

EFFECT OF MACRO-ECONOMIC VARIABLES ON PROFITABILITY OF SELECTED COMMERCIAL BANKS IN RWANDA

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Abstract: The purpose of this study was to determine the effect of macroeconomic variables on the profitability of selected commercial banks in Rwanda.

A descriptive research design was used and data was collected from four commercial banks in Rwanda licensed by the National Bank of Rwanda (NBR). Secondary data covering a period of three years, from 2016 to 2018 were sourced from the published financial reports of the selected commercial banks and the National Bank of Rwanda. The study used a multiple regression analysis in examining how macroeconomic variables affect the financial performance of commercial banks in Rwanda.

Findings of this study show that there is a negative correlation between the macroeconomic variables performance indicators and ROE and a positive correlation between the macroeconomic variables and the ROA. Based on the findings, the researchers conclude that macroeconomic variables factors are very fundamental to the profitability of the commercial banks therefore commercial banks should clearly analyse the macroeconomic environment where they operate.

Keywords: GDP, ROA, ROE Inflation rate, Interest rate, unemployment rate, Macroeconomic factors, profitability, Banking sector

1. INTRODUCTION

Financial institutions globally facilitate the movement of funds from the surplus units in an economy to the deficit supply units (Eakins & Mishkin, 2012). Commercial banks form a part of these financial institutions. In Rwanda commercial banks are the major players in the financial system (NBR, 2016). Banks undertake their financial intermediation role with the goal of maximizing their returns, also; through improved financial performance. As such, they accumulate and deploy assets towards achieving the desired performance.

Banks also operate in the industry and national environment. This environment is often turbulent and volatile as a result of interaction between and among various forces, among them macroeconomic variables.

Governments often enact legislation desired to achieve certain socioeconomic goals; these legislative enactments and other government intermediations in the market influence the macroeconomic environment (Osamwonji & Chijuka, 2014).

The agency theory (Jensen & Meckling, 1976) postulates that firm managers (agents) should be in a position to anticipate the macroeconomic environment changes and take adaptive measures for them to safeguard and maximize their firms' returns. This study sought to investigate how macroeconomic variables affect the financial performance of commercial banks in Rwanda.

Macroeconomic variables are the elements that typify the national economy and business environment. In an economy, these macroeconomic factors are not within the influence of one individual firm (Brueggeman & Fisher, 2011). However the government often influences the macroeconomic variables through enactment of legislation and or policies. These factors include the inflation rate, GDP, interest rate, foreign exchange rate, money supply, and so on (Simiyu & Ngile, 2015). Macroeconomic variables influence the complexity and volatility of the business setting (San & Heng, 2013). Due to increasing globalization and technological advances, economic turbulence in other (international) economies might creep into the local business environment.

The government has a precarious role in enhancing stability of the macroeconomic variables. Businesses, among them commercial banks, prefer a stable macroeconomic environment; a stable environment is more predictable, risk is also lower under such stable conditions. Financial performance denotes the percentage or degree of attainment of economic goals, objectives and or targets by a firm. Financial performance is specified as at a stated point in time and refers to performance in a given time period (Pandey, 2009). Financial performance is measured in various ways. The Financial performance of commercial banks is best measured using ratios such as return on assets, return on equity, net interest margin, equity multiplier, and non-performing loans (Eakins & Mishkin, 2012). Return on assets ratio is a ratio of net income to total assets; the return on equity is a ratio of net income and shareholders' equity; net interest margin is the difference between interest expenses paid out and interest income earned by a bank.

Firms seek to improve continuously their financial performance for various reasons, among them to maximize shareholder returns (Brueggeman & Fisher, 2011). Returns to shareholders are largely dependent and linked to the financial performance registered by

commercial banks. Good financial performance is essential as resources available to a firm are scarce; better financial performance leads to surplus inflow of resources to the banks, these resources are then available to be deployed for further growth, undertake expansion purposes, or to just sustain the commercial banks going concerns.

Macroeconomic variables are anticipated to influence the business setting (Brueggeman & Fisher, 2011). These variables affect the nature and intensity of the volatility of the operating environment. According to (Markowitz, 1952), the portfolio theory states that investors will make decisions on the risk-return tradeoff; such investors tend to prefer more returns to less returns, they also favor less risk to higher risk. High volatility of variables in the macroeconomic environment creates and fosters an unstable and highly volatile environment, risk, thus becomes aggravated and in turn threatens returns. Good and healthy financial performance then becomes uncertain.

The theory of efficient market hypothesis (Fama, 1970) postulates that, in a market security price will reflect all the available information, always. Bank managers as such therefore ought to react fast and accurately to actual and anticipated macroeconomic variable changes by adapting the said changes or planning for them well in advance. Such prudence assists to assure financial performance not only in the present, but also in future. Macroeconomic variables affect firms' profitability (Gerlach, Peng & Shu, 2005). Changes in macroeconomic variables present opportunities as well as threats to the industry players concurrently; those prepared for the changes, shall realize gains from the opportunities that arise, thus fostering their financial performance, while those who are unprepared might suffer from the threats and might in turn impact their financial performance negatively.

The Rwandan banking sector has faced a challenging macro-economic environment such as capping of interest rate that was affected, but the sector remains resilient. Other macro-economic challenges that affected the sector include; increasing levels of prices, unpredictability of interest rates and exchange rate variability. The Rwandan francs have greatly depreciated against most traded world currencies over the last few years, in addition to widening current account deficit. These unfavorable macroeconomic variables may result to great problems in the banking industry, when management deeds are far-off reflecting the recurring nature of the economy in its decisions. Mounting stress within the banking system can be experienced due to extremely unexpected cyclical fluctuation. Nevertheless, the macroeconomic variables might well deliver good indicators, but it's not always the case. (NBR, 2016)

In Rwanda the national bank through its monetary policy committee, sets the base lending rate and as such influences the prevailing lending rates in the economy (NBR, 2016). Banks in Rwanda have also showed growth in profitability over the previous few years, with the exception of a few that reported poor performance.

The Rwandan government also influences macroeconomic variables not only through economic and fiscal policies, but also through market activities such as issuance of government debt securities, capping of interest rates in the economy. Banks are left with the only option of adapting to macroeconomic changes in order to protect and safeguard their future financial performance.

A number of research studies (foreign & regional) have embarked on this research area. Osamwonji and Chijuka (2014) investigated how macroeconomic variables affect the profitability of commercial banks. The study finds a significant positive relationship between the return on equity and GDP, a significant negative relationship between return on equity and interest rate, and an insignificant negative relation involving inflation rate. San and Heng (2013) found macroeconomic variables like gross domestic growth and inflation do not have an effect on profitability.

Local study that has been conducted by Nkurikiye and Uwizeyimana (2017) in study called the effects of GDP, interest rate, and inflation on private investment in Rwanda, the research has revealed that gross domestic products affects private investment and both in the long run and short run, and study has revealed that there is a positive impact of inflation on investment.

Another local empirical study that has been conducted by Gatsimbazi and Mulyungi (2018) in study called "effects of macroeconomic variables on stock market performance in Rwanda, the study has revealed that GDP growth rate, inflation and exchange rate are negatively significant in the Rwandan stock market.

Dukundane and Rukera (2016) in their research entitled the impact of credit risks management on financial performance of commercial banks in Rwanda, they research findings has revealed that there is a negative correlation between non performing loan and financial performance of banks.

Even though many researchers (local) worked on financial performance cases, but they didn't deepen on the relationship between the macroeconomic variable and financial performance, and many researchers have been putting blame on internal control of commercial towards

financial performance. Yet they are other factors that are beyond the control of internal control that can affect the profitability of commercial banks in Rwanda. This study sought to fill this gap by seeking to answer the research question: What are the effects of macroeconomic variables on the financial performance of commercial banks in Rwanda?

2. THEORETICAL AND CONCEPTUAL FRAMEWORK

Various theories have been discussed presenting arguments that guided this study. These theories include Schumpeter economic cycle theory, Keynesian liquidity preference theory and macroeconomic theory.

2.1. Schumpeter Economic Cycle Theory

The theory was propounded by Schumpeter (1939) who indicated the process of economic change or evolution that consists of two distinct phases, "prosperity" and "recession". One under which the impulse of entrepreneurial activity, draws away from an equilibrium position, and the second of which it draws toward another equilibrium position. Schumpeter calls those fluctuations/cyclical processes in the economic life business cycle. Schumpeter shows the intermediary role of the financial sector between those who save and invest, through a process referred to as credit creation by bank financing that leads to economic growth and development. The effect of this process leads to profit and loss generated by the lender and the borrower.

Certain macroeconomic variables, typically display a unique pattern of boom and recession in a business cycle. A crisis is said to occur at the peak of expansion when growth in real GDP and domestic demand decline leading to acceleration in inflation. During periods of economic expansion, firms and their respective sectors profits increases, asset prices rises aggregate sectoral demand for credit facilities, expands leading to growth in bank lending resulting to increased interest income. Banks may underestimate their risk exposures, relaxing credit standards and reduce provisioning for future losses while the economy indebtedness rises.

As the downturn sets in individual's, firms and sector profitability deteriorates (Bikker and Hu, 2002). The theory assumes that recessions and periods of economic growth are an efficient response to exogenous changes in the real economic environment and that decline in profitability result in fall of asset prices, non-performing loans, lowers borrowers' financial capacity, fall in employment levels, and depresses the value of collaterals as a secondary mean of servicing debts. Banks' risk exposure increases, and consequently raises the need for larger loan provisions and

higher levels of capital, exactly when it is more expensive or simply not available. This may lead to banks reacting by reducing the amount of lending, especially if they have low capital buffers above the minimum capital requirement, thus increasing the effects of the economic downturn as well as increasing the lending rates.

Critics of the theory state that it is a common misconception that macroeconomic purely based on shocks to supply, as opposed to shocks on demand, and this leads to the common criticism of Schumpeter economic cycle theory by ignoring the demand side of the economy. However, in the real business cycles situation, consumers will change their intertemporal consumption and savings decisions based on the real interest rate available to them, which is a shift in demand. In relation to the study, the theory views interest rate changes as normal economic occurrences which will affect commercial bank's performance. It disregards the argument that interest rates are determined by the liquidity in the economy, but is determined by the prevailing macroeconomic environment as determined by the business cycles. Hence, according to the theory, interest rates will keep on changing according to the prevailing macro-economic conditions.

2.2. Keynes's Liquidity Preference Theory

The theory was advanced by Keynes (2006). According to the liquidity preference theory, the interest rates are determined by the demand for and supply of money balances. The theory assumes that people's demand for money is not for transactions purpose, but as a precaution and for speculative purposes. The transaction demand and precautionary demand for money increases with income, while the speculative demand is inversely related to interest rates because of the forgone interest. The supply of money is determined by the monetary authority (the central bank), by the lending of commercial banks and by the public preference for holding cash (Were, Kamau, Sichei, Kiptui, 2013).

Therefore, interest rates are expected to increase as the maturity profile of securities increases. This is so because the longer the maturity, the greater is the uncertainty; and therefore the premium demanded by investors to part with cash increases as the maturity profile increases. The expectation, therefore, is that forward exchange rates should offer a premium over expected future spot exchange rates for those who are risk-averse demand a premium for securities with longer-term maturities. A premium is offered by way of greater forward rates in order to attract investors to longer-term securities. Consequently, current interest rates reflect expected inflation rates, income (GDP) and expected money supply changes (Were et al., 2013).

Critics of this theory argue that the liquidity preference theory of interest suffers from a fallacy of mutual determination. Keynes alleges that the rate of interest is determined by liquidity preference. In practice, however, Keynes treats the rate of interest as determining liquidity preference. The critics state that "The Keynesians therefore treat the

The rate of interest, not as they believe they do- as determined by liquidity preference- but rather as some sort of mysterious and unexplained force imposing itself on the other elements of the economic system (Were et al., 2013). In relevance to the study, the theory views interest rates as being mainly driven by the liquidity level in the economy. The theory does not recognize the role of macroeconomic policies formulated by the central bank, but interest rates are purely driven by the demand of money in the economy. Therefore, interest rates will go up and down according to the level of liquidity in the economy and preference for the liquidity by the users of funds.

2.3. Macroeconomic Theory

The theory was proposed by Friedman, (1963). The theory has viewed interest rates as always and everywhere a monetary phenomenon (Friedman, 1963). Further, macroeconomic theory assumes that growing the money supply in excess of real growth causes interest rates to rise. This is also the result from the Harberger (1963) model, which assumes that prices adjust to excess money supply in the money market. It is on the basis of this assumption that it is possible to invert the real money demand and control interest rates.

Interest rate volatility in open economy results from different disequilibria in many markets specifically, the domestic money market, external/foreign markets and the labor market. Thus an increase in interest rates emanates from three main sources that include excess money supply, foreign prices and cost push factors (Were et al., 2013). The theory is related to Keynesian liquidity preference theory, but recognizes additional sources of interest rates not only demand for money but also foreign prices and cost push factors.

Critics of this theory base their argument on the grounds that governments would in practice be unlikely to implement theoretically optimal policies. According to them, the implicit assumption underlying the macroeconomic revolution was that economic policy would be made by wise men, acting without regard to political pressures or opportunities, and guided by disinterested economic technocrats. They argued that this was an unrealistic assumption about political, bureaucratic and electoral behavior.

In relevance to the study, macroeconomic theory views growing money supply in excess of real growth as the cause of interest rates to rise. Interest rate volatility is seen by the theory as emanating from three main sources that include excess money supply, foreign prices and cost push factors. Interest rate volatility will also result from different disequilibria in many markets specifically, the domestic money market, external/foreign markets and the labor market. Hence, controlling interest rate volatility will involve dealing with disequilibrium in the markets.

Yuqi (2008) examined the determinants of 123 United Kingdom (UK) banks profitability and its implication on risk management from 1999 to 2006. The study utilized multiple regression models and panel data estimation. The econometric results indicate that capital adequacy has significant positive impacts on profitability but inflation has insignificant positive impact on profitability. Liquidity and credit risk had significant negative impacts on profitability though; GDP and interest rate have insignificant negative impacts on the profitability of banks in UK.

Buyinza (2010) investigated samples of 23 commercial banks profitability from 1999 to 2006 in Sub Sahara Africa countries. The study utilized panel data and the regression results revealed that capital, efficient expenses management, bank size, credit risk, diversified earning ability of the banks, per capital GDP, growth rate and inflation have significant and positive impact on banks' profitability. Ali, Akhtar, and Ahmed (2011) examined the bank specific and macroeconomic indicators of 22 public and private sector commercial banks profitability from 2006 to 2009 in Pakistan. The research made use of multiple regression models and panel data estimation. The study found that bank size, operating efficiency, asset management and GDP had positive effect on banks' profitability. However, capital and credit risk had negative effect on banks profitability in Pakistan.

Gul, Irshad, and Zaman (2011) studied the factors affecting samples of 15 commercial banks profitability from 2005 to 2009 in Pakistan. The investigation utilized a regression model, panel data estimation and Pooled Ordinary Least Square (POLS) method of computation with the aid of an econometric package. The econometric result indicated both internal and external factors such as bank size, loan, deposit, GDP, inflation and market capitalization have significant positive influence on banks profitability measured by Return on Assets (ROA). Still in Pakistan, Gilchris (2013) examined the influence of bank specific and macroeconomic factors on samples of 25 commercial banks profitability from 2007 to 2011 in Pakistan. The regression results indicated that bank size, net interest margin, and industry production growth rate had positive and significant impact on

the profitability (ROA and ROE). Non-performing loan to total advances and inflation have negative and significant impact on ROA while GDP has positive impact on ROA. Capital ratio has positive significant impact on ROE.

Saidu and Tumin (2011) investigated the performance and financial ratios on samples of four Malaysian and nine Chinese commercial banks from 2001 to 2007. The research made use of panel data and the regression results show that credit, capital and operating ratios have influence on the performance of banks in China which is not true for Malaysia. The study found that liquidity and size of the banks do not influence the performance of the banks in both countries. Khrawish, and Siam, (2011) investigated the determinants on samples of three Jordan Islamic banks profitability from 2005 and 2009.

The multiple linear regression results show capital, bank size, financial risk, GDP growth rate, inflation, and the exchange rate have significant negative relationship with profitability but credit risk has an insignificant positive relationship with the profitability of Islamic banks in Jordan. Rachdi (2013) examined what determines the profitability of banks during and before the international financial crisis. The study samples 10 Tunisian banks from 2000 to 2010.

The regression results indicate that, before the US subprime crisis, capital adequacy, liquidity, bank size and yearly real GDP growth affect positively the performance (ROA, ROE and NIM) of the Banks. However, cost-income ratio, yearly growth of deposits and inflation rate are negatively correlated across all measures of bank profitability. In crisis period, bank profitability is mainly explained by operational efficiency, yearly growth of deposits, GDP growth and inflation.

Lucas and Anne (2010) examined the effect of macroeconomic developments on performance, credit quality and lending behavior of banks in Kenya, by estimating a dynamic panel data model using Generalized Method of Moments. The study suggested that banks needed to continue pursuing risk sensitive loan pricing policies to ease the extent of counter cyclical behavior during economic upswings/downswings respectively, which in turn reduces the chances of supply driven credit crunch effects. Macharia, (2013) studied the effects of global financial crisis on the financial performance of commercial banks offering mortgage finance in Kenya.

The study found a negative relationship between inflation, interest rates as a result of global financial crisis and financial performance of commercial banks offering mortgage finance in Kenya. A unit increase in

inflation and interest rates led to a 0.543 and 0.425 decrease respectively in the scores of financial performance of commercial banks offering mortgage finance in Kenya. The study further found that exchange rates, as a result of global financial crisis, had a positive effect on financial performance of commercial banks offering mortgage finance in Kenya. A unit increase in foreign exchange rates led to a 0.652 increase in the scores of financial performance of commercial banks offering mortgage finance in Kenya.

Otuori (2013) investigated the determinant factors of exchange rates and their effects on the performance of commercial banks in Kenya. The study found that exports and imports Interest rates, inflation and exchange rates were all highly correlated. By manipulating interest rates, central banks could exert influence over both inflation and exchange rates, and changing interest rates impact inflation and currency values. Higher interest rates offered lenders in an economy a higher return relative to other countries which attract foreign capital and cause the exchange rate to rise.

Mboka (2013) studied the relationship between macro-economic variables on nonperforming loans of commercial banks in Kenya. Data was analyzed by applying both descriptive and inferential statistics for a 10 year period (2003 to 2012). The study found a strong correlation between inflation and gross domestic product and current account deficit. GDP also correlated strongly with inflation and Money supply. A significant and positive correlation was also found between nonperforming loans and GDP growth rate, exchange rate volatility, and banking sector development index. Kiruri and Olkalou (2013) studied the ownership structure on samples of 43 banks profitability from 2007 to 2011 in Kenya. The simple linear regression shows that ownership concentration and state ownership had negative and significant effects on bank profitability while foreign ownership and domestic ownership had positive and significant effects on bank profitability in Kenya.

3. RESEARCH METHODOLOGY

The section focuses the research design and methodology that was applied in conducting this study. It describes the research design, population of the study, sample size, sample frame, data collection methods and data analysis and presentation of the research findings.

3.1. Research Design

This research employed a quantitative research design. The quantitative research design method helped in gathering information about the existing status of the phenomena in order to describe what exists in respect to

variable. This method is used because it addresses the objective of the study in investigating the relationship between the variables of the study (Kothari, 2008). The design takes into consideration aspects like the size of the sample in relation to the target population, the variables under the study, the approaches to the research, and the methods employed in data collection.

Multi-regression method was used to determine the relationship between interest rates and profitability of commercial banks. The study used time series empirical data on the Variables to examine the relationship between interest rate by establishing correlation coefficients between the variables and profitability of commercial banks.

3.2. Population of the Study

The target population for this study was 4 commercial banks in Rwanda (Bank of Kigali, CoGEBANK Bank, I&M Banks and ECO BANK). The commercial banks were selected because the accessibility of their financial data by the public. All the 4 banks constituted the study sample. A census design was applied where all the 4 commercial banks were studied. A census is a collection of information from all units in the population or a complete enumeration of the population. A census design is used where the population is small and manageable (Mugenda & Mugenda, 2003).

3.3. Data Collection

The data required for the study were obtained from secondary sources that were used to investigate the relationship between dependent and independent variables. In the study, 3 years data (2016 to 2018) were collected. The collected data related to dependent variable which is the commercial bank's profitability as measured by return on assets, return on equity, non-performing loan, net profit and the independent variables which was Interest rate. Documentation techniques were used to investigate, categorize and collect physical resources, mostly commonly written documents.

3.4. Data processing and Analysis

The secondary data that was collected from the reports were summarized using excel software. Data was imported in the Statistical Package for Social Sciences (SPSS) version 21 from where analysis was made. Inferential statistics was conducted using a multiple – regression which was also used to determine the relationship between macroeconomic variables and profitability of commercial banks. The variable was considered significant where the P-value is less than 5%

3.5. Operational definition of variables

The study analyzed two study variables which are macroeconomic variables and profitability of commercial banks. The macroeconomic variables were measured using Gross domestic product (GDP), Inflation (IF), Interest rate (IT), and unemployment rate (UP). On the other hand, the profitability of the bank was measured using the return on asset (ROA) and the return on Equity (ROE).

$$\text{Profitability (P)} = F(\text{GDP, IF, IT, UP}) + \alpha$$

$$P = \beta_0 + \beta_1\text{GDP} + \beta_2\text{IF} + \beta_3\text{IT} + \beta_4\text{UP} + \alpha$$

Parameters β_0 β_5 was estimated using a least square method which appropriate when one has used a multiple regression method. The covariance of the error terms α was assumed to be zero.

4. RESULTS AND DISCUSSION

This section presents the results collected from the survey of the selected commercial banks and provides a discussion to the findings.

4.1. Multicollinearity test

In the following lines, the presence of linear relationship of all the predictors used in the model and their coefficient estimates is examined.

Table 1: Variance Inflation Factor values for each predictor
Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	GDP	.953	1.049
	Interest rate	.950	1.053
	Inflation rate	.908	1.101
	Unemployment rate	0.902	1.113

Survey data 2019

Variance Inflation Factor (VIF) was analyzed to test for the existence of multicollinearity. This phenomenon occurs when “two or more independent variables (or combination of independent variables) in a multiple linear regression are highly correlated with each other” (Kothari 2000), meaning that one can be linearly predicted from the others with a substantial degree of accuracy. This leads to problems with understanding which independent variable contributes to the variance explained in the

dependent variable, as well as technical issues in calculating a multiple regression model. The VIF for each predictor is quite low compared to the maximum acceptable value of 5, hence absence of co-linearity among them.

4.2. Testing violation of the normality assumption of the error term in the model

In the line that follows, the assumption on the error terms in model is examined. These have been assumed to be normally distributed with constant variance. Reading from the two graphs below reveals that these are close to being normally distributed. In fact, the right hand side graph reveals that the standard deviation of the residual is small, since their density tends to conglomerate around the center or the mean.

Table 2: Tests of Normality

	<i>Kolmogorov-Smirnov^a</i>			<i>Shapiro-Wilk</i>		
	<i>Statistic</i>	<i>df</i>	<i>Sig.</i>	<i>Statistic</i>	<i>df</i>	<i>Sig.</i>
GDP	.210	11	.189	.917	11	.291
Inflation	.171	11	.200*	.884	11	.118
Interest Rate	.231	11	.104	.815	11	.152
Unemployment	.180	11	.200*	.854	11	.428

a. Lilliefors Significance Correction

Table 2 tests on whether the study variables are normally distributed. A null hypothesis which state that at 5% level of significant the data are not significantly different from the normal distribution. Using the Kolmogorov – Smirnov and Shapiro – Wilk significant test, the results from the survey shows that all the tested variables are not statistically significant as their P-value is more than 5%. The researchers therefore accepted the null hypothesis. This, therefore, means that the tested variables are normally distributed.

4.3. Effect of Macroeconomic Variable on Return on Equity

Table 2: Model summary on the effect of macroeconomic variable on ROE

<i>Model</i>	<i>R</i>	<i>R Square</i>	<i>Adjusted R Square</i>	<i>Std. Error of the Estimate</i>
1	.889 ^a	.790	.788	7.46074

Source: Survey data 2019

Table 2 shows the correlation coefficient and the coefficient of determination. From the table the correlation coefficient is very high (0.889).

This means that macroeconomic variable and profitability of commercial banks are highly positively correlated. This means when the macroeconomic variable improves, the profitability of the commercial banks will improve. The coefficient of determination is 0.790 which implies that 79% of the variation in ROE is explained by the macroeconomic variables. The study revealed that it is only 21% of the variation in the ROE that is caused by other variables.

Table 3: Significance of the model to determine profitability: ANOVA^a

<i>Model</i>		<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
1	Regression	5.8 x 10 ⁷	3	1.92 x 10 ⁷	311.903	.000 ^b
	Residual	1.5 x10 ⁶	248	6.17 x 10 ⁴		
	Total	7.3 x 10 ⁷	251			

Source: Survey data 2019

ANOVA was conducted to assess whether the data are consistent with the model assumptions or not. This was done on the basis of the null hypothesis stated that “there is no difference between the model without independent variables and the model with independent variables”. From Table 3, the P-Value (0.000) is less than the significance level (0.05), thus there is enough evidence for rejecting the null hypothesis. This, therefore, implies that the coefficients used in the model are not zero.

Table 4: Coefficients of determinants of profit shifting

<i>Model</i>		<i>Unstandardized Coefficients</i>		<i>Standardized Coefficients</i>	<i>t</i>	<i>Sig.</i>
		<i>B</i>	<i>Std. Error</i>	<i>Beta</i>		
1	(Constant)	2004136077.975	643387036.508		3.115	.002
	GDP	.995	.037	.818	26.834	.000
	Interest rate	-1.271	-.200	-.190	-6.373	.000
	Inflation rate	-.567	-.062	.096	-9.226	.000
	Unemployment	-0.455	-.004	-1.56	-10.22	.000

Source: survey data 2019

Table 4 shows the significance of the independent variables in predicting the relationship. This was done on the basis of the null hypothesis that “the independent variable has no effect on the return on equity. The table above shows that the P-Values for GDP, interest rate, inflation rate and employment rate (0.000) which is smaller than the significance level (0.05). Thus there is enough evidence to reject the null hypothesis for these independent variables. We can therefore conclude that macroeconomic

variables have significant effects on return equity. GDP has positive relationship with the ROE meaning that their increase leads to the increase in the profitability. However, interest rate, inflation rate and unemployment rate has a negative relationship with the ROE. This means that an increase in these variables leads to a decrease in the profitability. The study findings agree with Buyinza (2010) and Osamwanji and Chijuka (2014) who indicates a positive correlation between GDP and ROE and a negative relationship between inflation, interest rate and the ROE.

$$\text{ROE} = 2004136077 + 0.995(\text{GDP}) - 1.271(\text{IT}) - 0.567(\text{IF}) - 0.455(\text{UP}) \quad (3)$$

From the regression equation (3), the following conclusion can be drawn: A unit change in GDP increases ROE by 0.995 units keeping all other variables constant.

4.4. Effect of Macroeconomic Variables on Return on Assets (ROA)

Table 5: Model summary of effect of macroeconomic variables on ROA

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	-.874 ^a	.764	.681	6.773

Source: Survey data 2019

Table 5 shows the correlation coefficient and the coefficient of determination. From the table the correlation coefficient is -0.874. This means that macroeconomic variables and ROA are negatively correlated. The coefficient of determination is 0.764 which implies that 76.4% of the variation of ROA is determined by the variations in macroeconomic variables. This means that GDP, interest rate, inflation rate and unemployment rate explains 76.4% of the variation in the profitability of commercial banks. This implies that 23.6% of the variation in the ROA is unaccounted for by the model.

Table 6: Significance of the model: ANOVA^a test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.58 × 10 ⁸	3	1.86 × 10 ⁸	40.575	.000 ^b
	Residual	1.11 × 10 ⁸	248	4.58 × 10 ⁸		
	Total	1.69 × 10 ⁸	251			

ANOVA was conducted to assess whether the data are consistent with the model assumptions or not. This was done on the basis of the null hypothesis stated that "there is no difference between the model without

independent variables and the model with independent variables". Table 6 shows that P-Value (0.000) is less than the significance level (0.05), thus there is enough evidence for rejecting the null hypothesis. We can therefore conclude that there is a significant statistical difference between the model without independent variables and the model with independent variables hence the model fits the data.

Table 7: Coefficients of the determinants of profit shifting
Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-9.999	5.5556		-1.800	.073
	Unemployment	-1.36	.032	-.233	-4.269	.000
	Inflation rate	-1.866	.172	-.579	-10.856	.000
	Interest rate	-.54	.0398	-.007	13.568	.000
	GDP	1.243	0.234	2.123	6.871	0.021

Source: Survey Data 2019

Table 7 shows the significance of the independent variables. This was done on the basis of the null hypothesis that "the independent variables have no effect on ROA. The table shows that the P-Values for unemployment rate, inflation rate and interest rate is (0.000) whereas GDP has a P-value of 0.021 which is less than the significance level (0.05), thus there is enough evidence to reject the null hypothesis for these independent variables. We can therefore conclude that GDP, interest rate, inflation rate and unemployment rate have significant effects on ROA. The study findings agrees with Gilchris, (2013) report which identified a relationship between macroeconomic variables and profitability of commercial banks

$$ROA = -9.98 + 1.243(GDP) - 1.36(UP) - 1.866(IF) - 0.54(IT) \quad (4)$$

From the regression equation (4), we can say that: A unit change in GDP, the ROA will increase by 1.243. More still, a unit change in unemployment, inflation rate and interest rate the ROA will decrease by 1.36, 1.866 and 0.54 respectively.

5. CONCLUSION AND POLICY RECOMMENDATIONS

5.1. Conclusion

The results from the survey indicated a strong relationship between the macroeconomic variables and profitability of commercial banks. The results

revealed that GDP, Unemployment rate, inflation rate and interest rate highly explains the variability in the profitability of commercial banks. The results revealed that there is a positive correlation between GDP and profitability of commercial banks and a negative correlation between inflation, interest rate, unemployment and profitability of the commercial banks. Improving the economic activities is very fundamental to the profitability of commercial banks. However, care should be taken while improving the economic activities on controlling the level of inflation, interest rate and unemployment as these factors negatively affect the profitability of the commercial banks.

5.2. Policy Recommendation

The research has revealed that there are some macroeconomic variable that affect financial performance of bank negatively (inflation rate, and interest rate), the increase in one of those variables leads into poor performance of commercial banks and inflation contribute to an increase in nonperforming loan (customer loan default).

The research has revealed that there is a strong negative correlation between lending rate and financial performance, this makes sense that the increase in the cost of borrowing it doesn't yield return on banks instead the increase in lending rate it create a heavy burden to borrower which finally result into a total loan default. Commercial banks and central bank of Rwanda are advised to a reasonable lending rate that is suitable for borrowers/investors.

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