

Accounting Ratios and False Financial Statements Detection: Evidence from Nigerian Quoted Companies

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Abstract

The paper investigated accounting ratios and false financial statements detection among firms quoted in the Nigerian Stock Exchange. Accounting data were obtained from the reported financial statements of 30 sampled firms in financial and non financial sectors covering a time frame of five (5) years (2007-2011). The statistical instrument employed was Pooled Data Binary Logit regression. Data collected were run with E-Views 7 and SPSS 20. The findings revealed that investment and liquidity ratios were significantly related to financial statements fraud. It was recommended that accounting ratios should be critically examined by investors and stakeholders so as to detect probabilities of financial statements fraud occurrences, and also Government regulatory authorities like the Nigerian Stock Exchange, Security and Exchange Commission, Central Bank of Nigeria, Financial Reporting Council of Nigeria and others should ensure that financial statements of firms are properly screened and endorsed by them before being released to the public.

Keywords: Accounting ratios, financial statement, Frauds, Firm size

1. Introduction

The separation of ownership from control has necessitated management running the affairs of the firm for their self interest. Financial statements prepared by management tend to be deceptive. The demise of high profile firms like Enron and WorldCom in the United States of America, Northern Rock in the United Kingdom, Metagelshaft in Germany, Parmalat in Italy, Afribank Plc, Union bank Plc, Bank PHB, Spring Bank Plc, Oceanic bank, Intercontinental bank plc, African Petroleum Plc, Fin Bank Plc, Cadbury Plc in Nigeria (Onwuchekwa, Erah & Izedonmi, 2012; Ifeanyi, Olagunju & Adeyanju, 2011., Arel, Brody & Pany, 2005) have shown incidence of financial statements fraud as their financial statements were robustly dressed. Spathis (2002) asserts that financial statements contain falsifications such that its elements no longer represent the true picture of the company.

Financial statement fraud is a deliberate misstatement of material facts by management in the books of accounts of a company with the aim of deceiving investors and creditors. This illegitimate task performed by management has a severe impact on the economy because it significantly dampens the confidence of investors. Spathis (2002) notes that, regardless of the type of company, the percentage of financial statements that contained false information is quite high. Against this background, researchers, management, lenders, workers, suppliers, clients and the community at large have demonstrated a great interest in the detection of false financial statements.

While there are strong research concerns for detecting false financial statement fraud in developed countries, in Nigeria, very little attention has been given to this area in accounting research, especially in the use of accounting ratios to predict the probability of fraud occurring in a firm. While we acknowledge that some empirical studies that relates to financial statement fraud has been conducted in Nigeria (Ifeanyi, Olagunju & Adeyanju, 2011, Faboyede & Mukoro, 2012), these studies did not focus on how accounting ratios can provide insights for detecting financial statement fraud.

1.1 Objectives of the Study

The broad objective of the study is to investigate accounting ratios and false financial statements detection, while the specific objectives are to:

- 1) ascertain the extent to which leverage ratios significantly relate to the probability of financial statement fraud occurrence;
- 2) determine the extent to which profitability ratios significantly relate to the probability of financial statement fraud occurrence;
- 3) examine the extent to which asset management ratios significantly relate to the probability of financial statement fraud occurrence;
- 4) ascertain the extent to which investment ratios significantly relates to the probability of financial statement fraud occurrence; and,
- 5) examine if liquidity ratios significantly relates to the probability of financial statement fraud occurrence.

2. Review of Related Literature

2.1 Conceptual Framework on Financial Statement Fraud

Financial statement serves as a tool for communicating to users and stakeholders the true and fair view of the company. Financial statement shows where the company is, and where it is heading. Weygant and Warfield (2007) assert that financial statements are useful for the assessment of a company's liquidity, solvency, financial flexibility and performance. Financial statements have been viewed in connection with avenue to perpetuate fraudulent activities and deception. ACFE (2003) claims that financial statement fraud is the deliberate misrepresentation of the financial condition of an enterprise accomplished through the intentional misstatement or omission of amounts or disclosures in the financial statements to deceive financial statement users.

Financial statement fraud begins in areas of Generally Accepted Accounting Practices (GAAP) which contain ambiguities (except for jurisdictions with very prescriptive accounting standards). Managers may exploit the ambiguities and available choices to present the financial picture that meets their financial targets. Thus, the dividing line between "earnings management" and "earnings manipulation" is indeed narrow (Brennan & McGrath, 2007). Public and private business commit financial statement fraud to secure investors interest or obtain bank approvals for financing as justification for bonuses or increased salaries or to meet expectations of its shareholders.

According to Spathis (2002), financial statements fraud falls into different categories and consists of manipulating elements by overstating assets, sales and profit or understating liabilities, expenses or losses. We explain these types of financial statement fraud briefly:

- i) Improper revenue recognition: The most common scheme used in financial statement fraud involves manipulation of revenue figures. This involves posting sales before they are made or prior to payment.
- ii) Manipulating expenses: Another fraud involving financial statements is the deliberate manipulation of expenses. An example of manipulating expense is to capitalize normal operating expense. This is an improper method to delay recognition of the expense and artificially raise income figures.
- iii) Overstating assets: Overstatement of current assets on financial statements and failure to record depreciation expense are often employed as methods of fraud. This fraud can cause significant losses and have far reaching effects, not only can financial statements fraud bring down the business, it can also hurt the organizations employees, clients, investors and third parties.

2.2 Empirical Evidence on Accounting Ratios and Financial Statement Fraud

An accounting ratio is an index computed from two or more accounting values with close affinity or relationship (Ilaboya, 2008). Okoye (2000) opines that the basic tool in financial statement analysis is the ratio, which is a percentage or decimal relationship of one figure to another. Financial ratios describing all aspects of financial performance, including profitability, solvency, leverage, liquidity and managerial performance; are indicators of the company's health and means to deceive creditors and investors (Courtis, 1978).

Financial accounting ratios are widely used for modeling purposes both by practitioners and researchers. A few prior works assert that ratios are useless (Kathleen et al, 2004) while some argue the exact opposite (Spathis, 2002).

Zhou and Kapoor (2011) applied four data mining techniques namely regression, decision trees, neural network and Bayesian networks in order to examine the effectiveness and limitations of these techniques in detection of financial statement fraud. Recently, Johan (2008) compares the performance of six popular statistical and machine learning models in detecting financial statement fraud. The empirical evidences are discussed as follows.

2.2.1 Leverage Ratios and Probability of Financial Statement Fraud

Leverage is defined as “the sensitivity of the value of equity ownership with respect to changes in the underlying value of the firm” (Welch, 2011). A high debt structure increases the likelihood of financial fraud as it shifts the risk from equity owner to the debt owner. The financial ratios related to debt structure such as (i) Total debt/Total assets and (ii) Debt/Equity need to be carefully considered when searching for indications of fraud (Ujal, Amit, Hiral & Rajal, 2012). Ilaboya (2008) states that the leverage ratio is calculated based on balance sheet values and a high leverage ratio is an indication that a large proportion of the assets of the organization are financed through external capital.

Leverage is traditionally viewed as arising from financing activities in which firms borrow to raise cash for operations (Nissim & Penman, 2003). Following the above views, we hypothesize that:

H1: Leverage ratios significantly relate to the probability of financial statement fraud occurrence.

2.2.2 Profitability Ratios and Probability of Financial Statement Fraud

Profitability ratios measure the company's returns in relation to its total investment (Ilaboya, 2008). Persons (1995) notes that profitability ratio is measured by return on equity, return on asset, gross profit margin, net profit margin etc. Lower profit may give management an incentive to overstate revenue or understate expenses. Kreutzfeldt and Wallace (1986) discovered that firms with profitability problems have significantly more errors in the financial statement than firms without profitability problems. This approach is based on the expectation that management will be able to maintain or improve past levels of profitability, regardless of what those levels were (Summers & Sweeney, 1998). If this expectation is not met by actual performance, then it provides a motivation for financial statement falsification. Financial distress may be a motivation for false financial statement (Loebbecke, Eining and Willingham, 1989; Kreutzfeldt and Wallace, 1986). Therefore, we assert that:

H2: Profitability ratios are significantly related to the probability of financial statement fraud occurrence.

2.2.3 Investment and Capital Market Ratios and Probability of Financial Statement Fraud

Fraud at publically-traded companies has a significant impact on investors. Investors in Enron lost a reported \$60 billion (Vinod, 2002), and trial testimony revealed that investors in WorldCom lost up to \$200 billion (Rakoff, 2003). The recent \$50 billion fraud committed by Bernie Madoff indicates that investors continue to suffer serious consequences from financial statement fraud (Feiden & Zambito, 2008).

According to McNichols and Stubben (2008), previous literature on earnings management provides limited evidence on whether false financial statements to investors results in resource misallocation. As Healy and Wahlen (1999) noted, only a small part of the earnings management literature addresses the consequences of earnings management on resource allocation, and the findings of this literature are mixed. Furthermore, managers could fraudulently invest in unprofitable or low Net Present Value. A first stream of literature, including Foster (1979), Dechow, Sloan, & Sweeney (1996), Beneish (1997) and Palmrose, Richardson and Scholz (2004), Healy and Wahlen (1999) note that the market reaction to disclosure of misleading reporting is significantly negative, indicating that investors were not completely aware of the manipulation. Based on the above views we hypothesize that:

H3: Investment ratios significantly relate to the probability of financial statement fraud occurrence.

2.2.4 Asset Utilization Ratios and Probability of Financial Statement Fraud

Asset management ratios are indicators of management efficiency in the utilization of business assets. The ratio relates the business assets to volume of operation to determine whether there is over or under utilization. Under-utilization results in high maintenance cost which in turn has a reducing effect on the operating profit of the organization. While over-utilization results in frequent breakdown or disruption in operations and high cost of repairs (Ilaboya, 2008).

Because subjective judgment is involved in determining the value of these accounts, management may use these accounts as tools for financial statement manipulation (Summers & Sweeney, 1998). Loebbecke *et al.* (1989) found that the inventory account and accounts receivable were involved in 22 per cent and 14 per cent, respectively, of frauds in their sample. Many researchers such as Persons (1995), Schilit (1993) and Stice (1991) also suggest that management may manipulate inventories. Based on the fore mentioned, we hypothesized that:

H4: Asset management ratios significantly relate to the probability of financial statement fraud occurrence.

2.2.5 Liquidity Ratios and Probability of Financial Statement Fraud

Liquidity is used to describe the ease with which current assets can be converted to cash to meet a short term maturing obligation and still have surplus to meet operational needs. While it is usually very easy to convert account receivables, credit bank balances into cash, it is quite difficult to realize stock at short notices (Ilaboya, 2008).

There are different measures to liquidity; lower liquidity may provide an incentive for managers to engage in fraudulent financial reporting. This argument is supported by Kreutzfeldt and Wallace (1986) who discovered that firms with liquidity problems have significantly more errors in their financial statements than firms without liquidity issues. The sign of this variable is therefore expected to be negative. According to Chordia, Roll and Avanidhar (2005), liquidity is the ability of a company to sell large quantity of assets at a reasonable price to meet its short term financial obligations. Following the above opinion, we therefore hypothesize that:

H5: Liquidity ratios are significantly related to the probability of financial statement fraud occurrence.

3. Methodology

3.1 Research Design

The study employed pooled data of firms listed in the Nigerian Stock Exchange, covering a time period of (5) years (2007-2011). The firms investigated consist of both financial and non-financial sector companies listed in the Nigerian Stock Exchange.

A total of two hundred and nine (209) firms quoted in the Nigerian Stock Exchange constituted the population of the study (Fact book, 2012). The study basically employed secondary source of data collection. Historical data were obtained from the annual financial reports of accounts of 30 sampled firms.

3.2 Model Specification and Method of Data Analysis

The model includes the following parameters:

$$\text{Pr (FSA= 1, 0)} = X_0 + X_1\text{LEV}; + X_2\text{PROF}; + X_3\text{ASSTU}; + X_4\text{INVR}; + X_5\text{LIQD} + E.$$

Where,

Pr (FSA) = Probability of financial statement fraud.

LEV; = Leverage ratio.

PROF; = Profitability ratio.

ASSTU; = Asset utilization ratio.

INVR; = Investment ratio.

LIQD; = Liquidity ratio.

E; = Error term.

Apriori sign:

$$X_1 > 0, X_2 > 0, X_3 > 0, X_4 > 0 \text{ and } X_5 > 0.$$

3.3 Operationalization of Variables

Variables	Proxy	Operation	Sign
Probability of financial statement fraud	FSA	Dichotomous variable of “1” for companies with case of fraud and “0” for otherwise	
Leverage ratio	LEV	Operationalized by Debt to Equity (D/E), Debt to Asset (D/A) and interest coverage ratios	+
Profitability ratio	PROF	Operationalized by Return on assets (ROA), Return on equity (ROE), Gross profit and net profit ratios	+
Investment ratio	INVR	Operationalized by the ratio of EPS	+
Asset management ratio	ASSTU	Operationalized by Inventory ratio and fixed asset turnover	+
Liquidity ratio	LIQD	Operationalized by current ratio and quick acid test ratio	+

Source: Authors (2014)

Data obtained were analyzed using the descriptive statistics, Pearson correlation and Pooled data Binary logit regression analysis.

4. Analysis and Interpretations of Results

4.1 Interpretation of Results

The section gives detailed analysis of the descriptive statistics, Pearson correlations and co-efficients of Binary Probit (Quadratic hill climbing) regression are analyzed as below.

Table 1: Descriptive Statistics

	FSA	LEV	PROF	ASSTU	INVR	LIQ
Mean	0.517241	57.54328	31.43793	19.01862	2.700000	70.54293
Median	1.000000	63.02000	34.70000	18.56500	2.800000	67.17000
Maximum	1.000000	74.54000	42.80000	27.10000	5.800000	92.23000
Minimum	0.000000	23.80000	16.40000	10.45000	1.200000	46.98000
Std. Dev.	0.504067	13.49724	7.712028	4.982633	0.930195	12.36469
Skewness	-0.069007	-0.917895	-0.604490	0.008818	0.586675	0.323108
Kurtosis	1.004762	3.048163	1.943313	1.790828	4.020582	2.010846
Jarque-Bera	9.666721	8.150074	6.230699	3.534152	5.844317	3.373717
Probability	0.007960	0.016992	0.044363	0.170832	0.053817	0.185100
Sum	30.00000	3337.510	1823.400	1103.080	156.6000	4091.490
Sum Sq. Dev.	14.48276	10384.01	3390.097	1415.118	49.32000	8714.483
Observations	148	148	148	148	148	148

Source: Authors (2014)

Table 1 highlights the descriptive statistics of the variables examined with emphasis on mean, maximum, minimum and the Jarque-Bera test results. It was revealed that financial statement fraud (FSA) for the period investigated stood at a mean value of 0.5172 which is approximately 52%, indicating that about 52% of the financial statement were manipulated by the organization, while the maximum and minimum financial statement fraud stood at 1.000 and 0.000 respectively, and a significant Jarque-Bera result of 9.6667 with a probability of 0.008 indicates the extent to which the result is highly significant. Also, Leverage (LEV) stood at a mean value of 57.5433 which is approximately 58%, while the maximum and minimum leverage stood at 74.54 and 23.800 values respectively, and Jarque-bera test shows 8.15007 and a probability of 0.0169 (2%) reveals that leverage is significantly related to financial statement fraud.

It is observed that profitability (PROF) of the firms has a mean value of ₦314 million, maximum and minimum value of ₦428 and ₦164 million respectively, while the Jarque-Bera test indicates a value of 6.230699. In the same vein, Assets utilization (ASSTU) indicates a maximum and minimum values of 27.100 (27%) and 10.450 (10%) respectively and Jarque-Bera test result of 3.53415 with a probability at a significant level of 0.1708%.

Investment ratio stood at a mean value of 2.70, while the Jarque-Bera results stood at a value of 5.844. Finally, Liquidity (LIQ) shows a mean value of 70.54 indicating that the debt collection of the firm is extremely high while the Jarque-Bera result stood at a value 3.373 and a probability of 0.185.

Table2: Correlations

		FSA	LEV	PROF	ASSTU	INVR	LIQ
FSA	Pearson Correlation	1	.197	-.316*	-.055	-.187	-.230
	Sig. (2-tailed)		.138	.016	.682	.160	.083
	N	148	148	148	148	148	148
LEV	Pearson Correlation	.197	1	.052	.057	-.124	.167
	Sig. (2-tailed)	.138		.699	.670	.356	.210
	N	148	148	148	148	148	148
PROF	Pearson Correlation	-.316*	.052	1	.268*	.028	.242
	Sig. (2-tailed)	.016	.699		.042	.835	.068
	N	148	148	148	148	148	148
ASSTU	Pearson Correlation	-.055	.057	.268*	1	.000	.254
	Sig. (2-tailed)	.682	.670	.042		.997	.054
	N	148	148	148	148	148	148
INVR	Pearson Correlation	-.187	-.124	.028	.000	1	-.191
	Sig. (2-tailed)	.160	.356	.835	.997		.152
	N	148	148	148	148	148	148
LIQ	Pearson Correlation	-.230	.167	.242	.254	-.191	1
	Sig. (2-tailed)	.083	.210	.068	.054	.152	
	N	148	148	148	148	148	148

Source: Authors (2014)

Table 2 shows the associations of variables captured in the study. The association between financial statement fraud (FSA) and leverage (LEV) reveals that they are positively significant at 0.197 (20%). This implies that leverage is associated in the determination of financial statement fraud. Meanwhile, the correlation between financial statement fraud (FSA) and profitability (PROF) deduce that they are negatively and lowly significant at a value over 316 (14%). Similarly, it is further deduced that financial statement fraud (FSA) and asset utilization stood at negative correlation value of 0.55. Also, financial statement fraud (FSA) and investment ratio stood at Pearson negative correlation value of 0.187 which is approximately 19%. Finally, financial statement fraud (FSA) and Liquidity (LIQ) stood at negative correlation value of 0.23. The result of the correlation indicates that financial statement fraud and Liquidity are significantly correlated which invariably means that high liquidity can influence financial statement fraud. Meanwhile, all the Pearson correlations of variables were positively and negatively correlated at 5% significance level, and at 2-tailed.

Table 3

Method: ML - Binary Probit (Quadratic hill climbing)

Date: 02/25/14 Time: 23:54

Sample: 2007 2011

Included observations: 148

Convergence achieved after 4 iterations

Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	2.986815	1.555482	1.920186	0.0548
LEV	0.025931	0.013951	1.858737	0.0631
PROF	-0.056228	0.025780	-2.181075	0.0292
ASSTU	0.021520	0.041049	0.524242	0.6001
INVR	-0.330822	0.198772	-1.664327	0.0960
LIQ	-0.030427	0.016291	-1.867672	0.0618
McFadden R-squared	0.681891	Mean dependent var		0.517241
S.D. dependent var	0.504067	S.E. of regression		0.465878
Akaike info criterion	1.340063	Sum squared resid		11.28619
Schwarz criterion	1.553213	Log likelihood		-32.86183
Hannan-Quinn criter.	1.423089	Deviance		65.72367
Restr. Deviance	80.33609	Restr. log likelihood		-40.16805
LR statistic	14.61243	Avg. log likelihood		-0.566583
Prob(LR statistic)	0.012153			
Obs with Dep=0	64	Total obs		148
Obs with Dep=1	84			

Source: Authors (2014)

Table 3 above highlights the outcome of the Binary Probit (Quadratic Hill climbing) result. It is deduced that Mc Fadden co-efficient of determination stood at 0.68189, meaning that over 68% of the systematic variations in the dependent variable (financial statement fraud, proxied with FSA) were explained by independent variables (LEV, PROF, ASSTU, INVR and LIQ) while the remaining 32% were unexplained hence captured by the stochastic disturbance. The overall LR statistic indicates a positive value of 14.462 which is far higher than the standard estimation (error) of regression which stood at a minimal value of 0.4658. The results are good enough and capable for prediction.

4.3 Test of Hypotheses and Discussion of Findings

Hypotheses formulated were tested in this section. The decision rule was to accept the hypothesis if the calculated p-value is < p-critical value at 10% otherwise we reject.

Firstly, it is deduced that leverage (LEV) stood at positive coefficient value of (0.0259) about 3% with FSA. The P-value calculated was 0.0631(6%). We accept the hypothesis since leverage calculated p-value < critical p-value at 10%; indicating that leverage ratios are significantly related to the probability of financial statement fraud occurrences. The finding supports Ujal, et.al (2012) views that debt and equity ratios are indications for searching financial statements frauds.

Secondly, profitability ratios (PROF) showed negative coefficient value of -0.0562 with FSA. While p-calculated value stood at 3% (which is less than the p-critical value at 10%) implying that profitability ratios are significantly related to the probability of financial statement fraud.

Profitability problem appears to be a motivation for false financial statement (Loebbecke *et al.*, 1989; Kreutzfeldt and Wallace, 1986) and can be detected with detailed evaluation of the financial statements.

Thirdly, asset management and asset utilization ratios (ASSTU) indicate positive coefficient value of 0.0215 (2%) with FSA, while calculated P-value revealed about 60% (over the critical P-value at 10%) suggesting that asset management ratios does not significantly relate to the probability of financial fraud occurrence. Although Persons (1995), Schilit (1993) and Stice (1991) suggested that management may manipulate inventories in the reported financial statements.

Fourthly, investment (INV) ratios stood at negative coefficient value of -0.3308 (33%) with FSA. Furthermore, calculated p-value stood at approximately 10% (equals critical P-value) revealing that investment ratios are significantly related to the probability of financial statement fraud occurrence. Beneish (1997), Palmrose et al (2004), Healy and Wahlen (1999) evidences also indicated that managers' opportunities and investment behaviour could be related to financial statement frauds.

Lastly, liquidity (LIQ) indicated negative coefficient value with FSA of about -0.0304 (3%). However, p-value stood at 6% (less than p-critical value) showing that liquidity ratios are significantly related to the probability of financial statement fraud occurrence. This argument is in support of Kreutzfeldt and Wallace (1986) who found that firms with liquidity problems have significantly more errors in their financial statements.

5. Conclusion and Recommendations

The concern for accounting ratios and fraudulent financial statements detection have been of interest in accounting research in recent times. The collapse of highly rated firms around the world is linked to financial statements frauds and inability for early detection by stakeholders. Meanwhile, incidences of financial statement frauds are at increasing side. Therefore, it is expected that application of accounting ratios would aid in detection of likelihood of financial statements frauds occurrences.

The following recommendations were consequently put forward.

- (1) Creditors like Mezzanine financing, Venture capitalists, Debenture holders should ensure that leverage or debt ratios are computed whenever financial statements of firms they have stake are released so as to check the true state of the firms.
- (2) Stakeholders should ensure that profitability and performance ratios of firms are critically evaluated and also used for assessing the health of their firms in the annual reported financial statements.
- (3) Investors both local and foreign should always closely examine at least five years financial statements of firms before investing and monitoring the level of their investments in firms in terms of their dividends and earnings.
- (4) Procedures for the management of firm's assets (assets utilization) should be documented in the Companies and Allied Matters Act by the regulatory authorities so as to prevent sharp practices of Managers.
- (5) Liquidity ratios should be clearly computed and the manner to arrive at the respective figures should be well stated by management in the notes to accounts of the reported financial statements so as check incidence of fraudulent financial statements.
- (6) Professional Accounting bodies in Nigeria (Institute of Chartered Accountants of Nigeria and Association of National Accountants of Nigeria) should from time to time admonish her members not to support or be involved in fraudulent financial statements.
- (7) Government regulatory authorities like Nigerian Stock Exchange, Security and Exchange Commission, Central Bank of Nigeria, Financial Reporting Council of Nigeria and others should ensure that financial statements of firms are properly screened and endorsed by them before being released.

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