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MASTERS OF BUSINESS ADMINISTRATION

FINANCE OPTION

**IMPACT OF BORROWERS' INFORMATION ON FINANCIAL
PERFORMANCE AND RESILIENCE OF COMMERCIAL BANKS IN
RWANDA. (CASE STUDY: SIX COMMERCIAL BANKS)**

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**THESIS SUBMITTED TO SCHOOL OF BUSINESS, COLLEGE OF
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ADMINISTRATION BY UNIVERSITY OF RWANDA.**

JUNE, 2021

DECLARATION

I hereby declare that this thesis is my original work and has not been submitted before for any degree at any other university.

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DEDICATION

I dedicate this research project to my Father, NDAGIJIMANA Leonard for creating in me the desire to excel academically since childhood, My mother NYIRANSENGIMANA Primitiva, my young brother KAZANA, my sister GIRUBUGINGO, my girlfriend UMUHOZA and UMUGANWA for their moral support, my family for their unconditional Love and encouragement and my Supervisor Dr. Samuel MUTARINDWA for his incredible advice, encouragement and support.

Key words

Borrower information: Means all information received from the borrower or any of its subsidiaries or any of their respective businesses, or a combination thereof, which obligations are required to be classified and accounted to the bank.

Financial performance: It reflects the cost of bank intermediation services and the efficiency of the bank. The higher the net interest margin, the higher the bank's profit and the more stable the bank is. Thus, it is one of the key measures of bank profitability.

Bank resilience: Is the ability of the bank to become stronger, healthier, and more successful.

ABSTRACT

This study seeks to determine the impact of borrowers' information on the financial performance and resilience of commercial banks in Rwanda. The independent variable for the study is borrowers' information whereas the dependent variables include bank performance measured using Loan, Net Interest Margins (NIM), and Return on Assets (ROA) and resilience measuring using Non-Performing Loans (NPL) and Z-score. This study uses a sample of six commercial banks operating in Rwanda over the period 2007 to 2018. Using Ordinary Least Squares (OLS) estimation technique, findings reveal that. Borrowers' information sharing through Credit Reference Bureaus (CRB) significantly improve banks' resilience and performance. Specifically, findings show that borrower information increases banks' Z-score and reduces loan defaults (NPL) and also increases banks' return on assets, growth in loanable assets and reduces banks' cost of intermediation (Net interest margin)

This study has both academic and policy implications. First, the study adds to the debate on the role of information sharing on borrowers in enhancing bank stability in a developing country context. From a policy point of view, this study recommends the vital importance of strengthening credit information infrastructures in Rwanda to increase bank resilience and performance.

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LIST OF ABBREVIATIONS AND ACRONYMS

BANCOR: Banque a la Confiance d’Or

BCR: Banque Commercial du Rwanda

BK: Bank of Kigali

BPR: Banque Populaire du Rwanda

BRD: Banque Rwandaise de Development

CIS: Credit Information System

COGEAR: Compagnie Generale d’Assurance et Reassurances

COGEBANQUE: Compagnie Generale de Banque

CR: Credit Reporting

CRB: Credit Reference Bureaus

ECOBANK: Economic Community bank

GDP: Gross Domestic Products

I&M BANK: Investment & Mortgages Bank

LOG: Logarithm

NIM: Net Interest Margin

NPL: Non Performing Loans

OECD: Organization for Economics and Development

OLS: Ordinary Least Squares regression

PLC: Public Limited Company

PROPARCO: Promotion et Participation pour la Cooperation Economique

ROA: Return On Asset

ROAA: Return On Average Assets

SME: Small and Medium Enterprise

US: United States

USD: United States Dollars

CHAPTER ONE: INTRODUCTION

1.1 Introduction

In recent years, from 2010 to 2017, Rwandan economy experienced impressive growth and expansion. The Rwandan financial sector is still quite young the sector is made up of commercial banks, development banks, saving and credit schemes, microfinance institutions, the sector is narrow and shallow. Banks work in an austere monitored environment but there have been series of monetary easing measures of late where 14% of Rwanda's adult population is banked which offers investment opportunities for investors. However, the development of financial infrastructure was not able to catch up with the needs of the economy, which was in booming growth and expansion. After all, the poor loans management was the most problematic to dare. Along with a massive enlargement of the economy, the financial market also grew with remarkable rate. However, the experience of banks in loan management did not support the development. The crisis of banks in 2010 was clear evidences where the impact of crisis structural change for the stability of the banking sector. Banks in Rwanda have enhanced their resilience to future risks by substantially building up capital and liquidity barriers. The increased use of stress testing by banks and supervisors since the crisis also provides for greater resilience on a forward-looking basis which should help support loan flows in good and bad times.

According to Honohan and Beck (2007). A World bank report has shown that in African banking systems, there is a limited access to credit in some difficult environments may be attributable to the reluctance of existing mediators to do relationship lending on a small scale. Globalization of finance can also play a part in improving access, and not entirely by increasing the flow of investable funds, but rather by increasing the efficiency of capital allocation, while lacking in depth compared to other parts the world, are also excessively liquid and channel a large proportion of savings into foreign assets. That is to say, savings mobilization does not emerge to represent a binding constraint on African banks' ability to lend.

Empirical evidence suggests that the development of banking systems goes hand in hand with economic development (see, e.g., Levine, 2004). Although the evidence on causality is mixed (e.g., Demetriades and Hussein 1996), there is broad consensus that well-functioning banking systems promote economic growth (Demetriades and Andrianova 2005). It is, therefore, a difficult situation that so many countries remain financially under-developed. This is particularly true of Sub-Saharan Africa, which remains one of the most financially under-developed regions in the world. If banks exchange information about their customer's loan worthiness, they can assess also the quality of non-local loan seekers, and lend to them as safely as they do with local clients.

Previous literatures show that there is a positive effect of private credit bureaus on access to finance. Important among others are studies assessed by Haselmann and Wachtel (2009), Andrianoivo and Amo (2010), Honohan and Beck (2007), (Demetriades and Andrianova (2005) Jappelli and Pagano (2005), Jappelli and Pagano (2009), Qian and Strahan (2007). These studies mentioned above are notable contribute in the empirical literature on borrower information and non-performing loans, the current study adds to this literature in several ways. Ghitti, M., Silanes, L. d., & Mata, R. (2020) argued that relationship lending and banking sector concentration are important factors determining firms' access to external finance, particular these factors seem to constitute important tools to attenuate the adverse consequences of poor creditor rights for economic development. Andrianaivo and Amo (2010) in their preceding study argued that better protection of creditor rights sound economic and trade policies and economic growth stimulate the demand for cheaper credit. Demetriades et al., (2012) argued that the older government owned and foreign banks suffer from the problem of information this is consistent with an information capital story in which banks without sufficient information capital are unwilling to lend and unable to grow their assets. Houston et al., (2010) argued that when creditors are given rights to the access the loan's information increase the likelihood of that country experiencing a financial crisis stronger creditor rights are correlated with higher growth of loan performance. Pagano and Jappelli, 1993; Powell et al., 2004; Padilla and Pagano, 2000 suggest that credit information sharing reduces bank adverse selection, moral hazard and serves as a motivation for loan repayment which turns to reduce bank non-performing loans and enhances bank asset quality; Qian and Strahan (2007) find that better creditor protection results in more concentrated ownership of syndicated loans, longer maturities, and lower interest rates, Honohan and Beck (2007) assessed that acquiring information is time consuming and costly. These empirical studies mentioned above were mostly conducted in Africa, Europe, Asia, and America, all assessed on the link between credit and information sharing with the interaction of banks and credit bureaus activities.

Information sharing plays a strategic role in improving the efficiency of financial institutions in addressing loan defaults (Padilla and Pagano (1997). This research will ascertain the credit information institution as a significance of evaluating credit worthiness in lending organizations, credits are popular type of asset that most financial institutions must deal with. According to Beck (2007), increased information sharing accrues the following benefits to an economy; allows for more informed risk assessment, improves access to credit for groups that have traditionally underserved, enables greater and broader access to capital for small businesses and entrepreneurs, generally enables better lending decisions with lower rates of delinquency and default. In Rwanda the CRB idea came into place in 2009 when the Rwanda Bankers Association released a request for a proposal to a number of international bureau operators to bid for the opportunity to establish and operate the credit bureau in Rwanda and licensed by the central bank in July 2010. CRB is an absolutely necessary institution in assisting financial institutions in their credit appraisal processes and manage credit risk effectively by

providing timely and accurate information on a consumer's debt profile and allow the Small and Medium Enterprises to build a credit history, an asset that can reduce physical collateral to support borrowing for microloans. According to Galindo and Miller (2001) they argued that there is a positive relationship between nonperforming loans and an index of information sharing. Therefore, the current problem is that scarcity of accurate information from financial institutions on the history of borrowers, that is one of the challenges facing the recently inaugurated Credit Reference Bureau (CRB). As such, despite, the numerous benefits reported to be associated with information sharing in the credit market, very little studies have examined the impact of credit reference bureau on financial performance and stability in commercial banks. Such has created a literature gap, which necessitates a study on what are the impacts of credit reference bureaus on financial performance and resilience of commercial banks in Rwanda?

1.2 Problem statement

According to the reports of the National Bank (NBR 2016), Rwanda's banking sector is on the right track with the sector's total assets amounting to Frw 2443.32 billion by March of 2018, while 72% of Rwandans are accessing some form of financial services whereas the banking return on equity was 26.2% as of March 2018. There were 9 licensed commercial banks, 1 development bank, 1 mortgage bank, 1 cooperative bank, 3 micro-finance banks and 1 discount house. There are also 490 MFIs and 479 SACCOs. The absence of credit information about a borrower makes it difficult for banks to make a proper risk assessment of a particular person or business seeking a loan, thus the Rwanda office of the Credit Reference Bureau Africa (CRB) Africa, which was established in 2010, has also highly contributed to making the credit market more attractive through collecting loan and debt information from a various institutions and make the data available to financial institutions in the country. Before the establishment of CRB Rwanda, financial institutions used to ask the loan applicants to bring loan clearance forms from other banks, which used to take a lot of time and money, but with the introduction of CRB which compiles this information, that process has been greatly simplified.

CRB Africa helps to combat the scourge of non-performing loans (NPLs), which constitute a loss for financial institutions, since the collateral offered usually doesn't cover the total amount of the loan or, worse, it might have been used as a guarantee for multiple loans. As a result, if the ratio of NPLs is high, banks will factor in the cost by increasing their overall interest rates. By now banks can now check whether an applicant has other outstanding loans, and what his credit history looks like, thus significantly reducing the risk of NPLs. Statistics at NBR indicate that after 1994, Rwanda's non-performing loans were above 70% with virtually no mechanisms in place to tame the situation. Ten years ago, NPLs had dropped to 40% while in December 2012 they were at 6.1% from 2011's 8.0%, better than the central bank bench mark of 7%. That's healthy although NBR's target is 5%. It is

reckoned that lower NPLs would result to banks reducing their interest on loans as the borrowers' credit worthiness improves. Between 2012 and 2018, the loan performance rate fell from 8.5% to 6.1%, bank net interest margin (%) in Rwanda was reported at 9.3256 %, bank return on assets was reported at 0.99809 %, Bank Z-score in Rwanda was reported at 8.1718 , according to the World Bank collection of development indicators, in 2017, and this is a great improvement to financial performance which shows that more banks are stable and able to lend at reasonable interest rates and this means that CRB Africa plays a key role in banking sector specifically as far as this issue is concerned in Rwanda.

With these contextual issues at hand, one wonders if credit information to commercial banks would improve their resilience and performance. Despite the numerous benefits reported to be associated with information sharing in the credit market, very little studies have examined the impact of credit reference bureau on financial performance and stability in commercial banks. Such has created a literature gap, which necessitates a study on what are the impacts of credit reference bureaus on financial performance and resilience of commercial banks in Rwanda?

1.3. Objectives of the research

1.3.1. Main objective

The main objective of this research is to assess the impact of borrower's information on financial performance and resilience of commercial banks.

1.3.2. Specific objectives

1. To analyze the levels of bank performance with the establishment of CRB in Rwanda
2. To identify the levels of bank resilience with the establishment of CRB in Rwanda
3. To assess the effects of borrower information on bank performance and resilience.

1.3.3. Research questions

- ✓ What is the trend of financial performance with the establishment of CRB in Rwanda?
- ✓ What are the levels of resilience within commercial banks with the establishment of CRB in Rwanda?
- ✓ What are the effects of borrower information on bank performance and resilience?

1.4. Research hypothesis

1.4.1. General hypothesis

There is a relationship between borrowers' information with financial performance and resilience/stability.

1.4.2. Specific hypothesis

Based on existing literature current study formulated three hypotheses. The hypotheses are given below.

H1: Borrowers' information increased financial performance in commercial banks

Null: Borrowers' information doesn't affect financial performance of commercial banks

H2: Borrower information increased the level of resilience/stability in commercial banks

Null: Borrowers' information does not affect the resilience in commercial banks.

H3: There is a relationship between borrowers' information and financial performance and resilience/ stability.

Null: There is no relationship between borrowers' information and financial performance and resilience/ stability?

1.5. Justification of the study

According to the central bank of Rwanda (NBR 2010) CRB is responsible for providing accurate information on borrowers' debt profiles and repayment history, an activity that is currently done by lending institutions. The recorded information used by commercial banks, credit institutions and Microfinance Institutions to quickly decide on ones' loan request.

This study seeks to examine the relationships between credit information institution and banks performance, resilience and whether this relationship contribute to the academic literature. As the annual report June 2018 and June 2019 from central bank of Rwanda (NBR 2018;2019) has addressed a gap in credit lending and credit information which leads the banks in many losses and less profitability, this research help to address the gap which is in credit information institutions and current banking sector practices and recommend how to fulfil the gap if found in order to attract many investors and sustaining their local profitability. Lenders who provide their personal information to credit bureaus are given access to the common database insofar as the information presented timely and accurate (Jappelli & Pagano, 2005). From the previous studies have been carried out many of them have been conducted about credit information institutions, credit information sharing and loan performance in commercial banks. Further, I took a very narrow scope by focusing on only three variables; borrowers' information, performance and banks resilience therefore the results of the study cannot be used to make inference on the relationship between loans information sharing and the loan portfolio of the commercial banks in Rwanda. This study aims to look on the relationship between borrowers' information, financial performance and resilience in commercial banks in Rwanda is yet to be carried out.

Therefore, this research provided empirical data related to the studied variables “borrowers ‘information; resilience and financial performance”. This will make contribution to the academic literatures, theoretical and empirical development for the banking industries performance. In addition, it will suggest local areas for further research.

1.6. Organization of the thesis

In study, the rest of this thesis is organized as follows: Chapter two entails a descriptive literature on the variables under study. Chapter three summarizes the methodology and methods used in the current study. Chapter four follows with analysis and discussion of findings. Chapter five concludes and provides academic and policy recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1. Definition of key concepts

2.1.1. Credit Reference Bureaus

A credit reference bureau is an establishment accredited by the Central Bank of Rwanda to accumulate, stockpile, and collate credit information on individuals and corporations from various sources and provides the information in the form of a credit statement upon the application of a financier (NBR, 2009). This information is usually collected and presented in the form of a credit report and is made available on request to contributing parties for the purposes of credit assessment and rating primarily on decisions relating to loan advances. Typical clients to CRBs include banks, mortgage lenders, credit card companies and other financing companies (Sacerdoti, 2005). Credit reference bureaus enable information sharing about a borrower's characteristics and their indebtedness.

Those lower costs for good credit risks motivate those borrowers to be more careful with repayment (Djankov, McLeish & Shleifer, 2005). Credit reference bureaus to provide credit reports with information that is relevant, complete, accurate and recent need striving the all credit histories. They provide information through a variety of means but electronic means allow them to quickly and inexpensively process and provide massive amounts of information. A credit reference bureau score is based on the contents of the credit report and historical borrowing at a particular point in time. The designers of a Credit Scoring system, through years of experience, determine which details particular collectively to predict future ability to repay (Beck *et al*, 2004). I used this theory to analyse the Effective risk management requires reporting and reviewing structure to ensure that risks are effectively identified, assessed and that appropriate controls and responses are in place.

2.1.2 Performance and Resilience

Performance is a subjective measure of how well a bank can use assets from its primary mode of business and generate revenues. The term is also used as a general measure of a bank's overall financial health over a given period. While resilience is a wide term that comprises and represents the ability of banks to rapidly adapt and respond to all types of risks, besides the ability to face the consequences of a major incident like default of loans, lower liquidity and borrowing, banks resilience also includes the capacity to adapt and adjust to a new environment and new circumstances.

The link between financial performance and resilience/stability has been drawn out clearly in some of the earliest studies of non-performing loans, Z-score, net interest margin, return on asset and loans. Hence, it is necessary to pick some indicators characterizing the resilience and performance of the banking system. This research relies on stability and nonperforming loan means a bad debt refers to loans that delinquent. In other words, these are loans that aren't getting paid back (NBR 2010). In the other

hand, the nonperforming loan can be defined as a sum of borrowed money upon which the debtor has not made his or her scheduled payments means principal plus interest for at least 90 days. A nonperforming loan is either defaulted or close to being defaulted. Once a loan is nonperforming, the odds that it was repaid in full are considered to be substantially lower. If the debtors making payments again on a defaulted loan, it becomes a re-performing loan, even if the debtor has not caught up on all the missed payment. Bank Z-score computed as the ratio of the sum of return on assets and the capital asset ratio to the standard deviation of return on assets. The z-score is equivalent to the inverse of the probability of insolvency if profits are assumed to follow a normal distribution. Specifically, z-score indicates the number of standard deviations below the expected value of a bank's return on assets at which equity is depleted and the bank is insolvent (Beck, 2010). The theory concludes that higher the z-score the more stable is the bank.

2.1.3. Credit Information Sharing

Pagano and Jappelli (1993) defines credit information sharing as the process where banks and other credit providers submit information about their borrowers to a credit reference bureau so that it can be shared with other credit providers. This enables lenders to obtain information on how borrowers have been servicing their loans. It is also known as credit reporting (CR). CIS enables banks to distinguish between bad and good borrowers. This means that defaulters will not be able to walk into a bank and get credit. This process in the long run will mean better information on borrowers resulting in accessible and cheaper loans. Under the Banking law governing credit information systems in Rwanda came into force on the 14th of May, 2010. banks are required to relay negative information to CRB on a monthly basis. The bureau gets updated on any eventual (positive) changes to the information as they occur. The credit report forms a basis for making lending decision by banks. Information is data that has been processed or transformed so that they are meaningful. The quality of information often impacts on the decision that is made using the information. According to Armstrong (2008), credit information from several countries across the world show that existence of credit reference bureau is associated with increase in lending volume, growth of clients lending improved access to financing a more stable banking sector. Further, Hansen (2004), highlighted that many borrowers make a lot of effort to repay their loans, but do not get rewarded for it because this good repayment history is not available to the banks that they approach for new loans or credit. Whenever borrowers fail to repay their loans, financial institutions are forced to pass on the cost of defaults to other customers through increased interest rates and others fees. In moral hazard setups, information sharing may provide borrowers with higher incentives to perform; because information becomes available to competitors, borrowers are happy to perform better because they no longer fear being held up by the lender monopolist (Padilla, 1997). Second, borrowers do not want to default, because this will be publicly known; when default information is shared, borrowers will face an increase in interest rates and a

decrease in access to finance not only by the current financial institution, but by the rest of the financial institutions in the market. This is called disciplinary effect. (Padilla, 2000).

Angulin and Scapens (2000) in their study indicated that it is not easy to have accurate information on the financial ability of prospective borrowers and even more difficult to have accurate information on their credit history. This makes it extremely difficult for the lenders to assess the credit worthiness of potential borrowers and their ability to pay loans. According to Sacerdoti (2005) to ensure a more accurate information on the financial status of borrowers, through improved quality of annual accounts and financial statements, professional development of accounting personnel, establishment of credit bureaus, and possible introduction of rating systems. credit reference bureaus work as a borrower discipline device; every borrower knows that if he defaults his reputation with all other potential lenders is ruined, cutting him off from credit or making it much more expensive.

Information sharing creates incentives for borrowers to perform in line with banks' interests and that information sharing can drive borrowers to repay loans when the legal environment makes it difficult for banks to enforce credit contracts (Brown, Jappelli & Pagano, 2007). As commercial banks exchanging information about their customers, banks can improve their knowledge of loans applicants' characteristics, past behavior and current debt exposure. Thus, information sharing reduces informational asymmetries, which in turn reduces adverse selection obstacles in lending, as well as change borrowers' motives to repay, both directly and by adjusting the competitiveness of the credit market (Brown, Jappelli & Pagano, 2007). A study by Galindo and Miller (2001) find a positive relation between access to finance and an index of information sharing. They find that doing well credit reporting systems reduce the sensitivity of investment to cash flows. Love and Mylenko (2003) combine firm-level data from the World Bank Business Environment Survey with aggregate data on credit reference bureaus collected in Miller (2003) and find that credit reference bureaus have a significant effect on financing constraints. credit information systems first create a screening effect that promote level of loan applicants, thereby raising portfolio quality, which, in turn, reduces rates of arrears. Jappelli and Pagano (2002) in their study on information sharing, lending and defaults revealed that bank lending has gone up and credit risk lowered in countries where lenders share information, regardless of the private or public quality of the information sharing mechanism.

2.1.4. Commercial Banks and CRBs.

The ability of borrowers to provide adequate financial statements and the establishment of credit reference bureaus are essential to encourage the expansion of loans, promote competition at credit market and banking systems, and thereby reduce the interest on loans to borrowers. In many countries, banks are resisting to extend credit to SMEs because of the inability of the borrower to produce formal financial statements and audited accounts (Sacerdoti 2005). According to figures reported by

Honohan and Beck (2007), Africa is the only part of the world where bank credit to the public sector exceeds bank credit to the private sector. A high level of lending to the public sector is a feature even of many North African countries with a relatively high level of banking sector development, such as Egypt (where commercial bank credit to the public sector is over 30% of GDP), Morocco (over 15%) and Algeria (over 15%). It is important here to make a distinction between commercial bank claims on central government (e.g. in the form of treasury bills) and claims on state-owned enterprises. Treasury bills are a relatively safe asset, especially attractive to African banks operating in an environment where many loans are highly risky. Commercial banks came into existence in 19th century. They further contracted that, the major feature of the commercial banks is that they are all mutually competitive in order to magnetize and retain customers. This feature distinguishes them from other financial institutions such as central banks, stock exchange etc. Basically, banking is a business that is registered to accept deposits from the public and make out loans. Technically, banks mobilize funds from the surplus units and channel it to the deficit units of the economy (Luckett, 1994). This purpose makes banks one of the principal financial intermediaries in every economy and also assists Central Banks in achieving their monetary policies. Banks earn money in servicing beyond selling money. Banking services are about the money in different types and attributes like lending and borrowing, deposits and drawings and transferring procedures.

Daumont *et al.* (2004), commercial banks in Africa have been particularly susceptible to failure resulting from a high level of loan default. The rate of loan default is partly a consequence of the quality of contract enforcement, which does vary across Africa, but it is also a function of the quality of information about potential borrowers and in most African countries such information is very limited. African credit bureaus are still in their infancy, systematic records of credit history are very rare and the African average for the World Bank depth of credit information index is the lowest of all regions in the developing world. The effect of this lack of information is likely to vary from bank to bank. Older, well-established banks are likely to have extensive informal networks that make gathering information about new borrowers relatively easy. Newer banks lacking such networks will find it much more difficult to gather information and in a high- default environment this may generate heterogeneity in bank behavior.

2.1.5. Credit Access

Accessibility to credit is the ability of borrowers to access financial services of borrowed capital. Measuring financial access can be through the number of bank accounts, number of bank branches and number of firms with line of credit (World Bank, 2011). The factors that determine accessibility of credit may change over time, it is the norm to segment the market into banked and unbanked which helps classify current and future state of users. Estimating and measuring financial access is difficult

due to lack of relevant data but a simple use of number of credit accounts and deposits has been used widely in approximating access to finance (Demirigio-Kunt, Beck & Honohan, 2011).

Formal market comprises of financial institutions that are governed by banking regulations and supervision and informal normally operate outside the structure of government regulation (Ledgerwood, 2012). Both markets have thrived due to inequitable resource accessibility and as the world becomes a global village sharing the increased challenges of poverty, the informal market has had an increase in number of customers (Demirigio-Kunt *et al.*,2011). There is work to be done to increase financial inclusion for all especially in the growing economies.

2.1.6 Information sharing

Research on information sharing is relatively recent and growing in Rwanda. Earlier papers analyze the effect of information sharing in a market with uneven info, both moral hazard and adverse selection. In moral hazard theory, credit information sharing may come up with motivations to perform loans because information becomes available to competitors, borrowers are contented to perform better because they no longer fear being held up by the lender monopolist (Padilla, 1997). Second, borrowers do not want to default, because this will be publicly known when default information is shared, borrowers will face an increase to cost of borrowing and decrease of loan access not only by the current financial institution, but also by the rest of the financial institutions in the market. This is called disciplinary effect. (Padilla, 2000). Providing comprehensive information on individual's credit history, Moreover, information sharing resolves adverse selection problems when banks have extant information advantage, as in Pagano (1993) and Padilla (2000).

By sharing credit information, banks may learn about credit reports to determine good and bad borrowers of the competitor financial institutions who exogenously switched from previous financial institutions. Gehrig and Stenbacka (2001), however, identify a dark side of information sharing rather than starting with ex-ante informational advantage, their adverse selection model considers a two period competition with symmetric knowledge in period one. In their location model, when banks have less encouragement to acquire credit information for many clients in period one, when they know they will have to compete away rents on them by sharing information in period two. They show that if information about borrowers true becomes known to other banks, second period competition will be higher and first period interest charges will increase.

Hauswald and Marquez (2003) show that credit information processing, providing the screening MFIs with more informational advantage on lenders, will safeguard it from competition allowing to earn rents. Therefore, high-tech technological growth allows easier access to the incumbent's data will drop the earnings to invest in that kind of information. Based on objective of the study I used this theory to

show how there is less effort in requirement of borrowers' information and thus causing the increase of defaults of loans leads to the additional of loans application.

2.2. Theoretical Framework

2.2.1 Agency theory

The agency problem arises because financial institutions have access to information of their clients who need to access credit facilities but lack similar information on other lending institutions. This results to asymmetry of shared information that lead the good borrowers and increases the cost of credit facilities (Otwori, 2013). The lending institutions in the context of asymmetrical information settings are forced to price their credit facilities in terms of the interest rates in a manner that is reflective of the borrowers pooled. The CRBs are designed to reduce asymmetry of information between various lending institutions. This is meant to assist the lenders differentiate between good and risky borrowers. So that the lenders are better able to describe both the local and foreign credit facility applicants, then the good borrowers should be able to get attractive interest rates due to their low risk profile. The financial institutions also benefit from having an improved pool of borrowers, decreases default rates and expansion of the credit market. In the adverse selection theory, the interest rate may not raise enough to guarantee that all loan applicants secure credit, in times when loanable funds are limited.

In general, the level of performing loans and level of effort is less than the first best. Borrowers who have greater wealth to secure in order to obtain inexpensive credit, which have the enticement to work harder, and earn more income as a result. The borrowing classes are assumed moreover magnified into the future by operation of the credit market, by exchange information about their customer's banks can improve their knowledge of claimant's personalities and conduct. In Principles, this reduction of informational asymmetries can reduce adverse selection problems in the lending, as well as change borrower's incentives to repay. Results shows that determine accessibility of credit may change over time, it is the norm to segment the market into banked and unbanked which helps classify current and future state of users.

Information asymmetries are the main obstacle for deposit taking financial institutions to arrange for loans to their customers. According to Silwal (2003) to subside asymmetry of information, financial organizations generally requires business proposal, borrower past credit information and security in advance before approving loans. Deposit taking financial institutions similarly offer credit through group based lending method to mitigate adverse selection and to replace the collateral requirement. Pagano and Jappelli (1993) show that sharing of information decrease adverse selection by in improving MFI's information on credit applicants. If financial institutions exchange client's credit information, they can also check on the quality of non-local credit seekers, in addition to loan them as

do with clients. Information sharing can also create incentives for clients to perform in line with deposit by taking interest from financial institution. Klein (1982) shows that credit information can motivate clients to repay loans, in his model clients pay back their loans because they recognize the fact that nonpayers will be excluded from future borrowing.

I used this theory to explain how the asymmetry of information on borrowers might create adverse lending and subsequent problems in reinforcement of loan recovery management.

2.2.2 Moral Hazard

The moral hazard theory is based on the conviction state that the borrower has an incentive to default unless there are consequences to his future credit facility applications. In the case of the banking sector, unobservable behavior is something characteristic of the borrower. Once a borrower gets a loan, there is a high probability that they will not use it for the purpose indicated during the loan application. If they engage in risky activity using the loan, this means that they might not pay their loan and the risk is transferred to the lender. On the other hand, it was argued that, the moral hazard is that the risk that the borrower may not utilize the funds prudently hence affecting his ability to repay the loan.

For my current study, this theory was used to explain how borrowers can exploit information differences among lenders to default on loans advanced to them by banks.

2.2.3 Credit theory

Early literature on credit uses traditional especially methods of credit risk, whose considerable difficulty lies in their total dependence on historical data. Merton (1974) initiated the credit risk theory otherwise called the structural theory, which said that all defaulted assets derive from a firm's asset evolution modeled by a diffusion process with constant framework. Such reports are commonly defined "structural model" and based on variables related to a specific issuer.

The advancement of this category is represented by a set of models where the loss conditional on defaulted asset is specific. In these models, the default can happen all over the life of a corporate bond or such security and not only at maturity (Longstaff and Schwartz, 1995). Many researchers including Al Amari (2002) call attention to the importance of using credit rating models in assessing credit risk. However, Al Amari (2002) assert that there is no optimal method. This suggested that one model of rating credit risk might work with specific financial institution.

I used this theory to explain how banks use credit information in credit scoring and subsequent lending.

2.3 Empirical Review

Timeline and trustworthiness of the data reported by financial institutions to credit reference bureaus is always enforced by determining deviants that they will be excluded from access to the common data base (Smith, 1998). Credit reference bureaus such as Duns & Bradstreet in the US, can be considered as voluntary information sharing operations, so far as they draw a large section of their data from lenders and borrowers, who in return obtain preferential access to their data (Alvarado, 1999). The results demonstrate that credit bureaus in US are associated with higher levels of financial access do not have any substantial effect on mitigating financial access constraints.

The type of information shared in bureaus is mainly black information such negative information is defaults. The use of Credit Reference Bureaus extends to sharing information merged from other sources such as criminal records, tax records and the data of information is compiled together and used to assign credit scores of borrowers based on statistical risk analysis (Carolina, 1999).

According to Akerlof (1970), adverse selection implies that there are qualitatively different types of credit seekers. In contrast with high quality borrowers, low quality borrowers are not capable to use the borrowed money for valuable investment and they will have a relatively large chance to fail on payment of the loan. Banks consequently prefer to select high quality credit seekers and the major way of examining a potential borrower is by analysing all available information, Leland and Pule (1977). The alternative results from the behaviour of lower number of loan quality applicant that presumes to submit high quality project but do not forward all relative information.

In the model developed by Pagano and Jappelli (1993), shared credit information upgrade the pool of borrowers, reduces defaults and decreases interest rates. It can also lead to growth of lending. When banks are local monopolists, however, in some cases lending reduces, because the exchange of credit information increases the banks' possibility of price discrimination between safe and risky borrowers and the increase in lending to safe borrowers does not fully compensate for the reduction in that too risky types. as result when financial institutions are competitive, lending level is more likely to increase: competition limits the banks' ability to charge more interest from their clients and credit information sharing increases banking competition.

As per Pauly (1968), if the concept of moral hazard is applied to a lending and borrowing circumstance, it means that the customer to whom a loan has been extended controls the money of the lending institution. In such instances, the customer may use the money for his own interest and not consider the percentage stake of the bank. Banks thus need to monitor their clients by incentives of interest as all principals do with their agents. Monitoring however requires some guarantees that proper information will be provided. Moral hazard models also recommend that credit information sharing should decrease level of default loans and interest rates and increase lending level, either

because credit reference bureaus promoting competition by reducing informational rents, Padilla and Pagano (1996) or because they punish borrowers (Padilla and Pagano, 1997). In severe cases, information exchange may make lending feasible in markets where no credit would be extended otherwise. In this model, whenever banks choose to share credit information they bring about a Pareto improvement by raising customers' welfare along with their own profits. Padilla and Pagano (1997) mention that the effect of credit reference bureaus arises only from the exchange of negative information. Credit information about past defaults generates fear of social stigma. Sharing white information, i.e. Data on borrowers' characteristics, while fading adverse selection effects, may actually decrease the effect of credit information sharing. Consequently, the reasonable benefit of sharing black and white information depends on the relative importance of moral hazard and adverse selection problems in the market. Results suggest show that collaboration of CRB and commercial banks increasing information sharing positively affects financial performance and resilience. On the other hand, lending extension is influenced by availability of information.

Credit information play a crucial role because there is generally a definite relationship between past and future performance in loan repayment. Very often, this history is not within the bank's reach because the potential borrower's repayment records are scattered in the various archives of the other financial institutions where the customer has previously borrowed. Whenever public or clients have credit information that the lender cannot access, this is officially referred to as information asymmetry. Kalberg and Udell (2003) also point out that information exchange from multiple sources improves the precision of the signal about the quality of the credit seeker. As a result, the default rate reduces. In contrast, the disciplinary effect on lending is unclear, because when banks exchange credit information about their clients' categories, the implied increase in lending to good borrowers may fail to compensate for the reduction in lending to risky borrowers. Banking competition for loan applicants extend the positive effect of credit information sharing, when credit markets are competitive, information sharing reduces informational interest charged and increases banking competition, which in turn leads to increased lending. Klein (1992) shows that sharing of credit information can inspire borrowers to pay their loans, when the legal framework makes it difficult for banks to implement credit agreements. In this model borrowers repay their loans because they know that defaulters will be blacklisted due to share of credit information, reducing external finance in the near future.

Bennardo et al. (2009) find that over-indebtedness can be reduced through sharing of credit information among lenders and banks as individual borrowers classified as highly indebted receive less credit and ultimately reduce the over-indebtedness of borrowers. Brown and Zehnder (2007) again established that the financial institutions would fall down in the absence of credit information sharing and reputational banking. Their study further reported that credit information sharing encourages borrowers to honor their loans thereby allowing lenders to identify borrowers with good credit history.

Kallberg and Udell (2003) also show that credit information provided by credit reference bureaus have powerful default anticipative ability, hence making banks more resistant to adverse selection and in turn reducing bank non-performing loans. Barron and Staten (2003) again offer evidence that lenders can significantly reduce level of defaulted loans by sharing and involving more complete and in-depth borrower information in their predictive models. Jappelli and Pagano (2002) show that credit information sharing increases lending level and decrease defaulted loans. Also, Padilla and Pagano (2000) confirm that credit information sharing institutions can raise the borrowers' cost of default loans and thereby increasing loan repayment by borrowers, hence moral hazard reduced.

Pagano and Jappelli (1993) acknowledge that credit information sharing decrease adverse selection. That is information sharing among lenders allow loans to be advanced to good borrowers who would not have received loans or credit where banks or lenders did not share credit information on borrowers. This leads to the increase of lending level in the credit market. The results show that borrowers' information influence financial performance and resilience means credit bureaus have a higher incidence on banking system efficiency and financial activity.

Table 2.1 Summary of positive impact on empirical studies.

Author	Focus of the study	Findings
Jappelli & Pagano 2002.	Impact of CRBs at the economy wide level.	The presence of CRBs leads to higher levels of lending and lower credit risk. They found no difference in the effect between the private and public CRBs on credit market performance.
Kallberg & Udell 2003.	Assessing the role of business credit information in determining borrower quality.	Business credit information is a powerful indicator of borrower quality and in predicting if firm will default or not.
Djankov, Mcliesh, Sheleifei 2005.	Private credit in 129 countries.	Countries with private bureaus increased lending by 21% compared to an increment of 7% in public bureaus.
Turner, Varghese & Walker 2008	The Structure of information sharing and credit access: lessons for policy.	There was a significant increase credit acceptance rate for minorities in America after introduction of CRBs. 28.1% for Caucasians and 35.5% for minorities. The study also showed that credit information sharing had both micro and macro positive impacts on the economy.
Doblas-Madrid & Minetti 2010	The disciplining effect of credit information sharing.	The credit bureaus are associated with a drop in default rate by 13% on average (37%) for the maximum.

By OECD 2010

Discussion Paper on Credit
Information Sharing

Private credit bureaus are better at reducing adverse selection than public credit registries. This is because most public credit registries only contain information on supervised institutions and the data is more constrained. public credit registries are often also subject to stricter privacy laws than private bureaus. So many will only report on the aggregate credit exposure of an individual or a firm.

Dierkes, Erner, Business credit information sharing and
Langer & Norden default risk of private firms.
2012

Credit information sharing increases the overall accuracy of default prediction. The default prediction accuracy is higher in older firms and those with limited liability. The higher the depth and quality of credit information the lower the default rates.

Table 2.2 Summary of contradicting impact empirical studies

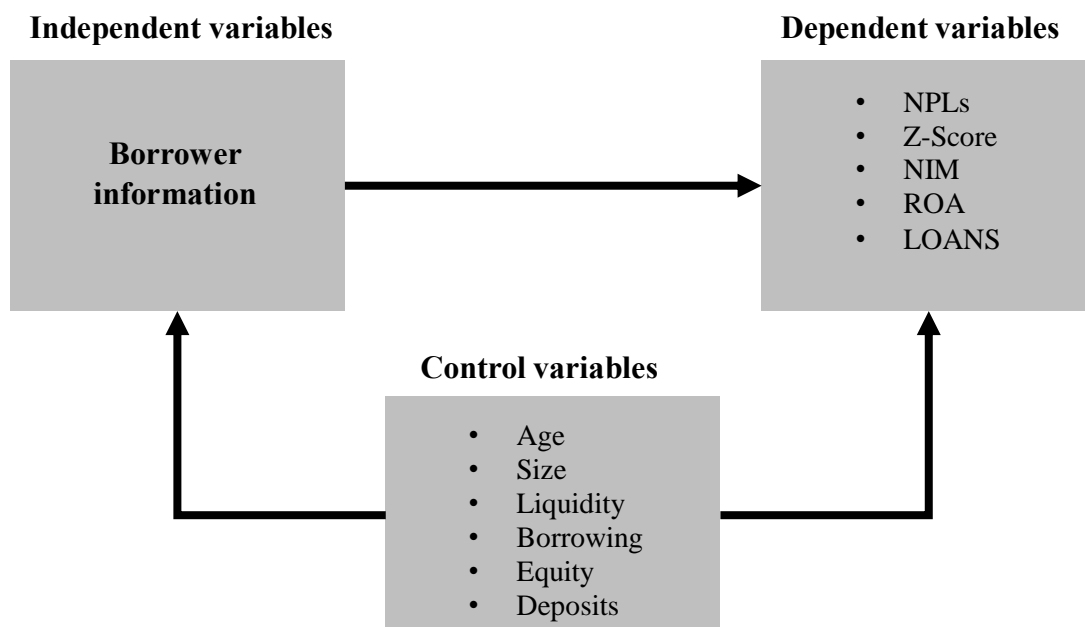
Author (s)	Focus of the study	Findings
Vercammen 1995	Credit Bureau Policy and Sustainable Reputation Effects in Credit Markets.	There is a reputation effect where lenders become increasingly informed about their borrowers. Information sharing mechanism is therefore not sustainable in the long run. He recommends implementation of policies that restrict flow of information which may be desirable from a social efficiency perspective.
Riestra 2002	Necessity of credit information sharing and the role of CRBs in the assessment of the borrowers' ability to repay incurred debts.	Collection of comprehensive information by CRBs does not ensure ability to anticipate occurrences of defaults or over indebtedness. He also found that the cost of collecting positive data raises the cost for credit in institutions which will ultimately increase the cost for consumers.

2.4. Literature Gap

A number of studies have been carried out about many aspects of credit reference bureaus and nonperforming. None of them addresses the impact of borrowers' information on banks' performance and resilience. This study has the following objectives: to establish the levels of bank performance with the establishment of CRB in Rwanda, to identify the levels of bank resilience with the establishment of CRB in Rwanda and to assess the effects of borrower information on bank performance and resilience.

This study therefore seeks to establish the impact of credit reference bureaus after its establishment and credit information sharing on nonperforming. So far, there has been slim empirical evidence on the impact of credit reference bureau and credit information sharing on banks' performance and resilience in Rwanda. This paper attempted to fill this gap and foster research in this important area for credit reference bureaus and credit information sharing.

Figure 2. 1. Conceptual Framework



The conceptual framework indicates borrower information as independent variables. On the other hand, NPLs, Z-score, NIM, ROA and loans are dependent variables and age, size, liquidity, borrowing, Equity and Deposits are control variables. The study was guided by the assumption that both credit reference bureaus, borrower information and control variables influencing loan performance, Z-score and loans in commercial banks in Rwanda. The interrelation of these section completes the framework for certain expected outcomes. This shows that credit reference bureau is one of the promoters of loans performance and control variables are the acceleration in

this situation, when people borrowed from a range of banks with no purpose of repaying the loans. In an environment with information sharing, there would be an intervention of CRB by sharing information about defaulters and borrowers realize that if they default, their reputation with all other potential lenders is compromised, which in turn will make it more difficult and/or more expensive to receive future credit because of loans defaulted. Consequently, by enhancing borrowers' incentives to repay, both CRB and banks must tends to deal with control variables to reduce the moral hazard problems that arise after the contract is signed (Vercammen,1995; Padilla and Pagano, 1997, 2000). Information sharing is therefore likely to reduce the level of nonperforming loan.

CHAPTER 3: RESEARCH METHODOLOGY

3.1. Introduction

This section explain the method used in this research. Basically, different methods of this research serve different results. Data are desirable and obtained from the different annual reports of commercial banks and Rwandan central bank website. I am interested in investigating the impact of Credit reference bureau on financial performance and resilience/stability of commercial banks in Rwanda, I used panel data. The panel data consists of 6 commercial banks over the period of 2007- 2018.

3.2. Research Design

This study followed quantitative design using longitudinal/panel data to measure the effect of borrowers'information on performance and resilience of banks in Rwanda. I am interested in exploring what happens to banks (Financial performance and resilience) before and after the Central Bank introduce credit reference bureaus. The Rwandan CRB was introduced in 2009. Basing on data availability, I assessed banks' performance and resilience starting in 2007 to 2009 (based on data availability) before the Central bank introduced credit reference and 2009-2018 when CRB is operating. Data was collected on performance and resilience of commercial banks and other bank and country-level controls. Bank-level information will be sourced from annual reports of 6 commercial banks operating in Rwanda during the period 2007-2018. Country-level data was sourced from the National Bank of Rwanda website as well the other from the World Bank.

3.3. Population and sample of the study

This study aims at analysing the impact of borrowers'information on financial performance and resilience of commercial banks in Rwanda, needed data were collected from financial reports of banks. According to the research objectives, the population of interest are the commercial banks that have been selected and are in operation before and after the establishment of CRB. According to NBR Monetary and Financial Stability statement of the 28th of August 2020¹, there are 16 banks operating in Rwanda of which 11 are Commercial banks, 3 are Microfinances, 1 Cooperative bank, and 1 Development bank. The population considered for this study are

¹ National Bank of Rwanda (2020) Monetary Policy and Financial Stability Statement of 28th August 2020 available on <https://www.bnr.rw/news-publications/publications/monetary-policy-financial-stability-statement/> accessed on 5th September 2020

commercial banks. Basing on the availability of data, only six commercial banks were selected as the study sample namely access bank, BK, BPR, CogeBanque, Ecobank, I&M bank. I observed the performance and resilience of these banks over the period of 2007 to 2018.

3.4 Measurement of Variables

3.4.1 Dependent Variables

In this study there are two dependent variables namely resilience and performance, where resilience is presented by NPL and Z-score and performance by ROA, Loans and NIM

3.4.1.1 Non performing Loan

According to Mutarindwa, Schafer & Stephan (2020), NPLs are loans for which the borrower fails to pay principal and interest over a longer period, and therefore violates the terms and conditions of the loan contract. When a borrower hasn't made scheduled payments for principal and interest at least 90 days, the loan is considered a nonperforming loan, or NPL. Bank nonperforming loans equal to total gross loans are the value of nonperforming loans divided by the total value of the loan portfolio (including nonperforming loans before the deduction of specific loan-loss provisions).

$$\text{NPL ratio} = \text{NPLs} / \text{Gross loan}$$

Data pertaining to NPL will be obtained from banks' annual Reports.

3.4.1.2 Z-score

Z-score is an indicator of bank resilience and for this study, it is considered as another dependent variable. A higher Z-score above 1(100%) indicates that banks are stable. Z-score is computed as:

$$\text{Z-score} = \frac{\text{ROAA} + \text{Capital ratio}}{\sigma(\text{ROAA})}$$

where ROAA is the return on average assets, capital ratio is equity to total assets and $\sigma(\text{ROAA})$ is the standard deviation of ROAA. Data for this variable will also be obtained from banks' annual reports.

3.4.1.3 Net Interest Margin (NIM)

The net interest margin (NIM), that is the ratio of net interest income to the average earning assets (interest earning assets) or net interest profitability. This indicator is less frequently encountered in reports and statistics compared to returns on assets (ROA) or returns on equity (ROE). However, it does succinctly summarize the effectiveness of banks'

interest bearing assets. The larger the net interest margin, the more successfully does the bank manage its' interest bearing assets

3.4.1.4 Return on Asset (ROA)

Return on assets defined as total income over total assets. These variables 'data are obtained from the financial reports of commercial banks, however analysis contains returns on assets for individual banks, that is the ratio of total profits of the banking sector to the total assets.

3.4.1.5 Loans

Another performance measure used is the quantity of loans offered by commercial banks to customers. A loan is the lending of money incurred by an individual or other entity. The lender usually an individual firm, corporation, financial institution, or government liable to pay interest on debt. In return, the borrower agrees to pay a certain set of amount or assets including any finance charges, interest, repayment date, and other conditions. For instance, the lender may require collateral like property to secure the loan and ensure repayment. Loans may also take the form of securities, bonds and certificates of deposit. Value of loan is value of loanable assets. Information on loans will also be sourced from banks' financial statements in their annual reports. Since this is expressed in values, I will transform this into natural logarithm to offset outlier effects.

3.4.2 Independent Variables

3.4.2.1 Borrowers'information

The borrowers'information are provided by credit reference bureau, CRB is an establishment accredited by the Central Bank of Rwanda to accumulate, stockpile, and collate credit information on individuals and corporations from various sources and provides the information in the form of a credit statement upon the application of a financier (NBR, 2009). Credit reference bureaus enable information sharing about a borrower's characteristics and their indebtedness. To measure CRB I will use dummy variables 0 and 1, where 0 will be the period before the introduction of CRB and 1 after its introduction and information to use in measurement will be collected from NBR website.

3.4.3 Control Variables

1. **Age** is also an important variable on the firm's performance as it tells about the experience possessed by the firm in the operations. According to Ericson & Pakes (1995), firms are learning

and over time they discover what they are good at and learn how to be more efficient. Age measured by counting the time when the bank was established/incorporated in Rwanda. This information will be obtained from banks' websites (history page).

2. **Size** of the firm has shown to have an impact on performance due to the advantages faced by the firms with a particular level of growth. Banks size is measured using total assets as a proxy. In this study, total assets will be transformed into natural logarithms to avoid outlier effects as well. Data on this variable will be collected from banks' annual reports.

3. **Bank liquidity:** It is important to honor the immediate demand of depositors which has significance on the survival and sustainability of banks' existence. Liquidity measured by taking liquid funds divided by total interest-bearing liabilities. And information will take from banks' annual reports.

4. **Equity:** Equity describes the value of an asset after subtracting the value of any liabilities on the asset. equity can refer to the value of a corporation's stock, and it helps determine the ability of the bank's owner or shareholders to continue funding its operations. Equity can be found on a bank's balance sheet and is one of the most common pieces of data employed by analysts to assess the financial health of a bank.

5. **Deposits** A deposit is a financial term that means money held at a bank or a sum of money placed or kept in a bank account, usually to gain interest. A deposit is a transaction involving a transfer of money to another party for safe keeping. Some bank deposits at commercial banks (demand deposits) are part of the money supply calculated by the federal reserve.

3.5. Estimation approach

To assess how the introduction of credit reference bureaus affect bank resilience and performance, an OLS estimation technique is used and the following equation shows the regression model used.

$$\text{Performance/resilience}_{it} = f(\text{CRB}_{t+} + \text{bank controls}_{it}) + \epsilon_{it}$$

According to the formula, the performance and resilience of commercial bank equal to function of summation of credit reference bureau, bank controls at firm/bank level and error time over specific time

Where:

i: individual firm / bank

t: Time

ϵ : Error time

f: Function

3.6 Data analysis

I used STATA software to analyse, interpret and communicate the results. Descriptive statistics, correlation and regression were reported in the analysis section.

3.7. Limitation and Ethical issues

Some important ethical concerns that should be taken into account while carrying out research are: anonymity, confidentiality and informed consent. The study is limited to the availability of data. However, this study focuses to the impact of borrower information on performance and resilience. The financial means, proximity and time period allocated to this study would not allow for an extensive research into the topic. In spite of these limitations, it hoped that this work would provide useful insights into the academic area The study is limited to the period of 2007 up 2018. The ethical issues must take into consideration when collecting data. in conducting my research using the data for academic purposes only is also very important ethically and I will often specify the source of data, designing the study, consent methods, statistical methodology, and interpretation of the results.

CHAPTER 4: PRESENTATION OF THE FINDINGS

4.1. Introduction

The research data was gathered exclusively through financial reports as the sample from the following six commercial banks.

4.1.1 Profile of sampled banks

1. Access Bank Ltd is the sixth largest bank in Nigeria by asset, officially acquired BANCOR SA after its successful acquisition of a 75% stake. Access Bank (Rwanda) Ltd is a commercial bank that operates in Rwanda. The bank was officially launched in January, 2009 after fulfilling all regulatory requirements. Formerly BANCOR S.A Rwanda and created in 1995 by foreign investors, the bank was restructured in 2001 after its takeover by Rwandan and South African private investors. the Bank has since expanded its operations by extending its network to Rubavu, Musanze, Rusizi, etc. in 2018 access bank has total loans of USD 28788339; total deposit USD 76269869; Return on assets ratio 0.017; return on equity 0.159; cost to income ratio 0.122; net margin 0.167; Liquidity ratio 0.759 and 159 employees in Rwanda.

2. Bank of Kigali was incorporated in the Republic of Rwanda on December 22nd 1966 as a joint venture between the Government of Rwanda and Belgolaise, the subsidiary of Fortis Bank. The public private partnership involved the ownership of 50% of the ordinary share capital. In compliance with revised laws relating to private companies in Rwanda, in 2011 the Bank changed its name from Bank of Kigali S. A to Bank of Kigali Limited and to BK Group PLC in 2017 with 3 subsidiary companies namely BK General Insurance, BK TecHouse and BK Capital. Bank of Kigali in 2018 has total equity USD 100396008; total deposits USD 762698690; borrowings USD 4323789; net income USD 16570950; total revenue USD 99063132; loans to deposit ratio 0.377; return on assets ratio 0.017; return on equity 0.159; cost to income ratio 0.122; net margin 0.167; liquidity ratio 0.759; 79 branches and 1200 employees.

3. Banque Populaire du Rwanda Public Limited Company (BPR PLC), formerly Banque Populaire du Rwanda SA, is a commercial bank in Rwanda. The bank is licensed by the National Bank of Rwanda, the central bank and national banking regulator. BPR is a retail (consumer) bank, offering products that include current and savings accounts, debit and credit cards, mortgages and loans. As of December 2018, BPR was a medium-sized financial services provider in Rwanda. Its total asset valuation was RWF:273.201 billion (US\$320 million), with RWF:42.568 billion (US\$50 million) in shareholder funds with 163 branches. In 2018, BPR employed about 1,411 staff at that time. However, following the acquisition by Atlas Mara, and the merger with BRD

Commercial, about 300 people were terminated after acquisition. BPR in 2018 has total deposits USD 217262721; borrowings USD 2488048; net income USD 5412825; total revenue USD 39405849; loans to deposit ratio 0.801; return on assets ratio 0.019; return on equity 0.134; Cost to income ratio 0.096; Net Margin 0.6001; Liquidity ratio 0.137.

4. Cogebanque was established in July 1999 by forty-two private Rwandan investors. At that time, the insurance company Compagnie Générale d'Assurance et de Reassurance (COGEAR), was the largest shareholder, with 34% ownership. Has 29 branches with 497 employees staff and in 2018 has total equity USD 26436833; total deposits USD 139222551; borrowings USD 32989430; net income USD 4793846; total revenue USD 27684635; loans to deposit ratio 0.889; return on assets ratio 0.023; return on equity 0.181; cost to income ratio 0.794; net margin 0.173 and liquidity ratio 0.185

5. Ecobank Rwanda is located in Kigali, Rwanda and is part of the Banks & Credit Unions Industry. Ecobank Rwanda has 350 employees at this location and generates \$22.91 million in sales (USD). There are 232 companies in the Ecobank Rwanda corporate family. Has 19 branches; total equity USD 175488258; total deposits USD 126888128; borrowings USD 361485925; net income USD 4681436; total revenue USD 25879591; loans to deposit ratio 0.965; return on assets ratio 0.224; return on equity 0.214; cost to income ratio 0.568; net margin 0.222 and liquidity ratio 0.295.

6. I&M bank was opened in 1963 under the name (French "Banque Commerciale du Rwanda" (BCR)) or "Commercial Bank of Rwanda". In the beginning, it was wholly owned by the Government of Rwanda. In 2004, it was privatized. As of April 2010, Actis Capital owned 80 percent and the Rwandan government owned the remaining 20 percent of the financial institution. Actis Capital is a private equity investment firm, headquartered in London, United Kingdom, that specializes in investments in developing countries. The firm's investment portfolio was almost US\$5 billion as of April 2010.

In July 2012, Actis Capital divested from BCR by selling its shares to a consortium comprising the I&M Bank Group from Kenya, PROPARCO from France, and the German Investment Corporation. The Rwandan government retained its shares in the bank. In August 2013, the bank rebranded to I&M Bank (Rwanda) to reflect its current shareholding. In 2018 I&M bank Has 14 branches; total equity USD 39567498; total deposits USD 192840285; borrowings USD 14362917; net income USD 10817422; total revenue USD 38218621 loans to deposit ratio 0.876; Return on assets ratio 0.036; Return on Equity 0.273; Cost to income ratio 0.484; Net Margin 0.283 and Liquidity ratio 0.099.

4.2. Descriptive statistics

This chapter presents findings from the study. The results are presented in accordance with the sets of statistics; correlation matrix, and regressions respectively.

Table 4.1 Summary statistics:

Variable	Obs	Mean	Std. Dev.	Min	Max
Age	67	30.73	15.04	9	55
Log (total loans)	58	18.05	1.008	16.03	20.16
Log (liquid assets)	58	17.00	0.654	15.03	18.26
Log (total assets)	58	18.78	0.781	17.39	20.59
Log (total equity)	58	17.27	1.043	15.79	19.09
Log (total deposits)	58	18.41	0.758	16.83	20.09
Log (total borrowings)	58	16.27	1.903	13.53	19.70
NPL ratio	58	5.564	2.567	2.1	13.5
NIM	58	0.143	0.1172	0.3	0.343
ROA	58	0.032	0.035	-0.043	0.224
Year	67	2012	3.246	2007	2018
Z-score	58	0.159	0.101	0.095	0.924

Table 4.1 reports descriptive statistics for the variables used in this study for the period 2007-2018. Results show that the banking industry in Rwanda has older banks as the average age of the bank is 30 years old with the oldest aged 55 years and the youngest aged 9 years. In terms of stability, results show that banks have lower non-performing loans (below the 7% standard) but with lower z-scores (far less than 100% standard) of 15%. In terms of performance, banks return on assets are on average as low as 3% while intermediation costs are as higher as 14% across all banks in the sample.

In other findings, banks lend on average about 18 million US dollars and keep liquid assets as higher as 17 million US dollars. The average bank size is 18 million USD as total assets and total equity on average stands at 17 million US dollars. Results also show that banks keep on average 18 million USD as deposits and borrow on average 16 million US dollars.

Table 4.2. Correlation Matrix

	Age	CRB	NPL ratio	ROA	NIM	Z-score	Log (total loans)	Log (liquid assets)	Log (total assets)	Log (total equity)	Log (total desposits)	Log (total borrowings)
Age	1.0000											
CRB	0.2626	1.0000										
NPL ratio	0.2065	0.0212	1.0000									
ROA	0.0464	-0.1483	-0.3663	1.0000								
NIM	0.4156	0.1447	-0.5821	0.3792	1.0000							
Z-score	0.0187	0.0880	0.1419	-0.0484	0.1784	1.0000						
Log (total loans)	0.6858	0.3853	0.1785	0.0010	0.3442	0.0693	1.0000					
Log (liquid assets)	0.3106	0.2441	-0.1197	0.0694	0.4340	-0.1457	0.1619	1.0000				
Log (total assets)	0.7280	0.3449	0.1482	0.0495	0.4284	-0.0271	0.9602	0.2104	1.0000			
Log (total equity)	0.1932	0.0792	-0.1489	0.4618	0.3254	0.0304	0.5696	0.0096	0.5890	1.0000		
Log (total desposits)	0.7837	0.3379	0.2258	0.0007	0.3646	0.0143	0.9489	0.2177	0.9743	0.4763	1.0000	
Log (total borrowings)	0.2920	-0.0967	-0.3000	0.5229	0.1519	0.0174	0.2507	-0.1274	0.2518	0.7768	0.1219	1.0000

Table 4.2 reports correlation matrix results. Most variables are not highly correlated to each other (correlation coefficients are less than 0.7) except a few variables including deposits-total assets; loans-deposits; loans-total assets whose correlations are above 0.9. They are included in subsequent regressions for a number of reasons. We include deposits and total assets as these appear on different sides of the balance sheets and thus, they do not convey the same meaning. Second, both loans and deposits are included because deposits serve as key inputs for bank lending and in our regression, one is a dependent variable (loans) and another is a control variable (deposits). Although bank assets include loans, they can be used together in the regressions as total assets is a proxy for banks' sizes, and loans are used as bank performance measures in our regressions.

Other descriptive results:

Table 4.3 reports means and standard deviation of dependent variables per bank in the sample studied. On average, there are no significant differences among banks with respect to lending. Results show that on average, Bank of Kigali lends more (19.4 million US Dollars) compared to other banks. Among all the banks, Access bank on average lends less (16.6 million US Dollars). With respect to bank resilience, most banks' z-scores are in the same range and overall, bank resilience is low (below 1 or 100% which is the standard). In terms of the cost of intermediation (net interest margins), all banks incur little intermediation costs in lending. In terms of loans defaults, Banque populaire has on average higher non-performing loans with the ratio of 10% compared to other banks in the sample.

Table 4.3. Dependent variable by Bank

Bank name	Log (total loans)	Z-score	NIM	NPL ratio	ROA
Access bank:					
Mean	16.63	0.113	0.107	5.190	0.017
Std.dev	0.500	0.012	0.067	1.232	0.010
Bank of Kigali:					
Mean	19.44	0.134	0.243	5.756	0.036
Std.dev	0.443	0.019	0.058	0.837	0.008
BPR					
Mean	18.54	0.230	-0.017	10.578	0.002
Std.dev	0.334	0.261	0.113	1.788	0.019
COGEBANQUE:					
Mean	18.18	0.163	0.146	3.956	0.019
Std.dev	0.346	0.050	0.067	0.648	0.009
ECOBANK:					
Mean	17.86	0.185	0.128	4.572	0.068
Std.dev	0.602	0.053	0.066	0.994	0.056
I&M bank:					
Mean	18.28	0.138	0.289	3.425	0.040
Std.dev	0.484	0.013	0.040	1.56	0.008
Total					
Mean	18.09	0.160	0.144	5.568421	0.031
Std.dev	0.980	0.110	0.117	2.589194	0.034

Table 4.4. below report comparative results of other bank characteristics in the sample. results show that I&M bank is the oldest bank having been incorporated in the 1960s as Banque Commerciale du Rwanda (BCR) and was acquired by I&M bank holdings to become I&M bank Rwanda. COGEBANQUE is the youngest in the industry (sample) and was incorporated in Rwanda as a new bank in 1999. Access bank is a foreign-owned bank by Access bank group PLC from Nigeria. It was incorporated in Rwanda through the acquisition of former BANCOR bank in August 2008. Ecobank, a pan African bank was incorporated in Rwanda as formerly BCDI, and later was acquired by Ecobank Transnational (ETI) from Lomé, Togo. It now operates as branch of Ecobank.

In other bank characteristics, Table 4.4. shows that banks are on average of the same size (total assets) in the range of 17-18 million US Dollars. Banks on average also hold comparable liquid assets as shown in the table. In terms of deposits, Bank of Kigali holds higher deposits compared to other banks. In terms of bank borrowing, Ecobank borrows more than other banks on average.

Table 4.4. Other bank characteristics by bank:

Bank name	Age	Log (liquid assets)	Log (total assets)	Log (total equity)	Log (deposits)	Log (borrowings)
Access bank:						
Mean	18	17.39	17.80	15.97	17.49	14.47
Std.dev	3.31	0.223	0.334	0.114	0.444	0.668
Bank of Kigali:						
Mean	47	17.17	20.08	18.34	19.61	16.91
Std.dev	3.316	1.237	0.288	0.356	0.324	0.537
BPR:						
Mean	38	16.78	18.98	16.75	18.82	14.59
Std.dev	3.316	0.275	0.34	0.604	0.258	0.395
COGEBANQUE:						
Mean	14	16.55	18.69	17.03	18.30	17.03
Std.dev	3.316	0.497	0.381	0.791	0.329	0.483
ECOBANK:						
Mean	19	16.88	18.57	18.51	18.00	19.16
Std.dev	3.317	0.397	0.403	0.488	0.371	0.316
I&M:						
Mean	50	17.37	18.92	16.98	18.62	14.74
Std.dev	3.316	0.298	0.396	0.363	0.295	1.100
Total						
	31	17.02	19	17.26	18.42	16.22
	14.99	0.640	0.772	1.051	0.758	1.887

4.3 Regression results:

The aim of this study is to assess the extent to which establishment of credit reference bureaus, shortened as CRB, contribute to bank performance and stability/resilience taking the sample of 6 commercial banks operating in Rwanda during the period 2007-2018. This study uses Ordinary least squares regression (OLS) using fixed effects models. Regression results pertain to performance (lending, intermediation and return on assets) and stability (non-performing loans and z-scores) and are reported in tables 4.5; 4.6; and 4.7, respectively. Baseline regression results are reported in Table 4.5 below:

Table 4.5. Baseline regressions

	(1)	(2)	(3)	(4)	(5)
	NPL ratio	ROA	Log (total loans)	NIM	Z-score
CRB	-1.445*** (-0.78)	0.000266 (0.01)	-0.0366 (-0.20)	0.0341** (0.47)	0.0129 (0.15)
Age	-0.0702 (-1.40)	0.0014** (2.40)	0.00141 (0.29)	0.00395** (2.01)	0.000829 (0.36)
Log (liquid assets)	-0.718 (-1.38)	0.00736 (1.20)	-0.100** (-1.98)	0.0626*** (3.07)	-0.0325 (-1.37)
Log (total assets)	-2.511 (-0.87)	-0.0461 (-1.36)	-0.119 (-0.43)	0.305*** (2.70)	-0.363*** (-2.77)
Log (total equity)	0.463 (0.67)	0.00635 (0.78)	0.0204 (0.30)	-0.0119 (-0.44)	0.0203 (0.64)
Log (total deposits)	4.563* (1.65)	0.0146 (0.45)	1.306*** (4.87)	-0.317*** (-2.94)	0.333*** (2.65)
Log (total borrowings)	-0.757* (-1.72)	0.014*** (2.75)	0.0919*** (2.15)	0.00804 (0.47)	0.0183 (0.91)
Cons	-11.24 (-0.66)	0.118 (0.59)	-3.865 (-2.33)	-0.891 (-1.33)	0.719 (0.92)
N	57	57	57	57	57

t statistics in parentheses. $p < 0:10$, $p < 0:05$, $p < 0:01$

Table 4.5 reports results on the effects of credit reference bureaus and other bank-level variables on the performance and stability of commercial banks. Column 1 shows that higher levels of information sharing (proxy by CRB) reduces significantly non-performing loans in all banks. The coefficients are negative and highly significant. Credit bureaus moderately increases banks' return on assets, lending, as well as

banks' resilience (Z-scores). However, it does not reduce the cost of intermediation. These results may imply that cost reduction could be a bank-level strategy and thus may not be explained by credit bureaus. Column 2 of Table 4.5 shows that older banks have higher returns on assets, moderately have lower non-performing loans and moderately lend more, and are relatively stable compared to younger banks. In other findings, banks that hold higher liquid assets and lend little. These results concur with previous studies on African financial systems (e.g. Honohan and Beck, 2007; Andrianova et al., 2015) that because of no trust on opaque customers, African banks tend to lend little and instead hold higher liquid assets. Findings in Table 4.5 also show that banks incur higher operational and intermediation costs in managing loans and loans defaults. Results also show that big banks are neither higher performers nor highly stable.

In other findings, results in Table 4.5 show that banks significantly convert deposits into loans and deposits help them reduce the cost of intermediation and increases their stability. Finally, bank borrowings reduce their non-performing loans, increases their return on assets and significantly increases loanable assets.

Other findings:

This study also attempts some alternative estimations. Specifically, it assesses whether there are differences in banks' performance and stability prior to the establishment of the CRB and after its (CRB) establishment and operations. The Rwanda credit reference bureau was established by the central bank (NBR) in 2009. This study runs to estimations. The first estimation pertains to the period before the bureau was established and results are reported in Table 4.6. The second estimation pertains to the period after 2009 and results are reported in Table 4.7.

Table 4.6. Regression results for Pre-2009 period

	(1)	(2)	(3)	(4)	(5)
	NPL ratio	ROA	Log (total loans)	NIM	Z-score
CRB	-1.445**	0.000266	-0.0366	0.0341	0.0129
	(-0.78)	(0.01)	(-0.20)	(0.47)	(0.15)
Age	-0.0702	0.00142**	0.00141	0.00395**	0.000829
	(-1.40)	(2.40)	(0.29)	(2.01)	(0.36)
Log (liquid assets)	-0.718	0.00736	-0.100***	0.0626***	-0.0325
	(-1.38)	(1.20)	(-1.98)	(3.07)	(-1.37)
Log (total assets)	-2.511	-0.0461	-0.119	0.305***	-0.363***
	(-0.87)	(-1.36)	(-0.43)	(2.70)	(-2.77)
Log (total equity)	0.463	0.00635	0.0204	-0.0119	0.0203
	(0.67)	(0.78)	(0.30)	(-0.44)	(0.64)
Log (total deposits)	4.563*	0.0146	1.306***	-0.317***	0.333***
	(1.65)	(0.45)	(4.87)	(-2.94)	(2.65)
Log (total borrowings)	-0.757*	0.0143***	0.0919**	0.00804	0.0183
	(-1.72)	(2.75)	(2.15)	(0.47)	(0.91)
Cons	-11.24	0.118	-3.865	-0.891	0.719
	(-0.66)	(0.59)	(-2.33)	(-1.33)	(0.92)
N	57	57	57	57	57

t statistics in parentheses. $p < 0:10$, $p < 0:05$, $p < 0:01$

Results in Tables 4.6 and 4.7 show that there are significant differences between the periods pre-2009 and post-2009 for the effects of credit reference bureau on the performance and stability of banks operating in Rwanda. The differences are observed on the changes in the coefficients (economic size) as well as the significance levels. Specifically, whereas findings in Table 4.6 are similar to the overall results reported in Table 4.5, results in Table 4.7 for the period after 2009

show significant changes with respect to the effects of credit reference bureaus on the performance and stability variables. The coefficients on non-performing loans increase from -1.455 to -15.44 and significance levels increase from 0.005 to 0.001 implying that there was a significant reduction in banks' non-performing loans after the establishment of the CRB. For dependent variables, the coefficient significantly increases such as on return on assets, loans, net interest margin and Z-scores. Other variables do not significantly change post-2009 period implying that credit reference bureaus have a very higher positive impact on both performance and stability of banks compared to other bank-level variables. This leads to the confirmation of this study's hypothesis that higher levels of information sharing among banks as provided by CRBs increases the probability of banks' resilience and their performance.

Table 4.7. Regression results for Post-2009 period

	(1)	(2)	(3)	(4)	(5)
	NPL ratio	ROA	Log (total loans)	NIM	Z-score
CRB	-15.4*** (-0.80)	0.241 (1.09)	-2.991 (-1.64)	-0.821 (-1.09)	1.142 (1.32)
Age	-0.0734 (-1.28)	0.0019*** (2.97)	0.00520 (0.96)	0.00379* (1.70)	0.00242 (0.94)
Log (liquid assets)	-0.735 (-1.31)	0.00382 (0.60)	-0.128** (-2.42)	0.065*** (2.99)	-0.0431* (-1.72)
Log (total assets)	-2.749 (-0.78)	-0.0865** (-2.15)	-0.423 (-1.27)	0.337*** (2.45)	-0.480*** (-3.04)
Log (total equity)	0.478 (0.65)	0.00285 (0.34)	-0.00483 (-0.07)	-0.0106 (-0.37)	0.00977 (0.30)
Log (total deposits)	4.965 (1.51)	0.0485 (1.29)	1.562*** (5.03)	-0.35*** (-2.75)	0.428*** (2.91)
Log (total borrowings)	-0.764 (-1.34)	0.0216*** (3.33)	0.145*** (2.70)	0.0043*** (0.19)	0.0400 (1.57)
N	53	53	53	53	53

t statistics in parentheses. $p < 0:10$, $p < 0:05$, $p < 0:01$

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter presents the discussions on the findings in chapter four. It includes the conclusions and recommendations. This research examines the impact of credit reference bureaus on financial performance and resilience/stability of commercial banks in Rwanda in a panel analysis. My first findings are that for the performance of Rwandan commercial banks during the establishment of CRB, apart from performance indicators, ROA, Loans and NIM of banks are significant for banking sector, as estimated by my model. In order to analyse significant factors for banking stability I reviewed the literature and analysis. I included NPL and Z-score as independent variables that control stability. Our first findings are that for the stability of Rwandan banks during the establishment of CRB, stability indicators are significant.

5.2. Discussion

The findings are in the relation with the objectives of the study.

5.2.1 To analyze the levels of bank performance with the establishment of CRB in Rwanda

The first objective sought to assess the levels of bank resilience. The study established that to a great extent, credit bureau keeps a credit history record of the borrower and consolidate information from many lenders, facts from analysis shows that all banks have moderate non-performing loans with the influences of other variables like the age of the firm which indicate firm experience have a positive impact on efficiency and sustainability and bank size indicating total assets was negatively related to the efficiency sustainability and profitability of bank and Z-score also is medium thus reflect that access to sources of financing influenced by sharing of borrowers' information. Therefore, they have stability due to the availability of information about borrowers. through panel, I found that the bank with higher interest rate have high percentage of non-performing loans and thus would lead the bank to the lower z-score (stability). This leads to the confirmation of the study's hypothesis that higher levels of borrowers 'information sharing among banks as provided by CRBs increases the probability of banks' resilience.

5.2.2 To identify the levels of bank resilience with the establishment of CRB in Rwanda

The second objective sought to establish the trends of performance with the impact of sharing of borrowers' information. The findings revealed that a bank with greater return on assets has the higher volume of loans and this causing the decline of net interest margin of loans and the bank performance is better and all accelerated by the availability of borrowers' information that's contribute towards more deposits, borrowing increase lending activity of the bank. While banks lack information needed to screen loans applications and to monitor borrowers by using more liquid assets. It was also noted that the spread of borrowers' information has impact on bank performance in Rwanda. More over a low return on assets blamed on complex loans processes on the markets whereby the banks had enhanced the request of borrower's information this indicated that banks increased the performance by forcing to reduce their net interest margins because of much loans available to the bank but do not approached for new borrowers. On the other hand, whenever borrowers fail to repay their loans banks are forced to pass on the cost of defaults to other customers through increased interest rates and other fees.

5.2.3. To assess the effects of borrower information on bank performance and resilience.

The third objective sought to establish the relationship between performance, resilience and borrowers' information. The study findings revealed that there was a positive and significant relationship between borrower's information and management of non-performing loans among commercial banks in Rwanda. The findings also revealed that credit reference bureau had a positive and significant relationship with the management of non-performing loans. The findings revealed that CRB had helped in lowering of loans defaulted and cost of return for good borrowers which has motivated many borrowers to repay their loans. The difference is observed in the changes in the economic size where the coefficient on NPLs increase from -1.455 to -15.44 CRB had also acted as a pivotal role in reducing information asymmetry that exist between banks and the borrowers thus helping in the assessment of credit requests which has helped to mitigate risks of bad debts. Credit information sharing has prevented borrowers from overcommitting to credit facilities all which has helped in the stability of NPLs. In terms of stability results showed that banks have lower NPLs but with lower Z-scores while in terms of performance banks have lower return on assets while intermediation cost are higher as 14% with respect to resilience of banks, most banks Z-score are in same range but incur little intermediation costs to some banks in lending as shown from data analysis.

5.3. Conclusions

This study aimed to ascertain the impact of borrowers' information on resilience and financial performance of commercial banks in Rwanda. Panel data set, descriptive statistics, correlation matrix and regression analysis were used to explain the impact of borrowers' information to resilience and financial performance. Results indicated that financial performance explained by three variables, return on asset, loans and net interest margin and resilience by two variables, nonperforming loans and Z-score and such these dependent variables are described by specific control variables in informal way such as loans, liquid assets, total assets, equity, deposits and borrowings. Consider results from analysis since there is a relationship between the age and size of total assets and performing loans, the older bank, the bigger one and has more liquid assets and borrowing, while deposits and liquidity are likely to increase loans volume easily thus helping to reduce the default of loans and reinforce the resilience of bank.

The study concludes that the independent variable, which is credit reference bureau has positive impact on the financial performance defined by return on asset, loans and net interest margin and resilience defined by non-performing loans and Z-score. Further the study concludes that there is a strong relationship between sharing of borrowers' information and financial performance and resilience of commercial banks in Rwanda.

5.5. Recommendations

This research recommends that all commercial banks should enhance the level of performing loans and become sustainable thus there is a need for continuing engagement with credit reference bureau as well as the information relating to the borrowers minimize the level of non-performing loans and improve the banks performance. The borrowers must ensure that their records are clear, if they have clear history they should access loans at better conditions.

This research recommend that commercial banks should use borrowers' information as a tool to reduce the default of loans and set up the management strategies to cover non-performing loans. It is very important that commercial banks should have stability and regular performance of management, an effective performance and resilience require analysis to interpret return on assets and but also professionals to deal with loans management. Commercial banks need to concentrate to the records of borrowers provided by CRB before taking relevant decisions over the loans requests to ensure that the repayment of loans distributed to the borrowers are revised respectively plus operational costs incurred not additional cost charged on defaulted loans, thus will facilitate to set better regulations to

encourage prudent management and analyzing the information provided on each borrower before the approve of loan.

5.4 Future studies

This study focused on the impact of borrowers' information on financial performance and resilience of commercial banks. The study focused on whether banks are able to access borrowers' information before they extend loans to potential customers. However, basing on limited access to borrowers' information, this study could not ascertain exacty what kind of borrower's information is needed by banks to grant them loans. Future studies can exploit this empirical research gap by ascertaining the type of information needed by banks and how it affects the size and quality of lending.

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APPENDICES

BANKS	YEAR	age	BAN K ID	CR B	TOT AL LO	N P L	LIQ UID ASS	TOT AL ASS	TOT AL EQUI	TOT AL DEPOS	BORROWIN GS	NE T INCO	TOT AL REVEN	Loa n s to Dep osit	Return on assets	Return on Equi	Cost to inc om	Net Mar	Liqui dity rati	Z- SCOR E
Access Bank	2008	13	1	0	995624	5.	2856689	3559855	723545	2045654	752229	74458	586471	0.25	0.02	0.01	0.07	0.0	0.503	0.10
Access Bank	2009	14	1	1	1034659	5.	2985688	3812545	758225	2425546	958746	87565	627811	0.30	0.02	0.10	0.07	0.0	0.536	0.10
Access Bank	2010	15	1	1	1035845	5.	3001578	4059655	792555	2655358	1158991	91558	659789	0.23	0.02	0.10	0.08	0.0	0.559	0.10
Access Bank	2011	16	1	1	1125503	5.	3003689	4160084	810003	2958220	1253442	99250	669005	0.35	0.01	0.10	0.09	0.1	0.563	0.11
Access Bank	2012	17	1	1	1127895	5.	3256614	4624552	811211	3158455	1553254	12011	688224	0.31	0.03	0.12	0.11	0.1	0.682	0.13
Access Bank	2013	18	1	1	1324998	4	3488435	4888880	847236	3976906	1693059.74	12521	693752	0.33	0.02	0.14	0.12	0.1	0.863	0.14
Access Bank	2014	19	1	1	2064870	4.	3488795	5723502	903852	4728991	2018969.38	87442	648529	0.43	0.01	0.09	0.07	0.1	0.724	0.11
Access Bank	2015	20	1	1	2567943	4.	3708866	6583871	1007056	5172533	2242221	78088	728179	0.49	0.01	0.07	0.06	0.1	0.693	0.11
Access Bank	2016	21	1	1	3456460	5.	3851671	7677862	916108	6125732	5027056	-	866857	0.56	-	-	0.08	-	0.615	0.11
Access Bank	2017	22	1	1	3057269	7.	4781630	8236970	910030	6694485	5194219	76394	909045	0.45	0.00	0.08	0.15	0.0	0.702	0.11
Access Bank	2018	23	1	1	2878833	3.	5911436	9250243	1039600	7626986	4323789	16570	990633	0.37	0.01	0.15	0.12	0.1	0.760	0.10
Bank of Kigali	2008	42	2	0	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Bank of Kigali	2009	43	2	1	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Bank of Kigali	2010	44	2	1	1655422	5.	336667	4000030	6541200	2000074	12548800	110658	4582594	0.59	0.02	0.19	0.38	0.1	0.091	0.09
Bank of Kigali	2011	45	2	1	1921745	6.	345987	4058598	6947852	2500365	15125165	112568	5214558	0.62	0.03	0.19	0.39	0.2	0.095	0.11
Bank of Kigali	2012	46	2	1	1987224	6.	3654815	4125885	7000486	2536458	15324560	125248	5684552	0.65	0.03	0.20	0.40	0.2	0.106	0.12
Bank of Kigali	2013	47	2	1	1990252	6.	3596526	4223600	7076368	2804894	17345024	148302	6376914	0.71	0.03	0.21	0.42	0.2	0.113	0.15
Bank of Kigali	2014	48	2	1	2334395	6.	5895904	4826079	8954773	3246011	15214461	183168	7083514	0.71	0.03	0.20	0.39	0.2	0.167	0.14
Bank of Kigali	2015	49	2	1	3139255	4.	5952421	5612264	9924554	3847137	22609724	204840	7744503	0.81	0.03	0.20	0.37	0.2	0.142	0.13
Bank of Kigali	2016	50	2	1	3858245	4.	4686477	6383365	1083023	4204650	28205184	207558	9311014	0.91	0.03	0.19	0.56	0.2	0.099	0.14
Bank of Kigali	2017	51	2	1	4717043	5.	6231502	7272047	1224715	4575897	42377460	341720	1093454	1.03	0.04	0.27	0.49	0.3	0.117	0.15
Bank of Kigali	2018	52	2	1	5681047	4.	8498627	8774013	1947050	5319593	61312934	426016	1240345	1.06	0.04	0.21	0.33	0.3	0.135	0.14
BPR	2008	33	3	0	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
BPR	2009	34	3	1	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
BPR	2010	35	3	1	7123587	8.	1458982	1055490	1032595	1098547	1515486	35967	2154877	0.57	0.01	0.00	0.29	0.0	0.756	0.92
BPR	2011	36	3	1	8358755	9.	1578874	1254584	1125830	1204587	1578870	74845	2248799	0.60	0.01	-	0.39	0.0	0.911	0.10
BPR	2012	37	3	1	8889920	1	1625445	1456805	1200785	1215400	1856715	5687	2436555	0.62	0.01	-	0.39	-	0.955	0.12
BPR	2013	38	3	1	9282337	10	1703512	1574388	1378137	1334488	1924217.54	-	2633340	0.69	-	-	0.49	-	0.119	0.16
BPR	2014	39	3	1	1049699	11.	1784186	1577172	1588089	1311108	1874713	14676	2501605	0.80	0.00	0.09	0.31	0.0	0.127	0.15
BPR	2015	40	3	1	1176856	13	1702426	1715660	1386288	1460026	1874713	-	2553120	0.80	-	-	0.21	-	0.109	0.14
BPR	20	4	3	1	1682342	13	3138221	2516028	4153211	1885955	5614622	-	3637654	0.89	0.00	0.00	0.23	0.0	0.153	0.14
BPR	20	4	3	1	1705144	9.	2882073	2746063	4256809	2131341	2488048	20963	4248650	0.80	0.00	0.04	0.42	0.0	0.126	0.15
BPR	20	4	3	1	1741125	8.	2232527	2732010	4024911	2172627	2488048	54128	3940584	0.80	0.02	0.13	0.60	0.1	0.096	0.14
COGEBANQU	20	9	4	0	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
COGEBANQU	20	1	4	1	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
COGEBANQU	20	1	4	1	4856942	3.	805155	8062661	8236584	5948250	13548000	10548	1268970	0.61	0.00	0.07	1.95	0.0	0.096	0.15

COGEBANQU	20	1	4	1	5568180	3.	958845	8154665	9448421	6258416	15295877	13589	1487525	0.71	0.01	0.08	2.01	0.0	0.116	0.25
COGEBANQU	20	1	4	1	5955520	4.	1001085	9584515	1058484	6552541	16584451	14548	1604825	0.80	0.01	0.09	2.47	0.0	0.125	0.23
COGEBANQU	20	1	4	1	6292603	4.	1115055	1070483	1148179	7325206	18378432	15788	1616369	0.85	0.01	0.13	1.03	0.0	0.144	0.15
COGEBANQU	20	1	4	1	7880754	3.	1320532	1340003	1371808	9005794	22872491	32411	1851143	0.87	0.02	0.23	0.76	0.1	0.136	0.13
COGEBANQU	20	1	4	1	9467110	4.	2315975	1779587	1828500	1104131	47105741	38144	2130735	0.85	0.02	0.20	0.83	0.1	0.206	0.12
COGEBANQU	20	1	4	1	1073273	3.	2350788	1759703	2191372	1051471	45494109	53898	2389037	1.02	0.03	0.24	0.70	0.2	0.217	0.13
COGEBANQU	20	1	4	1	1150069	5.	2798508	2009965	2630716	1347465	36538823	62797	2693062	0.85	0.03	0.23	0.73	0.2	0.203	0.13
COGEBANQU	20	1	4	1	1238183	3.	2691951	2045736	2643683	1392225	32989430	47938	2768463	0.88	0.02	0.18	0.79	0.1	0.185	0.13
Ecobank	20	1	5	0	9139924	5.	7568254	4473663	3407299	4785225	15698752	11456	1156728	0.34	0.09	0.05	1.82	0.0	0.079	0.09
Ecobank	20	1	5	0	2604756	4.	8694755	5872548	4473663	3789924	13845006	12569	1456876	0.45	0.04	0.06	1.69	0.0	0.045	0.15
Ecobank	20	1	5	1	2901535	4.	1835151	6196487	4698725	3948542	15678524	13459	1359782	0.57	0.05	0.07	1.98	0.0	0.065	0.15
Ecobank	20	1	5	1	3277790	3.	1954822	8879824	9280708	4952254	16745884	14697	1687893	0.64	0.06	0.07	1.98	0.0	0.096	0.16
Ecobank	20	1	5	1	7912734	4.	2165522	9394330	9417215	5692254	17458987	15486	1784698	0.69	0.09	0.08	0.95	0.0	0.118	0.18
Ecobank	20	1	5	1	2180926	6.	1458892	1206498	9926348	5875256	17658923	24782	1874569	0.68	0.08	0.08	0.84	0.0	0.172	0.16
Ecobank	20	1	5	1	7464872	5.	2215789	1129854	1329785	6458521	18468452	18458	1859478	0.74	0.04	0.09	0.80	0.0	0.195	0.24
Ecobank	20	2	5	1	8658878	5.	2378920	1427719	1456876	7786224	21365845	25842	1978825	0.84	0.03	0.15	0.72	0.1	0.247	0.29
Ecobank	20	2	5	1	8847885	4.	2453248	1687233	1584723	8129876	23898860	28458	2185478	0.87	0.04	0.17	0.68	0.1	0.255	0.24
Ecobank	20	2	5	1	8905774	4.	3174518	1698003	1687850	8856972	24589782	35687	2245874	0.97	0.02	0.14	0.54	0.2	0.264	0.13
Ecobank	20	2	5	1	9612587	3.	3327541	1713540	1589784	9147582	35548826	38454	2348487	0.92	0.02	0.16	0.65	0.2	0.286	0.14
Ecobank	20	2	5	1	9945698	3.	3364584	1764580	1754882	1268881	36148592	46814	2587959	0.96	0.22	0.21	0.56	0.2	0.295	0.13
I&M Bank	20	4	6	0	na	n	na	na	na	na	na	na	na	na	na	na	na	na	na	na
I&M Bank	20	4	6	1	na	n	na	na	na	na	na	na	na	na	na	na	na	na	na	na
I&M Bank	20	4	6	1	na	n	na	na	na	na	na	na	na	na	na	na	na	na	na	na
I&M Bank	20	4	6	1	4562380	2.	3015420	9875411	1455878	8975431	754122	34789	1756930	0.59	0.02	0.19	0.14	0.2	0.298	0.12
I&M Bank	20	4	6	1	4897520	2.	3087822	1105458	1624872	9100874	845478	54812	1847821	0.61	0.04	0.21	0.16	0.2	0.298	0.14
I&M Bank	20	5	6	1	6563640	2.	3174050	1258037	1874665	9406295	924157	67554	2017149	0.69	0.05	0.36	0.19	0.3	0.300	0.16
I&M Bank	20	5	6	1	8274913	6	3923273	1503076	2161457	1144675	1888701	64579	2167827	0.72	0.04	0.29	0.28	0.2	0.310	0.14
I&M Bank	20	5	6	1	9402887	5.	2850438	1718267	2446067	1198840	2639073	71249	2455625	0.78	0.04	0.29	0.33	0.2	0.197	0.14
I&M Bank	20	5	6	1	1129973	3.	5109657	2061388	3042312	1341523	5987275	84152	2761698	0.84	0.04	0.27	0.32	0.3	0.314	0.13
I&M Bank	20	5	6	1	1495975	2.	5650128	2601741	3506452	1774221	6726313	98483	3108214	0.84	0.03	0.28	0.34	0.3	0.257	0.11
I&M Bank	20	5	6	1	1690328	2.	2384015	2941656	3956749	1928402	14362917	10817	3821862	0.87	0.03	0.27	0.48	0.2	0.099	0.13

GDP, Inflation and Interest Table

year	inflation rate %	GDP PER CAPITA VALUE	GDP percapita in
2004	12.25	0	0
2005	9.01	0	0
2006	8.88	0	0
2007	9.08	0	0
2008	15.44	0	0
2009	12.94	519	8.33
2010	-0.26	562	4.12
2011	3.1	585	11.4
2012	10.27	652	8.59
2013	5.94	708	0.32
2014	2.33	728	2.55
2015	2.53	736	1.16
2016	7.18	735	-0.21
2017	8.27	774	5.31
2018	-0.31	787	1.64
2019	3.35	825	4.88

year	Interest rate
2013	14.28
2014	11.95
2015	16.72
2016	11.69
2017	8.88
2018	17.83

year	interest rate
2013	14.28
2014	11.95
2015	16.72
2016	11.69
2017	8.88
2018	17.83

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