THE IMPACT OF FINANCIAL REPORTING MANIPULATIONS ON THE BANKRUPTCY LIKELIHOOD: A STUDY OF NORDIC BANKS

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Abstract

The phenomenon of financial reporting manipulations and bankruptcy likelihood has always been a topic of interest among researchers. Corporate managers can have the motivation to compromise the financial reporting quality to hide the deteriorating financial health of the firms, nonetheless, if such practices go unabated then such firms can be exposed to serious outcomes in the form of their increased bankruptcy likelihood (Berglund & Makinen, 2016). The abovementioned *outcome* can be even more threatening in the banking sector due to its inherent nature. The current study aims to examine the impact of financial accounting manipulations on the likelihood of bankruptcy in Nordic banks. Beneish M-score model and Jones model have been applied to evaluate earnings quality, whereas financial distress has been measured by Altman Z-score model (Ebaid, 2022). Based on the analysis of secondary data collected from 33 Nordic banks for the period 2011–2018, the findings disclose that there is an absence of any systematic application of financial accounting manipulations measures, with a few exceptions, by the Nordic banks. Furthermore, there is no evidence to suggest that financial accounting manipulations increase the bankruptcy likelihood of banks. The current study is not only amongst the fewest empirical studies on the said topic conducted in the context of Nordic banks, but it also adds to methodological refinements by including two distinct measures of financial reporting quality to enhance the reliability and robustness of empirical findings.

Keywords: Accounting Manipulations, Bankruptcy, Financial Distress, Jones Model, Beneish M-Score Model, Altman Z-Score Model, Financial Performance, Discretionary Accruals

1. INTRODUCTION

The association between financial reporting manipulations and bankruptcy likelihood is an important field of study in several academic disciplines including accounting, finance, law, and corporate governance; and it has always attracted the attention of researchers, investors, corporate managers, and other stakeholders.

Nordic countries are famous for their high level of trust, honesty, transparency, and fairness in every walk of life. Nordic countries have a distinction of being among the least corrupt countries in the world for a long time. Nordic countries have been appearing in the top positions in international surveys/indexes/rankings such as those published by the Transparency International Corruption Perceptions Index, among others (Romberg, 2019). Moreover, Nordic banks have recovered better than their other European counterparts after the financial crisis in 2008 (Berglund & Makinen, 2016). In general, the Nordic banking industry has been free from financial crime activities, for example, Nordic banks have experienced a minimal incidence of occurrence of anti-money laundering (AML) scandals. Unlike their other European counterparts, Nordic banks have been least affected by technological and operational process transformations, and this feature highlights the readiness of Nordic banks to adapt according to new developments in the fast-changing business environment in the banking sector (Dasgupta, 2018).

However, in recent times there have been instances of the alleged involvement of certain Nordic banks in money laundering scandals (Jensen, 2019). This unhealthy phenomenon in the Nordic banking industry necessitates thorough academic investigations to understand its root causes and other relevant dynamics. Notably, the stock market reaction, after the accusations of manipulations were made against the concerned banks, has been highly adverse. For example, the value of Danske Bank's shares fell by half in one of the largest money-laundering scandals. Nordea lost one-fifth of its market value after its name appeared in several investigations related to financial wrongdoings (Milne, 2018). Between 2007 and 2015, 200 billion euros from 'unknown' sources have been channeled through Danske's Estonian branches ("Watchdog launches probe", 2019).

The abovementioned developments have raised doubts about the traditional reputation related to honesty, trust, transparency, integrity, objectivity, and fairness of the Nordic banking industry. Notably, several banking organizations in the region have come forward to erase the taints in their reputation. For example, Nordea has invested more than 730 million euros and recruited more than 1500 employees to fight financial crimes ("Nordea Q3 profits plunge", 2018). Handelsbanken has hired more people having expertise in artificial intelligence (AI) to ensure secure and swift transactions (Fredell, 2019).

Therefore, in the above-mentioned research background, the authors endeavor to explore two important research objectives: first, to examine the nature and extent of financial reporting manipulations, which not only underpin financial reporting quality but also highlight the key ethos of Nordic societies including honesty, transparency, truthfulness, and fairness, among others; and second, to examine the effect of financial reporting manipulations on the bankruptcy likelihood of the Nordic banks.

To explore the abovementioned research questions, the secondary data of 33 Nordic banks from Finland (5), Sweden (17), and Denmark (11) have been obtained for the period January 2011 to December 2018. Various econometric models have been applied in the current study to explore the abovementioned objective. To measure the quality of financial reporting, authors have used discretionary accruals as a measure of earnings management (Jones, 1991; Bedard et al., 2004). To check the robustness of findings, 8-factor Beneish M-score model has also been applied to measure accounting manipulations (Beneish, 1999). The financial distress of banks has been proxied by Altman Z-score (Altman, 1968, 1973).

The empirical findings show that there is no significant evidence of the Nordic banks committing financial reporting manipulation practices in their financial reports, except for a few components of M-score. The findings disclose that the Z-score of most of the sample banks is relatively high, thus underlying a high level of financial health and a lower likelihood of potential financial distress. Similarly, neither of the two measures of financial reporting manipulations: discretionary accruals measured by applying the Jones model and M-score measured by Beneish model, affect the bankruptcy likelihood, measured by Altman Z-score, of the sample banks. Furthermore, it has been found that the board independence and operating performance of banks enhance their financial stability.

The current study contributes to the extant literature in several ways. First, the current study is amongst the very few empirical studies that have been conducted to analyze the financial health of Nordic banks in light of financial reporting quality. Second, the current study applies two distinct measures of financial reporting quality to enhance the reliability and robustness of empirical findings. Furthermore, a major theoretical contribution of the current study is that it corroborates the argument that economic and business hardships can provide motivations to business organizations to do earnings management to *mask* the financial challenges encountered by them, nonetheless, such practices if followed consistently can result in the full-fledged financial distress (to the extent of bankruptcy).

The remainder of the paper is structured as follows. Section 2 highlights the literature review and hypotheses, whereas Section 3 underscores the research methodology. Empirical findings are explained in Section 4 and conclusions are presented in Section 5.

2. REVIEW OF LITERATURE

Business organizations provide financial reporting and disclosures to communicate their financial health to the outside world. Financial information and data play an important role in affecting the financial decisions of investors, and other stakeholders (Duchin et al., 2010). In the words of

Ball (2008), "financial reporting is an important economic activity" (p. 2), as these reports provide information that can be useful in various aspects related to firm operations, investment, and financing decisions; assessing future cash flow prospects of the current and future projects; and estimating firms' existing, and potential resources as well as claims to these resources (IFRS Foundation, 2020). True financial data underlines the true value of business organizations. In some situations, certain business entities may have the motivation to manipulate the financial results in a favorable direction to attract capital and positively maneuver their stock prices, among other reasons. Similarly, on other occasions, business organizations may attempt to show their financial results unfavorably to get favorable treatment from tax authorities and lending institutions. Therefore, to maximize the quality of financial reporting, high standards of financial reporting are always in demand (Dichev et al., 2013).

Earnings persistence is a key characteristic of the quality of financial reporting. However, there are other characteristics too such as the predictability, and significance of accruals (Nell, 2019). One of the important facts about financial reporting quality is that it can differ across firms operating in different business sectors, even if there is no clear evidence of any manipulations in financial reporting. The reason for such disparity is that some firms need more forecasting and estimations, especially in the case of fast-growing firms, which spend a significant amount of money on intangibles, research and development (R&D), and promotional activities. Any errors committed to estimating the value of intangibles can decrease the earnings persistence of firms and result in an incorrect valuation of the projects. Although the concept of financial reporting quality is vague, however, in real life it is possible to improve the quality of financial reporting if accruals can 'smooth out' unvalued changes in the cash flows. The principal objective of accounting standards is to make financial data reliable and relevant. *Reliable* information is easy to be checked and it should be reasonably free from mistakes. *Relevant* information is recorded on time and provides the opportunity to make a true valuation of a firm (Dechow & Schrand, 2004).

Melumad and Nissim (2008) have described true earnings as the combination of the following characteristics:

• *Conservatism* — the quality of conservatively estimated earnings is high since they are unlikely to be overstated in the sense of future performance. For example, conservative accounting is required to exclude unrealized gains from earnings and recognizes unrealized losses in a timely manner (Kwon et al., 2022).

• *Economic earnings* — the quality of earnings is high when they are reported accurately and reflect the changes in the value of the firm according to its operational activities. For example, an audit committee, which comprises independent and financial expert directors and meets frequently, is expected to disclose objective financial data reflecting the true economic substance of the firm (Masmoudi, 2021).

• *Persistence* — earnings are of high quality if they are sustainable, i.e., the current level of earnings is approximately the same as the future one. This definition underlines the lower volatility of earnings over time. Earnings persistence suggests that the firm can achieve a sustainable level of earnings over time by smothering the potential earnings volatility that can be caused by the occurrence of certain events or activities. Earnings persistence underscores stability, prediction, diversity, and earnings trends (Fatma & Hidayat, 2020).

All the above characteristics are related to each other; however, they can have contradictory implications too. For instance, firm managers can measure the value of assets and liabilities by incorporating unrecognized gains and losses; and by doing this, they may improve the earnings quality of the firm. Nonetheless, by making such actions they can compromise the predictability and persistence of financial reporting quality (U.S. Securities and Exchange Commission [SEC], 2019).

In their study of Greek financial institutions, Ballas et al. (2019) provide empirical evidence that several corporate governance characteristics, such as board diversity (gender and cultural, in particular), audit committee independence, and financial expertise and effectiveness of internal, and external audit play a significant impact on the quality of financial reporting, among others. The findings of the above study further show that financial institutions choosing external auditors who have expertise and experience in the field of corporate social responsibility, health and safety, and sustainability often experience improvement in their financial reporting quality.

One of the most important reasons why firms go bankrupt is the unfavorable effect of the macroeconomic environment on their performance. Macroeconomic risk is the main source of systemic risk, which has a huge impact on the performance of the banking sector. There is a strong correlation between the level of macroeconomic characteristics, such as interest rate, inflation, unemployment rate, and earnings of business organizations (Bhattacharjee et al., 2007).

Wheelock and Wilson (2000) argue that if a bank has higher equity in a percentage of assets, it is less likely to fail due to its limited repayment obligations. In other words, the less equity a bank has, the less protection it has from potential loan losses. Consequently, a stable macroeconomic environment supports the healthy functioning of banking organizations because it diminishes their credit risk exposure as the stable gross domestic product (GDP) growth lowers the non-performing loans (NPL) ratio.

There are several macroeconomic variables, which can influence banks' performance:

• indicators of domestic economic activities, such as the growth of GDP, investment expenditures, unemployment rate, inflation rate;

• indicators of the external economic environment, for example, import and export of goods and services, and inflow and outflow of capital;

• different price indicators, such as consumer price index, real estate prices, exchange rates;

• and monetary variables, for example, interest rates, monetary aggregates, and loans to the business sector.

Banks and other financial institutions face additional challenges concerning their balance sheet in comparison with their non-banking counterparts. Banks, unlike other kinds of businesses, have a significant portion of their assets in loans. Loans are the least liquid and the riskiest assets, therefore, banks can increase their operating performance and stability by generating non-interest revenue. Shahriar et al. (2022) have found in their empirical study of West Asian banks that non-interest income enhances the stability of banks, *ceteris paribus.* The study suggests that non-interest revenue can help banks to distribute risk through revenue diversification, improve market-to-book ratios, and increase their solvency. Therefore, the income diversity of banks can play a vital role to enhance their stability.

The current study tests the following principal hypotheses:

H1: The overall measure of financial reporting quality and its components vary across banks.

H2: There is an association between accounting manipulations and bankruptcy likelihood.

3. RESEARCH DESIGN

For the current research, data from 33 Nordic banks from Finland, Sweden, and Denmark have been obtained for the period 2011 and 2018. The convenience sampling technique has been applied to select the sample banks. The initial sample was comprised of 40 banks, however, due to the non-availability of data and organizational restructuring of some Nordic banks, the final sample was comprised of 33 banks only: Finland (5), Sweden (17), and Denmark (11). The choice of the abovementioned analysis period can be justified by the fact that it underlines a relatively stable growth period. Multiple sources of secondary data have been utilized as the accounting data have been collected from sample banks' financial reports, including income statements, balance sheets, and cash-flow statements and the stock market data have been collected from the NASDAQ OMX Nordic database.

In the current study, two methods of financial reporting quality have been applied. The first one is Jones (1991) model based on discretionary accruals. The description of the Jones model is as below:

The first step is to calculate total accruals ($TACC$) in the 't' period in the following equation (1):

$$TACC_t = \Delta CA_t - \Delta Cash_t - \Delta CL_t + \Delta DCL_t - DEP_t \tag{1}$$

where,

• ΔCA_t — change in current assets in the period 't' over the previous period 't - 1';

• $\Delta Cash_t$ — change in cash and cash equivalents in the period 't' over the previous period 't - 1';

• ΔCL_t — change in current liabilities in the period 't' over the previous period 't - 1';

• ΔDCL_t — change in short-term debt included in current liabilities in the period 't' over the previous period 't - 1';

• DEP_t — depreciation and amortization expense in the period 't'.

The second step is to estimate regression coefficients in the following equation (2):

$$\frac{TACC_t}{A_{t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{t-1}} + \alpha_2 \frac{\Delta REV_t}{A_{t-1}} + \alpha_3 \frac{PPE_t}{A_{t-1}} + \varepsilon_t \tag{2}$$

where,

• $TACC_t$ — total accrual in the period 't';

• ΔREV_t — change in revenue in the period 't' over the previous period 't - 1';

• PPE_t — gross property plant and equipment in the period 't';

• A_{t-1} — total assets in the period 't - 1';

• $\alpha_1, \alpha_2, \alpha_3$ — parameters to be estimated;

• ε_t — residuals in year t.

The third step is to measure nondiscretionary accruals in the following equation (3):

$$\frac{NDACC_t}{A_{t-1}} = \hat{\alpha}_0 + \hat{\alpha}_1 \frac{1}{A_{t-1}} + \hat{\alpha}_2 \frac{\Delta REV_t}{A_{t-1}} + \hat{\alpha}_3 \frac{PPE_t}{A_{t-1}} \tag{3}$$

where,

• $NDACC_t$ — nondiscretionary accruals in the period 't', and $\hat{\alpha}_0$, $\hat{\alpha}_1$, $\hat{\alpha}_2$, and $\hat{\alpha}_3$ are the estimators of the parameters given in equation (2).

The formula to calculate standardized discretionary accruals in period 't' scaled by assets in the period 't - 1' is given in the following equation (4):

$$\frac{DACC_t}{A_{t-1}} = \frac{TACC_t}{A_{t-1}} - \frac{NDACC_t}{A_{t-1}} \tag{4}$$

When comparing equation (2) and equation (3), it can be concluded that discretionary accruals in period 't' scaled by assets in the period 't - 1' is

the error term present in the model as given in equation (2).

The rationale for applying Jones model (1991) is that accounting manipulations are often carried out through discretionary accruals, which are obtained by subtracting non-discretionary accruals from total accruals. Jones model (1991) provides a measure to separate non-discretionary accruals from total accruals and, therefore, supports the creation of a proxy of accounting manipulations. Although researchers such as Martinez and de Carvalho (2022) have used the modified Jones model, nonetheless, the original Jones model has been applied in the current study owing to its theoretical, and practical rigor and wider acceptance among researchers.

To check the robustness of empirical findings, the current study applies the 8-factor Beneish M-score model of measuring financial reporting quality (Beneish, 1999). Beneish model detects changes in income and expenses. An abnormal increase in income, as well as an abnormal decrease in expenses, are a sign that earnings management is applied.

The basic form of the model is given below:

$$M - score = -4.840 + 0.920 * DSRI + 0.528 * GMI + 0.404 * AQI + 0.892 * SGI + 0.115 * DEPI - 0.172 * SGAI + 4.679 * TATA - 0.327 * LEVI \tag{5}$$

where,
- *DSRI* = days sales in receivable index

Days sales in receivables index ratio shows if there is a disproportionate increase in receivables compared to sales can be a sign of manipulations (revenue overstatement).

$$DSRI = \frac{Receivables_t/Sales_t}{Receivables_{t-1}/Sales_{t-1}} \tag{6}$$

- *GMI* = gross margin index

Gross margin index ratio measures changes of gross margin. If this ratio values more than 1, then gross margin is considered to be deteriorated.

$$GMI = \left(\frac{Sales_{t-1} - COGS_{t-1}}{Sales_{t-1}}\right) / \left(\frac{Sales_t - COGS_t}{Sales_t}\right) \tag{7}$$

- *AQI* = asset quality index

Asset quality index ratio measures non-current assets other than property plan and equipment (*PPE*) to total assets. If *AQI* is greater than 1, then one may argue that firm has increased cost deferment to show a higher profit.

$$AQI = \left(1 - \frac{Current\ assets_t + PPE_t}{Total\ assets_t}\right) / \left(1 - \frac{Current\ assets_{t-1} + PPE_{t-1}}{Total\ assets_{t-1}}\right) \tag{8}$$

- *SGI* = sales growth index

Sales growth index ratio growth does not always indicate the incidence of financial statement manipulations, but fast growth can be viewed as a ploy to push the profits upwards. For example, when a firm experiences significant stock price losses, it can resort to this tactic.

$$SGI = Sales_t/Sales_{t-1} \tag{9}$$

- *DEPI* = depreciation index

Depreciation index ratio defines the probability that a firm has increased useful lives of its assets. If the value of this ratio is more than 1 then a firm can be suspected of accounting manipulations. In the below formula, depreciation is also inclusive of amortization.

$$DEPI = \left(\frac{Depreciation_{t-1}}{Depreciation_{t-1} + PPE_{t-1}}\right) / \left(\frac{Depreciation_t}{Depreciation_t + PPE_t}\right) \tag{10}$$

- *SGAI* = sales, general, and administrative expense index

Sales general and administrative expenses index ratio help to analyze the disproportionate increase in sales, which is a sign of financial statement fraudulent.

$$SGAI = \left(\frac{SGA\ Expense_t}{Sales_t}\right) / \left(\frac{SGA\ Expense_{t-1}}{Sales_{t-1}}\right) \tag{11}$$

- *TATA* = total accruals to total assets

Total accruals to total assets ratio show that higher positive accruals signify higher accounting manipulations. *TATA* ratio helps to define the extent to which a firm's managers tend to make discretionary accruals as a tool to inflate their earnings in a period standardized by assets in the same period.

$$TATA = \frac{TACC_t}{Total\ Assets_t} \tag{12}$$

The formula to calculate $TACC_t$ has already been given above.
- *LEVI* = leverage index

Leverage index ratio measures total debt to total assets. If *LEVI* value is more than 1, it may indicate an increase in leverage. A substantial increase in *LEVI* highlights manipulations in the capital structure in the wake of the poor stock market performance of the firm.

$$LEVI = \left(\frac{LTD_t + Current\ Liabilities_t}{Total\ Assets_t}\right) / \left(\frac{LTD_{t-1} + Current\ Liabilities_{t-1}}{Total\ Assets_{t-1}}\right) \tag{13}$$

The calculated *M-score* value is more than the cut-off value equal to -2.22 (*M-score* > –2.22), it implies the incidence of financial manipulations (Beneish, 1999). For example, if a firm has *M-score* value -2.09, which is more than cut-off value equal to -2.22, the firm can be accused of doing financial manipulations.

Altman Z-score model has been applied to underline the likelihood of bankruptcy/financial distress experienced by a firm (Altman & Hotchkiss, 2006).

$$Z-score = 0.717X1 + 0.847X2 + 3.107X3 + 0.420X4 + 0.998X5 \quad (14)$$

where,
• *X1* = working capital/total assets (*WC/TA*);
• *X2* = retained earnings/total assets (*RE/TA*);
• *X3* = earnings before interest and taxes/total assets (*EBIT/TA*);
• *X4* = book value of equity/book value of total liabilities (*BVE/TD*);

• *X5* = sales revenue/total assets (*S/TA*).

The *Z-score* shows the financial strength of a company, and whether there is a risk of bankruptcy. The result is based on the value of the *Z-score* in the following way: if *Z-score* values are less than or equal to 1.23, the firm is considered to be experiencing significant financial difficulties and experiencing very high risk of bankruptcy; if *Z-score* values are between 1.81 and 2.90, the firm may in the gray area, meaning that company has high bankruptcy risks, but at the same time can overcome difficulties depending on management actions; and if *Z-score* is more than 2.90, then a company is in a financially healthy state, therefore, the probability of bankruptcy is low (Altman & Hotchkiss, 2006).

Descriptive statistics, correlation analysis, and multivariate linear regression analysis have been applied to highlight key findings and draw inferences based thereon.

The multivariate ordinary least square (OLS) regression technique is used to estimate the following principal model:

$$Z-score_{it} = \alpha_{it} + \beta_1(M-score/DACC)_{it} + \beta_2(ROA)_{it} + \beta_3(Equity)_{it} + \beta_4(BoardInd)_{it} + \beta_5(OpCash)_{it} + \varepsilon \quad (15)$$

In the above model, *DACC* and *M-score* have alternatively been included as the main predicting variables. Similarly, individual components of *M-score* have also been taken as the predicting variables after ensuring that no mutual multicollinearity problem amongst *M-score* and its individual components exists.

However, the variables hitherto unknown in the above model are explained below:

1. *ROA* is the return on assets, highlighting firm performance, calculated by net income (year '*t*') of the bank '*i*' by its assets (year '*t*').

2. *Equity* is the market value of equity (market capitalization), underlying the size of the bank '*i*' in the year '*t*'. Natural logarithmic values are analyzed to minimize, the size effect and potential linearity problem. Since the market value of the bank during a year can fluctuate enormously and frequently, therefore, the median of the daily market value of equity of the bank '*i*' in the year '*t*' has been obtained to avoid the impact of extreme values.

3. *BoardInd* is the proportion of independent directors on the bank board. This variable signifying the corporate governance characteristic of the bank is derived by dividing the number of independent directors by the number of total directors of the bank '*i*' in the year '*t*'.

4. *OpCash* is operating cash flow, which is a measure of the amount of cash generated by the bank through its normal/usual business operations/activities. This variable is scaled by the total assets of the bank '*i*' in the year '*t*'.

4. KEY FINDINGS

Table 1 highlights descriptive statistics including mean, standard deviation, maximum value, minimum value, and range of sample banks. The average *M-score* is -2.58, which is less than the threshold limit of -2.22. If the *M-score* of a firm is below -2.22, it is considered that the firm is not manipulating its financial data. Therefore, one can interpret, based on the value of the *M-score*, that there is no evidence of Nordic banks manipulating

their financial data. A similar interpretation can be drawn based on the mean values of other components of the *M-score* as well. Nonetheless, the mean score of *SGI* and *SGAI* is higher than 1. Similarly, the mean *Z-score* value is 7.12, which is considerably higher than the minimum value of 2.90. Therefore, it can be inferred that on average the Nordic banks analyzed in the current study are financially sound and their bankruptcy likelihood is very low. Similarly, the mean *ROA* of the sample banks is 7% over the analysis period. The highest and the lowest *ROA* have been observed to be 29% and -5%, respectively. The average board independence and operating cash flows to the total assets of the sample banks are 62% and 25%, respectively.

Table 1. Descriptive statistics

Variables	N	Mean	S.D.	Range	Min.	Max.
M-score	265	-2.58	2.78	2.91	-4.13	-1.22
DSRI	265	0.66	3.63	2.45	0.13	2.58
GMI	265	0.59	2.54	3.37	0.03	3.40
AQI	265	0.13	3.78	3.77	0.02	3.79
SGI	265	1.71	4.12	4.49	0.01	4.50
DEPI	265	0.79	4.73	3.18	0.28	3.46
SGAI	265	1.48	1.88	2.86	0.09	2.95
TATA	265	0.01	0.17	1.82	0.00	1.82
LEVI	265	0.89	0.87	2.62	0.00	2.62
DACC	265	0.06	4.28	53.66	-19.46	34.20
Z-score	265	7.12	8.61	9.05	0.76	9.81
ROA	265	0.07	1.04	0.34	-0.05	0.29
Equity	265	12.80	3.81	21.69	3.89	25.58
BoardInd	265	0.62	2.62	0.30	0.45	0.75
OpCash	265	0.25	1.12	0.32	0.12	0.44

Table 2 below highlights pairwise Pearson's correlation coefficients matrix between all the variables analyzed in the study. The significant correlation between two predicting variables implies the possibility of multicollinearity, therefore, any pair of two predicting variables that have significant pairwise correlation have not been taken together when estimating the coefficients of multivariate OLS models. Notably, with a few exceptions, such as the pairwise correlation between *DEPI* and *M-score*,

SGAI and *DSRI*, and *TATA* and *LEVI*, the pairwise correlation coefficients between other predicting (independent) variables have not been found to be significant. On the other hand, *Z-score* (main predicted variable) is positively (and significantly) correlated with the proportion of independent directors on the bank board and operating cash flow scaled by the total assets of the banks.

Table 2. Pairwise correlation of variables

	DACC	M-score	DSRI	GMI	AQI	SGI	DEPI	SGAI	TATA	LEVI	Z-score	ROA	Equity	BoardInd	OpCash
DACC	1	0.02	0.03	0.04	0.01	0.01	0.00	0.03	0.04	0.03	0.03	0.07	-0.05	0.07	0.01
M-score	0.02	1	0.02	0.02	0.57*	0.01	0.78**	-0.01	-0.48	-0.61	-0.02	0.00	0.01	0.00	0.03
DSRI	0.03	0.02	1	0.97	0.01	0.01	0.01	0.28*	0.00	0.00	-0.01	-0.02	-0.01	-0.01	0.00
GMI	0.04	0.02	0.97	1	0.04	0.00	0.01	0.98	0.04	0.00	0.01	0.03	0.01	0.00	0.00
AQI	0.01	0.57*	0.01	0.04	1	0.01	0.00	-0.03	-0.36	-0.85	-0.01	0.09	0.07	0.02	0.01
SGI	0.01	0.01	0.01	0.00	0.01	1	0.00	0.01	0.02	0.00	0.04	0.04	0.01	0.02	0.02
DEPI	0.00	0.78**	0.01	0.01	0.00	0.00	1	-0.01	-0.10	-0.01	0.00	-0.04	-0.04	-0.02	0.02
SGAI	0.03	-0.01	0.28*	0.98	-0.03	0.01	-0.01	1	-0.03	0.00	0.00	-0.01	-0.03	-0.01	0.00	0.00
TATA	0.04	-0.48	0.00	0.04	-0.36	0.02	-0.10	-0.03	1	0.76**	0.06	0.03	0.03	-0.03	0.04
LEVI	0.03	-0.61	0.00	0.00	-0.85	0.00	-0.01	0.00	0.76**	1	0.04	-0.03	-0.04	-0.01	0.03
Z-score	0.03	-0.02	-0.01	0.01	-0.01	0.04	0.00	-0.01	0.06	0.04	1	-0.19	-0.06	0.11**	0.42***
ROA	0.07	0.00	-0.02	0.03	0.09	0.04	-0.04	-0.03	0.03	-0.03	-0.19	1	0.03	-0.07	0.09
Equity	0.05	0.01	-0.01	0.01	0.07	0.01	-0.04	-0.01	0.03	-0.04	-0.06	0.03	1	0.10	0.00
BoardInd	0.07	0.00	-0.01	0.00	0.02	0.02	-0.02	0.00	-0.03	-0.01	0.11**	-0.07	0.10	1	0.02
OpCash	0.01	0.03	0.00	0.00	0.01	0.02	0.02	0.00	0.04	0.03	0.42***	0.09	0.00	0.02	1

*Note: *** p < 0.01; ** p < 0.05. and * p < 0.10. Number of observations (N) = 265.*

Table 3 highlights the effects of financial reporting manipulations on bank-level bankruptcy likelihood. Various multivariate OLS models, (a) to (g), have been formed to minimize the effects of the multicollinearity problem. Interestingly, neither *M-score* nor any of its components affect *Z-score*. This finding is contrary to the popular theoretical argument that firms manipulating financial data can be exposed to a higher probability of bankruptcy. It is often argued that firms can manipulate financial data to mask their deteriorating financial health for some time, however, such a ploy cannot work forever and eventually the realities reveal, and such firms can eventually face a greater risk of potential bankruptcy.

Table 3. Effects of financial reporting manipulations (*M-score* and its components), and other variables on firm bankruptcy likelihood (*Z-score*)

Z-score (Predicted variable)	Model (a)	Model (b)	Model (c)	Model (d)	Model (e)	Model (f)	Model (g)
Intercept	-0.78 (-0.71)	-0.97 (-0.91)	-0.76 (-0.68)	-0.74 (-0.64)	-0.81 (-0.81)	-0.77 (-0.69)	-0.56 (-0.51)
M-score	-0.01# (-0.11)	0.02 (0.12)	0.01 (0.09)	0.01 (0.09)			0.01 (0.07)
DSRI		0.03 (0.14)			0.02 (0.13)		
GMI	0.02 (0.29)				0.02 (0.33)	0.06 (0.51)	0.04 (0.37)
AQI					0.00 (0.09)		
SGI			0.07 (0.43)		0.06 (0.43)	0.08 (0.75)	0.11 (0.89)
DEPI					0.09 (0.69)	0.04 (0.27)	
SGAI				-0.02 (0.34)	-0.02 (0.34)	0.01 (0.13)	0.03 (0.39)
TATA						0.05 (0.67)	0.07 (0.82)
LEVI						0.06 (0.73)	0.03 (0.37)
ROA	0.76*** (2.84)	0.83*** (2.97)	0.85*** (3.25)	0.92*** (3.76)	0.86*** (3.36)	0.93*** (3.96)	0.89*** (3.47)
Equity	-0.13 (0.93)	-0.09 (0.76)	-0.06 (0.56)	-0.11 (0.87)	-0.13 (0.98)	0.02 (0.13)	0.02 (0.13)
BoardInd	0.42*** (2.71)	0.52*** (2.93)	0.56*** (3.45)	0.62*** (3.72)	0.52** (2.28)	0.51** (2.22)	0.49** (2.17)
OpCash	0.23** (2.22)	0.21** (2.09)	0.21** (2.09)	0.26*** (3.49)	0.20* (2.07)	0.20** (2.07)	0.24** (2.16)
Adjusted R²	0.21	0.22	0.24	0.23	0.23	0.22	0.23
F-statistic	13.47***	15.29***	13.48***	13.47***	16.87***	16.89***	16.73***
Durbin-Watson (DW) Sstatistic	1.95	1.96	2.04	2.05	2.05	2.01	1.99
Number of observations	265	265	265	265	265	265	265

*Note: #OLS estimates are shown in the above table (t-statistics appear in parentheses). *** p < 0.01, ** p < 0.05, and * p < 0.1.*

On the other hand, banks producing higher financial performance, as measured by *ROA*, experience higher financial stability. Higher financial performance enables banks to accumulate financial resources to counter any financial challenges. Similarly, the banks experiencing favorable financial results emit positive signals to the investors and resultantly such banks consolidate their position in the financial markets and the likelihood of their bankruptcy diminishes.

Table 4. Effects of financial reporting manipulations (*DACC*), and other variables on firm bankruptcy likelihood (*Z-score*)

Z-score (Predicted variable)	Coefficients
Intercept	3.78*** (6.71)
DACC	-0.02# (-0.14)
ROA	1.23*** (6.84)
Equity	-0.13 (0.83)
BoardInd	0.53*** (3.91)
OpCash	0.19** (2.13)
Adjusted R^2	0.21
F-statistic	9.97***
Durbin-Watson (DW) statistic	1.94
Number of observations	265

Note: #OLS estimates are shown in the above table (t-statistics appear in parentheses). *** p < 0.01, ** p < 0.05, and * p < 0.1.

Similarly, those banks, that have a higher proportion of independent directors on their boards, experience a higher level of *Z-score*. This result implies that a higher proportion of independent directors on the bank board is capable of monitoring, controlling, and advising its executive directors, which enhances the efficacy of the bank's system of accountability, and discipline, thereby, reducing agency costs. Furthermore, banks having a higher level of operating cash flow scaled by the total assets (*OpCash*) have a higher level of financial stability and, therefore, lower bankruptcy likelihood. Increasing operating cash flows signify favorable operating performance of the banks, which can strengthen their financial stability, and, therefore, banks can thwart any potential financial challenges. The values of the Adjusted R^2 highlighting the explanatory power of the multivariate OLS models have been ranging between 0.21 to 0.24. The Durbin-Watson (DW) test statistic ranges between 1.95 to 2.05, therefore, negating the presence of the autocorrelation problem.

Table 4 highlights the effects of financial reporting manipulations (*DACC*) on bankruptcy likelihood (*Z-score*). In the current study, *DACC* has been analyzed as the independent variable to check the robustness of the financial reporting quality of the banks. Consistent with *M-score*, the impact of *DACC* on *Z-score* is insignificant. In a similar vein, other findings given in Table 4 are fully in line with those found in Table 3.

Overall, the empirical findings demonstrate that Nordic banks in general have relatively high standards of financial reporting quality and stable, and strong financial strengths even though several

cases of financial manipulations have been committed by Nordic banks in the recent past. Money laundering incidences committed through financial reporting manipulations in the Nordic banking sector have attracted significant public outcry. It can be imagined, as *a priori*, that incidences related to financial reporting manipulations can adversely affect the financial strength of the Nordic banks and even increase their bankruptcy likelihood. Nonetheless, empirical findings of the current study show the nature and extent of financial reporting manipulations, measured by the bank level discretionary accruals and Beneish M-score, first, is not *too serious*, and second, do not significantly affect Z-score, a measure of bankruptcy likelihood. Similarly, relatively independent boards of directors and operating cash flow scaled by the total assets enhance the financial stability of the Nordic banks.

5. CONCLUSION

The Nordic banking system is reckoned as one of stablest and the strongest banking system in the world. Characterized by deeply ingrained virtues of transparency, trust, resilience, and honesty in almost every aspect of life, and Nordic banking system has managed several challenges, for example, the financial crisis in 2008, the phenomenon of money laundering, and the digitalization of financial sector and cybercrimes related to it, better than their other European counterparts. However, in recent times there has been alleged involvement of certain big Nordic banks in money laundering scandals. Financial reporting manipulations have been used to *siphon-off* billions of euros by the banks. This newly observed phenomenon has raised doubts about whether the Nordic banking sector has deviated from the inherent virtues that it is known. In such a backdrop, it is important to examine two important research objectives. First, to examine the nature and extent of financial reporting manipulations, which on the one hand underscore financial reporting quality and on the hand highlight the ethos of honesty, transparency, truthfulness, and fairness, among others, that Nordic societies are known for; and second, the phenomenon of financial reporting manipulations committed by the Nordic banks affect their bankruptcy likelihood.

The empirical findings demonstrate that Nordic banks in general have high standards of financial reporting quality and high levels of financial strength. This has been proved by the descriptive statistics of the current study. However, there have been several incidences of financial manipulations that Nordic banks have committed in the recent past. Several money laundering incidences witnessed in the Nordic banking sector in the recent past, particularly those associated with the larger banks, have attracted significant public attention. One can argue that such incidents have the potential to adversely affect the financial strength of banks and trigger financial distress. The current study explores whether accounting manipulations affect the bankruptcy likelihood of Nordic banks. The empirical findings show that the financial reporting quality, measured by the bank-level discretionary accruals and Beneish M-score, does not

affect the Z-score, a measure of bankruptcy likelihood. There is no evidence of the impact of even any of the individual components of financial reporting quality on the bankruptcy likelihood of banks. Overall, it can be stated that the earnings manipulation incidences committed by Nordic banks do not have any effect on their financial distress and bankruptcy likelihood, besides the nature and extent of financial reporting manipulations are not *too serious.*

Similarly, relatively independent boards of directors, on the one hand, provide better guidance and advice to the bank executives and establish effective systems of monitoring, control, and accountability, which minimizes agency costs and enhances the financial strength of the banks, on the other hand. Furthermore, the Nordic banks having higher levels of operating cash flow scaled by the total assets (*OpCash*) have a higher level of financial stability and, therefore, experience lower bankruptcy likelihood.

However, the size of banks, measured by the market value of equity, does not affect the financial strengths of sample banks. The research also shows that the mean Z-score underscores the existence of impressive financial health of the Nordic banks. It is pertinent to note that a full-fledged failure of large banks is impossible because of government control and the existence of an extremely secure financial ecosystem in the Nordic.

The current study makes several contributions to the literature. First, the current study, investigating the impact of financial reporting quality on bankruptcy likelihood, is among the very few empirical studies that have been conducted in the context of Nordic banks. Second, the current study adds methodological refinement by adding two distinct measures of financial reporting quality to enhance the reliability and robustness of empirical findings. Similarly, a major theoretical contribution of the current study is that it brings an important argument to the forefront that economic and business hardships can provide motivation to business organizations to do earnings management to put aside the financial challenges encountered by them, nonetheless, such practices when followed consistently can result in financial distress.

It is worth mentioning that the current study is not free from limitations. Regarding theoretical limitations, the current study combines financial reporting quality and several other bank-level control variables to predict the bankruptcy likelihood of banks. However, bank-level control variables can first impact financial reporting quality, which in turn can affect the bankruptcy likelihood of banks. Similarly, bank-level performance measures, as a predicted variable, has been excluded in the current study. Regarding the methodological limitations, although the current study applies robustness tests for financial reporting quality, however, it fails to do the same for the bankruptcy likelihood. Similarly, the current study applies the *older version* of the Jones model to estimate financial reporting manipulations, however, the modified Jones model, which is a *new version* has been excluded from the current study.

It is recommended that future studies should bring more focus on conceptual refinements by bringing theoretical models to the overall discourse. Similarly, future studies can take financial reporting quality as the mediator variable and at the same time add a few moderator variables underpinning corporate governance and relevant institutional settings, given that the sample size is increased. Similarly, bank-level performance measures, including accounting, stock market, and non-financial proxies, can be positioned as the predicted variables in future studies. Lastly, future studies should apply more robustness tests with respect to financial reporting quality and bankruptcy likelihood.

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