Determinants of Bank Financial Performance:
A Study of Nigerian Deposit Money Banks

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This paper investigates the effects of bank-specific and macroeconomic determinants on bank profitability; a panel data approach has been adopted and effectively applied to 14 Nigerian deposit money banks set for a period covering from 2012 to 2018 representing 98 firm-year observations. The study adopts panel data regression analysis Fixed Effects Model (FEM) and Random Effects Model (REM). The paper finds that bank-specific factors, such as capital efficiency, operational efficiency, credit risk, and bank size significantly determine the financial performance of Nigerian banks. Also, the gross domestic product (GDP) as a macroeconomic factor plays a significant role in determining the profitability of banks in Nigeria. The study recommends that policy should also be directed towards improving the efficiency and resilience of Nigerian banks towards withstanding economic shocks that may occur, such as a global pandemic.

Keywords: bank profitability, panel regression analysis, bank-specific determinants, macroeconomic determinants

Introduction

Due to the intermediary function between lenders and borrowers, banks play an important role in an economy. They are considered the lifeblood of any economy because microeconomic, as well as macroeconomic activities of an economy, largely depend on them. An efficient financial system improves banks' profitability, increases the volume of funds flowing from savers to borrowers, and ensures a better quality of services offered to customers (Sufian & Habibullah, 2009). The soundness of a country's economy is dependent to a large extent on the strength and health of the banking sector (Sufian & Chong, 2008).

With the coming of globalization, banks are faced with risks, such as credit risk, liquidity risk, interest rate risk, and currency risk. This lends credence to the reason why financial regulators across the world continuously regulate their banking system. Increased regulations have encouraged competition within the banking sector, and hence exposed banks to increased risks. For over two decades, the financial system in Nigeria has been characterized by massive government intervention, poor asset quality, and low capitalization.

Bank profitability is essential for financial development; its relevance goes beyond individual bank profitability to economic stability. The Federal Government of Nigeria (FGN) through the Central Bank of Nigeria (CBN) over the years has carried out several reforms to enhance the profitability and stability of

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Nigerian deposit money banks (DMBs). Firstly, the financial sector reforms covering 1987-1991 included elements of liberalization and measures to enhance prudential regulation and tackle bank distress. Secondly, the minimum share capital requirement for banks operating in Nigeria was increased five times by the CBN from ₦ 50 million in 1991 to ₦ 25 billion in 2004 (Aburime & Uche, 2008). This saw the reduction of DMBs in Nigeria from 89 in 2004 to 25 as of January 2006. Finally, the execution of the treasury single account in 2015 led to the mopping up of an estimated ₦ 5.7 trillion worth of FGN deposits in DMBs in the first quarter of 2017 alone. Overall the goal of these reforms is to improve the profitability and stability DMBs in Nigeria. However, in some instances, the results differ from expectations.

Several studies have examined bank profitability to determine the factors that account for differences in the earnings of DMBs. Some studies have investigated the effect of bank specific factors on bank earnings while other studies have investigated the effect of macroeconomic and bank specific factors on bank earnings. However, most studies in Nigeria are focused only on bank specific factors with little research on the effect of macroeconomic factors. As a result, the research broadly aims to identify, based on empirical evidence, significant determinants of bank profitability in Nigeria. The study seeks to estimate the relationship between internal (firm-specific) and external (macroeconomic) factors on the profitability of 14 deposit money banks (DMBs) covering a period of 2012-2018.

Apart from the "Introduction", this paper has four other sections. Section two focuses on the theoretical and literature review. Section three discusses the methodology of the study. Section four presents the empirical results and findings while the last section summarizes the major findings of the research, recommendations, and conclusion.

Conceptual Framework

Bank Performance

The banking industry plays a major role in the economic development of a nation. It is based on this premise that a lot of researchers pay greater attention to the performance of DMBs. Studies, such as Macit (2012) suggested that the performance of DMBs can be measured in terms of competition, productivity, profitability, efficiency as well as concentration. Financial performance is based on how well a bank is performing over some time and expressed in terms of profitability or losses incurred over the period under consideration (Bodie, Kane, & Marcus, 2005). DMBs that perform very well are considered to be better equipped to withstand or resist negative shocks from the environment and thus can contribute significantly to the stability of a country's financial system (Athanasoglou, Brissimis, & Delis, 2008).

The Nigerian Banking Sector

Owing to the important role DMBs play in the development of any economy, their operations are consistently monitored and reformed to improve performance. A positive performance serves as a reward to investors thus encouraging additional investments which ultimately lead to economic growth. Ezike and Oke (2013) suggested that DMBs should closely be monitored because of the crucial role they play in capital formation. With a GDP of US$510 billion, Nigeria is the 26th largest economy in the world and the largest in Africa. Also, the Nigerian financial services sector is one of the largest in Sub-Saharan Africa, second only to South Africa (Becker, Chammard, Hussein, Kotsuji, & Quagraine, 2008). Over the last two decades, DMBs in Nigeria have undergone several challenges, such as undercapitalization, illiquidity, weak corporate governance,

insolvency, and a high number of non-performing loans that have threatened their very existence. This has necessitated the need for banking sector reforms.

Banking reforms result in a stable and healthy economy. According to Sanusi (2012), the Nigerian banking sector reforms have been geared towards financial stability and financial intermediation. Key reforms in the Nigerian banking sector started with the deregulation of interest rates from 1986 to 1993 to allow for private sector participation, enhancement of prudential regulations, and tackling of bank distress (Obamuyi, 2009). This allowed easy entry into the Nigerian banking space and loosened credit allocation quotas which led to an increase in the number of banks from 34 in 1987 to 89 by 2004.

Another major reform in the Nigerian banking sector was in July 2004 with the CBN increasing the minimum capital base of DMBs to 25 billion Naira. The consolidation exercise through mergers and acquisitions reduced the number of DMBs operating from 89 in 2004 to 25 as of January 2006. As a result, DMBs in Nigeria experienced monumental growth with a 54 percent increase in the branch network of DMBs. The number of depositors increased by 39 percent and total loans and advances increased by 197 percent. However, factors, such as corporate governance failures, inadequate disclosures, critical gaps in prudential guidelines, and uneven supervision led to a fragile system that was negatively affected by the global financial crisis of 2008 (Aburime & Uche, 2008). To mitigate these challenges, the CBN reviewed its prudential guidelines in 2010 following the Basel Accord Framework to address areas, such as corporate governance, risk management, anti-money laundering, and allowance for loan loss aimed at improving bank operations.

Also, the FGN commenced the treasury single account (TSA) on the 7th of august, 2015. Before the commencement of TSA, the FGN had fragmented banking arrangements for revenue and payment transactions with over 20,000 bank accounts in multiple banks. With the implementation of TSA, Federal Government of Nigeria was able to mop up ₦ 5.7 trillion inflows by the first quarter of 2017 alone. The implication was that banks no longer had access to the float provided by the accounts they maintained for ministries, departments and parastatals leading to funding liquidity strain on the DMBs (Kanu, 2016). Again DMBs had to find ways of mitigating these challenges to improve profitability.

Review of Empirical Studies

Akinkunmi (2017) studied the determinants of banks' profitability in Nigeria by using a panel dataset from 2001 to 2015. Regression analysis Ordinary Least Squares (OLS) and Generalized Method of Moment techniques were adopted as statistical tools. Findings indicate that efficiency and credit risk have a statistically significant relationship with bank profitability. Rahman, Hamid, and Khan (2015) studied determinants of bank profitability: Empirical Evidence from Bangladesh covered 25 commercial banks from 2006 to 2013 adopted the regression analysis GMM estimator as a statistical tool. Their results suggest that capital adequacy and bank size have a positive and significant effect on profitability. Results also show that cost efficiency and off-balance sheet activities have a negative and significant effect on bank profitability. Owoputi, Kayode, and Adeyefa (2014) investigated the effect of bank-specific, industry, and macroeconomic indicators on profitability in the Nigerian banking sector from 1998 to 2012. Their study adopts a panel data regression model as a statistical tool. Results indicate that capital adequacy, productivity growth, deposits, and bank size have a positive and significant effect on profitability. However, credit risk and liquidity ratios have a negative and significant effect on bank profitability. Also, the inflation rate and interest rate as macroeconomic variables have a negative and significant effect on bank profitability. Owoputi et al. (2014) did not consider GDP as a determinant of

profitability in their study. Also, the time frame for their study was before the implementation of International Financial Reporting Standard (IFRS). Osuagwu (2014) investigated the determinants of bank profitability in Nigeria by using a panel of selected banks covering the period from 1980 to 2010. He utilized panel data regression analysis as a statistical tool. The results indicate a significant positive relationship between profitability and market concentration, exchange rate, and credit risk. Osuagwu (2014) did not consider GDP as a macroeconomic determinant in his study. Ani, Ugwunta, Ezeudu, and Ugwuanyi (2012) studied the determinants of Bank Profitability in Nigeria from 2001 to 2010 covering 15 banks. They adopted regression analysis ordinary least square as a statistical tool. Their findings indicate that asset composition and capital have a statistically significant relationship with bank profitability in Nigeria. Ani et al. (2012) limited their research to bank-specific factors in their study. Babalola (2012) investigated the determinants of banks' profitability in Nigeria from 1999 to 2008 covering 14 banks. Utilized panel data regression analysis is a statistical tool. Results indicate that capital adequacy ratio, bank size, and tangibility of DMBs have a statistically significant relationship with bank profitability. However, Babalola (2012) did not find GDP to be statistically significant. Flamini, McDonald, and Schumacher (2009) investigated the determinants of bank profitability in Sub-Saharan Africa. Using panel data regression on a sample of 389 banks in 41 countries found that bank size, capital adequacy, and GDP have a positive significant effect on bank profitability. Aburime (2008) investigated the determinants of bank profitability in Nigeria from 1980 to 2007 covering 138 banks. Adopted panel data regression is a statistical tool. The results indicate that the competition level and the degree of foreign ownership in the Nigerian banking industry have negative relationships with the profitability of banks operating in Nigeria. Aburime (2008) considered only industry-specific determinants. Nagaraju and Boeteng (2018) investigated the relationship between bank-specific and macroeconomic variables on the profitability of savings and loan banks in Ghana from 2011 to 2016. Multiple regression analysis was utilized as a statistical tool. Results indicate that non-performing loans, capital adequacy, bank size, GDP growth, and inflation rate have a negative relationship with the profitability of savings and loan companies in Ghana, while loans and advances are positively related to profitability.

The literature reviewed suggests that findings of studies on factors determining the profitability of banks have not been exhaustive. A common feature of the reviewed literature is that most studies on the determinants of bank profitability in Nigeria do not take into account macroeconomic variables. Studies, such as Aburime (2008), Ani et al. (2014), Babalola (2012), and Osuagwu (2014) fall into this category.

Methodology and Data

Methodology

The study relied on panel data regression analysis, Random Effects Model (REM) and Fixed Effects Model (FEM) as a statistical tool to analyze the relationship between bank profitability (the dependent variable) and liquidity, credit risk, operational efficiency, bank size, bank capital efficiency, inflation, and economic growth (the independent variables). The Hausman test was used to decide between the FEM and the REM.

Model Specification

$$\text{ROA}_{it} = a_0 + \beta_1 \text{NPTL}_{it} + \beta_2 \text{TETA}_{it} + \beta_3 \text{SIZE}_{it} + \beta_4 \text{TLTA}_{it} + \beta_5 \text{NITE}_{it} + \beta_6 \text{GDP}_{it} + \beta_7 \text{IFL}_{it} + et_{it}$$

Where ROA is the return on assets of bank i for the year t, β_1 is a constant term, β_2 to β_7 are the coefficients of the explanatory variables, NPTL, represents the ratio of non-performing loans to total loans

(credit risk), TETA represents total equity to total assets (bank capital efficiency), SIZE represents the natural logarithmic of total assets, TLTA represents the ratio of total loans to total assets (liquidity), NITE represents the ratio of net interest margin to total operating expenses (operational efficiency), GDP is the first of the macroeconomic variables representing gross domestic product, INF is the other macroeconomic variable representing inflation, and et is the composite error term.

Data

The researchers constructed a cross-sectional dataset from the annual balance sheet of sampled banks for the estimation of bank-specific variables and the CBN statistical bulletin for the estimation of macroeconomic related variables. The population of the study consisted of 22 DMBs listed on the NSE. The sample size of 14 banks was arrived at based on data availability and set criteria covering the period 2012 to 2018 (98 firm-year observations).

Variables Used in the Analysis

Return on assets. Return on assets (ROA) reflects the ability of a bank to generate profits from the management of its assets. It is frequently used as the key ratio for evaluation of bank profitability in several studies, such as Akinkunmi (2017), Babalola (2012), and Claessens and Laeven (2004). ROA may be misleading as a result of off-balance-sheet activities. However, ROA can be considered as primarily an indicator of managerial efficiency. Golin (2001) concluded that ROA is the key measure of profitability for banks. Hassan and Bashir (2005) and Rivard and Thomas (1997) believed that ROA is the best measure of bank profitability because it is not distorted by high equity multipliers.

Credit risk. Credit risk arises from a borrower failing to make required payments. Credit risk occurs through lending and various other activities, such as trading and capital markets where banks are exposed to the risk of counterparty default. Duca and McLaughlin (1990) believed that differences in bank profitability are largely attributable to variations in credit risk. The proxy for credit risk as regards this study is the ratio of non-performing loans to total loans (NPTL). This approach to credit risk has been used by researchers, such as Djalilov and Piesse (2016) and Osuagwu (2014). A negative relationship between NPTL and profitability is expected.

Bank capital efficiency. Capital can be considered as long-term funds contributed to a bank, primarily by its owners, consisting of common and preferred equity, reserves, and retained earnings. The strength and quality of capital reflect a bank's ability to absorb losses and handle risk exposure for shareholders. The proxy for capital adopted in this research is the ratio of total equity to total assets (TETA). The effect of capital efficiency ratio on the profitability of the banks is not conclusive. Previous studies, such as Hassan and Bashir (2005) have found a positive relationship between TETA and profitability because well-capitalized banks are less risky and more profitable (Bourke, 1989). However, studies, such as Buchory (2015) found a negative relationship between the two variables.

Bank size. Bank size has an effect on DMBs in areas, such as access to capital, investment opportunities, reputation, and portfolio diversification (Zhang, Wu, & Liu, 2008). Size is used to buttress the point that large banks are better equipped than smaller banks in taking advantage of economies of scale in transactions which possibly leads to a higher level of profit. According to Kaufman (1992), the increase in size has a positive effect on profitability. On the other hand, Syafri (2012) suggested that an increase in bank size has a negative effect on profitability. This is because of large experience bureaucratic bottlenecks and other reasons. Hence,

the size-profitability relationship is considered non-linear (Eichengreen & Gibson, 2001). In our study, the logarithm of total bank assets (size) has been used to accommodate this nonlinear relationship. Consequently, a positive relationship is expected between bank size and profits (Bikker & Hu, 2002).

Liquidity risks. Liquidity risk occurs when banks are unable to meet short term financial demands. It involves the ability of a bank to anticipate changes in funding sources. Effective liquidity management seeks to ensure that a bank will have access to the funds necessary to fulfill customer needs, maturing liabilities, and capital requirements for operational purposes even under adverse conditions. The proxy for liquidity as regards this study is the ratio of total loans to total assets (TLTA). TLTA ratio is expected to have a positive relationship with profitability (Sufian, 2009).

Operational efficiency. Operational efficiency is used to see the effect of efficiency of management regarding expenses on banks' profitability. The proxy for operational efficiency as regards this research is the ratio of net interest margin to total operating expenses (NITE). NITE is expected to have a negative relationship with profitability according to studies, such as Abreu and Mendes (2001).

Economic growth. Economic growth affects bank profitability. The growth of the economy leads to greater demand for more loans to be financed by banks. Bank profitability is expected to increase when more loans are financed. As a result of this, economic growth and bank profitability are expected to show a positive relationship (Demirgüc-Kunt & Huizinga, 1999). The proxy for economic growth in this study is the logarithm of GDP (lnGDP).

Inflation. Banking performance is highly influenced by inflation because inflation affects most economic variables, such as interest rates. The higher the inflation rate, the higher the interest rate. A higher interest rate increases bank profitability. Consequently, bank profitability and inflation are positively related. The proxy for inflation as regards this study is annual growth in consumer price index (INF). The studies of Khrawish (2011) and Syafri (2012) suggest a significant negative effect of inflation on profitability. However, studies by Vong and Chan (2007) and Wallich (1980) show a positive relationship between inflation and profitability.

Findings and Discussion

Findings

Descriptive statistics of all variables used in the study are reported in Table 1. Credit risk recorded a mean ratio of 5.04% which suggests that averagely, 5% of all loans disbursed are not performing.

Table 1

Descriptive Statistics

Variable	Observations	Mean	Std./deviation	Min.	Max.
Return on assets	98	0.0197409	0.0239036	-0.0953183	0.1325266
Capital efficiency	98	0.1053602	0.2086989	-1.547496	0.2443763
Bank size	98	8.583854	1.167447	5.830473	9.74782
Liquidity	98	0.4115949	0.107816	0.057238	0.5627128
Operational efficiency	98	1.136247	0.4228867	0.5621089	2.414504
Credit risk	98	0.0504462	0.0544878	0.0001326	0.3663014
Inflation	98	0.1172571	0.0318459	0.0805	0.165
GDP	98	11.46399	0.184919	11.18044	11.75793

Note. Source: Computation using STATA.

As reflected in Table 2, there is no incidence of multicollinearity amongst the independent variables examined. Also, capital efficiency and operational efficiency have a higher degree of correlation with profitability than the other independent variables in the study while inflation has the lowest degree of correlation with profitability.

Table 2

Correlation Matrix

	Return on assets	Capital efficiency	Bank size	Liquidity	Operational efficiency	Credit risk	Inflation	GDP
Return on assets	1.0000							
Capital efficiency	0.4675	1.0000						
Bank size	-0.1138	0.0748	1.0000					
Liquidity	0.0351	0.3941	0.1771	1.0000				
Operational Efficiency	0.2331	-0.0734	0.3224	-0.0595	1.0000			
Credit risk	-0.1998	0.0214	-0.0294	0.1504	-0.0456	1.0000		
Inflation	-0.0190	-0.1323	0.0099	-0.0811	0.1253	0.0058	1.0000	
GDP	0.1241	-0.1727	-0.0911	-0.0830	0.0225	0.0028	0.4657	1.0000

Note. Source: Computation using STATA.

Table 3 presents the results of the Fixed Effects Model and Random Effects Model for the determinants of profitability in the Nigerian banking sector. The Probability (F statistic) of 0.000 for both the fixed effect and random models show that the two models are statistically significant at the 5% level. The regression analysis of the Random Effects Model reveals that capital efficiency ratio, operational efficiency, and GDP have a positive relationship with net return on assets while bank size, credit risk, liquidity, and inflation have a negative relationship. However, only the bank capital efficiency ratio, bank size, operational efficiency, credit risk, and GDP are statistically significant. The mean-variance inflation factor statistic of 1.19 indicates a tolerable level of serial correlation. The fixed effects regression reveals that capital efficiency ratio, liquidity, and GDP have a positive relationship with net return on assets while bank size, operational efficiency, asset quality, and inflation have a negative relationship. However, only capital efficiency ratio, bank size, and GDP are statistically significant. The Hausman test result (Prob. > chi2) of 0.0726 suggests the random-effects model as the better model for this study.

Table 3

Regression Analysis

Estimator	Fixed effects		Random effects	
	Coef.	Prob.	Coef.	Prob.
Capital efficiency ratio	0.0476337	0.001	0.0624924	0.000
Bank size	-0.0099332	0.000	-0.0058514	0.003
Liquidity	0.0080071	0.786	-0.0129426	0.561
Operational efficiency	-0.0006545	0.940	0.0163325	0.004
Credit risk	-0.0286969	0.506	-0.0705367	0.056
Inflation rate	-0.023715	0.660	-0.0579024	0.285
GDP	0.022009	0.042	0.0282029	0.009
R^2	0.1960		0.4349	
Prob. (F statistic)	0.000000		0.000000	
Hausman test				0.0726
Total observations	98			

Note. Source: Computation using STATA.

Discussion

The capital efficiency ratio is estimated to have a positive statistically significant relationship with the return on assets. This suggests that the capital structure bank chooses plays a role in determining profitability. This result is consistent with the work of Babalola (2012) and Flamini et al. (2009). This result, however, contrasts the findings of Ani et al. (2014) who found a negative relationship. Bank size is negatively correlated with profitability. This suggests that larger banks are less profitable than smaller banks in Nigeria. This is consistent with the findings of Babalola (2012) and Nagaraju and Boeteng (2018). This result, however, contradicts the findings of Owoputi et al. (2014) and Flamini et al. (2009). Operational efficiency has a positive significant relationship with profitability. This suggests the importance of managerial efficiency in determining the profitability of Nigerian DMBs. Credit risk has a negative significant relationship with profitability as expected. This could be because DMBs tend to service non-performing loans with their profits. This result agrees with the findings of Nagaraju and Boeteng (2018), Owoputi et al. (2014), and Osuagwu (2014). GDP has a positive statistically significant relationship with bank profitability. This suggests that economic growth plays an important role in determining the profitability of Nigerian DMBs. This result is consistent with the findings of Flamini et al. (2009). However, this result contradicts the findings of Babalola (2012) and Nagaraju and Boeteng (2018). Liquidity has a positive relationship with return on assets however that relationship is not statistically significant. This result contradicts the findings of Owoputi et al. (2014). Also, non-performing loans and annual inflation have an inverse relationship with return on assets. However, the relationships are not statistically significant.

Conclusion

Nigeria as a developing country has undergone several financial reforms that affected the financial performance of the entire banking system. Owing to this and the relatively few studies on the determinants of profitability in the Nigerian banking sector, this study investigated the determinants of profitability in the Nigerian banking sector. The determinants were classified as bank-specific variables (capital efficiency, bank size, asset quality, operational efficiency, and liquidity) and macroeconomic variables (annual interest rate and GDP).

The paper finds that bank-specific factors (capital adequacy, bank size, credit risk, and operational efficiency) are the main determinants of the financial performance of Nigerian DMBs. This emphasizes the critical role management plays in determining bank profitability. The study also finds that GDP as a macroeconomic factor plays a significant role in determining the profitability of banks in Nigeria. The effect of GDP on bank profitability suggests that under favorable economic conditions, banks can achieve higher profits. This emphasizes the important role the Nigeria government plays in shaping policy that creates favorable economic conditions that lead to increased profitability in the banking sector. Overall, capital efficiency and operational efficiency are the major factors in determining performance across Nigerian DMBs.

The study recommends that the FGN policy should also be directed towards improving the efficiency and resilience of Nigerian banks towards withstanding economic shocks, such as a global pandemic that may occur.

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Appendix 1

Random-effects GLS regression	Number of obs. = 98					
Group variable: BANKID	Number of groups = 14					
R-sq: within = 0.2750	Obs. per group: min. = 7					
between = 0.7085	avg. = 7.0					
overall = 0.4349	max. = 7					
Wald chi2(7) = 53.20						
corr(u_i, X) = 0 (assumed)	Prob. > chi2 = 0.0000					
RETURNONAS~S	Coef.	Std. err.	t	P > |t|	95% conf. interval	
BANKCAPITA~Y	0.0624924	0.0107672	5.80	0.000	0.0413892	0.0835957
BANKSIZE	-0.0058514	0.0019946	-2.93	0.003	-0.0097607	-0.0019421
LIQUIDITY	-0.0129426	0.0222616	-0.58	0.561	-0.0565746	0.0306894
NETINTERES~N	0.0163325	0.0056973	2.87	0.004	0.005166	0.027499
NONPERFORM~S	-0.0705367	0.0368845	-1.91	0.056	-0.142829	0.0017556
cpiendofye~h	-0.0579024	0.0541164	-1.07	0.285	-0. 639686	0.0481637
lnGDP	0.0282029	0.0108559	2.06	0.009	0.0069257	0.04948
_cons	-0.2627315	0.1255421	-2.09	0.036	-0.5087895	-0.0166736
sigma_u	0.00651057					
sigma_e	0.01699723					
rho	0.12794568	(fraction of variance due to u_i)				

Appendix 2

Fixed-effects (within) regression	Number of obs. = 98					
Group variable: BANKID	Number of groups = 14					
R-sq: within = 0.3394	Obs. per group: min. = 7					
between = 0.0740	avg. =7.0					
overall = 0.1960	max. = 7					
F(7, 77) = 5.65						
corr(u_i, Xb) = -0.2948	Prob. > F = 0.0000					
RETURNONAS~S	Coef.	Std. err.	t	P > |t|	95% conf. interval	
BANKCAPITA~Y	0.0476337	0.0136373	3.49	0.001	0.0204785	0.074789
BANKSIZE	-0.0099332	0.0026709	-3.72	0.000	-0.0152516	-0.0046148
LIQUIDITY	0.0080071	0.0294417	0.27	0.786	-0.0506188	0.0666331
NETINTERES~N	-0.0006545	0.0086101	-0.08	0.940	-0.0177993	0.0164903
NONPERFORM~S	-0.0286969	0.0429531	-0.67	0.506	-0.1142275	0.0568336
cpiendofye~h	-0.0237153	0.0537604	-0.44	0.660	-0.130766	0.0833354
lnGDP	0.022009	0.0106677	2.06	0.042	0.0007669	0.0432511
_cons	-0.1506132	0.1272872	-1.18	0.240	-0.4040743	0.1028479
sigma_u	0.01638765					
sigma_e	0.01699723					
rho	0.48174708	(fraction of variance due to u_i)				

Notes. F test that all u_i = 0: F(13, 77) = 2.29; Prob. > F = 0.0128.

Appendix 3: Hausman Fixed Random

	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Coefficients			
	Fixed	Random	Difference	S.E.
BANKCAPITA~Y	0.0476337	0.0624924	-0.0148587	0.0083692
BANKSIZE	-0.0099332	-0.0058514	-0.0040817	0.0017763
LIQUIDITY	0.0080071	-0.0129426	0.0209497	0.0192674
NETINTERES~N	-0.0006545	0.0163325	-0.016987	0.0064555
NONPERFORM~S	-0.0286969	-0.0705367	0.0418398	0.0220114
cpiendofye~h	-0.0237153	-0.0579024	0.0341871	
lnGDP	0.022009	0.0282029	-0.0061938	

Notes. b = consistent under Ho and Ha; obtained from xtreg; B = inconsistent under Ha, efficient under Ho; obtained from xtreg; Test: Ho: difference in coefficients not systematic; $chi2(7) = (b-B)'[(V\_b-V\_B)^{(-1)}](b-B) = 12.98$; Prob. > chi2 = 0.0726 (V_b-V_B is not positive definite).

Appendix 4

Variables	VIF	1/VIF
LIQUIDITY	1.27	0.789958
lnGDP	1.25	0.801855
cpiendofye~h	1.23	0.810174
BANKCAPITA~Y	1.22	0.820766
BANKSIZE	1.18	0.848628
NETINTERES~N	1.16	0.862025
NONPERFORM~S	1.03	0.971951
Mean VIF	1.19	