

The background of the cover features a close-up, slightly blurred photograph of a calculator and a stack of banknotes. The calculator is in the upper left, and the stack of money is in the lower right. The overall color palette is warm, with shades of orange and brown.

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ARTICLES

Research

Financial ratios between fraudulent and non-fraudulent firms: Evidence from Tehran Stock Exchange 38

Somayyeh Hosseini Nia

Royalty interest management strategy and cost of oil and gas production in the Nigerian Niger- Delta 45

Akani, N. Fyeface*, Oladutire, E. Oladeji

Full Length Research Paper

Financial ratios between fraudulent and non-fraudulent firms: Evidence from Tehran Stock Exchange

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Fraud is a broad concept with two basic types seen in practice. The first is the misappropriation of assets and the second is fraudulent financial reporting. Fraudulent financial reporting usually occurs in the form of falsification of financial statements in order to obtain some forms of benefit. The current research compares the financial ratios between fraudulent and non-fraudulent firms for the companies listed on Tehran Stock Exchange. The sample consists of 134 companies from 2009-2014 and for testing the hypothesis Independent sample t-test was exerted. The results show that there is a significant difference between the means of Current Assets to Total Assets, Inventory to Total Assets and Revenue to Total Assets ratios. This means that management of fraud firms may be less competitive than management of non-fraud firms in using assets to generate revenue. Management may manipulate inventories. The company may not match sales with corresponding cost of goods sold, thus increasing gross margin, net income and strengthening the balance sheet. In addition, manipulation of inventory is in form of reporting inventory lower than cost or market value, and companies choosing not to record the obsolete inventory. Higher or lower margins are related to the issuing of fraudulent financial reporting. In addition, the results show that there is not a significant difference between the means of Total Debt to Total Equity, Total Debt to Total Asset, Net Profit to Revenue, Receivables to Revenue and Working Capital to Total Assets ratios.

Key words: Fraud, fraudulent financial reporting, financial ratio.

INTRODUCTION

Financial fraud is a broad legal concept, however, covering a wide range of activities. The American Institute of Certified Public Accountantsⁱ (Statement on Auditing Standardsⁱⁱ No. 82) and the USA Government Accountability Office have defined two types of financial misstatement. The first, known as management fraud, arises from intentional misstatements or omissions of amounts and disclosures in financial statements. These are perpetrated by management with the intent to

deceive. The second arises from the misappropriation of assets, and is known as employee fraud or defalcation. The majority of research on fraudulent financial reporting models focuses on the first type of fraud (Persons, 1995). Fraudulent financial reporting is one type of fraud with substantial negative impacts, loss of investor confidence, reputational damage, potential fines and criminal actions (Ernst and Young, 2009). Fraudulent financial reporting may result from an attempt to hide other acts of corporate

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fraud or be perpetrated to improve the company's financial appearance (Hasnan et al., 2013). Fraudulent financial reporting is more likely to occur in companies experiencing financial difficulties than in normal companies (Beasley et al., 1999; Kinney and McDaniel, 1989; Mishra and Drtina, 2004).

Such fraudulent reporting is a critical problem for external auditors, both because of the potential legal liability for failure to detect false financial statements and because of the damage to professional reputation that results from public dissatisfaction about undetected fraud (Kaminski et al). SAS No. 53 was designed to narrow the gap between clients' expectations regarding the auditor's responsibility to detect fraud during an audit and what that responsibility actually is (Levy, 1989: 52). SAS No. 82, Consideration of Fraud in a Financial Statement Audit, provides guidance on the auditor's responsibility to "plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether caused by error or fraud" (Bell and Carcello, 2000).

Howe (1999) suggested that firms turn to fraudulent financial reporting when they have already taken advantage of the most aggressive Generally Accepted Accounting Principlesⁱⁱⁱ.

"Analysis of ratios of account balances is a widely applied attention-direction procedure, yet little is known of the ability of ratio analysis to identify material monetary error in actual accounting data" (Kinney, 1987: 60). Such financial analysis is frequently posited to be a useful tool for identifying irregularities and/or fraud (Thornhill, 1995). For example financial leverage, capital turnover, asset composition and firm size are associated with fraudulent financial reporting (Persons, 1995).

Fraud detection is one of the specific tasks assigned to auditors as stated in International Standards on Auditing^{iv} 240. Auditors commonly use tools known as analytical procedures to assist them in detecting fraud (Thornhill, 1995; Albrecht et al., 2009). "The Treadway Commission recommended that the ASB Security requires the use of analytical procedures on all audits to improve the detection of fraudulent financial reporting" (Wheeler and Pany, 1996: 558). Analytical procedure is the name used for a variety of techniques the auditor can use to assess the risk of material misstatements in financial records. These procedures involve the analysis of trends, ratios, and reasonableness tests derived from an entity's financial and operating data. SAS No. 56 requires that Analytical procedures be performed in planning the audit with an objective of identifying the existence of unusual events, amounts, ratios and trends that might indicate matters that have financial statement and audit planning implications (AICPA, 1988). According to SAS No. 99, the current fraud standard, the auditor should consider the results of Analytical procedures in identifying the risks of material misstatement due to fraud (AICPA, 2002). While

the procedures are well known and widely used, there is a general lack of understanding of how they are properly applied, and how much reliance should be placed on them. So, companies, auditors, and regulators have increased their focus on understanding fraudulent reporting and how to mitigate its occurrence (Liu et al., 2014).

Due to the importance of fraudulent financial reporting issue the objective of this paper is to investigate the significant differences between the mean of financial ratios of fraud and non- fraud companies.

The remainder of the paper is organized as follows: Section 2 discusses the fraudulent financial reporting and highlights the prior research, Section 3 develops eight hypotheses, and Section 4 describes the research design and methodology. Section 5 describes the results of research and finally, Section 6 provides conclusions.

LITERATURE REVIEW

The increased focus on internal controls by organizations as a mechanism to prevent unethical behavior is consistent with the Fraud Triangle, a widely recognized framework used to understand factors that are predictive of fraudulent reporting and thereby as a means to identify ways to mitigate fraud (AICPA, 2002; The Committee of Sponsoring Organizations^v, 1999). The framework of Fraud Triangle identifies three broad factors that increase the likelihood for fraud: incentives, opportunities, and rationalization. The impact of fraudulent financial reporting often goes far beyond losses for investors and selected classes of creditors. An adequate economic and ethical analysis requires consideration of the outcomes of unethical behavior on multiple stakeholders, and even the ripple effect on the economy and society as a whole (Kalbers, 2009).

Fraudulent financial reporting by businesses is a matter of grave social and economic concern and it has become an increasingly important issue to the accounting profession, as well as to society general (Cox and Weirich, 2002).

One problem with financial reporting is the restatement of financial statements. Restatements generally result from material errors in financial statements that are discovered some time after being issued. Restatements may result from fraud, but also may originate from various types of errors, including misinterpretation of accounting principles. While these errors may not be intentional, the quality of reporting and the adequacy of controls over the financial reporting process are called into question (Kalbers, 2009) (Table 1).

Most of the above studies investigate the financial ratios between fraudulent and non-fraudulent firms with logistic Regression. In this research we used the t- test method for highlighting the differences of ratios between fraudulent and non-fraudulent firms.

Table 1. Finding prior research survey in scope of fraudulent financial reporting.

Author(s)	Year	Country	Results
Persons	1995	N/A	In total, ten variables, including eight ratios, were examined and used to develop two predictive logistic models. One model was for the fraud year and the other was for the preceding year. Stepwise-logistic models indicated that financial leverage, capital turnover, asset composition and firm size were significant factors influencing the likelihood of fraudulent financial reporting.
Spathis	2002	Greece	Ten financial variables are selected for examination as potential predictors of fraudulent financial reporting. Univariate and multivariate statistical techniques such as logistic regression are used to develop a model to identify factors associated with fraudulent financial reporting. The model is accurate in classifying the total sample correctly with accuracy rates exceeding 84 per cent.
Kaminski et al.	2004	N/A	The fraudulent firms were matched with non-fraudulent firms. Using this matched-pairs design, ratio analysis for a seven-year period was conducted on 21 ratios. Overall, 16 ratios were found to be significant. Of these, only three ratios were significant for three time periods. Of the 16 statistically significant ratios, only five were significant during the period prior to the fraud year. Using discriminant analysis, misclassifications for fraud firms ranged from 58 percent to 98 percent.
Grove and Basilico	2008	N/A	For identifying both fraud and non-fraud one year before the frauds became public knowledge, this model had overall 76 percent accuracy with 14 percent Type I errors and 10 percent Type II errors. Three ratios in the model really drove these results: the gross margin index, the sales growth index, and the accounts receivable index.
Dani et al.	2013	Malaysia	The study tests eleven financial ratios. The logistic regression was used. The results show that all the financial ratios have significant relationships with fraudulent financial reporting except for Gross Profit-to-Assets ratio, percentage of Inventory-to-Total Assets, Gross Margin Index and Z-Scores.
Amaechi and Nnanyereugo	2013	Nigeria	Logistic Regression was used in analyzing data. The study revealed 16 significant ratios out of 29 financial ratios used for the study as being capable of aiding detection of fraud in the financial statements.
Dalnial et al.	2014	Malaysia	Investigate whether there are any significant differences between the means of financial ratios of fraudulent and non-fraudulent firms and to identify which financial ratio is significant to detect fraudulent reporting. The study found that there are significant mean differences between the fraud and non-fraud firms in ratios such as total debt to total equity, account receivables to sales. In addition, Z score which measures the bankruptcy probability is significant to detect fraudulent financial reporting.

Hypotheses development

This study expects that there is difference between the means of some financial ratios between fraudulent and non-fraudulent firms. Hence, the following hypothesis is proposed:

H₁: There is a significant difference between the means of the Total Debt to Total Equity ratio between fraudulent and non-fraudulent firms.

H₂: There is a significant difference between the means of the Total Debt to Total Asset ratio between fraudulent and non-fraudulent firms.

H₃: There is a significant difference between the means of the Net Profit to Revenue ratio between fraudulent and non-fraudulent firms.

H₄: There is a significant difference between the means of the Current Assets to Total Assets ratio between fraudulent and non-fraudulent firms.

H₅: There is a significant difference between the means of the Receivables to Revenue ratio between fraudulent and non-fraudulent firms.

H₆: There is a significant difference between the means of the Inventory to Total Assets ratio between fraudulent and non-fraudulent firms.

H₇: There is a significant difference between the means of the Working Capital to Total Assets ratio between fraudulent and non-fraudulent firms.

H₈: There is a significant difference between the means of the Revenue to Total Assets ratio between fraudulent and non-fraudulent firms.

Population and sampling

The population of this study consists of firms listed in Tehran Stock Exchange (TSE). However, due to high volume of population and heterogeneity among firms listed in TSE, following conditions are considered:

1. Firm's fiscal year must be ended at the end of year and they have not changed their fiscal year during studied period.

2. The needed information must be available.

By applying these restrictions, 134 companies during the

period 2008-2014 were selected.

METHODOLOGY

This work can be classified as a descriptive study regarding its objectives, as our aim is to observe record, analyze and correlate facts and phenomena without manipulating them. The information of the companies was collected through devise processor software and formal website of the Stock Exchange (www.rdis.ir and www.codal.ir). Finally, data were prepared using Excel software and then the final analysis was performed using SPSS 21 software.

Measuring fraudulent financial reporting

The extent of likelihood of fraudulent financial reporting is measured by combining two models in measuring red flags for the likelihood earning management. The models are Z-score bankruptcy prediction model and Beneish M-score model. The Z-score model that has been developed by Altman (1968) is a proxy for financial distress risk or bankruptcy risk, where these risks could be an early warning sign for potential collapse that will lead to the occurrence of fraud or manipulation in an organization. Meanwhile, Beneish M-score model that was developed by Beneish (1999) is similar to the Altman Z score, but it is optimized to estimate the probability of manipulation rather than bankruptcy (Beneish, 1999). Therefore, using these two models, the likelihood of fraudulent financial reporting in an organization could be determined (Razali and Arshad, 2014).

ALTMAN Z-score

$Z = 1.2$ (working capital/total assets) + 1.4 (retained earnings/total assets) + 3.3 (earnings before interest and taxes/ total assets) + 0.06 (market value of equity/book value of total debt) + 1.0 (sales/total assets)

The level of financial distress had been classified in three zones of discrimination. Z-scores that are less than 1.81 is an indicator that the organization is in the "distress" zone, scores between 1.81 and 2.99 indicate that the organizations were in the "grey" zone, and for scores that are more than 2.99, it is an indicator that the organization is in the "safe" zone (Razali and Arshad, 2014).

Definition of "BENEISH MODEL"

It is a mathematical model that uses financial ratios to identify whether a company has manipulated its earnings. The variables are constructed from the data in the company's financial statements and, once calculated, create an M-Score to describe the degree to which the earnings have been manipulated.

These variables are:

1. DSRI - Days' sales in receivable index
2. GMI - Gross margin index
3. AQI - Asset quality index
4. SGI - Sales growth index
5. DEPI - Depreciation index
6. SGAI - Sales and general and administrative expenses index
7. LVGI - Leverage index
8. TATA - Total accruals to total assets

According to Beneish (1999) these variables calculated are as below:

$$DSRI = \frac{\text{Receivables}_t / \text{Sales}_t}{\text{Receivables}_{t-1} / \text{Sales}_{t-1}}$$

$$GMI = \frac{(\text{Sales}_{t-1} - \text{Cost of goods sold}_{t-1}) / \text{Sales}_{t-1}}{(\text{Sales}_t - \text{Cost of goods sold}_t) / \text{Sales}_t}$$

$$AQI = \frac{(1 - \text{Current asset}_t + \text{PP\&E}) / \text{Total assets}_t}{(1 - \text{Current asset}_{t-1} + \text{PP\&E}_{t-1}) / \text{Total assets}_{t-1}}$$

$$SGI = \frac{\text{Sales}_t}{\text{Sales}_{t-1}}$$

$$DEPI = \frac{\text{Depreciation}_{t-1} / (\text{Depreciation}_{t-1} + \text{PP\&E}_{t-1})}{\text{Depreciation}_t / (\text{Depreciation}_t + \text{PP\&E}_t)}$$

$$SGAI = \frac{\text{Sales, general, and administrative expense}_t / \text{Sales}_t}{\text{Sales, general, and administrative expense}_{t-1} / \text{Sales}_{t-1}}$$

$$LVGI = \frac{(\text{LTD}_t + \text{Current liabilities}_t) / \text{Total assets}_t}{(\text{LTD}_{t-1} + \text{Current liabilities}_{t-1}) / \text{Total assets}_{t-1}}$$

$$TATA = \frac{\Delta \text{Current assets}_t - \Delta \text{Cash}_t - \Delta \text{Current liabilities}_t - \Delta \text{Current maturities of LTD}_t - \Delta \text{Income tax payable}_t - \text{Depreciation and amortization}_t}{\text{Total assets}}$$

Once calculated, the eight variables are combined together to achieve an M-Score for the company. An M-Score of less than -2.22 suggests that the company will not be a manipulator. An M-Score of greater than -2.22 signals that the company is likely to be a manipulator.

$$M\text{-Score} = -4.84 + .920 * DSRI + .528 * GMI + .404 * AQI + .892 * SGI + .115 * DEPI + .172 * SGAI + 4.679 * TATA - .327 * LVGI$$

Test method

In this study the Independent sample t-test was used. Given the matched-pairs design, paired-sample t tests were conducted for each variable to determine if the mean of the fraud sample was significantly different than the mean of the non- fraud sample.

Measurement of variables

Likelihood of fraudulent financial reporting

In this study, Likelihood of fraudulent financial reporting is based on an integration of Beneish M-score model and Altman's Z-score model.

Financial ratio

These ratios are financial leverage, profitability, asset composition, liquidity and capital turnover.

Financial leverage

This is Total Debt to Total Equity and also Total Debt to Total Asset. Leverage is also referred to as gearing. It is where a relationship exists between a firm's liabilities and its assets; that is the total debts used to finance the firm's assets. Leverage is also used to measure the firms' ability to repay its financial obligations as they mature (Alkhatib and Marji, 2012). Higher leverage is typically associated with a higher potential for violations of loan agreements and a reduced ability to obtain additional capital through borrowing (Dalnial et al., 2014).

Table 2. Independent sample t-test (Hypothesis 1).

Variables	Company type	Mean	Std. Deviation	t-statistics	p-value
Total Debt / Total Equity	Non Fraudulent	2.0449296	9.36778800	1.370	.124
	Fraudulent	3.3693926	19.60781763		

Table 3. Independent sample t-test (Hypothesis 2).

Variables	Company type	Mean	Std. Deviation	t-statistics	p-value
Total Debt / Total Asset	Non Fraudulent	.6814299	.27046923	1.605	.533
	Fraudulent	.7134140	.25369296		

Table 4. Independent sample t-test (Hypothesis 3).

Variables	Company type	Mean	Std. Deviation	t-statistics	p-value
Net Profit / Revenue	Non Fraudulent	12.3288508	22.97246392	-1.342	.657
	Fraudulent	10.0137866	22.57918083		

Table 5. Independent sample t-test (Hypothesis 4).

Variables	Company type	Mean	Std. Deviation	t-statistics	p-value
Current Assets / Total Assets	Non Fraudulent	.6505163	.19690997	1.418	.074*
	Fraudulent	.6708291	.17494789		

* P < 0.1.

Profitability

Profitability is measured by Net Profit to Revenue. Profitability is a financial ratio that is used as an assessment technique in order to evaluate the capability of a company to generate earnings (Alkhatib and Marji, 2012). Lower profits may provide management with an incentive to overstate revenues or understate expenses (Dalnial et al., 2014).

Asset composition

Asset Composition is measured by Current Assets to Total Assets, Receivables to Revenue and Inventory to Total Assets. Beasley et al. (1999) confirm that account receivables and inventory are important variables when assessing the risk of fraud and that both are common items misstated in accounts. These variables are expected to be positive values, which show that the higher the amount of both items, the higher the risk of overstatements in the account, which leads to an increase in the likelihood of fraud.

Liquidity

Liquidity is measured by Working Capital to Total Assets. Firms with a very low working capital to total assets ratio indicates that they cannot meet their obligations. Thus these ratios are expected to be negative values, concluding that the lower a firm's liquidity the more likely it is for managers to engage in fraudulent financial reporting (Dalnial et al., 2014).

Capital turnover

Capital Turnover is measured by Revenue to Total Assets. The turnover represents the sales generating power of the firm's assets. It also measures management's ability to deal with competitive situations. Managers of fraudulent firms may be less competitive than that of non- fraudulent firms in using the firm's assets to generate sales. This inability to compete successfully may be an incentive for engaging in fraudulent financial reporting (Dalnial et al., 2014).

EMPIRICAL RESULTS

Tables 2-9 present the mean values, standard deviations, t-test statistics and P values of ratios for non – fraud and fraud firms.

Hypothesis 1: There is a significant difference between the means of the Total Debt to Total Equity ratio between fraudulent and non-fraudulent firms.

The results in Table 2 show that there is not a significant difference with $\alpha = 5\%$ between the means of the Total Debt to Total Equity ratio between fraudulent and non-fraudulent firms.

Hypothesis 2: There is a significant difference between

Table 6. Independent sample t-test (Hypothesis 5).

Variables	Company type	Mean	Std. Deviation	t-statistics	p-value
Receivables / Revenue	Non Fraudulent	1.2525591	2.56621442	4.091	.389
	Fraudulent	2.0555793	2.77339994		

Table 7. Independent sample t-test (Hypothesis 6).

Variables	Company type	Mean	Std. Deviation	t-statistics	p-value
Inventory / Total Assets	Non Fraudulent	.2512581	.13683605	-1.819	.016*
	Fraudulent	.2331574	.12113397		

* P < 0.05.

Table 8. Independent sample t-test (Hypothesis 7).

Variables	Company type	Mean	Std. Deviation	t-statistics	p-value
Working Capital / Total Assets	Non Fraudulent	.0756863	.25286050	-1.406	.409
	Fraudulent	.0491164	.25087640		

Table 9. Independent sample t-test (Hypothesis 8).

Variables	Company type	Mean	Std. Deviation	t-statistics	p-value
Revenue / Total Assets	Non Fraudulent	.2434078	.38771550	-2.968	.009*
	Fraudulent	.1649212	.23307373		

* P < 0.05

the means of the Total Debt to Total Asset ratio between fraudulent and non-fraudulent firms.

The results in Table 3 show that there is not a significant difference with $\alpha = 5\%$ between the means of the Total Debt to Total Asset ratio between fraudulent and non-fraudulent firms.

Hypothesis 3: There is a significant difference between the means of the Net Profit to Revenue ratio between fraudulent and non-fraudulent firms.

The results in Table 4 show that there is not a significant difference with $\alpha = 5\%$ between the means of the Net Profit to Revenue ratio between fraudulent and non-fraudulent firms.

Hypothesis 4: There is a significant difference between the means of the Current Assets to Total Assets ratio between fraudulent and non-fraudulent firms.

The results in Table 5 show that there is a significant difference with $\alpha = 10\%$ between the means of the Current Assets to Total Assets ratio between fraudulent and non-fraudulent firms.

Hypothesis 5: There is a significant difference between the means of the Receivables to Revenue ratio between fraudulent and non-fraudulent firms.

The results in Table 6 show that there is not a significant difference with $\alpha = 5\%$ between the means of the Receivables to Revenue ratio between fraudulent and non-fraudulent firms.

Hypothesis 6: There is a significant difference between the means of the Inventory to Total Assets ratio between fraudulent and non-fraudulent firms.

The results in Table 7 show that there is a significant difference with $\alpha = 5\%$ between the means of the Inventory to Total Assets ratio between fraudulent and non-fraudulent firms.

Hypothesis 7: There is a significant difference between the means of the Working Capital to Total Assets ratio between fraudulent and non-fraudulent firms.

The results in Table 8 show that there is not a significant difference with $\alpha = 5\%$ between the means of the Working Capital to Total Assets ratio between fraudulent

and non-fraudulent firms.

Hypothesis 8: There is a significant difference between the means of the Revenue to Total Assets ratio between fraudulent and non-fraudulent firms.

The results in Table 9 show that there is a significant difference with $\alpha = 5\%$ between the means of the Revenue to Total Assets ratio between fraudulent and non-fraudulent firms.

Conclusion

The objective of this paper is to investigate the significant differences between the mean of financial ratios of fraud and non-fraud companies. For testing the hypothesis, the Independent sample t-test was used.

The results of hypotheses test show that there is a significant difference between the means of the Current Assets to Total Assets ratio, Inventory to Total Assets ratio and Revenue to Total Assets ratio between fraudulent and non-fraudulent firms. These findings are similar to previous reports (Feroz et al., 1991; Dani et al., 2013; Dalnial et al., 2014).

And also, the result that there is not a significant difference between the means of the Net Profit to Revenue ratio between fraudulent and non-fraudulent firms is consistent with the research of Dalnial et al. (2014).

The ratios on Revenue / Total Assets measure the capital turnover, represent the Revenue generating power of firm's assets and measure management's ability to deal with competitive situations. Persons (1995) argued that management of fraud firms may be less competitive than management of non-fraud firms in using assets to generate revenue. This may provide them opportunity to engage in fraudulent financial reporting and sign of this ratio should be negative. Further, Summers and Sweeney (1998) indicate that fraudulent financial statements are detected by looking at the behavior of the management who tend to reduce purchases on their common stocks to enhance revenue.

Net Profit / Revenue ratio is used to measure a company's financial health and profitability. Net profit should be positive and higher enough to cover all the expenses. It helps investors to predict the future performance stocks in the market. Positively, high Net Profit to Revenue indicates that the company is financially doing well and investors benefits from investing in that company. Net Profit represents the company's entire sales revenue minus the cost pays to manufacture the sales goods or cost of goods sold. Another issue examined in Spathis (2002) is whether the higher or lower margins are related to the issuing of fraudulent financial reporting, and for that purpose the ratio of Net Profit / Revenue is used.

Persons (1995) stated that examinations of fraud firms' financial statements seem to indicate that current assets of these firms consist mostly of receivables and inventories. The sign of current assets/ total assets is expected to be positive and the result found fraud firms have higher of this variables than non-fraud firms. Similar with Persons (1995), Spathis (2002) argued that management may manipulate inventories. The company may not match sales with corresponding cost of goods sold, thus increasing gross margin, net income and strengthening the balance sheet. In addition, manipulation of inventory is in form of reporting inventory lower than cost or market value and companies choosing not to record the obsolete inventory.

Fraudulent financial reporting firms seem to have on average higher Total Debt / Total Asset and Total Debt / Total Equity. The higher debt to equity, the lower Revenue to total assets values for the fraudulent financial reporting firms may indicate that many firms issuing fraudulent financial reporting were in financial distress (Fanning and Cogger, 1998; Summers and Sweeney, 1998). This could provide the motivation for management fraud. The ability to manipulate the values in accounts receivable was clearly reflected in the results. This is a very difficult area due to the subjective nature of estimating accounts receivable. These results suggest that additional time is necessary for auditing accounts receivable.

In addition, the results of hypotheses test show that there is not a significant difference between the means of the Total Debt to Total Equity ratio, Total Debt to Total Asset ratio, Receivables to Revenue ratio and Working Capital to Total Assets ratio between fraudulent and non-fraudulent firms. These findings are similar with the study of Spathis (2002) and Dani et al. (2013). Also, these findings are not similar to previous reports (Persons, 1995; Spathis, 2002). One reason may steam from the weakness of corporate governance in Iranian companies and the weakness of the effectiveness of audit committee that have not enough monitoring in internal controls of the companies. This is because most of these ratios are determined by board of company and the level of these ratios shows the operation of firm and board. Thus, if the corporate governance be stronger, these ratios will improve more. One of the key contributions of Loebbecke et al. (1989)'s study is that it highlighted the potential for audit committee and board governance mechanisms to reduce occurrences of financial statement fraud. Other potential reason may be that the economic circumstance is different in various countries.

Consequently, it is recommended that auditors who are eager to look into the possibility of detecting false financial statements can adopt it and save endless time in search for possible red flags. Finally, it is proposed to researchers to examine this research in different industries.

Conflict of Interests

The authors have not declared any conflict of interests.

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ⁱ American Institute of Certified Public Accountants (AICPA)

ⁱⁱ Statement on Auditing Standards (SAS)

ⁱⁱⁱ Generally Accepted Accounting Principles (GAAP)

^{iv} International Standards on Auditing (ISA)

^v The Committee of Sponsoring Organizations (COSO)

Full Length Research Paper

Royalty interest management strategy and cost of oil and gas production in the Nigerian Niger- Delta

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This study examined royalty interest management strategy and cost of oil and gas production in the Nigerian Niger-Delta. The respondents were sixteen opinion leaders from two oil and gas bearing communities in Rivers State. The survey research design was adopted for the study. The spearman rank order correlation coefficient was used to test the hypotheses. Results indicated that there is a strong and significant relationship between royalty interest and oil and gas production; and there is a positive and significant relationship between resource control and Niger-Delta development. It was concluded that royalty interest is a source of revenue paid to a land owner by an oil and gas company for the drilling of oil and gas from his domain, which will make the land owner to freely allow the oil and gas company to continue the process of oil and gas production. It was recommended that revenue right of collecting royalty interest from the oil and gas companies should be accorded the Niger-Delta region so that oil and gas production will take place in the region without disruptions; the Niger-Delta should be accorded the right of resource control in order to enable them develop the region in every ramification.

Key words: Royalty interest, management strategy, oil, gas.

INTRODUCTION

Background of the study

Studies have indicated that the Niger-Delta of Nigeria is a hostile ground for the operation of oil and gas companies in recent years (Egan, 1999). Amnesty International (2006) noted that the region has been recognized in the past for special development initiative and attention in the Independence Constitution of 1960. This was because the Pre-Independence Constitution had earlier recognized the Niger-Delta as a place with special right for the

ownership of oil and gas resources deposited in the land, but this special right has not been accorded the region till date, as the people of the region are marginalized in the Nigerian polity (Carter, 2007). Moreover, provision of a 50% royalty payment from oil and gas exploitation to the oil producing areas in the region by the Pre-Independence Constitution has even eluded the people of the region. This is because the provision for a 50%

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revenue allocation formula has been abrogated by additional constitutional provisions and decrees, thus denying the people of the region access to the natural resources (oil and gas) in their domain (Amnesty International, 2006). As a result, the Niger-Delta people are agitating for the ownership of minerals beneath their ground in order to receive proceeds from the extraction of natural resources like oil and gas, and to fully control the resources in their land (Obi, 2005; Ingersoll and Rose, 1992).

According to Amnesty International (2006), it was observed that oil companies in the region do not pay royalties to the people, rather what the people get are stipends from the practice of corporate social responsibility by the oil companies. This study therefore contends without valid contradictions that royalty interest and other oil and gas revenue are not paid to the Niger-Delta people because their land and resources were forcefully taken away from them by the land use decree. Thus, this study is intended to investigate Royalty Interest Management Strategy and cost of oil and gas production in the Nigerian Niger-Delta.

Statement of the problem

The Oil and Gas Accounting profession has long struggled to provide a solution to the issue of Royalty Interest Management Strategy and cost of oil and gas production in the Nigerian Niger-Delta (Amnesty International, 2006). Egan (1999) noted that the oil and gas industry has greatly degraded the environment of the people of Niger-Delta, and in most ways the sources of livelihood of the people has been eroded. Thus, Omuku (2005), Obi (2005), and Boham (2005) identifies the challenges of development in the Niger-Delta to be community interface and security; crude oil theft; increase pipeline leakages, communal conflict - in particular over land/boundary disputes with oil deposits; youth unemployment; increasing hostility-resource control agitations and relative cost of development in the region. These problems identified by the various scholars are enough reasons why the government should allow the oil rich Niger-Delta to manage the resources in their domains. Hence, in this study, the issue of Royalty Interest Management Strategy and Cost of Oil and Gas Production will be addressed by assessing the following: Do the people of the Niger-Delta, especially those in the oil bearing communities receive royalty interest? Is it lawful in Nigeria for land owners to obtain royalties for the natural resources in their land? Is it justifiable for owners of natural resources not to be stakeholders in the oil and gas industry? This is our point of departure.

Purpose of the study

This study is designed to investigate "Royalty Interest Management Strategy and Cost of Oil and Gas produc-

tion in the Nigerian Niger-Delta: An Accounting Empirical Investigation". Consequently, the study will provide explanations on royalty interest and cost of oil and gas production in the Niger-Delta Oil and Gas environment. Thus, the specific objectives are to:

- find out the extent to which royalty interest payment has helped to enhance sustainable development; and
- assess if the resource control can develop the Niger-Delta.

Research questions

The following research questions founded on the statement of the problem and purpose of the study were raised to guide the study.

- To what extent can royalty interest enhance oil and gas production?
- To what extent can the implementation of resource control through fiscal federalism develop the Niger-Delta?

Research hypotheses

The research hypotheses formulated for the study is guided by the research question.

H₀₁: There is no relationship between royalty interest and oil and gas production.

H₀₂: There is no relationship between implementation of resource control and Niger Delta development.

THEORETICAL FRAMEWORK

The oil and gas accounting discipline studies and analyse how investments in oil and gas exploration, extraction and development activities are carried (Brennan and Schwartz, 1985). According to Obara (2011), the well acclaimed origin of oil and gas is the organic theory. To him, the origin of oil and gas holds that petroleum (hydrocarbons) is formed from ancient land and sea plants and animals that were deposited millions of years ago in low-lying areas normally on the ocean bed (Obara, 2011). Eremosele (1997) opined that the oil and gas sector operates in two broad sectors- the upstream and downstream sectors. The upstream activities involve the acquisition of universal interest in proportion for prospecting, exploration, development and production of oil and gas. While, downstream activities relate to the transportation of oil, gas and derivatives as well as their transformation into finished products, their distribution and marketing (Eremosele, 1997).

According to Ekern (1985), royalties, (sometimes, running royalties, or private sector taxes) are usage-based payments made by one party (the "licensee") to another (the "licensor") for natural resources. Royalties are typically agreed upon as a percentage of gross or net

revenues derived from the use of an asset or a fixed price per unit sold of an item of such, but there are also other models and metrics of compensation (Ingersoll and Rose, 1992). A royalty interest is the right to collect a stream of future royalty payments, often used in the oil industry and music industry to describe a percentage ownership of future production or revenues from specific leasehold which may be divested from the original owner of the asset (Ingersoll and Rose, 1992).

According to Ekern (1985), all interests are fractions of the total production of a well. A greater decimal interest will receive a larger share of the income from production. An overriding royalty interest is an interest usually carved out of a working interest. These are often used to compensate people associated with assembling the production package, including landmen, petroleum engineers and prospect hunters. The override terminates when the well is no longer producing. A royal interest is one paid to the mineral owner who has leased his mineral interests for production. They do not participate in the drilling costs of a well, including equipment or labour (Ekern, 1985). A working interest requires the interest owner to participate in the cost of production (Ingersoll and Rose, 1992). The working interest owner assumes some financial risk as there are costs associated with operating even if the well is unsuccessful. However, if the well is successful, the working interest owner typically receives a large percentage of the income (Ingersoll and Rose, 1992).

EMPIRICAL LITERATURE REVIEW

Over the years, studies have been carried out on royalty interest, but none have examined an empirical research of Royalty Interest Strategy Management and cost of oil and gas production in the Nigerian Niger-Delta (Obi, 2005). The earliest major attempt to explain royalty interest of oil bearing communities has been credited to Egan (1999), Banks (1987), and Rosenthal (1988) who conducted their separate studies on the Arab Gulf areas. Since then, there has been the debate for the introduction of royalty interest payment to the oil and gas producing regions in Africa. This issue did not receive any serious attention in the less developed African countries until agitations for resource control took violent tone, especially in Nigeria's Niger-Delta. Thus, Obi (2005) empirically tested the activities of oil companies and how they relate to their host communities and the Niger-Delta Development Commission (NDDC) from 2000 to 2004 when he studied the activities of the Shell Petroleum Development Company (SPDC) of Nigeria. To him, Shell was committed to working with all stakeholders in Nigeria's Niger-Delta to contribute to the sustainable development of the communities in the region in order to create peace and improve the well-being of the people. This is evidenced by the huge total expenditure on

sustainable community development programmes, including contributions to NDDC for the development of the Niger-Delta region (SPDC's contributions (Appendix 1). However, SPDC did not pay royalty interest to the Niger-Delta region.

More so, in the oil and gas industry, royalty interest refers to the ownership of a portion of the resource or revenue that is produced (Banks, 1987; Rosenthal, 1988). A company or person that owns a royalty interest does not bear any of the costs of operations needed to produce the resource, yet the person or company still owns a portion of resource of revenue produced (Ingersoll and Rose, 1992). Oil production is the operation that brings hydrocarbons to the surface and prepares them for processing (Lehman, 1989). Production begins after the well is drilled (Lohrenz, 1988). The mixture of oil, gas and water from the well is separated on the surface. The water is disposed of and the oil and gas are treated, measured, and tested (Lehman, 1989). Production operations include bringing the oil and gas to the surface, maintaining production, and purifying, measuring, and testing (Lohrenz, 1988).

Production or lifting costs are the expenses associated with bringing oil and gas from the reservoir to the surface, separating the oil from any associated gas, and treating the produced oil and gas to remove impurities such as water and hydrogen sulfide (Lehman, 1989). Those who have right of royalty interest do not pay the cost of oil production (Lohrenz, 1988). Having an oil and gas royalty interest is a safer way to get involved in energy production without having to worry about excessive costs (Ingersoll and Rose, 1992).

ASSOCIATION BETWEEN ROYALTY INTEREST MANAGEMENT STRATEGY AND COST OF OIL AND GAS PRODUCTION

This study examines Royalty Interest Management Strategy and cost of oil and gas production of the Nigeria's Niger Delta. The Niger Delta region has a population of 27 million, covering an area of 70,000 square kilometers, with 5000 communities, 50 ethnic groups and 250 dialects. The region is not only rich in oil and gas, but also well endowed with other natural resources like water, timber and other forest resources like, wild life and sharp sand. The region comprises of nine states of Nigeria, namely: Delta, Bayelsa, Ondo, Akwa Ibom, Edo, Rivers, Imo, Abia, and Cross River States. The significant feature of the Niger Delta is the general state of underdevelopment, not only by world standards but also in relation to many parts of Nigeria itself. The poverty of this region, whilst being the source of the majority of Nigeria's wealth, is the paradox that poses one of the key challenges to the nation's governance (Carter, 2007).

The people of the Niger-Delta until now have not gotten

the right of ownership and management of the oil and gas wealth in their domain (Amnesty International, 2006). According to Ingersoll and Rose (1992), getting involved in the ownership of minerals beneath the ground is the domain of oil and gas royalty interest programs or deals. These types of deals involve receiving a portion of the proceeds from extraction of natural resources like oil and gas. There are some limitations concerning such investment opportunities but there is also the potential for big payouts. Some benefits of owning oil and gas interest run the gamut and in general are less risky than owing an actual well. Owning a well introduces a host of problems including messy liability issues and also major expenditures for production (Ekern, 1985). Oil production is the operation that brings hydrocarbons to the surface and prepares them for processing (Lehman, 1989). Production begins after the well is drilled (Lohrenz, 1988). The mixture of oil, gas and water from the well is separated on the surface. The water is disposed of and the oil and gas are treated, measured, and tested (Lehman, 1989). Production operations include bringing the oil and gas to the surface, maintaining production, and purifying, measuring, and testing (Lohrenz, 1988).

However, the people of the Niger-Delta have never been given any right to own and manage the oil and gas in their land. Rather than give the Niger Delta region royalty interest, because the region contributes over 95% of the nation's wealth. This is because the laws (constitution and decrees) of the country made it compulsory for all revenues generated through petroleum and royalty to be the source of revenue for the Federal Government (Junger, 2007).

METHODOLOGY

Research design

The research design for this study is the quasi-experimental research design. The quasi-experimental (survey) research design was used because the various elements of the design are not under the control of the researcher (Baridam, 2001).

Area of Study

The area of study was oil and gas bearing companies in Rivers State. They are: Elem-Bakana, and Soku all in Degema Local Government Area of the State.

Population and sample size

The population of the study comprised all the compound heads and chiefs of the two communities. Elem-Bakana has 10 leaders, while Soku has 13. This brings the total number to 23 opinion leaders. The sample size was obtained by the use of judgmental sampling technique at the discretion of the researcher. This was because, out of the 23 respondents, only 16 were educated and it was that number that was able to attend to the administered questionnaire. Hence, this brings the response rate to 69.57%.

Instrumentation

The study used questionnaire derived from the research questions and research hypotheses as instrument for gathering data. The instrument is based on the use of the five point Likert scale on ordinal basis. And they are: (a) to a great extent 5; (b) to a considerable extent 4; (c) to a moderate extent 3; (c) to a slight extent 2; and (e) not at all 1. The instrument based on the ordinal scale was used to elicit information on the subject matter, which is "Royalty Interest Management Strategy and cost of oil and gas production in Nigerian Niger-Delta."

Validity of Instrument

The researcher used questionnaire as the instrument to get responses from the respondents contacted in the selected communities. The questionnaire was constructed based on the use of content validity to show questions covering the variables in the study. The instrument was face-validated by co-students of the post graduate class, experts in the field.

Reliability of the instrumentation

The reliability of the instrument was established using the test-retest method on 16 respondents from the selected communities, and a co-efficient of 0.7 was obtained for the instrument using the Cronbach Alpha.

Data analysis

The research hypotheses developed in this study was analyzed and tested by the use of the spearman's rank order correlation based on the application of the statistical package for social sciences (SPSS).

PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

Results

The analysis of our findings based on the research questions were raised in research question was answered thus:

Results regarding research question 1: To what extent can royalty interest enhance oil and gas production? Table 1 shows the responses gathered when it was inquired if royalty interest affects oil and gas production. Out of the 16 respondents, 8(50%) gave to a great extent response thereby indicating that royalty interest which is a form revenue paid to the land owners by the oil and gas companies can be re-invested by the owners of the resources in the oil and gas business as a venture. In addition, 6(37.5%) and 2(12.5%) of the respondents supported this view by providing to a considerable extent and to a moderate extent responses respectively. This implies that royalties are typically agreed upon as a percentage of gross or net revenues derived from the use of an asset, which in this case are the oil and gas deposits. A royalty interest is the right to collect a stream of future royalty payments, often used in the oil industry

Table 1. Effect of royalty interest on oil and gas production.

Item	Frequency	Percentage
To a great extent	8	50.0
To a considerable extent	6	37.5
To a moderate extent	2	12.5
To a slight extent	0	0
Not at all	0	0
Total	16	100.0

Source: Field Data, 2013

to describe a percentage ownership of future production or revenues from specific leasehold which may be divested from the original owner of the asset. The royalty interest can empower the Niger-Delta and make it also participate fully in the oil and gas industry.

Results regarding research question 2: To what extent can the implementation of resource control through fiscal federalism develop the Niger-Delta? Table 2 shows the responses obtained when it was inquired if resource control principle can influence the development of the Niger Delta. Out of the 16 respondents, 9(56.25%) gave to a great extent response thereby indicating that resource control, which is a principle by which owners of natural resources will be engaged in the exploration, exploitation, extraction and development of the mineral resources in their domain and then pay a specific tax to the relevant tax authorities. In addition, 7 or 43.75% of the respondents agreed with this view by giving to a considerable extent response. The implication of this is that when the people of the Niger Delta have full control of the natural resources in their region, they will use it judiciously to sustainable development in every ramification. Thus, with resource control in place, the people will not rely on the stipends from the practice of corporate social responsibility by the oil companies in their domain.

Testing of hypotheses

Relationship between royalty interest and oil and gas production

H₀₁: There is no relationship between royalty interest and oil and gas production. The aim of this hypothesis was to find out the relationship between royalty interest and oil and gas production. The result of the test show a spearman correlation coefficient ($\rho = 0.785$, $p < 0.05$) (Appendix 2). This reveals a strong and positive relationship between royalty interest and oil and gas production. The null hypothesis is thereby rejected, while the alternative hypothesis is accepted. The literature review of the present study supports this fact (Ingersoll and Rose, 1992). According to Ingersoll and Rose (1992), getting involved in the ownership of minerals beneath the

Table 2. Effect of resource control on Niger-Delta development.

Item	Frequency	Percentage
To a great extent	9	56.25
To a considerable extent	7	43.75
To a moderate extent	0	0
To a slight extent	0	0
Not at all	0	0
Total	16	100.0

Source: Field Data, 2013

ground is the domain of oil and gas royalty interest programs or deals. These types of deals involve receiving a portion of the proceeds from extraction of natural resources like oil and gas and in turn using same for developmental purposes and for the maintenance and management of the oil and gas business. Royalty interest refers to the ownership of a portion of the resource or revenue that is produced (Banks, 1987; Rosenthal, 1988). A company or person that owns a royalty interest does not bear any of the costs of operations needed to produce the resource, yet the person or company still owns a portion of resource of revenue produced (Ingersoll and Rose, 1992).

Relationship between resource control and Niger-Delta development

H₀₂: There is no relationship between implementation of resource control and Niger-Delta development. The purpose of this hypothesis was to determine the relationship between resource control and Niger Delta development. The result of the spearman correlation coefficient ($\rho = 0.756$, $p < 0.05$) (Appendix 2). This implies that there is a positive and significant relationship between resource control and Niger-Delta development. As a result, the null hypothesis was rejected, and the alternative hypothesis accepted. According to Amnesty International (2006), it was observed that oil companies in the region do not pay royalties to the people, rather what the people get are stipends from the practice of corporate social responsibility by the oil companies. As a result, the Niger-Delta people are agitating for the ownership of minerals beneath their ground in order to receive proceeds from the extraction of natural resources like oil and gas, and to fully control the resources in their land (Ingersoll and Rose, 1992). This view supports the findings from our personal interview based on the research question which says, "To what extent can the implementation of resource control through fiscal federalism develop the Niger-Delta?" Thus, the responses obtained were of the view that resource control, which is a principle by which owners of natural resources will be engaged in the exploration, exploitation, extraction and development of the mineral resources in their domain and then pay a specific tax to the relevant tax authorities can

be used to achieve sustainable development in every ramification in the Niger-Delta region.

Discussion of Findings

The main findings of this study are discussed thus:

Relationship between royalty interest and oil and gas production: A royal interest is one paid to the mineral owner who has leased his mineral interests for production. Royalty interest refers to ownership of a portion of the resource or revenue that is produced. With the payment of royalty interest, which is a source of revenue for the use of natural resources in the domain of a people, the proceeds can be used to invest in the oil and gas business in order to recoup more returns. Thus, the statistical analysis of the test gave a spearman correlation coefficient ($\rho = 0.785$). This is to indicate that there is a strong and positive relationship between royalty interest and oil and gas production.

Relationship between resource control and Niger-Delta development: resource control is a principle by which owners of natural resources are engaged in the exploration, exploitation, extraction and development of the mineral resources in their domain and then pay a specific tax to the relevant tax authorities. The Niger-Delta is an oil and gas-rich region, but it is characterized by underdevelopment. With the resource control principle, the proceeds generated from oil and gas production will be used to develop the area by the people. Hence, the statistical analysis of the test provided a spearman correlation coefficient ($\rho = 0.756$). This reveals that there is a positive and significant relationship between resource control and Niger-Delta development.

Conclusion

The findings of the study show a positive relationship between royalty interest management strategy and cost of oil and gas production. Royalty interest refers to the ownership of a portion of the resource or revenue that is produced. A company or person that owns a royalty interest does not bear any of the costs of operations needed to produce the resource, yet the person or company still owns a portion of resource of revenue produced. A royalty interest is the right to collect a stream of future royalty payments, often used in the oil industry to describe a percentage ownership of future production or revenues from specific leasehold which may be divested from the original owner of the asset. Oil and gas production starts from drilling. It involves the process of separating the mixture of oil and gas from water. Thus, we should conclude that royalty interest is a source of revenue paid to a land owner by an oil and gas company for the drilling of oil and gas from his domain, which will

make the land owner to freely allow the oil and gas company to continue the process of oil and gas production.

RECOMMENDATIONS

In the light of our findings, we suggested the following recommendations:

- Revenue right of collecting royalty interest from the oil and gas companies should be accorded the Niger-Delta region so that oil and gas production will take place in the region without disruptions.
- The Niger-Delta should be accorded the right of resource control in order to enable them develop the region in every ramification.

Conflict of Interests

The authors have not declared any conflict of interests.

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CITATION

NNPC (2008). *Oil and Gas Bearing Communities in the Niger Delta*. Bulletin of the Nigerian National Petroleum Corporation, Abuja.

Appendix 1

Spearman's rank correlation analysis of the relationship between royalty interest management strategy and cost of production of oil and gas.

	Statistics	Royalty interest management strategy	Resource control of Niger- Delta	Oil and gas production	Royalty interest
Royalty interest management strategy	Rho	1.000			
Resource control of Niger -Delta	Rho	0.180**	1.000		
oil and gas production	Rho	0.605**	0.244**	1.000	
Royalty interest	Rho	0.785*	0.756*	0.215**	1.000

Source: Survey Data, 2011 and SPSS Output. N = 16

* - Correlation significant at 0.05 level (2-tailed)

** - Correlation significant at 0.01 level (2-tailed)

Appendix 2

Spdc community development spending including contribution to NDDC in dollars (\$).

S/No	Year	Community development	Contribution to NDDC	Total
1.	2000	57,800	N/A	57,800
2.	2001	48,900	30,000	78,900
3.	2003	66,800	48,000	114,800
4.	2004	29,500	54,000	83,500
5.	2005	25,000	69,500	94,500

SOURCE: Obi, E. (2005) Sustainable Community Development SPDC's New Approach for working in and with Communities. Being a paper presented at Shell Seminar for Leaders of Faith-Based Organizations in Rivers State, (November 28).

The background of the entire page is a blurred image of a calculator and a stack of papers. The calculator is in the foreground, showing several buttons like 'x', 'y', and '1/x'. The papers are stacked behind it, with some text visible but mostly out of focus. The overall color scheme is warm, with orange and brown tones.

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