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Sustainability Disclosure and Market Value of Quoted Oil and Gas Companies in Nigeria

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Abstract

This study has been carried out to examine disclosure and market value of quoted oil and gas companies in Nigeria. The Nigerian oil and gas industry plays a crucial role in fostering economic growth and development. This research employed an ex-post facto research design, with the study population comprising eight (8) publicly listed oil and gas companies on the Nigerian Exchange Group (NEG) as of December 31, 2022. A purposive sampling technique was utilized to select a sample size of seven (7) companies based on data availability. The study spanned from 2012 to 2021, and data were extracted from the annual reports and accounts of the sampled companies on the NEG. Descriptive and inferential statistics were applied to analyze the data, with the testing of hypotheses conducted through panel data regression analysis employing robust cluster standard error. The findings revealed that environmental cost disclosure had a negative and significant impact on market value, while community development cost disclosure had a negative and insignificant effect on the market value of the oil and gas companies. The study concluded that caution should be exercised in disclosures to prevent adverse effects on the firm's market value. Additionally, it recommended that disclosures be closely monitored to avoid negative impacts on the company's market value.

Keywords: Disclosure, Nigerian Exchange Group, Market Value, Oil and Gas Companies, #SDG9.

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1.0 Introduction

The Nigerian oil and gas sector plays a vital role in driving the nation's economic growth and development, holding a strategic position as the primary contributor to foreign exchange earnings. Accountants are particularly focused on devising acceptable accounting practices for industry operators, aiming to accurately reflect the industry's overall financial position. The Nigerian Accounting Standards Board (NASB), now the Financial Reporting Council of Nigeria (FRCN), has established accounting standards for the industry, complemented by other regulatory frameworks such as the Company and Allied Matters Acts (CAMA) (2004) (as amended), The Nigerian Upstream Petroleum Regulatory Commission (NUPRC) , among others.

The contemporary business environment, characterized by competitiveness and dynamism, underscores the necessity for increased information disclosures to aid stakeholders in making informed economic decisions. Given the importance of financial information for economic decision-making, the quality of financial statements relies on the underlying accounting standards. Financial statements serve as the foundation for decisions made by economic agents, financial authorities, and other stakeholders. Accounting standards directly influence the supervisory role of the (NUPRC) and the oversight functions of the National Assembly, as operators in the petroleum industry provide a comprehensive overview of the industry's liquidity, profitability, and financial status. Hope (2003) emphasizes the contribution of accounting standards to reinforcing financial stability, while Salvioni & Bosetti (2014) assert that reporting on corporate sustainability informs stakeholders about corporate responsibility.

The specter of corporate failure underscores the importance of disclosures and transparency. Patrache (2009) highlights that an excessive focus on Enron's immediate financial success led to the abrupt demise of the energy giant. The repercussions of corporate failures extend beyond the organization, affecting corporate stakeholders. This study aims to investigate the relationship between disclosure practices and the market value of quoted oil and gas companies in Nigeria.

1.1 *Statement of Research Problem*

Financial statements serve as the foundation for the decisions made by economic and financial agents, as well as authorities. However, the absence of explicit guidelines from the Nigerian government regarding the conduct and reporting of social and environmental responsibility has resulted in voluntary environmental reporting. Notably, in the history of sustainability reporting, oil and gas companies tend to increase their reporting activities following adverse events such as spills. Patten (1992)

observed a surge in environmental disclosure by oil and gas companies in their annual reports after the Exxon Valdez oil spill in 1989. Similarly, Deegan, Rankin and Voght (2000) identified changes in disclosure practices following events like the Exxon Valdez oil spill and the Bhopal disaster.

Given the imperative for oil and gas companies to justify their legitimacy in the context of environmental impact, there is a need for sustainability performance and effective communication through sustainability accounting information to stakeholders. As highlighted by Asuquo, Dada and Onyeogaziri (2018), in the present era of information-driven economics, the increased demand from investors and other stakeholders for accounting information disclosure is more voluntary than mandatory, lacking globally accepted standards for reporting. These circumstances contribute to setbacks in the comparability and quality of accounting information. Consequently, this study aims to investigate the relationship between disclosure practices and the market value of quoted oil and gas companies in Nigeria. The adapted model for this study is expected to make a valuable contribution to existing knowledge.

1.2 *Objectives of the Study*

The main objective of this study is to identify the sustainability disclosure and market value of quoted oil and gas companies in Nigeria.

The specific objectives of this study are to:

1. examine the effect of environmental cost disclosure on market value of quoted oil and gas companies in Nigeria;

2. investigate the effect of community development cost disclosure on market value of quoted oil and gas companies in Nigeria.

1.3 *Research Hypotheses*

The hypotheses of this study are stated in null.

H_{01}: Environmental cost disclosure has no significant effects on market value of quoted oil and gas companies in Nigeria.

H_{02}: Community development cost disclosure has no significant effect on market value of quoted oil and gas companies in Nigeria.

2.1 Conceptual Review

2.1.1 *Financial Disclosure*

Financial reporting plays a crucial role in offering valuable information to external stakeholders, either serving decision-making purposes or meeting accountability requirements. As outlined by the International Accounting Standards Board (IASB), the primary objective of financial statements is to furnish information about the financial position of an enterprise. This information aims to be useful to a broad spectrum of users, aiding them in making informed economic decisions (Salvioni and Bosetti, 2014).

2.1.2 *Environmental Disclosure*

Environmental disclosure refers to the communication, notification, or reporting of information related to soil contamination, ground contamination, surface water contamination, or energy emissions, either by or on behalf of the entity, to environmental authorities or other third parties. It represents a form of corporate responsibility arising from activities that have a negative impact on the environment. Environmental disclosure involves fulfilling the informational needs of the company's stakeholders, including investors, shareholders, customers, and others (Oshiole, Elamah, and Amahalu, 2020). Effective corporate communication is pivotal in reporting sustainability disclosure. According to Salvioni & Bosetti (2014), reporting on corporate sustainability serves as a means to apprise stakeholders about the corporation's responsibility to its various stakeholders.

2.1.3 *Market Value*

Maximizing shareholder wealth involves increasing the disparity between the market value of a company's stock and the equity capital provided by shareholders, often referred to as market value added. As outlined by Achmad, Luqi and Moch (2017), market value added serves the purpose of reflecting the company's performance since its inception, primarily based on the stock value. In essence, market value added is understood as the surplus of the market value of capital over the book value of capital. This metric is instrumental in assessing the growth and success of a company from its establishment, gauged through the lens of its stock market performance. The formula is: $\mathrm{MVA} = \mathrm{MV} - \mathrm{CE}$

Where: MVA = Market Value Added, MV = Market Value of company, CE = Capital Employed.

2.1.4 *Community Development Cost*

Community development cost refers to the expenses incurred in the development of the community where a company operates. Due to their operational activities, oil and gas companies play a significant role in contributing to environmental issues such as pollution, improper waste disposal, oil spillage, and adversely affecting communities and individuals reliant on land and water for their livelihoods. For example, certain oil and gas companies, especially those in the Niger Delta region, have faced accusations of oil spillages that have had detrimental effects on farmlands and water resources (Salvioni and Bosetti, 2014).

2.1.5 *Environmental Cost*

Environmental cost encompasses the expenditures required to address environmental damage resulting from past events or transactions, or to compensate third parties affected by such damage or loss. Corporate activities can give rise to various environmental costs, including but not limited to soil contamination, surface water contamination, air and energy emissions, cleanup expenses, environmental fines and penalties, costs related to pollution prevention technologies, and waste management.

Oil and gas companies bear significant responsibilities when their operations negatively affect the environment. Consequently, these companies disclose and report aspects of their performance that may pose risks to their operations and entail future obligations. According to Salvioni and Bosetti (2014), reporting on corporate sustainability serves as a means to communicate corporate responsibility to stakeholders. This implies that a company is accountable for its actions in three dimensions: environmentally, socially, and in terms of governance.

2.2 Review of Prior Empirical Studies

Nwokoji (2021) conducted an investigation into the relationship between environmental accounting and the profitability of selected quoted oil and gas companies in Nigeria from 2012 to 2017. The study specifically focused on the correlation between environmental expenditure and the net profit of these companies. Employing an explanatory, historical, and correlational design, the study utilized secondary data. The findings indicated that there was no significant relationship between environmental expenditure and the net profit of the oil and gas companies that were studied.

Akinlo and Iredele (2014) empirically explored the impact of environmental information disclosure on the market value of fifty quoted companies in Nigeria over the period 2003-2011. The aggregate and individual impact of Corporate

Environmental Disclosure (CED) were regressed on market value (Tobin's Q) while firm size was factored in as an extraneous variable. Their analysis revealed a negative impact of community development cost on market value.

Felicia, Poppy, Vince and Novita (2022) investigated the effect of environmental, social, and governance disclosure on firm value. Their study focused on non-financial companies listed on the Indonesia Stock Exchange from 2016 to 2021, employing purposive sampling. The results indicated a negative effect of environmental disclosure on firm value.

Natalia, Lars, Hasseli and Hendrik (2009) investigated the effect of environmental disclosure on the market value of listed companies in Sweden using residual income valuation model. The result showed that environmental responsibility as disclosed by sampled companies has value relevant, since it is expected to affect the future earnings of listed companies.

Handoyo and Angela (2021) explored the relationship between a firm's characteristics and environmental disclosure quality. The study involved 33 listed firms on the Indonesian Stock Exchange consistently issuing sustainability reports from 2014 to 2016. Simultaneous tests suggested that the characteristics of the firm significantly explained the variance in environmental disclosure quality, with leverage being the only variable significantly influenced.

Koaje, Abubakar, Ibrahim and Adeiza (2019) assessed sustainability reporting in relation to the financial performance of oil marketing firms in Nigeria. The longitudinal study, spanning from 2003 to 2013, revealed a positive and significant relationship between total assets, total turnover, and sustainability information disclosure of oil marketing companies in Nigeria.

Jalia and Komathy (2019) studied the relationship between sustainability reporting and firm financial performance in Malaysia. Using secondary data from annual corporate reports, content analysis, and regression techniques, the study found a positive relationship between sustainability reporting and financial performance, measured by return on assets and earnings per share among firms in Malaysia.

Yossi (2018) investigated the mediating effect of disclosures on financial performance and firm value in Indonesia. The study, covering the period 2013-2015 and utilizing the Jakarta Islamic index to assess sustainability disclosure, showed that higher sustainability disclosure significantly increased firm value.

Nnamani, Onyekwelu and Ugwu (2017) assessed sustainability accounting and reporting on the financial performance of the Nigerian Breweries industry Limited to

the Nigerian Breweries industry. The study used data from financial statements of three sampled firms and ordinary linear regression. The results revealed a positive and significant effect of sustainability accounting on the financial performance of the studied firms.

2.3 Stakeholder Theory

Edward Freeman pioneered stakeholder theory in 1984, advocating that a firm should generate value for all stakeholders, not solely for shareholders. This theory, a framework for organizational management and business ethics, considers the various constituencies affected by business entities, including employees, suppliers, local communities, creditors, and others. Stakeholder theory encompasses ethical considerations and values in managing an organization, addressing aspects such as social responsibility, market economy, and social contract theory.

According to Antonelli, D'Alessio and Cuomo (2016), stakeholder theory extends beyond the actions of stakeholders to recognize that the decisions of companies impact multiple agents, and the interests of these agents must be safeguarded. The theory contends that the primary goal of a firm should not be limited to shareholder wealth maximization; instead, it should strive for stakeholder wealth maximization. Antonelli et al (2016) emphasize that stakeholders are individuals or institutions interacting with a firm.

This theory is particularly relevant to the study because it acknowledges the importance of all stakeholders in the annual report, emphasizing a broader perspective beyond merely financial performance. Stakeholder theory encourages a more holistic approach to organizational management, recognizing and addressing the diverse interests and impacts of various stakeholders.

3.0 Methodology

The research employed an ex-post facto research design, focusing on a population comprising eight quoted oil and gas companies listed on the NEG as of December 31, 2022. A purposive sampling technique was applied to select a sample size of seven companies. The study spanned from 2012 to 2021. Data for analysis were gathered from the annual reports and accounts of the selected seven quoted oil and gas companies on NEG and were subsequently subjected to panel regression analysis.

3.1 *Model Specification*

In specifying the model for this work, the regression model was formulated to ascertain the relationship between the dependent variable and the independent variables in the

study. Capturing the impact of environmental cost disclosure and community development cost disclosure on market value is formulated as follows:

$$MV = F(ECD, CDCD)$$

The explicit formula of the model is stated as follows:

$$MV = \beta_0 + \beta_1 ECD + \beta_2 DCD + \mu$$

Where:

MV = Market Value

ENVCD = Environmental Cost Disclosure

COMDEVCD = Community Development Cost Disclosure

μ = Error (Stoclastic term)

The market value is regarded as the dependent variable while the independent variables are environmental cost disclosure on MV and community development cost disclosure on MV.

3.2 *Variable Measurement*

Variables	Abbreviation	Measurement
Dependent:		
Market Value	MV	Total equity divided by market capitalization.
Independent:		
Environmental Cost Disclosure	ENVCD	Disclosure of Environmental Cost in annual financial statements with "1" and "0" for otherwise
Community Development Cost Disclosure	COMDEVCD	Disclosure of Community Development Cost in annual financial statements with "1" and "0" for otherwise

4.0 Data Analysis and Results

4.1 *Descriptive Analysis*

Table 1: *Descriptive Statistics*

Variables	Mean	Std. Dev.	Minimum	Maximum	Obs.
MV	0.18	0.86	-0.51	5.38	60
ENVCD	0.02	0.13	0	1	60
CONDEVD	0.43	0.49	0	1	60

Source: Author's Computation, 2023 (STATA 14)

Table 1 displays the behavior of the variable data collected. It consists the mean, standard deviation, minimum, maximum and the number observation for each of the variable. The mean for market value is 0.18 with standard deviation of 0.86. The minimum value is -0.51 and maximum 5.38. The mean for the environmental cost disclosure is 0.02 with standard deviation of 0.13. The minimum value for firm size is 0 with maximum value of 1. Community development cost disclosure has mean of 0.43 with standard deviation of 0.49, it has a minimum value of 0 and maximum value of 1.

4.2 *Normality Test*

Table 2: *Shapriro-Wilk Test*

Variables	W	V	Z	Prob.
MV	0.517	26.239	7.042	0.000
ENVCD	0.517	26.249	7.043	0.000
COMDEVD	0.994	0.314	-2.499	0.9937

Source: Author's Computation, 2023 (STATA 14)

The table shows the result of the normality test for both dependent and independent variables. Market value shows p value of 0.000, environmental cost disclosure (0.000) and community development cost disclosure has p value of 0.9937. Hence, we assumed that the data are normally distributed and we estimated Pearson correlation.

4.3 *Correlation Matrix*

Table 3: *Pearson Correlation*

Variable	ART	FS	P
MV	1.000		
ENVCD	-0.003	1.000	
COMDEVD	0.069	0.149	1.000

Source: Author's Computation, 2023 (STATA 14)

Table 3 shows the result of the Pearson correlation matrix, which measures the relationship between the dependent and independent variables. Environmental Cost Disclosure (ENVCD) has negative correlation (-0.003) with Market Value (MV) while community development cost has a positive correlation (0.069) with market value. This result implies that there is no evidence of multicollinearity between the variable under the study.

4.4 *Multicollinearity Test*

Table 4: *Variance Inflation Factor*

Variable	VIF	I/VIF
MV	1.02	0.9778
ENVCD	1.02	0.9778

Mean VIF	1.02	

Source: Author's Computation, 2023 (STATA 14)

Variance inflation factor was used to test for multicollinearity of the variable as shown in table 4 above. The mean VIF is 1.02, which shows that the variable under study is free from multicollinearity since the mean value is less than the accepted standard of 10.

4.5 *Regression Analysis*

Table 5: *Robust Standard Error for Random Effect Cluster*

Variable	Coefficient	Z value	Prob.
Cons.	0.193	0.92	0.36
ENVCD	-0.14	-5.26	0.00
COMDEVD	-0.02	-0.41	0.68
Wald Test **Prob.**			28.41 0.000
Heteroskedascity Test: Breusch-Pagan / Cook-Weisberg: Chi2 Prob.			 6.93 0.00
Breusch and Pagan Lagrangian Multiplier Test for Random Effects: Chibar2 Prob.			 4.99 0.00
Hausman Test: Chi2 Prob.			 0.73 0.69
Pesaran's test of cross-sectional independence: Chi2 Prob.			 1.36 0.09
Wooldridge test for autocorrelation in panel data: F stat. Prob.			79.16 0.17

Source: Author's Computation, 2023 (STATA 14)

Table 5 displays the conclusive outcomes of the model estimation (Cluster Random Effect Model) for the hypotheses. The study initially estimated both pooled least square and random effect models, utilizing the Brusch and Pagan Lagrangian test to determine the suitable model estimation. The obtained p-value of 0.01, which is below the 5% significance level, indicates the appropriateness of the random effect model. Subsequently, the Hausman test was conducted to choose between fixed effect and random effect models. The p-value of 0.69 from the Hausman test suggests that the Random Effect Model was the appropriate choice for model estimation.

Post-estimation tests were conducted, including the heteroskedasticity test using Breusch-Pagan/Cook-Weisberg. The result, with a p-value of 0.00 below the 5%

significance level, indicates the presence of heteroskedasticity, implying that the residuals of the model exhibit changes over time. Additionally, Pesaran's test of cross-sectional independence yielded a p-value of 0.17, indicating no cross-sectional dependency in the model. However, the Wooldridge test for autocorrelation in panel data showed a p-value of 0.00, indicating the presence of autocorrelation.

To ensure a robust estimation, corrections were made for heteroskedasticity and autocorrelation in the model. The Robust Cluster Random Effect estimation method was adopted for testing the hypotheses.

The analysis results revealed that environmental cost disclosure has a coefficient of -0.140, with a corresponding p-value of 0.00, signifying a negative and significant effect on market value. In contrast, community development cost disclosure exhibited a negative and insignificant effect on market value, with a coefficient of -0.021 and a p-value of 0.681, which is not significant at the 5% level.

The Wald test, indicating a value of 28.41 with a p-value of 0.0030, attests to the model's good fitness, as the p-value is significant at the 5% level of significance.

4.6 *Test of Hypotheses*

H_{01}: *Environmental cost disclosure has no significant effect on market value of quoted oil and gas companies in Nigeria.*

Based on the findings presented in Table 5, environmental cost disclosure exhibits a coefficient of -0.141 with a corresponding p-value of 0.00, achieving significance at the 5% level. This suggests a negative and significant impact of environmental cost disclosure on market value. Consequently, we reject the null hypothesis positing that environmental cost disclosure lacks a significant effect on the market value of quoted oil and gas companies in Nigeria. Instead, we accept the alternative hypothesis, affirming that environmental cost disclosure does indeed exert a significant effect on the market value of quoted oil and gas companies in Nigeria.

H_{02}: *Community development cost disclosure has no significant effect on market value of quoted oil and gas companies in Nigeria.*

As indicated in Table 5, the results reveal that community development cost disclosure carries a coefficient of -0.02, accompanied by a corresponding p-value of 0.68. This implies that community development cost disclosure exerts a negative and statistically insignificant effect on the market value of quoted oil and gas companies in Nigeria during the study period. Consequently, we accept the null hypothesis, suggesting that community development cost disclosure lacks a significant effect on the market value

of quoted oil and gas companies in Nigeria. Simultaneously, we reject the alternative hypothesis positing that community development cost disclosure has a significant impact on the market value of quoted oil and gas companies in Nigeria.

4.7 *Discussion of Findings*

Based on the above analysis, it is evident that environmental cost disclosure exhibits a negative and significant impact on the market value of oil and gas companies during the study period. This finding aligns with the results of Felicia et al (2022) who similarly observed a negative effect of environmental disclosure on market value. However, it diverges from the findings of Natalia et al (2009) who reported a positive effect of environmental cost disclosure on market value.

On the other hand, the analysis indicates that community development cost disclosure has a negative and statistically insignificant effect on market value. This result supports the discoveries of Akinlo and Iredele (2014) who found that community development costs have a negative impact on market value. To the best of the researchers' knowledge, there is no contrasting result available.

In summary, the study's outcomes for environmental and community development cost disclosures contribute to the ongoing discourse, revealing both congruence and disparity with existing literature on the subject.

5.0 Conclusion and Recommendations

This study empirically investigated the sustainability disclosure and market value of quoted oil and gas companies in Nigeria for a period of ten (10) years, spanning from 2012 to 2021. The proxies used to employ sustainability disclosure (the independent variables), are environmental cost disclosure and community development cost disclosure on market value. Data were obtained from annual reports and accounts of the sampled oil and gas companies for the study period using a sample of seven (7) quoted oil and gas companies on the NEG. Descriptive and inferential statistics were applied to analyze the data with the testing of the hypotheses conducted through panel data regression analysis employing robust cluster standard error. From the analysis and findings above, the study concluded that both environmental cost disclosure and community development cost have negative effect on the firms' market value. It is important for the management to consider the type of disclosure they do to improve the market value.

Based on the findings above, this study observed that environmental cost disclosure is good because it is expected to appropriately improve environmental activities to achieve better and more competitive corporate values and image.

However, the effect on the market value should be considered before doing so. Also, the management of oil and gas companies in Nigeria should take caution in areas where environmental activities impact negatively on the value of the firm. Finally, community development cost disclosure should be considered under strict monitoring in order not to affect the market value of the firm. Businesses should invest in areas that enhance value for the firm.

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Appendixes

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  ___  ____  ____  ____  ____ (R)
 /__    /   ____/   /   ____/
___/   /   /___/   /   /___/   14.0   Copyright 1985-2015 StataCorp LP
  Statistics/Data Analysis            StataCorp
                                      4905 Lakeway Drive
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                                      979-696-4600        stata@stata.com
                                      979-696-4601 (fax)

Single-user 8-core Stata perpetual license:
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         Licensed to:  Stata 14
                       StataCorp Lp
```

Descriptive Statistics

```
    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
          mv |         60    .1811667    .8661528       -.51       5.38
       envcd |         60    .0166667    .1290994          0          1
     comdevd |         60    .4333333    .4997174          0          1
```

Normality Test

```
                  Shapiro-Wilk W test for normal data

    Variable |        Obs       W           V         z       Prob>z
-------------+-------------------------------------------------------
          mv |         60    0.51728     26.239     7.042    0.00000
       envcd |         60    0.51710     26.249     7.043    0.00000
     comdevd |         60    0.99423      0.314    -2.499    0.99378
```

Pearson Correlation Matrix

```
             |       mv    envcd  comdevd
-------------+---------------------------
          mv |   1.0000
       envcd |  -0.0032   1.0000
     comdevd |   0.0697   0.1489   1.0000
```

Pooled Ordinary Least Square

```
      Source |       SS           df       MS      Number of obs   =        60
-------------+----------------------------------   F(2, 57)        =      0.14
       Model |   .22332141         2  .111660705   Prob > F        =    0.8658
    Residual |  44.0396981        57  .772626283   R-squared       =    0.0050
-------------+----------------------------------   Adj R-squared   =   -0.0299
       Total |  44.2630195        59   .75022067   Root MSE        =    .87899

------------------------------------------------------------------------------
          mv |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       envcd |     -.0932   .8963991    -0.10   0.918    -1.888208    1.701808
```

```
     comdevd |   .1243765   .2315801     0.54   0.593    -.3393547    .5881077
       _cons |   .1288235   .1507458     0.85   0.396    -.1730398    .4306868
------------------------------------------------------------------------------
```

Multicollinearity test

```
    Variable |       VIF       1/VIF
-------------+----------------------
     comdevd |      1.02    0.977836
       envcd |      1.02    0.977836
-------------+----------------------
    Mean VIF |      1.02
```

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

         chi2(1)      =     6.93
         Prob > chi2  =   0.0085
```

Random Effect Model

```
Random-effects GLS regression                   Number of obs     =         60
Group variable: companyid                       Number of groups  =          6

R-sq:                                           Obs per group:
     within  = 0.0022                                         min =         10
     between = 0.1560                                         avg =       10.0
     overall = 0.0009                                         max =         10

                                                Wald chi2(2)      =       0.04
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.9795

------------------------------------------------------------------------------
          mv |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       envcd |  -.1408707   .8470497    -0.17   0.868    -1.801058    1.519316
     comdevd |  -.0208624   .2493293    -0.08   0.933    -.5095389     .467814
       _cons |   .1925549   .2412022     0.80   0.425    -.2801928    .6653026
-------------+----------------------------------------------------------------
     sigma_u |  .47198494
     sigma_e |  .80630229
         rho |  .25520854   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

```
Breusch and Pagan Lagrangian multiplier test for random effects

        mv[companyid,t] = Xb + u[companyid] + e[companyid,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
                      mv |   .7502207       .8661528
```

```
                     e |   .6501234       .8063023
                     u |   .2227698       .4719849

       Test:   Var(u) = 0
                           chibar2(01) =     4.99
                        Prob > chibar2 =   0.0127
```

Fixed effect Model

```
Fixed-effects (within) regression               Number of obs     =         60
Group variable: companyid                       Number of groups  =          6

R-sq:                                           Obs per group:
     within  = 0.0031                                         min =         10
     between = 0.1533                                         avg =       10.0
     overall = 0.0036                                         max =         10

                                                F(2,52)           =       0.08
corr(u_i, Xb)  = -0.2379                        Prob > F          =     0.9225

------------------------------------------------------------------------------
          mv |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       envcd |  -.1377778    .868599    -0.16   0.875    -1.880749    1.605194
     comdevd |  -.0883333   .2687674    -0.33   0.744    -.6276546     .450988
       _cons |   .2217407   .1546404     1.43   0.158     -.088568    .5320495
-------------+----------------------------------------------------------------
     sigma_u |  .46717447
     sigma_e |  .80630229
         rho |  .25133369   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(5, 52) = 3.15                     Prob > F = 0.0148
```

Hausman Test

```
                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |       fe           re         Difference          S.E.
-------------+----------------------------------------------------------------
       envcd |   -.1377778    -.1408707        .0030929        .1414324
     comdevd |   -.0883333    -.0208624       -.0674709        .0919035
------------------------------------------------------------------------------
                           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(2) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        0.73
                Prob>chi2 =      0.6926


Pesaran's test of cross-sectional independence =     1.364, Pr = 0.1726

Average absolute value of the off-diagonal elements =     0.413
```

```
Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
    F(  1,       5) =     79.185
           Prob > F =      0.0003



Random-effects GLS regression                   Number of obs     =         60
Group variable: companyid                       Number of groups  =          6

R-sq:                                           Obs per group:
     within  = 0.0022                                         min =         10
     between = 0.1560                                         avg =       10.0
     overall = 0.0009                                         max =         10

                                                Wald chi2(2)      =      28.41
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0000

                              (Std. Err. adjusted for 6 clusters in companyid)
------------------------------------------------------------------------------
             |               Robust
          mv |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       envcd |  -.1408707   .0267658    -5.26   0.000    -.1933308   -.0884106
     comdevd |  -.0208624   .0506691    -0.41   0.681     -.120172    .0784471
       _cons |   .1925549   .2093607     0.92   0.358    -.2177845    .6028943
-------------+----------------------------------------------------------------
     sigma_u |  .47198494
     sigma_e |  .80630229
         rho |  .25520854   (fraction of variance due to u_i)
------------------------------------------------------------------------------

.
```

fiscal year	Company	MV	ENVCD	COMDEVD
2012	TotalEnergies Marketing Nigeria	0.39	0	0
2013	TotalEnergies Marketing Nigeria	0.56	0	0
2014	TotalEnergies Marketing Nigeria	0.36	0	0
2015	TotalEnergies Marketing Nigeria	0.4	0	0
2016	TotalEnergies Marketing Nigeria	0.57	0	0
2017	TotalEnergies Marketing Nigeria	0.46	0	1
2018	TotalEnergies Marketing Nigeria	0.29	0	1
2019	TotalEnergies Marketing Nigeria	0.07	0	1
2020	TotalEnergies Marketing Nigeria	0.11	0	0
2021	TotalEnergies Marketing Nigeria	0.16	1	1
2012	Mrs(Texaco Chevron)	-0.23	0	0
2013	Mrs(Texaco Chevron)	-0.09	0	0
2014	Mrs(Texaco Chevron)	-0.12	0	0
2015	Mrs(Texaco Chevron)	-0.13	0	0

2016	Mrs(Texaco Chevron)	-0.14	0	1
2017	Mrs(Texaco Chevron)	-0.26	0	1
2018	Mrs(Texaco Chevron)	-0.24	0	0
2019	Mrs(Texaco Chevron)	-0.33	0	0
2020	Mrs(Texaco Chevron)	-0.35	0	0
2021	Mrs(Texaco Chevron)	-0.36	0	0
2012	Japaul Gold & Ventures Plc	-0.36	0	0
2013	Japaul Gold & Ventures Plc	-0.31	0	0
2014	Japaul Gold & Ventures Plc	-0.24	0	0
2015	Japaul Gold & Ventures Plc	-0.01	0	0
2016	Japaul Gold & Ventures Plc	-0.51	0	0
2017	Japaul Gold & Ventures Plc	1.12	0	0
2018	Japaul Gold & Ventures Plc	1.53	0	0
2019	Japaul Gold & Ventures Plc	-0.15	0	0
2020	Japaul Gold & Ventures Plc	0.07	0	0
2021	Japaul Gold & Ventures Plc	0.17	0	0
2012	Eternaoil	-0.08	0	0
2013	Eternaoil	-0.19	0	0
2014	Eternaoil	-0.26	0	0
2015	Eternaoil	-0.25	0	0
2016	Eternaoil	-0.21	0	0
2017	Eternaoil	-0.15	0	1
2018	Eternaoil	-0.13	0	1
2019	Eternaoil	-0.27	0	1
2020	Eternaoil	-0.19	0	0
2021	Eternaoil	-0.12	0	1
2012	Conoil	-0.02	0	1
2013	Conoil	0.35	0	1
2014	Conoil	0.12	0	1
2015	Conoil	-0.01	0	1
2016	Conoil	0.11	0	1
2017	Conoil	0.02	0	1
2018	Conoil	-0.04	0	1
2019	Conoil	-0.1	0	1
2020	Conoil	-0.1	0	0
2021	Conoil	-0.12	0	1
2012	Ardova Plc (Forte Oil)	0.02	0	0
2013	Ardova Plc (Forte Oil)	0.79	0	0
2014	Ardova Plc (Forte Oil)	3	0	0
2015	Ardova Plc (Forte Oil)	5.38	0	1
2016	Ardova Plc (Forte Oil)	0.91	0	1
2017	Ardova Plc (Forte Oil)	0.01	0	1
2018	Ardova Plc (Forte Oil)	-0.18	0	1

2019	Ardova Plc (Forte Oil)	0.16	0	1
2020	Ardova Plc (Forte Oil)	-0.01	0	1
2021	Ardova Plc (Forte Oil)	0	0	1