Determinants of Commercial Banks' Lending Behavior in South Africa

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ABSTRACT

This study is carried out to investigate the factors that determine commercial banks' lending behavior in South Africa. The model used for this study is summarized in South African commercial banks loans to total assets as the dependent variable and other predictor variables such as credit risk, equity risk, liquidity risk, management efficiency, and GDP growth for the period: 2007-2014. Using the panel data model and regression analysis, this research investigates if any relationship exists between the dependent variable and the specified independent variables. Also, it investigates the significant effect of these independent variables to the South African commercial banks' lending decisions. This study discovered that the predictor bank specific and macroeconomic variables used were significant at alpha level 1% and 10% and influences banks' lending behavior. In addition, credit risk, equity risk and management efficiency all have a positive significant influence whilst GDP growth and liquidity risk both have a negative significant impact on commercial banks' decision to lend in South Africa.

Keywords: Commercial banks, credit risk ratio, determinants of commercial banks' lending, GDP growth, South Africa.

ÖZ

Bu çalışma, Güney Afrika'da ki ticari bankaların yatırım davranışlarını belirleyen faktörleri araştırmaktadır. Çalışmada kullanılan model Güney Afrika ticari bankalarında ki verilen kredilerin toplam varlıklara olan oranı bağımlı değişken olarak kullanılıp, kredi riski, öz sermaye riski, yönetim etkinliği ve gayri safi yurtiçi hasıla (GSYH) değişkenleri 2007-2014 yılları arasında açıklayıcı değişkenler olarak kullanmaktadır. Panel veri modeli kullanarak yapılan regresyon analizinde, bağımlı ve bağımsız değişkenler arasındaki ilişkiler incelenmektedir. Ayrıca, Güney Afrika ticari bankalarının borç verme kararlarının istatistiksel anlamlılığı araştırılmaktadır. Çalışmanın sonuçları banka spesifik ve makro-ekonomik değişkenlerin %1 ve %10 alfada anlamlı olduğunu ortaya çıkarmış ve bankaların borç verme kararlarını etkilediğini göstermiştir. Bunlara ek olarak; kredi riski, öz sermaye riski ve yönetim etkinliği ticari bankaların borç verme kararlarında pozitif bir etki yaratırken, GSMH büyümesi ve likidite riskinin negatif etki yarattığı gözlenmiştir.

Anahtar Kelimeler: Ticari bankalar, kredi risk oranı, ticari banka borç verme belirleyicileri, GSYH büyümesi, Güney Afrika

To my parents

Mr Tabila Mbenda Anthony

&

Mme Mbenda Emilia Fembe

ACKNOWLEDGMENT

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LIST OF ABBREVIATIONS

SMEs	Small and medium size enterprise
ATMs	Automated Teller Machines
GDP	Gross Domestic Product
DCs	Developing countries
OLS	Ordinary Least Squares
SARB	South African Reserve Bank
SACCOL	The Savings and Credit Co-operative League of South Africa Ltd

Chapter 1

INTRODUCTION

1.1 Background of the Study

Lending which is considered to be the main function of banks in general and commercial banks, in particular, could be on a short, medium and long-term basis. It is the act of making funds available with the hope of receiving back the principal plus interest payment or/and any other fees imposed on carrying out the transaction. The lender or borrower could be an individual, a public or private group. In recent years after South Africa got its independence on 31/05/1961, commercial banks were very much involved in the banking business transaction. They welcomed deposit of various kinds and at the same time granted loans to lenders in order to encourage and expand their investment ability. Banks make loans and advances to SMEs, individuals and the government for investment purposes and for the possibility for them to engage in activities that will make them grow personally and at the same time boosting up the economic advancement of an economy (Olokoyo, 2011).

Commercial banks are financial institutions that embark in services such as accepting deposits, making business loans and mortgage loans available to their customers. These financial institutions are considered to be the most vital in terms of mobilization, savings and the allocation of financial resources. Most traditional commercial banks have physical locations, for example, brick and mortar institutions with tellers and ATMs. However, it is important to note that other commercial banks

cannot be located physically and their transactions are only carried out through the internet or on a phone.

The path towards achieving rapid economic growth is a major concern for many developing countries in the world, particularly in South Africa. For these reasons, the banking system plays a major role in the economic growth of a country. According to Tobin (1964), money is made available by commercial banks to the lenders in order for them to meet their financial needs and accomplish their activities. Meyer (1998), stated that commercial banks do not only make credit available to SMEs or businesses but in addition, they render fast and quality services in terms of transactions and deposits. According to Panagopoulos and Spiliotis (1998), the main primary role of commercial banks is to act as suppliers and demanders in the production process. That is, they supply loans and obtain deposits from various sector of the economy.

Banks would always want to give out loans irrespective of where they obtain the funds needed to carry out their operations. Nevertheless, it is very important to note that liquidity, solvency, and profitability are the three main elements that direct banks' activities. Commercial Banks' lending decision can be determined by a number of internal and external factors such as; liquidity risk, credit risk, management efficiency, equity risk, the volume of deposit, bank size, inflation rate, required reserve ratio, and GDP growth.

1.2 Statement of the Problem

Banks core activity is to make loans available for the borrower which as well generates income for the banks in return. According to recent researchers, loan

portfolio is considered to be the largest asset and source of revenue for banks. However, Banks do not plow in their entire fund in the main profitable and liquid assets. These assets are very vital as it helps banks to maintain and efficiently fulfill its liquidity obligation to their borrowers (Nwankwo, 2000). Commercial banks in South Africa prefer not to put in their entire fund in this profitable asset (loan portfolio) but would rather save it in order to meet the required cash reserve amount. Several investigations have been carried out by previous researchers to determine the factors that influence commercial banks' lending decision in South Africa.

1.3 Research Questions

1. Is there a significant relationship between commercial banks' lending and bank-specific factors?

2. Is there a significant relationship between commercial banks' lending and macroeconomic factors?

3. Which variables had the greatest impact on the banks' lending decision?

1.4 Objective of the Study

The aim of this study is to find out the factors that determine or significantly affect commercial banks' lending decision in South Africa for a period of 2007-2014. Specifically, it is to determine; the effect of bank-specific factors (credit risk, equity risk, liquidity risk, and management efficiency) on commercial banks' lending.

The effect of macroeconomic factors (GDP growth) on commercial banks' lending.

In addition, to find out if truly cash reserve is an alternative way to maintain banks liquidity. Also, to know if it is possible for a reserve requirement to achieve a contraction in home credit or not.

1.5 Structure of Thesis

This thesis comprises of a total of six chapters. Chapter one is the introduction which consists of the background of the study, problem statement, research questions, the purpose of the study and the thesis structure. Chapter two focuses on the literature review. Chapter 3 discusses the South African banking sector. Chapter 4 shows the data and methodology used in carrying out the analysis. Chapter 5 analyzes the results and findings mention in chapter 4. Chapter 6 presents the conclusion and recommendation.

Chapter 2

LITERATURE REVIEW

The world generally, is experiencing inequality between the poor and the rich when it comes to formal financial services. In the developing countries (DCs) particularly South Africa, the poor people are excluded from the formal financial systems. It is noteworthy that as a result of this exclusion, an increasing number of financial institutions for example commercial banks have been created for the purpose to meet the financial needs of these individuals. However, there are a couple of factors that determine commercial banks' Lending behavior. Several researchers who carried out this study used the panel data analysis and OLS regression model to test and determine the impact of those explanatory variables (liquidity risk, profitability, bank size, interest rate, volume of deposits, inflation rate, credit risk, cash required reserve, gross domestic product and so on) on commercial banks' lending. Their results exhibited a statistically insignificant and/or a significant both positive and negative relationship between commercial bank lending (on either long-term and/or short-term basis) and the explanatory variables. The views of past researchers concerning this study will be discussed in 4 categories irrespective of whether lending was done on a long or short-term basis. First, reasons why commercial banks won't hesitate to lend (Buccheit, (1992); Eichengreen et al, (1998); Kashyap et al (1997). Secondly, the importance of regulatory principles in determining commercial banks' lending behavior (Kunt et al (2008); Kashyap et al (2002); Ahiawodzi and Sackey, (2013); Quintyn et al, (2003); Daniel and Jones, (2007); Bbenkele, (2007);

Kumbirai et al, (2013); Gilbert et al, (2009). Thirdly, the determinants of commercial banks' lending behavior to every sector in the country (Cole, (1998); Chodechai, (2004); Panagopoulos and Spiliotis, (1988); Olokoyo, (2011); Djiogap and Ngomsi, (2012); Tomak, (2013); Malede, (2014). Lastly, the determinants of banks' lending behavior to the private sector (Behr and North, (2012); Imran and Nishat, (2013); Ahiawodzi and Sackey, (2013).

A lot of researchers have displayed their views about possible reasons why commercial banks will not hesitate to make huge credit available to some sector of the country. Also, others talked about the implications that may affect the output and productivity based on the loans or credits given out. Buccheit (1992) in his study based on "Syndicated loans" found out that when commercial banks jointly give out loans to a borrower, they are able to efficiently minimize their cost and manage time. They can better deliberate with the borrower(s) concerning the loan agreement for their various organization. In addition, this paves the way for a constant follow-up of these borrowers to avoid default. Eichengreen et al (1998), believe that commercial banks will not hesitate to give out loans if they can effectively deal with the problem of asymmetric information through constant surveillance. Also, if they are able to mitigate lending risks to a greater extent by diversifying their portfolio assets and maximize their profits. According to Kashyap et al (1997), commercial banks would be willing to lend to individuals whose information are not perfect. This is because these firms will solely depend on the banks for their financial needs. In this case, the banks can exercise their full rights over them and obtain the necessary information to know if they will be able to meet their debt obligation. Moreover, with the information at hand, these banks will be efficient and guided in making good lending decisions.

It is believed that there were no strict rules that standardized the banking practice worldwide not excluding South Africa in particular until the Basel Accord and Basel III became very effective with their norms to be imposed on every country. Banks have implemented several guiding principles in order to effectively carry out their lending activities and many economists and researchers think that it is very logical and important for them to do so.

It's necessary for banks to rightly set up regulatory principles for lending with constant supervision. This greatly enhances the prevention or reduction of a crisis in a country and also helps them to better manage their loan portfolio (Kunt et al., 2008). Lending activities carried out by commercial banks are very risky, and therefore calls for precautionary measures to be undertaken as they are a major driving force for the growth of most countries particularly South Africa. For instance, lending requires obtaining high-cost information concerning non-transparent borrowers and giving out loans on the basis of the information they have (Kashyap et al., 2002).

According to Ahiawodzi and Sackey (2013), banks use different strategies to assess their credit and it is vital for them to consider these guiding rules in carrying out their lending activities. This is because commercial banks do not trust the information they acquire from opaque borrowers who might end up defaulting. Some recent researchers found out that in addition to a political and environmental crisis, the banking crisis is also a major hindrance to the economic growth of countries. One way to tackle this issue is to implement or set up strict rules and regulations to govern banks' lending activities. This policy does not only reduce the cost of the

crisis in a society, but it as well enables banks to better maximize their profits and boost up economic growth (Quintyn et al., 2003).

Daniel and Jones (2007), who carried out a study based on "Financial liberalization and Banking crisis in emerging countries", were of the opinion that some causes of the financial crisis occurred because some banking systems were not well coordinated. They believed that a proper supervision of these banks would have permitted a good number of countries to experience a grace period of minimum risk followed with economic development before the outburst of the crisis. In South Africa, commercial banks do not easily make loans available to SMEs and less privileged individuals in the society. This is as a result of mistrust and it intend makes them set up strict lending policies and regulations because these firms are considered to be prone to default (Bbenkele, 2007).

Kumbirai et al (2013), did a study for the case of South Africa on "Banks' ratio analysis performance" discovered that in the process of meeting up with the 1994 constitutional democracy, the South African commercial banks had to experience series of updates in their regulatory policies. Gilbert et al (2009), supported this view by saying that "the implementation of these rules and regulations for banks was purposely done to bring about the equality across a nonvolatile financial domain and to curb the rising competition costs through regulatory requirements, innovation and new technologies during the financial crisis".

The financial crisis that occurred in recent years, negatively affected every part of the world, particularly in South Africa. Banks were not only reluctant to lend to one another, but became even more unwilling to give out loans to SMEs and individuals.

According to the World Bank report, the GDP growth rate which was 3.2% in 2008, greatly reduced to -1.5% in 2009 as a result of this crisis. Also, the inflation rate which had a stable trend of between 4-7% following the years 2005-2007, later increased to 11.5% in 2008 leaving the economy in a state of depression or recession. Some recent researchers deliberated on the determinants of commercial banks' lending behavior to every sector in an economy. Djiogap and Ngomsi (2012), carried out a study for the period of 2001-2010 on "Factors that influences banks' Lending Behavior in the Central African Economic and Monetary Community on long-term basis". Six countries in the CEMAC zone and 35 commercial banks were considered. Using a panel data analysis, they found out that bank's capital to asset ratio, long-term liabilities, GDP growth and its size were statistically significant. This implies that these variables are taken into consideration by banks in making long-term loans available to firms. They also carried out a multivariate test based on different countries which revealed that banks with inadequate capital, high non-performing loans and small banks functioning in areas experiencing economic decline are very unwilling to lend on long term basis. Olokoyo (2011), examined this topic for the case of the Nigerian Economy for the period of 1980-2005. From her findings, the predictor variables (volume of deposits, investment portfolio, foreign exchange, and GDP) were statistically significant and portrayed a positive relationship with commercial bank lending. This implies that these explanatory variables are very vital for banks' lending decisions to give out loans and advances to borrowers. She suggested that commercial banks in Nigeria should improve their management skills and lending performance by building up new strategies and system that will pull deposits irrespective of its source.

Panagopoulos and Spiliotis (1998), for the period of 1971-1993 also carried out a dissertation on the influencing factors of commercial banks' lending decision in Greece and made use of the panel software analysis and regression model. Their findings exhibited that credit money, money wage bill, and loan customer relation had a strong significant impact on commercial banks' lending behavior in Greece. These researchers asserted that "statistically it is senseless for Greek monetary authorities to keep pressurizing commercial banks to reserve a large percentage of their deposits in risk-free assets such as T-bills". They suggested that the Greek monetary authorities should set the maximum amount of bank's lending rate. Malede (2014), examined the determinants of commercial banks' Lending in Ethiopia over a 6-year period (2005-2011). He applied the panel data analysis and OLS to find out that credit risk, bank size, GDP, liquidity, lending rate and investment were statistically significant and had a positive relationship with commercial banks' lending. He concluded that these explanatory variables greatly influenced banks' lending decisions compared to deposit and cash required reserve which was insignificant. He suggested that commercial banks should throw more light on their credit risk and better manage their liquidity ratio because these variables prevent their willingness to lend. Tomak (2013), investigated on this topic for the case of Turkey starting from the period 2003-2012 considering 18 banks for the sample size. His results showed that GDP and interest rate were statistically insignificant. On the other hand, banks total liabilities, NPL, size and inflation rate were statistically significant and had a positive relationship with commercial banks' lending behavior.

Chodechai (2004), in his study on the "Determinants of bank lending in Thailand" supported Cole's second view about past relationships as a criterion in banks' lending decision. He discovered that when banks have such relationships with

borrowers, they are more confident in accessing the borrowers' privacy concerning their occupations and their financial state at every point in time. Cole (1998), found out that commercial banks, unlike other lending institutions are very unwilling to give out loans. The reason is because during the period of the 1990s these lenders were pressurized by their regulators to make underwriting benchmark or requirement difficult to attain or meet up with. He further stressed that these banks would consider making credit available to firms with whom they have had a close relationship no matter how long. In addition to that, if they are informed about them being the sole providers of financial services to these firm, they will be willing to lend. Loutskina (2011), in her research study on the role of securitization in bank liquidity and funding management she found out that when banks are able to liquidate their loans in order to meet their liquidity needs, they will be more willing to make credit available to borrowers. According to her, since liquid funds and loans are very vital elements of bank assets there is a negative relationship between liquid funds and lending. That is to say, as the former decreases the later increases.

This paragraph discusses the view of researchers under category 4 as specified in the 1st paragraph above. Behr et al (2013), carried out investigations on "Financial constraints of Private firms" and discovered that banks' lending behavior are influenced by soft information based on the quality of the borrower and continuous lending relationship. Ahiawodzi and Sackey (2013), investigated the rationing behavior of some commercial lending in Ghana. Their results displayed that experience, security value, sex, net profit, purpose, and age were significant in determining the amount of loan given out. Similarly, Imran and Nishat (2013), empirically identified "Commercial banks credit lending in Pakistan" for the period 1971-2010. From their findings domestic deposits, exchange rate, foreign liabilities,

greatly influenced banks' lending decisions to the private sector in the long run. Inflation has an insignificant role in the long run. Also, domestic deposits in the short run do not apply with private credit because banks do not loan from the current account deposit.

Chapter 3

SOUTH AFRICA BANKING INDUSTRY

3.1 South African Economy

South Africa ranks the second largest economy in Africa after Nigeria with a population of fifty-four million people. A well-capitalized banking and good regulatory systems have been one of the driving force behind the country's economic growth. South Africa is classified the upper-middle income economy as recorded by the World Bank. The 2008 financial crisis negatively impacted the South African economy as its financial sector was left in a great mess. According to the World Bank report, the GDP growth rate which was 3.2% in 2008, greatly reduced to -1.5% in 2009 as a result of this crisis. Moreover, the inflation rate which had a stable trend of between 3% and 7% following the years 2005 to 2007, later increased to 11.5% in 2008 thereby leaving the economy in a state of depression. In addition to the financial sector, other economic sectors which also contributes to the economy's GDP includes; agriculture and fisheries, mining, vehicles manufacturing and assembly, wholesale and retail trade, clothing and textiles, transportation and food processing. This country is one of the world's leading economy in the mining sector in exporting goods such as chromium and platinum. Exports in South Africa greatly contributes about 65% of the country's GDP and it remains an outstanding fact even with a decrease in its supply to the national GDP from 21% to 6% following the periods 1970 and 2011 respectively. South Africa's main trading countries are

Germany, US, India, China, and Botswana. On average it has generated 15015.29 million ZAR from the period 1957-2016.

Looking at the data in table 1 below, the rate of unemployment in South Africa from the past decades until recently has been increasing steadily. This increasing rate which slows down the growth of the country has been enhanced by some drawbacks such as inadequate skilled labor, frequent strikes that put most businesses on a halt, and lack of competition which often leads to the expansion of some businesses.

Table 1: South Africa Macro Economic Indicators

Year	Inflation rate %	GDPgrowth rate %	Interest rate % (lending rate)	Per capita income in US$	Unemployment rate %
2005	3.4	5.3	10.6	4554	23.8
2006	4.6	5.6	11.2	4701	22.6
2007	7.1	5.4	13.2	4990	22.3
2008	11.5	3.2	15.1	4505	22.7
2009	7.1	-1.5	11.7	4795	23.7
2010	4.3	3.0	9.8	5964	24.7
2011	5.0	3.2	9.0	6493	24.7
2012	5.7	2.2	8.8	6134	25.0
2013	5.4	2.2	8.5	5549	24.6
2014	6.4	1.5	9.1	5224	25.1

Source: World Bank Data 2014

The inflation rate in South Africa gradually experienced an increasing trend until it reached its peak in 2008 with a rate of 11.5% as a result of the financial crisis and later decreased thereafter. Also, GDP growth fell to 3.2% in 2008 and was at its lowest in 2009 exhibiting a growth rate of -1.5% due to this crisis which negatively affected every part of the world. During this period, the South African government ran into huge budget deficits amounting to 26.0% in 2008. In 2006, the foreign debt of the national government was just 12.7% of its total debt while the other 82.3% is traced from the domestic market. Following the period 2005-2014, per capita income of the country has been growing gradually and it was at its highest in 2011 and 2012

with an amount of 6493$ and 6134$ respectively. The lending rate for the above period of time has been increasing until 2008 where it reached its maximum (15.1%) and started falling back steadily thereafter.

3.2 The South African Banking Sector

Banks play very vital role in the advancement of any country by making funds available to borrowers who can be both the government and private sectors. Banks in South Africa are classified under foreign-controlled banks, locally controlled banks, Mutual banks and banks in liquidation. The Central Bank of South Africa is the monetary authority that regulates the banking sector of the country. Big banks such as FirstRand bank, Standard bank, Absa, Investec, and Nedbank have their location in Cape Town, Durban, and Johannesburg for the purpose of creating a stable financial economy in all regions of South Africa. In 2003, South Africa had 22 commercial banks, 17 banks were locally controlled, 2 mutual banks and the number of foreign banks with local branches were 15. Currently in 2015, as reported in the SARB statistics, the number of commercial banks amounts to 16 (10 are locally controlled banks and 6 are foreign controlled banks). Also, there are 3 mutual banks, 15 branches of foreign banks, 38 foreign banks with the recognition of local representatives, 2 banks in liquidation which are Islamic Bank Limited and the Regal Treasury private Bank Limited. According to the Regulatory Act, all banks registered under the SARB, are allowed to receive deposits whereas Savings and co-operatives and credit unions controlled by SACCOL (The Savings and Credit Co-operative League of South Africa Ltd) are restricted from these deposits.

Table 2: List of registered banks under the SARB

No.	BANKS	CATEGORY	DATE OF ESTABLISHMENT
1	FIRSTRAND BANK	Domestic	1998
2	INVESTEC BANK	Domestic	1974
3	ABSA BANK	Foreign	1991
4	NED BANK	Domestic	1888
5	CAPITEC BANK	Domestic	2001
6	STANDARD BANK OF S.A	Domestic	1962
7	AFRICAN BANK LIMITED	Domestic	1998
8	GRINDROD BANK	Domestic	1994
9	MERCANTILE BANK	Foreign	1987
10	SAFIN BANK	Domestic	1951
11	BIDVEST BANK LIMITED	Domestic	2000
12	HABIB OVERSEAS	Foreign	1941
13	ALBARAKA BANK	Foreign	1989
14	HBZ BANK LIMITED	Foreign	1995
15	UBANK LIMITED	Domestic	1975
16	S.AFRICA BANK OF ATHENS	Foreign	1947

The three mutual banks include;

➢ FINBOND MUTUAL BANK established in 2003

➢ GBS MUTUAL BANK established in 1877

➢ VBS MUTUAL BANK established in 1982

Banks generally exhibit distinct characteristics which go a long way to enhance the rapid development of countries worldwide. They render fast and quality services in terms of transactions and deposits. Their role as financial intermediaries enhances the production process of any given country by supplying loans and demanding deposits from every sector of the economy. The South African banks recorded under the SARB in 1994 amounted from 36 to 45 in the year 2000. Following the period 2001-2002 the number of small domestic banks drop due to privatization by larger banks and other banks like Mc Cathy bank, Mercantile Lisbon bank, the Imperial bank merged in order to maximize their profits. Other banks such as Royal treasury and Corpcapital banks were eliminated because they exhibited impecunious financial outcomes.

According to (SARB 2008 REPORTS), the financial sector of South Africa was able to stand its ground even with the fact that the economic growth of most countries and financial markets were affected by the outbreak of the turmoil that occurred in 2008. Some statistics recorded for 2008/2009 were as follows;

✦ The banks' total assets for September 2008/2009 were 2936Rbn and 3000Rbn respectively with a 2.2% growth rate.

- Both the capital-adequacy ratio and the tier 1 capital adequacy ratio exhibited an upward trend. The former had a rate of 12.7% and 13.9 % and the later 10.0% and 11.0% for the years 2008/2009.

- The Return on assets and Return on equity by January2009 to September 2009 drop from 1.2% to 1.0% and 20.7% to 16.7% respectively.

- The financial leverage ratio for September 2008/2009 decreased from 17.8% to 16.5%.

3.3 The Regulatory Authority

South Africa's financial sector is not only monitored by banks but by other three main regulatory authorities such as the Central bank of South Africa also known as the SARB (South African Reserve Bank), the Financial Services Board and lastly the National Credit Regulator.

3.3.1 The Central Bank of South Africa

This bank was put into place on the 30/06/1921 and it is the most advanced bank in terms of existence (advanced in years) in the whole Africa. The SARB was the first bank to publicly make banknotes available on the 19th of April 1922 without the need of turning these banknotes into gold as done by the commercial banks in the past. A drawback about this bank concerning share ownership is that no shareholder is allowed to have above 100 lots (10000shares) alone. The SARB performs the following functions;

- The South African Reserve Bank helps in making necessary statistics available to the government for the creation of policies that will benefit the economy.

- When commercial banks are unable to meet the immediate cash needs of their customers, the central bank being their last option helps to solve this problem.

- Makes sure banks are in good shape and are able to effectively satisfy the public demands of the country.

3.3.2 The Financial Services Board

The FSB comprises of a set of persons solely hired to monitor and control the South African financial services firms (capital markets, retirement funds, Lloyd's correspondents) excluding banks in favor of the community. The Financial Services Board was created in 1991 and it helps in solving challenges faced by customers who are not satisfied and complain about their financial services.

3.3.3 The National Credit Regulator

NCR, as it is commonly referred to in South Africa is in charge of monitoring the credit firm in the economy. The National Credit Regulator was created under the National credit Act 34 of 2005 and engages in developing policies, handles the enrollment of credit providers, ensures the empowerment of the Act, educate and guides the government on policy and legislation issues.

Chapter 4

DATA AND METHODOLOGY

4.1 Data Collection

This research is carried out to investigate the factors that determine commercial banks' lending behavior in South Africa. Seven domestic and four foreign-controlled banks will be considered summing up to a total of eleven banks used for the study. The financial statements and ratios of these sampled banks were developed under the International Financial Reporting Standards (IFRS). Data of the variables were obtained from the World Bank, the bank scope and the Central bank of South Africa for the period starting from 2007 to 2014.

Table 3: Banks List

Domestic Banks	Total Assets (mil ZAR/2014)	Foreign Banks	Total Assets (mil ZAR/2014)
Standard Bank of South Africa	1131150	Absa Bank	814061
FirstRand Bank	851200	South African Bank of Athens	2284
Ned Bank	753444	Habib Overseas	1207
Grindrod Bank	9256	Mercantile Bank	8384
Safin Bank	6366	African Bank Limited	49502
GBS Mutual Bank	1018		

4.2 Specification of the Model and Description of the Variable

4.2.1 Specification of the Model

The model used in this study is summarized in a sample of eleven South African Commercial banks and the analysis of these banks will be done considering the loans to total assets as the dependent variable, while the bank-specific and macroeconomic variables will be considered as the independent variables. The demonstration of this predicted variable and predictor variables can be seen below as follows;
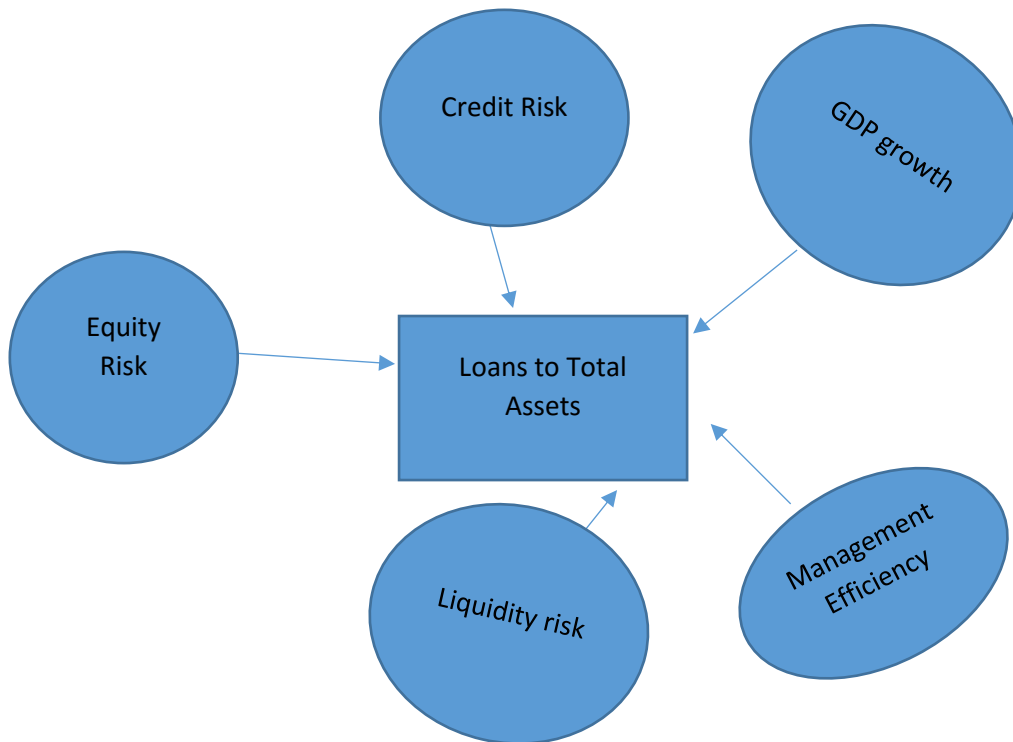
Figure 1: Controlled variables for Loans to Total Assets

Looking at the table above the rectangle in the middle is the predicted variable (Loans to total assets) and the five oval shapes enclosing it represent the predictor variables which are Credit Risk, Equity Risk, Liquidity risk, Management Efficiency, and GDP growth.

4.2.2 Description of the Variables

Loans-to-Total Assets

The loans to total assets ratio is the dependent variable used in this study and it measures the total loans outstanding as a percentage of total assets or the percentage of the assets that is attached to loans. When this ratio is high, it implies that a bank is loaned up or they have less excess reserve and its liquidity is low. The higher the ratio, the riskier a bank may be to higher defaults or is likely to experience bad debts from its borrowers and the less liquid it is. The proxy used to determine this ratio is the Net loans/Total Assets.

Credit risk ratio

Credit risk is a risk of default on a debt and it occurs when borrowers fail to make required payments or cannot meet up their loan repayment or borrowed fund. This risk occurs from traditional lending business (commercial lending which includes financial guarantee contracts and loan commitments) and trading activities such as securities. Credit risk depends on both the internal and external factors. Examples of some external factors include; competition and market conditions, interest rates, legislation and regulatory changes, exchange rates and technological advancement. Country risk is one type of credit risk among many that usually occurs from the social, political and economic environment of where the borrowers' live or their country. The measurement of credit risk ratio that will be used in this study is the Loan loss reserve/Gross loans which is a reserve for loan losses indicated as a percentage of total loans. A negative relationship is expected between credit risk ratio and banks' lending because the more borrowers fail to repay their debt obligations, the more banks are unwilling to lend or give out loans.

Equity or capital risk ratio

Equity or capital risk is the financial risk involved when equity is held in a specific investment of which the investor may lose all or part of the amount of capital invested. This ratio is sometimes known as the net worth to total assets ratio and it measures the amount of a firm's assets financed by investors. In addition to the information it gives about the firm's solvency position, it communicates the shareholder's funds to total assets. The capital of a bank represents the net worth of the bank or its value to investors. The equity ratio helps to portray the soundness of a firm's capital structure or its overall financial strength. For instance, banks will not make loans available to firms with a low equity ratio because of higher risk and vice

versa. However, if the bank decides to lend, it will charge very high-interest rates in order to cover the risk involve. Banks with enough capital to shield from credit risk are more able to give out risky loans on long term basis. Thus, an increase in banks equity boosts up their ability to give out loans or increase their willingness to lend. A positive relationship is therefore expected between banks' lending and equity ratio. The proxy used in this study for measuring the equity risk ratio is Total equity/Total Assets.

Liquidity risk ratio

Liquidity risk is the risk that a bank is not able to meet up or fulfill its short-term debt obligation or its short-term financial needs effectively and on time. Banks are normally faced with this risk when they are unable to convert a security or an illiquid asset to cash without a substantial loss of income or capital. According to Samad (2004), liquidity is considered to be the life and blood of commercial banks. Examples of liquidity risks banks usually faced are funding and time risk. Generally, banks can measure their liquidity risk using any of the following ratios; loan losses/net loans, loans/total assets, purchase funds/total assets, loans/core deposits. In this study liquidity measurement used is liquid asset/customer deposit and short-term borrowed funds. It shows how banks can be able to fulfill their short-term obligation using their liquid assets in situations of immediate cash demands expressed in percentage. Banks' are usually faced with liquidity risk and are unwilling to give out loans when they are unable to convert an illiquid asset to cash without a substantial loss of capital. Thus, a negative relationship is expected between liquidity and bank lending decision or behavior.

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Management Efficiency Ratio

The ability for a bank to generate and maximize its profitability performance is very vital in carrying out its lending decisions. Management efficiency ratio shows how banks' assets and liabilities are well organized and managed in order to maximize profit and hedge against risk. In order to measure the banks management efficiency ratio for this research, the cost/income ratio will be used. This proxy measures the income generated per $ cost. That is to say, it stipulates the expense that a bank incurs in order to produce a unit of output. A lower cost/income ratio is preferred and leads to a better performance of a bank. According to Alhassan, Brobbey and Asamoah (2013) when banks' staff are highly skilled they are more informed about the loan market. As a result, they are able to make the difference between bad and good loans and this reduces the chances of giving out loans that might result to defaults or bad debts. When banks expenses increase as a result of higher cost and higher salaries which tend to reduce their profitability, they become reluctant to lend. Therefore, a negative relationship is expected between management efficiency and banks' lending behavior.

GDP Growth Rate

This is the rate at which the Gross Domestic Product of any economy changes as years go by. It is the most vital indicator of how sound an economy is and it measures the speed at which an economy is growing. A positive GDP growth rate implies that an economy is experiencing an expansion. This will permit borrowers to be able to demand more loans from banks at lower interest rates for investment purposes. Thus, personal income, businesses, and jobs will also grow or expand. On the other hand, if the GDP growth rate is on a slow pace, many businesses will not invest in new purchases and new employees will not be employed because banks will

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be unwilling to lend to firms or investors for fear of high default risk. The GDP growth rate is driven by four elements of the Gross Domestic Product such as consumption, business investment, government spending, and net exports. It can be expressed as (GDP=C+I+G+X-M). An increase in GDP growth boosts up banks willingness to make loans available to borrowers or investors as they will be able to meet up their debt obligations at lower rates without the tendency to default. A positive relationship is therefore expected between GDP growth and banks' lending behavior.

4.2.3 Methodology

A lot of factors determine commercial banks' decision to lend or make loans available to borrowers as earlier discussed in the previous section above. For this study, correlation matrix, descriptive statistics, and fixed effect panel regression will be applied in presenting and analyzing the factual results. Also, it will be used to examine the effects and verify the relationship that exists between the loans to total assets (response variable) of commercial banks and the individual predictor variables (equity risk, management efficiency, credit risk, liquidity risk and GDP growth). Some factors such as government control and past relationship with customers not mentioned in the model of this research are apprehended by the error term (μ). Both fixed and random effect panel data regression analysis will be performed with E-views software and a decision on whether to consider the fixed or random effect model will be made based on the probability (P-Value) and the significant level after performing the Hausman test and likelihood test.

An illustration of the mean, standard deviation, maximum and minimum values of the variables in this research will be displayed by the descriptive statistics. The

values shown by the mean is to points out the central tendency of these values from the individual variables whilst the values of the standard deviation show the dispersity from the average. Also, in order to examine the extent to which the independent variables are correlated among them, the coefficients obtained by applying the Pearson correlation matrix will be used. The outcome of the correlation matrix will enable us to detect if there is any problem of multicollinearity among variables taking into account the perspective of Kennedy (2008) who expressed that multicollinearity problem exists if the correlations exceed 0.70 or 0.80.

In addition, a choice on whether to consider the random or fixed effect panel data model will be based on the outcome after running the Hausman test for the random effect model and the Likelihood test for the fixed effect model. The null hypothesis will represent the random effect model and the alternative hypothesis is considered for the fixed effect and we make the following assumptions stated in the hypothesis below;

H0: The random effect model is appropriate

H1: The fixed effect model is appropriate

Both the random and fixed effect model will be carried out and if the probability value (P-value) of random is less than alpha (α) at all levels 1%, 5%, and 10%, we reject the null hypothesis (H0). Therefore, the random effect model is not appropriate and we use the fixed effect model to run our balanced panel data for the regression analysis. The econometric formula for both random and fixed effect model is written as follows;

$Y_{it} = \beta_1 X_{it} + \alpha_i + \mu_{it}$ (Fixed effect model)

The equation model of this study is expressed as follows;

$$LTA_{i,t} = \beta_1 + \beta_2(Cr_{i,t}) + \beta_3(Er_{i,t}) + \beta_4(Lr_{i,t}) + \beta_5(Me_{i,t}) + \beta_6(GDPG_{i,t}) + u_{i,t}$$

Where;

LTA: Loans to total assets

Cr: Credit ratio

Er: Equity ratio

Lr: Liquidity ratio

Me: Management efficiency ratio

GDPG: GDP growth rate

β_1: Intercept for each bank $_i$ and β_1-β_6 are the coefficients of the explanatory variables at time $_t$

$\mu_{i,t}$: The error term

Table 4: The Research Variables and Measures

	Variables	Symbols	Measures	Expected Sign
Dependent	Loans to Total assets	LTA	Loans/Total Assets	
Independent	Credit ratio	CR	Loan loss reserve/Gross loans	Negative
	Equity ratio	ER	Total equity/Total assets	Positive
	Liquidity ratio	LR	Liquid asset/customer deposit and short-term borrowed funds.	Negative
	Management efficiency ratio	ME	Cost/Income	Negative
	Gross Domestic Product	GDPG	% of annual GDP Growth rate	Positive

Chapter 5

EMPIRICAL ANALYSIS AND RESULTS

The results obtained in this study will be analyzed based on the descriptive statistics, correlation matrix and the result estimates of the fixed effect model. The panel unit root test was performed using the E-views software to verify if our variables are stationary or not. The test was carried out laying emphasis on five models such as; Levin, Lin, and Chu t*(LLC), Breitung t-stat, Im Pesaran and Shin W-stat (IPS), Fisher Chi-square (ADF), and Fisher Chi-square (PP) at alpha levels 1%, 5%, and 10%. The hypothesis for this test is known as;

H0: The variables have unit root

H1: The variables do not have unit root.

The final outcome after running the test exhibited that the variables do not have unit root. Therefore, the null hypothesis (H0) is rejected because the P-value is lower than all levels of alpha (1%, 5%, and 10%).

Table 5: Summary of Unit root test

LTA	LLC	Breitung test	IPS	ADF	PP
Trend and intercept	-10.8997*	1.94719	-1.33986*	48.1704*	30.0360
Intercept	-22.5336*	-	-6.06910*	66.7009*	41.8458*
None	0.00350	-	-	11.7746	6.17304
CR	LLC	Breitung test	IPS	ADF	PP
Trend and intercept	-26.3222*	2.59258	-2.39784*	55.3485*	41.6812*
Intercept	-5.58827*	-	-6.06910*	66.7009*	41.8458*
None	0.00350	-	-	11.7746	6.17304
ER	LLC	Breitung test	IPS	ADF	PP
Trend and intercept	-6.52622*	2.59258	-2.39784*	55.3485*	41.6812*
Intercept	-5.58827*	-	-1.18768	38.9185*	27.1388
None	-2.19920*	-	-	20.5848	14.4593
LR	LLC	Breitung test	IPS	ADF	PP
Trend and intercept	-9.99640*	2.16603	0.09123	24.1554*	46.7620*
Intercept	2.25737	-	0.67906	35.1661*	42.4239*
None	-2.15579*	-	-	21.1258	43.0096*
ME	LLC	Breitung test	IPS	ADF	PP
Trend and intercept	-24.6342*	-0.83618	-0.79974	31.4813*	45.1399*
Intercept	-3.43602*	-	0.05640	19.5236*	35.5289*
None	0.52656	-	-	14.1191	19.9318
GDP	LLC	Breitung test	IPS	ADF	PP
Trend and intercept	-32.7084*	-2.32161*	-3.21774*	64.9188*	35.5204*
Intercept	-10.0318*	-	-2.13403*	39.5444*	18.6922
None	1.69410	-	-	11.9448	16.8398

The fixed effect panel regression model was chosen to be the perfect model for this research after running the fixed likelihood test and obtained a probability of F-stats indicated by the probability greater than chi-square statistics of 0.0000. This result is

< alpha at all levels (1%, 5%, 10%) which means that the coefficients used in this model are different from zero. Therefore, the fixed effect model is the perfect model for this study as it is used to point out variables that significantly determine South African commercial banks' lending behavior. The R-squared value stipulates that the independent variables together greatly influences the dependent variable. Looking at our R^2 on table 8 below, it means that 91% of the variation in LTA can be explained by the explanatory variables jointly. The remaining percentage can be explained by other predictor factors.

5.1 Descriptive Statistics and Multicollinearity Analysis

The statistical description of the table below exhibits the minimum, mean, standard deviation and the maximum values of the individual variables considered in this research. The central tendency point and the dispersion of the variables from their averages are measured by the mean and standard deviation respectively. The credit risk exposure of the banks used in this study had a mean of 0.23. These banks equity capital structure on average is approximately 11.29%. This means 88.71% of the sampled banks' total assets are funded by debt. The liquidity, management efficiency, and GDP growth mean are 0.4522, 0.6024, and 0.0240 respectively.

Table 6: Summary Statistics for LTA

Descriptive Statistics				
	Minimum	Maximum	Mean	Std. deviation
CR	-0.0092	1.7820	0.2317	0.2866
ER	0.0078	0.2709	0.1129	0.0627
LR	0.0402	5.2146	0.4522	0.7426
ME	0.2550	1.1406	0.6024	0.1502
GDPG	-0.0154	0.0536	0.0240	0.0183

The correlation matrix analysis is carried out in order to check how the independent variables are correlated with each other. From our result as seen in table 6 below, the variables are both positively and negatively correlated with each other and the highest correlation coefficient is 0.38 or 38%. Taking into account the perspective of Kennedy (2008), who expressed that multicollinearity problem exists if the correlations exceed 0.70 or 0.80, so we can say that there is no multicollinearity problem present among the variables.

Table 7: Correlation Matrix

	CR	ER	LR	ME	GDPG
CR	1.00				
ER	-0.175267	1.00			
LR	0.197489	0.384869	1.00		
ME	-0.533216	-0.007649	-0.435364	1.00	
GDPG	-0.165466	-0.006933	0.061382	0.000185	1.00

5.2 Autocorrelation Check

In this section, we checked if there exists any autocorrelation problem with the data. Durbin-Watson test was used to confirm whether this problem is present in our model or not. The general rule for Durbin-Watson stat is that it must be close to 2, else there is autocorrelation problem. Looking at our model in table 8 below, the Durbin-Watson stat is 1.891486 which is approximately 2. Therefore, we can say that there is no autocorrelation problem.

Table 8: Multiple Regression Results for our sample banks

Variable	Coefficient	Std. Error	t-Statistic	Probability
C	0.180853	0.061462	2.942549	0.0046
CR	0.055390	0.030159	1.836614	0.0712
ER	0.857649	0.262969	3.21406	0.0018
LR	-0.034421	0.008759	-3.929978	0.0002
ME	0.156923	0.085282	1.840056	0.0707
GDPG	-0.574643	0.085855	-6.693140	0.0000
R-Squared	0.919921			
F-statistic	55.56673			0.0000
Durbin-Watson stat	1.891486			

5.3 Estimation of the Regression Model

The E-views software was used to carry out the multiple regression equations in order to see if our predictor variables are statistically significant and the kind of impact they have on our explanatory variable. The cross-section fixed effect model was chosen over the random effect model to run our panel least squares regression. This model was considered the best model for this study because after running the likelihood test, we found out that the F-stat > Chi-square with both P-values of 0.0000 less than alpha at all levels. This result, therefore, permitted us to reject our null hypothesis which states that the random effect model is appropriate and on the other hand we fail to reject the alternative hypothesis which says the fixed effect model is appropriate. Also, concerning the coefficient covariance method we selected the white cross-section to run our regression. The white test was applied in order to solve the problem of heteroscedasticity which was present in our model.

5.4 Discussion of the Results Estimate

Here we will discuss the Intercept ($\beta1$) and the independent variables ($\beta2$ to $\beta6$), see if they are statistically significant at α level of 1% based on the stated null and alternative hypothesis and how they affect our explanatory variable looking at our result in table 8 above.

5.4.1 The Predictor Variables

Looking at our regression result in table 8 above, we discovered that credit ratio has a positive relationship with banks loans to total assets. This can be explained by the fact that, an increase in credit risk ratio by 1% causes the loans to total assets of South African banks to increase by 0.055%. This implies the percentage amount of assets tied to loans increases and it will make the banks suffer default from its borrowers or end up with bad debts. When commercial banks expects defaults from its borrowers or the inability of borrowers to repay back their loans, they will be unwilling to lend. This variable was found to be statistically significant at an alpha level of 10%, having a t-statistics of 1.836614 and a P-value of 0.0712. We, therefore reject the null hypothesis (H0) in this case based on our result. Our result supports the findings of Malede (2014) who found credit risk to be significant and had a positive relationship with commercial banks' lending.

Another predictor variable which is the equity ratio is statistically significant at 1% level of alpha with a coefficient value of 0.8576%. The coefficient value tells us that the equity ratio has a positive relationship with the loans to total assets of banks. That is to say, as equity ratio increases by 1%, banks loans to total assets will increase by 0.8576%. We, therefore reject the null hypothesis since our equity risk ratio is statistically significant with a t-statistics of 3.2614 and a P-value of 0.0018 < alpha at

all levels. This positive relationship implies that when banks experience an increase in their equity capital, they will make loans available to its borrowers provided that they have excess reserve cash to cover up for any bad debt. Our result is consistent with the findings of Bernanke and Lown (1991) who also found out that shortage or insufficient equity capital greatly influences banks' willingness to lend or make loans available to its borrowers. Also, Lepetit and Bouvatier (2007) and Djiogap and Ngomsi (2012) discovered that banks with low or poor capitalization are unwilling to lend.

Liquidity ratio portrays a negative significant relationship with the banks loans to total assets with a slope coefficient of -0.0344. The implication of this relationship is that if liquidity ratio increases by 1%, the loans to total assets of the banks will decrease by 0.0344. This explanatory variable is significant at 1% level of alpha with a t-statistics of -3.9299 and a probability value of 0.0002. Thus, it is preferred to reject the null hypothesis. Our result exhibited a negative relationship between liquidity and lending as expected. Liquidity allows banks to meet any unexpected expenses without having to liquidate other assets. When banks are unable to fund their loans or make payments on debt, they will be very unwilling to lend. Thus, a low liquidity reduces commercial banks' lending.The result of Loutskina (2011) also exhibited a negative relationship between liquidity and lending and it was significant.

When banks seek to improve their management efficiency, they are often faced with an operational risk that takes place within the banks such as human errors. Some example of such risk includes; human risk (when an information is wrongly felt during a check transaction clearance), IT failure, and process risk (information leakage or improper processing of an information).The management efficiency ratio

from our result has a positive relationship with loans to total assets. A 1% increase in management efficiency, on average, leads to a 0.1569% increase in South African loans to total assets. Also, management efficiency ratio is statistically significant having a t-statistics of 1.8400 and a probability of 0.0707 < alpha at 1% which permits us to reject the null hypothesis. The ability for banks to manage their banking operations efficiently so as to maximize their profit and hedge against risk, encourages them to give out loans. Alhassan, Brobbey and Asamoah (2013) also found out that management efficiency has a positive significant influence on banks' lending behavior.

GDP growth has a negative relationship with loans to total assets from our result. This tells us that if GDP growth rate increases by 1%, South African banks' loans to total assets will decrease by 0.5746%. Looking at our regression result, GDP is statistically significant with a t-statistics of -6.6931 and a probability value of 0.0000 greater than all alpha levels. Therefore, we fail to reject the alternative hypothesis. Our result is consistent with the findings of Olokoyo (2011) and Malede (2014) which tells us that GDP growth has a significant impact on banks' lending decision and it portrayed a positive coefficient sign unlike ours which had a negative coefficient. Possible reasons for the negative sign might be as a result of deflation and consumer confidence. For instance, no matter the low interest rates most persons would choose to save when there is deflation because of a high effective interest rate. Also, even with low-interest rates banks may not want to give out loans. For example, banks made it difficult for mortgages to be available after the 2008 credit crunch. Thus making it difficult for people who wanted to obtain loans at lower-interest rates because huge deposits were required.

Chapter 6

CONCLUSION

This research covered the period starting from 2007-2014 taking into consideration a sample number of 11 banks made up of four foreign and seven locally controlled banks. The data of this study were acquired from the World Bank, the bank scope and the Central bank of South Africa. Multicollinearity, fixed balanced panel regression, and descriptive statistics were used to analyze the results. This study succeeded to uncover the factors that determine commercial banks' lending in South Africa which was the aim of our research. Commercial banks remain dominants in the banking system in terms of their shares of total assets and deposit liabilities. Also, it is an undeniable fact that they play very vital role in boosting up the growth of the economy.

From our regression result, we discovered that our independent variables all have both positive and negative statistical relationship with commercial banks' lending. This implies that these variables are very important factors considered by commercial banks in their decisions to give out loans. We found out that equity ratio, liquidity ratio, and GDP growth are the most significant variables that influence banks' lending behavior in South Africa. The probability of our F-statistics is at 0% level of significance which implies that our model is best fit. Moreover, the Durbin-Watson statistics obtained tells us that there is no autocorrelation problem. We also found out that there is no multicollinearity problem in our model which can cause

serious consequences for our regression. Considering all the above outcomes, we say that our model fit our panel regression and we have genuine results. Some recommendations suggested by this study include;

> Commercial banks in South Africa should lay more emphasis on some lending guides such as credit rating, and loan purpose which will help to avoid or minimize their credit risk.

> Also, concerning equity or capital risk and some other insecure management operations which often increase cost, the banking sector of South Africa should instigate the Basel II rules. This will curb the risk and enable banks to be financially fit against any unforeseen circumstance.

> Commercial banks should plow in more funds in their loan portfolio which is considered to be the largest asset and source of revenue for banks. In doing so, banks will be able to maintain and efficiently fulfill its liquidity obligation to their borrowers.

> Lastly, the regulatory authorities and the commercial banks of South Africa should work hand in gloves so as to keep maintaining a good regulatory banking system which will stimulates economic growth.

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APPENDICES

Appendix A: Panel Unit root test for the sampled banks

LTA	LLC	Breitung test	IPS	ADF	PP
Trend and intercept	-10.8997*	1.94719	-1.33986*	48.1704*	30.0360
Intercept	-22.5336*	-	-6.06910*	66.7009*	41.8458*
None	0.00350	-	-	11.7746	6.17304
CR	LLC	Breitung test	IPS	ADF	PP
Trend and intercept	-26.3222*	2.59258	-2.39784*	55.3485*	41.6812*
Intercept	-5.58827*	-	-6.06910*	66.7009*	41.8458*
None	0.00350	-	-	11.7746	6.17304

GDP	LLC	Breitung test	IPS	ADF	PP
Trend and intercept	-32.7084*	-2.32161*	-3.21774*	64.9188*	35.5204*
Intercept	-10.0318*	-	-2.13403*	39.5444*	18.6922
None	1.69410	-	-	11.9448	16.8398
ER	LLC	Breitung test	IPS	ADF	PP
Trend and intercept	-6.52622*	2.59258	-2.39784*	55.3485*	41.6812*
Intercept	-5.58827*	-	-1.18768	38.9185*	27.1388
None	-2.19920*	-	-	20.5848	14.4593
LR	LLC	Breitung test	IPS	ADF	PP
Trend and intercept	-9.99640*	2.16603	0.09123	24.1554*	46.7620*
Intercept	2.25737	-	0.67906	35.1661*	42.4239*
None	-2.15579*	-	-	21.1258	43.0096*
ME	LLC	Breitung test	IPS	ADF	PP
Trend and intercept	-24.6342*	-0.83618	-0.79974	31.4813*	45.1399*
Intercept	-3.43602*	-	0.05640	19.5236*	35.5289*
None	0.52656	-	-	14.1191	19.9318

Appendix B: Multiple regression result for the sampled banks

Dependent Variable: LTA
Method: Panel Least Squares

Date: 06/27/16   Time: 15:01
Sample (adjusted): 2008 2014
Periods included: 7
Cross-sections included: 11
Total panel (balanced) observations: 77
White cross-section standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.180853	0.061462	2.942549	0.0046
CR2	0.055390	0.030159	1.836614	0.0712
ER1	0.857649	0.262969	3.261406	0.0018
LR2	-0.034421	0.008759	-3.929978	0.0002
ME	0.156923	0.085282	1.840056	0.0707
GDPG	-0.574643	0.085855	-6.693140	0.0000
LTA(-1)	0.453041	0.072625	6.238045	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.936780	Mean dependent var	0.662190
Adjusted R-squared	0.919921	S.D. dependent var	0.150827
S.E. of regression	0.042681	Akaike info criterion	-3.278012
Sum squared resid	0.109302	Schwarz criterion	-2.760548
Log likelihood	143.2034	Hannan-Quinn criter.	-3.071031
F-statistic	55.56673	Durbin-Watson stat	1.891486
Prob(F-statistic)	0.000000		

Appendix C: Correlation of independent variables for the sampled banks

	CR	ER	ME	GDP	MS
CR	1.00				
ER	-0.175267	1.00			
LR	0.197489	0.384869	1.00		
ME	-0.533216	-0.007649	-0.435364	1.00	
GDPG	-0.165466	-0.006933	0.061382	0.000185	1.00

Appendix D: Fixed effect Likelihood test

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	46.590704	(10,72)	0.0000
Cross-section Chi-square	17.6969728	10	0.0000

Cross-section fixed effects test equation:
Dependent Variable: LTA
Method: Panel Least Squares
Date: 07/29/16   Time: 12:55
Sample: 2007 2014
Periods included: 8
Cross-sections included: 11
Total panel (balanced) observations: 88

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.271573	0.090210	3.010441	0.0035
CR2	0.325822	0.059075	5.515372	0.0000
ER1	0.936841	0.247457	3.785875	0.0003
LR2	-0.045062	0.022714	-1.983889	0.0506
ME	0.345569	0.117800	2.933526	0.0043
GDPG	0.974328	0.762453	1.277886	0.2049

R-squared	0.322104	Mean dependent var	0.664140
Adjusted R-squared	0.280769	S.D. dependent var	0.150473
S.E. of regression	0.127612	Akaike info criterion	-1.213895
Sum squared resid	1.335360	Schwarz criterion	-1.044986
Log likelihood	59.41139	Hannan-Quinn criter.	-1.145846
F-statistic	7.792517	Durbin-Watson stat	0.276201
Prob(F-statistic)	0.000005		