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Determinants of Financial Reporting Quality: Evidence from Listed Agriculture and Natural Resources Firms in Nigeria

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Abstract

This paper investigates the determinants of financial reporting quality in listed Agriculture and Natural Resources firms in Nigeria. Owing to the widespread advocacy to diversify the Nigerian economy, the choice of the Agriculture and Natural Resources sectors, being a prospective mainstay of the economy is necessary, so that investors and other stakeholders will understand the financial reporting practices in the sectors. The sectors comprise of 9 listed Agriculture and Natural Resources Firms, made up of 5 Agriculture and 4 Natural Resources firms. A sample of 7 firms was drawn from the population. Data was collected through secondary sources from annual financial reports of the firms from 2008-2015. The study adopted the correlation and ex-post factor research designs and employed the use regression as a tool for data analysis. The results showed a positive significant relationship between leverage, liquidity, board size and financial reporting quality, measured using residuals from the modified Jones model by Dechow, et al. (1995). It is recommended among others that managers of firms in the Agriculture and Natural Resources sectors maintain an optimum liquidity level and finance their operations from more of debt instruments, so as to ensure quality of reported accounting numbers. The Nigeria Stock Exchange (NSE) should review its monitoring rules to ensure specific rules for the prevention of window dressing activities by management in financial reporting.

Keywords: *Earnings management, Financial reporting quality, Firm characteristics and Nigerian listed agriculture, Natural Resources firms.*

Background to the Study

The need for producing quality financial report has become a global phenomenon. The global financial crises of the 1930s and the recent one in 2008 necessitated the demand for unbiased financial reporting, with the accounting figures not just free of error, but also a true reflection of an organization's activities for the period being reported. Shehu and Farouk (2014) observe that due to the financial crises, accounting earnings reported by corporations may be far from being relevant, reliable and effective. Regulators and other stakeholders place a very high premium on the veracity of financial report. The truthfulness of the report depends on the reliability of reported earnings.

A major managerial function is decision making. Management takes decision on the appropriate accounting policies that underlies the preparation of financial reports. Appropriate measures and values are given to items that make up the financial statements. Management could be subjective in the way it recognizes, measure and allocate values to certain items of expenditure and revenues in the financial report. Pattaraporn (2016) observes that investors give more attention to earnings in the financial reports more than other accounting information; therefore, management becomes prone to influencing accounting earnings in order to meet investors' expectations. According to Shehu (2013) due to income smoothening activities, management can manipulate certain items in the financials to achieve a desired result. Manipulation of earnings impairs on the quality of financial reports and diminishes investors' confidence (Shehu & Abubakar, 2012).

Earnings management is a fundamental aspect of financial reporting quality. How earnings are recognized and measured is essential to the quality of financial reporting. Corporations, through their managers are duty bound to report business activities for the benefit of shareholders, potential investors, regulators/policy makers, suppliers of finance and other stakeholders. This is usually done through the production of annual reports covering their economic, financial, environmental and social activities. These reports are expected to be high quality information, portraying a true and fair view of transactions. However, the practice of earnings management flaws this process of producing quality financial reports and questions the credibility of the quality of reported earnings, Shehu & Abubakar (2012).

Several studies have been conducted on the quality of reported earnings in relation tospecific firm characteristics of corporations in Nigeria. The outcomes of these studies have documented varying and conflicting results, thereby pointing to the inconclusiveness of the subject matter. Besides, though some studies have been carried out in the non financial sector of the Nigerian economy, to the best of the researchers' knowledge, no study have been done in the Agriculture and Natural Resources Sectors on the subject under investigation. Moreover, the call to diversify the Nigerian economy from its overdependence on oil revenue, to other productive sectors is gathering increased momentum. It is therefore expected that the influx of investors into these productive sectors will increase, hence the need to study their financial reporting quality, as investors depend on financial reports to make decisions, Kibiya, Ahmad and Amran, (2016). The choice of studying the Agriculture and Natural Resources sectors is predicated on the

credence that the sectors have great potential to generate revenue to the Nigerian economy. On this basis, it is therefore important and equally necessary to identify the determinants of quality financial reporting. This paper therefore seeks to investigate the determinants of financial reporting quality with a bias for listed Agriculture and Natural Resources firms in Nigeria.

The general intention of this research work is to investigate the determinants of financial reporting quality of listed Agriculture and Natural Resources firms in Nigeria. The specific objectives are to determine the relationship and the impact that firm age, leverage, liquidity, audit committee independence, board size has on financial reporting quality of listed Agriculture and Natural Resources firms in Nigeria.

Understanding the financial reporting practices of Agriculture and Natural Resources firms in Nigeria in relation to specific firm attributes will help regulators and other policy makers to make well informed decisions, regulations and policies to check unhealthy practices of earnings management. Also, the study will reveal the interplay between firm features and financial reporting quality. This will help managers of business and investors and other stakeholders to make knowledgeable investment decisions as they will be able to identify company features that enhance the quality of reported earnings. This research will compliment previous studies done in other sectors and industries in Nigeria, and provide a premise for further researches.

The remaining part of this paper is structured as follows: section two reviews empirical literature, develops the hypotheses of the study and provides the theoretical framework for the study, section three discuses the research methodology and model specification. The empirical results of the research are presented and discussed and the policy implications are highlighted in section four. Section five is devoted to conclusion and recommendations.

Empirical Literature Review, Hypothesis Development and Theoretical Framework

The age of a firm is considered as one of the essential determinants of financial reporting quality. The internal control system of a firm gets stronger with age, and a strong and well structured internal control system guarantees quality financial reporting process, (Huang, Ena & Lee, 2012). As firms advance in age, they also improve in their governance mechanisms, and as a result, become more closely monitored by government regulatory agencies. This is expected to produce a corresponding improved financial reporting practice (Chalaki, Didar, & Riahnezhad, 2012). Based on these studies, the study expects a positive significant relationship between age and financial reporting quality. Thus, the first hypothesis of the study is that age has a positive significant impact on financial reporting quality in listed Agriculture and Natural Resources firms in Nigeria.

In their study of one hundred and thirty six (136) listed firms in the Tehran Stock Exchange (TSE), Chalaki, et al. (2012) used age of firms as a control variable, and found that age is not statistically significant with financial reporting quality. Huang, et al. (2012), Hossain (2008) also reported insignificant relationship. The result of the study of non financials firms in Nigeria by Kibiya, et al. (2016) used firm age as a control variable, and found a significant

association between age and financial reporting quality. Researchers use different measures of age to compute the age of firm. While some use the date of incorporation to the year of reporting (Olowokure, Tanko and Nyor (2016) others use of listing years, which is the number of years the firm has been on the stock exchange (Haniffa & Cook, 2002; Ojeka, Mukoro & Kanu, 2015). Scholars have the liberty to choose which measure is more appropriate, depending on the objectives of their study. The age firm from date of listing on the NSE, to the various reporting years is used for this study. This is because investors have more confidence in firms listed on the stock exchange in addition to the increased monitoring and scrutiny demanded by the stock exchange rules

Leverage refers to the proportion of debt financing in the total capital structure of a firm. It is believed that a proper mix of debt and equity capital increases the value of a firm. Leverage is also connected to financial reporting choices. Agency theory clarifies this link. According to this theory, highly leveraged firms have an inducement to voluntary increase the level of corporate reporting to stakeholders through conventional financial statements (Jensen & Meckling, 1976). Disclosure of financial information lessens agency costs and also makes it easy for creditors to evaluate the volatility of a company, and likely ask more information to safeguard their resources (Botosan & Plumlee, 2002; Fathi, 2013).

Extant literature reports varying interaction between leverage and financial disclosure quality. Fathi, (2013), Olowokure, et al. (2016), Agyei-Mensah, (2012), Uwuigbe, Uwuigbe and Okorie (2015), Akhtaruddin, Hossain, Hossain and Yao (2009) did not find any statistical relationship. On the contrary, the regression result of the work of Shehu (2013), Amr (2016), Shehu and Farouk (2014), Karami and Akhgar (2014), Kim and Yang (2014) found positive significant relationship between firm leverage and financial reporting quality. For the purpose of this study, the second hypothesis is stated thus: Leverage has a positive significant effect on financial reporting quality of listed Agriculture and Natural Resources firms in Nigeria.

The ability of a firm to meet its current obligations as they fall due is an indication to investors and creditors of its continued existence in the future. Thus, it will be willing to report its liquidity position to the public (Shehu & Farouk, 2014). Liquidity is also an indication of a healthy financial performance of a firm. A firm with good financial performance indices such as liquidity has more inducement to provide earnings information of higher quality, Amr (2016). According to Wallace et al. (1994), Wallace and Nasser (1995) and Alsaeed (2006) as cited by Shehata, Dahawy & Ismail (2014) firms with very impressive liquidity are more likely to disclose information on their performance to investors and other stakeholders. On the other hand, firms with low liquidity may also reveal more information to show that management is aware of the company's position and to avoid claims my shareholders.

Empirical researchers have found differing association between liquidity and financial reporting quality. The findings of Amr (2016), Takhtaei and Mousavi (2012), Shehu and Farouk (2014) revealed a positive significant relationship between liquidity and financial reporting quality. Shehu and Ahmad (2013), Shehata, et al. (2014) however reported a

negative significant relationship. Aljifri, Alzarouni, Ng & Tahir (2014) found an insignificant relationship in their study. This study would however hypothesize that liquidity has a positive influence on financial reporting quality of listed Agriculture and Natural Resources firms in Nigeria.

The Audit Committee is seen as a vital and prominent player in corporate governance of an organization. In view of this, audit committee maintains and boosts public confidence in the trustworthiness and the neutrality of financial reporting, through improving the reporting practices of published information (Bedard & Gendron, 2010; Kelton & Yang, 2008). In the same light, Shehu (2013) stated that an effective audit committee is suppose to improve financial reporting quality by carrying out its functions of reviewing financial statements and approving accounting policies among other functions. Audit committee independence measures the proportion of non executive directors in the audit committee. Independent directors on audit committee have no financially viable or personal relationship with management; therefore they are likely to work autonomously and without bias from management manipulation (Bedard & Gendron, 2010).

Klein (2006) in a study of six hundred and eighty seven (687) sampled US firms listed in S&P 500 found significant relationship between audit committee independence and earnings management, only when the composition of the committee is not 100%. Amazingly a 100% independent committee produced an insignificant relationship. Madi, Ishak & Manaf (2014), Kibiya, et al. (2016) found a positive significant association. However, Bala and Kumai (2015) could not find a significant relationship. For this study, we would test the hypothesis that audit committee independence has a positive significant impact on financial reporting quality of listed Agriculture and Natural Resources firms in Nigeria.

The board of directors has been found to impact on quality financial reporting. According to Obigbemi, Omolehinwa, Mukoro, Ben-Caleb & Olusanmi (2016) the Nigerian Code of Corporate Governance specifies that the composition of the board of directors must ensure diversity, so that integrity, compatibility, independence and availability will not be compromised. Furthermore, the board should be made up of both executive and non-executive directors to be headed by a Chairman, and the membership should be from 5 to 15 persons. Abu-Siam, Laili, & Bin-Khairi (2014) argue that board of directors play a supervisory role of controlling the reliability and quality of financial reports, because managers are prone to manage earnings to the detriment of shareholders.

Empirical results of the relationship between board size and earnings quality have been documented. A recent study by Akeju and Babantuntde (2017) examined this relationship for 40 listed firms in Nigeria, for the period 2006-2015. The study reported a positive significant relationship between board size and financial reporting quality. In the same vein, Kankanamage (2015), Obigbemi, et al. (2016), Shehu (2013) and Swastika (2013) also reported positive relationship in their studies. Conversely, an Indonesian study by Nugroho and Eko (2011) reported an insignificant relationship. This study however hypothesize that board size has a positive significant influence on financial reporting quality of listed Agriculture and Natural Resources firms in Nigeria.

Several theories have been used to explain the association between firm attributes and financial reporting quality. This includes the agency theory, the political cost theory and opportunistic theory among others. The agency theory defines the principal-agent relationship. The principal here are shareholders while agents refer to the managers. These parties have divergent interests, thus giving rise to agency costs, Shehata (2014). Disclosures by way of financial reporting and regulation help to mitigate the agency problem as it requires that management of corporations report both mandatory and voluntary information for the benefit of shareholders and other interest parties. By and large, since managers have first hand information about operations of a business, they are duty bound by the agency theory to report as appropriate to the owners of the businesses. This paper therefore adopts the agency theory as the theoretical support for this research work.

Methodology and Model Specification

For this study, the correlation and ex-post research design is used. Correlation research design is adopted because it is usually employed to investigate the relationship between two variables or more. Also, the ex-post factor design helps to investigate possible cause and effect relationships among variables. The population of the study is nine (9) listed Agriculture and Natural Resources firms in Nigeria as at 31st December, 2015, comprising of five (5) Agriculture Firms and four (4) Natural Resources Firms. Censoring sampling technique which is based on availability of data and the period of the study provided a basis for the selection of samples of the population of study. The study period is from 2008-2015. This was chosen so as to have a good representation of firms in the population, as two of the firms were listed on the NSE in 2008. This means that a study period prior to 2008 will not include these two firms, which will not give a justifiable representation of the population. Consequently, two firms were eliminated, one apiece from each sectors, leaving a sample of seven (7) firms for the study. The study used longitudinal balanced panel data from secondary sources because it is a quantitative study with positivism paradigm. The data were extracted from the audited financial reports of the selected firms within the period of the study. Multiple regression is adopted to examine the model of the study. Longitudinal panel data is used to account for individual diversity of the sample companies.

Two steps regression is employed. Firstly, the residuals from the modified Jones Model by Dechow, Sloan & Sweeny (1995) which represent the discretionary portion of accruals is used to derive values for financial reporting quality, which is the dependent variable of the study and secondly, the regression of the model of the study. The modified Jones model by Dechow, et al. (1995) adjusted to separate the discretionary accruals (DA) portion from the non discretionary portion of total accruals is given as:

$$DA = TA/A_{t-1} - \beta_1 (1/A_{t-1}) + \beta_2 (\Delta \text{ in } Rev_{it} - \Delta \text{ in } Rec_{it})/A_{t-1}) + \beta_3 (PPE/A_{t-1})$$

The values so derived for financial reporting quality are substituted as values for FRQ in the model of the study which is given as:

$$FRQ_{it} = \beta_{0it} + \beta_1 FAGE_{it} + \beta_2 LEVE_{it} + \beta_3 LIQU_{it} + \beta_4 ACIN + \beta_5 BSIZ + \epsilon_{it,}$$

where FRQ is financial reporting quality; FAGE is firm age; LEVE is leverage; LIQU is liquidity; ACIN is audit committee independence; BSIZ is board size; β_0 is Intercept; β_{1-5} are Coefficients of the independent variables; ϵ is the error term; i is firm and t is year.

Results and Discussions

This section presents the descriptive statistics, correlation matrix and the summary of the regression results followed by analysis and discussions of what the figures portrays.

Table 1: Descriptive Statistics

Variables	No. of Observations	Mean	Standard Deviation	Minimum	Maximum
FRQ	56	0.0789	0.0737	0.0033	0.3423
FAGE	56	19.3571	12.3088	1	38
LEVE	56	0.4703	0.1764	0.062	0.8121
LIQU	56	1.3552	1.3750	0.043	7.7884
ACIN	56	0.5006	0.0295	0.3333	0.6
BSIZ	56	8.0714	2.1647	4	12

Source: Output of STATA result

Table 1 presents the descriptive statistics for all the variables of the study. From the description, it is observed that for the sampled firms and for the period covered by the study, the average value for financial reporting quality (FRQ) is 0.0789 with standard deviation of 0.0737 which is very close to the mean. Also, the least and highest numbers of years (FAGE) of listing on the NSE are 1 and 38 respectively. The mean value leverage (LEVE) of 0.47 or 47% is an indication that debt financing in the Agriculture and Natural Resources sectors is to the tune of 47% of the total finance sources. The remaining 53% are sourced from equity financing. The liquidity (LIQU) position of the firms on the average of 1.36 falls below the safety benchmark of 2.0. This signals that the samples firms may be grappling with liquidity challenges, barely able to meet current obligations as they fall due. Audit committee independence (ACIN) has a mean value of 0.50, suggesting that the composition of the audit committee between shareholders and directors are equal at 50% each. The minimum and maximum board size of 4 and 12 respectively shows that the provisions of the Nigerian code of corporate governance is not fully complied with as the minimum number of directors should be 5.

Table 2: Correlation Matrix

VARIABLES	FRQ	FAGE	LEVE	LIQU	ACIN	BSIZ
FRQ	1					
FAGE	0.1953	1				
LEVE	0.2820	0.1516	1			
LIQU	0.2221	-0.1962	-0.4428	1		
ACIN	0.1861	0.0645	0.0333	0.0121	1	
BSIZ	0.1557	-0.1177	-0.1230	-0.0373	0.1608	1

Source: Output of STATA result

Table 2 captures the correlation values between the independent variables and dependent variable as well as among independent variables themselves. From the table it is revealed that all the independent variables of the study are weakly but positively associated with FRQ of listed Agriculture and Natural Resources Firms in Nigerian. The correlation matrix also revealed that no two explanatory variables were perfectly correlated. This means that there is the absence of multicolinearity problem in the model.

Table 3: Summary of Regression Result – Fixed Effects Model

FRQ	Coefficient	t- test	Probability	Variance Inflation Factor (VIF)
FAGE	0.0044	1.11	0.271	1.07
LEVE	0.1863	2.53	0.015	1.28
LIQU	0.0296	3.37	0.002	1.29
ACIN	0.1074	0.35	0.726	1.04
BSIZ	0.0158	1.88	0.067	1.08
INTERCEPT	-0.3158	-2.04	0.047	-
	R^2=0.2609	**FStat=3.11**		**P>F=0.0174**
	Hausman:	**Ch2=38.24**		**pro>chi2=0.0000**

Source: Output of STATA result

Table 3 is the regression result of the fixed effect model. The model was selected for interpretation because the hausman specification test favors the fixed effect model with, probability of 0.000 which is significant at 1%. The cumulative R^2 of 0.26 is the multiple coefficient of determination which shows the percentage of the total variation in the dependent variable explained by the independent variable together. Therefore, it indicates that 26% of total change in financial reporting quality of Listed Nigerian Agriculture and Natural Resources firms is explained by their level of age, leverage, liquidity, audit committee independence and board size. The value of F- statistics of 3.11 is significant at 5% level of significance. This indicates that the model is fit and the explanatory variable are properly selected, combined and used. The results of the VIF further prove the absence of perfect multicollinearity among the independent variables, because the maximum Variance Inflation Factor (VIF) is 1.29. The rule of thumb is that a value of VIF of 10 and above is a suggestion of multicolinearity among the explanatory variables (Gujarati, 2004).

Test of Hypothesis and Policy Implication

The result shows that firm age is positive but not significantly related to financial reporting quality. This implies that the higher the listing years of Agriculture and Natural Resources firms in the NSE, the higher the financial reporting quality. However, the result shows that listing age does not improve on their financial reporting quality. Most investors have more confidence in the operations of firms listed on the NSE than the unlisted ones, because of the increased monitoring and scrutiny by the NSE rules. The insignificant impact of age on financial reporting quality in the study may be a pointer that the additional monitoring rules by the NSE are not sufficient to check earnings

management practices of the firms. It may also be a reflection that the internal control systems in the sampled firms is weak. As a matter of policy implication, the NSE may wish to review its monitoring rules to ensure specific rules for the prevention of window dressing activities by management in financial reporting. Therefore, the study rejects the hypothesis that age has a positive significant impact on financial reporting quality of listed Agriculture and Natural Resources firms in Nigeria. The statistically insignificant result of this study between age and financial reporting quality agrees with the results from the work of Huang, et al. (2012), Chalaki, et al. (2012) and Hossain (2008) among others.

The relationship between leverage (which is measured as the ratio of total liabilities to total asset) and financial reporting quality is positively significant at 5%. This is an indication that the higher the leverage level in the Listed Agriculture and Natural Resources firms, the higher the quality of reported earnings. This may be the result of strict monitoring of the activities of the business by providers of debt financing, in order to safeguard their interest, thereby compelling an incentive to voluntary reporting by managers. Thus, the hypothesis that leverage has a positive significant influence on financial reporting quality of listed Agriculture and Natural Resources firms in Nigeria is accepted. This result concurs with the study of Shehu (2013), Karami and Akhgar (2014), Kim and Yang (2014), Shehu and Farouk (2014) and Amr (2016). Management and shareholders of firms in the Agriculture and Natural Resources firms in Nigeria as an issue of internal policy decision, may agree to increase leverage position to a level high enough to maintain the incentive to report quality accounting numbers, while also noting the financial risk of maintaining an unprecedented leverage level.

Furthermore, the interaction between liquidity (measured as current ratio) and financial reporting quality shows that a positive significant relationship is also reported, with probability value of 0.002 which is significant at 1%. This means that a strong and high liquidity position of the listed Agriculture and Natural Resources firms in Nigeria will enhance financial reporting quality. This finding corroborates the position that firms with good performance indices such as liquidity, profitability, etc, will like to disclose their performance in the financial report. Moreover, regulators, investors, analysts and other users of financial reports are interested in the liquidity with regard to the going concern of the firm and its ability to meet current obligations. This provides an evidence to fail to reject the hypothesis that liquidity has a positive significant effect on financial reporting quality of listed Agriculture and Natural Resources firms in Nigeria. Positive significant relationship is also reported by Takhtaei and Mousavi (2012), Amr (2016) and Shehu and Farouk (2014). This understanding of the positive relationship between liquidity and financial reporting quality in the Agriculture and Natural Resources sectors could elicit, as a matter of policy, the maintenance of an optimum level of liquidity by management.

The regression result between audit committee independence (measured as the ratio of non-executive members to total committee members) and financial reporting quality disclose a positive but insignificant relationship between them, with probability value of 0.726. This suggests that the non-executive members of the audit committee of listed Agriculture and Natural Resources firms in Nigeria may not have the capacity to check

income smoothening activities of management. Possible causes of this may be that the independent members of the audit committee lack requisite knowledge, skill and exposure to adequately perform their role. Policy makers should not define independence of the audit committee more on the number of independent members, but on the possession of essential knowledge and experience, in order to check unethical practices in financial reporting. Consequently, the study rejects the hypothesis that audit committee independence has a positive significant impact on financial reporting quality of listed Agriculture and Natural Resources firms in Nigeria. Previous studies by Bala and Kumai (2015), Temple (2016), Hamdan, Mushtaha & Al-Sartawi (2013), Nelson and Jamil (2011), documented similar results with this study.

Finally, the regression effect for board size (measured as the number of board of directors) and financial reporting quality reflects a probability value of 0.067 which is significant at 10% with a t-value of 1.88. This provides a basis for failing to reject the hypothesis that board size has a positive significant influence on financial reporting quality. Akhtaruddin, et al. (2009), Fodio, Ibikunle, & Oba (2013), Kankanamage (2015), Swastika (2013) among others reported similar result with this study. It goes to say that the number of directors in listed Agriculture and Natural Resources firms in Nigeria is sufficient to control the reliability of financial report through effective monitoring and checking the dominance of the Chief Executive. It is also a reflection that the number of directors was selected to guarantee diversity, so that integrity, compatibility, independence and availability are not compromised. Policy makers may wish to maintain the status quo in the number of directors on the board of corporations, while ensuring diversity, integrity and independence among members of the board.

Conclusion and Recommendations

The listed Agriculture and Natural Resources sectors in Nigeria was the focus of this study, due to the inherent potentials in these sectors of becoming the mainstay of the Nigerian economy, and for regulators, investors as well as potential investors, to know the financial reporting practices in the sectors. From the findings of the study, it is concluded that corporate features especially leverage, liquidity, and board size determine financial reporting quality in listed Agriculture and Natural Resources firms in Nigeria. The study therefore recommends that the firms may increase their leverage levels, which apart from enjoying the benefits of debt financing such as tax shield, provides an incentive to quality earnings reporting. A good liquidity position should be maintained as it has been found not only to preserve the going concern of the firm but also a strong feature for enhancing the quality of financial reporting. The board size of between 4 and 12 is recommended as it has been found that this size is adequate to check earnings manipulation in the sectors. Emphasis should not be placed on the number of independent members of the audit committee, but on their ability to checkmate management tendencies to manipulate the financials. The NSE should review its monitoring rules to ensure definite rules for the prevention of window dressing behavior of management in financial reporting. This will further boost investors' confidence in listed firms in the NSE.

This study focused only on the Agriculture and Natural Resources sectors of the Nigerian economy. Further studies could explore the subject matter in other productive sectors of the economy, incorporating explanatory variables such as audit fees, committee meetings, ownership structure and other corporate features not considered in this study.

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Appendix 1: List of Quoted Agriculture and Natural Resources Firms in Nigeria

S/N	Name of Company	Sector
1	ELLAH LAKES PLC. ***	Agriculture
2	FTN COCOA PROCESSORS PLC	Agriculture
3	LIVESTOCK FEEDS PLC.	Agriculture
4	OKOMU OIL PALM PLC.	Agriculture
5	PRESCO PLC	Agriculture
6	ALUMINIUM EXTRUSION IND. PLC.	Natural Resources
7	B.O.C. GASES PLC.	Natural Resources
8	MULTIVERSE MINING AND EXPLORATION PLC	Natural Resources
9	THOMAS WYATT NIG. PLC***.	Natural Resources

*** Not included in the study due to incomplete financial statement and annual reports.

Appendix 2: Regression Results
First Stage Regression (Derivation of FRQ)

```
  ___  ____  ____  ____  ____ (R)
 /__    /   ____/   /   ____/
___/   /   /___/   /   /___/   11.0   Copyright 1984-2009
  Statistics/Data Analysis            StataCorp
                                      4905 Lakeway Drive
     Special Edition                  College Station, Texas 77845 USA
                                      800-STATA-PC        http://www.stata.com
                                      979-696-4600        stata@stata.com
                                      979-696-4601 (fax)

Single-user Stata license expires 31 Dec 9999:
       Serial number:  71606281563
         Licensed to:  STATAForAll
                       STATA

Notes:
      1.  (/m# option or -set memory-) 50.00 MB allocated to data
      2.  (/v# option or -set maxvar-) 5000 maximum variables
      3.  New update available; type -update all-

. edit

. *(6 variables, 56 observations pasted into data editor)

. xtset id fyear, yearly
       panel variable:  id (strongly balanced)
        time variable:  fyear, 2008 to 2015
                delta:  1 year

.
. reg sloan astiv jrret jppet

      Source |       SS       df       MS              Number of obs =      56
-------------+------------------------------           F(  3,    52) =    1.26
       Model |  .046893533     3  .015631178           Prob > F      =  0.2989
    Residual |  .646818197    52  .012438811           R-squared     =  0.0676
-------------+------------------------------           Adj R-squared =  0.0138
       Total |   .69371173    55  .012612941           Root MSE      =  .11153

------------------------------------------------------------------------------
       sloan |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       astiv |  -3.710602   3.665411    -1.01   0.316    -11.06579    3.644583
       jrret |   .0142349   .0288914     0.49   0.624    -.0437398    .0722097
       jppet |  -.0805514   .0619661    -1.30   0.199    -.2048956    .0437927
       _cons |   .0325016   .0434399     0.75   0.458    -.0546669    .1196702
------------------------------------------------------------------------------

. predict FRQ, residuals

щ
```

This is the first stage regression to derive the values of the dependent variable, FRQ from the modified Jones Model by Dechow, et al. (1995).

Sloan is total accrual divided by total asset; astive is 1/total asset; jrret is the difference between change in revenue and change in receivables all divided by total asset and jppet is property, plant and equipment divided by total asset.

Second Stage Regression (Model of the Study)

```
  ___  ____  ___  ____  ___ (R)
 /__    /   ____/   /   ____/
___/   /   /___/   /   /___/   11.0   Copyright 1984-2009
  Statistics/Data Analysis            StataCorp
                                      4905 Lakeway Drive
     Special Edition                  College Station, Texas 77845 USA
                                      800-STATA-PC        http://www.stata.com
                                      979-696-4600        stata@stata.com
                                      979-696-4601 (fax)

Single-user Stata license expires 31 Dec 9999:
       Serial number:  71606281563
         Licensed to:  STATAForAll
                       STATA

Notes:
      1.  (/m# option or -set memory-) 50.00 MB allocated to data
      2.  (/v# option or -set maxvar-) 5000 maximum variables
      3.  New update available; type -update all-

. edit

. *(8 variables, 56 observations pasted into data editor)

. xtset id fyear, yearly
       panel variable:  id (strongly balanced)
        time variable:  fyear, 2008 to 2015
                delta:  1 year

.
. summarize frq fage leve liqu acin bsiz
```

Variable	Obs	Mean	Std. Dev.	Min	Max
frq	56	.0788821	.0736508	.0033	.3423
fage	56	19.35714	12.3088	1	38
leve	56	.4703179	.1764219	.062	.8121
liqu	56	1.355164	1.375011	.043	7.7884
acin	56	.5005946	.0294708	.3333	.6
bsiz	56	8.071429	2.164651	4	12

```
. swilk frq fage leve liqu acin bsiz
```

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
frq	56	0.80898	9.827	4.906	0.00000
fage	56	0.90845	4.710	3.327	0.00044
leve	56	0.98687	0.675	-0.843	0.80028
liqu	56	0.65224	17.890	6.192	0.00000
acin	56	0.71907	14.452	5.734	0.00000
bsiz	56	0.97501	1.286	0.539	0.29482

```
. pwcorr frq fage leve liqu acin bsiz
```

	frq	fage	leve	liqu	acin	bsiz
frq	1.0000					
fage	0.1953	1.0000				
leve	0.2820	0.1516	1.0000			
liqu	0.2221	-0.1962	-0.4428	1.0000		
acin	0.1861	0.0645	0.0333	0.0121	1.0000	
bsiz	0.1557	-0.1177	-0.1230	-0.0373	0.1608	1.0000

```
. reg frq fage leve liqu acin bsiz
```

Source	SS	df	MS
Model	.10548513	5	.021097026
Residual	.192859153	50	.003857183
Total	.298344283	55	.005424442

```
Number of obs =      56
F(  5,    50) =    5.47
Prob > F      =  0.0004
R-squared     =  0.3536
Adj R-squared =  0.2889
Root MSE      =  .06211
```

frq	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
fage	.0014342	.0007033	2.04	0.047	.0000215	.0028468
leve	.2050551	.0537924	3.81	0.000	.0970098	.3131004
liqu	.0264866	.0069289	3.82	0.000	.0125696	.0404037
acin	.2719277	.2897696	0.94	0.353	-.3100916	.853947
bsiz	.0083447	.004012	2.08	0.043	.0002862	.0164031
_cons	-.2846928	.1451203	-1.96	0.055	-.5761755	.0067899

```
. vif

    Variable |       VIF       1/VIF
-------------+----------------------
        liqu |      1.29    0.772629
        leve |      1.28    0.778682
        bsiz |      1.08    0.929823
        fage |      1.07    0.935816
        acin |      1.04    0.961651
-------------+----------------------
    Mean VIF |      1.15

. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of frq

         chi2(1)      =    10.88
         Prob > chi2  =   0.0010

. xtreg frq fage leve liqu acin bsiz,fe

Fixed-effects (within) regression               Number of obs      =        56
Group variable: id                              Number of groups   =         7

R-sq:  within  = 0.2609                         Obs per group: min =         8
       between = 0.4251                                        avg =       8.0
       overall = 0.2627                                        max =         8

                                                F(5,44)            =      3.11
corr(u_i, Xb)  = -0.6632                        Prob > F           =    0.0174

------------------------------------------------------------------------------
         frq |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        fage |   .0044391   .0039854     1.11   0.271     -.003593    .0124712
        leve |   .1863156   .0735379     2.53   0.015     .0381097    .3345215
        liqu |   .0296216   .0088001     3.37   0.002     .0118861    .0473571
        acin |   .1073949   .3048666     0.35   0.726    -.5070234    .7218132
        bsiz |   .0157611   .0084044     1.88   0.067    -.0011767     .032699
       _cons |  -.3157917   .1548268    -2.04   0.047    -.6278245   -.0037588
-------------+----------------------------------------------------------------
     sigma_u |  .04893433
     sigma_e |  .05946645
         rho |  .40374954   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(6, 44) =     1.76               Prob > F = 0.1306

. est store fe

. xtreg frq fage leve liqu acin bsiz,re

Random-effects GLS regression                   Number of obs      =        56
Group variable: id                              Number of groups   =         7

R-sq:  within  = 0.2308                         Obs per group: min =         8
       between = 0.6479                                        avg =       8.0
       overall = 0.3536                                        max =         8

Random effects u_i ~ Gaussian                   Wald chi2(5)       =     27.35
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000

------------------------------------------------------------------------------
         frq |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        fage |   .0014342   .0007033     2.04   0.041     .0000557    .0028126
        leve |   .2050551   .0537924     3.81   0.000     .0996238    .3104863
        liqu |   .0264866   .0069289     3.82   0.000     .0129063     .040067
        acin |   .2719277   .2897696     0.94   0.348    -.2960102    .8398657
        bsiz |   .0083447    .004012     2.08   0.038     .0004812    .0162081
       _cons |  -.2846928   .1451203    -1.96   0.050    -.5691234   -.0002622
-------------+----------------------------------------------------------------
     sigma_u |          0
     sigma_e |  .05946645
         rho |          0   (fraction of variance due to u_i)
------------------------------------------------------------------------------

. est store re

. hausman fe re

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |       fe           re         Difference          S.E.
-------------+----------------------------------------------------------------
        fage |    .0044391     .0014342        .0030049        .0039229
        leve |    .1863156     .2050551       -.0187394        .0501418
        liqu |    .0296216     .0264866         .003135        .0054252
        acin |    .1073949     .2719277       -.1645329        .0947484
        bsiz |    .0157611     .0083447        .0074165        .0073849
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       38.24
                Prob>chi2 =      0.0000
                (V_b-V_B is not positive definite)

щ
```