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Relationship Between Liquidity, Asset Quality, and Profitability of Mortgage Banks in Nigeria

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Walden University
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MBA, Finance, University of Abuja, 2007

BSc, Obafemi Awolowo University, Ile-Ife, 1997

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Liquidity (LQ) and asset quality (AQ) management present significant challenges to mortgage bankers in their efforts to improve profitability (PR). When liquidity increases, there is no positive impact on mortgage asset growth; however, this trend indicates that asset management and liquidity positions are not well managed. To run a viable mortgage business, mortgage bankers need to have a good grasp of the association between LQ, AQ, and PR. Anchored in the profit theory paradigm, the purpose of this multiple regression study was to examine the relationship between LQ, AQ, and PR of mortgage banks (MBs) in Nigeria. Archival financial data of 16 randomly sampled MBs covering a period of 8 years from 2009 to 2016 were used. Data were analyzed using multiple panel regression incorporating two PR models, net interest margin (NIM) and return on asset (ROA). The regression result indicated that LQ and AQ constructs significantly predicted PR as measured by NIM because $F (8, 80) = 2.061$, $p = 0.014$, $p < 0.05$, and effect size given by $R^2 = 0.458$, signifying 46% variation in NIM. The model of PR as measured by ROA also indicated that LQ and AQ constructs were significant because $F (8, 80) = 4.043$, $p = 0.000$, $p < 0.05$, with effect size measured by $R^2 = 0.624$, indicating 62% variation in ROA. The findings emphasized the need for optimization of LQ and AQ to maximize PR. The implications for positive social change include the potential to provide the business leaders in the mortgage industry with knowledge about optimization of LQ and AQ as drivers of PR. In addition, when business owners achieve increase profitability, they may provide more employment opportunities, better working conditions, better compensation plans, and more access to mortgage finance options.

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Dedication

I dedicate this work to my wife, Abisola, for her love, cooperation, encouragement and above all, her understanding without which I may not have completed this daunting task. She was my first line of reviewers. Thank you 'JisJis' for your support. Most importantly, every success in my life is dedicated to God Almighty, without Christ, I am nobody. Lord, I thank you for providing all that I needed to complete this program.

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Section 1: Foundation of the Study

The primary mortgage bank (PMB), as a mortgage originating bank, provides a vital nexus between home ownership growth and capital formation in most developing and developed countries (Agunbiade, Rajabifard, & Bennett, 2013). In the case of Nigeria, most of the mortgage banks (MBs) are battling with loss of profitability (PR) arising from liquidity challenges, poor assets quality, and other external factors (Johnson, 2014). The Central Bank of Nigeria (CBN) reports of the mortgage sector performances in 2015 corroborated Makinde's (2014) position on the poor performances of the sector leading to a drop in the numbers of the licensed MBs from 82 in 2009 to 32 in 2014.

Most literature on the development and performances of the Nigeria mortgage sector concerned welfare and government policies. In this quantitative study, I focused on critical internal limiting factors that must be effectively managed by the mortgage bankers to optimize PR. These are liquidity (LQ) and asset quality (AQ). Therefore, the purpose of this quantitative panel data regression study was to examine the relationship between LQ, AQ, and PR of the MBs in Nigeria.

In this section, I discuss the background of the study, the problem statement, the purpose of the study, the associated research question, the hypothesis, the nature of the study, and definitions to some terms. I conclude the section with an extensive review of related literature.

Background of the Problem

MBs provide funds to people who cannot afford a single payment term to own their homes and spread the repayments over several years. As such, MBs are vehicles for promoting homeownership. The latest reform of the mortgage sector by the CBN was to further reposition the sector to take the leading role in reducing housing deficit estimated between 17 million units to 22 million units (Agunbiade et al., 2013; Nicholas & Patrick, 2015). However, the performance of the Nigeria mortgage banks (NMBs) fall below expectations as the outstanding mortgage debts to GDP was below 1% (Agbada & Osuji, 2013; CBN, 2014; Mukhtar, Amirudin, & Mohamad, 2016). Existing literature demonstrated that the Land Use Act of 1978, which governs the land administration system in Nigeria, compounded the risk exposure of the sector, thus putting pressure on the LQ and AQ of some of the NMBs (Johnson, 2014).

LQ and AQ are internal limiting factors that are critical to the viability of any MB. Nicholas and Patrick (2015) illustrated that a paucity of long term funds and growing default rate accounted for the inability of the sector to remain profitable despite the existing huge market for mortgage products in Nigeria. Therefore, my focus in this quantitative study was to examine the relationship between LQ, AQ, and PR of MBs in Nigeria. The information provided in this study is useful to mortgage bankers, academics, government officials, and the investing public. It may also positively influence social change because the provision of easy access to housing finance will create an effective demand as affordability is enhanced leading to an improved welfare, upgraded slums, and higher standard of living of people in Nigeria.

Problem Statement

The NMBs are experiencing a loss in PR resulting in high failure rates (Ezema & Orji, 2015; Makinde, 2014). The numbers of licensed MBs have declined from 82 in 2009 to 32 in 2014, while outstanding mortgage debt to GDP remained low at 0.38% (Mukhtar et al., 2016). The general business problem is that funding and increasing rate of defaults have contributed to the loss of PR and failures of some NMBs. The specific business problem is that some MBs' managers have limited understanding about the relationship between LQ, AQ, and PR, which is necessary in building quality assurance strategy to improve their efficiency.

Purpose Statement

The purpose of this quantitative panel data regression study was to examine the relationship between LQ, AQ, and PR of the NMBs. The independent variables were LQ and AQ, while the dependent variable was PR. The target population consisted of archival data records of the NMBs with business offices in Lagos and Abuja. The two cities control 82% of the mortgage assets created by the NMBs (CBN, 2014; Makinde, 2014). The information provided will enhance the understanding of the mortgage bankers and the potential for improved efficiency and PR. The implications for positive social change that may arise from improved efficiency and PR include the potential to (a) reduce the affordability gap; (b) promote the worth and dignity of individuals and the communities through slum upgrades; (c) create employment opportunities; and (d) provide improved compensation, training, and better working conditions for employees.

Nature of the Study

I share a postpositivist paradigm of determinism worldview, and as such, I chose a quantitative research methodology over qualitative and mixed methods approaches. Wisdom, Cavaleri, Onwuegbuzie, and Green (2012) noted that a quantitative methodology is appropriate when researchers want to test hypotheses about relationships. Quantitative research includes an inquiry into a problem based on testing a theory composed of variables (Karanja, Zaveri, & Ahmed, 2013). Yilmaz (2013) argued that quantitative research explains phenomena using numerical data, which are analyzed by means of mathematically or statistically based methods, whereas the qualitative method involves an exploratory study that seeks to identify how people make sense and meaning of their lived experiences (Anosike, Enrich, & Ahmed, 2012). The qualitative studies use expressions in the form of words to describe a phenomenon (Yilmaz, 2013). The mixed methods approach combines both quantitative and qualitative approaches (Wisdom et al., 2012). The purpose of this study was not exploratory; rather it was an examination of the relationship between LQ, AQ and PR of the NMBs. The data I employed included financial data that are quantitative with a time series nature. My usage of statistical tools in analyzing these data makes the quantitative method the most suitable for this study.

Adoption of a research design depends on the nature of the research question, target population, data collection strategy, and data analysis techniques (Wester, Borders, Boul, & Horton, 2013). A research design can be experimental, quasi-experimental, or correlational (Turner, Balmer, & Coverdale, 2013). Experimental and quasi-experimental designs involve manipulation of variables and administration of intervention, while

correlation research design allows for an examination of association rather than a causal

relationship among the variables (Turner et al., 2013; Wisdom et al., 2012). Drawing

from this, I believe the nonexperimental correlational design was the most suitable design

for this study because my purpose was to establish the relationship between the variables

without manipulating any of the variables or administering any intervention.

Research Question and Hypotheses

A research question (RQ) is a statement that identifies the phenomenon to be

studied (McMillan & Schumacher, 2014). Allwood (2012) posited that every scientific

inquiry involves some form of questioning and the use of gap spotting in existing

literature to formulate research questions. The research question guiding this study was:

RQ: What is the relationship between LQ, AQ, and PR of NMBs?

H_0: There is no statistically significant relationship between LQ, AQ, and PR

of the NMBs.

H_1: There is a statistically significant relationship between LQ, AQ, and PR of

the NMBs.

Theoretical Framework

A theory is an abstraction of reality that researchers employ to summarize and

describe the relationships between concepts and propositions (Gay & Weaver, 2011). I

chose theory of profit as propounded by Knight (1942) as the theoretical framework for

this study. The concept of profit as a measurement of performance and entrepreneurial

reward is long in academic history. Knight's diary (as cited in Brooke & Tyler, 2010)

used the distinction between risk and uncertainty to explain the theory of profit. Knight

(1942) defined profit as the residual income due to the owners of business. Many scholars have used different proxies to represent banks' profits. Almazari (2014) used profit before tax (PBT) and profit after tax (PAT), while Obamuyi (2013) used net interest margin (NIM) and return on asset (ROA) as proxies for PR. In this study, I used ROA and NIM as proxies for PR.

Ambrose, Conklin, and Yoshida (2016) posited that there is a direct relationship between loan size, interest income, and PR. Kapaya and Raphael (2016) argued that AQ and LQ management are inherent risks that may lead to loss of PR for MBs. Conforti et al. (2013) proposed that incorporation of risk-based business process management into the overall enterprise risk management framework will assist in early detection of various risks the business may be faced with and enhance the capacity of the manager in building quality assurance strategy to manage the risk on time. Therefore, profit theory provides a coherent theoretical explanation of the relationship between the research variables.

Operational Definitions

Allocative and bureaucratic efficiency: Measures whether any level of production inputs are used in the proportion that minimizes the cost of production, given input prices (Holmes, Hsu, & Lee, 2014). Rancière and Tornell (2016) defined allocative efficiency as the extent to which resources are being allocated to be used with the highest expected value. While bureaucratic efficiency refers to the efficiency of the administrative structures and the set of regulations put in place by the internal and external regulatory agencies to rationalize, revolutionize, and professionalize the sector for enhanced service delivery at the minimum possible costs (Cornell & Grimes, 2015).

Asset quality (AQ): The performing status of mortgage loans portfolio in the balance sheet of each MB at a period (Makinde, 2014; Trujillo-Ponce, 2013). Kapaya and Raphael (2016) used two ratios to determine AQ: (1) ratio of nonperforming loans to gross loans, which measures the rate of doubtful loans; and (2) ratio of loan loss provisions to net loan, which relates to the provisions for impairment losses to the loan portfolio of a bank. Higher ratio signifies poor or low AQ, while lower ratio portends high AQ.

Business process management (BPM): A set of tools, methods, and techniques to identify and cover business processes and to monitor and control their execution (Roeser & Kern, 2015; Schulte, Janiesch, Venugopal, Weber, & Hoenisch, 2015).

Cost efficiency: A measure to determine an organization's level of technical and allocative efficiency. Consequently, it produces a given quantity, quality, and mix of outputs at minimum possible cost given existing knowledge of technologies and people's preferences (Shiraz, Fukuyama, Tavana, & Di Caprio, 2016).

Liquidity (LQ): The ability of the bank to maintain sufficient funds to pay for its maturing obligations as they fall due and undertake every worthwhile investment opportunity (Drehmann & Nikolaou, 2013). Therefore, LQ risk is referred to the probability that a bank may not meet its obligations as they fall due, which may possibly cause a fire sale of assets with negative impact on customers' confidence and profit (Arif & Nauman, 2012).

Mortgage-backed security (MBS): A security owning cash flows that are associated with assets in an underlying pool of mortgage loans and mortgage securities

guaranteed by the government. A financial institution is the seller of a mortgage loan

pool to a security, in which the cash flows are structured into bonds for sale to investors

based on market preferences of risk, credit rating, maturity, and interest rate (Ambrose,

Sanders, & Yavas, 2016; Hancock & Passmore, 2015). MBSs directly own mortgage

loans, unlike collaterized mortgage obligations that can own MBSs, assets-backed

securities, and/or collaterized debt securities (Jarrow, 2015).

Mortgage penetration: A measure of the amount of sales or adoption of

mortgages compared to the total theoretical market for the mortgages. It is the depth of

the mortgage market within a chosen location or segment (Hancock & Passmore, 2015).

Mortgage penetration in an economy is related to aggregate demand for mortgages or

outstanding mortgage debt to GDP (Ambrose, Sanders et al., 2016; Kutlukaya & Erol,

2016).

Originate to distribute (OTD) model: A situation where originated mortgages are

distributed to third parties through various secondary mortgage market channels (Kara,

Ozkan, & Altunbas, 2016). The OTD model allows banks to sell or securitize loans rather

than holding them until maturity (Chen, 2015). The OTD model injects LQ to the

mortgage market. This model separates various integrated activities from mortgage

origination to distribution through various frontiers of LQ facility channels unlike the

other variant, the originate to hold (OTH) model. The OTH model holds mortgage assets

from origination to maturity (Allen, Peristiani, & Tang, 2015; Rajan, Seru, & Vig, 2015).

Risk-based business process management: A process that enables detailed

attention to be placed on risks the organization is exposed to in order to identify and

prioritize them (Bolsinger, 2015). It also incorporates risk mitigation strategies into the business model during design time to monitor the emergence of risks and apply risk mitigation during run time to identify risks from logs and other postexecution artifacts (Conforti et al., 2013).

Strategic mortgage default: Mortgage default occurs when a mortgagor fails to meet his repayment obligations for whatever reason (Connor & Flavin, 2015). Strategic mortgage default occurs when a mortgagor exercises default option when the value of the mortgage loan exceeds the value of the property on mortgage (Bradley, Cutts, & Liu, 2015). Strategic mortgage default supports the propensity of the mortgagor to default on repayment obligation when the value of the mortgaged property becomes lower than the outstanding loans. In such instances, the mortgagor can file for bankruptcy and foreclosure will now become a better option (Guiso, Sapienza, & Zingales, 2013).

Assumptions, Limitations, and Delimitations

Assumptions

Assumptions are facts considered to be true but that may not be verified by the researcher (Barnwell & Stone, 2016). Assumptions are accepted as true, or at least plausible by researchers and peers who will read the dissertation (Ritchie, Lewis, Nicholls, & Ormston, 2013). According to McKibben and Silvia (2016), assumptions are conditions that give assurance to the validity of subsequent findings, the violation of which might invalidate the findings.

In this study, I relied on three key assumptions: (a) the research methodology, (b) the nature of the archival data, and (c) the construct of the variables. First, on the research

methodology, I assumed that all variables are measurable, and the quantitative correlation research design fit the purpose of the study. Also, I assumed that the statistical analysis and the sample size was adequate to detect the direction and the magnitude of the relationship between the variables if they existed in the population.

The second assumption relates to the nature of the archival data. It is mandatory for all licensed MBs to render monthly, quarterly, and yearly financial reports to the CBN. Drawing from this, I assumed the archival data from the CBN database would provide a valid and reliable metrics to measure all the variables. I also assumed that the archival data would meet the assumption of normal distribution and enable the use of parametric analysis using financial ratios. I further assumed that data collected would be accurate and comprehensive enough for inferences. There existed a possibility for incomplete data; I assumed that it would not be significant to the extent of invaliding the study findings. If the missing data for a MB was deemed significant, such MB was removed from the data pool and replaced with another MB.

The third assumption related to the construct of the variables, LQ, AQ, and PR. The constructs of the variables I used may not be exhaustive. For LQ, I used the construct of capital, deposit, cash, bank size, and management efficiency (MGTEFF). For AQ, I used the construct of loans size, nonperforming loans, and loan loss provision (LLP); while for PR, I used the constructs of NIM and ROA. In computing ROA, PBT was used for uniformity because MBs derive their tax liabilities using different methods to minimize tax payable. I assumed that these constructs were representative enough to enable a valid inference. I also assumed that information that would be provided may be

useful to the managers of MBs in their quest to build quality assurance strategies for better management of LQ and AQ.

Limitations

Limitations refer to the potential weaknesses of the study (Connelly, 2013). They are barriers that might prevent researchers from obtaining representative data and generalizable findings (Leedy & Ormrod, 2016). Tabachnick and Fidell (2013) posited that limitations are unavoidable shortcomings surrounding the study and within which researchers confine their conclusions. The first limitation was the fund available to travel to every part of Nigeria where MBs operate to collect data and the time available to conduct and conclude the research. Nevertheless, the two locations I selected control over 82% of the mortgage banking business in Nigeria, which is enough for inferences.

The second limitation was that the findings may not be generalizable because the scope was limited to MBs in Nigeria, whereas commercial banks also originate and funds mortgage loans. Third, the research is also limited by the validity and reliability of the instruments used in data collection and analysis. As a quantitative study, there are a universe of predictors of PR, but in this study, I limited the predictors to the constructs of the two independent variables, LQ and AQ.

Delimitations

Delimitations are descriptions of what the study will or will not cover concerning the scope, depth, subjects, sample, and methods (Leedy & Ormrod, 2016). Delimitations refer to the bounds or scope of the study. Marshall and Rossman (2014) noted that delimitation in research indicates clearly what the researcher would cover or not cover. I

carried out this study within two geographical locations in Nigeria, Lagos and Abuja. Lagos and Abuja account for the presence of 82% of the existing MBs and 78% of the total outstanding mortgages in Nigeria (CBN, 2014; Johnson, 2014; Makinde, 2014). Therefore, other cities in Nigeria were excluded from the study. Other financial institutions, like commercial banks, development banks, and micro finance banks were also excluded from this study. The reason for the exclusion of other financial institutions was because the focus of the study was on MBs. I made inferences about other countries' mortgage and banking operations only to establish standards and comparison.

<div align="center">**Significance of the Study**</div>

Contribution to Business Practice

This study may be significant because MBs in Nigeria are facing daunting challenges in managing LQ and the growing loan default rate, impairing the capacity of MBs to make better profit despite the high potential demand for mortgage and housing finance products. The pressure come mostly from the external business environment of which the MBs have little or no control over, but they must develop internal capacity to manage the risk to remain in business. Therefore, this study elicited information that may serve as vital inputs in business decisions regarding risk assessment and PR.

Second, the findings of this study may be used by the leaders in the mortgage industry to ensure that quality assurance strategies are in place to maintain and drive a high volume healthy mortgage asset that may result in improved PR. To underscore the importance of AQ management, Oyedokun, Adewusi, Oletubo, and Thomas (2013) argued that the quality of loan portfolio (AQ) rather than its sizes has more damaging

effects on PR of MBs. Therefore, undermining the significance of the relationship between LQ, AQ and PR may be inimical to the bottom-line of any mortgage firm.

Third, the contributions of this study may not be exclusive to MBs because LQ is important in every business practice. As such, the findings may also be of value to any business aiming at optimizing PR by maintaining a heathy working capital. Fourth, the findings from this study may be useful to investors, researchers, academicians, and government officials in making vital decisions pertaining to developing policies on mortgages and housing finance. Finally, my results from this research may be significant to other researchers and the scholarly communities as a background reference for future studies.

Implications for Social Change

From a social change perspective, the findings may stimulate managers to develop the capacity for efficient processes that may lead to an improvement in the housing finance system. The improvement in the housing finance system may ignite the value chain activities in the housing sector with the potential of reducing the affordability gap. The implication for social change from efficient housing finance can also be extended to the inherent potential to promoting the worth and dignity of individuals and the communities through upgrading of slums and creating employment opportunities.

The findings may also drive a behavioral change in decision making that could lead to optimization in the management of LQ and AQ such that will result in higher PR for the MBs. As the MBs become more profitable, they will have higher capacity and likelihood of investing in community development, education, social infrastructure, and

health care programs. Ruskin, Seymour, and Webster (2016) and Webster (2016) proposed a leadership model for social change that draws on the citizens, as corporations or individuals, to create a community that embraces social change as a shared value and as an inclusive process. Drawing from this postulation, corporate leaders could make a positive social impact and create shared value using the power of their businesses to solve fundamental social problems. Jones Christensen, Mackey, and Whetten (2014) also noted that profitable organizations could provide jobs, institute shared ownership, pay taxes, and contribute to the welfare of the community.

A Review of the Professional and Academic Literature

Turner et al. (2013), posited that a thorough review of literature is the foundation for useful research because the review helps the researcher to develop appropriate research questions, research strategies, and overcome methodological challenges. This position was expanded upon by Allwood, (2012) and Leedy and Ormrod, (2016) to underscore the significance of the literature review in academic research. The purpose of this quantitative panel data regression study was to examine the relationship between LQ, AQ, and PR of the NMBs. In this subsection, I examine both professional and academic contributions to elicit the views of numerous scholars on the relationship between LQ, AQ, and PR of financial institutions in general and MBs in particular, taking references from different economies across the world. The inferences that I drew from this review set the pace for the research findings to be presented in the later section of the study.

I have organized this review to follow chronological and topical structure. The structure is divided into four parts: opening narrative, historical perspective, theoretical

and empirical framework, and the conclusion. I conducted this literature review through the lens of profit theory as it is affected by the interaction of two major internal risk factors, LQ and AQ. The identification and the effective management of these risk factors is essential for MBs to remain profitable and sustainable.

MB, as a subsector of the financial institutions' framework, mobilizes deposits from surplus units of the economy to fund their operations, including creation of mortgage assets as elicited by Mergaerts and Vander Vennet (2016). While a commercial bank does all aspects of financing from retail to wholesale, an MB concentrates more on financing home development and acquisition. Both seek deposits from surplus units, otherwise referred to as liabilities, which may be long- or short-term, to finance their risk assets, otherwise referred to as loans. Therefore, most of the citations were drawn from the financial institution as a whole.

Search Strategy

To give credence to the study, I reviewed 205 resources related to the specific business problems. A total of 178 of the resources were peer reviewed journal articles found in 55 domain journals published not earlier than 2013. Others are nonpeer-reviewed journal articles, government releases, periodicals, books, research, and information bulletins on housing, banks, and mortgages. The following journals are frequently cited in this study: *Journal of Finance and Banking Management, African Development Review, Journal of Real Estate Finance and Economics, Real Estate Economics, Journal of Economic Behavior and Organization, Independent Journal of Management and production, Journal of Financial Economics, Journal of Real Estate*

Literature, International Journal of Business and Social Science, American Journal of

Economics, Journal of Real Estate Research, International Journal of Business and

Management, Real Estate Economics, Journal of Housing Economics, Journal of banking

and Finance, International Journal of Housing Markets and Analysis.

The databases searched to generate these resources are: EBSCO databases, such

as Academic Search Premier, Business Source Premier, Google Scholar, and Emerald

Management Journals. I also searched within dissertation and theses databases,

multidisciplinary databases, management and business databases. The use of Walden

library and the librarian were invaluable to the entire work done. The keywords used for

the searches included: savings and loans, small banks, *banks performances*, *profitability,*

asset quality, mortgage banks, nonperforming loans, profitability and liquidity, mortgage

defaults, mortgage penetration, liquidity management, net interest margin, return on

asset, and *risk management.*

I observed that most studies carried out on the performances of the Nigerian

mortgage institutions concentrated on the external factors influence like government

policies, regulatory bottlenecks, and other macroeconomic variables (inflation, interest

rate, unemployment, currency devaluation, fiscal and monetary policies). Only few

studies have examined the critical internal risk factors of which the efficient management

is pivotal to the viability of mortgage banking business in Nigeria. The Nigerian

mortgage and housing market are yet to be fully integrated to the capital market where

long term funds can be easily sourced to finance mortgages. This has created a serious

LQ challenge for the MBs. To remain viable, every MB must possess internal capacity to

effectively manage LQ risk and loan default that may impair their AQ. In this study, I

will expand on the existing literature by thoroughly examining the direction and extent of

the relationship between LQ, AQ, and PR of the NMB using correlation and panel data

regression analysis. It is my hope that the findings from this study will provide the

managers of MBs with vital information that may guide their decisions in building an

effective enterprise risk management framework that may reduce LQ risk and enhance

their AQ.

In reviewing related literature, I observed that the operation of mortgage business

in Nigeria is different from that of many countries. In some countries, unlike Nigeria,

mortgage companies do not fall under the strict regulatory regime of depository

institutions (Demyanyk & Loutskina, 2016). Therefore, as a starting point, it is necessary

to give a background on the system of mortgage business operations in Nigeria. This will

help the readers to understand the underlying perspective upon which this study is based.

Historical Background on the Nigeria Mortgage Bank Operations

NMB is a financial institution solely set up as a channel for home acquisition

finance. The NMB was established under the Mortgage Institutions Act of 1989 as a

vehicle to promote home ownership and to tackle the perennial home shortages by

providing easy access to home finance. The Nigerian population rose from 45million at

independence to 185.99million by the end of 2016 with a 2.6 percent annual growth

(World Bank Group, 2018). The population growth without commensurate increase in

home delivery left a big gap in the housing delivery situation in Nigeria. Various scholars

have put the housing shortage between 17 million and 22million units (Augusto, 2015;

Makinde, 2014; National Bureau of Statistic, 2015).
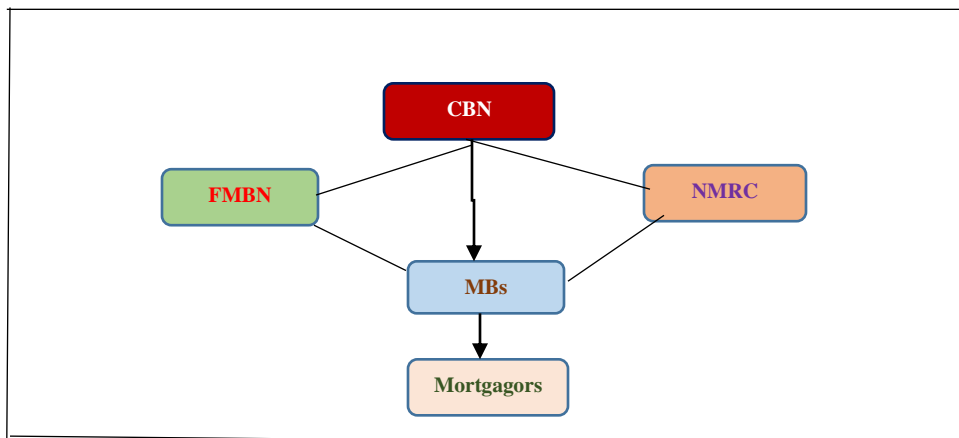
Figure 1. Structure of mortgage institutions in Nigeria.

The quest to tackle the problems of home ownership made housing a pivotal

agenda of every successive Nigerian government from independence to date. This led to

the establishment of Federal Mortgage Bank of Nigeria (FMBN) in 1977 as it transited

from the then Nigeria Building Society (NBS) that was established in 1957. The NMB

was established with the promulgation of the Mortgage Bank Act of 1989. FMBN and

MBs are the two distinctive structures of MBs in Nigeria with complementary

responsibilities. The Nigeria Mortgage Refinance Company (NMRC) came on board in

2014. The structure of mortgage finance institution in Nigeria is represented in figure 1.

As shown in Figure 1, the CBN, being the apex bank, regulates all the mortgage

institutions in Nigeria. The FMBN and NMRC are secondary mortgage institutions with

the established objective of providing long term LQ to MBs. FMBN focuses on social

housing with fixed interest of 6% p.a., while the newly established NMRC interest rate is

market determined. The MBs are the PMBs that originate mortgages and pass through the

conforming ones to the NMRC in the form of refinancing. FMBN does not refinance but rather funds the applicants of the National Housing Fund (NHF) after appraising them; the fund is passed through the MBs for on-lending to the prospective mortgagors who must be contributors to the NHF scheme. The mortgagors are the prospective subscribers to home acquisition who may require housing finance.

Nigeria Mortgage Refinance Company

NMRC is a new introduction into the Nigeria mortgage system. It is a LQ facility company formed through a Public Private Partnership (PPP) arrangement to provide long term LQ to the MBs and other commercial banks who own shares in the company. NMRC operates like a club as it only refinances conforming mortgage assets created by its shareholders. The MBs are the single largest shareholders in NMRC, holding 49% of the shares at the commencement of operations in January 2014. Commercial banks hold 8% while other shares are owned by private investors and government agencies. NMRC as a LQ facility company, acts as a catalyst in the provision of long term funds to the mortgage subsector by refinancing conforming mortgage assets. NMRC is expected to potentially link the subsector to the capital market, which may lead to securitization of mortgages and housing products.

As at the time of concluding this study, the operations of the NMRC were still too sketchy for any reasonable assessment to be made about the impact in cushioning the inherent LQ challenges in the market. The first re-financing was concluded in 2016, following the successful raising of first capital through corporate bonds. Suffice to note that the company successfully raised a fully subscribed 15 years' corporate bond of

N8billion (Eight billion naira) in the third quarter of 2015 at 14.9% p.a. to refinance conforming legacy mortgages of its shareholders.

Federal Mortgage Bank of Nigeria

FMBN is a government sponsored mortgage institution established under the FMBN Act of 1977 as a retail MB. The scope was later limited to promoting social housing through wholesale mortgage lending and administration of NHF. FMBN serves as a secondary vehicle exclusively for mortgage assets created through the NHF scheme. Therefore, its secondary mortgage role is limited to the administration of NHF. FMBN, being a government establishment, is supervised by the Ministry of Power, Works and Housing. CBN examines and regulates the activities of FMBN, like other financial institutions. At the helm of affairs in FMBN is the board, which members are appointed by the president of Nigeria.

At a point in time, the stock of housing available for NHF financing was short in supply. This is largely due to lack of long term funds and the high interest rate prevalent in the market. FMBN had to intervene in facilitating social housing development by providing estate development loans (EDL). The objective of FMBN intervention was in two folds: (1) to accelerate the stock of housing, (2) to enhance affordability through lower pricing. To achieve this, EDL was given out to the FMBN accredited developers at 10% p.a. interest, as against the prevailing market rates that oscillate between 22% to 27% p.a. FMBN also put ceiling to the prices of the houses they would finance. Consequently, housing stock in the market had a marginal increase.

For most of the developers, keeping to the FMBN maximum threshold in pricing, the quality of housing construction dropped significantly and patronage on FMBN funded estates became very low. Consequently, sales went down and the rate of default on EDL became very high. To plug the high default rate experienced on EDL, the management of FMBN therefore placed an embargo on EDLs. As at the time of concluding this study, FMBN is yet to lift the embargo placed on EDL.

National Housing Fund

One of the landmarks polices of the government in the 1990s was the introduction of the NHF Act. The aims and objectives of the Fund were to: (a) facilitate the mobilization of the Fund for the provision of houses for Nigerians at affordable prices, (b) ensure the constant supply of loans to Nigerians for the purpose of building, purchasing, and carrying out improvements on residential houses, (c) providing incentives for the capital market to invest in property development, (d) encourage the development of specific programs that would ensure effective financing of housing development, in particular, low cost housing for low income workers, (e) provide proper policy control over the allocation of resources and funds between the housing sector and other sectors of the Nigerian economy, and (f) provide long-term loans to mortgage institutions for on-lending to contributors to the Fund (FMBN, 2014).

According to the Act, the sources of funding NHF should consist of: (a) contributions by Nigerians working both in the public and private sectors, (b) investment in the Fund by commercial and merchant banks, (c) investment in the Fund by insurance companies registered under the Insurance Act; [Cap 117.], and (d) financial contributions

by the Federal Government for long-term housing loans. From these four sources, it is only the contributions by the Nigerian workers both in the public and private sectors that was activated up till the period of this review. The NHF Act provides that any Nigerian worker earning an income of N3, 000 and above per annum in both the public and the private sectors of the economy shall contribute 2.5 percent of his/her basic monthly salary to NHF scheme. The NHF is held like a Trust as the contributors are expected to collect back their contributions with 2% interest on retirement. This Act was not popular with labor unions, as such, compliance was not total.

FMBN manages the fund and administers the NHF policy. FMBN was established in the mold of the Government Sponsored Enterprises (GSE) in the American mortgage market that provides LQ to fund originated mortgages, like Government National Mortgage Association, Federal National Mortgage Association, and Federal Home Loan Mortgage Corporation popularly known as Ginnie Mae, Fannie Mae, and Freddie Mac respectively. Irrespective of the collapse of the America mortgage market in 2009, Odekon (2015) argued that GSEs were largely successful in meeting the objectives for which they were set up. Conversely, Radzimski (2014) posited that the failure of these type of financial institutions is exemplified in Poland where a subsidized scheme to provide housing for the poor failed before it was abolished. Nevertheless, the failure of the Polish version achieved some unintended benefits such as partly reflating the economy during the financial crises (Radzimski, 2014).

One of the objectives of NHF was to complement government affordable housing agenda. The total value of mortgages created under the NHF scheme as reported by the

Daily Independent Newspaper of August 12, 2012 amounted to N34.036billion. If an

average of N5million loan per applicant is assumed, only about 6,800 Nigerians have

benefited from the scheme as at August 2012. Makinde (2014) however discountenanced

the NHF as not fulfilling its primary objective as he expressed that the contribution of

NHF to government home ownership agenda was insignificant.

In my opinion, paucity of funds and poor management were the major challenges

of FMBN. The level of compliance by those bodies that the Act required to provide

funding to the scheme and the administration of the funds were generally poor, thus,

making the scheme not credible to most Nigerian workers who were the main

contributors. Enforcement of the provisions of the NHF Act will improve the funding

ability of FMBN and the potential of the scheme to impact positively on housing delivery

in Nigeria.

Mortgage Banks (MBs)

Mortgage Banks in Nigeria

MBs are the primary mortgage originators in Nigeria. They are licensed by the

CBN to carry on mortgage banking business. Prior to the release of the revised guideline

for mortgage institutions by the CBN in 2011, the NMBs were known as building

societies or savings and loans institution. They were then categorized as primary

mortgage institutions (PMI). To make it easy for the PMIs to attract deposit from the

market, and to also indicate clearly the specialized nature of the business, the word

'mortgage bank' was adopted in the revised guideline.

The revised guideline for the subsector which dated back to November 2011 categorized MBs into two by their share capital: The national MB and the state MB. The MBs with national authorization have a minimum share capital of N5billion unimpaired by losses, while the MBs with state authorization have share capital of N2.5billion unimpaired by losses. The MBs with national authorization are licensed to operate anywhere in Nigeria, while those with state authorization are limited in operation to only one state from the 36 states of the federation and the capital territory.

For emphasis, MBs in Nigeria are subject to strict regulations and guidelines of the CBN. Like other banking institutions, it is mandatory for each MB to render periodic returns (monthly, quarterly, yearly) in the required format to the CBN. It is also instructive to note that CBN and the Nigeria Deposit Insurance Corporation (NDIC) carry out physical examination on each MB once a year. The 2011 reform by the CBN listed the following as permissible activities for the MBs: a) mortgage finance; b) real estate construction finance within the permitted limits; c) acceptance of savings and time/term deposits; d) acceptance of mortgage-focused demand deposits; e) drawing from the mortgage funds for on-lending to mortgagors; f) financial advisory services for mortgage customers. The non- permissible activities for the MBs as per the revised guideline are: a) granting consumer or commercial loans; b) leasing; c) estate agency or facilities management; d) project management for real estate development; e) management of pension funds/schemes and all other businesses not expressly permitted by the guideline (CBN, 2014).

Risks faced by MBs became more pronounced with the model of mortgage banking practiced in Nigeria (Usman & Lizam, 2016). The Nigerian MBs perform bundled mortgage financial services, which is often referred to as the OTH model. The OTH is a model where MBs originate mortgages, fund, service and hold fully funded mortgages in their balance sheet till maturity (Rajan et al., 2015). In this clime, the mortgage market is illiquid because of the absence of a functional secondary mortgage market. OTD is a variant of OTH model. OTD model is a situation where originated mortgages are distributed to third parties through various secondary mortgage market channels (Allen et al., 2015; Kara et al., 2016). OTD model injects LQ to the mortgage market and separates various integrated activities from mortgage origination, to distribution through various frontiers of LQ facility channels (Shi & Zhang, 2013). In my opinion, the Nigerian mortgage model creates LQ risk to the operators by the absence of a functional secondary mortgage market.

Having looked at the historical development of MBs in Nigeria as an important foundation for this review, it is essential to examine the theoretical and empirical framework of this study. To explain the theoretical framework that underlies each of the variables, I will start with PR as the dependent variable. I will define and explain the constructs for the variables, the models, and the measurements for analyzing the variables. Under the empirical review, I will review the hypothesis to elicit the positions of previous studies regarding the direction of the relationship between the independent variables and the dependent variable. Most of the references will be taken from the financial institution because I observed that MB as practiced in Nigeria may be regarded

as a small bank that majorly specializes in housing finance under the same strict

regulations of the CBN like commercial banks.

Theoretical and Empirical Framework

Theoretical Review

Researchers formulate theories to explain, predict, and understand phenomena

and, in many cases, to challenge and extend existing knowledge within the limits of

critical bounding assumptions (Swanson & Chermack, 2013). The theoretical framework

of this study provides the lens through which I will examine it. Therefore, the framework

is anchored on the theory of profit as a measure of business performances and how the

profit aspiration may be threatened by two internal risk factors, namely, LQ and AQ. As

such, I found risk based business process management theory as an important anchor to

explain the relationship between the independent variables and the dependent variable.

As highlighted in the research question, this study revolves around 3 major variables, 2

independent variables, and a dependent variable. The independent variables are LQ and

AQ, while the dependent variable is PR.

Profit Theory

Apart from the not for profit organizations, businesses cannot survive and remain

sustainable without some margin above the break-even level. Profit sustains businesses

and rewards investors. Lingenfelter and Block (2014) inferred that profit is a part and

parcel of economic freedom and it is the last best chance to fight poverty. The theory of

profit as a measurement of performance and entrepreneurial reward dates back in

academic history. Knight (1942) used the distinction between risk and uncertainty to

explain the theory of profit. Knight defined profit as the residual income due to the owners of a business. Lloyd and Woodside (2015) illustrated that introducing innovation, adapting to the innovation of others, and bearing uncertainty (risk) are important in the quest for entrepreneurial PR.

From the Knight's theory of profit, Lloyd and Woodside (2015) identified three major concepts worthy of attention mentioned in relation to profit theory: (1) measurement of performance, (2) risk that could make the profit aspiration uncertain and (3) innovation that forms a necessary ingredient for continued viability and sustainability. Innovative managers envisage risks, identify them, device a measuring strategy, and prepare adequately to mitigate them to ensure PR and business continuity. The dominant theory for this study therefore is profit theory while the supporting theory is viewed from a risk management perspective represented by two internal risk factors that could jeopardize the PR aspiration of MBs in Nigeria, LQ and AQ.

Operating in a market that is not efficient and highly illiquid as the Nigeria mortgage market automatically creates risks that may threaten performances. Therefore, managing the risks to remain profitable and sustainable will require that the managers and the business leaders in that industry would need to activate their innovative minds as reflected in Lloyd and Woodside (2015) study. To do this, they will require information that could lead to the identification of the risks before they crystallize. The efficient management of LQ and AQ are critical success factors for the sustainability of MBs as demonstrated by Pick, Weber, Connell, and Geneste (2015). The quality of these two independent variables is positively correlated to the level of PR obtainable in most

financial institutions, *ceteris paribus*. I share Lloyd and Woodside (2015) expressed

opinion that the managers of firms must be innovative in the formulation of their business

process management framework such that the process flow will lead to the identification

of possible risks in every loan transaction, measurement of the severity of the risks, and

institute measures to mitigate them.

The PR of MBs, as with other financial institutions, are measured in absolute

figures and financial ratios which are usually reported in annual published financial

statements (Roth, Mavin, & Dekker, 2014). Some of the ratios used are ROA, ROE,

NIM, PAT, PBT, operating profit, market power, and degree of regulatory costs (Roth et

al., 2014). Each of these constructs have different measuring parameters which may give

different absolute results but would not in any way affect the quality of the findings in

any study that uses any of the constructs as proxy for PR. To this study, I will limit the

proxies for PR to NIM and ROA.

Net interest margin. NIM indicates how well interest bearing assets are

employed relative to interest bearing liabilities. NIM is a measure of the difference

between interest income and interest expense relative to the value of the loan assets

(Kapaya & Raphael, 2016). Gill and Biger (2013) measured NIM as a percentage of what

the bank earns on loans and other assets in a time period minus the interest expended on

borrowed funds divided by the average value of the assets on which it earned income in

that time period.

Ho and Sanders (1981) developed the dealership model of bank's margins, in

which the bank is viewed as a risk-averse dealer, and loans and deposits are seeing as

homogeneous structures. Dealership model of bank's margins viewed NIM simply as the spread between the bank's lending rate and deposit rate. The model anchored the size of the spread as a function of four variables, namely, (1) the degree of managerial risk aversion; (2) average transactions size, (3) competition within the bank's market, and (4) the variability of interest rates. This model implied that liability and asset structures should be analyzed together since they were positively related through transactions uncertainty. However, researchers expanded this model from homogeneity structure of loan and deposit to heterogeneity where innovative ideas and regulations shape the spread between the portfolio of loans and deposits (Ahmad, Shaharuddin, & Tin, 2016; Islam & Nishiyama, 2016; and Lartey, Antwi, & Boadi, 2013). The dealership theory as expanded by Ahmad et al. (2016) is relevant to this study. As such I consider it as the starting point for the understanding of the factors that can influence the NIM and its appropriateness as a proxy for MB's PR.

The major drivers of NIM are interest rate on loan, quality of the loan, the size, and the cost of liabilities or debt. It reflects the cost of the bank's intermediation services and its MGTEFF. Ongore and Kusa, (2013) argued that the higher the NIM, the higher the PR, and the more stable the bank is. However, Khrawish (2011) posited that a higher interest margin could reflect riskier lending practices associated with substantial LLP that may have negative impact on the PR. Irrespective, NIM is one of the key measures of bank PR. Therefore, a high level of NIM is desirable for improved PR.

Return on assets. ROA is another key ratio that indicates the PR of any bank. Ongore and Kusa (2013) used the ratio of income to total assets as the measurement for

ROA. This is the most common measurement used to determine the performance of

banks. This ratio indicates how efficiently the resources of the bank are used to generate

the level of income realized as indicated by Khawish (2011). Khawish (2011) argued that

ROA indicates the efficiency of the management in generating net income from all the

resources of the Bank. In this study, I will take the ROA as the ratio of PBT to total asset.

Lartey et al. (2013) study on the relationship between NIM and ROA revealed a strong

positive relationship. The relationship is more supported by high quality loan assets stock

and efficiency on operational and other cost that have direct impact on PR. To the two PR

proxies, it can be deduced that efficiency is central to higher PR. Therefore, the choice of

NIM and ROA as proxies for the dependent variable is justified.

The presence of uncertainty in PR because of the inherent risk in mortgage loan,

like other financial intermediation business, may constitute impediments to PR objective.

The independent variables, LQ and AQ are considered from the risk perspective. High

LQ position may not necessarily contribute to the PR, especially if AQ is impaired, and

LLP requirement becomes very high. The structure and the environment of mortgage

banking operations in Nigeria constitutes a risk for LQ and poor AQ. To optimize PR,

effective risk based business management process framework is essential. Therefore, risk

based business management process is another theory upon which this study is based.

The independent variables are looked at from the risk perspective.

Risk Based Business Process Management

Business process management (BPM) supports businesses by providing a set of

tools, methods, and techniques to identify and cover business processes, and to monitor

and control their execution (Roeser & Kern, 2015; Schulte et al., 2015). The relevance of

BPM in today's management is critical. Researchers have determined that many

organizations have deployed business process management systems to manage and to

remain competitive (Cummins, Peltier & Dixon, 2016; Mertens, & Van den Bergh,

2013). BPM ensures quality assurance strategy is deployed for the benefit of cost

reduction, and overall process quality improvement.

A recent paradigm shift in BPM systems is the incorporation of risks that

organizations face in their day to day operations which may have a profound impact on

the organizations' bottom-line. Risk based business process management enables detailed

attention to be placed on risks the organization is exposed to, identifies them, prioritizes

them and incorporates mitigation strategies into the overall business model (Conforti et

at., 2013; De Weerdt, Schupp, Vanderloock, & Baesens, 2013). Jans, Van der Werf,

Lybaert and Vanhoof (2011) advanced the position of Conforti et al by adding that risks

should be envisaged and incorporated into the business model and other post execution

artifacts. Failure of risk management is reflected in the profit that organizations make

over time; on the extreme side, it erodes their capital and if not checked, business failure

will occur.

In the banking sector, enterprise risk management (ERM) has become a crucial

component of regulatory requirements and contemporary corporate governance reforms

with abundance of principles, guidelines, and standards. The adoption of this model was

not visible in the operations of some MBs as their financial statements reflected high

portfolio of non- performing mortgage loans. The major risks faced by most financial

institutions can be broadly categorized into LQ, default risk that may affect AQ, and

operational risks (OR). A possible risk of LQ and poor AQ are the most vulnerable risks

that PMBs face in Nigeria today resulting from macro- economic challenges (Johnson,

2014). It can be argued that if LQ and AQ are efficiently managed, OR will be less

vulnerable. This can be a point for future research. For this study, LQ and AQ are viewed

as the most challenging risks faced by MBs in Nigeria today. Mortgage bankers must

develop adequate capacity to understand, identify and manage their business exposure to

these risk elements to remain in business and be profitable. I will now consider the

independent variables and their measurements starting with LQ.

Liquidity

Umar and Sun (2016) described LQ as the ability of banks to meet their liabilities,

unwind or settle their positions as the liabilities fall due. Rubio and Carrasco-Gallego

(2016) averred that LQ is the ability of solvent institutions to make agreed upon

payments in a timely period. LQ plays very significant roles in the sustainability of every

business venture. Alshati (2015) viewed the concept of LQ as the bank's ability to meet

financial obligations when due, and these obligations can include lending, investment,

withdrawal of deposits, and maturity of liabilities which may happen in the normal course

of business. LQ plays a pivotal role in financial intermediation business. The paramount

role LQ plays in the life of all financial institutions is a justification for the arrangement

in the banks annually published financial reports in the order of liquid assets. The

arrangement in the financial statement is in order of LQ, whereas for other businesses the

arrangement is in order of fixed asset. This underscores the paramount roles of LQ in the survival of any financial institution.

Bank LQ refers to the ability of the bank to maintain sufficient funds to pay for its maturing obligations as they fall due (Berger, Bouwman, Kick, & Schaeck, 2016; Berger, Imbierowicz, & Rauch, 2016). The maturing obligations include meeting cash withdrawal requests, payment of bills, honoring of payment instruments, new loans, and meeting the minimum LQ benchmark set by the regulatory agencies (Agbada & Osuji, 2013). Just like commercial banks, MBs as licensed by the CBN perform financial intermediation roles in home acquisition finance. The MBs mobilize deposits in form of savings and demand deposits in Nigeria.

However, the preponderance of short term deposits in the market, exacerbated by the absence of effective secondary mortgage market creates a serious LQ risk for MBs in Nigeria. Consequently, most MBs find themselves in a precarious situation of LQ gap, which resulted into mismatching of short term liabilities to finance mortgage assets which are long term in nature. A prudent management of MBs requires that assessment of LQ position is done accurately every day to determine their maximum loans exposure and alternative sources of meeting LQ gap (Cleary & Hebb, 2016). LQ risk is the potential that the bank would not meet its call obligations as they fall due. It also portends that the bank may not have the capacity to take on all investment opportunities that can maximize their PR.

Alshatti (2015) study on the effect of the LQ management on PR of the Jordanian banks recommended an optimum utilization of the available LQ in every aspect of

investment to increase PR. He contended that banks should adopt a general framework of LQ management to assure sufficient LQ for executing their operations. This further buttress the usefulness of the RBPM theory that underlies this study. The capacity to achieve a balance between sources and uses of funds is a must for the NMBs to be competitive and profitable.

LQ is a measure of the ability and ease of convertibility of assets into cash when needed. Examples of Liquid assets generally include cash, reserves with CBN, convertible government debt, deposits, receivables, and other liabilities. There is a plethora of studies on financial institutions where financial ratios were used as performance measurement. Alshati (2015) used investment ratio, quick ratio, capital ratio, liquid-asset ratios as measurement of LQ. Arif and Nauman (2012) in their study on LQ risk and performance of the banking system used capital adequacy, deposit, bank size and their related ratios as constructs for LQ.

The importance of LQ to MB and other financial institutions can be likened to blood in the human vein; absence or insufficiency of it may cause doom to the banks. The bank liquidation witnessed across many economies years back was linked to poor LQ management. This justified why Ali (2004) as referenced by Arif and Nauman (2012) referred to LQ risk as bank's assassin. LQ risk management is an essential component of the overall enterprise management framework that concern all financial institution, including MBs. A well-established risk management system will help the banks to timely recognize sources of LQ risk.

The critical risk factors in LQ are deposit, capital, cashflow position, and LQ gap. They are interrelated factors which are limited in supply and as such the managers of MBs must deploy sufficient capacity to prudently manage them. RBPM is central to the effective management of LQ risk. Central to LQ is the ability of MBs to mobilize deposits for the funding of their operations. Many authors have used different constructs as proxies for LQ and AQ. By virtue of the constructs I chose for the variables, all other internal risk factors not directly mentioned will be well represented as will be seen later in the study. Lartey et al. (2013) used cash ratio, quick ratio, current ratio and capital ratio to determine the relationship between LQ and PR of listed banks in Ghana. Bateni, Vakilifard, and Asghari, (2014) used deposit asset ratio, equity ratio, CAR, and risk assets ratio in their study on factors that influence capital adequacy ratio in Iranian banks. Alshatti (2015) used capital ratio, liquid ratio, quick ratio, investment ratio, and credit ratio as constructs to demonstrate the effect of LQ management on Jordanian banks' PR. Ilhomovich (2009) in Lelissa, (2014) used cash to deposit ratio (DEPRAT) as a construct for LQ.

As demonstrated above, to a very large extent, what determines the constructs to deploy will depend on the objective of the researchers. My objective is to determine the relationship between LQ, AQ, and PR of MBs in Nigeria. Therefore, for constructs of LQ, I will use capital, deposit, cash, bank size, and MGTEFF, while for AQ, I will use non-performing loans (NPL), LLP, and Loan size as the constructs. These constructs will be expressed in ratios for ease of analysis and comparison, starting with the models of LQ constructs.

Capital. Ongore and Kusa (2013) referred to a bank's capital as bank's owned fund available to support the business and act as a buffer in case of adverse situations. The bank's capital is the lowest cost of stable funds available for the bank's operations. As illustrated by Lartey et al. (2013), a bank's capital serves as a LQ buffer and it strengthens the institution to withstand financial shocks. This justifies why banks have mandatory minimum capital imposed by the regulators.

In Nigeria, CBN imposed a minimum mandatory capital of N2.5billion (two billion, five hundred million naira only) and N5billion (five billion naira only) for MBs with state and national authorization respectively, as explained earlier in the study. This is the minimum level the CBN believes is adequate for the operations of each type of the MBs. Bateni et al. (2014) in their analysis used ratio of equity capital to total assets as the model for capital ratio. This is for uniformity because there is no uniformity in the weight attached to each class of asset. In the analyses in later chapters, if the CAR for all the sampled MBs is easily available on the financial report, the CAR will be used. Otherwise, I will use the ratio of equity capital to total assets model.
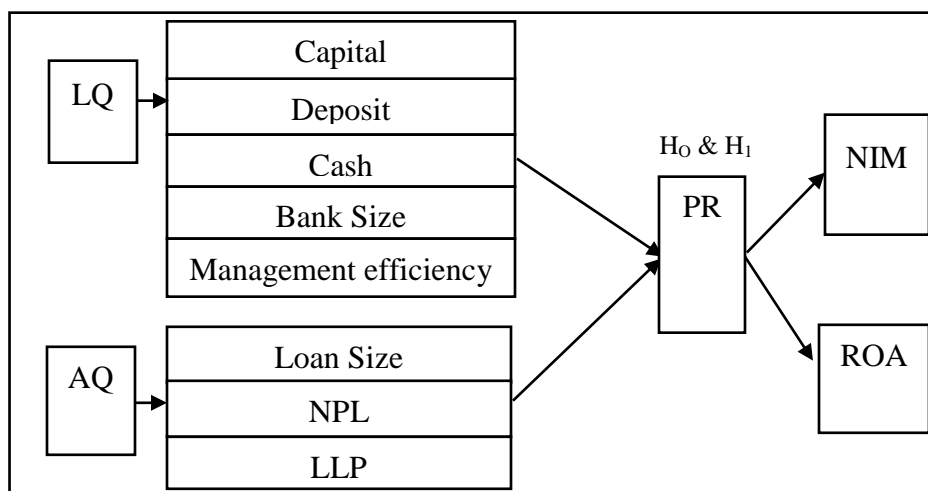
Figure 2. Schematic diagram showing the variables, constructs, and relationships.

Basell 111 framework for financial stability and resilience of banks released in 2013 set minimum capital adequacy ratio for banks at 8% with 2.5% capital conservation buffer (Qin & Wei, 2014). The capital adequacy ratio measures a bank's capital in relation to its risk-weighted assets. CAR is calculated by adding tier 1 capital (equity and reserves) and tier 2 capital (long term debt, redeemable stocks), divide by risk-weighted assets (Angelini et al., 2015). The tier 1 capital is the core capital of a bank. The CBN set the CAR for MBs at 20%. The weight attached to each class of the bank's assets as adapted from 2016 financial reports for Infinity Trust Mortgage Bank Plc is shown in Table 1.

Deposit. Deposits are customers' account credit balances with banks. Deposits form part of the current liabilities in the bank's statement of financial position. Deposits are demand deposits, call deposits, savings deposit, fixed deposits, mortgage refinancing inflow, mortgage focus deposits, and other liability products issued by the MBs. The deposit classes have different interest rate implications as demonstrated by Alshatti (2015). Deposit liabilities enhance the LQ position of banks as they transition to form part of the cash and cash equivalent in a bank's asset structure. The core deposit for MBs are the long-term deposits required to finance the mortgage assets that are long term in nature. Reposis (2015) described deposits as guaranteed funds contributed in the bank to ensure economic stability and LQ of the account holder. In deriving the DEPRAT, the total deposit liabilities will be considered without any classification. Therefore, DEPRAT is computed as total deposit to total asset. This model is similar to Qin and Wei (2014),

Angelini et al. (2015). Figures for deposits and assets are displayed in the statement of

the financial position of the selected MBs in their published annual financial reports.

      Cash. Cash is the most liquid asset in the bank's balance sheet. The bank's

balance sheet is arranged in order of LQ and cash comes first in this arrangement to

underscore its importance in the structure of a bank's finances. Lartey et al. (2013)

indicated that cash is the most liquid of all the bank's assets. In most financial statements,

it is reported as cash and cash equivalent. This includes cash in the vault of the bank,

credit balances with other banks, and short term convertible investment. Ilhomovich

(2009) in Lelissa, (2014) used cash to DEPRAT as a construct for LQ. Similarly, in this

study, cash ratio is calculated as the ratio of cash and cash equivalent (balances at hand,

in other bank, and short term investment) to deposits.

Table 1

Risk Weight for Asset Classes

Assets	Risk weight %
Cash	0%
Bank balances within Nigeria	20%
Bank balances outside Nigeria	20%
Placements with banks and discounts houses	20%
Federal Govt bonds and bills	0%
State Govt bonds	20%
Investments	100%
Net loans	100%
Other Assets (Net)	100%
Fixed Assets	100%
Contingents	50%

Source: Infinity Trust Mortgage Bank Plc 2016 published financial reports.

Bank size. In literature, various methods have been used to determine a firm's size. Bateni et al. (2014); Calem, Covas, and Wu (2013) deployed a logarithm of book value of assets to determine a bank's size. Many other scholars used capitalization value or the market value of equity to determine a firm's size, while others used the size of the branches and loan portfolio as determinants of a bank's size (De Jonghe, Diepstraten, & Schepens, 2015; Laeven, Ratnovski, & Tong, 2016; and Mattana, Patroni, & Rossi, 2015). Just like Bateni et al. (2014) I will use a logarithm of total assets as proxy for the size of MBs to bring it near to other variables' sizes for ease of comparison.

Management efficiency. MGTEFF is a major, if not the most important internal key factor that determines the bank PR. Ongore and Kusa (2013), and Lelissa (2014) posited that MGTEFF is one of the complex subjects to capture with financial ratios. Researchers have examined the efficiency and PR in financial intermediation business,

whether MB, commercial bank, development bank, or merchant bank in various aspects

(Calem et al., 2013; De Jonghe et al., 2015; Laeven et al., 2016; Lelissa, 2014; Mattana et

al., 2015). These scholars look at efficiency from the perspective of scale, allocation,

scope, and operational. Scale efficiency refers to the relationship between the level of

output and the average cost (Laeven et al., 2016). The allocative efficiency measures

whether for any level of production, inputs are used in the proportion that minimizes the

cost given input prices. Scope efficiency refers to the relationship between average cost

and the creation of varieties of output while operational efficiency is a broad concept

often referred to as x-efficiency, which measures the maximum achievable output for a

given level of input (Johnson, 2014). In this study, I look at MGTEFF from operational

efficiency perspective. I used financial ratio of cost to income in the analysis of the

variables.

Having explained the model for the 5 constructs I selected as proxies for LQ, I

will now take a cursory look at the constructs for AQ and explain the model I will use in

the analysis before I delve into the empirical relationship of the variables. As explained

earlier in my operational definition of AQ, AQ is limited to the standard of the loan asset

of MBs. Standard represents the level of performances of the loan asset. A high quality

loan will have very low default rate which translates to high standard risk assets. Loan

assets is the major income head in the operations of mortgage banking business in

Nigeria. The more the mortgage loan created, the more likely the value of the NIM and

the more likely the PR. This assertion will be verified under empirical analysis in the next

part.

Asset Quality

The highest risk facing MBs in Nigeria today apart from LQ risk, is the risk associated with mortgage loans performance, otherwise referred to as AQ. Dang, (2011) argued that the risk of non-performing loans is the most vulnerable risk that affects the performance of banks. For a MB to remain profitable, the AQ must be strong. A strong AQ indicates high standard where non-performing loans (NPL) are very low and impairment charge is also minimal. In line with prudential guidelines, provisions made for NPL is a charge against income which ultimately reduces the operating profit.

To underscore the importance of AQ, the loan of a MB is the major asset that generates its income. Ongore and Kusa (2013) posited that loan portfolio quality has a direct bearing on a banks' PR. Laeven et al. (2016) argued that low NPL to total loan indicates good AQ. However, the most challenging risk that the bank cannot run away from but must efficiently manage is the possibility of default. AQ is determined by the rate of default on mortgage loan. High default rate is associated with poor quality of the loan assets as posited by Laeven et al. (2016).

Mortgage loan default occurs when the mortgagor fails to honor the terms of the mortgage loan agreement. High default rate lowers the quality of the loan asset. Classified mortgage loans refer to loans with repayment obligations that are outstanding for more than 90 days as shown in Table 2. The annexure 6 of the prudential provisions issued by the CBN for the MBs categorizes nonperforming mortgage loans into four with their expected provisions as shown in Table 2. In a severe situation, high default rate may

lead to insolvency, fire sale, or total liquidation (Shaban, Duygun, Anwar, & Akbar, 2014).

The loan assets of all MBs in Nigeria are classified into 4 categories: 1) watch-list, 2) sub-standard, 3) doubtful, and 4) lost. Table 2 shows at a glance the requirements and computations for provisions that MBs are mandated to make as a charge against profit for non-performing mortgage loans (NPML). NPMLs are classified loans. For consistency, NPL will be used to mean the same as NPML.

A MB's long-term survival is dependent upon the ability of the borrowers to fulfill the contract obligations with the MB. The risk of default is present in every mortgage loan. There is a growing literature for the reasons why this situation may occur (Campbell, 2013; Johnson, 2014; Warnock & Warnock, 2012). MB managers must therefore have good understanding of the reasons why mortgagors may default and put this in perspective during origination of mortgage loans to ensure adequate quality assurance solution is applied to limit the incidences of default.

The internal factors that determine the AQ is largely associated with the internal capacity of the managers to effectively and efficiently manage the processes leading to the granting of mortgage loans (Fiedor & Holda, 2016). Berger et al. (2016) posited that the increasing rate of default in most of the financial institutions they examined was largely due to the absence of good corporate governance which was exploited by the management and the board. In the management of AQ for MBs, sound corporate governance is a panacea for improved performances.

Mortgagors can default strategically or because of loss of income. The theory of strategic mortgage default indicates that the households will have a high propensity to default when the value of the mortgage loans outstanding exceeds the value of the property on mortgage (Guiso et al., 2013). Fiedor and Holda (2016) posited that the major reason for low AQ is associated with the poor capacity of the managers to effectively and efficiently manage the processes leading to the granting of mortgage loans. For an improved AQ, management of loan assets from origination to maturity is pivotal. Berger et al. (2016) and Bateni et al. (2014) used the construct of ratio of LLP to net loan as proxy for AQ. Lelissa (2014) used the ratio of NPL to gross loan, loan size, and LLP as the constructs for AQ. In this study, I will use loan size (LS), NPL, and LLP as constructs for AQ.

Loan Size. LS refers to aggregate loan stock of a MB in relation to its total assets. Trujillo-Ponce (2013), argued that LS affects the PR of banks as it is an evidence of market penetration. In Trujillo-Ponce study on what determines the PR of banks, his findings revealed that the high bank PR during the years he studied was associated with a significant percentage of loans in total assets, a high proportion of customers' deposit, efficiency in origination evidenced by low NPL.

Non-performing loan. NPL as a construct of AQ refers to credit risk. It is a potential loss that may arise from the failure of mortgagors to honor their financial contractual obligations to the MB as at when due (Gizaw, Kebede, & Selvaraj, 2015). Akter and Roy (2017) referred to NPLs as problem loans. Allen et al. (2015) referred to problem mortgage loans as Limbo loans. They defined Limbo loans as delinquent

mortgage loans that have not progressed to resolution. For a MB, it is the aggregate of all past due loan repayment obligations taken at a period. To measure the AQ regarding NPL, Ongore and Kura (2013) used the ratio of NPL to total loans. I will adopt a similar approach in my analysis in the later chapter.

Loan loss provision. LLP is the capital that a bank must set aside to cover changes in future expected losses on problem loans (Makri, Tsagkanos, & Bellas, 2014). It relates to provision for impairment losses to the loan portfolio of a bank (Gambetta, García-Benau, & Zorio-Grima, 2016). LLP is a charge on the profit and loss account of a bank. Prudential guidelines for the NMBs as shown in Table 2 indicated the parameters for the loan loss classifications and the relevant required provisions.

Table 2

Mortgage Loans classifications and provisions.

Category	Classification	Days Past Due	Treatment of Income	% of Provision
1	Watch list	Where mark-up/ interest or principal is overdue (past due) by more than 90 days from the due date.	Unrealized mark-up/ interest to be put in Suspense Account and not to be credited to Income Account except when realized in cash	1% of total outstanding principal balance.
1A	Substandard	Where mark-up/ interest or principal is overdue (past due) by more than 180 days from the due date.	As above	10% of total outstanding principal balance.
2	Doubtful	Where mark-up/ interest or principal is overdue (past due) by more than 1 year form the due date.	As above	Un-provisioned balance should not exceed 50% of the estimated net realizable value of the security.
3	Lost	Where mark-up /interest or principal is overdue (past due) by more than 2 years from the due date.	As above	100% of total principal outstanding balance.

Note. Annexure 6 of the prudential requirements for mortgage banks by the CBN.

Preparing for the future should the loan become bad and unrecoverable. It will reduce profit in the interim, but if the loan is repaired and paid up, the provision sum will be written back to the profit and loss account. To determine AQ in relation to LLP, the ratio of LLP will be taken as total provisions to net loans. An increase in LLP would indicate a worsening AQ.

Relationship between Liquidity, Asset Quality, and Profitability

Empirical Review

In measuring economic relationships among variables, the first step is to ascertain whether a relationship exists at all. If a relationship exists, the next step is to determine the direction and the strength of the relationship. Many researchers have used different methodologies to determine economic relationship between variables and to ascertain the direction of such relationship as would be seen later in this section. I derive the study hypothesis from the research question. As posited by McMillan and Schumacher (2014), an RQ is a statement that identifies the phenomenon to be studied. The RQ for this study seeks to know the relationship between LQ, AQ, and PR of MBs. The RQ will be answered by putting the null hypothesis to test. The null and the alternate hypothesis is restated as thus:

H_0: There is no statistically significant relationship between LQ, AQ, and PR of MBs in Nigeria.

H_1: There is a statistically significant relationship between LQ, AQ, and PR of MBs in Nigeria.

Having defined the variables and their constructs, discussed the measurements, and explained the theoretical framework for the study, I will use the rest of this review to provide a critical empirical analysis and synthesis of the literature pertaining to the interaction of the variables by eliciting different points of view from previous research and findings. Reflecting from all the points of view expressed earlier, it seems unarguable that relationships do exist between the independent variables and the dependent variable. For ease of analysis, I will approach this empirical review by hypothesizing the constructs of the independent variables to elicit the findings from previous research regarding the direction and extent of the relationships between the variables.

As a reflection, the background problem for this study centers on the continued loss of PR by some MBs in Nigeria (Ezema & Orji, 2015). Two critical risk factors I observed as a practitioner in the Nigerian mortgage industry over the years are LQ risk and growing defaults rate that impaired the quality of loan assets created by the MBs. The identified problem is created by the external business environment that is beyond the immediate control of the MBs. Irrespective, the MBs must develop adequate capacity to early identify the risks, quantify the effect, and develop the strategy to prevent, transfer or curtail the impact in line with postulation by Conforti et al. (2013).

The specific business problem is to provide information regarding the relationship between LQ, AQ, and PR. I hope such information may help the MBs to manage the inherent risk of loss of PR by building an effective risk assurance strategy to curtail the impact. Almazari (2014) averred that low AQ and poor LQ are the two major causes of bank failure. Therefore, they constitute the key risk sources in banking business. As

earlier noted, LQ risk is highly probable in the Nigerian mortgage market majorly

because of the model of mortgage banking operation in Nigeria, the OTH model, a

variant of OTD model that is prevalent in many developed and developing countries

where the contributions of housing to GDP have recorded between 25% and 80% as

against below 0.5% reported for Nigeria (Makinde, 2014). I opine that where this model

(OTH) is practiced, there will always be LQ challenges. Therefore, I see the OTH model

as the root cause of the illiquidity position of the MBs in Nigeria.

From the foregoing, a relationship thus exists between LQ, AQ, and PR of MBs.

Is this relationship significant or not? What is the direction of the relationship? I will now

elicit the views of some scholars on the empirical relationship between the two classes of

the variables to prove whether or not the null hypothesis should be rejected. I will follow

the constructs identified for each of the variables, hypothesize and analyze them to test

the hypothesis. It is important to note beforehand that efficiency is pivotal in measuring

the PR of any venture. The relationship between LQ and PR of any financial institution

may be difficult to analyze without reference to how the liquid asset is deployed. MBs are

supposed to maintain a minimum prudential ratio of 75% of mortgage assets to total loan

assets. This suggests that a substantial percentage of their capital must be invested in

funding originated mortgages. Therefore, for any MB, AQ is as important as its LQ.

Liquidity and Profitability

The LQ position of a MB determines the amount of capital that is available for

investment, settlement of maturing obligations, and for the growth of loan assets (Berger,

Bouwman, et al., 2016). Can the LQ position of a MB influence its PR? My response will

be yes, LQ does affect PR of a MB. The importance of LQ to financial institutions in general was earlier enunciated. Inadequate or excess LQ may suggest inefficiency and may negatively impact on the PR of any MB. Pradhan and Shrestha (2016) argued that LQ and PR are effective indicators of the corporate health and performance of all profit-oriented ventures. Berger et al. (2016) demonstrated that a statistically significant relationship exists between LQ and PR of Nepalese commercial banks. Dang's (2011) findings also indicated that adequate level of LQ is positively related with the banks' PR. To elicit the empirical relationship between the variables, I will use the constructs of LQ identified earlier.

Capital and profitability. The capital ratio for MBs, like any other financial institution, indicates the extent of their financial stability. Capital ratio is measured by the rate of equity capital to total asset as advanced by Almazari (2014). Dagher and Kazimov (2015) opined that capital ratio measures the financial strength of a bank and its ability to withstand shock. Pradhan et al. (2016) deployed regression models to test the significance of LQ on the performance of Nepalese banks using archival data. They found positive correlation between capital ratio and ROE. Similarly, Trujillo-Ponce (2013) used the generalized method of moments (GMM) estimator developed for dynamic panel models by Arellano and Bover (1995) and Blundell and Bond (1998), to examine the relationship between some internal determinants of PR of Spanish financial institutions. Trujillo-Ponce (2013) discovered a significant positive relationship between capital and ROA.

Laeven et al. (2016) argued that the higher the capital position of any financial institution, the higher the degree of stability and capacity to originate more loans, capture

more markets, and withstand LQ shocks and systemic crisis. Duca (2016) and Thakor (2014) did not deviate from Laeven et al.'s position by similarly averring that capital is associated with higher lending capacity, higher LQ creation, higher bank values, and higher probability of surviving crises. Thus, higher capital is expected to yield higher return, all things being equal. Nasiru, Musa and Kaoje (2012) examined whether capital regulation addressed the issue of LQ challenge. They identified a positive relationship between increase in minimum capital base of banks, their LQ, and AQ.

Increase in capital of a MB should ordinarily increase its LQ position and its ability to grow mortgage assets, withstand LQ shock, and consequently increase its PR. Conversely, some studies have demonstrated that higher LQ ratio may not necessarily translate to higher PR if the LQ is not efficiently deployed (Lelissa, 2014; Mattana et al., 2015). Lelissa's (2014) identified a negative correlation between LQ and NIM on the financial institutions examined. He adduced high cost of deposit and growing NPL as the reasons for the negative relationship. I interpreted this to mean that a higher LQ ratio indicates inefficiency in the management of LQ. It shows that idle cash is held with cost implications instead of investing such either in loan assets or other investment opportunities with better yield. This position was re-echoed by the earlier study conducted by Agbada and Osuji, (2013) on the Nigeria financial institution. They identified efficiency in the management of the available LQ.

Lartey et al. (2013) in their study of the relationship between LQ and PR of listed banks in Ghana observed a very weak positive relationship between LQ and PR. They adopted longitudinal time dimension panel method in their analysis and observed a

downward trend in both LQ and PR. I interpret this to indicate that an inadequate LQ

position may cause a decline in PR. This can be likened to the NMBs who operate in an

illiquid mortgage market. From the foregoing, taking capital as a proxy for LQ will

indicate a statistically positive and significant relationship with PR.

Deposit and profitability. In Nigeria mortgage system, MBs accept deposits and

mobilize savings just like commercial banks; therefore, they are exposed to similar LQ

risk. Ahmad Azam, Mohammad and Muhamad (2013) indicated that LQ is a key element

in managing the assets of a bank. The robust and sound LQ management enables funds to

be raised easily to meet the demands of depositors and borrowers at any time with a

satisfactory price. They posited that without sufficient LQ, the bank may face other

fiduciary risks that may affect the bank's financial stability. I fully subscribe to this

position but will extend it further that MBs should only take the risk their funding

capacity can cope with conveniently and strive to maintain equilibrium position in their

assets and LQ match.

Deposits improve the LQ position of a bank and its ability to grow its loan asset

portfolio, enhance PR and capital formation (DeYoung & Jang, 2016). Deposits form a

substantial part of liability portfolio of financial institutions. DeYoung and Jang (2016)

findings revealed a positive relationship between demand deposit and NIM. The cheapest

form of deposit is demand deposit. In characteristic, it is the most volatile because its

withdrawal requests must be honored on demand.

On regulatory provision for MBs, it is mandatory for each MB to maintain an

adequate level of deposits in cash to meet various call requests by its customers (Agbada

and Osuji, 2013). A reasonable portion of demand deposits must be held in cash to meet

call requests on demand. To underscore the inherent volatility of deposit liability, the

CBN mandated each MB to keep a minimum of 2% of its total deposits with CBN as

mandatory regulatory cash reserve. This compounded the cost of holding deposit

liabilities as the capacity of MBs to originate and fund mortgage assets reduces, just as its

NIM will similarly reduce by this reserve. This is further strengthened by Pradhan and

Shrestha (2016) position that the correlation between ROE and LQ ratio is negative.

Further, the correlation is found to be negative for quick ratio with ROE.

The relationship between DEPRAT and capital adequacy ratio with other bank's

specific factors of Iranian banks was examined by Bateni et al. (2014). They used

archival data taken from the financial reports of 6 private Iranian banks spanned from

2006 to 2012 with a total of 41 observations for each variable. Panel data regression

model was used in the analysis and the findings indicated that DEPRATs do not have any

significant relationship with capital adequacy ratio. By logical extension, any internal

variable that may improve the capital of a MB, will more likely improve its PR.

Considering this position, I will extend Bateni et al.'s findings to indicate that DEPRAT

has no significant relationship with PR of a MB. It is necessary to point out here that

Bateni et al.'s. perspective on deposit is largely on banks having sufficient capital to

safeguard depositors' funds. The position was equally alluded to by Repousis (2015)

when he posited that deposits are guaranteed funds contributed in the bank to ensure

economic stability and LQ of the account holder.

The findings of Trujilio-Ponce (2013) and Almazari (2014) were however different from the positions of Reposis (2015) and Bateni et al. (2016). Trujilio-Ponce's (2013) findings revealed that high bank PR of the sampled Spanish banks for the period 1999-2009 was associated with a large percentage of loans in total assets, a high proportion of customers' deposits, good efficiency and a low doubtful assets ratio. In similar vein, Almzari's (2014) study on Saudi and Jordanian banks supported the position of Trujilio-Ponce. He deployed regression analysis to test the relationship of some bank specific factors and PR. He got his data from the income statement and the balance sheet of the sampled banks. He posited that bank size, LQ, credit, investment, capital, risk management, and expenses management affect PR of the bank directly. Specifically, he illustrated that cost, LQ, and size of the bank have positive and significant effects on PR.

However, MBs in Nigeria find it difficult to compete with commercial banks on deposit mobilization because of the market skepticism about the safety of their deposits with MBs that are small in size and in geographical dispersion. To engage the market for deposit mobilization, MBs may be aggressive by offering higher interest rates than the commercial banks. This aggressive deposit drives, otherwise called deposit war may have negative correlation with PR if pursued at the expense of a reduction in the NIM. Almazari (2014), Favara and Imbs, (2015), and Trujilio-Ponce (2013) supported this assertion. I deduce from most of my reviews that the level of managerial efficiency will determine to a large extent, the direction and the extent of the relationship of the internal risk factors, of which LQ plays a key role, to the level of PR recorded by any MB.

Cash and profitability. As posited earlier**,** cash is the most liquid asset in a bank's balance sheet and the most important in the structure of financial assets of any financial institution (Lartey et al., 2013). Cash and cash equivalent as usually indicated on the asset side of the balance sheet of banks, includes cash in the vault, credit balances with other banks, and short term convertible investments. Lelissa (2014) modeled the ratio of cash to deposits as a construct of LQ and posited that the higher the cash asset to DEPRAT the higher the PR. Higher cash deposit may indicate higher capital or other long term liabilities. Cash asset also enhances the LQ positions of MBs and their abilities to increase loan assets to earn more interest income.

Taking reference from the regulatory provisions for MBs in Nigeria, interest income from mortgage and housing related finances forms the highest contributor to the income of the NMBs. This suggests that the higher the NIM of MBs, the higher the PBT. As a reflection, the CBN prudential guideline for MBs mandated that all MBs must have a minimum of 50% ratio of mortgage assets to total assets and a minimum of 60% mortgage assets to loanable funds. The implication of this provision is to ensure that MBs focus more on mortgage and housing finance. None of the interest earning assets of MBs in Nigeria attracts higher interest rates than mortgage and housing related loans.

The interest earning assets for MBs as indicated in the published financial statement of Infinity Trust Mortgage bank Plc can be categorized into two broad heads, namely, the money market investments and loan assets. Cash and cash equivalent attracts no or insignificant earnings in relation to loan assets. For improved PR, minimum level of

cash holding should be maintained, while optimal level of liquid assets is invested in mortgages and housing development finances for increased NIM.

The more liquid asset is held in cash the less the NIM, while growth in other income may result in increase in ROA. This position was extended in the studies carried out by Laeven et al. (2016); Lelissa (2014); Tran, Lin, and Nguyen (2016). They posited that the higher the cash holding, the lower the NIM. They equally espoused how over capitalization can push the operators to subprime mortgage lending with the resultant jumbo mortgage assets that may drain up the LQ of any financial institution as experienced during the economic meltdown of 2007 to 2009. The review suggests therefore, that the higher the cash holding the lower the NIM.

Bank size and profitability. I use bank size as another construct for LQ because of the economies of scale the big size can attract. There is a plethora of studies on how banks attract deposits from the market through bank branching and expansion. Almazari's (2014) position indicated that large banks could create economies of scale which may lower the average cost with positive impact on PR. This position suggests a positive relationship between bank size and PR. Similarly, for MBs, the larger the balance sheet, the larger the capacity to grow the mortgage assets and improve the NIM. However, over trading may lead to diseconomies of scale as the cost of operations and maintaining the size gets higher. The large size may be difficult to manage and may lead to profit loss. Lelissa (2014) argued that some big banks in Ethiopia must cut down their sizes to optimal level if they must remain profitable.

This position was evaluated by Trujillo-Ponce (2013). He formulated two hypotheses: 1) There is a positive relationship between bank size and bank PR; 2) There is a negative hypothesis between bank size and bank PR. His findings indicated that size is positively correlated with PR to a certain size threshold, beyond which diseconomies of scale can arise, making the size detrimental to PR. I deduce from the review that more than anything else, management capacity to manage the internal risk factors is pivotal to continued PR.

Management efficiency and profitability. Empirical studies have shown that there is a positive correlation between efficiency and PR. For overall efficiency to be attained, the market, and policy environment must be efficient to complement the internal operational efficiency. Assaf, Barros and Ibiwoye (2012) examined the cost-efficiency of Nigerian banks pre and post consolidation period using the Bayesian random frontier model. Their findings show a negative correlation between cost and profit margin and the extent of the relationship was indicated as significant. In their study, the quality of the risk assets (loans and advances), the volume and the mix of deposit portfolio and treasury efficiency were considered and found significant in influencing the profit level. The authors reported that in the pre-consolidation period, the cost to income reached its highest average of 91.21 percent for banks in Nigeria. The MB is a specialized financial institution that undertakes financial intermediation business in housing financing. Given the same circumstances, MBs' PR will be similarly affected. Therefore, a high level of cost efficiency must be maintained for improved PR.

Rancière and Tornell (2016), like Nyako (2009) described allocative efficiency as the extent to which resources are being allocated with the highest expected value. Since the mortgage and housing market in Nigeria are characterized by inefficiency, the MB PR measurement is not considered based on the overall market and operational efficiency but based on cost to income level. The lower the cost to income rate the better and the more efficient the MB as argued by Assaf et al. (2012).

What determines the PR of MBs? In literature, there is a consensus that market and operational efficiency contribute significantly to the profit level of small and large banks (Mohsni & Otchere, 2015; Raashid, Rasool and Raja, 2015). Since I focus this study on internal risk factors, I will only consider operational efficiency. Operational efficiency should minimize mortgage default and operational cost. MBs in Nigeria are regarded as small banks for this study because of their balance sheet and risk assets sizes relative to commercial banks.

In measuring the cost and profit efficiency of banks, financial ratios were used by many authors. For example, Kumbirai and Webb (2013) used financial ratios to examine the performance of South Africa's commercial banking sector for the period 2005-2009. They measured the PR, LQ and credit quality performance of five large commercial banks over a five-year period. They determined that overall bank performance increased considerably in the first two years of the analysis but changed significantly from 2007 to 2009 during the global financial crisis. Consequently, falling PR, low LQ and deteriorating credit quality were recorded to have significantly contributed to the poor level of PR recorded. Mlambo and Ncube (2011) used a stochastic frontier model to

determine both cost and profit efficiency of four large and four small South African-based banks. The results of the study show that South African banks have significantly improved their cost efficiency between 2000 and 2005 as the PR was on the increase during the period. A weak positive correlation was found to exist between the cost and profit efficiency.

Ajao and Ogunniyi (2010) examined the efficiency of 13 western banks in Nigeria using Data Envelopment Analysis (DEA). They identified that 25% of the sampled banks were not efficient. This is consistent with the theory underlying the study on PR of MBs in Nigeria. Efficiency level is positively correlated with PR level. The higher the efficiency level, the higher the PR level, all things being equal. Said (2012) carried out a nonexperimental quantitative study to examine whether efficiency changes during the financial crisis of 2007-2009 were different between western and Islamic banks. His study was grounded in conventional economic theory. He used secondary data of small and large western commercial banks obtained from the Federal Deposit Insurance Corporation (FDIC) website. For Islamic banks, data was collected from the Islamic banks and Financial Institutions Information (IBIS) website. Data Envelopment Analysis (DEA) was used to calculate the efficiency of these banks, and independent samples test was used to test the hypotheses. The results indicated that the impact of the financial crisis was different depending upon the bank type. The financial crisis had the greatest impact on the efficiency of small commercial western banks compared to Islamic banks and large western banks. The connection of this study is that large banks with large

deposit liability, given operational efficiency will be more profitable and can absorb market shock better than small banks.

Mlambo and Ncube (2011) used firm-level data to analyze the evolution of competition and efficiency of the banking sector in South Africa. They adopted a three-step estimation approach: They used DEA to measure efficiency; Panzar-Rosse approach to derive the H-statistic for competitive conditions in banking and thirdly, they looked at the role of managerial ability in competition by re-estimating the Panzar-Rosse model, with DEA efficiency scores as an explanatory variable. The findings showed that while average industry efficiency was high, the number of efficient banks fell leading to decline in their PR. Similarly, Raphael (2013) used DEA to estimate the relative efficiency of 58 selected commercial banks in East African Communities of Burundi, Tanzania, Uganda, Kenya and Rwanda from 2008 to 2011. His findings show that most commercial banks in East Africa were operating under a decreasing return to scale. This suggests that their input resources were inefficiently managed, thus resulting in low PR. PR helps to measure the performance of businesses and serves as the base for corporate tax application. Therefore, measuring performance is useful for monitoring, control, processes, and productivity improvement.

Marwa and Aziakpono (2014) evaluated and benchmarked the performance of Tanzanian Savings and Credit Cooperatives (SACCO) using efficiency-profit matrix to distinguish best performers from struggling SACCOs. They used secondary data derived from 103 SACCOs. Data Envelopment Analysis (DEA) was deployed to measure the technical efficiency of the SACCOs and return on assets was used to measure their PR.

The findings indicated that about 61% of the SACCOs were classified under the low efficiency category. Fourteen were highly profitable but had low efficiency scores demonstrating a potential for performance improvement by increasing their efficiency. Shafiee, Sangi, and Ghaderi (2013) extended the methodology used to measure the performance of banks. They observed that DEA methodology as efficiency measurement may not be sufficient especially when time factor is incorporated into the efficiency determination. This was tested in the empirical study they carried out on the Iranian banking sector by incorporating time factor into the efficiency.

In behavioral perspective, if credit expansion is blindly pursued, liquid assets will be invested to grow loan assets for PR. This may lead to a serious LQ gap that may threaten the solvency of any MB. The inability of any MB to honor its maturing obligations on the due date may erode customers' confidence. In severe situations, fire sales may result which may cause a run on the bank. Mohsni and Otchere (2015) in their study on the impact of LQ infusion to banks by government in the post financial crisis era discovered that banks' appetite on the risk-taking behavior of Canadian banks was increased. Pre-financial crisis, excess LQ led to the creation of jumbo mortgage loans and subprime lending that facilitated the financial crisis of 2007 to 2009 (Raashid et al., 2015).

From the foregoing, it is clearly indicated that efficiency is pivotal in the operations of MBs for sustainable PR. LQ risk is a permanent decimal in the operations of MBs in Nigeria. This will remain a pivotal issue until secondary mortgage market becomes functional, effective and efficient. The identified LQ constructs show the

possible extension of the risk to capital, deposit liabilities, cash asset, bank size, and

MGTEFF. Considering all the views of scholars examined, I can say that the null

hypothesis is rejected. The empirical analysis of the NMBs to be sampled may support or

reject this finding as would be espoused in the later chapter.

Asset Quality and Profitability.

The relationship between LQ and PR was empirically examined using 5

constructs as proxies, namely, capital, deposit, cash, bank size, and MGTEFF as shown in

Figure 2. Next is to examine literature to elicit established positions regarding the extent

and the direction of the relationship between AQ and PR. As indicated in Figure 2, I will

use 3 proxies as the constructs for AQ, namely, LS, NPL, and LLP. AQ relates to the

performance of the loan assets of a financial institution as earlier defined. As advanced

by Dietrich (2016), a high rate of mortgage default indicates a low or poor AQ, while low

default rate indicates a high or strong or sound AQ. To maintain an improved PR, a

strong AQ is recommended always as this will indicate a high level of loan performance

with very minimal impairment charges. Lelissa (2014) asserted that the quality of loan

asset portfolio determines the PR of banks.

Mortgage default is the risk that must be proactively envisaged and mitigated as

increase in default rate will undermine PR and could lead to losses. In extreme cases,

bankruptcy or business liquidation may become an imperative option. This is evidenced

by the financial crisis witnessed recently. Many scholars adduced subprime mortgage

lending with the resultant high rate of nonperforming loans as one of the principal causes

of the financial crisis witnessed in 2007 to 2008 (Kim & Ryu, 2015). A poor AQ will

lead to loss in interest income and decline in NIM. Therefore, MB managers must build appropriate risk assurance strategy into their process flow from mortgage origination to maturity in their quest to remain profitable.

Loans size and profitability. The size of loan assets and their quality has been adjudged a major internal determinant of PR in banks (De Jonghe et al., 2015). Laeven et al. (2016) examined the relationship between bank size, capital, and PR. Findings of their study indicate that there is a significant relationship between growth of loans and PR. This suggests that the higher the loan size, the higher the interest income. For MB, expansion of mortgage loans should ordinarily result into increase in interest earnings.

LS has also been used to determine whether a financial institution is big or small. MBs in Nigeria are regarded as small banks because of their total loan portfolio, which CBN reported in 2014 as less than N300billion. Campello and Gao (2017) posited that higher customer concentration leads to increases in interest spread as LS increases. The pursuit of high loan stock may lead to high returns on interest income and high PR as posited by Fernando and Ekanayake (2015). Conversely, Akter and Roy (2017) did not completely agree with this postulation as they argued that high loan stock with poor AQ will undermine the PR. Nevertheless, if LQ and AQ are well managed, it may lead to high spread and high PR as illustrated by Trujillo-Ponce (2013).

The impact of loans growth on interest income for the NMBs is not expected to be significantly different from the position of Laeven et al. (2016). Mortgage loans is the major income head of the NMBs. There are 3 provisions from the revised prudential guideline for the NMBs that underscore the significance of mortgage loans as the major

profit source for the NMBs. The guideline mandates each MB to maintain a prudential

minimum ratio of; 1) 50% mortgage assets to total assets, 2) 60% mortgage asset to

loanable funds, and 3) 25% real estate construction finance to total assets. From this

guideline, a minimum of 75% of the total assets of a MB must be on loans for property

acquisition and construction. Therefore, the larger the size of loan assets of a MB, the

higher the interest income, the higher the PR as posited by Fernando and Ekanayake

(2015). This postulation is without prejudice to the cost of funding the loan assets.

Francis (2013) investigated the determinants of bank PR in Sub-Saharan Africa.

He used unbalanced panel of 216 commercial banks drawn from 42 countries for the

period 1999 to 2006. His findings reveal that PR is determined by variables like growth

in loan assets, operational cost efficiency, growth in banks deposit. This position was

corroborated by Trujillo-Ponce (2013) in his article on empirical analysis of the factors

that determine the PR of Spanish banks. Like Francis (2013), Trujillo-Ponce (2013)

positioned that a large percentage of loans in total assets is positively correlated to high

bank profit. Raashid et al. (2015) used the fixed effect regression model of estimation to

examine the effect of LQ management on Jordanian banks' PR. The main result

demonstrated a positive relationship between efficient LQ management, AQ, and PR. The

emphasis here is on the efficient management of LQ and the efficient management of the

processes of creating mortgages from origination to maturity.

Kelly (2015) examined the Nigeria housing growth and economy diversification.

His findings reveal a national housing deficit of between 17m to 23m in Nigeria, which

posits that a high demand for mortgage loans exist in Nigeria. Many MBs exploit this

housing gap to grow their mortgage assets in pursuit of increasing interest income. MB with high capitalization will have more capacity to originate higher volume of mortgage loans and record higher profit than the one with less capital outlay. Therefore, the Nigerian economy has immense potential for primary mortgage lenders. In the later section of this study, I will empirically determine the relationship between LS and PR of the sampled MBs. The findings may confirm or reject the overarching hypothesis.

Mortgage credit expansion in pursuit of increased PR may be counter-productive in the long run if it results in the creation of a poor AQ. Ozel, Nathanael, Raberto, Teglio, and Cincotti, (2016) in their working paper on the macroeconomic implications of mortgage loans expansion posited that if mortgage lending regulation is relaxed too much by raising debt service to income ratio, mortgage loans creation will be expanded and as such the default rate may be similarly expanded. Many literature on the recent financial crisis identified mortgage expansionary drive which culminated into subprime mortgages lending as the principal cause of the contagious financial crisis that spread across the world like wide fire. Demyanyk and Loutskina (2016) argued that financial liberation, increasing banking competition, shadow banking, and secondary market for mortgages with its abundant supply of capital create insatiable hunger for bankers to create risky mortgage loans that contributed to the deteriorating lending standards. When risky mortgage loans become bad, it erodes PR as a big chunk will be required for provisioning, which will consequently reduce PR, in extreme situations, it may erode shareholders' funds. Therefore, it is important for the managers of MBs to have sufficient capacity in managing efficiently LQ and maintain good AQ for better performance.

Nonperforming loans and profitability. NPLs have attracted a great deal of interest among researchers and policy makers over the years. Many researchers' findings reveal that the recent banking crisis and the global economic meltdown witnessed within the past decades resulted from the recorded high problem loans (Berger et al., 2016; Calem et al., 2013; De Jonghe et al., 2015). NPL is therefore a worldwide issue that affects financial markets' stability and viability of banking institutions (Ongore & Kusa 2013). An increase in NPL would indicate a poor AQ.

There is a consensus in literature on financial institutions performances that NPL undermines PR. The need to manage the processes leading to mortgage loans creation cannot be overemphasized. Most risk management frameworks put more emphasis on AQ. NPL is a major determinant of AQ. Laryea et al. (2016) examined the relationship between NPL and PR of some banks in Ghana. They deployed a panel fixed effect model for the study. The findings revealed that a relationship exists between NPL and PR, and the direction of the relationship is negative, and it is significant. The study conducted by Rajha (2016) on the Jordanian banking sector also expanded Laryea et al. (2016) position and call for the Jordanian banks to embrace a sound corporate governance for effective loan administration.

Demyanyk and Loutskina (2016), in their study of mortgage companies and regulatory arbitrage argued that indiscriminate mortgage loans expansion resulted in increase in loan-related losses. There is a plethora of studies on the contributory factors to the increase in NPL of some mortgage companies. Waldron and Redmond (2014) examined the extent of the mortgage crisis in Ireland and policy responses. The findings

reveal that the property bubble experienced in Ireland in the mid-1990s caused the

collapse of the banking system, property market, and pushed the country into a state of

insolvency as the default rate on contracted mortgages became very high. This is just to

underscore the implication of pursuing expansionary mortgage loans to earn more interest

income without appropriate strategy to manage LQ and mortgage default risk that may

result.

Doyran (2012) examined the determinants of United States Savings and Loans'

PR from 1978 to 2009 using Unit Root Econometrics time series as methodology. The

author used ADF as a statistical test by estimation of least squares trend fitting. The study

highlighted that high leverage and large nonperforming loan ratio (NPL) leads to a lower

rate of return on capital. He also posited that loan ratio has a significant negative

coefficient on return on asset and equity capital. He provided the evidence to support the

postulation that the quality of loan portfolio, rather than the size, affects PR of Savings

and Loans negatively. The positions of Doyran (2012) was expanded on in the later study

conducted by Calem et al. (2013); Berger et al. (2016). Most studies agree with the

Doyran findings that a positive relationship exists between LQ, AQ, and PR.

Every MB must develop an effective risk management framework to lower the

rate of NPL to remain profitable. From the various literature I reviewed, the endogenous

variables like quality of loan packaging, poor underwriting standard, inadequate due

diligence, poor asset valuations, and non- existence of sound corporate governance policy

have been noted to have contributed significantly to the high default rate in most MBs in

Nigeria (Ezema & Orji, 2015; Kabigting, 2011). Special attention must be placed on these factors by the mortgage bankers for effective loan packaging and monitoring.

High capitalization with no sound risk management framework may result in subprime lending with the negative consequences on the PR and long term survival of mortgage banking business. Johnson (2014) argued that the recapitalization may give the banks opportunity to pursue increase in loan stock and make higher interest income in the short run, but in the long run, it may lead to subprime that can threaten the sustainability of the business. The success of the recapitalization exercise of the Nigerian financial institution led to reckless loan creation which increased toxic assets of banks (Makinde, 2012). Johnson (2014) opined that mortgage default is a major factor for the liquidation of some MBs in Nigeria. Johnson (2014) position was supported by Bala, Bustani, Kuroshi, and Madawaki, (2014). Therefore, it is essential to have a good risk management and corporate governance framework in place for a sound and resilient mortgage banking business.

Allen et al. (2015) argued that a sharp increase in the number of delinquencies on subprime mortgages in the United States led to the global financial crisis as the shift from originate-to-hold to an originate-to sell mortgage model resulted in rapid and contagious credit expansion and limbo loans. Agarwal, Amromin, Ben-David, Chomsisengphet and Evanoff (2014) argued that most banks engaged in predatory mortgage lending prior to the financial crisis in pursuit of high interest income. They see predatory lending as another key driver that led to the high mortgage default rate among subprime borrowers which preceded the crisis. The risk of default is present in every mortgage loan. Mortgage

bankers must envisage this at the mortgage origination stage, identify all possible risks of defaulting, and proffer adequate mitigation, or reject the loan application no matter how profitable it may be if the risk of default and the impact, if it occurs, will outweigh the gains expected.

On a behavioral level, the theory of strategic default as earlier stated supported the position that households' propensity to default on mortgages loans repayment even if they can afford to pay occurs when the value of the mortgage exceeds the value of the property on mortgage (Guiso et al., 2013). The survey data to measure the attitude of households to default carried out by Guiso et al. (2013) observed that the willingness to default is affected by both pecuniary and non-pecuniary factors of fairness and morality and the probability of being sued. Conversely, in Nigeria, numbers of other reasons other than strategic, ranging from poor cash flow to prioritization of households needs accounted for defaults.

A racial dimension is introduced in the New York area where Afro-Americans are noted to default resulting in differential treatment of blacks within different census tracts (Warren, 2012). Warren (2012) argued that an unscientific approach in loan appraisal exacerbates differential treatment of mortgage loan requests from different genders, colors and races. In supporting the scientific approach in loan appraisal, Oyedokun et al. (2013) adopted a primary based data in their study of Nigerian banks' lending pattern. They illustrated that default risk is more pronounced where the lender does not use statistical-based model in the loan appraisal and packaging processes. The extent to which this is peculiar to Nigeria was not illustrated. However, resulting from the

perceived risk of default, most MBs in Nigeria use different approaches to determine the character of the mortgagors. The perceived character of the mortgagors is deemed to be very key in the loan repayment obligations, especially in an environment where foreclosure processes take a long closing period that may run into years. Since the demand for mortgage is high resulting from the housing gap, differential treatment between genders, places of work, and relationship with the managers determine the weight of the loan appraisal over the use of a scientific model as illustrated by Oyedokun et al. (2013)

The legal institution to enforce foreclosure is a critical factor in mortgage contracts especially where non-prime mortgages have been created. If the legal institutional framework is weak, long closing period of default related cases may induce default (Johnson, 2014). This is prevalent in Nigeria where foreclosure cases can run into years. Chan, Gedal, Been and Haughwot (2013) argued that after extensive controls, mortgage contracts in environments with poor legal system might still go bad as default rates increase the rate of foreclosures. To minimize this occurrence, the managers must strengthen their mortgage underwriting standard taking into consideration the peculiarity of their environments.

Adeusi, Akeke, Oladunjoye and Adebisi (2014) posited that there is an inverse relationship between financial performance of banks and doubtful loans. Doubtful loans are a major cause of financial illiquidity in financial institutions. Oyewole (2013) proved this with the various tests of the DMBs that there is a significant negative relationship between PR and nonperforming loans. Olanrewaju and Adeyemi (2015) adopted Granger

Causality Technique (GCT) to test the direction of the causality for PR and LQ in some

deposit money banks in Nigeria. They discovered that the result is varied and weak,

reflecting the different levels of risk assumption of the Banks. They concluded that only a

weakly significant unidirectional flow from LQ to PR can be observed in the test.

Loan loss provision and profitability. Gambetta et al. (2016) described LLP and

PR as the amount set aside for possible impairment losses on the loan portfolio of a bank.

It is a prudent way of setting aside from today's profit an amount computed in

accordance with the prudential provision for future probable bad and unrecoverable

loans. If the loan is eventually recovered, it will increase the profit for the year of

recovery as the provided amount is written back to profit. An increase in LLP would

indicate a worsening AQ as advanced by Gambetta et al. (2016). It may also indicate that

the bank is prudent in profit declaration. Jin, Kanagaretnam, and Lobo (2011) illustrated

that a negative relationship exists between LLP and PR. I agree with this postulation

because an increase in LLP indicates that a higher impairment charge is debited to the

income account and as such reduces PR. Therefore, LLP is a key factor in determining

the AQ of any financial institution.

Fernando and Ekanayake (2015) refer to LLP as a tool to mitigate the credit risk

that occurs in banking business as doubtful loans are proactively provided for, although

the provision will ultimately affect the PR of the bank. Gizaw et al. (2015) examined the

impact of credit risk on the PR of some banks in Ethiopia. They use descriptive statistics

and panel data regression model to analyze the archival financial data of the sampled

banks. Their findings reveal that NPL, LLP and capital have significant influence on PR.

This position further buttresses the assertion that a negative relationship exists between LLP and PR. Curcio and Hasan's (2015) investigation on the relationship between LLP and earnings management in the context of the capital adequacy of some Euro Area banks and non-Euro Area banks reveals a negative relationship between LLP and earnings. They however, add another twist on the possibility of banks managers to use LLP for discretionary purposes like income smoothing. From the study of the Nigerian mortgage system, most MBs are interested in minimizing as much as possible the level of provisioning as higher provisioning would indicate poor AQ and indict management of lacking adequate capacity in loan packaging and management. It will also portend a failure or lack of effective enterprise risk management framework.

It is fundamental for any lending bank to cut down its loan portfolio in the face of LQ challenges as a first step disaster preventive measure. This aligns with the study on LQ risk management and credit supply by Cornett, McNutt, Strahan, and Tehranian (2011). Cornett, et al. (2011) submitted that LQ dried up during the financial crisis of 2007–2009 and led to a decline in credit supply. The propensity of MBs to increase loan portfolio is higher when there is no LQ challenge, but the necessity to cut down mortgage loan size becomes imperative when the bank is facing LQ challenges. The banks that rely more on core deposits and equity capital financing are likely to be more resilient than others that rely principally on short term deposit as argued by DeYoung and Jang (2016).

The CBN had at various times increased the share capital requirement for licensed MBs to make the sector resilient. Within 10 years, the capital requirement was increased from ₦100m (one hundred million naira) to ₦2.5b (two billion, five hundred million

naira) and ₦5b (five billion naira) for state and national authorization respectively. However, as the volume of mortgage loans increased in response to an increase in LQ position, the quality of the originated mortgage loans waned. Recapitalization improves LQ and drives the managers of MBs to grow loan assets and shun quality for quantity. Consequently, mortgage default rate increases and the level of provisions charge also increases leading to declined PR.

In a similar vein, Nasiru et al. (2012) examined whether capital regulation addresses the LQ challenge the financial institutions in Nigeria are exposed to. The result of their quantitative correlational study revealed a positive relationship between increase in minimum capital base of banks, and their LQ and asset quantity. However, if there exists no sound risk management framework, although, the recapitalization may give the banks the opportunity to pursue increase in loan stock and make higher interest income in the short run, but in the long run, it may lead to subprime that can threaten the sustainability of the business. The negative fall out of the recapitalization in Nigeria banks led to reckless loan creation which increased the toxic assets of banks. This consequently led to the death of many of the banks. Therefore, it is essential to have good risk management and corporate governance structures in place for a sound and resilient mortgage finance system.

To recap, I have extensively discussed the variables (dependent- PR, and the two independents variables- LQ and AQ) one after the other in relation to the academic and professional work done by many scholars. The relevance of the proxies for the variables were also extensively discussed. I discussed the models, theories, and measurement of the

variables necessary to carry out the test on hypothesis in the later chapter. I examined different points of view of over 120 scholars. I also related this study to previous researches and findings through a comprehensive critical analysis and synthesis of the literature pertaining to the relationship between the variables.

A review of prior studies confirmed that a quantitative research method and panel data regression techniques with time series dimension are standard in the study of banks' PR. It is also established in literature that a statistically significant relationship exists between LQ, AQ, and PR. The direction of the relationship may be negative or positive depending on the manager's capacity to understand how to optimize the relationship. Armed with the relevant information regarding the risk factors and the capacity to put in place appropriate risk management framework, it is evident that MBs may record better performances. It is therefore established here that increased and efficiently managed LQ positions with improved AQ, will have a positive influence on PR.

Gap in Research

There is a plethora of studies on the performances of financial institutions across many countries, including Nigeria. This is because of the critical role financial institutions play in the economic wellbeing of most nations. Most of the studies mainly focus on commercial banks as reflected in this review. The few studies I identified on the Nigerian MBs were concentrated on the external factors like government policies, regulations, unemployment, interest rates, and other macroeconomic indices (Johnson, 2014; Makinde, 2014; Mukhtar et al., 2016; Nwuba, Kalu & Umeh, 2015). Perhaps, this may be the first study to be carried out on the Nigeria mortgage banking system that

focuses mainly on the relationship between two critical internal success factors that must be well managed to reverse the trend of declining PR in the existing illiquid Nigerian mortgage market. The capacity to manage these risks will become a defining success factor for most mortgage bankers.

The findings are expected to provide mortgage bankers and other stakeholder's empirical information on the extent and direction of the relationship between LQ, AQ, and PR of MBs in Nigeria. The information will raise the need for the managers of MBs to put more attention into building an effective risk management framework around credit and LQ risk. Since the empirical examination that will be conducted in the later section of this study will be on the sampled MBs, the findings will be useful to compare the responses of the variables with other existing studies cited here.

Transition

There is a plethora of study on the Nigerian financial institutions with concentration on the commercial banks. Most studies on the Nigerian Mortgage Institutions that I have come across were concentrated on the problems of mortgage penetration caused by government policies, regulations, legal infrastructure, land administration system, funding, and foreclosure; very few studies were found to have focused on the internal limiting factors to the viability of the NMBs. LQ and AQ have been noted as the two most critical areas of concentration for the leaders in the Nigerian mortgage industry to take very seriously in order to strengthen their business viability. This study is the first to take these two variables and evaluate the extent of their

influences on the PR of 16 MBs in Nigeria. This gap is the motivating reason for this study.

In section 1, I succinctly captured the reason for this project in the problem and purpose statement. I explained why I adopted a quantitative approach and stated clearly my research questions and the hypothesis to be tested. The terminologies I thought may be misunderstood were also defined with authorities cited. To stimulate the reader's interest, I elaborately reviewed over 120 related literatures taking into consideration the practices from countries such as South Africa, United Kingdom, Tanzania, Gambia, Ghana, United States, Pakistan, Ethiopia, EU, and Nigeria.

In Section 2, most of the elements in section one was discussed elaborately. The discussion on the research design, the methodology, research instrumentation, population, ethical considerations, data collection and analysis were expanded for improved study validity. Section 3 of this study included the presentation and discussion of the findings and results of the study. The impact of the findings on the performances of the Board and Management of the MBs in Nigeria was espoused and recommendations were made for further study.

Section 2: The Project

This section presents the project and its mechanics beginning with a restatement of the purpose to reiterate the objective of the study. I discuss my role and that of the participants in the process of collecting data. I also justify the research method and design that grounded the study and present data collection instruments and techniques used in collecting, organizing, and analyzing data. This section ends with a discussion on the reliability and validity of the instruments used.

Purpose Statement

The purpose of this quantitative study was to examine the relationship between LQ, AQ, and PR of the NMBs. The independent variables were LQ and AQ, while the dependent variable was PR. The target population consisted of archival financial records of the NMBs with business offices in Lagos and Abuja. The two cities control 82% of the mortgage assets created by the NMBs (CBN, 2014; Makinde, 2014). The information provided enhances the understanding of the mortgage bankers, which may improve their efficiency and in turn the PR of their business. The implications for positive social change that may arise from improved efficiency and PR include the potential to (a) reduce the home ownership affordability gap; (b) promote the worth and dignity of individuals and the communities through slum upgrades; (c) create employment opportunities; and (d) provide improved compensation, training, and better working conditions for employees (Beschorner, 2014; Porter & Kramer, 2011).

Role of the Researcher

Bryman (1995) stated that the role of a quantitative researcher is to test hypotheses. In this study, I developed and tested hypothesis by using a panel data regression model. Kyvik (2013) indicated that a researcher in any research activity must espouse neutrality and eliminate bias in data collection and analysis. My postpositivism worldview dictates that I remain objective and refrain from being influenced by personal, social, or economic pressures that may influence my interpretation of data collected in a specific way. I remained objective in conducting this study and avoided contamination of the data with personal viewpoints. The findings were reported as accurately as possible.

In a quantitative study, especially a nonexperimental quantitative study, the possibility of bias will not be as pronounced as it would be in a qualitative study. Therefore, as an accountant and a banker for over 20 years in a top management position in the mortgage subsector, comprehending the financial data and research variables used posed no challenges. The value of this study is in providing a basis for improvement in mortgage banking business performances. The agents of this improvement are the mortgage bankers. As such, their understanding of the relationship among the variables is crucial. This study provides the relevant information that may improve the understanding of mortgage bankers regarding the relationship between the variables.

Caruth (2013) averred that quantitative researchers rely on the development of empirical measurement instruments and procedures to collect data and arrive at analytical conclusions. In a similar vein, I used financial ratios derivable from the published financial statements of the sampled MBs and statistical tools to analyze the data and test

the hypothesis. Wisdom et al. (2012) argued that in quantitative or mixed methods research, researchers may collect data with little or no contact with the participants. My study was quantitative in nature; as such, I used archival financial data records of some sampled MBs. The records are public documents, available in CBN, the website of the selected MBs, published in the newspapers, and displayed at the offices of each of the MBs in compliance with the regulatory requirements. Consequently, I had no interaction with human participants. The role of a researcher aside from data collection includes adherence to ethical consideration and *Belmont Report* principles of respect for persons, justice, and beneficence (Aluwihare-Samaranayake, 2012; Brakewood & Poldrack, 2013). Individual MB or personnel were not separately identified in this study; as such, I did not use individuals or individual identified data to warrant application of the *Belmont Report* principles.

Participants

The population of interest for this study included the published archival financial records of MBs in Nigeria. Tipton et al. (2014) argued that clarity in specification of sample selection and eligibility criteria improves the reliability and validity of the study. In alignment with this postulation, the sample MBs needed to meet four eligibility criteria. First, it must be a CBN licensed MB. Second, it must have business offices in Lagos and/or Abuja. Third, it must be recognized as an MB with either state or national license. Finally, it must have a full year of published financial statements as a MB from 2009 to 2015. There was no direct interaction with human participants; therefore, there was no need to establish working relationships with the managers of the sampled MBs.

The geographical locations of the MBs were limited to Abuja and Lagos State because of time and cost constraints. Lagos State was the former capital of Nigeria and as the most densely populated state, the economic center of Nigeria. Over 80% of the existing MBs are in these two locations, with Lagos alone having the highest concentration, follow by Abuja. The information from these locations was sufficient to give the study the validity and reliability that was needed.

Most of the MBs have their published financial accounts on their websites. This avenue was explored as one of the sources for the secondary data. All MBs render monthly, quarterly, and yearly reports to the CBN. Some of these reports are expressed in ratios that were very useful for this study. Some of the ratios were adapted from the published financial records of the sampled MBs. LQ ratio, the ratio of mortgage assets to loanable funds, and the ratio of nonperforming loans to total loans are part of the special reports required by the CBN along with the full financial reports. It is mandatory for all MBs to publish yearly in not fewer than two national newspapers their audited financial statements approved by the CBN. Therefore, I found it easy getting these reports from the CBN and the MBs because they are public documents.

Nevertheless, though the data are in the public domain, extra care was taken to protect the confidentiality of the information gathered and the names of the MBs. The data collected was secured with a password on a computer. The hard copies are locked in a fireproof safe for 5 years before they will be shredded, and digital files will be destroyed afterward. Codes were used to identify the banks instead of their names.

Research Method and Design

There are three major approaches at the disposal of researchers, namely

qualitative, quantitative, and mixed method. The choice of quantitative as the apt

methodology for this study was informed by my personal world view, the purpose of the

study, the research question, and the nature of data needed. The study involved the

examination of whether, and to what extent, a relationship exists between LQ, AQ, and

PR of MBs in Nigeria. I employed a quantitative research method and nonexperimental

correlational and panel data design to test the hypothesis formulated in the previous

section. The statistical data are categorized into dependent (PR) and independent

variables (LQ and AQ). The following section provides justifications for the selection of

the research method and the design.

Research Method

Qualitative research is mostly suitable for the exploration of lived experiences, as

posited by Wisdom et al. (2012). In a similar vein, Allwood (2012) argued that a

qualitative researcher follows a constructivist epistemology and explores a socially

constructed dynamic reality through a context-sensitive conceptual framework.

Conversely, I followed a positivist research philosophy, and as such I chose quantitative

methodology over qualitative.

Mixed methods involve both qualitative and quantitative approaches. Caruth

(2013) and Doyle, Brady, and Byrne (2016), posited that a mixed method is useful when

different research questions in a study call for different methods to overcome the inherent

weaknesses of single-method study. Flick (2017) averred that researchers should not

consider mixed methods as a best practice solely because it has capacity to reduce method specific weaknesses, unless the deciding factor relies on ontological compatibility. However, I chose quantitative over mixed methods because the quantitative method was sufficient to answer my research question without exposing my findings to any method-specific weakness.

Quantitative research includes an inquiry into a problem when based on testing a theory composed of variables (Karanja et al., 2013). According to Bryman (1995), quantitative research tests objective theories by examining the relationship among variables using statistical procedures. It provides explanations of predictions and explains causal relationships. Case and Light (2011) inferred that the research questions determine the selection of a research methodology. I answered the research question using numerical data and statistical analysis. Therefore, the quantitative method was best suited for this study.

Quantitative research is the numerical representation and manipulation of observations for describing and explaining the phenomena that those observations reflect (Bryman, 1995). Given the nature of the mortgage industry under study, and the nature of data it generates, no other design could have been more appropriate for this study other than the quantitative method. The quantitative method easily lends itself in developing research questions and hypotheses for examining the significance of the relationship among the three variables. This will consequently help the stakeholders to understand the nature and the severity of the relationships. The findings provide information that may enhance the understanding of the mortgage bankers on the relationships between the

variables and the influence on their PR. Because the independent variables are critical risk factors, the understanding may engender the deployment of effective strategies in managing the severity of the impact on PR.

Research Design

The nature of this study made the use of data panel regression model the most suitable design for this study. Panel data are data collected in respect of a variable or variables on a cross-sectional unit over time with space and time dimensions (Gujarati, 2014). There is the possibility of heterogeneity in panel data because it relates to different firms as in the case of this study (Bonhomme & Manresa, 2015). Therefore, panel data regression models take this heterogeneity into account explicitly by allowing for individual-specific variables (Greene, 2005; Gujarati, 2014).

Panel model is more informative, has greater variability, guarantees less collinearity, gives a higher degree of freedom, and is more efficient as it combines a time series of cross-sectional observation (Elhorst, 2014). Because the panel model employs data on repeated cross-section of observations, it gives information about dynamic changes in the cross-sectional units under investigation (Baltagi, Fingleton, & Pirotte, 2014; Elhorst, 2014; Gujarati, 2014).

The Ordinary Least Square Panel regression model is given by:

$$Y_{it} = b_{0i} + b_i X_{it} + w_{it} \tag{2.1}$$

$i = 1, 2, 3\dots$ N (cross-sectional unit identifier)

$t = 1, 2\dots$ T (time identifier)

$Y_{it} =$ Dependent variable

X_{it} = Independent variable

w_{it} = consist of two error components such that we can re-specify (2.1) as:

$$Y_{it} = b_{0i} + b_i X_{it} + e_i + u_{it} \qquad (2.2)$$

where: e_i is the cross-sectional unit specific factors that influence the dependent variable, and u_{it} is the idiosyncratic factors that affect the dependent variable. They are both time and cross-sectional unit varying. The maximum cross-sectional units are given by *N* and the maximum time as *T*. This gives the panel model a degree of freedom advantage as the sample becomes *NxT*.

The intercepts/effects, b_{0i} are assumed to be random variables with mean value:

$$E(b_{0i}) = b_0 \qquad (2.3).$$

Also, the intercept value for unit *i* can be expressed as

$$b_{0i} = b_0 + e_i \qquad (2.4)$$

i = 1... N

where: $E(e_i) = 0$ and $Var(e_i) = \sigma_e^2$.

Each unit in the sample was drawn from the population of MBs which share the common mean value b_0.

It is assumed that: $E(w_{it}) = 0$,

$Var(w_{it}) = \sigma_e^2 + \sigma_u^2$,

$Cov(w_{it}, w_{is}) = \sigma_e^2 / \sigma_e^2 + \sigma_u^2$

Here, w_{is} came in for unbiasness assumption

The random or fixed effect model (REM) is specified for this study. The REM is viewed as one with which investigators make unconditional or marginal inferences with respect to the population of all effects (Leow & Crook, 2016). There is really no distinction on the *nature of the effect*. It is up to the investigators to decide whether to make inference with respect to the population characteristics or only with respect to the effects that are in the sample. When inferences are going to be confined to the effects in the model, the effects are more appropriately considered fixed (Bell & Jones, 2015; Gujarati, 2014). When inferences are made about a population of effects from which those in the data are random sample, then the effects would be considered random (Bell & Jones, 2015; Greene, 2005)

Econometric test. As a starting point, I investigated the existence of a cointegrating relationship between PR on one hand, LQ and AQ on the other hand. This assumes that the variables considered are integrated. Subsequently, I conducted the Hausman test for random effects versus fixed effects (FEM) to justify the choice of REM or FEM as illustrated by Racicot (2015); Reed and Zhu (2017). The data set consists of a balanced panel of sixteen (16) Nigerian primary mortgage institution for the period 2009 to 2016 on annual basis. The dependent variable is PR and the independent variables are LQ and AQ. These have been adequately elaborated upon in the literature and their measurement explained in the variable construct section.

Model Specification. In line with the foregoing description, the following panel multiple regression model for the sixteen (16) MBs for the period 2009 to 2016 on annual basis is specified thus:

$$ROA_{it} = \beta_0 + \beta_i\Sigma_1^3\, AQ_{it} + g_i\Sigma_1^5\, LQ_{it} + d_t + \alpha_i + U_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$$

(2.5)

$$NIM_{it} = a_0 + a_i\Sigma_1^3\, AQ_{it} + b_i\Sigma_1^5\, LQ_{it} + \lambda_t + r_i + U_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$$

(2.6)

Where:

β_j, g_j, a_j, b_j are vectors of coefficients and β_0, a_0 are intercepts

$i = 1\ldots 16$ and $t = 2009\ldots 2016$

ROA_{it} is return on asset for mortgage bank i at time t

NIM_{it} is net interest margin for mortgage bank i at time t

$\Sigma_1^3\, AQ_{it}$ is vector of asset quality for mortgage bank i at time t

$\Sigma_1^5\, LQ_{it}$ is vector of liquidity for mortgage bank i at time t

d_t is time varying factors which affect ROA

α_i is time unvarying factors which affect ROA

λ_t is time varying factors which affect NIM

r_i is time unvarying factors which affect NIM

U_{it} is idiosyncratic factors which affect ROA and NIM.

Population and Sampling

The population for this study is finite. There are only 32 licensed MBs in Nigeria. Simple random sampling technique (probabilistic sampling) was used to determine the MBs to be included in the study. A G-power sample size calculator was used to determine the required number of observations that give the sample size for the study. A sample size calculation is a critical and fundamental aspect in designing a study protocol (Walum, Waldman, & Young, 2016). Therefore, an ideal study will require a minimum power of 80% as posited by Kline, (2015). The statistical power of a research should ideally be high, suggesting that the study has a high chance of detecting a difference between groups if one exists. If, however, the study proves no difference between groups, the researcher can be rationally confident in concluding that none exists (Akobeng, 2016; Whitley & Ball, 2002).

G*Power is a statistical software package researcher uses to conduct an apriori sample size analysis (Faul, Erdfelder, Buchner, & Lang, 2009). I used G*Power version 3.1.9 software to determine the appropriate sample size for the study. An a priori power analysis, assuming a medium effect size ($f^2 = 0.15$), $\alpha = 0.05$, and 8 predictor variables, identified that a minimum of 89 observations is required to achieve a power of 0.9507.

Tail(s) = Two, Number of predictors = 8, α err prob = 0.05, Effect size f² = 0.15
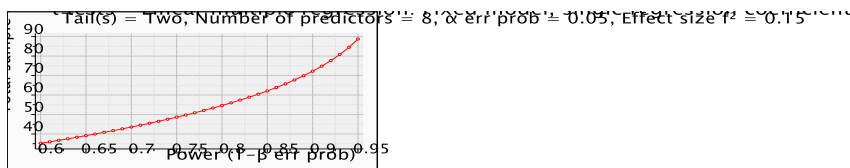
Figure 3. Power as a function of sample size using the free G*Power 3.1.9.2 Software.

Increasing the sample size to 128 observations will increase power to 0.99. Therefore, I sought between 89 and 128 observations to get the required sample size for the study.

Tail(s) = One, Number of predictors = 9, α err prob = 0.05, Effect size f² = 0.15
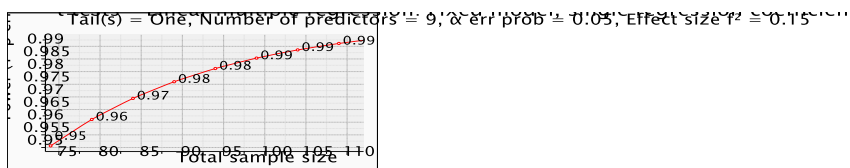
Figure 4. Sensitivity of power to sample size.

The use of a medium effect size ($f^2 = 0.15$) is appropriate for this study. The medium effect size was based on the analysis of Faul et al. (2009) where predictors were the outcome measurements. The historical financial data which are published financial reports of 16 MBs from 2009 to 2016, with 8 predictor variables were used. This gave

128 observations which was sufficient for validity and possible generalization of the findings. This is within the construct of the panel data methodology as it gives room for greater degree of freedom.

Therefore, the sample MBs used were 16 out of the 32 existing MBs in Nigeria. The 16 MBs included all the 10 MBs with national license. In terms of market size, LQ portfolio, mortgage assets, and capital, the 10 MBs with national authorization have over 70% shares of the Nigerian mortgage market, while the remaining 30% is shared by all the 22 MBs with state license (CBN, 2014). The remain 6 MBs were selected base on the availability of full data from 2009 to 2016.

Ethical Research

Ethical compliance is central to successful conduct of any research study. Ahorbo (2014) posited that ethical research involving human subjects are associated with confidentiality, informed consent, and risks. Ethical principles of respect for people, beneficence, and justice are traditionally required of researchers conducting studies involving human participants (Bromley, Mikesell, Jones, & Khodyakov, 2015). Irrespective of the research methodology to be applied, researchers should constantly and actively address every issue of ethical dilemma that may occur during their research. This will indicate that necessary protocols such that elicit respect for human right and dignity are observed.

I used archival financial data records of licensed MBs. The records are available as public documents, as such, consent from the MB is not necessary. The financial records are published annually in at least 2 national newspapers in compliance with

regulatory provisions with serious sanction for non-compliance. The sanction may include revocation of operating license to underscore the public nature of the documents. The records are also available in CBN and on the website of each MB. It is also mandatory for each MB to paste a copy of the abridge financial records in all their branch offices. Therefore, consent from the MBs are not necessary.

Dunn, Sheehan, Hope, and Parker (2012), posited that studies involving only secondary data require very minimal ethical considerations if the data is publicly available and retrievable with relative ease. Since this study does not involve direct contact with human subjects and the names of the MBs are not necessary, the potential for ethical threats is very minimal. Irrespective, I used numerical codes to identify each of the sampled MBs. Upon conclusion of the data analysis, I transferred all data from my computer to a password protected Universal Serial Bus (USB) flash drive. I stored and secured them in a fireproof safe for 5 years before the storage device is destroyed. I will provide a summary of key findings to any interested parties upon request.

Data Collection Instruments

Turner et al. (2012) averred that all quantitative researchers must carefully develop the measurement of their research constructs for validity. Engberg and Bergen (2012), argued that measurement involves the operationalization of constructs and the application of instruments to quantify the variables. I require secondary data for in-depth analysis of the variables. The secondary data was collected as presented by each MB in its various published annual financial reports.

I wrote letters, review documents, and used financial ratios as data collection instruments. This is justified because the data are exclusively historical archival data. Secondary data are data collected by another person other than the researcher and they are available as information for a specific purpose different from the purpose of this study. Nwangi (2014) posited that secondary data provide large and high quality database that would be difficult to collect through individual researchers as is the case with primary data.

I wrote letters to all the sampled MBs, the CBN, and the Mortgage Banking Association of Nigeria (MBAN) requesting for specific financial information relating to LQ, non-performing loans, and profit they published from 2009 to 2016. MBAN is the umbrella body for all licensed PMBs in Nigeria. Thus, it keeps valuable information of the members for periodic analysis of the sector's performances. I requested for specific information from the published financial statements of MBs in Nigeria from 2009 to 2016. A copy of the data collection instrument used was listed as Appendix A.

The CBN requires all MBs to publish their approved financial statements yearly in at least 2 national newspapers. The MBs are also mandated to render monthly, quarterly, and yearly returns to the CBN. Thus, the data is readily available. The financial statements include the statement of assets and liabilities, statement of comprehensive income, notes to the accounts, and a host of other mandatory disclosures. MBAN also mandated all MBs to submit annual reports approved by the CBN to the association yearly. MBAN also keeps records of mortgage portfolios, performing and non-performing loans of all MBs in its research and development unit. I used all these

channels to collect the data required for the study. The data was extracted and converted into ratios to properly fit for the multiple regression model chosen to answer the research questions and to test the hypothesis.

The financial reports are appropriate and adequate sources of information to measure the constructs of the variables (LQ, AQ, and PR) for various reasons. First, the financial statements must be audited by an external auditor for completeness and accuracy. An opinion must be expressed by the external auditor to indicate whether there is material misstatement or not. This is a third-party attestation that the reports reflected the true position of the financial affairs of the MB. Second, archival records enable the researcher to examine the phenomenon in the context of action that had already taken place. Third, the financial records reveal a trend analysis which provides inputs for business decision making.

Fourth, the financial statement is prepared in accordance with the international financial reporting standards (IFRS). As such, part of the records provided must include (1) the statement of comprehensive income where some of the financial ratios for the constructs of PR and AQ were computed, (2) the statement of financial position where some of the financial ratios for the constructs of LQ were computed, and (3) the notes to the financial statements that offer more explanations for the figures was readily useful in computing other needed ratios for the constructs. The documents will be useful in operationalizing the constructs to answer the research question and to test the hypothesis. The variables, constructs, and their measurements are presented next.

Profitability Measures

Apart from the not for profit organizations, businesses cannot survive and remain sustainable without some margin above the break-even level. Profit sustains businesses and rewards investors. Lingenfelter and Block (2014) inferred that profit is a part and parcel of economic freedom and it is the last best chance to fight poverty. I will use 2 constructs for PR. These are NIM and return on assets (ROA).

Net interest margin. NIM indicates how well interest bearing assets are being employed relative to interest bearing liabilities. NIM is a measure of the difference between interest income and interest expense relative to the value of the loan assets (Kapaya & Raphael, 2016). Gill and Biger (2013) measured NIM as a percentage of what the bank earns on loans and other assets in a time minus the interest expended on borrowed funds divided by the average value of the assets on which it earned income in that time. Interest income and interest expense are display in the statement of comprehensive income of each MB's financial statement. Total loan asset is stated on the assets side in the statement of the financial position of every MB and computed as follows:

$$\text{NIM} = \frac{\text{interest income} - \text{interest expense}}{\text{Total loan asset}}$$

Return on assets. ROA is another key ratio that indicates the PR of any bank. Ongore and Kusa (2013) used the ratio of income to total assets as the measurement for ROA. This is one of the most used measurement to determine the performance of banks. This ratio indicates how efficiently the resources of the bank are used to generate the level of income realized as indicated by Schaeck and Cihák (2014). Aprilia, Rohman,

Chariri, and Ghozali, (2016) argued that ROA indicates the efficiency of the management

in generating net income from all the resources of the Bank. In this study, I will take the

ROA as the ratio of PBT to total asset. PBT is taken from the statement of comprehensive

income, while total assets are identified in the statement of financial positions and

computed as follows:

$$ROA = \frac{PBT}{Total\ Asset}$$

Liquidity Measures

Umar and Sun (2016) described LQ as the ability of banks to meet their liabilities,

unwind or settle their positions as the liabilities fall due. Rubio and Carrasco-Gallego

(2016) averred that LQ is the ability of solvent institutions to make agreed upon

payments in a timely period. LQ plays very significant roles in the sustainability of every

business venture.

Bateni et al. (2014) used deposit asset ratio, equity ratio, CAR, and risk assets

ratio in their study on factors that influence capital adequacy ratio in Iranian banks.

Alshatti (2015) used capital ratio, liquid ratio, quick ratio, investment ratio, and credit

ratio as constructs to demonstrate the effect of LQ management on Jordanian banks' PR.

Ilhomovich (2009) in Lelissa, (2014) used cash to DEPRAT as a construct for LQ. In this

study, I used capital, deposit, cash, bank size and MGTEFF as the constructs for LQ.

Bank size. In literature, various methods have been used to determine a firm's

size. Bateni et al. (2014); Calem et al. (2013) deployed a logarithm of book value of

assets to determine a bank's size. Many other scholars used capitalization value or the

market value of equity to determine a firm's size, while others used the size of the

branches and loan portfolio as determinants of a bank's size (De Jonghe et al., 2015;

Laeven et al., 2016; & Mattana et al., 2015). Just like Bateni et al. (2014), I used a

logarithm of total assets as proxy for the size of MBs to bring it near to other variables'

sizes for ease of comparison.

Table 3

The Research Variables, Constructs, and Measurements

Variables	Constructs	Measurements
Profitability (PR)	(1) Net Interest Margin (NIM)	Net interest Income / Total Loans Assets
	(2) Return on Assets (ROA)	Profit Before Tax / Total Assets
Liquidity(LQ)	(1) Capital	Tier 1 capital / Total Assets
	(2) Deposit	Total deposits / Total Assets
	(3) Cash	Total cash/cash equivalent / Total Deposit
	(4) Bank Size	Logarithm of assets
	(5) Management efficiency	Total cost / Total Income
Assets Quality (AQ)	(1) Loan Size	Total Loans / Total Assets
	(2) Nonperforming Loans (NPL)	NPL / Total Loans Assets
	(3) Loan Loss Provisions	LLP / Net Loans

Capital. Ongore and Kusa (2013) referred to a bank's capital as bank's owned

fund available to support the business and act as a buffer in case of adverse situations.

The bank's capital is the lowest cost of stable funds available for the bank's operations.

As illustrated by Lartey et al. (2013), a bank's capital serves as a LQ buffer and it

strengthens the institution to withstand financial shocks. I used the ratio of equity capital

to total assets model as a measure of capital. Equity capital is the addition of paid up

capital, preference shares, and reserves. Equity capital was adapted from the statement of

financial positions under the shareholders' funds as follows:

$$\text{Capital ratio} = \frac{\text{paid up capital} + \text{preference share} + \text{reserves}}{\text{Total Assets}}$$

Deposit. Deposits are customers' account credit balances with banks. Deposits

form part of the current liabilities in the bank's statement of financial position. Deposits

are demand deposits, call deposits, savings deposit, fixed deposits, mortgage refinancing

inflow, mortgage focus deposits, and other liability products issued by the MBs. The

deposit classes have different interest rate implications as demonstrated by Alshatti

(2015). The implication of interest rate on profit is outside the scope of this study,

therefore, I will not expatiate further on it. DEPRAT is computed as total deposit to total

asset as used in the study carried out by Qin and Wei (2014), Angelini et al. (2015).

Figures for deposits and assets are displayed in the statement of the financial position of

the selected MBs in their published annual financial reports as follows:

$$\text{Deposits ratio} = \frac{\text{Total deposits}}{\text{Total Assets}}$$

Cash. Cash is the most liquid asset in the bank's balance sheet. The bank's

balance sheet is arranged in order of LQ and cash comes first in this arrangement to

underscore its importance in the structure of a bank's finances. Lartey et al. (2013)

indicated that cash is the most liquid of all the bank's assets. In most financial statements,

it is reported as cash and cash equivalent. This includes cash in the vault of the bank,

credit balances with other banks, and short-term convertible investment. Ilhomovich

(2009) in Lelissa, (2014) used cash to DEPRAT as a construct for LQ. Similarly, in this

study, cash ratio is calculated as the ratio of cash and cash equivalent (balances at hand,

in other bank, and short-term investment) to deposits as follows:

$$\text{Cash ratio} \; = \; \frac{\text{Total cash and cash equivalent}}{\text{Total Deposit}}$$

Management efficiency. MGTEFF is a major, if not the most important internal

key factor that determines the bank's PR. Ongore (2013) in Lelissa (2014) posited that

MGTEFF is one of the complex subjects to capture with financial ratios. Lelissa, 2014;

Mattana et al., 2015). These scholars look at efficiency from the perspective of scale,

allocation, scope, and operational. Scale efficiency refers to the relationship between the

level of output and the average cost (Laeven et al., 2016). In this study, I looked at

MGTEFF from operational efficiency perspective. I used financial ratio of cost to income

in the analysis of the variables as follows:

$$\text{Management efficiency ratio} \; = \; \frac{\text{Total cost}}{\text{Total Income}}$$

Asset Quality Measures

The highest risk facing MBs in Nigeria today apart from LQ risk, is the risk

associated with mortgage loans performance, otherwise referred to as AQ. Dang, (2011)

argued that the risk of non-performing loans is the most vulnerable risk that affects the

performance of banks. For a MB to remain profitable, the AQ must be strong. A strong

AQ indicates high standard where non-performing loans (NPL) is very low and impairment charge is also minimal.

Ongore and Kusa (2013) posited that loan portfolio quality has a direct bearing on a banks' PR. Laeven et al. (2016) argued that low NPL to total loan indicates good AQ. However, the most challenging risk that the bank cannot run away from but must efficiently manage is the possibility of default. AQ is determined by the rate of default on mortgage loan. High default rate is associated with poor quality of the loan assets as posited by Laeven et al. (2016). I used 3 constructs as proxies for AQ.

Loan size. LS refers to aggregate loan stock of a MB in relation to its total assets. Trujillo-Ponce (2013), argued that LS affects the PR of banks as high ratio is an evidence of market penetration and acceptance. In Trujillo-Ponce study on what determines the PR of banks, his findings revealed that the high bank PR during the years he studied was associated with a significant percentage of loans in total assets, a high proportion of customers' deposit, efficiency in origination evidenced by low NPL. In this study, I measured LS as the ratio of loans to total assets as follows:

Loan size =   Loan Assets
                   Total Assets

Nonperforming loan. NPL as a construct of AQ refers to credit risk. It is a potential loss that may arise from the failure of mortgagors to honor their financial contractual obligations to the MB as they fall due (Gizaw et al., 2015). Akter and Roy (2017) referred to NPLs as problem loans. Allen et al. (2015) referred to problem mortgage loans as Limbo loans. They defined Limbo loans as delinquent mortgage loans that have not progressed to resolution. For a MB, it is the aggregate of all past due loan

repayment obligations taken at a period. To measure the AQ regarding NPL, Ongore and

Kura (2013) used the ratio of NPL to total loans. I adopted a similar approach in my

analysis in the later section. The ratio of NPL to total loan must be indicated in the

financial as mandated by the CBN. This was adapted from the notes to the account in the

annual audited financial statements of the sampled MBs as:

Nonperforming loan = $\dfrac{\text{Total outstanding loans due but unpaid}}{\text{Total Loan Assets}}$

Loan loss provision. LLP is the capital that a bank must set aside to cover

changes in future expected losses on problem loans (Makri et al., 2014). It relates to

provision for impairment losses to the loan portfolio of a bank (Gambetta et al., 2016).

LLP is a charge on the profit and loss account of a bank. Prudential guidelines for the

NMBs as shown in table 2 indicated the parameters for the loan loss classifications and

the relevant required provisions. The provision is prudent ways of preparing for the future

should the loan become bad and unrecoverable. It will reduce profit in the interim, but if

the loan is repaired and paid up, the provision sum will be written back to the profit and

loss account. To determine AQ in relation to LLP, the ratio of LLP will be taken as total

provisions to net loans. An increase in LLP would indicate a worsening AQ. The value

for LLP was adapted from the notes to the account in the audited annual financial

statements. Where this is not indicated, the value of impairment charges in the statement

of comprehensive income was used as follows:

Loan Loss Provision = $\dfrac{\text{Total Loan Loss Provisions}}{\text{Total Net Loan}}$

Data Collection Technique

The secondary data used was extracted from the financial records of the selected MBs in Nigeria. The MBs in Nigeria are concentrated in the urban areas of Lagos and Abuja. Lagos state has the highest concentration with over 60%, closely followed by Abuja with about 30%, while other states of the federation share the remaining 10% (MBAN, 2015). The reason for this is obvious: Lagos was the former federal capital city and the commercial center of Nigeria with the highest number of working population while Abuja is the new federal capital city with a growing population. I concentrated on MBs with business offices in Lagos and Abuja. The total asset base of each bank was considered in selecting the banks for this study. The MBs considered have over 70% of the mortgage market in Nigeria. I used financial ratios to extract the variables from the financial records of the selected 16 MBs. The identity of each participating bank was not disclosed to protect and respect their privacy.

Data Analysis

My interest in this study stemmed from the perception that the specific business problem contributing to the declining PR of MBs in Nigeria relates to inadequate understanding of the importance of LQ and AQ to the declining performances of the NMBs. This perhaps led to latest reports of LQ mix-match and the growing default rate published about the sector by the CBN. The data collected was analyzed to elicit the extent of the relationship by providing answers to the research questions and testing the hypotheses thereof.

The research question was:

RQ: What is the relationship between LQ, AQ, and PR of NMBs? The answer was provided by testing the following hypotheses:

H_0: There is no statistically significant relationship between LQ, AQ, and PR of mortgage banks in Nigeria.

H_1: There is a statistically significant relationship between LQ, AQ, and PR of mortgage banks in Nigeria.

As mentioned earlier, I chose panel regression model as the analytical tool to analyze the secondary data. The nature of this study in relation to panel data motivated me to use this method. I conducted necessary preliminary test on the data to satisfy the assumptions of panel data modeling. In addition, I employed Hauseman test to choose between fixed effect and random effect model while necessary residual diagnostics were carried out on the panel models to ensure they were well behaved in line with assumptions for the method.

I carried out panel unit root test in respect of the data. Financial time series, like any other macroeconomic series are subject to the vagaries of the dynamics in an economy. It is therefore very important to properly analyze such time series before they are employed to build models (Choi, 2001). Accordingly, I tested the time series that was used in this study to determine their order of integration. I ran the Fisher-ADF and Fisher-PP tests, which assume individual unit root processes across banks included in the model (Pesaran, 2012).

I chose Statistical Package for Social Science (SPSS) and Eview software for the analysis of data in this study. SPSS was used for descriptive analysis of the data, while

Eview was used to analyze the panel model and test the significance of the variables in the model. SPSS software was developed in 1968 by Norman H. Nie, C. Hadlai Hull and Dale H. Bent. Eviews was originally developed and distributed by Quantitative Micro Software (QMS) but was acquired by IHS Inc. in May of 2010. They have been severally employed by scholars for data analysis (Kansal & Khurana, 2018; Samitas & Polyzos, 2015; Winarso & Salim, 2017). The choice of these packages over others was informed by their operational simplicity and desired features as they relate to secondary data and OLS methodology.

I used t-statistic, standard error, and probability values from the regression output to judge the partial significance of the independent variables (Goeman & Solari, 2014). The relationships between the dependent and independent variables will be determined by the signs of the coefficients of the independent variables. Usually, a low probability value of less than or equal to 0.05 will suggest that a parameter is significant at 5% and below. The F- Statistic was used to judge the overall significance of the panel model. A low probability (less than or equal to 0.05) of the F-Statistic, is indicative of overall model significance.

Study Validity

Reliability is in respect of stability in terms of the quality of a measurement (Bryman, 1995). The reliability of the data using the OLS model and the accompanying diagnostics strengthen the reliability of this study. Validity can be in terms of external and internal. This study concerns correlation; hence, its internal validity is important.

Also, since the result of this study might be applicable to all MBs in Nigeria, its external validity is sacrosanct.

Validity represents the success in measuring the elements of a study (Bolukbasi & Oktem, 2018). External validity is concerned with the probable generalization of outcomes from a research study to the general populations (Drost, 2011). External validity threats may arise when conclusions drawn from this study are generalized to a larger population. These threats may be particularly high for this study because there are many others micro and macro-economic factors that can influence PR of the MBs, other than the two independent variables behaviors under study. Internal factors like cost to income, management of overheads, issues affecting corporate governance, tenure of CEOs and management quality are all internal factors that can influence the PR of MBs, aside LQ and mortgage default, the subject matter.

Nevertheless, the fulfilment of these assumptions was checked by conducting appropriate tests to ensure internal validity of the OLS model. If any of the OLS assumptions is violated, the procedure for correcting the violation as recommended by the tests will be followed. Inferences was drawn from the OLS model parameters based on their sigs and magnitude as well as their probability values.

Transition and Summary

In Section 2, I restated the purpose statement and provided details of the strategy and methodology for the study. The population of study, the samples taken and how it was arrived at was stated. I considered the sample as sufficient to represent the population. OLS model is specified and justified as fit and proper for the study. Each of

the variables was defined and data collection strategy highlighted. I elaborated on the

data analysis and model specified. SPSS (version 17.0) statistical software was used to

analyze the data.

In Section 3, I used panel data to examine the significance of the impact of LQ

and mortgage default on PR of MBs in Nigeria and gave a summary of the result and

findings. I elicited the application of the results to professional practice and the

implications for social change. Section 3 was concluded with recommendations for action

and for further research in viability of mortgage banking business in a country where

secondary mortgage markets are non-existent.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this quantitative study was to examine the relationship between LQ, AQ, and PR of MBs in Nigeria. Archival financial records of 16 MBs from 2009 to 2016 were extensively analyzed using descriptive statistics and a panel data model to determine the relationship among the variables. The data were collected from the CBN and 31 out of the existing 32 MBs in Nigeria. The outcome of the panel regression models suggested that we cannot accept the null hypothesis because the findings indicated that a significant statistical relationship exist between the variables.

The justification for using a disaggregated multiple variable construct for both the dependent and independent variables as earlier discussed was to reflect the interest of diverse stakeholders in the Nigerian primary mortgage sector. The findings of this study may assist managers in the Nigerian mortgage sector to identify LQ and AQ measures that can promote greater business objective (PR) and social change that may arise from an improved PR as explained in Section 1. This section covers (a) an overview of the study, (b) presentation of the findings, (c) application to professional practice, (d) implication for social change, (e) recommendations for action and further study, and (f) my reflection on the research experience. The section ends with a summary and conclusion for the topic of research.

Overview of Study

In this study, I used a quantitative panel data design within the standard ordinary least square technique (multiple regression) to examine the relationship between the

variables. After ensuring that cases of statistical assumptions were dealt with, I proceeded with the estimation proper. I estimated the two models of PR, NIM and ROA. Model 1 was NIM as a function of LQ and AQ measures, and model 2 was ROA as a function of LQ and AQ measures. The reason for employing the multiple measures approach was because single PR measure would not reflect the diverse interest of stakeholders in the mortgage industry. This position was supported by Manova, Wei, and Zhang (2015). The use of the multiple measures of PR was further illustrated and recommended by Raut, Cheikhrouhou, and Kharat (2017) as being able to make up for the shortcomings of traditional economic measures.

The NIM model was estimated based on the assumption of random effect; that is, other factors that may influence PR aside from the explanatory variables in the NIM model are idiosyncratic. This assumption was tested using the Hausman test and it was not found to be true for both NIM and ROA models (Appendices B and C*)*. Accordingly, I followed the fixed effect specification. The NIM model significantly predicted PR as F $(8, 80) = 2.061$, $p > 0.014$. The effect size measured by R^2 was 0.458, indicating that the model accounted for about 46% of the variation in PR as measured by NIM. Among the five LQ measures, only capital (CAPRAT) and cash ratios (CASRAT) were found to be statistically significant at 5% and 1% (*p = 0.024 & p = 0.001*). CAPRAT and CASRAT also had positive and negative relationship with PR respectively. DEPRAT and bank size (BKSIZ) had positive but statistically insignificant relationships with PR (*p > 0.05*), while MGTEFF had negative but statistically insignificant (*p > 0.05*) relationship with PR.

On the other hand, all the AQ measures had significant statistical relationships with PR as the *p-values* < 0.05. However, the relationship was negative for both loan size ratio (LNSIZ) and NPL. The relationship was however positive for LLP. The ROA model significantly predicted PR as F *(8, 80) = 4.043, p = 0.000*, i.e. *p < 0.05*. The effect size measured by R^2, was 0.624, indicating that the model accounted for about 62% of the variation in PR. Among the five LQ measures, DEPRAT and MGTEFF were found to have positive and statistically significant relationships with PR at 5% and 1% (*p = 0.028 & p = 0.0002*) respectively. CAPRAT, CASRAT and BKSIZ had negative but statistically insignificant relationships with PR ($p > 0.05$).

Meanwhile, for the AQ measures, LNSIZ and LLP had statistically insignificant relationship with PR. Whereas the relationship was negative for LNSIZ, it was positive LLP. However, NPL had a negative significant statistical relationship with PR as $p <$ 0.05.

Dealing with missing data and outliers. Missing data have an impact on the validity of a research work. It is incumbent on researchers to report the degree and causes of missing data and the method deployed to manage it (Leys, Ley, Klein, Bernard, & Licata, 2013). During the data cleaning processes, I eliminated data on any MBs without complete financial records from 2009 to 2016. I sent a data collecting instrument to CBN as the primary source and to 31 out of the 32 licensed MBs, though 16 MBs were intended to be sampled as arrived at through simple random sampling technique in Section 2. This was a strategy to foreclose the case of missing data. It turned out that the preemptive measure was fortuitous as cases of missing data occurred for some of the

MBs, but it was easy to get 16 MBs that had complete data sets. Another issue is that of possible outliers in the data sets that can cause an incorrect estimate of parameters. Leys et al., 2013 expressed that researchers must recognize and correct any sign of outliers to maintain the quality of the data and the estimation of the parameters therefrom. However, the plots of the series employed for this study do not show any sign of outliers in the data sets.

Test of assumptions. In this subsection, the result for the test of assumptions for panel data methodology is presented (Appendices B and C). Traditionally, there are two specifications within which the panel model can be estimated. These are the fixed effect and random effect assumptions. In the case of fixed effects model, inferences are restricted to the cross-sectional units sampled (Clark & Linzer, 2015). The random effect is an appropriate specification if drawing *n* units randomly from a large population (Asparouhov, Hamaker, & Muthén, 2018). The choice between the two specifications is an empirical matter. I followed the Hausman test procedure to make a choice, and I chose fixed effect specification based on the *p-value* of the Hausman test statistic. A *p-value* tending towards zero implies that the researcher should give preference to fixed effect over random effect and vice-versa (Chatfield, 2018).

Residual diagnostics. I conducted diagnosis on the residuals of the panel model regressions and found that the probability of the Jarque-Bera statistic indicate that the panel residuals are nonnormal. However, Sun (2013) studied the robustness of several tests for individual effects with respect to nonnormality of the disturbances. Their findings suggested that the *F* test is robust against nonnormality.

Cross section dependence test. It is commonly assumed that disturbances in panel data models are cross-section independent, especially when the cross-section is large. There is, however, considerable evidence that cross-sectional dependence is often present in panel regression settings. Ignoring cross-section dependence in estimation can have profound consequences, with unaccounted for residual dependence resulting in estimator efficiency loss and invalid test statistics (Ertur & Musolesi, 2017). Because for this study period T is relatively small, I wished to focus on the results for the asymptotically standard normal Pesaran CD. Accordingly, the null hypothesis of no cross-sectional dependence in the residuals of the two models was accepted.

Redundant fixed effect test. The cross-section F and Cross-section Chi-square evaluate the joint significance of the cross-section effects using sums-of-squares (F test) and the likelihood function (Chi-square test) (Beekhuijzen et al., 2017). The test statistic values and the associated p-values strongly reject the null that the cross-section effects are redundant. Based on this test, I conclude that the fixed effect specification for NIM and ROA are not redundant. Coefficient confidence interval test was also carried out and the result indicated that all the coefficients of the variables in the models are within the 95% confidence interval.

Panel model estimates.

Model 1

$$NIM = -0.90 + 2.73CAPRAT + 0.65DEPRAT - 0.089CASRAT + 0.055BKSIZ -$$
$$t \quad (-1.46) \quad (2.32)^{**} \quad (0.76) \quad (-3.36)^{**} \quad (-0.09)$$

$$0.001MGTEFF + 4.572LNSIZ - 4.511NLPRAT + 0.608LLPRAT \quad (3.1)$$
$$(-0.65) \quad (-2.85)^{**} \quad (-5.12)^{**} \quad (-3.16)^{**}$$

$$R^2 = 0.458 \quad \text{F stat} = 2.06 \quad (\text{Prob. F} = 0.0144)^{**} \quad \text{Durbin} \quad - \quad \text{Watson} \quad \text{stat.} \quad =$$
1.760

Model 2

ROA = -0.004 - 0.05CAPRAT + 0.12DEPRAT - 0.002CASRAT - 0.006BKSIZ +
   t   (-0.15)   (-1.21)   (2.26)**   (-1.02)   (-0.16)

      0.001MGTEFF – 0.089LONSIZ – 1.12NLPRAT + 0.032LLPRAT   (3.2)
       (3.95)**   (-1.55)   (-2.12)**   (1.54)

      $R^2 = 0.624 \quad \text{F} = 4.04 \quad (\text{Prob. F} = 0.0000) \quad \text{Durbin} - \text{Watson stat.} = 2.64$

**indicates that the variable is significant at 5% level of significance. The signs taken on by each variable signifies the relationship with profitability

Presentation of the Findings

This section presents the descriptive statistics, preliminary tests, estimated models, and the theoretical linkage of the findings. The research question for this study focused on whether relationships exist between LQ, AQ, and PR of MBs in Nigeria's emerging primary mortgage industry. The hypothesis was that there is no statistically significant relationship between the variables. Prior to testing the hypothesis within the panel data methodology frame, I obtained the descriptive statistics and integration properties of the data, as shown in Table 5, to have a general view of the data and to see if the data behaved well as required by classical ordinary least square technique. The result of the unit root test (Appendix D) suggested that most of the variables are integrated of order 1 and 2 while some are of order 0. This was factored into the specification of the panel model during estimation as can be seen in the estimates in Appendices B, C, and D. The order of integration warranted that the integrated variable be differenced, and this was responsible for some loss in degree of freedom.

Descriptive Statistics

Descriptive statistics avail the researcher with information on important properties of the data in relation to central tendency and dispersion as foundation for further analysis (Bradley et al., 2015). The descriptive statistics for the variables in the models were obtained using SPSS version 23 as shown in Table 4. The result shows that both the mean and standard deviation of the series employed in the study pass the 95% confidence interval test for the central tendency and dispersion statistics. This implies that they are well distributed and have good spread around their mean values.

Summary of the Analysis

The purpose of this quantitative study was to examine the relationship between LQ, proxied by CAPRAT, DEPRAT, CASRAT, BKSIZ, MGTEFF; AQ proxied by LNSIZE, NPL, LLP; and PR, proxied by NIM, ROA of MBs in Nigeria from 2009 to 2016. The model specified was estimated using the panel data methodology based on fixed effect assumption as decided by Hausman test.

Table 4

Mean (M), Standard deviations (SD), and 95% Bootstrap confidence interval (CI)

				Bootstrap*		95% Confidence	
		Statistic	Std. Error	Bias	Std. Error	Lower	
NIM	Mean	.9570	.23262	.0021	.2391	.5167	1.4694
	SD	2.63177		-	.51507	1.50663	3.57012
ROA	Mean	.9570	.23262	.0021	.2391	.5167	1.4694
	SD	2.63177		-.05160	.51507	1.50663	3.57012
CAPRAT	Mean	.396443	.0202796	.000263	.019620	.356211	.436139
	SD	.2294373		-.0004362	.0135317	.2008987	.2556404
DEPRAT	Mean	.259103	0167444	-.000171	.016756	.224982	.291626
	SD	.1894417		-.0006134	.0104289	.1681574	.2096153
CASRAT	Mean	2.926510	4392072	.015843	.426094	2.198379	3.865427
	SD	4.9690625		-.0791268	.8966986	3.1889867	6.6577458
BKSIZE	Mean	3.815080	.0321755	-.001888	.032645	3.744550	3.875749
	SD	.3640247		-.0014179	.0380553	.2909003	.4413127
MGTEFF	Mean	-1.337846	1.1813393	-.008814	1.169552	-3.914278	.496723
	SD	13.3653288		-1.0180205	4.9977758	2.0881386	20.6753875
LNSIZE	Mean	.296533	.0138267	.000102	.014309	.268208	.323412
	SD	.1564309		-.0004495	.0078068	.1402140	.1709613
NPLRAT	Mean	.174032	.0142992	.000036	.014713	.148415	.206739
	SD	.1617766		-.0022571	.0229069	.1143051	.2025662
LLPRAT	Mean	.359747	1487556	.000073	.148212	.151390	.702452
	SD	1.6829781		-	.7847823	.3663141	

Note. *bootstrap results are based on 1000 bootstrap samples. Source: Author's computation,

Model 1: NIM model. As shown in the Panel model estimates, Model 1 significantly predicted PR of the selected MBs as $F (8, 80) = 2.061$, $p > 0.014$. and $R^2 = 0.458$. CAPRAT had positive and statistically significant relationship with PR. Table 5 indicated that CASRAT had negative and statistically significant relationship with PR. The result shows that 1% increase in CAPRAT will cause PR to rise by about 27% while 1% CASRAT will cause PR to drop by about 9%. Two LQ variables, namely DEPRAT

and BKSIZE had positive but statistically insignificant relationship with PR. MGTEFF
had negative but statistically insignificant relationship with PR. The AQ variables were
all statistically significant. LNSIZ and NPL took on the expected signs while LLP took
on an unexpected positive relationship with PR. More loans translated to less profit and
this is corroborated by high rate of NPL.

Table 5

Model 1: NIM Model

Variables	Constructs	Coefficients	P-Values	Relationship	Significance
	Constant	-0.90	0.1472	Negative	Insignificant
	CAPRAT	2.73	0.0242	Positive	Significant
LQ	DEPRAT	0.65	0.4479	Positive	Insignificant
	CASRAT	-0.089	0.0014	Negative	Significant
	BKSIZ	0.055	0.9302	Positive	Insignificant
	MGTEFF	-0.001	0.5197	Negative	Insignificant
AQ	LNSIZ	-4.572	0.0061	Negative	Significant
	NPL	-4.511	0.0000	Negative	Significant
	LLP	0.608	0.0026	Positive	Significant

Drawing from this result, I concluded that CAPRAT plays a key role in the PR of
MBs in the Nigerian mortgage industry. The more the capital base, the more profit the
MBs can make. Also, CASRAT of MBs is a dowsing factor for PR of MBs as higher LQ
holding constraints the PR of MBs. The result from the first model showed that LQ as
measured by CAPRAT, CASRAT, and AQ as measured by LNSIZ and NPL are the most
crucial factors for the PR of MBs in Nigeria. These findings are in conformity with the

positions of Ibe (2013) and Islam and Nishiyama, (2016). In their respective studies, they found LQ management very crucial to banks' PR and supported the postulation that capital adequacy is necessary for banks survival. Laryea et al. (2016) also buttressed the findings as their study revealed that NPL has significant negative impact on PR.

Model 2: ROA. As shown in the Panel model estimates for model 2, ROA significantly predicted profit of the selected PMBs as F (8, 80) = 4.043, $P > 0.00001$, and $R^2 = 0.624$. DEPRAT and MGTEFF had positive and statistically significant relationship with PR, while the other LQ variables, CAPRAT, CASRAT and MGTEFF had negative but statistically insignificant relationship with PR. The result as shown in Table 6 indicated that 1% increase in DEPRAT will cause PR to rise by about 11% while 1% improvement in MGTEFF will cause a marginal PR growth of about 0.1%. The remaining LQ variables, namely CAPRAT, CASRAT and BKSIZ had negative but statistically insignificant relationship with PR. This could be interpreted that CAPRAT, CASRAT, and BKSIZ are not important LQ factors for MBs' PR under ROA model. Furthermore, it suffices to state that CAPRAT dragged down PR of the selected banks by about 5% though this is not statistically significant.

The AQ variables were all statistically insignificant except NPL which is statistically significant. NPL took on a negative relationship with PR. As expected, the result indicated that 1% rise in NPL caused PR to drop by about 12%.

Table 6.

Model 2: ROA Model

Variables	Constructs	Coefficients	P-Values	Relationship	Significance
	Constant	-0.004	0.8823	Negative	Insignificant
	CAPRAT	-0.049	0.2321	Negative	Insignificant
LQ	DEPRAT	0.109	0.0276	Positive	Significant
	CASRAT	-0.002	0.3116	Negative	Insignificant
	BKSIZ	-0.006	0.8726	Negative	Insignificant
	MGTEFF	0.001	0.0002	Positive	Significant
AQ	LNSIZ	-0.089	0.1279	Negative	Insignificant
	NPL	-1.122	0.0389	Negative	Significant
	LLP	0.032	0.1301	Positive	Insignificant

Drawing from this result, I concluded that DEPRAT plays a key role in the PR of MBs in the Nigerian mortgage industry, the more the deposits and refinancing liabilities the MB has, the more profit the MBs can make, all other heterogenous factors held constant. Also, the efficiency of managers of MBs is a key factor for PR of MBs in the Nigerian mortgage industry as higher efficiency can raise their PR. This can be achieved by efficient management of all related operational overhead.

The result from the second model as shown in Table 6 indicated that LQ as measured by DEPRAT, MGTEFF, and AQ as measured by NPL are the most crucial factors for the PR of MBs in Nigeria. These findings are in conformity with the findings of Laeven et al. (2016). Laeven et al. (2016) indicated that systemic risk grows with bank size, while it was inversely related with capital. The findings further extended the positions of Lelissa (2014) on the determinants of Ethiopian Banks' PR in relation to

MBs in Nigeria. Therefore, to tame the profit declining tide of MBs in Nigeria, effective and efficient management of AQ and LQ is of utmost priority.

Theoretical of the Findings

The findings from this study need to be placed side by side with what theory says in terms of the relationship between LQ and PR on one hand, and AQ and PR on the other hand. The underling theoretical framework for this study, as explained in the earlier section is profit theory as propounded by Knight (1942). Knight defined profit as the residual income due to the owners of business. Knight's diary (as cited in Brooke, 2010) used the distinction between risk and uncertainty to further expand the theory of profit and how it can be optimized. AQ and LQ portfolio are the major risk factors in the business of financial intermediation as illustrated by Gizaw et al. (2015). The central concept of the profit theory is the underlie risk which if well managed can improve PR.

Based on the theoretical framework employed, it is expected that optimal LQ and AQ will guarantee optimal PR as illustrated by Gizaw et al. (2015). Specifically, and with respect to the variable constructs for this study, CAPRAT, DEPRAT, BKSIZ, MGTEFF and LNSIZ were expected to take on positive relationship with PR. However, Using NIM as a measure of PR, the signs taken on by CAPRAT, DEPRAT, CASRAT, BKSIZE, and NPL conform with theory, while the signs taken on by MGTEFF, LNSIZE and LLP negates theoretical stance. For instance, it is not theoretically true that higher efficiency leads to lower profit and higher LLP leads to more profit. The expectation was a positive relationship. Ambrose, Conklin et al. (2016) posited that there is a direct relationship between loan size, interest income, and profit. However, the reason for this may not be

unconnected with the rate of interest income to total income in the data used for NIM model. This also suggested that substantial part of the MBs income was not from mortgage lending activities. This was further justified by the findings from ROA model which took on the expected direction of positive relationship. ROA is arrived at after considering all income and all expenses, while NIM only indicated the margin between interest earned on mortgage loans and interest paid on the related deposits used.

Relating the findings from model 2, ROA model, to theory, the positive signs taken on by DEPRAT, CASRAT, MGTEFF, and NPL corroborated the findings already established in literature of banks' performances (Almazari, 2014, Kapaya & Rapheal, 2016). Conversely, the signs taken on by CAPRAT, BKSIZE, LNSIZ and LLP not really contradicted this established theoretical position as portend. It however established the cruciality of MGTEFF in creating and managing quality loan assets. If jumbo loans were created to drive PR and resulted into high rate of default, the negative signs indicated by the constructs should be expected. The findings indicated that most of the MBs have high volume of NPL, that resulted into high LLP which lower their PR.

Extant literatures on the performances of financial institutions indicated an inverse relationship between LLP and PR of financial institution (Cleary & Hebb, 2016; Cuccio & Hasan, 2015). LLP is a conservative measure that set aside certain sum from the profit for loans that are doubtful of recovery. It is always a charge on profit account, which ultimately reduces profit reported in the financial statements. As such, LLP should have a negative relationship with PR. The positive expected sign of CAPRAT indicated a statistically significant relationship with PR under NIM model. It suggested that

enhancing the capital base of MBs in Nigeria has PR prospects. Similarly, MGTEFF for instance, took on expected positive direction that is statistically significant in relationship with PR under ROA model. This means that higher efficiency guarantees greater PR for MBs. In addition, raising DEPRAT, keeping cash ratio low, building up bank size via asset base, reducing the NPL to the minimum possible while raising the loan size and keeping LLP low are very fundamental to raising MBs PR in Nigeria as indicated by the findings from this study

When the composite regression analysis result was considered, it was evident that LQ and AQ have significant influence on PR of MBs. Effective management of these independent variables is a critical success factor to tame the declining PR of MBs in Nigeria. The business leaders in the sector must develop requisite capacity to manage the risk of creating poor AQ and LQ challenges to optimize PR of their business.

Applications to Professional Practice

The purpose of this quantitative study was to examine the relationship between LQ, AQ and PR of MBs in Nigeria. The findings of this study revealed that DEPRAT, CAPRAT, CASRAT, MGTEFF, NPL, and LNSIZ, are significant determinants of PR for the Nigeria's MBs data examined. This applies to professional business practices in several ways.

First, this result presents to the managers of MBs information about the magnitude and direction of relationship between these significant variables and their objective of being in business – PR. The evidence on the relationship between LQ, AQ, and PR will add to the existing body of literature as this is the first study carried out on

the Nigeria mortgage banking sector that will deploy the combination of LQ and AQ to examine how they influence the PR of the sector.

Second, the result showed that those significant LQ and AQ measures influenced PR at different levels within the two models specified. For instance, DEPRAT made great contribution to ROA than to NIM. Also, CAPRAT made great contribution to NIM than to ROA. CASRAT had greater negative effect on NIM than on ROA. In addition, the AQ measures had greater negative effects on NIM than on ROA as measures of PR. In fact, the result showed that NPL is a major bane of PR loss for the selected MBs in the country. Third, these findings suggested that managers of MBs in the country need to focus on LQ and AQ variables and specifically re-evaluated the quality of their asset, hold cash optimally, get more Nigerians to access mortgage facilities, raise deposits, and improve managerial efficiency to plug the declining PR positions some of the MBs are experiencing.

Implications for Social Change

From a social change perspective, the findings may stimulate managers to develop the capacity for efficient processes that may lead to an improvement in housing finance system. The improvement in housing finance system may ignite the value chain activities in the housing sector with the potential of reducing the affordability gap. The implication for social change from an efficient housing finance can also be extended to the inherent potential to promoting the worth and dignity of individuals, and the communities through upgrading of slums and creating employment opportunities.

The findings may also drive a behavioral change in decision making that could lead to optimization in the management of LQ and AQ such that will result in higher PR for the MBs. As the MBs become more profitable, they will have higher capacity and likelihood of investing in community development, education, social infrastructure, and health care programs. Peer and Webster (2016) proposed a leadership model for social change that draws on the citizens, corporates or individuals, to create a community that embraces social change as a shared value and as an inclusive process.

Drawing from this postulation, corporate leaders could make a positive social impact and create shared value using the power of their businesses to solve fundamental social problems. Peer and Webster (2016) also noted that profitable organizations could provide jobs, shared ownership, pay taxes, and contribute to the welfare of the community.

Recommendations for Action

Profit of MBs as per the CBN guidelines should come substantially from interest earned on mortgage loans. To improve PR therefore, it becomes expedient for the business leaders in the industry to increase the size of their mortgage loans. However, indiscriminate increase in the size of the mortgage loans portfolio can result in creating bad quality asset which may be evidenced by high non-performing loan and high loan provisions with capacity to reduce capital, decline PR and on a worse scenario, leading to insolvency. This is evidenced in the findings of this study. Loan size that should have positive relationship took on negative for both models and NPL took a similar pattern. To reduce the vulnerability of the banks to possible insolvency, based on the findings of this

study, I recommend the following four lines of action for the business leaders in the

mortgage sector in Nigeria.

First, the quantum of mortgage loans that can be created should depend upon the

available LQ as supported by the size of the capital. Why is it desirable to drastically

increase the loan assets, short term funds should be avoided in financing long term assets

as funds mis matched may lead to insolvency, loss of reputation, and possible liquidation.

MBs should maintain a reasonable level of LQ to avoid possible vulnerability to market

shocks and other business exigencies.

The findings in the NIM model indicated that capital and deposit have positive

relationship with profit made by the 16 MBs examined, with capital carried a significant

influence. The second line of action I propose for the business leaders in this industry is

to pursue recapitalization and possible long-term debt agenda to improve their capacity to

book more mortgage loans. Mortgage refinancing options can also be leveraged on to

increase mortgage asset than creating jumbo mortgages.

Third, both models indicated that bank size did not have a significant influence on

the profit recorded in the industry. This suggested that each MB can operate efficiently

within the capital and funds available for them and still be profitable. I recommend that

the business leaders in the mortgage sector in Nigeria should develop a robust LQ

management framework such that will determine the maximum level of their exposure to

mortgage loans per time. This should be included in the build of their enterprise risk

management framework.

Fourth, the findings showed that nonperforming loans have negative and significant impact on the profit level recorded in the industry. This suggested that AQ from the MBs was generally poor resulting in declined PR. The business leaders in the Nigeria mortgage sector is advised to develop a robust uniform mortgage underwriting standard detailing the processes of mortgage origination, qualifications criteria for mortgagors, acceptable standard of collateral, and other eligibility criteria that could engender best AQ and improve mortgage loans performing standard.

Recommendations for Further Research

This study was not without limitations. It was limited both in scope of analysis and time available to complete the study. As such, there are several potential avenues for future research and improvements. The importance of LQ and AQ to MBs PR in Nigeria cannot be over emphasized. The decline in the number of MBs in Nigeria over the years was linked to LQ and AQ issues on the account of which some MBs could not breakeven, while some had to exit the market. This study has been able to show, to some extent, that LQ and AQ have expected relationship with PR and that such relationships are statistically significant. However, there is the need to extend the focused independent variables to include other operating expenses and corporate governance to properly situate their influences on the performance of the sector.

Further research may be extended to examine which of these variables is the leading critical factor, the causal relationship between them, and to understand the short run and long run dynamics between and among these variables for a better and vibrant mortgage industry in Nigeria. The mixed methodology may also be deployed for an in-

depth analysis of the causal relationship among the variables. This will be possible in the next few years as the scope of available data on the Nigerian MBs broadens.

The time could not permit the examination of the relationship on individual MB by MB basis which would have elicited individual peculiarities and easy comparison necessary to explain why some were experiencing increase in PR while others profit level are declining. Perhaps, this may account for behaviors of some variables in a way opposing to already established norms and study, like LLP for both models. Therefore, future study is recommended to expatiate on this by focusing on MB's specific factors to espouse their specific peculiarities and responses.

Reflections

I was introduced to the doctoral program by my friend, Nosayaba Ernest Orumwense in 2013, who was also a student then. The initial stages of my studentship were particularly difficult being my first time in on-line academic program. Having Nosayaba within proximity made it easier for me to adjust and integrate as quickly as possible. Nevertheless, I found the program very rigorous, challenging, but enlightening and rewarding. I did not envisage the program would be such demanding in time, energy, and finance. Combining the program with family demand, bad network connectivity most times, and official responsibilities as the chief executive officer was a daunting task leading to delay in completing the program within a reasonable 9000 classes. I had occasionally taken a leave of absence to refresh and align my other responsibilities appropriately. Irrespective, I found the exposure to writing scholarly research paper the most rewarding experiences in the program.

The study entailed an examination of the relationship between LQ, represented by 5 constructs; AQ, represented by 3 constructs; and PR represented by 2 constructs, summing up to 10 variables - 8 independent variables and 2 dependent variables. The 2 dependent variables were the 2 models on which the analysis of the constructs was based. Data collection were not particularly challenging being archival data and being a major operator in the industry. Similarly, getting 16 MBs data was equally seamless because of the strategy I deployed. I got data for 31 MBs but only data from 2009 to 2016 for 18 MBs were found complete for my analysis, of which only 16 banks data formed part of this study. Therefore, all other MBs without complete data and others that failed the test of assumptions for panel design were eliminated. As such, the problem of possible outliers was eliminated which enhanced my understanding of how scholars overcome such challenges.

Through an extensive review of related literature, I was able to identify one important gap. No single academic literature was found to have examined the PR of the Nigerian mortgage sector from the lien of the combination of their LQ and AQ. As such this may be the first academic literature to fill this gap. From the analysis of the constructs of the variables, using two models for PR, I observed that the two models, in some cases, react differently, while some failed to meet my apriori expectations. For instance, under the model 1, NIM model, the findings revealed a negative but insignificant relationship between MGTEFF and PR. This negates the findings of Agbada et al. (2013) on the efficacy of LQ management and banking performance in Nigeria, where among others, revealed a significant positive relationship with PR of commercial

banks in Nigeria. Agbada findings were also corroborated by the findings of Almazari (2014); Alshatti (2015) and Berger et al. (2016). However, under model 2, ROA model, my apriori expectation was confirmed as the relationship was found to be positive and significant.

The reason for the behavior under NIM model may be because of the narrowness in the concept of NIM as a measure of PR. In arriving at NIM, many other cost structures, like overheads, staff cost, depreciation, operating expenses were not brought into the computations, unlike under ROA. The possible big sizes of these other cost structure in relation to interest expense may be the justification for the observed trend under NIM model. On reflection, I learned that notable assumptions may be defeated depending on the concepts used, industry and country's specificities, and the depth of the data used in the examination. Therefore, ROA model gives a better picture of the relationship between the independent and the dependent variables used.

Above all, I also learnt that, at Walden University, students are a learning community where continuous interactions is essential, and where students are guided towards being a positive social change agent to their community. This, I found played a valuable role in the doctoral study process at Walden University. I align with this as a potent positive social change agent that should be inculcated in the academic setting in my country. Presently, I don't see this being given a priority attention in the academic setting in Nigeria.

Conclusion

The imperativeness of this study stem from the need to find evidences for the relationship between LQ, AQ, and PR of MBs in Nigeria in order to provide possible answers to the declining PR some of the MBs are experiencing. The dearth in understanding the significance of the relationship poses a great threat to the efficient management of the inherent risks in mortgage banking business as well as in the attainment of the corporate goals of the banks. The findings of the econometric analysis I deployed indicated that AQ and LQ have significant influence on PR of the MBs in Nigeria. This finding further provided support to the argument that banks with low AQ and poor LQ management are prone to running at a loss (Dagher & Kazimov, 2015; Dietrich, 2016; Fernando & Ekanayake, 2015).

In the constructs of LQ analyzed, the findings revealed that cash ratio, DEPRAT, and MGTEFF are factors that significantly predicted PR. Thus, indicated that the business leaders in the mortgage sector must ensure optimal management of their LQ portfolio to maintain healthy and profitable life. For AQ, the findings also gave reasons why increase in loan size may not always resulted to increase in PR if AQ is impaired by high rate of non-performing loans. The effect of non-performing loan is clear cut with the two models used. It took on the expected sign and was statistically significant suggesting that high NPL results in low PR. As such business leaders in the sector must ensure thorough analysis in originating mortgage loan to improve AQ.

In conclusion, from the empirical evidences adduced, LQ and AQ significantly predicted the PR of the Nigeria MBs. Therefore, it is imperative for the business leaders

in the sector to consider this nexus in the buildup of their enterprise risk management

framework to ensure risk assurance strategies are in place to effectively manage LQ and

AQ for improved PR. The need for the optimization of LQ and AQ for the attainment of

higher PR and other business and social goals is expedient for the leaders in the Nigeria

mortgage sector to consider.

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Appendix A: Data Collection Instrument

Mortgage Banks A1 to P1– Financial Data From 2009 - 2016

S/N	ITEM	2009 N'm	2010 N'm	2011 N'm	2012 N'm	2013 N'm	2014 N'm	2015 N'm	2016 N'm
	INCOME STATEMENT								
1	**Turnover**								
2	**Interest Income**								
3	**Interest Expense**								
4	**Staff Cost**								
5	**Other Operating Cost**								
6	**Depreciation**								
7	**Profit Before Tax**								
8	**Profit After Tax**								
	FINANCIAL POSITION								
9	**Cash in Till**								
10	**Cash at Bank**								
11	**Placements**								
12	**Treasury Bills**								
13	**Receivables (if Any)**								
14	**Total Loans**								
15	**Loan Loss Provision**								
16	**Total Deposits**								
17	**Total Assets**								
18	**Total NPL**								
19	**Share Capital**								
20	**Share Premium**								
21	**Reserves**								

Appendix B: Net Interest Margin Model—Test of Assumptions-

MODEL 1

Dependent Variable: D(NIM)
Method: Panel EGLS (Cross-section random effects)
Date: 01/30/18   Time: 02:27
Sample (adjusted): 2010 2014
Periods included: 5
Cross-sections included: 16
Total panel (balanced) observations: 80
Swamy and Arora estimator of component variances
White period standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.045346	0.286612	-0.158212	0.8747
CAPRAT	1.585854	0.519384	3.053335	0.0032
DEPRAT	-0.253572	0.490188	-0.517295	0.6066
CASRAT	-0.067964	0.021563	-3.151961	0.0024
D(BKSIZE)	0.001126	0.511849	0.002199	0.9983
D(MGTEFF(2))	-0.007989	0.003701	-2.158412	0.0343
D(LOANSIZ)	-4.329594	1.558359	-2.778303	0.0070
D(NPLRAT)	-3.133449	1.264801	-2.477424	0.0156
LLPRATIO	-0.233685	0.078431	-2.979500	0.0040

Effects Specification

		S.D.	Rho
Cross-section random		0.572885	0.3019
Idiosyncratic random		0.871132	0.6981

Weighted Statistics

R-squared	0.162431	Mean dependent var	0.115733
Adjusted R-squared	0.068057	S.D. dependent var	0.882280
S.E. of regression	0.851728	Sum squared resid	51.50629
F-statistic	1.721146	Durbin-Watson stat	1.661351
Prob(F-statistic)	0.108361		

Unweighted Statistics

R-squared	0.148793	Mean dependent var	0.205810
Sum squared resid	66.80056	Durbin-Watson stat	1.280978

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	8	1.0000

* Cross-section test variance is invalid. Hausman statistic set to zero.
** WARNING: robust standard errors may not be consistent with
    assumptions of Hausman test variance calculation.
Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
CAPRAT	2.732215	1.585854	1.121872	0.2791
DEPRAT	0.646819	-0.253572	0.475835	0.1918
CASRAT	-0.088962	-0.067964	0.000235	0.1712
D(BKSIZE)	0.054554	0.001126	0.122260	0.8786
D(MGTEFF(2))	-0.000989	-0.007989	-0.000011	NA
D(LOANSIZ)	-4.571969	-4.329594	0.145048	0.5245
D(NPLRAT)	-4.511252	-3.133449	-0.823502	NA
LLPRATIO	0.608108	-0.233685	0.030928	0.0000

Cross-section random effects test equation:
Dependent Variable: D(NIM)
Method: Panel Least Squares
Date: 01/30/18   Time: 02:34
Sample (adjusted): 2010 2014
Periods included: 5
Cross-sections included: 16
Total panel (balanced) observations: 80
White period standard errors & covariance (no d.f. correction)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.901354	0.614179	-1.467575	0.1478
CAPRAT	2.732215	1.179675	2.316075	0.0242
DEPRAT	0.646819	0.846239	0.764346	0.4479
CASRAT	-0.088962	0.026465	-3.361467	0.0014
D(BKSIZE)	0.054554	0.619878	0.088007	0.9302
D(MGTEFF(2))	-0.000989	0.001527	-0.647827	0.5197
D(LOANSIZ)	-4.571969	1.604223	-2.849958	0.0061
D(NPLRAT)	-4.511252	0.881034	-5.120409	0.0000
LLPRATIO	0.608108	0.192560	3.158021	0.0026

Effects Specification

Cross-section fixed (dummy variables)

S.E. of regression	0.871132	Akaike info criterion	2.80528
Sum squared resid	42.49682	Schwarz criterion	3.51988
Log likelihood	-88.21119	Hannan-Quinn criter.	3.09178
F-statistic	2.061449	Durbin-Watson stat	1.760342
Prob(F-statistic)	0.014373		

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.062624	(15,56)	0.02
Cross-section Chi-square	35.188727	15	0.00

Cross-section fixed effects test equation:
Dependent Variable: D(NIM)
Method: Panel Least Squares
Date: 01/30/18   Time: 03:50
Sample (adjusted): 2010 2014
Periods included: 5
Cross-sections included: 16
Total panel (balanced) observations: 80
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.181523	0.274333	0.661691	0.51
CAPRAT	1.342985	0.668767	2.008151	0.04
DEPRAT	-0.642002	0.462749	-1.387366	0.16
CASRAT	-0.066408	0.031152	-2.131720	0.03
D(BKSIZE)	0.043665	0.548848	0.079557	0.93
D(MGTEFF(2))	-0.008828	0.004717	-1.871317	0.06
D(LOANSIZ)	-4.417777	1.566908	-2.819423	0.00
D(NPLRAT)	-2.851281	1.353613	-2.106422	0.03
LLPRATIO	-0.354634	0.156622	-2.264271	0.02

R-squared	0.159302	Mean dependent var	0.20
Adjusted R-squared	0.064576	S.D. dependent var	0.99
S.E. of regression	0.963969	Akaike info criterion	2.87
Sum squared resid	65.97582	Schwarz criterion	3.13
Log likelihood	-105.8056	Hannan-Quinn criter.	2.97
F-statistic	1.681706	Durbin-Watson stat	1.35
Prob(F-statistic)	0.117931		

Cross Section Effect

1	1.535868
2	0.158126
3	0.102478
4	0.228777
5	0.553972
6	0.467503
7	1.420377
8	0.249176
9	-0.333650
10	-2.294466
11	-0.408280
12	-0.739788
13	-0.189569
14	0.342556
15	-0.469397
16	-0.623683

Residual Cross-Section Dependence Test

Null hypothesis: No cross-section dependence (correlation) in residuals

Equation: Untitled

Periods included: 5

Cross-sections included: 16

Total panel observations: 80

Cross-section effects were removed during estimation

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	194.9282	120	0.0000
Pesaran scaled LM	3.803801		0.0001
Bias-corrected scaled LM	1.803801		0.0713
Pesaran CD	-0.432652		0.6653

Coefficient Confidence Intervals

Date: 01/30/18   Time: 03:59

Sample: 2009 2016

Included observations: 80

Variable	Coefficient	90% CI Low	90% CI High	95% CI Low	95% CI High	99% CI Low	99% CI High
C	-0.901354	-1.928583	0.125874	-2.131703	0.328994	-2.539071	0.736362
CAPRAT	2.732215	0.759183	4.705247	0.369043	5.095387	-0.413401	5.877832
DEPRAT	0.646819	-0.768534	2.062172	-1.048401	2.342038	-1.609687	2.903324
CASRAT	-0.088962	-0.133226	-0.044699	-0.141979	-0.035946	-0.159533	-0.018392
D(BKSIZE)	0.054554	-0.982206	1.091313	-1.187211	1.296318	-1.598358	1.707465
D(MGTEFF(2))	-0.000989	-0.003542	0.001564	-0.004047	0.002069	-0.005060	0.003082
D(LOANSIZ)	-4.571969	-7.255068	-1.888870	-7.785614	-1.358324	-8.849650	-0.294288
D(NPLRAT)	-4.511252	-5.984800	-3.037704	-6.276175	-2.746330	-6.860539	-2.161965
LLPRATIO	0.608108	0.286047	0.930168	0.222364	0.993851	0.094645	1.121570

All coefficients lie within the 95% confidence interval.

Appendix C: ROA Model—Test of Assumptions

Dependent Variable: D(ROA(2))
Method: Panel EGLS (Cross-section random effects)
Date: 01/25/18   Time: 17:50
Sample (adjusted): 2010 2014
Periods included: 5
Cross-sections included: 16
Total panel (balanced) observations: 80
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.009327	0.009512	-0.980523	0.3302
CAPRAT	-0.026078	0.016465	-1.583798	0.1177
DEPRAT	0.077548	0.019290	4.020146	0.0001
CASRAT	0.002626	0.000827	3.175457	0.0022
D(BKSIZE)	-0.076379	0.025481	-2.997541	0.0037
D(MGTEFF(2))	0.001044	0.000227	4.596588	0.0000
D(LOANSIZ)	-0.039482	0.052550	-0.751321	0.4549
D(NPLRAT)	-0.028547	0.042671	-0.668997	0.5057
LLPRATIO	0.010362	0.005878	1.762926	0.0822

Effects Specification

		S.D.	Rho
Cross-section random		0.000000	0.0000
Idiosyncratic random		0.027878	1.0000

Weighted Statistics

R-squared	0.402558	Mean dependent var	0.007416
Adjusted R-squared	0.335241	S.D. dependent var	0.038284
S.E. of regression	0.031214	Sum squared resid	0.069176
F-statistic	5.980008	Durbin-Watson stat	1.835416
Prob(F-statistic)	0.000007		

Unweighted Statistics

R-squared	0.402558	Mean dependent var	0.007416
Sum squared resid	0.069176	Durbin-Watson stat	1.835416

Residual Cross-Section Dependence Test

Null hypothesis: No cross-section dependence (correlation) in residuals

Equation: Untitled

Periods included: 5

Cross-sections included: 16

Total panel observations: 80

Note: non-zero cross-section means detected in data

Cross-section means were removed during computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	139.9812	120	0.1026
Pesaran scaled LM	0.256986		0.7972
Pesaran CD	-0.685072		0.4933

The null hypothesis of no cross section dependence in residuals is accepted for all the test statistics.

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq.	Chi-Sq. d.f.	Prob.
Cross-section random	32.103724	8	0.0001

** WARNING: estimated cross-section random effects variance is zero.
Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
CAPRAT	-0.048857	-0.026078	0.001364	0.5374
DEPRAT	0.109328	0.077548	0.001963	0.4732
CASRAT	-0.001741	0.002626	0.000002	0.0034
D(BKSIZE)	-0.005871	-0.076379	0.000680	0.0068

D(MGTEFF(2))	0.001119	0.001044	0.000000	0.6598
D(LOANSIZ)	-0.088863	-0.039482	0.000546	0.0345
D(NPLRAT)	-0.122355	-0.028547	0.001524	0.0163
LLPRATIO	0.032357	0.010362	0.000409	0.2768

Cross-section random effects test equation:
Dependent Variable: D(ROA(2))
Method: Panel Least Squares
Date: 01/25/18   Time: 17:59
Sample (adjusted): 2010 2014
Periods included: 5
Cross-sections included: 16
Total panel (balanced) observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.004061	0.027296	-0.148789	0.8823
CAPRAT	-0.048857	0.040439	-1.208152	0.2321
DEPRAT	0.109328	0.048320	2.262580	0.0276
CASRAT	-0.001741	0.001705	-1.021000	0.3116
D(BKSIZE)	-0.005871	0.036454	-0.161054	0.8726
D(MGTEFF(2))	0.001119	0.000283	3.951122	0.0002
D(LOANSIZ)	-0.088863	0.057510	-1.545192	0.1279
D(NPLRAT)	-0.122355	0.057839	-2.115457	0.0389
LLPRATIO	0.032357	0.021060	1.536434	0.1301

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.624112	Mean dependent var	0.007416
Adjusted R-squared	0.469730	S.D. dependent var	0.038284
S.E. of regression	0.027878	Akaike info criterion	-4.078617
Sum squared resid	0.043523	Schwarz criterion	-3.364009
Log likelihood	187.1447	Hannan-Quinn criter.	-3.792111
F-statistic	4.042641	Durbin-Watson stat	2.646956
Prob(F-statistic)	0.000010		

The test shows that cross section random effect variance is zero, hence fixed effect specification is better than random effect.

Coefficient Confidence Intervals

Date: 01/25/18   Time: 18:07

Sample: 2009 2016

Included observations: 80

		90% CI		95% CI		99% CI	
Variable	Coefficient	Low	High	Low	High	Low	High
C	-0.004061	-0.049714	0.041591	-0.058741	0.050618	-0.076845	0.068723
CAPRAT	-0.048857	-0.116493	0.018779	-0.129867	0.032153	-0.156689	0.058975
DEPRAT	0.109328	0.028512	0.190144	0.012531	0.206125	-0.019518	0.238174
CASRAT	-0.001741	-0.004593	0.001111	-0.005156	0.001675	-0.006287	0.002806
D(BKSIZE)	-0.005871	-0.066842	0.055100	-0.078898	0.067156	-0.103077	0.091335
D(MGTEFF(2))	0.001119	0.000645	0.001592	0.000552	0.001686	0.000364	0.001874
D(LOANSIZ)	-0.088863	-0.185049	0.007323	-0.204069	0.026342	-0.242213	0.064487
D(NPLRAT)	-0.122355	-0.219091	-0.025619	-0.238219	-0.006490	-0.276582	0.031872
LLPRATIO	0.032357	-0.002866	0.067581	-0.009831	0.074545	-0.023799	0.088514

Residual Cross-Section Dependence Test

Null hypothesis: No cross-section dependence (correlation) in residuals

Equation: Untitled

Periods included: 5

Cross-sections included: 16

Total panel observations: 80

Cross-section effects were removed during estimation

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	154.9154	120	0.0175

Pesaran scaled LM	1.220986	0.2221
Bias-corrected scaled LM	-0.779014	0.4360
Pesaran CD	-0.373995	0.7084

The null of no cross section dependence in residual is accepted for three of the test statistics at 5%.

Cross Section Effect Test

CROSSID	Effect
1	0.013124
2	0.079929
3	-0.020244
4	-0.031738
5	0.026934
6	-0.005045
7	0.013011
8	-0.020906
9	0.069783
10	-0.064259
11	-0.041605
12	-0.013997
13	-0.004075
14	-0.000886
15	0.014963
16	-0.014988

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.200486	(15,56)	0.0172
Cross-section Chi-square	37.069327	15	0.0012

Cross-section fixed effects test equation:
Dependent Variable: D(ROA(2))

Method: Panel Least Squares
Date: 01/25/18   Time: 18:17
Sample (adjusted): 2010 2014
Periods included: 5
Cross-sections included: 16
Total panel (balanced) observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.009327	0.010650	-0.875738	0.3841
CAPRAT	-0.026078	0.018435	-1.414543	0.1616
DEPRAT	0.077548	0.021598	3.590527	0.0006
CASRAT	0.002626	0.000926	2.836107	0.0059
D(BKSIZE)	-0.076379	0.028529	-2.677204	0.0092
D(MGTEFF(2))	0.001044	0.000254	4.105367	0.0001
D(LOANSIZ)	-0.039482	0.058838	-0.671030	0.5044
D(NPLRAT)	-0.028547	0.047777	-0.597504	0.5521
LLPRATIO	0.010362	0.006581	1.574528	0.1198

R-squared	0.402558	Mean dependent var	0.007416
Adjusted R-squared	0.335241	S.D. dependent var	0.038284
S.E. of regression	0.031214	Akaike info criterion	-3.990251
Sum squared resid	0.069176	Schwarz criterion	-3.722273
Log likelihood	168.6100	Hannan-Quinn criter.	-3.882811
F-statistic	5.980008	Durbin-Watson stat	1.835416
Prob(F-statistic)	0.000007		

The Cross-section F and Cross-section Chi-square statistics and their associated P-values reject the null hypothesis of redundant cross section effect.

Appendix D: Panel Unit Root Test (FISHER–ADF Test with Asymptotic Chi square

distribution)

Ariables	Level		First order difference		Second order difference		I(d)
	Constant	Constant + Trend	Constant	Constant + Trend	Constant	Constant + Trend	
NIM	29.1218 (0.6127)	19.9127 (0.9528)	49.5908* (0.0244)	27.5394 (0.6919)	67.6004** (0.0002)	45.4190 (0.0584)	I(1)
ROA	58.8790** (0.0026)	22.4027 (0.8963)	54.8023** (0.0073)	34.9324 (0.3304)	66.2536** (0.0004)	35.3658 (0.3122)	I(2)
CAPRAT	79.8437** (0.0000)	30/7498 (0.5297)	77.9104** (0.0000)	60.1602** (0.0019)	104.483** (0.0000)	60.0113 (0.0019)	I(0)
DEPRAT	66.7006** (0.0003)	27.1519 (0.7106)	53.2299* (0.0106)	36.9112 (0.2522)	73.4035** (0.0000)	42.4902 (0.1017)	I(0)
CASHRAT	54.7039** (0.0075)	42.6958 (0.0980)	88.9113** (0.0000)	52.5395* (0.0125)	100.190** (0.0000)	57.8186** (0.0034)	I(0)
BANKSIZE	192877 (0.9626))	28.0317 (0.6678)	61.9026** (0.0012)	40.0515 (0.1552)	83.5174** (0.0000)	52.0946* (0.0139)	I(1)
MGTEFF	40.0230 (0.1559)	14.6740 (0.9962)	41.9800 (0.1115)	28.7698 (0.6308)	65.6527** (0.0004)	33.8942 (0.3763)	I(2)
LOANSIZE	31.7162 (0.4809)	23.1424 (0.8738)	60.4920** (0.0017)	45.8248 (0.0539)	88.4988** (0.0000)	49.1179* (0.0271)	I(1)
NPLRAT	44.2948 (0.0727)	36.4129 (0.2707)	86.2605** (0.0000)	62.4649** (0.0010)	107.790** (0.0000)	64/0443** (0.0007)	J(1)
LLPRAT	75.2201** (0.0000)	39.1692 (0.1791)	80.3924** (0.0000)	59.9958** (0.0019)	104.820** (0.0000)	68.8272* (0.0006)	I(0)

Source: Author's computations

** & * indicates rejection of the null hypothesis of no unit root at 1% and 5%, levels of significance respectively. Figures in ( ) are probabilities