is the subject of this study. At least a portion of this information risk results from the lender's lack of access to private, insider information about a borrowing firm's financial position and debt repayment capacity. When contracting with firm insiders, the lender's information disadvantage exposes the lender to information risk for which they require compensation in the form of higher interest rates (Jensen & Meckling, 1976). It follows then that borrowing firms can reduce their cost of debt to the extent that they can reduce information risk.

However, despite the incentive to reduce information risk—shared by both the lender and borrower—competing reporting incentives will result in a cross-sectional disparity in the quality of information contained in financial reports. For instance, financially sound firms have an inducement to share performance-related information with lenders, whereas financially distressed firms have an incentive to conceal it[1].

Minimizing risk to lenders requires that credit decisions be based on reliable estimates of the borrower's future net cash flows since debt repayment depends on these cash flows. The income statement is one tool creditors can use to evaluate the magnitude, timing, and uncertainty of a firm's net cash flows. Specifically, the income statement provides the accounting earnings,

[1] In addition to cross-sectional differences in performance, variability in the quality of financial statement data may be associated with a variety of other economic transactions and events, like compensation contracts, initial public offerings, seasoned equity offerings, stock repurchases, and so forth.

which contain information about economic performance and current and future cash (Dechow, 1994; Schipper & Vincent, 2003).

Accounting earnings are comprised of two major components: a cash component and an accrual component, and both are useful in forecasting future cash flows; however, prior research finds that the two components are not perfect substitutes when predicting future cash flows (Barth et al., 2001; Dechow, 1994; Kim & Kross, 2005). Kim & Kross (2005) infer that the earnings variable captures the predictive ability of the accrual component of earnings because the predictive power of the cash component is extracted by the contemporaneous cash flow variable. Their study demonstrated that each of the earnings components offers incremental predictive ability for future cash flows over the other component. The authors further showed that current cash flows have been equally helpful in predicting future cash over the period 1973-2000, but the ability of accruals to predict future cash has been increasing over the same period. Barth et al. (2001) further decomposed earnings into the operating cash flow component and six major accrual components to show that each component provides additional usefulness when predicting future operating cash flows. It follows that both earnings components—cash and accruals—are important to lenders trying to assess the magnitude, timing, and uncertainty of future cash.

Although both cash and accruals offer useful information about future cash flows, both components are open to manipulation, which would undermine their usefulness (predictive ability). In the case of accruals, managerial judgment and estimation involved in determining accruals result in measurement error which gives rise to differences in the information content of accounting data. Accruals may also be manipulated opportunistically for a variety of reasons. When accruals are misstated, regardless of the reason, the relationship between earnings and future cash flows breaks down. However, the overstatement does not have a direct effect on the

cash flows of future periods, but it might lead to prediction errors, that is, predicting greater future cash than you otherwise would.

The cash component of earnings is also susceptible to managerial manipulation through the timing or structuring of transactions, which, like accruals manipulation, also reduces the usefulness of earnings for predicting future cash flows. This method of earnings manipulation is commonly referred to as real earnings management (REM). REM can be used to affect the accrual component as well as the cash component of earnings. Still, it is arguably more insidious than simple accruals manipulations because REM not only causes deterioration in the relationship between current earnings and future cash flows, it may also result in a loss of real future earnings and future cash. For example, when a manager reduces discretionary expenditures like research and development or advertising to improve current period earnings, it will likely result in lost sales in future periods, which not only results in misleadingly inflated earnings in the short-run but also reduces the value of the firm by decreasing future cash flows. In these ways, REM increases information risk for lenders.

Berger and Udell (2002) refer to lending models where credit decisions are based on financial statement data as transaction-based models. In transaction-based lending, creditors rely heavily on financial statement ratios in their decisions to offer credit and determine interest rates. Furthermore, lenders report that the most important of these ratios originate from the balance sheet and income statement (Gibson, 1983; Berger & Udell, 2002).

REM reduces the information content of both the balance sheet and income statement, but it does so differently. For instance, earnings data found on the income statement relates to a single year, so if REM is very high in a particular year, a ratio like times interest earned is

dramatically affected because the manipulated portion of earnings constitutes a significant portion of the numerator in the ratio. On the other hand, balance sheet ratios, like debt/equity, are much less impacted because questionable earnings are diluted by the fact that retained earnings, part of stockholders' equity, represent an accumulation of all the undistributed earnings of the firm since its inception. Hence, the questionable earnings of a particular year are combined with the higher-quality earnings of previous years. Therefore, lenders aware of high REM should rely less on financial ratios computed from income statement data and more on ratios calculated from the balance sheet when making credit decisions. Gray and Premti (2021) find that lenders decrease their reliance on income statement data to make credit decisions as accrual quality decreases. However, little is known about how lenders behave when faced with REM.

Because earnings manipulations via REM could be difficult to distinguish from normal operating decisions, it might offer a more attractive earnings management technique than the manipulation of accruals, especially in the wake of SOX. That is, the lower likelihood of getting caught might have increased the incidence and/or magnitude of REM. In fact, Cohen et al. (2008) find this to be true. However, the literature has shown mixed results on whether lenders behave differently in the presence of REM. Ge and Kim (2014) found that credit rating agencies and bondholders recognize REM as an element that increases credit risk, thereby necessitating a higher risk premium. Similarly, Crabtree et al. (2014) showed that REM is negatively associated with bond ratings and market yields on new debt issues, suggesting that creditors are not fooled by REM. Conversely, however, Liu et al. (2010) discovered that bondholders are unable to recognize income-increasing earnings in pricing new debt. In light of the conflicting results in the literature, it is unclear whether capital providers are misled by earnings manipulated in this way—at least in the case of creditors. Nonetheless, little is known about how exactly lenders

modify their reliance on financial statements when faced with low earnings quality caused by REM.

This study examines whether lenders modify their reliance on financial statements in response to REM. Specifically, the study seeks to understand whether lenders alter their reliance on the financial ratios in transaction-based lending models as the information in those ratios is affected by REM.

We follow the incremental R^2 approach as in Kim & Kross (2005) to measure changes in the informativeness in credit markets of earnings as REM changes. Specifically, changes in the incremental explanatory power of income statement ratios and balance sheet ratios for the cost of debt were measured as earnings quality (REM) increased. We find that the incremental explanatory power of the income statement for the cost of debt increased as earnings quality increased (REM declined). In contrast, the incremental explanatory power of the balance sheet remained unchanged. These findings suggest that lenders are aware that the informational role of accounting is undermined by low-quality earnings, specifically REM. In other words, lenders must realize that REM renders financial statement ratios less informative. Accordingly, they alter their reliance on these ratios—which serve as the primary inputs for transaction-based lending models—as the information in these ratios changes. Consequently, the findings of this study imply that lenders rely more on the income statement to establish interest rates when earnings quality is high (REM is low) and that they do not regard the balance sheet as being any more or less useful when earnings quality changes. These findings supplement the findings of Gray and Premti (2021). The results of these papers show that lenders are able to detect when both components of earnings (accruals and cash components) are of low quality, and in both cases,

they alter their behavior by relying less on income statement ratios when making their credit decisions.

The findings of this paper will benefit academics, practitioners, regulators, and standard setters. The findings presented in this study will aid academics working to refine our understanding of the role played by information risk in capital market transactions. Practitioners stand to gain from this study by having a better understanding of the implications associated with using REM as a tool for managing earnings. Regulators and standard setters may integrate the findings of this study when establishing compliance directives. These guidelines may be used to form or alter corporate governance structures.

2. Literature Review and Theoretical Background

2.1. The nature of REM.

Financial statements are critically important to lenders for assessing the adequacy of future cash flows for servicing debt. For example, the income ***s***tatement measures accounting earnings—a metric that signals information about economic performance and thus cash flows—both current and future (Schipper & Vincent, 2003). Accounting earnings are made up of two components—a cash component and an accrual component.

Both the cash and accrual components of accounting earnings are useful in predicting future cash flows, and the two together are more informative than either by themselves (Barth et al.,2001; Dechow, 1994; Kim & Kross, 2005). Even though both components possess information about future cash flows, they have different properties. Accruals provide valuable information regarding economic performance, but they are inherently less certain. Conversely, cash transactions offer enhanced credibility as to their contribution to overall firm performance

since they can be recorded with greater certainty. However, the reliability of the cash component of earnings may also be undermined.

REM can be used to undermine the information content of either earnings component through a deliberate manipulation in the timing or structuring of transactions to increase short-term cash flows and profits, even at the expense of long-term profits (Zang, 2012). Graham et al. (2005) report that most chief financial officers would be willing to decrease discretionary expenditures or delay capital investments in order to hit earnings targets, even though doing so might sacrifice long-term shareholder wealth. These findings are particularly important in the post-SOX era because of the dramatic increase in the severity of legal sanctions for knowingly certifying fraudulent financial statements.

2.2. Reporting incentives and opportunism.

Modern compensation contracts tie a manager's remuneration directly to earnings and/or stock price and are intended to align the interest of shareholders and managers so that both parties benefit from increases in these metrics. Therefore, as the preparers of financial statements, managers have asymmetric reporting incentives regarding actions that increase and decrease earnings. In other words, managers have an economic incentive to opportunistically inflate earnings, thereby impacting the value of their compensation packages, and REM offers a way of doing that (LaFond & Watts, 2008). Even though performance-based compensation is only one example of an asymmetric reporting incentive, it illustrates the point that managers have the incentive and opportunity to manipulate earnings, thereby increasing information risk. Knowing that managers have the opportunity and incentive to manipulate earnings, lenders will remain uncertain about the extent to which they can rely on financial statement data in making credit decisions.

Events other than compensation contracts may also incentivize managers to influence reported earnings. Increasing earnings may be desired in hopes of enhancing the outcomes associated with initial public offerings and seasoned equity offerings. Conversely, earnings may be managed downward to avert regulation, to diminish litigation risk, to defer bonuses for the future, to take a "big bath" when new management is introduced, to acquire more auspicious stock repurchase outcomes, and so forth.

Irrespective of the reason for managing earnings, information risk increases when earnings quality is low (Francis et al., 2005). Accordingly, creditors confronted with augmented information risk will require higher rates of interest (Bharath et al., 2008; Francis et al., 2005).

2.3. Cost of debt and earnings quality.

Extant literature shows a negative correlation between the cost of debt and the quality of a firm's accounting data (Dechow, Ge, & Schrand, 2010). Francis et al. (2005) used accrual quality to proxy for the information risk faced by capital providers and found that firms with low-quality accruals pay higher rates of interest and have lower Standard and Poor's credit ratings. Bhojraj and Swaminathan (2009) found that the corporate bonds of firms with high operating accruals underperform those with low operating accruals, thereby confirming that more operating accruals increase a creditor's perceived risk, resulting in an increase in the cost of debt. Anderson, Mansi, and Reeb (2004) found that firms with higher board independence, higher audit committee independence, and larger board size experience a lower cost of debt. Graham et al. (2008) learned that creditors establish more restrictive loan covenants following a restatement by a customer firm—evidence that restatements decrease trust in accounting data, increase perceived risk, and result in an increase in the cost of debt. Regarding REM, the focus of this study, Crabtree et al. (2014), showed that REM is negatively associated with bond ratings and

market yields on new debt issues, suggesting that REM increases risk for a creditor, which leads to a greater cost of debt for borrowing firms. Each of the preceding studies provides evidence that a decrease in the integrity of a firm's accounting data can lead to an increase in its cost of debt.

3. Hypothesis Development

The quality of accounting earnings is an important determinant of the information risk faced by capital providers. Earnings have two components—an accrual component and a cash component—both of which are open to manipulations that undermine their quality (information usefulness).

Extant literature demonstrates that accrual quality can impact both a firm's source of capital and cost of capital. Regarding the cost of capital, Francis et al. (2005) used accrual quality to proxy for the information risk faced by capital providers and discovered that the quality of accounting accruals is priced in both debt and equity markets. Bharath et al. (2008) discovered that accrual quality also impacts the behavior of firms issuing new debt by driving firms with low-quality accruals toward private rather than public debt. Furthermore, Bharath et al. (2008) found that both private and public lenders demand higher rates of interest when accrual quality is low (information risk is high), but the magnitude of the effect is greater in the case of public debt.

Prior literature also demonstrates that REM can impact a firm's cost of capital because it can reduce the quality of both earnings components. Credit rating agencies and bondholders acknowledge that REM increases credit risk and appropriately increase their risk premium (Ge & Kim, 2014). Crabtree et al. (2014) show that REM is negatively associated with bond ratings and

market yields on new debt issues, suggesting that creditors are not fooled by REM. Therefore, the informational role of accounting is undermined by low-quality earnings, regardless of whether it results from simple accruals manipulation or REM.

These studies make seminal contributions to our understanding of the informational role of accounting in capital markets, and they simultaneously invite further inquiry into an unanswered question: How do lenders modify their reliance on financial statements when faced with low earnings quality caused by REM? In other words, when faced with low earnings quality as a result of REM, do lenders alter their reliance on the financial ratios serving as primary inputs in transaction-based lending models as the information in those ratios changes?

A significant body of research has established that lenders base credit decisions on a few different types of models. For example, Berger and Udell (2002) describe two models affecting the availability and cost of debt—transaction-based models and relationship-based models. Relationship-based lending makes use of soft data obtained from the strength of personal connections that develop over time. In contrast, transaction-based models determine creditworthiness using information like that contained in financial statements—principally the balance sheet and income statement.

Using survey data collected from commercial loan officers at large U.S. banks, Gibson (1983) suggested that financial statement ratios are particularly important to lenders in assessing a firm's credit risk and its corresponding cost of debt, with the most important of these coming from the balance sheet and income statement. Therefore, if lenders are aware of the increased information risk imposed by low-quality earnings, this knowledge will affect their confidence in financial statement data when setting interest rates. Stated differently, if lenders price low earnings quality, they are certainly aware that REM makes financial statement ratios less

informative. If lenders are able to detect the presence of REM, when faced with lower quality earnings, they will rely less on Income Statement information (which is heavily impacted by REM), and they will rely more on Balance Sheet information (which is less impacted by REM) and/or other available information. As a result, we hypothesize that:

H1: Income statement ratios will have lesser explanatory power for the cost of debt in the presence of REM.

H2: Balance sheet ratios will have greater explanatory power for the cost of debt in the presence of REM.

4. Methodology

4.1. Sample description.

We collect data for all firms covered by Compustat from 1988 to 2016, excluding financial and utilities firms. Prior to 1988, the data from the statement of cash flows, which is required for our measures, is not available. To minimize time-series data requirements and concerns about survivorship bias, to calculate the REM metrics, we run annual, cross-sectional, industry regressions. We only maintain in the sample industries represented by at least 20 firms in any given year. To mitigate the effect of outliers, we winsorize all variables at the 98% level.[2]

4.2. Variable descriptions.

4.2.1. Cost of debt.

To test our hypotheses, we regress the realized cost of debt (COD) on financial ratios that serve as inputs in transaction-based lending models. The ratios are among those reported as most

[2] Inferences are unaffected by the use of trimmed data.

important to lenders (Gibson, 1983). Following Francis et al. (2005), the realized cost of debt was measured as the ratio of firm j's interest expense in year t + 1 (Compustat #15) to the average of beginning and ending interest-bearing debt outstanding (Compustat #9 and #34). To control for the effect of changes in interest rate environments, as well as differences between industries, year and industry fixed effects were eliminated from the cost of debt. Also, hypotheses testing relied on the fractional ranks of the cost of debt to control for unspecified non-linearities and to further mitigate the effect of outliers.

4.2.2. Real earnings management (REM).

Roychowdhury (2006) developed three metrics to empirically show that firms do indeed use REM to avoid reporting accounting losses. However, in accordance with Zang (2012), the ensuing model was excluded since real activities manipulation can affect cash flow from operations in different directions, resulting in a measure of abnormal cash flow from operations that might be ambiguous and hard to interpret. Specifically, Roychowdhury (2006) mentioned that over-production, price discounts, and channel stuffing all reduce cash flow from operations, while discretionary expenditures increase them. Because the two effects cancel each other out, high levels of REM could exist without being detected at all by Roychowdhury's abnormal cash flow from operations model.

$$\frac{CFO_t}{A_{t-1}} = \alpha_0 + \alpha_1\left(\frac{1}{A_{t-1}}\right) + \beta_1\left(\frac{S_t}{A_{t-1}}\right) + \beta_2\left(\frac{\Delta S_t}{A_{t-1}}\right) + \varepsilon_t$$

where *CFO* refers to cash flow from continuing operations, *A* refers to total assets, and *S* refers to sales revenue. Consequently, following Zang (2012), we only used two of the Rowchdhury (2006) models to proxy for REM. The first measures over-production of inventory (*AbnPROD*). To manage earnings upward, managers can overproduce inventory in order to

report a lower cost of goods sold. This works by shifting more fixed overhead to the balance sheet; as fixed overhead per unit decreases, so does the full cost per unit—hence, a lower cost of goods sold. Normal production costs are the predicted values obtained from a regression of actual production costs *(PROD)* on a scaled intercept *(1/A)*, the level of sales *(S)*, and changes in sales *(ΔS)* for the two most recent periods, as shown in Equation 1 where all variables are deflated by lagged assets and regressions are run by industry and year.

$$\frac{PROD_t}{A_{t-1}} = \alpha_0 + \alpha_1\left(\frac{1}{A_{t-1}}\right) + \beta_1\left(\frac{S_t}{A_{t-1}}\right) + \beta_2\left(\frac{\Delta S_t}{A_{t-1}}\right) + \beta_3\left(\frac{\Delta S_{t-1}}{A_{t-1}}\right) + \varepsilon_t \qquad (1)$$

where *PROD* refers to the cost of goods sold (Compustat #41) plus the change in inventory (change in Compustat #3).

AbnPROD, the first proxy for REM, is the reverse-coded residual from Equation 1. Larger residuals result from increasing production costs to increase income in the short-run, which lowers earnings quality. Therefore, the firm-specific residual from Equation 1 is reverse-coded so that larger values reflect greater earnings quality.

The second proxy for REM is any abnormal decrease in the amount of discretionary expenditures (*AbnDISEXP*). Earnings can be increased in the short-run by reducing discretionary expenditures, even if the reductions harm long-run profits. Normal discretionary expenditures are the predicted values obtained from regressions of actual discretionary expenditures *(DISEXP)* on a scaled intercept term *(1/A)* and the level of sales revenue *(S)* scaled by lagged assets. Equation 2 regressions are run by industry and year.

$$\frac{DISEXP_t}{A_{t-1}} = \alpha_0 + \alpha_1\left(\frac{1}{A_{t-1}}\right) + \beta\left(\frac{S_{t-1}}{A_{t-1}}\right) + \varepsilon_t \quad (2)$$

where $DISEXP_t$ is research and development expense (#46) plus advertising expense (#45) plus selling, general, and administrative expenses (#189) for year *t*.

AbnDISEXP is the residual obtained from Equation 2 regressions. Lower values of *AbnDISEXP* indicate abnormally low levels of expenditures (greater REM). Therefore, higher values of *AbnDISEXP* indicate greater earnings quality

Similar to Zang (2012), the two measures of REM used in Equations 1 and 2 above were added together in order to obtain one composite measure of earnings quality attributable to REM, where larger values indicated higher earnings quality. Specifically, *EQ_REM* was computed by adding the absolute values of *AbnDISEXP* and *AbnPROD* together, and in order for higher values to indicate higher earnings quality, we reverse code the sum by multiplying by -1. Then the earnings quality variable was cross-sectionally ranked, and the ranks (EQ_REM) were used to form portfolios of firms with increasing levels of earnings quality.

4.2.3. Financial statement ratios.

Gibson (1983) surveyed commercial loan officers at the 100 largest U.S. banks and found the financial ratios that these lenders use the most when making credit decisions. The three most significant income statement ratios, according to lenders (Gibson, 1983), were used to proxy for income statement information. The first is the fixed charge coverage ratio (*FixedCharge*), described by lenders as a measure of long-term debt paying ability ([Compustat #178+{#183/3}]/[Compustat #15+{#183/3}]). This ratio is calculated as the ratio of earnings to fixed charges. In this ratio, the earnings effects of taxes and interest (including capitalized interest and the interest portion of operating leases) is removed from operating income in the numerator. The denominator is interest expense plus capitalized interest and the interest portion

of operating leases. The second income statement ratio is the firm's net profit margin (*ProfitMargin*), which lenders describe as a measure of profitability (Compustat #18/Compustat #12). The ratio is calculated as earnings before extraordinary items and discontinued operations divided by sales revenue. Equity earnings are removed from the numerator. The final income statement ratio is the times interest earned ratio *(TimesInterest*). The ratio is calculated as the ratio of earnings to interest expense (Compustat #178/Compustat #15). In this ratio, the earnings effects of taxes and interest (including capitalized interest) are removed from the numerator. The denominator is interest expense plus capitalized interest. This ratio differs from the fixed charge coverage ratio in the treatment of the interest associated with operating leases. Therefore, a total of three ratios were used to collectively proxy for income statement information.

Regarding balance sheet ratios, the two most important ratios to lenders are the debt/equity ratio and the current ratio. Of greatest importance is the debt/equity ratio (*DebtEquity*), which lenders describe as a measure of long-term debt paying ability (Compustat #181/Compustat #216). Second in importance is current assets/current liabilities (*CurrentRatio*), which lenders express as a measure of liquidity (Compustat #4/Compustat #5). These two ratios are used to proxy for balance sheet information used by lenders. Both were selected solely because of their first and second place ranking in Gibson's (1983) survey results.

In addition, a third ratio from the balance sheet was used as a proxy for the quality of assets that, although not contractually specified as collateral, provide a basis for determining the extent to which loans are secured. In the event of firm failure, lenders may recoup their capital from the liquidation of firm assets. However, in this context, not all assets are of equal quality. For this reason, intangible assets are normally not included in the calculation of net assets for purposes of debt covenants. In fact, in liquidation, the intangibles of many firms likely have no

value at all (Holthausen & Watts, 2001). For this reason, we incorporated a ratio used by Bharath et al. (2008) to measure the tangibility (quality) of assets as indicated by the balance sheet. The variable *Tangibility* is the ratio of gross property, plant, and equipment to total assets (Compustat #6/Compustat #8). Therefore, we used a total of three ratios to collectively proxy for balance sheet information.

4.2.4. Controls.

In our models, we also control for several variables thought to be related to the cost of debt, but that are not directly related to the variables described above. Similar variables were used in Gray and Premti (2021). The market-to-book ratio is calculated as the market values of total debt and equity divided by the book values of total debt and equity ([Compustat #6 - #60 + #24 * #25] /#6) and is used as a proxy for growth opportunities. The cost of debt is expected to be decreasing in the market-to-book ratio. The natural log of total assets proxies for firm size (log of Compustat #6). Smaller firms tend to be more opaque (Berger & Udell, 2002). The cost of debt is expected to be decreasing in firm size (Campello et al., 2011). Length of a firm's operating cycle ([{Compustat #2 + LAG#6/2}/{#12/360}] + [{#3 + LAG#3/2}/{#41/360}]) is used as a proxy for the volatility of working capital requirements (Dechow, 1994). Working capital requirements tend to be more volatile in industries where the operating cycle is long. SOX significantly increased penalties associated with deliberately misleading financial statements, which may have created a structural change in the instances or levels of REM manipulations in financial reports. In order to control for systematic changes in the level of REM manipulations following the passage of SOX (Cohen et al., 2008), a dummy variable coded 1 for years after 2002, 0 otherwise, was included. To account for the possibility of different lender-pricing behavior in unusual situations, dummy variables were used to identify recession years

(coded 1 for years 1990, 2001, and 2008-2009, and 0 otherwise), negative income (coded 1 for firms with negative income (Compustat #123), and 0 otherwise), and firms considered to be high (low) performers (coded 1 for firms with their return on assets (Compustat #123/LAG [#6]) in the top (bottom) 20%, and 0 otherwise).

Table 1 reports summary statistics for variables used in our regression models for the full sample (*n* = 11,678 firm years). The extreme 2% of all variables shown in Table 1 were winsorized. The cost of debt variable shown in Table 1 is the realized cost of debt before removing any fixed effects. The mean (median) cost of debt is 8.341% (7.658%), which is consistent with prior research conducted by Francis et al., (2005). This result suggests that, on average, firms pay 8.34% on their debt.

AbnDISEXP captures abnormal levels of discretionary expenditures. Higher values of *AbnDISEXP* indicate higher levels of expenditures, thus greater earnings quality. In other words, earnings quality is high (REM is low) when managers do not use their discretion to lower expenditures for the sole purpose of increasing short-term earnings. The mean (median) of *AbnDISEXP* is -0.011 (-0.032), indicating that, on average, firms tend to engage in REM through exaggerated expenditures. *AbnPROD* captures abnormally high levels of production costs driven by the overproduction of inventory, and serves as another proxy for REM. Overproduction lowers earnings quality by shifting costs from the income statement to the balance sheet. Consequently, abnormally high production costs (*AbnPROD)* were reverse-coded so that larger values reflect greater earnings quality. The mean (median) of *AbnPROD* is 0.00 (0.00), indicating that, on average, firms do not tend to engage in REM through overproduction. Lastly, EQ_REM was computed by adding the absolute values of AbnDISEXP and AbnPROD together

and reverse coding their sum by multiplying by -1. The mean (median) of *EQ_REM* is -0.194 (-0.143), indicating that, on average, firms tend to engage in some form of REM.

The fixed charge coverage ratio has a mean (median) of 4.653 (3.007), which means that, on average, a firm's earnings are 4.653 times higher than its fixed charges. The profit margin has a mean (median) of -0.005 (0.025). Taken together, the mean and median suggest that, even after winsorizing, large losses in some firm years introduce some skewness in the distribution of profit margin. The times interest earned has a mean (median) of 8.944 (3.842), which indicates that, on average, firms have earnings that are 8.9 times higher than their interest expense.

The mean (median) of the debt/equity ratio is 1.587 (1.123), which signifies that, on average, firms use 1.587 times more debt financing than equity financing. The current ratio has a mean (median) of 2.211 (1.891) which indicates that, on average, current assets exceed current liabilities by 2.211 times. Tangibility is a proxy for the quality of assets that might serve to collateralize loans. Tangibility has a mean (median) of 0.299 (0.258) which means that, on average, approximately 30% of a firm's assets consist of long-term, tangible assets.

The market-to-book ratio has a mean (median) of 1.636 (1.303). The natural log of total assets has a mean (median) of 5.575 (5.393). The mean (median) number of days in a firm's operating cycle is 142 days (127 days). Therefore, it takes firms an average of 142 days after spending cash for inventory to collect cash from customers. SOX has a mean of (0.359), which indicates that 35.9% of firm years occur in the post-SOX period. Recession has a mean of 0.153, which indicates that 15.3% of our firm years occur in recession periods. Loss has a mean of 0.262, which indicates that 26.2% of the years, the firms in our sample experience a negative income. High (Low) Perform has a mean of 0.185 (0.128), which indicates that in 18.5% (12.8%) of the years, the firms in our sample have ROAs in the top (bottom) 20%.

<Insert Table 1 Around Here>

<Insert Table 2 Around Here>

Table 2 shows the correlation coefficients of the variables used in our model. The correlation coefficients do not show an indication that multicollinearity may be an issue in our models. We also check the VIFs of our model, and the highest VIF is 3.81, indicating that multicollinearity is not an issue of concern.

4.3. Hypothesis testing.

Hypothesis tests began by partitioning the data into earnings quality portfolios based on the EQ_REM. Specifically, the earnings quality variable was cross-sectionally ranked each year, and we created 100 portfolios based on the percentiles rank of EQ_REM, with percentile 100 containing firms with the highest earnings quality.[3] Then, for each of the 100 portfolios, we follow the incremental R^2 approach as in Kim and Kross (2005) and run a series of three regressions to calculate the incremental explanatory power of income statement ratios and balance sheet ratios for the cost of debt:

First, we run a full model that includes both the income statement ratios (ISR) and the balance sheet ratios (BSR), as follows.

$$COD_{jt+1} = \beta_0 + \beta_1(Controls) + \beta_2(ISR_{jt}) + \beta_3(BSR_{jt}) \quad (3)$$

[3] As a robustness test, we also repeat our analysis in portfolios created based on EQ_REM trentiles and ventiles.

where *COD* is the cost of debt capital. *Controls* is a collective reference for the control variables explained above. *ISR* is a collective reference to the three income statement ratios explained above, and *BSR* is a collective reference for the three balance sheet ratios explained above.

Next, two reduced models were estimated by dropping either the income statement ratios *(ISR)* or the balance sheet ratios *(BSR)* as follows.

$$COD_{jt+1} = \beta_0 + \beta_1(Controls) + \beta_2(ISR_{jt}). \quad (4)$$

$$COD_{jt+1} = \beta_0 + \beta_1(Controls) + \beta_2(BSR_{jt}) . \quad (5)$$

Lastly, we compute the incremental explanatory power of income statement ratios *(ISINFO)* and balance sheet ratios *(BSINFO)* for the cost of debt, as the differences in R^2 between the full and reduced models. The incremental explanatory power of income statement ratios was computed as follows.

$$ISINFO_{jt} = R^2_{model\ 3} - R^2_{model\ 5} . \quad (6)$$

When income statement ratios have greater incremental explanatory power for the cost of debt, *ISINFO* will be larger, which we attribute to lenders' increased reliance on the income statement for determining the cost of debt.

Likewise, the incremental explanatory power of balance sheet ratios was computed as follows.

$$BSINFO_{jt} = R^2_{model\ 3} - R^2_{model\ 4} . \quad (7)$$

When balance sheet ratios have greater incremental explanatory power for the cost of debt, *BSINFO* will be larger, which we attribute to lenders' increased reliance on the balance sheet for determining the cost of debt.

<Insert Table 3 Around Here>

Table 3 helps to illustrate this process. As illustrated above, we run a series of three models (Model 3, 4, and 5) on each of the 100 percentiles of earnings quality. Since it is used only for illustration purposes, Table 3 only shows the results of the series of the three models, run on the Percentile 1 portfolio (Columns 1 - 3), and on the Percentile 100 portfolio (Columns 4 - 6). The dependent variable in the regressions shown in Table 3 is the cross-sectional ranks of the cost of debt. Columns 1 and 4 display the full model (Equation 3); Columns 2 and 5 display the reduced model containing only the income statement ratios (ISR) (Equation 4); Columns 3 and 6 display the reduced model containing only the balance sheet ratios (BSR) (Equation 5). For our hypothesis testing, the most important statistics from Table 3 are the values of R^2 obtained from the three regression models shown. For each percentile portfolio, the *ISINFO* is calculated as the R^2 of the full model minus the R^2 of the reduced model containing only the balance sheet ratios (BSR). For example, the *ISINFO* for the Percentile 1 portfolio would be 0.194-0.17 = 0.024, while the *ISINFO* for the Percentile 100 portfolio would be 0.173-0.147 = 0.026. These results indicate that the marginal explanatory power of the income statement ratios on the cost of debt is 0.024 and 0.026 in the Percentile 1 and 100 portfolios, respectively. The *BSINFO* for the Percentile 1 portfolio would be 0.194-0.192 = 0.002, while the *BSINFO* for the Percentile 100 portfolio would be 0.173-0.169 = 0.004. This process is repeated for the other 98 percentiles, whose results are not shown in Table 3.

After computing the values of *ISINFO* and *BSINFO* for each earnings quality percentile portfolio *(EQ_REM)*, we run the following models to test our hypotheses:

$$ISINFO_{jt} = \omega_0 + \omega_1 EQ\_REM_{jt} \ . \quad (8)$$

$$BSINFO_{jt} = \theta_0 + \theta_1 EQ\_REM_{jt} \ . \quad (9)$$

EQ_REM in Equations 8 and 9 takes values of 1 to 100, where values of 1 indicate firms with the lowest earnings quality and values of 100 indicate firms with the highest earnings quality. As a robustness test, we also repeat our analysis by using trentile and ventile portfolios. H1 predicts that the incremental explanatory power of income statement ratios for the cost of debt is greater when earnings quality is high. Therefore, H1 predicts a positive sign for ω_1 in Equation 8. H2 predicts that the incremental explanatory power of balance sheet ratios for the cost of debt is greater when earnings quality is low. Therefore, H2 predicts a negative sign for θ_1 from Equation 9.

5. Results

Table 4 displays the results of Models 8 and 9: columns 1-3 display the results for *ISINFO* (Model 8), while columns 4-6 display the results for the *BSINFO* (Model 9). Columns 1 and 4 show the results based on the percentile portfolios; Columns 2 and 5 show the results based on the trentile portfolios; Columns 3 and 6 show the results based on the ventile portfolios. These models are run with robust standard errors, as in White (1980).

H1 predicts that the incremental explanatory power of the income statement for the cost of debt is increasing in earnings quality. For the *ISINFO* models, the coefficient of earnings quality is positive and significant in all three models. This result is consistent with H1 and suggests that lenders are aware that the informational role of accounting is undermined by low-quality earnings. Stated differently, lenders realize that REM makes income statement ratios less informative and rely less on the income statement ratios when making transaction-based lending decisions. Consequently, it appears that, on average, lenders regard the income statement ratios as being more useful for setting interest rates when earnings quality is high (REM is low).

H2 predicts that the incremental explanatory power of the balance sheet for the cost of debt is decreasing in earnings quality. In the *BSINFO* models, the coefficient of earnings quality is insignificantly different from zero in all three models. This result does not support H2, and suggests that when faced with lower quality earnings, lenders do not alter their reliance on balance sheet information. It appears that, on average, lenders do not regard the balance sheet as being any more or less useful when earnings quality changes due to REM.

<Insert Table 4 Around Here>

6. Conclusion

This study examines the impact of REM on the use of traditional, transaction-based lending models in which credit decisions are based on financial statement data. Specifically, we follow an incremental R^2 approach as in Kim & Kross (2005) to measure how lenders alter their reliance on Income Statement and Balance Sheet ratios when faced with REM. We find that when faced with REM, lenders rely less on Income Statement ratios when pricing debt. This result is consistent with our hypothesis and suggests that lenders are able to detect REM, and thus they rely less on Income Statement ratios which are highly affected by REM. We also hypothesize that as a result of REM, lenders would rely more on Balance Sheet ratios when pricing debt, as the Balance Sheet ratios are less affected by REM. We do not find support for this hypothesis. The results related to the Balance Sheet ratios are insignificant, and suggest that lenders do not significantly alter their reliance on Balance Sheet ratios when faced with REM.

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