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Original Research Article

Moderating Effect of Audit Quality on Corporate Attributes and Financial Performance of Listed Manufacturing Firms in Nigeria

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Abstract

Most of the previous studies on organisational attributes and financial performance of firms examined the direct relationship without examining the indirect relationship with the financial performance of firms. This paper examined the moderating effect of audit quality on corporate attributes and financial performance of listed manufacturing firms in Nigeria for the period 2004 to 2018. Secondary data was obtained from a population of six manufacturing firms through their annual reports and accounts. Corporate attributes as an independent variable were proxied by leverage, liquidity and tangibility as well as audit quality used as moderating variable.

In contrast, the return on assets was used to represent financial performance as the dependent variable of the study. The study adopted a random effect multiple regression techniques in analyzing the data. The findings revealed that leverage has a significant positive impact on financial performance, liquidity and tangibility has insignificant negative impact on the financial performance of the firms, while the joined interaction of leverage and audit quality as moderating variable of the study has a significant negative effect on the financial performance of the firms. It is recommended that the firms should increase the level of leverage in their company since it was found that leverage has a significant positive relationship with the firms' financial performance as well as proper liquidity and non-current assets management.

Keywords: Leverage, Liquidity, Tangibility, Audit Quality and Financial Performance

JEL Classification Codes: M400, M420

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1. Introduction

Firm's financial performance is the measurement of the results of a company's strategies, policies and operations in monetary term. Mirza and Javed (2013) viewed firms' performance as the ability of a company to achieve its objectives using its available resources. Leverage is the debt component of firm capital structure which they used to finance their operations for business expansion, acquisitions of assets and working capital management within a accounting period. Liquidity particular represents the amount of cash or current assets that can easily be converted to cash for the daily operations of a company. Tangibility refers to the fixed assets that the company required for its day-to-day operations in other to make a profit for better financial performance at the end of its accounting period.

Extant literature on corporate attributes and financial performance of companies in Nigeria and other countries of the world examined only the direct relationship among the variables of the study (Abbas, Bashir, Manzoor,& Akram, 2013, Birru, 2016, Ojo, 2012, and Olarewaju & Adeyemi, 2015). This creates a gap for further research by introducing audit quality as moderating variable to examine the indirect relationship between corporate attributes and financial

performance of listed manufacturing firms in Nigeria for a period beyond the 2017 financial year. Since, after the 2008 to 2009 financial crisis, manufacturing firms in Nigeria are finding it difficult to raise capital through equity financing in the capital market, this necessitates them to increase the level of leverage in their capital structure for them to survive in the business. significant contribution The of manufacturing firms to the Nigerian economy has made manufacturing firms a vital sector to be studied in the country. Therefore, this study seeks to examine the moderating effect of audit quality on corporate attributes and financial performance of listed manufacturing firms in Nigeria.

Following the introduction, section two focuses on the review of the existing literature. Section three addresses the methodology with an emphasis on the research design, theoretical framework and model specification. Section four presents the estimation results and discussion of findings and section five presents the conclusion and recommendation.

2. Review of Empirical Studies and Theoretical Framework

Leverage and Financial Performance

Empirical literature were reviewed from the previous studies on the relationship between leverage and financial performance of firms such as the work of Getahun (2016) who studied the effect of capital structure on the financial performance of insurance companies in Ethiopia using a sample size of 9 insurance companies out of the population of 17 firms for the period of 2004 to 2013 and found a significant negative relationship between leverage and financial performance of the companies. Another study was conducted by Mule and Mukras (2015) on the relationship between financial leverage and financial performance of listed firms in Kenya for the period of 2007 to 2011 using a sample size of 47 firms. The finding of the study reveals a significant association between leverage and financial performance of the firms.

Similarly, Abbas, Bashir, Manzoor, and Akram (2013) examined the impact of determinants of financial performance of listed firms in Pakistan for the period of 2005 to 2010 using sample size of 139 firms out of the population of 164 firms and the result shows evidence of insignificant negative correlation between leverage and financial performance of the selected firms. Birundu (2014) explored the effect of capital structure on financial performance of small and medium enterprises in Kenya using the sample size of 40 firms for the period of 2009 to 2013 and found negative insignificant relationship between leverage and financial performance of the firms. Bhattarai (2016) examined the impact of capital structure on the financial performance of manufacturing firms in Nepalese using the sample size of 8 companies from 2004 to 2014. The result of the analysis reveals evidence of a significant negative relationship between leverage and financial performance of the companies.

Sudivatno, Elen, and Kartika (2012) investigated policy. company firm performance and firm value using listed manufacturing firms in the Indonesian Stock Exchange from 2008 to 2010, and found a significant negative effect of leverage on firm financial performance. Their findings are in line with the results of Salehi (2009) who conducted a research on leverage and financial performance of some selected Iranian companies and found that leverage has a significant negative impact on firm performance. Earlier. Rayan (2008)documented that financial leverage has a significant negative effect on a firm's financial performance. Firms with low financial leverage tend to perform better than the firm with high financial leverage (Tan, 2009). Yoon and Jang (2005) studied effect of financial leverage on the profitability and risk of restaurant firms from 1998 to 2003. They found that firms that used the equity in financing their operations perform better than those firms that used leverage to fund their operations. Damouri, Khanagha, and Kaffash (2013) studied the relationship between changes in the financial leverages and the values of the listed firms in the Tehran Stock Exchange. using a sample of 98 firms from 2001 to 2010. Their results showed that there is no significant relationship between changes in the financial leverages and the financial performance of the selected firms.

Similarly, Fosu (2013) studied the relationship between capital structure and firm performance using panel data consisting of 257 South African companies for the period of 1998 to 2009 and found that financial leverage has a positive and significant effect on a firm's performance.

Low level of leverage can lead to an increase in profit, efficiency as well as firm performance. In contrast, a high degree of leverage can lead to a decrease in profit efficiency as well as a decrease in firm performance (Skopljak & Luo, 2012). Similarly, Hsu (2013) reported that leverage has a negative effect on the performance of 336 Information Technology companies in Taiwan. Onimisi (2010) examined the effect of capital structure on the performance of listed manufacturing firms in Nigeria and found a positive relationship between leverages and financial performance of manufacturing Nigerian listed firms. Likewise, Pachori and Totala (2012)examined the influence of financial leverage shareholders returns and market on capitalization in India. They found that there is no significant influence of financial leverage on shareholders' returns and market capitalization.

Rehman (2013) investigated the relationship between financial leverage and financial performance of listed sugar companies in Pakistan and found a significant positive relationship between leverage and firms financial performance. Akhtar, Javed. Maryam, and Sadia (2012) reported a significant positive relationship between leverage and the financial performance of listed fuel and energy companies in Pakistan. Ojo (2012) studied the effect of financial leverage on corporate performance of some selected companies in Nigeria and a significant effect reported between leverage and financial performance. However, Magpayo (2011) conducted a study on the relationship between leverage and financial performance, using a sample of 1000 companies in Philippine for one year (2009), and found a significant negative impact between leverage and the financial performance of the sampled firms.

Liquidity and Financial Performance

Museiga, Olweny, Mukanzi, and Mutua (2017) studied the effect of liquidity risk on the financial performance of commercial banks in Kenya from 2006 to 2015 using secondary data. The population of the study consists of 44 commercial banks in Kenya and 30 banks were used as the sample size of the study. Multiple regressions were used in analyzing the data, and the result reveals significant positive relationship between liquidity and financial performance of the firms. Olarewaju and Adeyemi (2015) examined the influence of liquidity on the financial performance of listed deposit money banks in Nigeria from 2004 to 2013 using the sample size of 15 banks. Secondary data was collected for the study and analyzed using multiple regressions, and the result of the analysis shows insignificant evidence of positive relationship between liquidity and financial performance of the banks. Pourali and Arasteh (2013) studied the relationship between liquidity, corporate governance and firm value and the results shows a significant positive relationship between liquidity and financial performance.

Also, Niresh (2012) examined the trade-off between liquidity and profitability of 31 listed firms in Sri Lanka for the period of 2007 to 2011. The result reveals a significant positive relationship between liquidity and profitability of the firms. Dalvi and Baghi (2014) explored the relationship between company performance and stock market liquidity, using a sample of 154 companies listed in Tehran Stock Exchange and found a strong positive association between liquidity and financial performance of firms. Owolabi and Obida (2012) examined the impact liquidity of management on the financial performance of listed manufacturing firms in Nigeria for the period of 2005 to 2009, using a sample of 12 manufacturing firms. The result showed a significant positive impact of liquidity on the financial performance of the firms.

Tangibility and Financial Performance

Birru (2016) studied the effect of capital structure on the financial performance of commercial banks in Ethiopia for the period of 2011 to 2015 using a sample size of 9 banks which was arrived at using a purposive sampling technique. Multiple regression was used in analysing the secondary data collected for the study, and the result reveals evidence of significant negative association between tangibility and financial performance of the banks. Adamassu (2016) investigated the influence of capital structure on the financial performance of manufacturing companies in Ethiopia using the sample size of 15 firms from 2006 to 2012. Random Effect Generalized Least Square multiple regression was adopted for analyzing the secondary data collected for the study. The finding of the study shows an insignificant positive association between tangibility and financial performance of the firms. Pouraghajan, Malekian, Milad, Vida and Bagheri (2012) explored the effect of capital structure on the financial performance of listed companies in Tehran Stock Exchange for the period of 2006 to 2010 using the sample size of 400 firms. Multiple regressions was used as statistical tool of analysis of the secondary data collected for the study and found evidence of significant positive correlation between tangibility and financial performance of the firms.

Also, Mwangi and Birundu (2015) studied the effect of capital structure on the financial performance of 40 small and medium scale enterprises in Kenya for the period of 2009 to 2013 using multiple regressions as a tool of analysis of the secondary data collected for the study. The result of the investigation reveals an insignificant positive association between tangibility and financial performance of the firms. Bongoye, Banafa and Kingi (2016) examined the effect of firm-specific factors on the financial performance of nonfinancial companies listed in Nairobi Securities Exchange from 2011 to 2015. The study used the population and sample size of 37 firms, and multiple regressions was used in the analysis of the secondary data collected for the study. The result exhibited evidence of insignificant negative correlation between tangibility and financial performance of the firms.

3. METHODOLOGY

Theoretical Framework and Model Specification

The study of the relationship between corporate characteristics and organisational performance is anchored on the signaling theory of Spence (1973). The theory provides opportunity to communicate between two parties to a transaction on the reliability of the transaction. The theory is concerned with the reliability of some certain signal in terms of decision making. Signaling theory considered the quality and reliability of financial information sent by the firms to their users of financial information decision for making bv investors. Spence (1973) state that a good performing firm differentiate itself from nonperforming one by sending good signal about its performance to capital markets and potential investors. Signals sent by company through its financial statement would inform the investors about their future financial performance. Also, signaling theory assumed that managers of a firm have more access to its financial information than the shareholders of a company. Signaling theory

is adopted in this study to underpin corporate attributes proxied by leverage, liquidity and tangibility as well as the financial performance proxied by return on assets.

Model Specification

Against the backdrop of the theoretical expousition and review of extant literature, we expect a functional relationship between corporate attributes and financial performance of the form:

ROA = f(LEV, LQT, TGY) -----(1)

The functional form of equation 1 is transformed into econometric model as : $ROA_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 LQT_{it} + \beta_3 TGY_{it} + \varepsilon_{it}$ (2)

Incorporating the moderating effect of Audit Quality into equation 2, we have:

 $ROA_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 LQT_{it} + \beta_3 TGY_{it} + \beta_4 AQY_{it} + \beta_5 LEV * AQY_{it} + \beta_6 LQT * AQY_{it} + \beta_7 TGY * AQY_{it} + \varepsilon_{it} - \dots (3)$

Where: ROA is return on assets, a proxy for financial performance, β_0 is the intercept, LEV is leverage, LQT is liquidity, TGY is tangibility, LEV*AQY is the interaction between leverage and audit quality, LQT*AQY is the interaction between liquidity and audit quality, TGY*AQY is the interration between tangibility and audit

Operationalisation of Variables

quality, β_1 to β_7 are the unknown coefficients of the independent variables, *i* is the number of companies, and *t* is the period covered by the study.

It is presumptively expected that β_1 to $\beta_7 > 0$ based on theory and extant literature.

Correlation research design is adopted because the study attempts to measure the relationship between corporate attributes financial performance of and listed manufacturing firms in Nigeria for the period of 2004 to 2018. The population of the study consists of all the listed manufacturing firms on the Nigerian Stock Exchange. Given the availability of data for six firms, the study adopted a random sampling approach by selecting six firms as a sample size of the study. The study used secondary data which was obtained from the annual reports and accounts of the six listed manufacturing firms in Nigeria for the period of the study. Generalized least square fixed effect multiple regression is adopted for the panel data analysis to establish the relationship among the variables of the study. Multiple regression was considered appropriate since it helps in not only establishing a relationship between the dependent and independent variables but also shows the cause and effect of their relationship.

Variables	ariables Variables Name Variables Measurement and Source			
Acronym				
	Dependent Variable			
ROA	Return on Assets	Measured as the profit before interest and tax divided by the firm's total assets (Mwangi & Birundu, 2015).		
LEV	Independent Variables Leverage	Measured as the ratio of long-term debt to the firm's total assets (Fosu, 2013).		

Table 1: Variables Definition and Measurement

LQT	Liquidity	Measured as current assets divided by the firm's current liabilities (Niresh, 2012).
TGY	Tangibility	Measured as fixed assets divided by the firm's total assets (Birru, 2016)
AQY	Moderator Audit Quality	Measured as natural logarithms of audit fees paid by the firms (Dalvi & Baghi, 2014).

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4. ESTIMATION RESULTS AND DISCUSSION OF FINDINGS

Some robustness tests like multicollinearity and heteroskedasticity tests were conducted to see their existence or otherwise. The multicollinearity analysis revealed a variance inflation factor and tolerance values of less than 10 and 1, respectively, meaning that the data used in the study do not have any problem of multicollinearity. The heteroskedasticity test revealed a Chi² value of 27.15 with a p-value of 0.000, which is significant at 1% level. This means is heteroskedasticity there problem associated with the data of the study. As a result of the existence of heteroskedasticity the study conducted fixed and random effect models tests and then Hausman test was used to decide which model to adopt. The result of the Hausman test reveals a Chi² value of 12.17 with a p-value of 0.09 which shows preference for the random effect model. Therefore, the study adopted the random effect regression for model 2 which has R^2 of 0.178 which is greater than the R^2 of 0.141 for model 1 of the study as well as the existence of a significant relationship of the joint effect of leverage and audit quality on the financial performance of listed manufacturing firms.

Table1 presents the summary of the random effect regression results obtained from the analysis of data in model 2 of the study.

	Model 1		Model 2	
Variables	Coefficient	P-Values	Coefficient	P-Values
Constant	-0.146	0.010	-0.024	0.934
LEV	0.176	0.048	0.713	0.035
LQT	0.058	0.051	-0.126	0.512
TGY	0.076	0.350	-0.077	0.875
AQY			-0.006	0.679
LEV*AQY			-0.032	0.085
LQT*AQY			0.011	0.322
TGY*AQY			0.008	0.769
\mathbf{R}^2	0.141		0.179	
Wald Chi ²	4.45	0.006	2.39	0.028
Hettest	18.08	0.000	27.15	0.000
Hausman	52.28	0.000	12.17	0.095
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Table 2:	Regression	R	es	ul	ts
		The second se	Æ	1	1

Source: Stata Output, 2020

Table 2 shows that leverage has a significant positive impact on the financial performance of listed manufacturing firms in Nigeria. This can be observed from the computed value of the beta coefficient of 0.713 with a p-value of 0.035, which is statistically significant at 5% level. It shows that as leverage rises, financial performance increases, this finding is in line with that of Mule and Mukras (2015) but inconsistent with Getahun (2016).

Table 2 reveals that liquidity is insignificant and negatively correlated with the financial performance of listed manufacturing firms in Nigeria. The coefficient of the variable is -0.126 with a p-value of 0.512, which is statistically insignificant at any level of significance. This implies that liquidity is decreasing the financial performance of manufacturing firms in Nigeria. The finding is inconsistent with the study of Museiga *et al.* (2017) but contradicts Olarewaju and Adeyemi (2015).

Furthermore, the result provides evidence of negative an insignificant association between tangibility financial and performance of listed manufacturing firms in Nigeria. The result shows a coefficient of -0.077 with a p-value of 0.875, which is insignificant. This signifies that tangibility is decreasing the financial performance of manufacturing firms in Nigeria. The result is in line with the findings of Pouraghajan et al. (2012) but contradicts Birru (2016).

Also, the result shows an insignificant negative relationship between audit quality as a moderating variable with the financial performance of listed manufacturing firms in Nigerian. This can be observed from the coefficient of -0.006 with p-value of 0.679, which implies that audit quality is reducing the financial performance of the selected manufacturing firms in Nigeria at an insignificant level.

In addition, the interaction of leverage and quality has significant negative audit relationship with the financial performance of listed manufacturing firms in Nigeria, based on the beta coefficient of -0.032 with the p-value of 0.085 which is significant at 10% level. This means the interaction of and audit quality leverage of the manufacturing firms in Nigeria is reducing their financial performance.

Furthermore, the interaction of liquidity and audit quality of listed manufacturing firms Nigeria has insignificant positive in relationship with the firm's financial performance. This can be proved from the beta coefficient of 0.011 and p-value of 0.322 which is not significant; this signifies that the joint effect of liquidity and audit quality of listed manufacturing firms in Nigeria is increasing their financial performance, but at an insignificant level.

Finally, the result provides evidence of an insignificant positive association between moderating variables tangibility and audit quality; and financial performance of listed manufacturing firms in Nigeria. The result shows a coefficient of 0.008 with a p-value of 0.769, which is insignificant at any level.

The Wald Chi^2 value of 2.39 with a p-value of 0.028, which is significant at 5% level shows that the model is well fitted with the variables of the study. Also, the coefficient of multiple determination (\mathbb{R}^{2}) which stands at 18% indicates the proportion of the total variations in the dependent variable that is explained by the independent variables. This signifies that 18% of the total variation in the financial performance of listed manufacturing firms in Nigeria is caused by

the combined effect of leverage, liquidity, tangibility and the moderating variables. In comparison, the remaining 82% is caused by other factors outside the model of this study.

5. CONCLUSION AND RECOMMENDATIONS

The study investigates the moderating impact of audit quality on corporate attributes and financial performance of listed manufacturing companies in Nigeria. was concluded that leverage It has significant positive influence the on of financial performance listed manufacturing firms in Nigeria. Liquidity have tangibility negative and and insignificant impact on the financial performance of the firms. The interaction of leverage and audit quality of the study is found to have a negative significant influence on the financial performance of listed manufacturing firms in Nigeria. It is recommended that the listed manufacturing firms in Nigeria should increase the level of leverage in their company since it was found that leverage has significant positive relationship with the firms' financial performance.

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Appendix

MODEL ONE

3-user 8-core Stata network perpetual license:

Serial number: 501306208483 Licensed to: MURTALA ABDULLAHI KADUNA STATE UNIVERSITY

Notes:

1. (/v# option or -set maxvar-) 5000 maximum variables

. edit

. *(10 variables, 90 observations pasted into data editor)

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Variable	Obs	Mean	Std. Dev.	Min	Max
roa	90 .03	18778	.1268584	73	.31
ev	90 .42	74167	.3142497	.01 .9	9189
qt	90 1.24	4309	5126244	.003 2	2.668
tgy	90 .39	53333	.1724403	.108	.92
aqy	90 .39	35471	3.164324	13.787	23.435
levaqy	90 7.	374746	5.598299	.1446817	18.88914
qtaqy	90 21	.50925	9.934408	.0565172	50.91152
tgyaqy	90 6.	860919	3.180055	1.578275	14.061

. pwcorr roa lev lqt tgy aqy levaqy lqtaqy tgyaqy, star (0.05)

roa lev lqt tgy aqy	levaqy lqtaqy
roa 1.0000 lev 0.2056 1.0000 lqt 0.3439* 0.3770* 1.0000 tgy 0.1099 0.2764* 0.0385 1.00 aqy -0.1221 -0.0437 -0.0532 0.00 levaqy 0.1584 0.9548* 0.3898* 0.2 lqtaqy 0.2716* 0.3529* 0.8878* 0.0 tgyaqy 0.0420 0.2064 0.0085 0.8 tgyaqy	00 001 1.0000 2314* 0.2021 1.0000 0280 0.3890* 0.4836* 1.0000 983* 0.4106* 0.2763* 0.1861
tgyaqy 1.0000	
. reg roa lev lqt tgy	
Source SS df MS	Number of obs = 90
Model .187482962 3 .062494321 Residual 1.24479951 86 .01447441	Prob > F = 0.0069 R-squared = 0.1006
Total 1.43228247 89 .016093061	Root MSE = .12031
roa Coef. Std. Err. t P> t	[95% Conf. Interval]
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 lev |
 .0258731
 .0456814
 0.57
 0.573
 -.0649385
 .1166848

 lqt |
 .0783706
 .0269327
 2.91
 0.005
 .0248302
 .1319111

 tgy |
 .0588863
 .0771632
 0.76
 0.447
 -.0945091
 .2122817

 _cons |
 -.0999778
 .0437075
 -2.29
 0.025
 -.1868654
 -.0130902

. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of roa chi2(1) = 18.08Prob > chi2 = 0.0000. vif Variable | VIF 1/VIF -----+-----lev | 1.27 0.789191 lqt | 1.17 0.853203 tgy | 1.09 0.918571 -----Mean VIF | 1.18 . xtset id year, yearly panel variable: id (strongly balanced) time variable: year, 2004 to 2018 delta: 1 year . xtreg roa lev lqt tgy, fe Number of obs = 90 Fixed-effects (within) regression Group variable: id Number of groups = 6 R-sq: within = 0.1414 Obs per group: min = 15 between = 0.1308avg = 15.0 overall = 0.0921max = 15 F(3,81) = 4.45 Prob > F = 0.0061 $corr(u_i, Xb) = -0.6303$ _____ roa | Coef. Std. Err. t P>|t| [95% Conf. Interval] -----+-----+ lev | .1760387 .0876521 2.01 0.048 .0016385 .350439 lqt | .0586591 .0296385 1.98 0.051 -.0003122 .1176303 tgy | .0768751 .0818156 0.94 0.350 -.0859122 .2396624 _cons | -.1467454 .0553002 -2.65 0.010 -.2567755 -.0367154 sigma_u | .06542625 sigma_e | .11689805 rho | .23852973 (fraction of variance due to u_i) _____

F test that all $u_i=0$: F(5, 81) = 2.02 Prob > F = 0.0847 . est store fixed . xtreg roa lev lgt tgy, re Random-effects GLS regression Number of obs 90 = Group variable: id Number of groups = 6 R-sq: within = 0.1163Obs per group: min = 15 between = 0.2856avg = 15.0 overall = 0.1301max = 15 Wald chi2(3) = 12.42corr(u i, X) = 0 (assumed) Prob > chi2 = 0.0061 roa | Coef. Std. Err. z P>|z| [95% Conf. Interval] lev | .0393267 .0499695 0.79 0.431 -.0586117 .1372652 lqt | .0755042 .0273685 2.76 0.006 .0218628 .1291455 tgy | .0546259 .0773784 0.71 0.480 -.0970329 .2062848 _cons | -.1004771 .0452961 -2.22 0.027 -.1892557 -.0116984 sigma_u | .01907916 sigma e | .11689805 rho | .02594697 (fraction of variance due to u_i) . est store random . hausman fixed random ---- Coefficients ----(b)(B)(b-B)sqrt(diag(V_b-V_B))fixedrandomDifferenceS.E.
 lev
 .1760387
 .0393267
 .136712
 .0720135

 lqt
 .0586591
 .0755042
 -.0168451
 .0113756

 tgy
 .0768751
 .0546259
 .0222492
 .0265777
 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

 $chi2(3) = (b-B)'[(V_b-V_B)^{-1}](b-B)$ = 52.28 Prob>chi2 = 0.0000

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. reg roa lev lqt tgy aqy levaqy lqtaqy tgyaqy

Source SS df MS Number of obs = 90					
Model .265436949 7 .037919564 Prob > F = 0.0155 Residual 1.16684552 82 .014229823 R-squared = 0.1853					
Total 1.43228247 89 .016093061 Root MSE = .11929					
roa Coef. Std. Err. t P> t [95% Conf. Interval]					
lev .5685801 .2962429 1.92 0.058 0207414 1.157901 lqt 2304092 .1879979 -1.23 0.224 6043969 .1435785 tgy .0376138 .4750021 0.08 0.937 9073168 .9825443 aqy 0153133 .0153353 -1.00 0.321 0458201 .0151935 levaqy 0331516 .0173883 -1.91 0.060 0677424 .0014393 lqtaqy .0185829 .0109371 1.70 0.093 0031744 .0403403 tgyaqy .0001435 .0276827 0.01 0.996 0549262 .0552132 _cons .1702406 .2671543 0.64 0.526 3612144 .7016955					
. hettest					
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of roa					
chi2(1) = 27.15 Prob > chi2 = 0.0000					
. xtset id year, yearly panel variable: id (strongly balanced) time variable: year, 2004 to 2018 delta: 1 year					
. xtreg roa lev lqt tgy aqy levaqy lqtaqy tgyaqy, fe					
Fixed-effects (within) regressionNumber of obs=90Group variable: idNumber of groups=6					
R-sq: within = 0.1787 Obs per group: min = 15 between = 0.1417 avg = 15.0 overall = 0.1251 max = 15					
corr(u_i, Xb) = -0.5694 $F(7,77) = 2.39$ Prob > F = 0.0287					
roa Coef. Std. Err. t P> t [95% Conf. Interval]					
lev .7139133 .3327447 2.15 0.035 .0513339 1.376493 lqt 1264486 .1919561 -0.66 0.5125086821 .2557848					

tgy | -.0774192 .488542 -0.16 0.875 -1.050231 .8953923 aqy | -.0068211 .0164088 -0.42 0.679 -.0394952 .025853 levaqy | -.0326236 .0186941 -1.75 0.085 -.0698484 .0046011 lqtaqy | .011161 .0112057 1.00 0.322 -.0111524 .0334745 tgyaqy | .0084112 .028589 0.29 0.769 -.0485167 .0653391 _cons | -.0241177 .2881088 -0.08 0.934 -.5978157 .5495803 -----+ sigma_u | .06192147 sigma_e | .11726243 rho | .21804515 (fraction of variance due to u_i) F test that all $u_i=0$: F(5, 77) = 1.57 Prob > F = 0.1781 . est store fixed . xtreg roa lev lqt tgy aqy levaqy lqtaqy tgyaqy, re Random-effects GLS regression Number of obs 90 = Group variable: id Number of groups = 6 R-sq: within = 0.1501Obs per group: min = 15 between = 0.5319avg = 15.0 overall = 0.1853max = 15 Wald chi2(7) = 18.65corr(u i, X) = 0 (assumed) Prob > chi2 = 0.0093_____ roa | Coef. Std. Err. z P>|z| [95% Conf. Interval] _____ lev | .5685801 .2962429 1.92 0.055 -.0120453 1.149205 lqt | -.2304092 .1879979 -1.23 0.220 -.5988783 .1380599 tgy | .0376138 .4750021 0.08 0.937 -.8933733 .9686008

 agy | -.0153133
 .0153353
 -1.00
 0.318
 -.0453699
 .0147433

 levaqy | -.0331516
 .0173883
 -1.91
 0.057
 -.067232
 .0009289

 lqtaqy | .0185829
 .0109371
 1.70
 0.089
 -.0028534
 .0400192

 tgyaqy | .0001435
 .0276827
 0.01
 0.996
 -.0541136
 .0544006

 _cons | .1702406 .2671543 0.64 0.524 -.3533722 .6938533 ----sigma_u | 0 sigma_e | .11726243 rho | 0 (fraction of variance due to u_i) _____ . est store random . hausman fixed random ---- Coefficients ----(b-B) sqrt(diag(V_b-V_B)) (b) (B) random Difference S.E. fixed _____ _____ ____ lev | .7139133 .5685801 .1453333 .151523 lqt | -.1264486 -.2304092 .1039606 .0387808

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tgy 0774192	.0376138	115033	.1142204
levagy 0326236	0331516	.0004922	.0068642
lqtaqy .011161	.0185829	0074219	.002439
tgyaqy .0084112	.0001435	.0082677	.0071413

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

 $chi2(7) = (b-B)'[(V_b-V_B)^{-1}](b-B)$ = 12.17 Prob>chi2 = 0.0951 (V_b-V_B is not positive definite)

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