

DOES ACCOUNTING REPORTING COMPLEXITY DISTRESS DEBT RATINGS?

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(Received: December 27, 2023; Revised: February 28, 2024; Accepted: February 29, 2024)

Abstract - We examine the influence of accounting reporting complexity at the corporate level on firm debt ratings. Utilizing a dataset comprising non-financial firms in the United States from 2011 to 2017, our findings indicate a statistically significant adverse impact of accounting reporting complexity on debt ratings. This suggests that firms characterized by higher accounting reporting complexity (ARC) levels tend to exhibit lower debt ratings. Additionally, our analysis reveals that the cost of debt serves as a crucial mechanism through which ARC influences debt ratings. Overall, firms are advised to enhance communication with stakeholders, collaborate with credit rating agencies, and maintain vigilance in monitoring and adapting to changes in reporting standards and industry practices, contributing to overall financial stability and investor confidence.

Key words - Accounting reporting complexity; Debt ratings; Cost of debt; US firms.

1. Introduction

In a corporate context, managers possess more extensive information about a firm's cash flows and profitability compared to external investors. Ideally, managers should utilize 10-K reports (A 10-K report is a comprehensive annual filing that publicly traded firms submit to the U.S. Securities and Exchange Commission (SEC). This report provides a detailed overview of a firm's financial performance and is a crucial source of information for investors and other stakeholders. The 10-K report typically includes the firm's financial statements, management discussion and analysis (MD&A), risk factors, business overview, and other relevant information. Firms are required to file a 10-K report within 60 days from the end of their fiscal year) to mitigate the information asymmetry between investors and the firm. Therefore, when composing 10-K filings, managers should employ less complex language (i.e., non-technical language) to facilitate investors' understanding of the firm. Complexity may arise from disparities between internal and external factors, the multinational nature of the business, and variations in information and business environments. This complexity, as noted by [1], results in ambiguity for external stakeholders trying to comprehend and assess firm operations.

Complex firms are more likely to receive lower debt ratings for several reasons. Firstly, the information asymmetry between management and external stakeholders regarding the firm's cash flows and associated risks is closely linked to firm complexity [2]. The authors also argue that managers struggle to segregate information based on relevance, making it challenging to disclose pertinent information to the market. Consequently, external stakeholders receive lower-quality information

about the firm's cash flows compared to managers. Also, more complex firms necessitate superior, more specialized managers, leading to higher monitoring costs [3]. Finally, the monitoring costs for debtholders are elevated for complex firms, prompting debtholders to demand higher returns [4].

This study investigates the impact of accounting reporting complexity (ARC) based on Extensible Business Reporting Language (XBRL) tags in 10-K filings on credit ratings (XBRL is an open-standard format submitted to the U.S. Securities and Exchange Commission (SEC) annually using the Form 10-K. It allows financial data to be tagged with unique identifiers, making it more accessible, comparable, and easily analyzable. In the context of 10-K filings, firms use XBRL tags to label and describe the various financial elements in their reports, such as revenues, expenses, assets, and liabilities. This structured data format enhances the usability and transparency of financial information, facilitating automated analysis and comparison of data across different companies and periods). The use of XBRL in 10-K filings aims to improve the efficiency and accuracy of financial reporting, making it easier for investors, analysts, and regulatory bodies to extract, analyze, and compare financial data from various companies in a standardized manner compared to textual approaches [5], enhancing the readability and understandability of annual reports. Utilizing a dataset comprising non-financial firms in the United States from 2011 to 2017, our findings indicate a statistically significant adverse impact of accounting reporting complexity on debt ratings. This suggests that firms characterized by higher ARC levels tend to exhibit lower debt ratings. Additionally, our analysis reveals that the cost of debt serves as a crucial mechanism through which ARC influences debt ratings.

This paper contributes to existing research in two primary ways. First, it expands the literature on the effects of ARC on debt ratings, particularly in the context of U.S. public firms mandated to use XBRL in 10-K filings. This standardized disclosure method is likely to reduce ARC variation across firms while enhancing the comprehensibility of accounting disclosures for users. In comparison to textual analysis, which may result in wider dispersion in bond ratings due to ARC, our approach offers more reliable evidence regarding the effects of ARC on credit ratings. Second, building on prior studies that highlight the challenges associated with complex accounting information disclosure, we establish that the cost of debt serves as a critical mechanism through which ARC influences debt ratings. This finding contributes to

the understanding of the broader implications of ARC on information asymmetry and the cost of capital ([6], [7]).

2. Hypothesis development

Information asymmetry refers to the situation where one party in a transaction has more or better information than the other. According to this theory [8], the disparity in information between managers and external stakeholders, such as credit rating agencies, plays a crucial role. Firms employing complex accounting practices introduce a higher degree of opacity into their financial reports, making it challenging for external parties to accurately assess the firm's true financial health. As accounting complexity increases, it becomes more difficult for credit rating agencies to interpret the underlying economic realities of the firm. This heightened information asymmetry can lead to increased uncertainty and apprehension among creditors, prompting them to err on the side of caution and assign lower credit ratings. In essence, the complexity in accounting reports becomes a signal of greater information asymmetry, influencing the credit rating agencies' perception of the firm's creditworthiness and reinforcing the theoretical link between information asymmetry and lower credit ratings.

In a similar vein, Signaling theory, as [9] reviewed, offers another valuable insights into understanding the relationship between accounting complexity and credit ratings in firms. According to this theory, firms use signals to communicate information about their financial health to external stakeholders, such as credit rating agencies. In the context of accounting complexity, intricate financial reporting practices may be interpreted as signals by these agencies. Complex accounting reports might be seen as a deliberate strategy to convey a certain image or message to the market. However, in the case of firms with greater accounting complexity, credit rating agencies might perceive this as a negative signal, indicative of potential managerial inefficiencies or an attempt to mask underlying financial weaknesses. The complex nature of the accounting practices may be viewed as an effort to obscure the true financial condition of the firm, prompting credit rating agencies to assign lower credit ratings as a precautionary response to the perceived risk associated with the signaling of complex financial information. In this way, Signaling theory provides a theoretical framework to understand how accounting complexity serves as a signal that influences the assessment of creditworthiness by external stakeholders.

Existing empirical evidence highlights the general challenge of ARC for operational managers, emphasizing its role in creating information friction that can obscure the genuine performance of a firm. Prior studies, such as the work by [10], indicate that ARC is linked to the concealment of unfavorable accounting information, posing a significant issue for operational managers striving for transparency. The detrimental impact of higher ARC on the effectiveness and reliability of accounting disclosure is highlighted by [11]. Put differently, increased ARC in annual reports hampers the clarity and transparency of financial information, consequently diminishing the

effectiveness and reliability of accounting disclosure. This diminished transparency may, in turn, adversely affect the perception of firm performance and, as a result, impede the ability of operational managers to make informed decisions. The study by [10] suggests that firms with poor performance often release more complex annual reports to obscure negative news from shareholders. They also demonstrate that firms meeting or surpassing the previous year's earnings issue more complex annual reports, implying that managers may aim to obfuscate information. Moreover, aligning with previous findings by [12] and [13], it is more likely that firms presenting more readable and less complex financial reports are likely to secure more favorable credit terms from capital markets compared to their counterparts with higher levels of ARC. Therefore, we propose the following hypothesis:

Hypothesis: *Firms characterized by greater complexity in their accounting reports exhibit lower credit ratings.*

3. Research design

3.1. Sample

To examine the impact of ARC on firm credit ratings, we extract the ARC data from the *Calcbench* database, S&P credit ratings from *Compustat*. Our financial accounting data are from *Compustat*. we use *CRSP* and *13F* for stock price and institutional ownership data, respectively. Our initial sample includes all publicly listed firms over the period between 2011 and 2017 based on their availability among our data sources. In line with conventional practice, we exclude financial firms with standard industrial classification (SIC) codes in the range 6000 to 6999 since such firms are highly regulated and have relatively higher leverage. Our final sample is an unbalanced panel of 12,426 observations from 2011 to 2017.

3.2. Modelling

To explore the relation between the firm ARC and its debt ratings, we use the specification model for panel data as in Equation (1):

$$RATINGS_{i,t} = \alpha + \beta ARC_{i,t-1} + CONTROLS_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

where:

- The dependent variable, $RATINGS_{i,t}$, indicates the S&P debt ratings using different scales ($S\&P24$, $S\&P22$, and $S\&P17$) for firm i in year t . For instance, the $S\&P24$ -point scale takes an ordinal value of 24 (1) for better (worse) letter ratings (e.g., AAA = 24, ..., SD = 1).

- We adopt the methodology employed by [5] in transforming the total count of distinct monetary XBRL tags found in Item 8 of the 10-K filings through a logarithmic process, thereby creating our ARC measure.

- Building upon earlier research ([14] and [15]), we incorporate several control variables ($CONTROLS$) known to influence a firm's credit ratings (measured in year $t-1$). These controls encompass firm size ($SIZE$), market-to-book ratio (MB), leverage (LEV), profitability ($NITA$), operating loss ($LOSS$), asset tangibility ($TANG$), interest coverage ($INTCOV$), stock return volatility ($SDRET$), and institutional ownership (IO).

Table 1 presents a summary of descriptive statistics for our primary dependent variable, credit ratings, and its predictors. The S&P debt ratings are reported using three distinct scales: S&P 24-point scale (*S&P24*), S&P 22-point scale (*S&P22*), and S&P 17-point scale (*S&P17*). These scales assign ordinal values to each credit rating, where higher values denote superior credit quality. The mean credit rating for *S&P24* is 18.12, for *S&P22* is 12.07, and for *S&P17* is 9.15, aligning with findings from prior studies like [16]. This suggests that, on average, the credit quality of firms in the study is relatively high, as indicated by mean credit ratings exceeding 9.0 across all three scales. The utilization of multiple scales allows for greater flexibility in exploring the relationship between credit quality and firm ARC. The range of firm ARC scores spans from 3.18 to 6.35, with a median value of 5.11. Despite a relatively narrow range of firm ARC scores, with only a 2.17 difference between the highest and lowest scores, this suggests a homogeneous sample in terms of firm ARC. The median value of 5.11 leans toward the lower end, indicating that a majority of firms in the sample have relatively high ARC scores.

Table 1. Descriptive statistics for our main variables

Variables	Sample	Mean	Med	Min	Max	SD
<i>S&P24</i>	12,426	18.12	18.00	1.00	24.00	2.52
<i>S&P22</i>	12,426	12.07	12.00	3.00	22.00	3.31
<i>S&P17</i>	12,426	9.15	9.00	1.00	17.00	1.35
<i>ARC</i>	12,426	5.31	5.11	3.18	6.35	4.15
<i>SIZE</i>	12,426	8.01	8.00	2.81	10.52	1.36
<i>LEV</i>	12,426	0.35	0.34	0.00	1.12	0.24
<i>NI/TA</i>	12,426	0.04	0.04	-1.31	0.26	0.14
<i>MB</i>	12,426	2.20	2.01	0.14	4.82	0.90
<i>LOSS</i>	12,426	0.22	0.00	0.00	1.00	0.44
<i>TANG</i>	12,426	0.57	0.58	0.00	2.00	0.40
<i>INTCOV</i>	12,426	12.43	5.71	-1.90	48.11	3.21
<i>SDRET</i>	12,426	0.35	0.34	0.14	1.72	0.21
<i>IO</i>	12,426	0.69	0.71	0.00	1.00	0.21

4. Empirical results

Table 2 presents the regression outcomes for the influence of firm's debt ratings, measured by different translations of S&P debt ratings (*S&P24*, *S&P21*, and *S&P17*), on ARC along with a set of control variables as outlined in Equation (1). All specifications include year and industry-fixed effects. The results in Table 2 reveal that the coefficients on ARC are consistently negative and significant at the 1% level across all specifications, indicating a substantial and negative association between firm ARC and S&P debt ratings. This finding supports our primary hypothesis, suggesting that the negative effect may stem from a lower quality of information concerning the firm's cash flows disclosed to external stakeholders, thereby elevating risks in assessing the firm's debt repayment capacity. Another plausible explanation is that increased operating costs may diminish a firm's expected cash flows, consequently heightening the default risk for bondholders.

The impacts of control variables align with our expectations and are in harmony with prior research. Specifically, coefficients on firm size, market performance, asset tangibility, interest coverage, and institutional ownership are all positive and significant at 1%-5% levels, indicating a positive influence of these factors on firms' debt ratings. Conversely, higher leverage, operating loss, and stock return volatility are associated with lower-rated debt, as evidenced by negative and significant coefficient estimates at 1% level.

Table 2. ARC and credit ratings

Variables	S&P24 (1)	S&P22 (2)	S&P17 (3)
<i>ARC</i>	-0.0034 (-7.11)***	-0.0031 (-6.96)***	-0.0015 (-6.12)***
<i>SIZE</i>	0.8165 (16.42)***	0.8011 (16.04)***	0.5863 (14.21)***
<i>LEV</i>	-3.1216 (-10.98)***	-3.0451 (-10.17)***	-1.8852 (-8.46)***
<i>NI/TA</i>	0.0362 (0.07)	0.0344 (0.06)	0.0014 (0.02)
<i>MB</i>	0.0228 (3.65)***	0.0207 (2.99)***	0.0154 (2.48)**
<i>LOSS</i>	-1.1124 (-7.12)***	-0.956 (-6.63)***	-0.842 (-5.54)***
<i>TANG</i>	1.0741 (6.88)***	1.0701 (6.54)***	1.0122 (6.15)***
<i>INTCOV</i>	0.0041 (1.15)	0.0035 (1.02)	0.0024 (0.92)
<i>SDRET</i>	-1.6820 (-14.59)***	-1.6730 (-14.42)***	-1.4010 (-12.39)***
<i>IO</i>	2.1488 (7.52)***	2.1025 (7.03)***	1.8533 (6.36)***
<i>Constant</i>	10.0144 (12.69)***	9.8851 (11.93)***	9.2321 (10.37)***
<i>Industry and Year effects</i>	Yes	Yes	Yes
<i>Adj R²</i>	0.671	0.665	0.661
<i>Obs</i>	12,426	12,426	12,426

To enhance the robustness of our initial findings, we conduct two additional tests. Firstly, we employ firm fixed effects, incorporating controls for firm- and year-fixed effects to account for other unobserved exogenous factors that might influence both the complexity of annual reports and credit ratings concurrently. This estimation proves valuable in assessing a causal relationship between variables, mitigating the concern of time-invariant unobservable determinants leading to omitted-variable bias. As demonstrated in the results presented in Table 3, we consistently observe a negative and statistically significant association between ARC and debt ratings even after accounting for firm fixed effects.

Second, to investigate if the negative relation between ARC and debt ratings persists, we substitute ARC with the *ARC_ALL* proxy. *ARC_ALL* involves taking the natural

logarithm of the total count of all monetary XBRL tags in Item 8 of the 10-K filings. This measure comprehensively includes all monetary facts within the filings, addressing repetitions within disclosures and comparable financial statement disclosures. Consequently, it offers a comprehensive perspective on accounting complexity, taking into account both the quantity of tags used and their frequency in the documents. The results in Table 4 continue to show a significant negative relation between the alternative measure of ARC and credit ratings, reinforcing our base evidence as in Table 2.

Table 3. Control for firm fixed effects

Variables	S&P24 (1)	S&P22 (2)	S&P17 (3)
<i>ARC</i>	-0.0029 (-6.53)***	-0.0024 (-5.62)***	-0.0009 (-2.31)**
<i>SIZE</i>	0.8171 (16.48)***	0.8003 (15.14)***	0.5861 (14.21)***
<i>LEV</i>	-3.1220 (-10.99)***	-3.0342 (-10.04)***	-1.7995 (-8.22)***
<i>NITA</i>	0.0360 (0.07)	0.0341 (0.06)	0.0010 (0.02)
<i>MB</i>	0.0231 (3.66)***	0.0210 (2.99)***	0.0154 (2.47)**
<i>LOSS</i>	-1.1114 (-7.08)***	-0.955 (-6.64)***	-0.841 (-5.54)***
<i>TANG</i>	1.0741 (6.88)***	1.0701 (6.54)***	9.8852 (5.86)***
<i>INTCOV</i>	0.0042 (1.14)	0.0030 (1.02)	0.0021 (0.95)
<i>SDRET</i>	-1.6820 (-14.55)***	-1.6730 (-14.41)***	-1.4010 (-12.37)***
<i>IO</i>	2.2557 (7.86)***	2.2348 (7.24)***	1.9629 (6.72)***
<i>Constant</i>	12.4252 (14.17)***	12.0481 (13.91)***	11.9001 (13.52)***
<i>Firm and Year effects</i>	Yes	Yes	Yes
<i>Adj R²</i>	0.547	0.518	0.506
<i>Obs</i>	12,426	12,426	12,426

Table 4. Alternative variable approach

Variables	S&P24 (1)	S&P22 (2)	S&P17 (3)
<i>ARC_ALL</i>	-0.0018 (-2.51)**	-0.0014 (-2.12)**	-0.0007 (-1.75)*
<i>Control variables</i>	Yes	Yes	Yes
<i>Industry and Year effects</i>	Yes	Yes	Yes
<i>Adj R²</i>	0.582	0.576	0.551
<i>Obs</i>	12,426	12,426	12,426

Previous studies have investigated the effects of accounting disclosure complexity on the behaviors of various stakeholders, including shareholders, banks, analysts, and auditors. Reduced accounting readability is linked to increased costs for stakeholders in obtaining and processing private information about firm performance [17]. As a result, we anticipate that the cost of debt acts as a moderating factor in the association between ARC and debt ratings. Specifically, we propose that as firms exhibit higher levels of ARC, the adverse impact on debt ratings will be more pronounced when the cost of debt is elevated. This

hypothesis stems from the view that greater accounting complexity may lead to increased information asymmetry and opacity in financial disclosures. When coupled with higher debt costs, this opacity could intensify the perceived risks associated with the firm, influencing credit rating agencies to assign lower debt ratings. Conversely, in instances where the cost of debt is lower, the negative influence of ARC on debt ratings might be somewhat mitigated, as the reduced debt-related expenses could alleviate concerns and uncertainties among creditors, resulting in a less severe impact on debt ratings. Therefore, we anticipate an interaction effect between ARC and the cost of debt, wherein the influence of ARC on debt ratings will be more pronounced when firms face higher debt costs.

The results reported in Table 5 indicate that the coefficients of the interaction variable between ARC and the Cost of Debt (CoD) (The cost of debt, CoD, is measured as the ratio of interest expense on the average debt balance in year t and year $t-1$), denoted as $ARC*CoD$, are negative and statistically significant at the 1% level, suggesting a robust and substantial interaction effect. The negative sign of the interaction term indicates that the relationship between ARC and debt ratings is more adverse when the cost of debt is higher. In other words, the impact of accounting report complexity on credit ratings is amplified in situations where firms face elevated costs of debt. This result aligns with the hypothesized expectation. In practical terms, these findings imply that firms with complex accounting reports may experience more severe debt rating downgrades or adverse reactions from credit rating agencies when their cost of debt is higher. This insight is crucial for financial managers and stakeholders, highlighting the interconnectedness of accounting complexity and debt costs in influencing the perceived creditworthiness of a firm.

Table 5. CoD as an important channel

Variables	S&P24 (1)	S&P22 (2)	S&P17 (3)
<i>ARC</i>	-0.0028 (-6.53)***	-0.0023 (-6.18)***	-0.0011 (-4.33)***
<i>CoD</i>	-0.1070 (-3.24)***	-0.1216 (-3.52)***	-0.0580 (-2.04)**
<i>ARC*CoD</i>	-0.0045 (-7.10)***	-0.0050 (-7.43)***	-0.0023 (-5.24)***
<i>Control variables</i>	Yes	Yes	Yes
<i>Industry and Year effects</i>	Yes	Yes	Yes
<i>Adj R²</i>	0.742	0.768	0.711
<i>Obs</i>	12,426	12,426	12,426

5. Conclusion

This study examines the correlation between ARC and debt ratings. Our empirical analysis provides evidence supporting a negative association between ARC and debt ratings, suggesting that firms characterized by higher complexity are more likely to face increased default risks, consequently leading to lower debt ratings. This

relationship is further accentuated in instances where firms incur elevated costs of debts.

The findings hold substantial significance for both firm managers and investors. For firm managers, understanding the negative correlation between ARC and debt ratings highlights the importance of simplifying and enhancing the transparency of financial reporting practices. Aiming for clearer and more understandable accounting disclosures may not only contribute to better credit ratings but also potentially lower the firm's default risks. Additionally, given the exacerbated effect on debt ratings in the presence of higher debt costs, management strategies that focus on reducing both accounting complexity and associated financial risks can be instrumental. For investors, the findings suggest the relevance of considering ARC as a crucial factor in assessing investment opportunities. Firms with less complex accounting reports may present more favorable debt ratings, signaling lower default risks. Investors may incorporate this knowledge into their decision-making processes, placing greater emphasis on firms that prioritize transparent financial reporting. Overall, these insights emphasize the strategic importance for firms to prioritize simplicity in their accounting practices, ultimately influencing how investors evaluate and allocate their capital.

Acknowledgement: This research is funded by Vietnam National Foundation for Science and Technology Development (NAFOSTED) under grant number 502.02-2021.84. We would like to thank Premkanth Puwanenthiren for sharing data.

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