

Firm-Specific Attributes and Financial Performance of Listed Deposit Money Banks in Nigeria

Ahmad Bello Dogarawa

Department of Accounting, Ahmadu Bello University, Zaria
abellodogarawa@gmail.com

&

Fatima Ahmed Maude

Department of Business Education,
Federal College of Education, Zaria

Abstract

The nature and extent of relationship between firm attributes and bank financial performance have continued to attract the interest of researchers in view of the role that banks play in the economy of every nation. This study assesses the effect of firm specific variables on financial performance of Deposit Money Banks (DMBs) in Nigeria. The study formulates ten (10) hypotheses and applies panel data regression to analyse the extent to which market share, liquidity, credit risk, interest rate spread, leverage, efficiency, operating expenses, deposits, capital management, and bank size affect the financial performance of the banks. The study utilises secondary data extracted from the financial statements of the 13 banks listed on the Nigerian Stock Exchange (NSE) that have their financial statements available over the period 2005 to 2014. Due to absence of cross-sectional effect in the dataset as confirmed by the result of Breusch Pagan Lagrangian Multiplier test and presence of heteroskedasticity, the study uses robust pooled panel regression result for analysis and interpretation. The result of the robust pooled regression model reveals that financial performance of banks in Nigeria is significantly affected by market share, liquidity, interest rate spread, leverage, and operating expenses. The result also reveals that default risk, efficiency, deposits, capital management and size have no significant effect on financial performance of DMBs. In view of this, the study recommends that the Central Bank

of Nigeria (CBN) should formulate policies that will motivate banks to increase their market share so that banking structure will be based on market share rather than reduction in the number of players. In addition, the CBN should at least maintain the current liquidity reserves for the banks in view of the strong positive relationship it has with banks' financial performance. On their part, banks' management should strive to put deposit to more profitable use in order to increase interest rate spread while shareholders should continue to put in place policies and strategies that will ensure effective management of their capital, size and efficiency for increased profitability.

Keywords: Banking reform, firm-specific attributes, deposit money banks, financial intermediation, financial performance, Nigeria.

1. INTRODUCTION

In the past few decades, the banking sector has undergone series of reforms in its environment with a view to repositioning the sector to be able to play its financial intermediation roles in more efficient ways and consequently increase its performance. The reforms are motivated by the fact that a banking system, which channels financial resources efficiently to deserving sectors of the economy, is a powerful mechanism for economic growth. As a key component of the financial system, banks intermediate between surplus and deficit units of the economy and collect deposits from savers in order to channel them to borrowers. In the process of discharging this role, banks transform the quality of capital with respect to size, maturity and risk, thereby, reducing the cost of obtaining information about both savings and borrowing opportunities and in turn help to make the overall economy more efficient by raising the level of investment and savings, and increasing the efficiency in the allocation of financial funds in the economic system.

The literature on financial intermediation has mainly focused on the role of banks as lenders (Ono & Uesugi, 2005). The focus was premised on the traditional theory of financial intermediation as explained in the works of Gurlay and Shaw (1960), Akerlof (1970), Fama (1980), Gorton and Pennacchi (1990) and Boot (2000) among others. The theory builds on the notion that as lenders, banks develop close relationships with borrowers over time and such proximity facilitates monitoring and screening and overcomes problems of asymmetric information (Boot, 2000). As financial intermediaries therefore, banks convert assets, diversify and repackage them; create medium of exchange; and serve as intermediary between lenders and borrowers (Scholtens & Wensveen, 2003).

Banks have several advantages over non-bank financial institutions in providing financial intermediation services to a country's teeming population (Dogarawa, 2011). First, they have clear regulations illustrating the conditions of ownership, financial disclosure, and capital adequacy that help them ensure prudent risk management. Second, they have physical infrastructure that include a large network of branches, which enables them to reach a large number of small and medium sized customers. Third, they maintain deep-rooted internal controls, administrative and accounting systems that facilitate keeping track of a large number of transactions. Lastly, their ownership structure tends to encourage sound governance practices, seeking cost-effectiveness and increasing profitability.

Empirical evidence has shown that a sound and profitable banking sector is in a better position to withstand negative shocks caused by either internal or external factors and contribute to the stability of the financial system. Given the strategic importance of DMBs to the economy of every nation, policy makers and bank regulators have continued to design and re-design informed policies that will help improve the overall financial performance of the banking sector.

Accordingly, the need to understand the determinants of DMBs' financial performance has continued to attract the attention of academics, bank management, financial markets and bank supervisors.

The literature has categorised the determinants of bank financial performance into firm-specific, industry-specific and macroeconomic indicators (Francis, 2012). Firm-specific indicators are the internal determinants of a bank's operations, which management can to a great extent control. They measure the overall performance of a bank, its ability to meet regulated capital standards, changes in its loan quality and risk, its ability to generate revenue and pay expenses, changes in its cash position, and changes in its assets. Specifically, bank specific indicators include growth in bank assets, capital adequacy and capital management, operational efficiency, credit risk, liquidity risk, market power, operating expenses, interest rate spread, and leverage. These indicators are considered instrumental in determining financial performance of banks and have therefore featured in various studies (Haron, 1996; Chirwa, 2001; Atemnkeng & Joseph, 2006; World Bank, 2010; Mirzaei, Liu & Moore, 2011; Francis, 2012; Mirzae, 2012). Industry-specific and macroeconomic indicators are commonly referred to as external determinants of bank financial performance and are beyond the control of management. The most common measure of industry-specific determinant is bank-concentration based on structure-conduct-performance (SCP) postulations. On the other hand, macroeconomic variables that affect bank financial performance include growth in GDP, GDP-per-capita, inflation expectation, interest rate and its spread.

Generally, all firm-specific determinants, with the exception of size, are expected to influence bank financial performance in the anticipated way. However, findings from previous studies on the relationship between bank specific attributes and financial performance have revealed mixed results (Francis,

2012). This is evidence in the results of many studies conducted in different parts of the world (e.g. Bourke, 1989; Athanasoglou, Delis & Staikouras, 2006; Flamini, McDonald & Schumacher, 2009; Chortareas, Garza-Garcia & Girardone, 2010; Vong & Chan, 2010; Mirzaei, Liu & Moore, 2011; Ongore & Gemechu, 2013; Gremi, 2013). The studies documented mixed results with a lot of inconsistencies thereby providing a motivation for further studies in the area.

In Nigeria, the banking sector has witnessed a boom-and-bust cycles leading to many changes in the areas of regulations and reforms; number of institutions, structure of ownership; and depth and breadth of operations especially all in an attempt to reposition the industry to play its financial intermediation role in an efficient and profitable manner (Dogarawa, 2011). Notwithstanding the various reforms the Nigerian banking sector has gone through, banks have remained largely fragmented with substantial gaps in the financing of economic activities for private agencies. This is evidenced in their capital adequacy levels, risk, liquidity position, deposits and loans, loan loss provision, and high interest spread, among others. This means, the reforms did not yield the expected outcomes in so far the strategic role of banks as facilitators of savings, investment, employment and, and blood of economic growth is concerned. In addition, level of financial performance of the banking system is generally regarded as low and does not correspond to what is seen in many financial sectors in emerging economies such as South Africa, Malaysia, Singapore and even its West African neighbour, Ghana. In view of this, it is imperative to empirically assess the determinants of financial performance of the DMBs in Nigeria using several measures.

This paper empirically examines the effect of firm-specific attributes on financial performance of DMBs in Nigeria over a 10-year period from 2005 to 2014. The paper hypothesises that market share, liquidity, credit risk, interest rate spread,

leverage, efficiency, operating expenses, deposits, capital management, and bank size have no significant effect on financial performance of the banks. The paper is organised into five (5) sections. Section 2 reviews some related empirical studies on the relationship between bank specific attributes and financial performance. Section 3 discusses the dataset and methods employed in data analysis. Section 4 analyses the results and discusses the findings in light of previous studies, and highlights the policy implications of the research findings. Section 5 concludes the paper and offers recommendations.

2. Conceptual Issues and Review of Empirical Literature

Four areas of bank analysis, namely, profitability, liquidity, asset quality, and capital adequacy have featured in the literature. However, as Wariboko (1994) explained, of these key areas, profitability analysis is the aspect that reveals the financial performance of a bank; while liquidity, assets quality and capital adequacy analysis reveal bank risk and condition. In view of this, bank-specific studies have concentrated on profitability (AL- Shubiri, 2010). Profitability is the principal goal of banks as well as all other business organisations. Without profitability, a bank will not survive in the long run (Al-Shubiri, 2010). Determining a bank's current and past as well as projecting future profitability is therefore very important (Sathye, 2002; Sutton, 2006).

Profitability measures include the rate of return on equity (ROE), rate of return on capital (ROC) and rate of return on assets (ROA). In most bank studies, emphasis is placed on measuring profitability in terms of ROC and ROA or ROA and ROE (Atemnkeng and Joseph, 2006). Smirlock (1985) observed that the use of ROA has provided strongest evidence on the relationship between firm-specific variables and profitability in banking much more than ROE in view of the fact that using the former provides opportunity of

benchmarking a bank's output against its total assets. Keeton and Matsunaga (1985) asserted that ROA is especially useful in measuring changes in bank performance over time since banks' income and expense components are more closely related to assets. On the whole, ROA is considered the most important measure of bank profitability. It is defined as the banks' before tax profit over total assets. The choice of ROA rather than ROE as proxy for bank profitability is because, as Flamini, McDonald and Schumacher (2009) put it, an analysis of ROE disregards financial leverage and the risks associated with it. Though, ROA, on its part, is criticised of being biased due to off-balance-sheet activities, it is still believed that such activities are negligible in most developing nations relative to the risk associated with leverage.

The relationship between firm-specific attributes and financial performance has been widely studied using data from different countries (Genchev, 2012). The results revealed mixed findings. On the whole however, using a bank-level panel dataset, Era and Holger (2007) examined the effect of a number of firm-specific variables on profitability of Armenian banks for the period 2002 – 2006. The study revealed that the explanatory variables have large potential to increase profitability.

With regard to market share, most studies found its relationship with financial performance of banks to be significant (Heggsted, 1977; Smirlock, 1985). Using bank-level data for, Demirgüç-Kunt and Huizinga (1998) found significant relationship for 80 developed and developing countries for the period 1988 – 1995. Also, Bektas (2006) and Chortareas, Garza-Garcia and Girardone (2010) documented similar results for North Cyprus and Latin American countries respectively. In addition, Genchev (2012) reported similarly reports. Contrary to the above findings, Barth, Nolle and Rice (1997) used cross-country data from 19 developed countries in 1993 to examine the effect of market share on profitability of banks. The study

revealed that market share has no significant effect on the profitability of the selected banks.

Hayden, Porath and Westernhagen (2007) and Berger, Hasan and Zhou (2010) investigated the effect of loan portfolio on financial performance of banks in the German and Chinese banking sector respectively. Both studies revealed that an increase in loan diversification reduces bank financial performance. Similarly, Tabak, Fazio and Cajueiro (2010) tested whether diversification of loan portfolio is associated with better financial performance of the Brazilian banking system. They found that loan portfolio concentration increases returns and reduces default risk. The outcome of their study contradicted in part, earlier similar studies that use loan portfolio along other bank-specific variables. Langrin and Roach (2008) could not conclude on the nature and extent of relationship between these two variables. On default risk, Brock and Suarez (2000) found that default risk measured by non-performing loans has a positive effect on profitability. Doliente (2005) also documented similar findings for Indonesia, Malaysia, the Philippines, and Thailand.

Leverage is another key internal determinants of bank financial performance. This is because banking business is all about leverage. Banks are highly leveraged financial institutions that are in the business of facilitating leverage for others through their financial intermediation role. Leverage refers to the extent to which an organisation, banking or non-banking, funds its assets with borrowings rather than equity. Leverage in banking is far higher than in other industry or sectors of the economy. According to Ingves (2014), while the average leverage ratio across 10 of the world's largest listed non-financial companies is on the order of 50:50 for debt and equity, a common ratio in banking is 95:5 even before off-balance sheet exposures are added. Though leverage has been theoretically demonstrated to be instrumental in explaining the financial performance of banks, its empirical effect is

inconclusive. (Berger, 1995) documented negative association between leverage and financial performance. Contrarily, Bourke (1989), Molyneux and Thornton (1992) and Goddard *et al.* (2004) reported positive effect of leverage on profitability.

Operational efficiency, which shows how well a bank streamlines its operations and manages its input-output relationship has also been studied. Ongore and Gemechu (2013) documented a significant positive association. Also, using a 15-year dataset from 1993 to 2007, Vong and Chan (2010) found significant association between efficiency and profitability for banks in Macacao. Also, Brock and Suarez (2000) found that operating expenses positively and significantly associated with profitability.

Operating expenses also referred to as overhead has also been found to play a significant role in determining financial performance of banks (Gremi, 2013). Empirically, findings on the association between operating expenses and financial performance are mixed. Bourke (1989), Molyneux and Thornton (1992) and Molyneux (1993) found a positive association operating expenses and profits. On the contrary, Anthanasoglou *et al.* (2006) found negative relationship.

Capital is also considered as an important determinant of bank profitability thus a positive relationship is expected to exist between capital management and bank profits. Theoretical literature has examined the effect of capital on the financial performance of banks. Most of the studies emphasise the role of capital and its management in reducing the probability of insolvency and consequent closure for banks on the one hand, and on the other hand, the probability of increasing profitability potentials of banks both during crisis and normal times. Empirically, good capital management has been demonstrated to be important in explaining the financial performance of

financial institutions, though its effect on bank profitability is still inexplicit (Berger, 1995). Diamond and Rajan (2000) and Mehran and Thakor (2009) also documented that higher capital leads to a survival tendency and higher profitability for banks. In addition, Bourke (1989), Molyneux and Thornton (1992), Demirgüç-Kunt and Huizinga (1998), Bikker and Haaf (2002), Goddard *et al.* (2004), Athanasoglou *et al.* (2005), Berger (2005), Somoye (2008), Adegbaaju and Olokoyo (2008) and Berger and Bouwman (2009) found a significant positive relationship between capital management and bank profitability. Despite the overwhelming evidence of significant positive relationship between capital adequacy and bank financial performance, the study of Eichengreen and Gibson (2001) indicated the need to be cautious because their results showed that capital would only have significant positive relationship with profitability to a certain limit, thereafter, the relationship could be negative due to bureaucratic and other reasons.

Empirically evidence on the effect of size on a bank's financial performance is mixed. Early studies such as Short (1979), Kwast and Rose (1982) found significantly relationship between size and bank profitability while Vernon (1971) found insignificant relationship. Later studies that include Gelos (2006) and Al-Hashimi (2007) all reported significant relationship. However, the study of Stienherr and Huveneers (1994) and Flamini, McDonald and Schumacher (2009) produced inconsistent results. On the direction of association, Stiroh (2004) and De Haan and Poghosyan (2011) found a negative relationship while Fayman (2009) documented positive relationship.

3. Materials and Methods

The paper uses correlational research design based on quantitative approach as rooted in positivism paradigm to examine the effect of firm-specific variables on profitability of DMBs in Nigeria. The study extracts panel data from the financial statements of all the 13 listed DMBs that have the required data available for the period 2005 – 2014. The variables of the study consist of one dependent variable, profitability, and ten independent variables: market share, liquidity, credit risk, interest rate spread, leverage, efficiency, operating expenses, deposit, capital management, and bank size representing bank specific variables.

The model of the study is based on cost efficiency profit model as employed by previous studies including Maudos *et al.* (2002), Mercia *et al.* (2002), Goddard *et al.* (2004) and Panayiotis *et al.*(2005) among others to evaluate the determinants of bank financial performance in different economies. The model is anchored on cost minimisation and profit maximisation relationship based on the presumption of Portfolio theory that a bank’s financial performance is influenced by internal efficiencies and managerial decisions (Francis, 2012). The model of the panel regression is given as:

$$ROA_{it} = \beta_0 + \beta_1 MSHARE_{it} + \beta_2 LIQ_{it} + \beta_3 DRISK_{it} + \beta_4 SPREAD_{it} + \beta_5 LEV_{it} + \beta_6 EFFCY_{it} + \beta_7 OPE_{it} + \beta_8 DEP_{it} + \beta_9 BCMGT_{it} + \beta_{10} BSIZE_{it} + \epsilon_{it} \quad (1)$$

Where:

Variable	Definition, measurement and source
ROA _{it}	Return on assets representing profitability of bank <i>i</i> at time <i>t</i> and measured as profit before tax/total assets

MSHARE	Market share of each bank measured by bank's assets/total assets of the banking sector (Haron, 1996; Chirwa, 2001; Mirzaei, Liu & Moore, 2011; Mirzaei, 2012)
LIQ	Liquidity measured as liquid assets/total assets (Athanasoglou, Brissimis & Delis, 2005; Dabla-Norris & Floerkemeier, 2007; Mirzaei, 2012)
DRISK	Default risk calculated by non-performing loans/total loans (Guavera, Maudos & Perez, 2008; Aysan, Dalgic & Demirci, 2012)
SPREAD	Interest rate spread calculated by interest received/interest paid (Dabla-Norris & Floerkemeier, 2007; Aysan, Dalgic & Demirci, 2012; Mirzaei, 2012)
LEV	Leverage measured as total equity/total assets (Rugemintwari, 2011)
EFFCY	Efficiency measured as total cost/total income (Guavera, Maudos & Perez, 2008; Mirzaei, 2012)
OPE	Operating expenses measured as overhead cost/total assets (Demirguc-Kunt & Huizinga, 1999; Dabla-Norris & Floerkemeier, 2007; Mirzaei, Liu & Moore, 2011; Mirzaei, 2012)
DEP	Bank deposits calculated by bank deposits/total liabilities (Rugemintwari, 2011)
BCMGT	equity/total assets (Chirwa, 2001; Athanasoglou, Brissimis & Delis, 2005; Atemnkeng & Joseph, 2006; World Bank, 2010; Mirzaei, Liu & Moore, 2011; Mirzaei, 2012)
BSIZE	Bank size calculated by log of total assets (Athanasoglou, Brissimis & Delis, 2005; Atemnkeng and Joseph, 2006; Dabla-Norris & Floerkemeier, 2007; Guavera, Maudos & Perez, 2008; Mirzaei, 2012)
β_0, β_1 β_{10}	Parameters of the model to be estimated

Using Stata 13.x software, the study generates both descriptive statistics and correlation matrix for the dataset to examine the main characteristics of the data and understand the direction and extent of relationship between and among the variables. The study also conducts normality test for the dataset to see its behaviour. Furthermore, the study runs three sets of panel regression; pooled regression based on ordinary least squares (OLS), fixed effect (FE) and random effect (RE) which are both based on Generalised Least Square (GLS) methods. Relevant diagnostic and robustness tests that include Heteroskedasticity, Multicollinearity, Hausman specification, and Breusch-Pagan Lagrange Multiplier (LM) were conducted to determine the most suitable model for analysis as well as determine whether or not the estimated models satisfy the conditions for acceptance.

4. Results and Analysis

The summary of the descriptive statistics of all the variables used in the study reveals mean values of 0.074, 0.485, 0.167, 0.128, 0.873, 1.208, .0568, 0.460, 0.210, 0.686 and 1.250 for ROA, MSHARE, LIQ, DRISK, SPREAD, LEV, EFFCY, OPE, DEP, BCMGT and BSIZE respectively. The respective minimum and maximum values for the variables are -.258 and .792, .065 and 1.922, .005 and .64, .002 and .56, -.125 and 2.164, .039 and 5.73, -2.59 and 5.73, .001 and 5.7, 0 and 1.096, -3.6 and 1.506, and 1.04 and 1.44. The values indicate wide dispersion in most of the variables. Also, the standard deviations of most of the variables vary significantly from the respective means of the data indicating that there are wide variations regarding the banks' behaviour to these phenomena. In addition, the Shapiro Wilk test for normality of data indicates that all the variables are not normally distributed. As

a rule, non-normality of data does not affect the validity of estimations with regression based on Gauss-Markov Theorem as explained by Shao (2003).

A Pearson correlation analysis was then performed on all the variables to check for degree of relationship between the dependent and independent variables and among the independent variables. Table 1 presents the correlation matrix as follows:

Table 1: Correlation Matrix

	roa	mshare	liq	drisk	spread	Lev	effcy	ope	dep	bcmgt	Bsize
roa	1.0000										
mshare	0.1633	1.0000									
liq	0.3306	0.0462	1.0000								
drisk	-0.1284	-0.1077	-0.1082	1.0000							
spread	-0.2007	0.0249	0.1731	-0.1721	1.0000						
lev	-0.0680	-0.0632	0.1849	0.2846	0.1436	1.0000					
effcy	-0.0874	0.0359	-0.1088	-0.0868	0.0448	0.1322	1.0000				
ope	-0.2447	0.0610	0.0717	-0.0885	0.1729	0.0568	0.0366	1.0000			
dep	-0.1266	-0.1241	-0.1502	-0.0889	-0.0389	0.0252	0.2425	0.0364	1.0000		
bcmgt	-0.1305	-0.1043	-0.1026	0.1061	-0.0122	0.0443	-0.0179	0.0310	0.0617	1.0000	
bsize	-0.0043	0.2652	0.0391	-0.1975	-0.0305	-0.1980	0.0624	-0.0250	0.0333	-0.0291	1.0000

Source: Output generated using Stata

In correlation analysis, high level and strong form of relationship between dependent and individual independent variables are expected while low level and weak form of relationship between and among independent variables are expected. From the correlation matrix presented in table 1, only MSHARE, LIQ, SPREAD, LEV and OPE have strong relationship with ROA. The result also shows that the independent variables are not strongly associated among and between themselves.

The paper then estimates the linear relationship between the explanatory variables and the response variable. It first generates a pooled panel regression. The model summary returns an F-statistics of 5.36 with a p-value that is statistically significant at 1% level of significance and an adjusted R-squared of 25%. It further carries out diagnostic test on the pooled panel result by testing for both multicollinearity and heteroskedasticity. The result of the variance inflation factor (VIF) and tolerance value (VF) revealed values that are consistently smaller than 10 and above 0.10 respectively indicating the absence of multicollinearity. The low mean VIF of 1.13 also pointed to the mild correlation that exists among the regressors. Heteroskedasticity was tested using the Breusch-Pagan/Cook-Weisberg test. The result reveals a χ^2 value of 30.41, which is significant at 1%. The result indicated that homoscedasticity assumption was violated in the dataset.

Using Generalised Least Square (GLS) method, we ran both fixed effect (FE) and random effect (RE). The results revealed a considerable difference between FE and RE based on which Hausman specification test was carried out to enable selection of the best model between the two. The result of the Hausman test revealed a χ^2 value of 11.72 with a p-value of 0.304, which is not statistically significant. On the basis of the Hausman result, RE model was considered as the preferred between the two models. This is supported by the coefficient, z-values and p-value of the constant term of 0.3689735, 2.24

and 0.025 respectively in the RE result. The p-value, which is statistically significant at 5% level of significance provides sufficient evidence for the rejection of the null hypothesis that presumes absence of significant difference in the banks' attributes in influencing their performance. This means the assumption of homogeneity in the specific attributes of the banks is violated.

In order to confirm whether our deduction from the p-value of the constant term in the RE model is correct, we carried out another test for cross-sectional effect using Breusch-Pagan Lagrange Multiplier (LM) to determine whether the entities are of the same or different characteristics in order to enable us decide between random effect regression and pooled panel regression. The rule is that if the banks are of the same characteristics, they would not have to be treated separately since there would be no panel/cross-sectional effect, and thus, pooled regression would suffice for analysis and interpretation. The null hypothesis in the LM test, which is generally considered as superior to p-value of constant term (Gujarati & Porter, 2009) is that there is no cross-sectional effect across the banks. The result of the LM test revealed a p-value that is not statistically significant and thus could not provide sufficient evidence for rejection of the null hypothesis. Accordingly, the pooled panel model is considered more appropriate.

Owing to the violation of the assumption of homoscedasticity in the pooled panel result as confirmed by the Breusch-Pagan/Cook-Weisberg test that turns a χ^2 value of 30.41, which is significant at 1%, we re-run a pooled panel regression using *robust* option as suggested by Gujarati and Porter (2009) to correct the problem of heteroskedasticity. The summary of the four models is presented in table 2 while the result of the robust pooled regression model is used for analysis and interpretation.

Table 2: Summary of Pooled Panel, Fixed Effect, Random Effect and Robust Pooled Models

Variable	Pooled panel	Fixed effect	Random effect	Robust pooled
MSHARE	.06506861**	.06380695**	.06506861**	.06506861***
LIQ	.3360903***	.39880772***	.3360903***	.3360903***
DRISK	-.22651405	-.09780374	-.22651405	-.2265141
SPREAD	-.0562729**	-.01822504	-.0562729**	-.0562729***
LEV	-.0225198*	-.00803381	-.0225198*	-.0225198**
EFFCY	-.00114369	-.00649739	-.00114369	-.0011437
OPE	-.03761474**	-.03272234**	-.03761474**	-.0376147***
DEP	-.03008327	-.03495307	-.03008327	-.0300833
BCMGT	-.00812646	-.00847152	-.00812646	-.0081265
BSIZE	-.19787284	-.30305939**	-.19787284	-.1978728
_CONS	.36897354**	.42552031**	.36897354**	.3689735
F-Stat./Wald Chi ²	5.36***	2.69***	53.59***	5.34***
Adj./Overall R ²	.25	.25	0.31	0.31

Source: Output generated using Stata *Legend:* * p<.1; ** p<.05; *** p<.001

Table 2 reveals that the robust R-squared (R^2) value is 0.31. This means that about 31% of the systematic variations in the selected banks' return on assets are jointly explained by changes in the banks' level of market share, liquidity, credit risk, interest rate spread, leverage, efficiency, operating expenses, deposits, capital management, and size of the banks. This implies that while the explanatory power of the model used in the study stands at 31%, other factors that have not been captured in the study explain the remaining 69%. The F-statistics returns a value of 5.34 that is statistically significant at 1% level of significance. This confirms the overall significance of the model. It further supports the assumption of a significant linear relationship between the dependent variable, return on assets (ROA), and the independent variables.

The result further shows positive t-values for MSHARE (2.85) and LIQ (4.23), indicating direct/positive relationship between these variables and financial performance of the selected banks. All the other explanatory variables return negative t-values. This indicates an inverse relationship between each of the other explanatory variables and the response variable. The coefficients and t-values obtained from the result show that MSHARE, LIQ, SPREAD and OPE are the most statistically significant variables that influenced financial performance of MDBs in Nigeria within the period of study at 1% level of significance in all cases. In addition to these, LEV also returns a coefficient and t-values that are statistically significant at 5% level of significance. The result provides a basis for rejecting the hypotheses on market share, liquidity, interest rate spread, leverage and operating expenses. This means that based on the robust pooled regression result, these variables strongly affect financial performance of DMBs in Nigeria with market share and liquidity moving in the same direction with financial performance, and interest rate spread, leverage and operating expenses moving in the opposite direction.

The finding of the study with regard to market share is consistent with the studies of Smirlock (1985), Demirgüç-Kunt and Huizinga (1998), Bektas (2006), Chortareas, Garza-Garcia and Girardone (2010), Genchev (2012) but inconsistent with the study of Barth, Nolle and Rice (1997). The finding on liquidity is inconsistent with that of Francis (2012). On credit risk and interest rate spread, the finding of this study contradicts the study of Brock and Suarez (2000) and Doliente (2005). On leverage, the finding supports the study of Berger (1995) on both the extent and direction of association with financial performance but contradicts the studies of Bourke (1989), Molyneux and Thornton (1992) and Goddard *et al.* (2004) with respect to direction of association. The finding on operational efficiency is inconsistent with the studies of Brock and Suarez (2000), Vong and Chan (2010) and Ongore and Gemechu (2013). All the three studies documented significant positive association. The finding on operating expenses is consistent with Anthanasoglou *et al.* (2006) on both the extent and direction of association. The finding is however contrary to Bourke (1989), Molyneux and Thornton (1992) and Molyneux (1993) who documented a positive relationship that is statistically significant. On deposits, the study contradicts the finding of Francis (2012). Furthermore, the finding of this study on capital management contradicts the study of Diamond and Rajan (2000), Bikker and Haaf (2002), Berger (2005), Somoye (2008), Adegbaju and Olokoyo (2008) and Berger and Bouwman (2009) and Mehran and Thakor (2009). The finding of this study also supports Vernon (1971) and contradicts Gelos (2006) and Al-Hashimi (2007).

On comparative basis, all the coefficients of all the explanatory variables under the pooled panel results are the same with those obtained for random effect model. In addition, the level of statistical significance of each of the p-values under the two models including the constants are the same. This confirms the

LM test that shows no cross-sectional effect among the banks. However, though the coefficients of the robust pooled regression are also the same with those of the two models, the level of significance of the p-values is different for all the variables except LIQ. The constant term in the robust pooled regression returns a p-value that is not statistically significant. This further lends support to the assumption of homogeneity of the banks' attributes in influencing their financial performance.

5. Conclusion and Recommendations

Studies on Nigeria's banking sector that aimed at revealing the true position of the sector and the areas that need improvement with regard to its financial intermediation role would be of great importance. This study has provided information on the true nature and extent of relationship between firm-specific attributes and financial performance of DMBs in Nigeria for the period 2005 – 2014.

In view of the findings, the study recommends that DMBs should work on increasing market share and liquidity position, and decreasing leverage and operating expenses. The apex bank should also provide incentive to ensure a competitive banking environment that will motivate banks to increase their market share so that banking structure will be based on market share rather than reduction in the number of players. Banks' management should continue to put in place policies and strategies that will ensure efficient matching of input to output and improvement in capital management. Lastly, management of DMBs should improve the quality of their loan portfolio through good credit appraisal and management policies in order to reap the benefit of effective credit function.

References

- Adegaju, A. A. & Olokoyo, F. O. (2008). Recapitalization and banks' performance: a case study of Nigerian banks. *African Economic and Business Review*, 6 (1): 1-17.
- AFRINVEST (2010). Nigerian Banking Sector Reform. Afrinvest (West Africa) Limited. Lagos.
- Akerlof, G. (1970). The Market for Lemons: Quality Uncertainty and the Market Mechanism, *Quarterly Journal of Economics*, 48, 488-500.
- Al-Hashimi, A. (2007). Determinants of bank spread in sub-Saharan Africa. *IMF Draft Working Paper*, 05/06.
- AL-Shubiri, F. N. (2010). Analysis of the relationship between market structure and profitability performance: the case of commercial banks in Jordan. *Global Journal of Finance and Management*, 2 (1): 103-121.
- Atemnkeng, T. J. & Joseph, N. (2006). Market structure and profitability performance in the banking industry of CFA countries: the case of commercial banks in Cameroon. Retrieved from http://www.jsd-africa.com/Jsda/Summer_2006/PDF/ARC_MarketStructureProfitabilityPerformace.pdf
- Athanasoglou, P. P., Brissimis, S. N. & Delis, M. D. (2005). Bank-Specific, Industry-Specific and Macroeconomic Determinants of Bank Profitability, *Bank of Greece Working Paper*, No. 25.
- Athanasoglou, P. P., Delis, M. D. & Staikouras, C. (2006). Determinants of bank profitability in the South Eastern European region. *Journal of Financial Decision Making*, 2, 1-17.

- Aysan, A. F., Dalgic, C. H. & Demirci, M. (2012). Global Crisis and Net Interest Rate Margin in a time of trouble. What matters more for an Emerging Market Economy, Bogazici University, Mimeo.
- Barth, J. R., Nolle, D. E. & Rice, T. N. (1997). Commercial banking structure, regulation, and performance: an international comparison, *Comptroller of the Currency Economics Working Paper*, 97-6.
- Bektas, E. (2006). Test of Market Structure and Profitability in Liberalizing the Deposit Market: The Case of North Cyprus. *Problems and Perspectives in Management*, 4 (2): 62-67.
- Berger, A. (1995) The relationship between capital and earnings in banking. *Journal of Money, Credit and Banking*, 27, 432-456.
- Berger, A. N. & Bouwman, C. H. S. (2009). Bank Liquidity Creation. *Review of Financial Studies*, 22: 3779-3837.
- Berger, A. N., Hasan, I. & Zhou, M. (2010). The effects of focus versus diversification on bank performance: evidence from Chinese banks. *Journal of Banking and Finance*, 34, 1417-1435.
- Berger, U. (2005). Access Charges in the Presence of Call Externalities. *The B.E. Journal of Economic Analysis & Policy*, Berkeley Electronic Press, 0 (1): 1-21.
- Bikker J. A. & Haaf, K. (2002). Measures of Competition and Concentration in the Banking Industry: A Review of the Literature. *Economic and Financial Modelling*, 9 (2): 53-98.
- Boot, A. W. A. (2000): Relationship Banking: What Do We Know?, *Journal of Financial Intermediation*, 9(1), 7-25.

- Bourke, P. (1989). Concentration and other determinants of bank profitability in Europe, North America and Australia. *Journal of Banking and Finance* 13, 65-79.
- Brock, P. L. & Suarez, L. R. (2000). Understanding the Behaviour of Bank Spreads in Latin America. *Journal of Development Economics*, 63(1):113-134.
- Chirwa, E. W. T. (2001). Market structure, liberalization and performance in the Malawian banking industry. *Research Paper*, 108, African Economic Research Consortium, Nairobi.
- Chortareas, G. E., Garza-Garcia, J. G. & Girardone, C. (2010). Banking sector performance in some Latin American countries: market power versus efficiency. *Banco de Mexico Working Papers*, 2010-20.
- Dabla-Norris, E. & Floerkemeier, H. (2007). Bank Efficiency and Market Structure: What Determines Banking Spreads in Armenia? *International Monetary Fund Working Paper*, WP/07/134
- De Haan, J. & Poghosyan, T. (2011). Bank Size, Market Concentration, and Bank Earnings Volatility in the US. *DNB Working Papers*. 282, Netherlands Central Bank, Research Department.
- Demirgüç-Kunt, A. & Huizinga, A. (1998). Determinants of commercial bank interest margins and profitability: some international evidence. *World Bank Economic Review*, 13, 379-408.
- Diamond, D. W. & Rajan, R. G. (2000). A theory of bank capital. *Journal of Finance*, 55, 2431-2465.
- Dogarawa, A. B. & Bello, M. S. (2013). An Analytical Appraisal of Bank Consolidation in Nigeria. *The Certified National Accountant*, A bi-monthly Journal of Association of National Accountants of Nigeria, 21 (4), 26-32

- Dogarawa, A. B. (2011). Chronology of Banking Reforms in Nigeria: A Survey of Past and Present Theoretical and Empirical Literature. *Journal of Financial Regulation and Compliance*, Published by Emerald Group Publishing Limited, 19 (4). 370-382, November, at DOI 10.1108/13581981111182965.
- Dogarawa, A. B. (2014). An Analytical Appraisal of the Components of Financial Reforms in Nigeria and its Impact on the Banking Industry. *Nigerian Journal of Management Technology and Development*, A publication of Faculty of Management Technology, Abubakar Tafawa Balewa University, Bauchi, 5 (2): 13-29.
- Doliente, J. (2005). Determinants of Bank Net Interest Margins in Southeast Asia. *Applied Financial Economic Letters* 1, 53-57.
- Eichengreen, B. & Gibson, H. D. (2001). Greek Banking at the Dawn of the New Millennium. *CEPR Discussion Papers* 2791, C.E.P.R. Discussion Papers.
- Eke, C. (2003). Equity Investments and the Nigerian Banking Sector” *Industry Analysis*, U.S. State Department Commercial Service Report ID: 111275
- Era, D. & Holger, F. (2007). Bank efficiency and market structure: what determines banking spreads in Armenia? *IMF Working Paper*, WP/07/134.
- Fama, E. F. (1980). Banking in the Theory of Finance. *Journal of Monetary Economics*, 6, 39-57.
- Fayman, A. (2009). Large banks versus small banks: how different are they? *Journal of Economic and Social Policy*, 13 (1)
- Flamini, V., McDonald, C. & Schumacher, L. (2009). The Determinants of Commercial Bank Profitability in Sub-Saharan Africa. *IMF Working Papers*, 1-30.

- Flamini, V., McDonald, C. & Schumacher, L. (2009). The Determinants of Commercial Bank Profitability in Sub-Saharan Africa. *IMF Working Papers*, 1-30.
- Francis, M. E. (2012). Determinants of Commercial Bank Performance in Sub-Saharan Africa. PhD Thesis submitted to the School of Post Graduate Studies, Makerere University, Uganda.
- Gelos, R. G. (2006). Banking Spreads in Latin America. *IMF Working Papers*, WP/06/44.
- Genchev, E. (2012). Effects of market share on the bank's profitability. *Review of Applied Socio- Economic Research*, 3 (1): 87-95
- Goddard, J., Molyneux, P. & Wilson, J. O. S. (2004). Dynamics of growth and profitability in banking. *Journal of Money, Credit and Banking*, 36, 1069-1090.
- Gorton, G. & Pennacchi, G. (1990): "Financial Intermediaries and Liquidity Creation", *Journal of Finance*, Vol. 45 (1) 4971.
- Gremi, E. (2013). Internal Factors Affecting Albanian Banking Profitability. *Academic Journal of Interdisciplinary Studies*, 2 (9): 19 – 25
- Guavera, J. F., Maudos, J. & Perez, F. G. (2008). Market Power in European Banking Sectors. *Journal of Financial Services Research*, 27(2): 109-137.
- Gujarati N. D. & Porter, D. C. (2009). *Essentials of econometrics*. McGraw-Hill/Irwin, New York. Fifth Edition.
- Gurley, J. G. & Shaw, E. S. (1960), *Money in a Theory of Finance*, The Brookings Institution, Washington, D.C.
- Haron, S. (1996). Competition and Other External Determinants of the Profitability of Islamic Banks. *Islamic Economic Studies*, 4 (1): 49 – 64.

- Hayden, E., Porath, D. & Westernhagen, N. (2007). Does diversification improve the performance of German banks? Evidence from individual bank loan portfolios, *Journal of Financial Services Research*, 32, 123-140.
- Heggested, A. A. (1977). Market Structure, Risk, and Profitability in Commercial Banking. *Journal of Finance*, 32, 1207-1216.
- Ingves, S. (2014). Banking on leverage. Keynote address to the 10th Asia-Pacific High-Level Meeting on Banking Supervision jointly organised by the Basel Committee on Banking Supervision (BCBS), the Financial Stability Institute (FSI), and the Executives' Meeting of East Asia-Pacific Central Banks Working Group on Banking Supervision (EMEAP WGBS), Auckland, New Zealand, 25–27 February 2014.
- Keeton, W. R. & Matsunaga, L. (1985). Profits of Commercial Banks in Tenth District States. *Economic Review of Federal Reserve Bank of Kansas City*, June, 3-22.
- Kwast, M. L. & Rose, L. J. (1982). Pricing, Operating Efficiency and Profitability among Large Commercial Banks. *Journal of Banking and Finance*, 6 (2): 233-254.
- Langrin, R. B. & Roach, K. (2008). Measuring the effects of concentration and risk on bank returns: evidence from a panel of individual loan portfolios in Jamaica, *Business, Finance and Economics in Emerging Economies*,
- Maudos, J., Pastor, J., Perez, F. & Quesada, J. (2002). Cost and Profit Efficiency in European Banks. *Journal of Financial Markets, Institutions and Money*, 12(1): 33-58.
- Mehran, H. & Thakor, A. V. (2009). Bank capital and value in the cross-section. *Working Paper*,

- Mercia, M. C., Evren, O. & Hassan, T. (2002). Bank Performance around the Introduction of Subsidiary Banks in the US. *Journal of Banking and Finance*, 17: 389-406.
- Mirzaei, A. (2012). The Effect of Market Power on Stability and Performance of Islamic and Conventional Banks. *Islamic Economic Studies*, 18, (1&2): 45-81.
- Mirzaei, A., Liu, G. & Moore, T. (2011). Does market structure matter on banks' profitability and stability? Emerging versus advanced economies, *Economics and Finance Working Paper Series*, No. 11-12, <http://www.brunel.ac.uk/economics>
- Molyneux P. (1993). Structure and performance in European banking. Doctoral Dissertation, University of Wales, Bagnor.
- Molyneux, P. & Forbes, W. (1995). Market structure and performance in European Banking. *Applied Economics*, 27 (1): 155–159.
- Molyneux, P. & Thornton, J. (1992). “Determinants of European bank profitability: A note.” *Journal of Banking and Finance*, 16, 1173-1178.
- Ongore, O. K. & Gemechu, B. (2013). Determinants of Financial Performance of Commercial Banks in Kenya, *International Journal of Economics and Financial Issues*, 3(1): 237-252.
- Ono, A. & Uesugi, I. (2005). The Role of Collateral and Personal Guarantees in Relationship Lending: Evidence from Japan's Small Business Loan Market. *RIETI Discussion Paper Series*, 05-E-027, available at www.rieti.go.jp/jp/publications/dp/05e027.pdf
- Rugemintwari, C. (2011). Essays on Bank Capital Regulation. Unpublished PhD Thesis submitted to Universite De Limoges

- Sanusi, S. L. (2010). The Nigerian Banking Industry: what went wrong and the way forward. Being the full text of a Convocation Lecture delivered at the Convocation Square, Bayero University, Kano, on Friday 26 February, 2010 to mark the Annual Convocation Ceremony of the University.
- Sanusi, S. L. (2011). Banks in Nigeria and National Economic Development: A Critical Review. Being a Keynote Address at the Seminar on “Becoming an Economic Driver While Applying Banking Regulations”, organized by the Canadian High Commission in Joint Collaboration with the Chartered Institute of Bankers of Nigeria (CIBN) and the Royal Bank of Canada (RBC) on March 7, 2011.
- Sanusi, S. L. (2012). Banking Reform and its Impact on the Nigerian Economy. Being a Lecture delivered at the University of Warwick’s Economic Summit, UK on 17th February, 2012.
- Sathye, M. (2002). X-efficiency in Australian Banking: An Empirical Investigation. *Journal of Banking and Finance*, 25, 613-630.
- Scholten, B. & Wensveen, D. V. (2003). The Theory of Financial Intermediation: An Essay on What it Does (not) Explain, *The European Money and Finance Forum*,
<http://www.suerf.org/download/studies/study20031.pdf>
- Shao, J. (2003). *Mathematical Statistics. 2nd ed.* New York, NY: Springer.
- Short, B. K. (1979). The Relation between Commercial Bank Profit Rates and Banking Concentration in Canada, Western Europe and Japan, *Journal of Banking and Finance*, 3, 209-219.

- Smirlock, M. (1985). Evidence of the (non)-relationship between concentration and profitability in banking. *Journal of Money, Credit and Banking*, 17 (1): 69-83.
- Somoye, R. O. C. (2008). The Performances of Commercial Banks in Post-Consolidation Period in Nigeria: An Empirical Review. *European Journal of Economics, Finance and Administrative Sciences*, 14 (2008).
- Steinherr, A. & Huveneers, C. (1994). On the Performance of Differently Regulated Financial Institutions: Some Empirical Evidence. *Journal of Banking and Finance*, 18, 271-306.
- Stiroh, K. J. (2004). Diversification in banking: is non-interest income the answer? *Journal of Money, Credit, and Banking*, 36, 853–882.
- Sutton, J. (2006). Market structure: theory and evidence. *Journal of Banking and Finance*, 29, 31–53.
- Tabak, B. M., Fazio, D. M. & Cajueiro, D. O. (2010). The effects of loan portfolio concentration on Brazilian banks' return and risk. *Working Paper Series*, Banco Central Do Brasil, No. 215
- Vernon, J. R. (1971). Separation of Ownership and Control and Profit Rates, the Evidence from Banking: Comment. *Journal of Financial and Quantitative Analysis*, 6 (1): 615-625.
- Vong, A. & Chan, H. (2010). Determinants of Bank Profitability in Macao, Faculty of Business Administration, University of Macau, Washington, DC.
- Wariboko, N. (1994). *Principles and Practice of Bank Analysis and Valuation*, African Press Limited, Ibadan.
- World Bank (2010). World development indicators. <http://data.worldbank.org/indicator/FB.BNK.CAPA.ZS>

```

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

```

```

. summarize roa mshare liq drisk spread lev effcy ope dep bcmgt bsize

```

Variable	Obs	Mean	Std. Dev.	Min	Max
roa	130	.0742154	.1462071	-.258	.792
mshare	130	.4849308	.3771778	.065	1.922
liq	130	.1668462	.1605117	.005	.64
drisk	130	.1275385	.0752437	.002	.56
spread	130	.8730462	.6047967	-.125	2.164
lev	130	1.207823	.9059068	.039	5.73
effcy	130	.5675846	.8936226	-2.59	5.73
ope	130	.4599385	.9446701	.001	5.7
dep	130	.2095077	.2346647	0	1.096
bcmgt	130	.6861462	.9474844	-3.6	1.506
bsize	130	1.25	.0935021	1.04	1.44

```
. swilk roa mshare liq drisk spread lev effcy ope dep bcmgt bsize
```

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
roa	130	0.70395	30.487	7.689	0.00000
mshare	130	0.82801	17.712	6.467	0.00000
liq	130	0.78330	22.316	6.987	0.00000
drisk	130	0.81961	18.577	6.574	0.00000
spread	130	0.94971	5.179	3.700	0.00011
lev	130	0.69841	31.058	7.731	0.00000
effcy	130	0.68313	32.632	7.842	0.00000
ope	130	0.47706	53.853	8.969	0.00000
dep	130	0.82256	18.273	6.537	0.00000
bcmgt	130	0.57928	43.326	8.480	0.00000
bsize	130	0.94351	5.817	3.962	0.00004

```
. correlate roa mshare liq drisk spread lev effcy ope dep bcmgt bsize
(obs=130)
```

	roa	mshare	liq	drisk	spread	lev	effcy	ope	dep	bcmgt	bsize
roa	1.0000										
mshare	0.1633	1.0000									
liq	0.3306	0.0462	1.0000								
drisk	-0.1284	-0.1077	-0.1082	1.0000							
spread	-0.2007	0.0249	0.1731	-0.1721	1.0000						
lev	-0.1849	-0.0632	0.0680	0.2846	0.1436	1.0000					
effcy	-0.0874	0.0359	-0.1088	-0.0868	0.0448	0.1322	1.0000				
ope	-0.2447	0.0610	0.0717	-0.0885	0.1729	0.0568	0.0366	1.0000			
dep	-0.1266	-0.1241	-0.1502	-0.0889	-0.0389	0.0252	0.2425	0.0364	1.0000		
bcmgt	-0.1305	-0.1043	-0.1026	0.1061	-0.0122	0.0443	-0.0179	0.0310	0.0617	1.0000	
bsize	-0.0043	0.2652	0.0391	-0.1975	-0.0305	-0.1980	0.0624	-0.0250	0.0333	-0.0291	1.0000


```
. xtreg roa mshare liq drisk spread lev effcy ope dep bcmgt bsize, fe
```

```
Fixed-effects (within) regression      Number of obs   =      130
Group variable: id                    Number of groups =       13

R-sq:  within = 0.2011                 Obs per group:  min =       10
        between = 0.3632                avg           =      10.0
        overall = 0.2496                max           =       10

corr(u_i, Xb) = -0.1030                F(10,107)      =       2.69
                                          Prob > F        =      0.0056
```

roa	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
mshare	.0638069	.0313774	2.03	0.044	.0016049	.126009
liq	.3988077	.1176871	3.39	0.001	.1655068	.6321087
drisk	-.0978037	.1770882	-0.55	0.582	-.4488604	.2532529
spread	-.018225	.0234535	-0.78	0.439	-.0647189	.0282688
lev	-.0080338	.0162914	-0.49	0.623	-.0403296	.024262
effcy	-.0064974	.0150973	-0.43	0.668	-.0364261	.0234313
ope	-.0327223	.0121099	-2.70	0.008	-.0567288	-.0087159
dep	-.0349531	.0578764	-0.60	0.547	-.1496863	.0797801
bcmgt	-.0084715	.0132669	-0.64	0.524	-.0347717	.0178286
bsize	-.3030594	.1391983	-2.18	0.032	-.5790037	-.0271151
_cons	.4255203	.1833093	2.32	0.022	.0621311	.7889096
sigma_u	.06812967					
sigma_e	.11911399					
rho	.24650572	(fraction of variance due to u_i)				

```
F test that all u_i=0:      F(12, 107) =      2.25      Prob > F = 0.0140
```

```
. estimates store fixed_effect
```

```
. xtreg roa mshare liq drisk spread lev effcy ope dep bcmgt bsize, re
```

```
Random-effects GLS regression           Number of obs   =       130
Group variable: id                     Number of groups =        13

R-sq:  within = 0.1653                 Obs per group:  min =        10
        between = 0.6476                avg =       10.0
        overall = 0.3105                max =        10

corr(u_i, X) = 0 (assumed)             Wald chi2(10)   =       53.59
                                           Prob > chi2     =       0.0000
```

roa	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
mshare	.0650686	.0312113	2.08	0.037	.0038957 .1262416	
liq	.3360903	.0726326	4.63	0.000	.193733 .4784476	
drisk	-.2265141	.1643286	-1.38	0.168	-.5485922 .0955641	
spread	-.0562729	.0195134	-2.88	0.004	-.0945185 -.0180273	
lev	-.0225198	.0135153	-1.67	0.096	-.0490094 .0039698	
effcy	-.0011437	.0131659	-0.09	0.931	-.0269484 .024661	
ope	-.0376147	.0120653	-3.12	0.002	-.0612623 -.0139672	
dep	-.0300833	.0502371	-0.60	0.549	-.1285462 .0683796	
bcmgt	-.0081265	.0119523	-0.68	0.497	-.0315525 .0152996	
bsize	-.1978728	.127609	-1.55	0.121	-.447982 .0522363	
_cons	.3689735	.1647605	2.24	0.025	.0460489 .6918982	
sigma_u	0					
sigma_e	.11911399					
rho	0	(fraction of variance due to u_i)				

```
. estimates store random_effect
```

```
. hausman fixed_effect random_effect
```

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fixed_effect	(B) random_eff~t		
mshare	.0638069	.0650686	-.0012617	.0032249
liq	.3988077	.3360903	.0627174	.0926
drisk	-.0978037	-.2265141	.1287103	.0660025
spread	-.018225	-.0562729	.0380479	.0130113
lev	-.0080338	-.0225198	.014486	.0090965
effcy	-.0064974	-.0011437	-.0053537	.0073884
ope	-.0327223	-.0376147	.0048924	.0010381
dep	-.0349531	-.0300833	-.0048698	.0287387
bcmgt	-.0084715	-.0081265	-.0003451	.005758
bsize	-.3030594	-.1978728	-.1051865	.0556066

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(10) = (b-B)'[(V_b-V_B)^(-1)](b-B)
 = 11.72
 Prob>chi2 = 0.3040
 (V_b-V_B is not positive definite)

```
. xttest0
```

Breusch and Pagan Lagrangian multiplier test for random effects

$$\text{roa}[\text{id},\text{t}] = \text{Xb} + \text{u}[\text{id}] + \text{e}[\text{id},\text{t}]$$

Estimated results:

	Var	sd = sqrt(Var)
roa	.0213765	.1462071
e	.0141881	.119114
u	0	0

Test: Var(u) = 0

chibar2(01) = 0.00
Prob > chibar2 = 1.0000

```
. regress roa mshare liq drisk spread lev effcy ope dep bcmgt bsize, robust
```

Linear regression

Number of obs = 130

F(10, 119) = 5.34

Prob > F = 0.0000

R-squared = 0.3105

Root MSE = .1264

| Robust

roa | Coef. Std. Err. t P>|t| [95% Conf. Interval]

-----+-----

mshare | .0650686 .0228386 2.85 0.005 .0198459 .1102913

liq | .3360903 .0793619 4.23 0.000 .1789458 .4932348

drisk		-.2265141	.145273	-1.56	0.122	-.514169	.0611409
spread		-.0562729	.0149212	-3.77	0.000	-.0858184	-.0267274
lev		-.0225198	.0102266	-2.20	0.030	-.0427696	-.0022701
effcy		-.0011437	.0078571	-0.15	0.885	-.0167016	.0144142
ope		-.0376147	.0123294	-3.05	0.003	-.0620283	-.0132012
dep		-.0300833	.0435874	-0.69	0.491	-.1163906	.0562241
bcmgt		-.0081265	.0082804	-0.98	0.328	-.0245226	.0082696
bsize		-.1978728	.1766	-1.12	0.265	-.5475586	.1518129
_cons		.3689735	.2337397	1.58	0.117	-.0938544	.8318015
