European Journal of Accounting Auditing and Finance Research
Vol.3, No.8, pp.25-39, August 2015
Published by European Centre for Research Training and Development UK (www.eajournals.org)

EQUITY FORMATION AND FINANCIAL PERFORMANCE OF LISTED DEPOSIT MONEY BANKS IN NIGERIA

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ABSTRACT: *This study examines the influence of equity formation on financial performance of listed Deposit Money Banks in Nigeria. The study covers the period of ten years 2005 to 2014. Data for the study were extracted from the banks' annual reports and accounts using 100 firm-year paneled observations. A multiple regression was employed to test the model of the study using Ordinary Least Square (OLS). After running for OLS a robustness test was conducted to improve the validity and reliability of statistical inferences. The results from the analysis revealed an inverse relationship between managerial shareholding and institutional shareholding and ROE Deposit Money Banks in Nigeria, while foreign shareholding showed a positive significant impact on ROE of listed Deposit Money Banks in Nigeria. In line with the foregoing findings, the study recommended that the Nigerian Deposit Money Banks should consider higher percentage of foreign shareholding by encouraging foreigners to invest in their firms as it was empirically observed that increasing such improves banks' performance. It was also recommended that listed Deposit Money Banks in Nigeria should discourage having higher percentages of institutional shareholdings and managerial shareholdings by the banks as it was clearly observed from the findings of the study that increasing one of them reduces performance the listed Deposit Money Banks in Nigeria.*

KEYWORDS; Managerial Shareholding, Institutional Shareholding, Foreign shareholding Firm Size and Leverage

INTRODUCTION

It is generally believed that profit maximization is one of the main objectives of a firm. Hence profitability of a firm has become the major criterion in determining its financial performance. The investors (both existing and prospective ones), concern mainly on the profitability of the firm. However, in the contemporary business environment, investors have to hire managers as their agents to play essential roles on their behalf. But sometimes managers work for their interest rather than maximizing wealth for shareholders. This will bring about agency conflict. Thus, firms tend to have poor performance when they have greater agency problems and these allow managers to generate personal benefits that serve their own interest instead of those of the stockholders (Jensen & Meckling, 1976)

ISSN 2053-4086(Print), ISSN 2053-4094(Online)

Ownership structure is a subset of corporate governance that relates to the nature of ownership of the equity shareholding of a firm. Who acquires the firm's equity shares and to what extend is the interest can either align with or entrench the minority shareholders" objective of value maximization (Hassan 2012 & Ahmed). As such Good governance by the board of directors is essential to improve the quality of financial reporting which in turn has impact on investors' confidence.

Several studies used different variables in determining firm's performance. Many from studies have shown that number of internal factors affect firm performance. These include among others size, age, quick ratio, current ratio; sales growth and capital turnover, managerial ownership, institutional ownership. (See Mukhopadhyay, 2004, Filbeck & Krueger, 2005). However, the impact of these factors on financial performance of firms differs from one country to another, from one period to another, from industry to industry and even one company to another.

The banking sector is considered to be an important source of financing for most businesses. The common presumption, which supports much of the financial performance research and discussion, is that increasing financial performance will lead to improved functions and activities of the organizations. The subject of financial performance and its measurement is well advanced within finance and management fields. Several studies used tradition financial ratio analysis and benchmarking to measure banks' performance as there is no consensus about which measurement is the best to apply (Tsoutsoura, 2004). Therefore, the objective of this study is to examine the influence of equity formation (ownership structure) on financial performance of listed Deposit Money Banks in Nigeria by taking managerial shareholding, institutional shareholding and foreign shareholding to proxy for equity formation and return on equity (ROE) to proxy for performance. Thus, the following specific objectives are also set below:

i. To examine the impact of managerial shareholding (MSH) on performance listed Deposit Money Banks in Nigeria.
ii. Assess the impact of institutional shareholding (ISH) on performance listed Deposit Money Banks in Nigeria.
iii. To assess the impact of foreign shareholding (FSH) on performance listed Deposit Money Banks in Nigeria.

In line with the objectives above, the following hypotheses were formulated in null form.
H01 Managerial shareholdings have no significant impact on performance listed Deposit Money Banks in Nigeria.
H02 Institutional shareholdings have no significant impact on performance listed Deposit Money Banks in Nigeria.
H03 Foreign shareholdings have no significant impact on performance listed Deposit Money Banks in Nigeria.

ISSN 2053-4086(Print), ISSN 2053-4094(Online)

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Managerial shareholding and financial performance

Berle and Means (1932) pointed out that potential conflicts of interest arise between corporate managers and dispersed shareholders when managers do not have an ownership interest in the firm. As such shares held by the managers in a firm helps to align the interests between shareholders and managers. When the manager's interests coincide more closely with those of shareholders, the conflicts between the shareholders can 'entrench' the controlling power over the firm's activities, leaving external or small shareholders with difficultly in controlling the actions of such ownership. Short (1994) supports this notion and suggests that implicitly assuming the 'linear' relationship between managerial ownership and firm financial performance in the previous research possibly brings misleading results. This is because there may be the opposite relationship between managerial shareholding at a certain level and firm performance. Morck, Shleifer, and Vishny, (1988) investigate that whether or not there is a non-linear relationship between managerial ownership and firm performance (as measured by firm's market value and a profit rate) for 456 of the Fortune 500 firms in 1980. To capture this relationship, they categorize managerial shareholding into three different levels: 0% -5%, 5%-25%, and beyond 25%. The results revealed that there is a positive relationship between managerial ownership holding at 0% to 5% and the firm's performance. After that, a negative relationship is found at 5% to 25% of managerial shareholding, and then the relationship becomes positive again (but not significant) beyond 25% of shareholding. In the profit rate regression, they report that there is only a significant positive relationship between managerial ownership holding at 0% - 5% and the profit rate.

McConnell and Servaes (1990) investigate the effects of managerial ownership on the firm's value. In their study, instead of fixing the level of managerial ownership, as had been conducted in Morck et al. (1988) study, they adopted managerial shareholding and managerial shareholding square as ownership variables. To do so, they drew upon a sample of 1,173 firms in 1976 and 1,093 firms in 1986. The results report that a positive relationship exists between managerial ownership holding at 0% to approximately 50% of shareholding and firm performance. Beyond 50%, a negative relationship between them is found. McConnell and Servaes (1990) therefore suggest that the impact of managerial ownership on the firm's value is nonlinear.

Short and Keasy (1999) also suggest that the performance (as measured by return on shareholders' equity) is positively related to managerial shareholding. More recently, Zakaria, Purhanudin and Palanimally (2014) examined ownership structure and firms' performance of Malaysian Trading and Service Sector for the period of six years 2005 to 2010. Their study revealed a positive significant impact between managerial shareholding and firms' performance.

Institutional shareholding and Financial Performance

Institutional shareholding is an investment from certain institutions which is usually higher than the investments of individual. It represents the percentage of the firms which are held by main investing institutions (own more than 5% of firm stock) (Hoseinbeglou Masrori, & Asadzadeh, 2013). A number of studies have sought to evaluate the link between institutional ownership and

ISSN 2053-4086(Print), ISSN 2053-4094(Online)

firm performance. However, their results are mixed and unclear. For instance, Agrawal and Knoeber (1996) find no significant association between institutional ownership and firm performance based on a list of 383 firms. Navissi and Naiker (2006) partitioned institutional investors into institutions that have appointed a representative to the board of directors of the firms in which they have a block investment and institutions with a similar holding but without a representative on the board of directors in the New Zealand, finds that institutions with board representation have greater incentives to monitor management. Therefore, their presence should have a positive influence on firm performance. Namazi and Kermani (2008) analyzed the impact of ownership structure on corporate performance of listed companies in Tehran Stock Exchange. The findings of this study indicate that there is a negative and meaningful relationship between institutional ownership and firm performance. In contrast, McConnell and Servaes (1990) find a positive relationship between institutional ownership and firm performance using a cross-sectional sample of 1173 firms listed on NYSE/AMEX in 1976 and another 1093 firms in 1986. Similarly, Chaganti and Damanpour (1991) provided evidence of a positive relationship between institutional ownership and return on equity in the US manufacturing sector continuously surveyed by the Value Line between 1983 and 1985. In the same vein, Clay (2001) finds a positive impact of institutional ownership on firm performance in which a percentage increase in institutional ownership translates into a 0.75 percent firm performance enhancement. Selecting the 1,914 firms included in Standard & Poor's from 1992 through 1997

Foreign Shareholding and Firm Performance

Foreign ownership represents the number of shares held by investors from different country. However, there are mix of findings on the relationship between Foreign Shareholding and Firm Performance. Zakaria *et al.* (2014) studied ownership structure and firms' performance of Malaysian Trading and Service Sector for the period of six years 2005 to 2010. Their study documented a positive impact between Foreign Shareholding and Firm Performance. Douma, George and Kabir (2006) examined the effect of foreign and domestic ownership in India. They found that foreign ownership is positively and significantly impacting on firm performance. Barbosa and Louri (2005) had a studied structured in form of question; corporate performance: does ownership matter? Their study compared foreign and domestic- owned firms in Greece and Portugal. The study showed a positive significant relationship between foreign ownership and firm performance.

It can be observed that most of the periods use for the above studies are not too current as a lot of activities have taken place, which include the changes in regulations, standards among others, as such the findings of these studies may have been taken over by the changes.

Theoretical Framework

Agency theory is concerned with contractual relationship between two or more persons called the agent(s) (management) to perform some services on behalf of the principal (owners). Both the agents and the principal are presumed to have entered into mutual agreement or contract motivated solely by self interest. The principal delegates decision making responsibility to agents (Chowdhury, 2004). It is a concept that explains why behavior or decisions vary when exhibited by members of a group. Specifically it describes the relationship between one party, called the principal that delegates work to another, called the agent. It explains their differences in behavior

ISSN 2053-4086(Print), ISSN 2053-4094(Online)

or decisions by noting the two parties often have different goals and, independent of their respective goals, different attitudes toward risk. Invariably, the agents' decision choices are assumed to have effect on both parties. These relationships, according to Bromwich (1992), are perceived in economic and business life and also generate more problems of contracting between entities in the economy. This means that there is a contractual relationship between shareholders and directors. For the purpose of this study, agency theory is adopted to anchor the variables of the study- shareholders (owners) and the agent (management).

RESEARCH METHODOLOGY AND MODEL SPECIFICATION

Research Design

A correlational research design was adopted due to the fact that the study measures relationships between ownership structure and financial performance of listed Deposit Money Banks in Nigeria. The population consists of all listed Deposit Money Banks in Nigeria for the period of 2005-2014. The study covers the period of ten years (2005-2014). The study intended to take the entire population, but did not provide all the required information. For that, filter is used as sampling criteria in the following manner that is the company must have published its financial statements for the period of the study (2005 to 2014). And also any bank that was listed before 2005 is excluded. After the application of filtering criteria, ten banks were qualified, the remaining were filtered because they did not provide the available information required necessary for the study. Ordinary least square regression is adopted to empirically run the regress using STATA as tool of analysis. The study uses correlation in order to determine the relationships between the variables of the study. Regression is employed because the study wants to determine the cause and effect of each variable. And finally, the study conducted robustness tests like, Hausman test and Heteroscedasticity test and Multicolinearity test in order to improve the validity of statistical inferences.

Variables Measurement

The variables of the study consist of Dependent Variable which is financial performance measured by ROE. The independent variables ownership structure was proxied by managerial shareholdings, institutional shareholdings and foreign shareholdings. This is shown in Table 3.1, which contains each variable with their definitions.

Table 3.1 Variable Measurement and Definition

Variables	Definition and Measurement
Financial performance (FP)	proxied by Return on Equity(ROE) measured as Net Income deflated by the total equity
Managerial shareholdings(MS)	Measured as the total amount of shares owned by directors deflated by the total outstanding shares
Institutional shareholdings(IS)	Measured as the total amount of shares owned by other firms
Foreign shareholdings(FS)	Measured as the total amount of shares owned by foreign investor deflated by the total outstanding shares
Leverage (LV)	Measured by total debt deflated by the equity
Firm Size(FSIZ)	A control variable measured as natural logarithm of the Firms total assets

Source: Generated by the Authors, 2015

ISSN 2053-4086(Print), ISSN 2053-4094(Online)

Model specification

The following is the model used to empirically test the hypotheses formulated.

$$\mathbf{ROE}_{it} = \beta_{it}0 + \beta 1\mathbf{MS}_{it} + \beta 2\mathbf{IS}_{it} + \beta 3\mathbf{FS}_{it} + \beta 4\mathbf{LV}_{it} + \beta 5\mathbf{FSIZ}_{it} + \varepsilon_i$$

Where,

ROE = Return on Equity of i time t
MS = Managerial Shareholdings of i time t
IS = Institutional Shareholdings of i time t
FS = Foreign Shareholdings of i time t
LV= Leverage of i time t
FSIZ = Firm Size of i time t
β0 = Constant of i time t
β1 to β4 = Beta Coefficient of i time t
ε= error time of i time t
i= firm
t= time

4.1 Result and Discussion

Table4.1: Correlation Matrix

VARIABLES	ROE	MS	IO	FS	LV	FSIZ
ROE	1					
MS	-0.2421	1				
IS	-0.2660	-0.2761	1			
FS	0.0933	-0.0731	0.2369	1		
LV	0.0993	-0.0403	0.1862	0.0663	1	
FSIZ	0.0124	0.3415	0.0816	-0.1710	0.0207	1

Source: STATA Output, 2015

The table 4.1 above shows that managerial shareholding and institutional shareholding have weak negative correlation with ROE of the Listed Deposit Money Banks in Nigeria. While foreign shareholding is weak but positively negatively correlated with ROE of the Listed Deposit Money Banks in Nigeria. And finally, the control variables leverage and firm size are weak but positively correlated with ROE of the Listed Deposit Money Banks in Nigeria. The tolerance values and the variance inflation factor are good measures of evaluating multicollinearity between the independent variables of the study. The results shows that tolerance values were less than 1.00 and the variance inflation factor were less than 10 showing that serial correlation may not cause problem to the study.

Robustness Tests

The robustness tests were conducted in this study in order to improve the validity of the statistical results. These include Multi-colinearity test and Heteroscedasticity test. The results reveal that there is absence of Multicolinearity as explained above. This is clearly shown from the result in Appendix A .The specification tests for all related regression of this study are discussed there.

ISSN 2053-4086(Print), ISSN 2053-4094(Online)

These specification tests examined every regression to verify that the appropriate test that had been chosen for each regression.

Multicolinearity Test

To further substantiate the absence of multicolinearity between the exogenous variables, multicolinearity diagnostics test are observed as the tolerance value and the variance inflators (VIF).

Variance Inflators Factor (VIF)

The variance inflation factor (VIF) is an advanced measure of assessing multicolinearity between the explanatory variables. The table below shows the tolerance value and variance inflation factor (VIF).

Table 4.3 Multicolinearity Diagnostics Test

Variable	VIF	^{1}/VIF
MS	1.13	0.883222
IO	1.22	0.821855
FS	1.32	0.754731
LV	1.07	0.932107
FSIZ	1.18	0.844243

Source: STATA Output, 2015

The above table 4.2. shows that the VIF are constantly smaller than 10 and VIF less than 1 respectively indicating absence of muticolinearity (Noter, Kutner, Nactsheirm, & Wasweman, 1996 and Cessey & Anderson , 1999). This shows the appropriate fit of filling of the model.

Hetetroscedasticity Test

The Brensh – Pagan test suggest the possible pressure of heteroskedasticity in the study model. A large chi-square would indicate that there is present of heteroscedasticity. In the result obtained from the heteroscedasticity test conducted in this study, chi-square value was 12.65 and the p-value was 0.0004 indicating the present of heteroscedasticity. Therefore, the study decided to conduct fixed and random effect test which will take care of the individual differences within units.

Breusch and Pagan Lagrangria Multiplier Test for Random Effects

The Random effects can be tested by using the Breusch-Pagan LM Test. The null hypothesis assumes that there are no random effects. If the null hypothesis is rejected then the random group effect model is more applicable than the pooled OLS model. The large X^2values show that the null hypothesis is rejected in favour of the random group effect model. This study shows X^2 of ROE is 0.28 as against p-value of 0.5947This indicates that OLS is more appropriate.

ISSN 2053-4086(Print), ISSN 2053-4094(Online)

Table 4.2: Regression Result

Variables	Coefficient	T-Values	P-Values
Constant	1.9820	4.9600	0.0000
MS	-4.9201	-3.6300	0.0000
IS	-5.2386	-4.3300	0.0000
FS	0.4006	1.7200	0.0890
LV	0.4243	1.6700	0.0970
FSIZ	-0.0235	-0.7400	0.7820
R2	0.2300	-0.2800	
Adj. R2	0.1900		
Wald Chi2	5.5300		
Prob. Chi2	0.0002		

Table 4.2 above, shows the summary of the estimated regression model
ROE= 1.9820-4.9201MS -5.2386IS +0.4006FS +0.42437LV-0.0235FSIZ
The model shows that managerial shareholding is found to be negatively significantly impacting on return on equity of the Listed Deposit Money Banks in Nigeria at 1% level. This can be observed from the beta coefficient of -4.92 which implies that any increase in managerial ownership will lead to a decrease of 4.92 Naira in return on equity. This may not to be surprise as managers often tend to satisfy their interest rather than the overall interest of the firm. This serves a justification for rejecting the third null hypothesis that was formulated as managerial ownership has no significant effect on return on equity of the Listed Deposit Money Banks in Nigeria. This supports the findings of Short and Keasy (1999) and Zakaria *et al.* (2014) who found positive significant impact between managerial ownership and firm performance.

The table also reveals a negative significant relationship between institutional shareholding and return on equity of the Listed Deposit Money Banks in Nigeria. This means that for every 1% increase in institutional shareholding return on equity will reduced by 4.98 Naira. That gives a basis for rejecting the second null hypothesis which states that institutional ownership has no significant relationship with ROE of the Listed Deposit Money Banks in Nigeria. This supports the finding of Kermani (2008) who documented a negative significant effect between institutional shareholding and firm performance and contradict the finding of McConnell and Servaes (1990) who fund a positive relationship between institutional ownership and firm performance

Additionally, foreign shareholding has positive significant impact on ROE of the Listed Deposit Money Banks in Nigeria at %10 level of significant. This shows foreign shareholdings improves banks' performance. This implies that for every 1% increase in foreign ownership ROE will increase by 1.7 Naira. The implication of this result is that, higher percentage of foreign ownership indicates higher performance. Consequently, the result produces a basis for rejecting the first null hypothesis formulated which presumed that foreign ownership has no significant effect on ROE

ISSN 2053-4086(Print), ISSN 2053-4094(Online)

of the Listed Deposit Money Banks in Nigeria. This is in line with work of Zakaria *et al.* (2014) who found positive significant impact between foreign ownership and firm performance.

Finally, the model shows that the control variable- leverage is positively and significantly related with ROE of the Listed Deposit Money Banks in Nigeria at %10 level of significant. This implies that highly levered banks are more profitable in Nigeria, while firm size is negatively related but statistically not significant. This implies that, the model can stand even without controlling for Firms size.

Overall, the combined and the overall impact between the repressors- equity formation (managerial shareholding, institutional shareholding and foreign shareholding) on return on equity of the Listed Deposit Money Banks in Nigeria, is shown on the model summary of the regression results. The Wald Chi2 of 5.68 which is significant at 1% (0.0004) reveals that the model is well fitted, while the coefficient of determination R^2 of 23. %, explains the individual variation of the dependent variable (ROE) as a result of the changes in the independent variable. It can be said that, equity formation (managerial shareholding, institutional shareholding, and foreign shareholding,) leverage and firm size have combined predictive power of 23% in impacting on earnings management of listed Food and Beverages Firms in Nigeria, while the remaining 77% is accounted for by other factors which are not captured in the model.

CONCLUSION AND RECOMMENDATIONS

This study investigates the relationship between managerial shareholding, institutional shareholding and foreign shareholding to proxy for ownership formation, while return on equity ROE was used to represent financial performance as the dependent variable of the study. It was therefore found that there is a negative significant relationship between managerial shareholding and institutional shareholding with ROE, while foreign shareholding is positively significantly related to ROE. For that the study concluded that institutional shareholding and managerial shareholding reduce the performance listed Deposit Money Banks in Nigeria. It was also established that higher proportion of foreign shareholding increases performance of the listed Deposit Money Banks in Nigeria.

In line with the above findings, the study recommended that the listed Deposit Money Banks in Nigeria should consider higher percentage of foreign shareholding by encouraging foreign investors to invest in their firms as it was empirically observed that increasing such improves banks' performance. It was also recommended that the listed Deposit Money Banks in Nigeria discourage having higher percentages of institutional shareholdings and managerial shareholdings by the banks as it was clearly observed from the findings of the study that increasing one of them reduces performance the listed Deposit Money Banks in Nigeria.

ISSN 2053-4086(Print), ISSN 2053-4094(Online)

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ISSN 2053-4086(Print), ISSN 2053-4094(Online)

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ISSN 2053-4086(Print), ISSN 2053-4094(Online)

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      Percentiles      Smallest
 1%        -8.26         -10.52
 5%       -1.865             -6
10%        -1.06          -2.31       Obs                 100
25%         .115          -2.31       Sum of Wgt.         100

50%           .8                      Mean           .8516065
                       Largest        Std. Dev.       2.00203
75%        1.885           4.27
90%         3.06           4.64       Variance       4.008125
95%       3.7755           4.64       Skewness      -1.988594
99%         4.64           4.64       Kurtosis       13.05578

                             ms
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      Percentiles      Smallest
 1%    .0003028       .0003028
 5%    .0041828       .0003028
10%    .0096901       .0031124       Obs                 100
25%    .0220388       .0031124       Sum of Wgt.         100

50%    .0538049                      Mean           .1166101
                       Largest        Std. Dev.       .140881
75%    .1316979       .4382504
90%    .4063439       .4382504       Variance       .0198475
95%    .4290819       .4382504       Skewness       1.344701
99%    .4382504       .4382504       Kurtosis       3.257618

                             is
-------------------------------------------------------------
      Percentiles      Smallest
 1%    .0100903       .0032494
 5%    .0190879       .0169313
10%    .0324808       .0169313       Obs                 100
25%    .0482402         .01867       Sum of Wgt.         100

50%        .123                      Mean           .1695211
                       Largest        Std. Dev.       .162912
75%        .2839          .5612
90%        .4012          .5891       Variance       .0265403
95%        .5061           .679       Skewness       1.303086
99%         .679           .679       Kurtosis       3.845973

                             fs
-------------------------------------------------------------
      Percentiles      Smallest
 1%    .0095711       .0087399
 5%    .0118834       .0104023
10%     .021001       .0104023       Obs                 100
25%    .0763583       .0117567       Sum of Wgt.         100

50%        .1191                     Mean           .2740341
                       Largest        Std. Dev.      .8013948
75%    .2959378       .7129617
90%    .5318543          .8231       Variance       .6422337
95%    .6274096       .8507298       Skewness       9.028432
99%    4.415365           7.98       Kurtosis       87.23768
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lv

	Percentiles	Smallest		
1%	-2.15	-2.98		
5%	.315	-1.32		
10%	.445	.26	Obs	100
25%	.515	.28	Sum of Wgt.	100
50%	.63		Mean	.6289
		Largest	Std. Dev.	.72921
75%	.715	.94		
90%	.84	.94	Variance	.5317472
95%	.9	.95	Skewness	3.685647
99%	3.69	6.43	Kurtosis	47.51248

fs

	Percentiles	Smallest		
1%	.84	.84		
5%	1.03	.84		
10%	1.165	.9	Obs	100
25%	1.3	.9	Sum of Wgt.	100
50%	1.39		Mean	1.9273
		Largest	Std. Dev.	2.186299
75%	1.665	4.09		
90%	2.93	9.41	Variance	4.779903
95%	3.35	13.43	Skewness	5.529456
99%	15.445	17.46	Kurtosis	35.23598

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. pwcorr roe ms is fs lv fsiz
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	roe	ms	is	fs	lv	fsiz
roe	1.0000					
ms	-0.2421	1.0000				
is	-0.2660	-0.2761	1.0000			
fs	0.0933	-0.0731	0.2369	1.0000		
lv	0.0993	-0.0403	0.1861	0.0666	1.0000	
fsiz	0.0124	-0.1710	0.0816	0.0649	0.0207	1.0000

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. reg roe ms is fs lv fsiz
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Source	SS	df	MS		
Model	90.1615778	5	18.0323156	Number of obs	= 100
Residual	306.642766	94	3.26215708	F(5, 94)	= 5.53
				Prob > F	= 0.0002
				R-squared	= 0.2272
				Adj R-squared	= 0.1861
Total	396.804343	99	4.00812468	Root MSE	= 1.8061

roe	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ms	-4.920089	1.357106	-3.63	0.000	-7.614655	-2.225524
is	-5.238567	1.20859	-4.33	0.000	-7.638251	-2.838884
fs	.4005933	.2334714	1.72	0.089	-.0629697	.8641564
lv	.4243307	.2534501	1.67	0.097	-.0789003	.9275617
fsiz	-.0234567	.084417	-0.28	0.782	-.1910686	.1441553
_cons	1.981957	.3992752	4.96	0.000	1.189186	2.774727

```
. hettest

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

         chi2(1)      =    12.65
         Prob > chi2  =   0.0004
```


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```
. xtset id year, yearly
       panel variable:  id (strongly balanced)
        time variable:  year, 2005 to 2014
                delta:  1 year

. xtreg roe ms is fs lv fsiz, fe

Fixed-effects (within) regression               Number of obs      =       100
Group variable: id                              Number of groups   =        10

R-sq:  within  = 0.2208                         Obs per group: min =        10
       between = 0.1742                                        avg =      10.0
       overall = 0.2128                                        max =        10

                                                F(5,85)            =      4.82
corr(u_i, Xb)  = -0.0479                        Prob > F           =    0.0006

------------------------------------------------------------------------------
         roe |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          ms |  -4.559234   1.699484    -2.68   0.009    -7.938264   -1.180204
          is |  -5.299895   1.306283    -4.06   0.000    -7.897134   -2.702655
          fs |   .3146626   .2410669     1.31   0.195     -.164643    .7939682
          lv |   .4948337   .2713261     1.82   0.072    -.0446352    1.034303
        fsiz |  -.1185075    .094156    -1.26   0.212    -.3057149    .0686998
       _cons |   2.112674    .437516     4.83   0.000     1.242775    2.982573
-------------+----------------------------------------------------------------
     sigma_u |   .7265398
     sigma_e |  1.7655633
         rho |  .14481464   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(9, 85) =     1.49                 Prob > F = 0.1664

. xtreg roe ms is fs lv fsiz, re

Random-effects GLS regression                   Number of obs      =       100
Group variable: id                              Number of groups   =        10

R-sq:  within  = 0.2090                         Obs per group: min =        10
       between = 0.3457                                        avg =      10.0
       overall = 0.2272                                        max =        10

Random effects u_i ~ Gaussian                   Wald chi2(5)       =     27.64
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000

------------------------------------------------------------------------------
         roe |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          ms |  -4.920089   1.357106    -3.63   0.000    -7.579968   -2.260211
          is |  -5.238567    1.20859    -4.33   0.000     -7.60736   -2.869775
          fs |   .4005933   .2334714     1.72   0.086    -.0570023    .858189
          lv |   .4243307   .2534501     1.67   0.094    -.0724223   .9210837
        fsiz |  -.0234567    .084417    -0.28   0.781     -.188911   .1419976
       _cons |   1.981957   .3992752     4.96   0.000     1.199392   2.764522
-------------+----------------------------------------------------------------
     sigma_u |          0
     sigma_e |  1.7655633
         rho |          0   (fraction of variance due to u_i)
------------------------------------------------------------------------------

. est store fixed

. est store random

. hausman fixed random

Note: the rank of the differenced variance matrix (0) does not equal the number of coefficients
        being tested (5); be sure this is what you expect, or there may be problems computing
        the test.  Examine the output of your estimators for anything unexpected and possibly
        consider scaling your variables so that the coefficients are on a similar scale.

                 ---- Coefficients ----
              |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
              |    fixed        random       Difference          S.E.
--------------+----------------------------------------------------------------
           ms |  -4.920089    -4.920089            0               0
           is |  -5.238567    -5.238567            0               0
           fs |   .4005933     .4005933            0               0
           lv |   .4243307     .4243307            0               0
         fsiz |  -.0234567    -.0234567            0               0
------------------------------------------------------------------------------
                           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
```


ISSN 2053-4086(Print), ISSN 2053-4094(Online)

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        roe[id,t] = Xb + u[id] + e[id,t]

        Estimated results:
                     |       Var     sd = sqrt(Var)
             ---------+-----------------------------
                 roe |    4.008125        2.00203
                   e |    3.117214       1.765563
                   u |           0              0

        Test:   Var(u) = 0
                            chi2(1) =      0.28
                         Prob > chi2 =      0.5947
```


ISSN 2053-4086(Print), ISSN 2053-4094(Online)