FIRM-SPECIFIC DETERMINANTS OF CAPITAL STRUCTURE OF KENYAN COMMERCIAL BANKS

By

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A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN FINANCE, FACULTY OF BUSINESS AND MANAGEMENT SCIENCE, UNIVERSITY OF NAIROBI.

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DECLARATION

This Research project is my original work and has not been presented for a degree in any other University.

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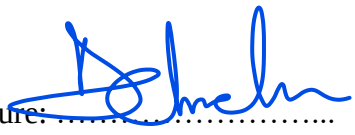
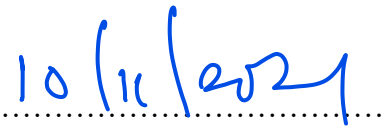
This project has been submitted for examination with our approval as University Supervisors.

Signature:  Date: 

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I humbly take this opportunity to thank the Almighty God for allowing me to see the completion of my project, it would not have been possible without His will. My sincere gratitude to my supervisors, Dr. Dan Chirchir and Prof. Cyrus Iraya for their guidance throughout my research project. I would like to express my sincere gratitude to Dr Joshua Ngaina for being the source of motivation in my academic journey.

DEDICATION

This research project is dedicated to my loving husband Joshua and my children Ruby and Eli. I thank you for your love, patience and prayers. You did everything possible just to ensure that I get the work done. This far we have come we thank God.

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ABBREVIATIONS AND SYNONYMS

ANOVA	-	Analysis of variance
ATS	-	Automated Trading System
CBK	-	Central Bank of Kenya
CMA	-	Central Market Authority
GDP	-	Gross Domestic Product
KBSC	-	Kenya Banking Sector Charter
MoU	-	Memorandum of Understanding
NSE	-	Nairobi Securities Exchange
PCC	-	Pearson's Correlation Coefficient
PP&E	-	Property, plant, and equipment
VIF	-	Variance inflation factors
WACC	-	Weighted Average Cost of Capital
WHO	-	World Health Organization

ABSTRACT

Commercial banks play significant role of contributing to the country's economic growth by mobilizing investments funds. Due to lack of agreement about optimal determinant of capital structure, the study will seek to establish firm specific determinants of capital structure on commercial banks in Kenya. The study selected 42 commercial banks as the population. The independent variables; the determinants of capital structure were growth rate, profitability, liquidity, age and size. Secondary data from 2015 to 2019 was obtained annually. A descriptive cross-sectional design together with multiple regression model was utilized in the analysis. The independent variables did not indicate any collinearity. There was a moderate correlation among the variables with growth rate and size being positively correlated with capital structure while profitability, liquidity and age were negatively correlating with capital structure. The study recommends that more research to be undertaken increasing the study period and the variables under study.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Financial institutions such as banks have a significant role in the distribution of economic resources within countries as they continuously circulate money from investors to depositors and vice versa. Therefore, banks need to be profitable and financially healthy to ensure its sustainability (Asfaw, 2018). The bank's capital remains crucial in determining its profitability and thus its existence. Determining capital that can absorb risk and make banks remain competitive is a crucial as it concerns the choice of financing which is dependent on both equity and debt and thus affecting corporate governance of banks and subsequent development (Mokhova & Zinecker, 2014). For banks to attain a gradual growth and remain successful its decisions must be anchored on good capital structure.

Modigliani and Miller (1958) pioneered the theory of capital structure by proposing that debt-equity mix is not dependent on the value of a firm. This was followed by Myers and Majluf (1984) Pecking Order Theory (POT) which put forward that a company can finances itself in three distinct tiers which includes retained earnings, debt or issuing of new equity. Jensen and Meckling (1976) also developed Agency theory which put emphasis on costs resulting from vested interest involving not only managers but also debt holders and other shareholders as it was based on the concept that manager's decisions are not always towards shareholder's best interest leading to many firms opting to finance their operations using debt.

Hovakimian and Li (2011) based on simulation experiments showed that both debt-equity and partial-adjustments models had potential to produce estimates that that were not valid.

These implied potential presence factors affecting corporate capital structure not able to be observed which varied across the firms but relatively unchanged for firms within same industry and thus imperative to think about the bank's capital structure as it may show unique risks that are integral in banking industry

1.1.1 Determinants of Capital Structure

Profitability measures the Bank's ability to generate internal income from revenue, assets, operating costs, or equity. Profitability was measured using the profitability ratios i.e., the margin and return ratios. In this research the return on assets was used to measure profitability. Return on assets is computed as the net income over the total assets. According to Komoro (2019), firms that make profits creates internal funds which is and thus decrease its leverage ratio as result of profitability (Kimoro, 2019).

The size of the bank is the amount of assets owned. It was measured by the natural logarithm of total assets. Ndungu and Thuo (2016), Ukaegbu and Oino (2013) and Kimoro (2019) noted that leverage and size of microfinance banks were positively related.

Growth rate is determined by the change in total assets and quantifies to the possibility of a firm's business expansion or opportunities to invest in future (Diaz & Tin, 2017). According to Shibru (2012), firm with higher leverage have less growth and thus necessitates the need for external fund especially for those that are still expanding due to inadequate internal funds.

Liquidity measured how easy it is to convert assets into cash. This study employed the current ratio to measure liquidity, that is, current assets over the current liabilities. The is

ratio is given as liquid assets over total assets. It determines how easily the assets of the commercial banks will be converted to cash. Several studies looked at the relationship of leverage and liquidity among them being Shibru (2012) who noted a negative association between liquidity and leverage.

Age of the bank was measured according to the number of years it has been in existence. Ndungu and Thuo (2016) showed that capital structure and age of microfinance banks had a positive relationship in Kenya. As firms age, creditors are easily convinced. In addition, the bank has the ability to find alternative credit source more efficiently and with better terms in case of debt capital (Mintesinot, 2010)

1.1.2 Capital Structure

Paramasivan and Subramanian (2009), Yung-Chieh (2013), Pais (2017), Islam and Nasreen (2018) refers to capital structure as a relation amongst long/short term debt and leverage referred as common/preferred equity. It accounts for funding from different sources used finance a firm's operations and growth (Al-Qudah, 2014). A bank's capital is important to regulators in determining a banks stability as it affects its ability and fragility to sustain economic shocks. According to Stuart et al (2019), capital structure represents the options for the banks to finance its operations and basis for computing its balance sheet. Gebremichael and Ababa (2016) acknowledged that the selection of capital structure is a significant part in decision making of firms as it influences profitability and hence a firm's value. In addition, Ullah et. al. (2020) noted that capital structure represents a blend of the sources through which a firm is financed as it is associated with risks and reward.

One of the alternative options and effective tools to contain cost of capital is capital structure (Timilsina, 2020) as it indicates the value of a firm (Chakrabarti and Gruzin 2019). Therefore, the choice of capital structure is a significant financial part of corporate management (Basnet, 2015; Jaafar et al., 2017; Guo et al., 2018). Basnet (2015) notes that too much debt solicited from either loans or bond issues cannot be amassed whereas, too much equity solicited from either preferred stock, common stock, or retained earnings cannot be issued. Although firms may be able to benefit from tax shields through interest payments that are tax deductible, it increases its cost of bankruptcy (Basnet, 2015). This necessitates determination of equilibrium between equity and leverage which directly affects the rate of return and investments risks.

It is noted that the leverage of commercial banks does not differ much and the determinants of leverage in both the banking and non-banking institutions are related. However, the is lack of agreement in the studies on how the factors affect capital structure. Generally, the capital structure of the commercial banks was measured by the debt-to-equity ratio as noted from the studies, therefore for both levered and the unlevered commercial banks the leverage ratio that was employed in this study measured the total liabilities over shareholder's equity.

1.1.3 Banking Sector in Kenya

In Kenya, Commercial banks play significant role of contributing to the country's economic growth by mobilizing investments funds. In Kenya, Central bank of Kenya (CBK) controls all commercial banks by ensuring implementation of minimum capital requirement regulations. These regulations are also aligned to the international standards

developed by the Basel Committee. According to the CBK, there were 41 commercial banks by end of financial year 2019/2020 (CBK Annual Report, 2020); (Annex 1).

In accordance with the requirements of the constitution, demonetization of the Kenyan currency (Kenya constitution, 2010) led new currency notes in June 2019. The old generation one thousand notes taken out of circulation at the end of September 2019. Previously, new coins had been launched in December 2018 (CBK annual report, 2019). Section 33B of the Banking (Amendment) Act (CBK annual report, 2019) introduced interest-rate caps to the financial (banks) sector in September 2016 and followed by issuance Kenya Banking Sector Charter (KBSC) by CBK in February 2019 not only to foster discipline within banking sector but also make them respond to market needs.

1.2 Research Problem

The success of banks remains dependent on their ability to manage different risk exposures that may range from market, credit, or operations. This requires effective, appropriate and efficient ways to determine essential capital to protect it from unforeseen losses that may arise. Yet, there is limited knowledge on the choice of capital structure and what affects corporate financing. Numerous studies have been published following the studies by Modigliani and Miller (1958).

Locally, some of the studies on capital structure include the work of Ukaegbu and Oino (2013), who noted that Kenyan banks are mostly funded by 80% debt. In addition, individual banks appear to have stable capital structures. A study by Ndungu and Thuo (2016) noted that capital structure was correlated positively correlated to size, age, profitability and related negatively to asset tangibility, tax-shield, business risks. Although

Booth et al. (2001) noted that capital structures choices were affected by similar variables in both developing and developed countries, evidence showed that persistent differences which accounted for country specific factors. In fact, Magero (2014) noted that it was not possible to have a specific uniform structure cutting across all commercial banks in Kenya.

Globally, Thao et al. (2016) studied the listed firms in Vietnam on how capital structure was affected by financial crisis and showed that tangibility firm size, and profitability significantly impacted capital structure. Shibru (2012) investigated how size, profitability, tangibility, growth, liquidity, and risk influences leverage and found that tangibility, size, profitability, and liquidity significantly influenced capital structure while growth and risk did not show any statistically significant effects on capital structure.

From the studies reviewed there is no distinct separation of firm specific and industry specific determinants of capital structure. Most if not all studies have summed up the two in the research. In Kenya this is a topic that has not been explored much and leaves a gap due to limited literature. The topic of commercial banks capital structure has been of debate for years and there is no agreement that has been reached so far. Due to lack of agreement about optimal determinant of capital structure, the study sought to establish firm specific determinants of capital structure on commercial banks in Kenya. This will help in establishing how commercial banks should balance between these capital structure and financial performance to ensure maximum profitability. This research aimed to identify the firm specific determinants of leverage and how they affect leverage. Therefore, the research question was, how is the leverage of the commercial banks in Kenya determined by the firm specific determinants of capital structure?

1.3 Research Objective

This study aimed to evaluate firm-specific determinants of capital structure of commercial banks in Kenya.

1.4 Value of the Research Study

This study will be beneficial to various stakeholders e.g., commercial banks, research community, policy makers and CBK who are interested in the commercial banks. The findings will provide insights on financial organizations management with success and failure indicators to the bank's financial managers and equips them knowledge useful to determine their firm specific capital structure.

The policy makers will use this research when making policies linked to capital structure of banks. When banks leverage is stabilized it will lead to economic growth and stability as banks will grow and create job opportunities, credit facilities at low interest rates and cheaper deposits

The study will also strengthen existing knowledge. The recommendations on best type of firm specific determinants of capital structure for commercial banks will be important to academicians and researchers, making it possible for them to carry out further research.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter looks at the literature review. Literature on determinants of capital structure are reviewed including theories and empirical studies linked to capital structure. The theories that support capital structure and the determinants of capital structure are reviewed in detail. Both international and local studies are included in the empirical review.

2.2 Theoretical Review

This section looks at the most relevant theories linked to capital structure. There are several theories that were proposed on capital structure but only a few were relevant to this specific study. The theories discussed are Modigliani and Miller, static Trade off, pecking order and agency cost theories. The section below highlights what each theory proposed about capital structure and the expected results on how the determinants are linked to capital structure.

2.2.1 Modigliani and Miller Theorem

Modigliani and Miller theory (MMT) states that the choice of capital structure selected by a company in a perfect market does not matter since market value of the firm is dependent on its underlying asset risk and earning power (Modigliani & Miller, 1958). The two propositions made by MMT stated that (I) the capital structure is not relevant to value of a company when taxes are not there and (ii) that value of a firm will be boasted whereas Weighted Average Cost of Capital (WACC) is reduced by financial leverage when there are taxes imposed.

This theory is contradicting the purpose of the study that seeks to determine capital structure of commercial banks. It is nevertheless important as it was among the pioneers of capital structure theories and shows the efforts of economists to make an understanding of capital structure.

2.2.2 Static Trade-off Theory

Static trade-off theory (STOT) states that profitable companies favour debt for tax considerations and thus employ more debt (Weerakoon et al. 2014). The firms note that increasing leverage will result to increased debt tax shield value. This implies that the risk in taking out debt is low compared to equity. Worth noting, financing based on debt at the initial stages is cheaper than equity financing. However, growing debt, has potential to increase company's risk. Based on STOT, an optimum combination of equity and debt are identified.

The theory is relevant in this study as it highlights how profitable companies' capital structure behaves. It assumes that debt finance increases with profitability, and this is a variable that this research will prove.

2.2.3 Pecking Order Theory

The pecking order theory (POT) proposes that internal financing through earnings that have been retained should be considered as the first choice of financing source and then debt and issuing of equity (Myers & Majluf, 1984). It is easy for stakeholders to determine the performance of a company by simply looking at the way it is financed. Financing through debt is a sign of undervalued stock whereas financing through equity implies the stock is

overvalued. POT assumes that there is information that is not balanced due to inefficient investment decision can be mitigated based on capital structure. The actions of management give an insight on the firm prospects as they know more than investors on the company's return on investments opportunities.

2.2.4 The Agency Cost Theory

The Agency cost theory (ACT) is about the association between the managers and the firm. It assumes that those in management do not execute their duties with shareholder's interest in mind. The ACT puts emphasis on costs resulting from vested interest between shareholders, debt holders' and firm's management (Jensen and Meckling, 1976). It is noted that managers tend to pursue profits of the company's they many and in most cases to their own gain against shareholders wishes.

The theory is important in determining capital structure of commercial banks because it agrees that agents have impact on commercial banks capital structure and may opt for debt finance in disregard to shareholder's interest.

2.3 Detailed Firm Specific Determinants of Capital Structure

The section below highlights the variables under study. It states the expected relationship with capital structure based on other studies. The determinants of capital structure are the independent variables, profitability, Firm size, Growth rate, Liquidity and Age. These variables are explained in a more detailed manner below.

2.3.1 Profitability

According to Kimoro (2019), companies which are profitable have the potential to make internal funds with expected increase of the company's debt-equity ratio resulting from profitability. It agrees with the POT which assumes a decreasing correlation between debt equity ratio and profitability. Most of the theories of capital structure refer a positive association between profitability and leverage. For example, MMT argues that when there are taxes, companies would choose debt because of the benefits from tax shield (Modigliani & Miller, 1963).

2.3.2 Firm Size

Studies in association between size of the firm and capital include Ndungu and thuo (2016) who noted that firm size was positively associated with capital structure. A study by Ukaegbu and Oino (2013) which considered nineteen (19) banks in Kenya indicated that leverage was positive and significantly associated with firm size and attributed it to the perception that it could not fail due to its large size. It also noted that due to its large size, the capital markets had confidence as they were seen to be more profit making, diversified and had ability to meet its obligations in terms of interest whenever they were due.

The trade-off theory notes that firms which were big in size, low bankruptcy costs and stable and more cash flow had higher potential for debt financing. Kimoro (2019) argued that bank size had positive and linear correlation with capital structure. Additionally, Kimoro (2019) found that big sized firms used more debt since they had more capacity to absorb the risk of bankruptcy whereas small sized firms took less debt due to the fear that they may become bankrupt in case they fail to make timely repayment of their debt. Diaz

and Tin (2017) also noted that the size of the bank has a positively influence on leverage implying that more debt is incurred whenever the bank is bigger.

2.3.3 Growth Rate

Growth rate is determined by total assets change computed based on its future potential to enlarge its business or foreseen investment opportunities (Diaz & Tin, 2017). According to Shibru (2012), firm with higher leverage have less growth. Growing firms are likely to require funding from external sources because the internal sources may not be sufficient to fund investment opportunities. The POT notes that debt are preferred to equity whenever they required funding from external sources due to reduced cost of information related to debt issues.

2.3.4 Liquidity

Liquidity is defined as liquid assets divided by total assets and determines how easily the assets of the commercial banks will be converted to cash. Several studies looked at the relationship of leverage and liquidity. For instance, Shibru (2012) noted that liquidity was negative associated to leverage. Firms which had lower leverage had more liquid equity (Lipson & Mortal, 2009). In addition, these firms raised their capital preferably through equity financing.

2.3.5 Age

Age of the bank will be measured according to the number of years it has been in existence. According to Ndungu and thuo (2016), microfinance in Kenya shows that capital structure is related positively to age. Worth noting, many years track record makes it possible for

the firms to persuade creditors in addition to having experience in sourcing for credit effectively or based on terms that were favourable whenever they wanted to consider debt capital (Mintesinot, 2010)

2.4 Empirical Literature Review

A study by Shibru (2012) investigated how size, profitability, tangibility, growth, liquidity, and risk influences leverage in eight (8) commercial banks in Ethiopia based on data spanning the period 2000-2011 (12 years). Shibru (2012) found that tangibility, size, profitability, and liquidity significantly influenced capital structure while growth and risk did not show any statistically significant effects on capital structure.

Amidu (2007) research on the banks dynamics that characterise capital structure in Ghana and found that the banks financing decision were influenced by corporate tax, profitability, growth, bank size and asset structure. In addition, Amidu (2007) found that debts had been used to finance the bank assets with three quarters of the bank's capital being constituted through short term debt.

Aremu et al. (2013) studied the banking sector in Nigeria and focused what determines the capital structure. The study was based on the period 2006 and 2010. The variables used in the study were bank size, dividends, tangibility, profitability, tax, and growth. The results findings showed that bank size, dividends, tangibility, profitability, tax, and growth significantly influenced the leverage levels of the bank.

A study on European union (EU) banks by Papagianni (2013) on standard determinants of capital structure and whether they applied during period that had financial crisis based on

data spanning six years between the period to 2007-2012 and found that they had an explanatory power on book leverage. However, the direction of influence was found to not always being probable and hence proposed that more studies based on bigger sample including other factors such as share price volatility, concentration ration and diversification of manager's compensation be done.

Li (2011) studied the commercial banks listed in China to determine the capital structure and showed that capital structure was greatly influenced by lowest capital adequacy requirement. However, factors that determined the capital structure were found to be able to adequately explain the leverage level. In addition, macroeconomic factors such as the gross domestic product were noted to greatly influence capital structure.

Allen et al. (2013) did a study on determinants of capital structure of Thai Banks for the 10-year period between 1999-2008and focused on both internal (firm specific) and market-based determinants of capital structure. They found that the consequence of market-based parameters far much bigger for market leverage than book leverage while the fir specific variables had a bigger effect on firm's leverage.

According to a study by Ukaegbu and Oino (2013) that focused on what determined the capital structure in Kenyan banks based on data spanning the period 2001 to 2009 found that they had stable capital structures at points that were explicit for each bank. In addition, it noted that Kenyan banks are being financed by up to eighty per cent (80%) debt. Results by Ukaegbu and Oino (2013) found that larger banks were mostly highly leveraged whereby with more profits, it accrued less debt whereas more regulatory capital implied

that the banks were less leveraged. Moreover, GDP was found to be significant and positively associated to leverage level.

A study by Mohamud (2019) on what determines capital structure of Kenyan microfinance banks noted that size was strongly associated to leverage whereas age was negatively correlated to leverage. Profitability and asset tangibility were found to be insignificant and inversely related to leverage. In addition, liquidity was found to negative and significantly related to leverage.

In Kenya, a study by Ndungu and Thuo (2016) on what determines banks capital structure with special attention to microfinance institutions found profitability, size, business risks, age and capital adequacy as important factors. A positive relationship was established between capital structure and age, size and profitability with the remaining factors being negatively related to capital structure.

Magero (2014) studied Kenyan commercial banks with aim of identifying how capital structure influenced performance based on a 5-year period (2009 -2013) and found strong relationship between return on assets/equity and not only long-term debts but also capital reserve. Magero (2014) concluded that there is no specific and perfect structure that would apply for all the commercial banks in a uniform manner. This is because banks are at all-time at different levels of what they hold as customer deposits, long-term debt, total capital reserves and short-term debts.\

2.5 Conceptual Framework

The conceptual framework of the research study consists of independent and dependent variables and how they are linked (Adom et al., 2018). The conceptual framework is presented as shown in Figure 1. Independent variables were profitability, size, growth rate, age and liquidity while the dependent variable were capital structure which were operationalized using the debt/equity leverage ratio, liabilities over total equity. The independent variables were measured as follows; Profitability was measured by taking the net income over total assets. Bank size was computed by taking the natural logarithm of total assets. Growth rate measures the rate of asset growth. Asset liquidity was measured using the current ratio; current assets over current liabilities.

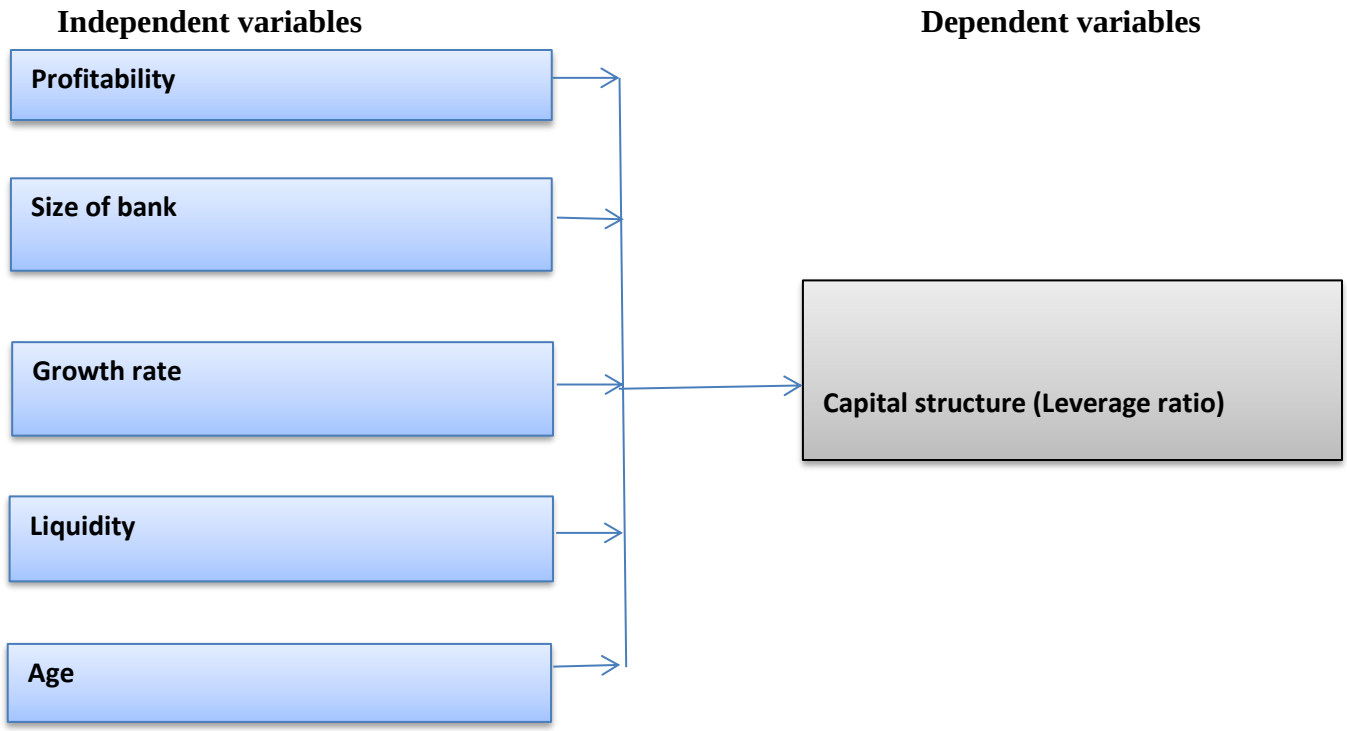


Figure 1 Conceptual Framework

2.6 Summary of Literature Review and Research Gap

It was noted that few studies have dealt with determinants of capital structure in Kenya. These include Ukaegbu and Oino (2013), Mohamud (2019), Ndungu and thuo (2016), Magero (2014). It was evident that there is presence of a gap under the study topic as many of them were carried out in other countries and very few focused on Kenya. More studies need to be undertaken locally on what determines the capital structure. Notably, no study done locally in Kenya had separated the determinants of capital structure that are firm or industry specific which this research aimed to achieve. It was also clear that reviewed research showed limited agreement on determinants of capital structure which left this as an interesting area of study.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents methodology that was used in the study. The type of research design, the population, data collection methods and data analysis methods employed in the study is explained in detail in this chapter. The analytical model and the operationalization of variables was also looked at.

3.2 Research Design

Research design is advance planning of the methods and techniques chosen by a researcher to answer questions identified by the researcher. The study used descriptive research design by examining current and existing state of the situation (Atmowardoyo, 2018). According to Williams (2007), descriptive research encompasses identifying certain qualities of a specific phenomenon based on observations or examination of association between different phenomena. Descriptive method was used because it best explains the correlation among the study variables, and it can analyse both quantitative and qualitative data.

3.3 Population of the Study

The study's population included all commercial banks in Kenya. Forty-one banks qualified for the study. Since the study was a census, no sampling was required.

3.4 Data Collection

Secondary data from banks' balance sheet and income statements retrieved from the commercial bank's audited and published financial statements spanning a five (5) year

period (January 2015 to December 2019) was sourced from the respective bank's website. Data collected was for five years. The coverage period was five years because this period is enough for a bank's capital structure to have stabilized. The compulsory requirement of publishing companies' financial statements made it easy to obtain secondary data.

3.5 Data Analysis

Orodho (2009) and McKinney (2012) notes that data analysis comprises of management, examination, and presentation. The purpose of the research is to ascertain the variables that are significantly determine decisions linked to capital structure of commercial banks in Kenya. Analysis of quantitative data was based on inferential and descriptive statistics was used to analyse the quantitative data.

3.5.1 Descriptive Analysis

The descriptive statistics gives the values of the mean, median, standard deviation, minimum and maximum values of variables. The analysis of variables was done based Gretl16 statistical software for five-year period between 2015 and 2019. The data was aggregate an annual basis.

3.5.2 Inferential Analysis

Statistical tests that were used to establish how independent variables are associated to independent variables include multicollinearity, homoscedasticity, autocorrelation, and normality tests.

Multicollinearity relates two or more predictors in a multivariate regression model that have a high correlation. It represents undesirable characteristics where independent variables have a high correlation. High multicollinearity indicates existence of exact linear correlation in one or more parameters. The Variance Inflation Factors was used to test for multicollinearity where Values > 10.0 may indicate a collinearity problem and thus needs to be dropped from the regression model. Pearson's Correlation Coefficient (PCC) was used for assessing Multicollinearity. A PCC of 0.7 is recommended indicator for Multicollinearity, which also indicates variable relatedness. A VIF value around or greater than ten (10) indicates collinearity.

Chi square test was used to test for normality. The level of significance in the study was 5%. The null hypothesis being the error term is not normally distributed. A Chi square graph was arrived at to see the behaviour of the data. Values greater than 0.05 will lead to rejection of null hypothesis.

Establishing whether error terms correlated with observed data was based on Heteroskedasticity. Ensuring that residuals met these criteria utilized the White's test. Autocorrelation was tested based on Durbin-Watson test and Wooldridge test. The test is based on the Null hypothesis that there is no first-order autocorrelation (rho = 0)

3.5.3 Analytical Model

The study used multiple regression analysis to compute effects of firm specific determinants on the bank 's leverage. The regression equation shown in equation 1 was used.

$$Y = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \in \qquad Eq.1$$

Where, Y, X_1, X_2, X_3, X_4, X_5, X_6, and X_7 represents leverage, profitability, bank size, growth rate, tangibility, liquidity, and age respectively. The error term is represented by €, the Y intercept by β_0 whereas β_1 to β_7 are the model coefficients.

*Table 1**: Operationalization of variables***

Variable	How it is measured
Capital stricture	Total liabilities/ shareholder's equity
Profitability	Net income/ total assets
Growth rate	Annual growth in total assets
Liquidity	Current assets / current liabilities
Age	Ln number of years since incorporation
Size	Ln total assets

3.5.4 Significance Tests

Significance test was based on analysis on Variance. This made it possible to check whether they singly or jointly significant within the regression model whereas the t-test was used to test the independent variables.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1 Introduction

In this chapter the researcher will analyse the findings and interpretation of the data which is obtained from CBK and commercial banks annual reports. The research aims to establish the determinants of capital structure of commercial banks in Kenya. The independent variables were the determinants of capital structure while the dependent variable is capital structure. Diagnostic tests, correlation analysis and regression analysis were carried out for the study.

4.2 Response Rate

This study aim was to collect data from all the 41 commercial banks. It was only possible to obtain data from 32 banks because some banks were not yet in operation as of 1st January 2015. In addition, 3 banks were under statutory governance and receivership whereas others did not have their data readily available. Availability of data from 32 banks out of 41 represents a response rate of 76.2% which was considered adequate. In total, there were 160 data points used for the study.

4.3 Descriptive Analysis

This section contains descriptive analysis for capital structure, growth rate, profitability, liquidity, age and size. The descriptive statistics gives a representation of the mean, median, standard deviation, minimum and maximum. Table 2 below shows the statistics of the variables used. An output of all the variables was extracted using gretl for five years (2015 to 2019) on an annual basis.

Table 2: Summary Statistics, using the observations 1:1 - 32:5

Variable	Mean	Median	S.D.	Min	Max
Capital structure	5.41	5.06	2.77	-9.95	15.5
Growth rate	0.119	0.0666	0.575	-0.906	6.82
Profitability	0.0566	0.0554	0.0272	0.000	0.277
Liquidity	1.22	1.19	0.434	0.123	6.46
Age	3.55	3.57	0.613	2.08	4.83
Size	17.8	17.8	1.45	14.2	20.6

Source: Research Findings (2021)

4.4 Inferential Analysis

Analyses were based on regression and correlation to establish the statistical significance association between the independent variables (Growth rate, Profitability, Liquidity, Age and Size) and dependent variable (Capital Structure). The data collected was subjected to diagnostic tests at 95% confidence interval and thus important in checking the truthfulness or falsehood of the data. The diagnostics tests included autocorrelation, Multicollinearity, normality, and Heteroskedasticity.

4.4.1 Multicollinearity Analysis

Analysis of variance inflation factors based on determinants of capital structure (Growth rate, Profitability, Liquidity, Age and Size) versus capital structure is presented in Table 3. The VIF of al the variables are less than 10 and therefore no variable will be dropped as there is no multicollineaarity.

Table 3: Overall Value Inflation Factors

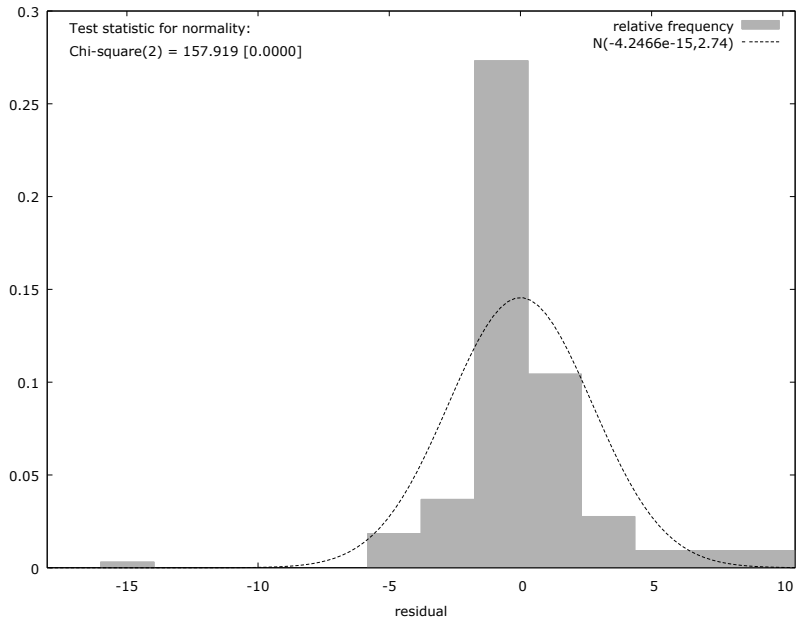
Variable	Value Inflation Factors
Age	1.525
Size	1.558
Growth rate	1.072
Profitability	1.080
Liquidity	1.027

Source: Research Data (2021)

4.4.2 Test for Normality

Test of normality used chi-square and histograms based on determinants of capital structure (Growth rate, Profitability, Liquidity, Age and Size) versus capital structure is presented in Figure 2

Figure 2: Test statistic for normality



Source: Research Data (2021)

The Figure 1 shows that the p-value is less than the level of significance 0.05. Hence the data series of all the variables is normally distributed

4.4.3 Test for Autocorrelation and Heteroscedasticity.

Autocorrelation and heteroscedasticity results on the determinants of capital structure (growth rate, profitability, liquidity, age and size) versus capital structure is presented in Table 4 below.

Table 4: Autocorrelation and heteroscedasticity analysis

	Test statistic	p-value
Wooldridge test	1.81386	0.0793895
Durbin-Watson statistic	1.02148	
White's test	80.645890	0.0000

Source: Research Data (2021)

Table 4 shows that Durbin-Watson statistic of 1.02148 and Wooldridge test were 1.8 indicates that there is positive autocorrelation of the variables. The null hypothesis will be rejected. From the results below the p value is less than 0.05 and the test statistic of 80.6 indicate that there is no homoscedasticity.

4.4.4 Correlation Analysis

Correlation analysis was based on Pearson correlation, 5% critical value (two-tailed) = 0.1552 for n = 160. The Table 5 presents the results on correlation analysis

Table 5: Correlation Coefficients, using the observations 1:1 - 32:5

	Capital structure	Growth rate	Profitability	Liquidity	Age	Size
Capital structure	1.0000	0.0235	-0.0599	-0.1879	-0.0993	0.0211
Growth rate		1.0000	0.0157	0.0366	0.0619	0.2441
Profitability			1.0000	-0.0609	0.2616	0.1273
Liquidity				1.0000	0.0469	0.1415
Age					1.0000	0.5493

Size	1.0000

Source: Research Findings (2021)

4.5 Multiple Regression Analysis

Multi regression analysis was based on analysis of model fitness, analysis of variance and analysis of model coefficients

4.5.1.1 Regression Model Summary.

Analysis of regression model fitness on determinants of capital structure (Growth rate, Profitability, Liquidity, Age and Size) versus capital structure. The regression analysis was performed a 5% significance level. The results are being presented in Table 6 below.

Table 6: Overall Model Summary

Regression Statistics	
R Square	0.05960
Adjusted R Square	0.029068
Standard Error	2.733110
Observations	160

(Source: Research findings, 2021)

The Table 6 indicate that computed coefficient of determination, R Square between capital structure and its determinants (growth rate, profitability, liquidity, age and size) is 0.0596 with a standard error of 2.77 at 5% significance level which implies that all determinants explains 5.96% of the variation in capital structure

4.5.1.2 Analysis of Variance

Analysis of variance (ANOVA) based on determinants of capital structure (Growth rate, Profitability, Liquidity, Age and Size) versus capital structure is presented in Table 7 below.

Table 7*: *Analysis of Variance (ANOVA)

Analysis of Variance:			
	Sum of squares	df	Mean square
Regression	72.9069	5	14.5814
Residual	1150.36	154	7.46989
Total	1223.27	159	7.69352
R^2 = 72.9069 / 1223.27 = 0.059600			
F(5, 154) = 14.5814 / 7.46989 = 1.95202 [p-value 0.0889]			

Source: Research findings, 2021

One-way ANOVA was performed to compare the effects of independent variables on dependent variable. The results revealed that there was a statistically significance difference in means between the variables; F (5,154) = 1.95202. the F value is greater than the level of significance therefore there is a statistically significant difference among the means.

4.5.1.3 Multiple Regression of Coefficients

Analysis of multiple regression analysis based on determinants of capital structure (Growth rate, Profitability, Liquidity, Age and Size) versus capital structure is presented in Table 8 below.

Table 8: Model Coefficients.

Model 1: Pooled OLS, using 160 observations, Included 32 cross-sectional units

Time-series length = 5

Dependent variable: CAPITALSTRUCTURE

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Constant	5.02747	2.76862	1.816	0.0713	*
GROWTHRATE	0.0357916	0.390563	0.09164	0.9271	
PROFITABILITY	−5.10685	8.29575	−0.6156	0.5391	
LIQUIDITY	−1.30162	0.506201	−2.571	0.0111	*
AGE	−0.694253	0.436983	−1.589	0.1142	
SIZE	0.265187	0.186423	1.422	0.1569	

Source: Research findings, 2021

The Table 8 shows the coefficient for growth rate, profitability, liquidity, age and size and thus implies that a unit change in growth rate, profitability, liquidity, age and size would increase capital structure by the rate of 0.0357916, −5.10685, −1.30162, −0.694253 and 0.265187 respectively. The fitted model from the result is Y (capital structure) = β_0 + β_{1*}(growth rate) + β_{2*}(profitability) + β_{3*}(liquidity) + β_{4*}(age) + β_{5*}(size) + €

Capital Structure = 5.02747 + 0.0357916*(growth rate) − 5.10685*(profitability) − 1.30162*(liquidity) − 0.694253*(age) + 0.265187* (size) + e_t

4.6 Interpretation and Discussion of Findings

The research sought to find the determinants of capital structure. The independent variables were, profitability, growth rate, liquidity, age, size and the dependent variable is capital structure. Overall model adequacy to predict the determinants of capital structure was examined. The Pearson's correlation coefficient between capital structure of banks revealed a substantial correlation between the variables.

Table 9: Overall model adequacy

	Capital structure	Growth rate	Profitability	Liquidity	Age	Size
Capital structure	1.0000	0.0235	-0.0599	-0.1879	-0.0993	0.0211
Growth rate		1.0000	0.0157	0.0366	0.0619	0.2441
Profitability			1.0000	-0.0609	0.2616	0.1273
Liquidity				1.0000	0.0469	0.1415
Age					1.0000	0.5493
Size						1.0000

Source: Research findings, 2021

The Pearson's correlation coefficient between capital structure and growth rate revealed substantial positive relationship. The Pearson's correlation coefficient between capital structure and profitability revealed a negative relationship. The Pearson's correlation coefficient between capital structure and liquidity revealed a strong negative correlation. This agrees with Shibru (2012) and (Lipson & Mortal, 2009) who noted that liquidity was negative associated to leverage. The Pearson's correlation coefficient between capital

structure and age showed a weak negative relationship. The Pearson's correlation coefficient between size of the bank and capital structure showed a positive correlation, this is in agreement with Ukaegbu and Oino (2013) study which considered nineteen (19) banks in Kenya indicated that leverage was positive and significantly associated with firm size.

CHAPTER FIVE: DISCUSSION OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introductions

The study's main objective was to examine the determinants of capital structure of commercial banks in Kenya. The section presents a summary of the findings, conclusions and recommendations for policy and practice in addition. The limitations faced are also presented followed by and suggestions for future studies.

5.2 Discussion of the Findings of the Research Study

The study aimed to evaluate the firm-specific determinants of capital structure of commercial banks in Kenya. It established if growth rate, profitability, liquidity, size, age of the commercial bank affects capital structure. The research adopted a descriptive panel data design. To have data on firm size and age as a ratio, the researcher used natural logarithm. GRETL was used to carry out the analysis. From findings, R square was 5.96%, showing that 5.96% of variations in capital structure arise from variations in growth rate, profitability, liquidity, age and size. Findings from ANOVA test showed that the F statistic was significant at 5% with a p=0.000 rendering the model appropriate in the study.

The Correlation analysis showed that profitability negatively correlated to capital structure this is in agreement with the POT which assumes a decreasing correlation between debt equity ratio and profitability. It does not agree with other studies like study of Kimoro ,2019 which found that companies which are profitable have the potential to make internal funds with expected increase of the company's debt-equity ratio resulting from profitability. The correlation between firm size and capital structure is negative based on

this study. The research findings are in agreement with the work of Ndungu and thuo (2016), Ukaegbu and Oino (2013), Kimoro (2019) and Diaz and Tin (2017).

Capital structure and growth rate are positively correlated contradicting the work of Shibru (2012) which found that a firm with higher leverage have less growth. The research however agrees with the POT notes that debt is preferred to equity whenever they required funding from external sources due to reduced cost of information related to debt issues. Further, the research found a negative association between leverage and capital structure. This can be backed up by the work of Shibru (2012) who noted that liquidity was negative associated to leverage. Also, firms which had lower leverage had more liquid equity (Lipson & Mortal, 2009). Finally, the research proved a negative correlation between capital structure and age of the firm. Ndungu and thuo (2016) who did a research on microfinance banks found a positive relationship between capital structure and debt, hence more studies on commercial banks need to be done to confirm.

5.3 Conclusion of the Research Study

The research revealed that growth rate and profitability do not have statistically significant influence on capital structure of commercial banks. Age, size and liquidity were statistically significant in determining capital structure of commercial banks and therefore substantial to liquidity. Nevertheless, the study concluded that the variables, growth rate, liquidity, profitability, age and size have a notable impact on capital structure of commercial banks in Kenya. The study concludes that capital structure is notably affected by growth rate, profitability, liquidity, age and size. A unit increase in growth rate and size of a commercial banks in Kenya increases its capital structure. While a unit increase in

profitability, liquidity and age leads the banks to employ more equity hence a decrease in leverage.

5.4 Recommendations of the Research Study

The section presents recommendations based on the research study. The following recommendations have been made based on the research study. It recommends to the commercial banks management to employ more equity when their profits and liquidity are high and vice versa. Older firms should apply more equity. Large firms and growing firms should employ more debt.

It is Government obligation through the CBK to develop policies that provides favourable environment for commercial banks to function and enhance their capital sufficiency which will translate in economic growth.

5.5 Limitations of the Study.

The research covered only a period of five years (2015-2019) and it cannot assure that the results obtained will apply if the period of study is increased. Furthermore, the economic situations may change and it cannot prove that the results will hold in the future. This implies that similar studies have to be done repeatedly in the future to ascertain the results. The research used secondary data which is assumed to be accurate, this cannot be ascertained unless it were primary data. The study used selected determinants of banks leverage and not all the factors due to data unavailability and a limited time to carry out the research.

5.6 Recommendation for Further Research

The study used five variables that growth rate, profitability, liquidity, size, age as the only variables that influence capital structure. The developed model indicated that growth rate, profitability, liquidity and age negatively affected capital structure whereas size had a negative influence on capital structure of commercial banks in Kenya. Future studies can incorporate other variables like dividends per share that can influence capital structure. The research only focused on Kenyan banks. The study's recommendations are that additional studies be carried out on other Kenyan financial companies.

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APPENDIX 1: COMMERCIAL BANKS IN KENYA

1. Absa Bank Kenya
2. African Banking Corporation Limited(Ltd)
3. Bank of Africa Kenya Limited
4. Bank of Baroda (K) Limited
5. Bank of India
6. Charterhouse Bank Ltd
7. SS
8. Citibank N.A Kenya
9. Consolidated Bank of Kenya ltd
10. Credit Bank Limited
11. Development Bank of Kenya Ltd
12. Diamond Trust Bank Kenya Ltd
13. DIB Bank Kenya Limited
14. Ecobank Kenya Limited
15. Equity Group Holdings
16. Family bank ltd
17. First Community Bank Limited
18. Guaranty Trust Bank (K) Ltd
19. Guardian Bank Limited
20. Gulf African Bank Limited
21. Habib Bank A.G Zurich
22. Housing Finance Group Ltd
23. Imperial Bank Ltd
24. Investment and Mortgage (I&M)
25. Jamii Bora Bank Limited
26. Kenya Commercial Bank Group
27. Mayfair Bank Limited
28. Middle East Bank (K) Limited
29. M-Oriental Bank Limited
30. National Bank of Kenya Ltd
31. NCBA Group
32. Paramount Bank Limited
33. Prime Bank Limited
34. SBM Bank Kenya Limited
35. Sidian Bank Limited
36. Spire Bank Ltd
37. Stanbic Holdings
38. Standard Chartered Bank Ltd
39. The Co-operative Bank of Kenya
40. Trans-National Bank Limited
41. UBA Kenya Bank Limited
42. Victoria Commercial Bank Ltd

Source: (Central Bank of Kenya, 2020)

APPENDIX2: RESEARCH DATA

BANK	REFERENCE	Year	CAPITAL STRUCTURE	SIZE	GROWTH RATE	PROFITABILITY	LIQUIDITY	AGE
1	Absa	2015	1.197436	8.381795	0.066578	0.084734	0.0755	1.995635
1	Absa	2016	1.195064	8.414459	0.07811	0.086003	0.0515	2
1	Absa	2017	1.194202	8.433253	0.044227	0.080395	0.0602	2.004321
1	Absa	2018	1.157526	8.511669	0.199632	0.067702	0.0723	2.0086
1	Absa	2019	0.987978	8.511669	0.152441	0.071354	0.077	2.012837
2	Stanbic	2015	1.16586	8.297931	0.158922	0.041634	0.0544	0.845098
2	Stanbic	2016	1.229978	8.331797	0.0811	0.050586	0.0402	0.90309
2	Stanbic	2017	1.208743	8.395743	0.158634	0.042793	0.0323	0.954243
2	Stanbic	2018	1.140406	8.448634	0.129511	0.042898	0.0785	1
2	Stanbic	2019	1.153433	8.466468	0.041919	0.04537	0.0914	1.041393
3	I&M	2015	1.213423	8.282675	0.086471	0.065966	0.0519	1.278754
3	I&M	2016	1.230983	8.32334	0.098156	0.073722	0.0526	1.30103
3	I&M	2017	1.243483	8.380412	0.140439	0.06478	0.0495	1.322219
3	I&M	2018	1.214075	8.460179	0.201621	0.054048	0.0483	1.342423
3	I&M	2019	1.357123	8.538185	0.196757	0.044918	0.044	1.361728
4	DTB	2015	1.164187	8.433944	0.283962	0.058641	0.0159	1.322219
4	DTB	2016	1.162586	8.515933	0.207784	0.062355	0.018	1.342423
4	DTB	2017	1.196322	8.560269	0.107482	0.056813	0.021	1.361728
4	DTB	2018	1.18489	8.577169	0.03968	0.055622	0.021	1.380211
4	DTB	2019	1.200536	8.586846	0.022532	0.051986	0.0212	1.39794
5	HF	2015	1.174037	7.855273	0.175475	0.043374	0.0004	1.414973
5	HF	2016	1.186166	7.856911	0.003778	0.044973	0.0699	1.724276

5	HF	2017	1.204122	7.829568	-0.06102	0.035536	0.0604	1.732394
5	HF	2018	1.206528	7.782388	-0.10294	0.030005	0.0459	1.740363
5	HF	2019	1.221632	7.751702	-0.06822	0.029559	0.0504	1.748188
6	KCB	2015	1.1704	8.746707	0.138182	0.070408	0.1737	2.075547
6	KCB	2016	1.193646	8.774692	0.066558	0.079005	0.0494	2.079181
6	KCB	2017	1.195976	8.810681	0.086399	0.074822	0.045	2.082785
6	KCB	2018	1.189329	8.853925	0.104698	0.096391	0.0589	2.08636
6	KCB	2019	1.168751	8.953553	0.257847	0.083924	0.0676	2.089905
7	NBK	2015	1.096633	8.098437	0.019078	0.051001	0.131	1.672098
7	NBK	2016	1.107073	8.061801	-0.0809	0.069552	0.0764	1.681241
7	NBK	2017	1.070479	8.040892	-0.047	0.079828	0.0683	1.690196
7	NBK	2018	1.064638	8.060128	0.045288	0.069291	0.0533	1.69897
7	NBK	2019	1.168751	8.953553	6.823936	0.068357	0.1132	1.70757
8	NCBA	2015	1.181768	8.216926	0.130386	0.059122	0.0539	1.763428
8	NCBA	2016	1.218134	8.229065	0.028344	0.071809	0.0429	1.770852
8	NCBA	2017	1.202479	8.314231	0.216651	0.05711	0.0462	1.778151
8	NCBA	2018	1.142694	8.389356	0.188844	0.064337	0.0574	1.78533
8	NCBA	2019	1.157349	8.694357	1.018374	0.043533	0.0468	1.792392
9	Stndchrt	2015	1.214057	8.369152	0.05155	0.075231	0.0609	2.021189
9	Stndchrt	2016	1.216652	8.398777	0.070594	0.075546	0.0619	2.025306
9	Stndchrt	2017	1.190221	8.455947	0.140698	0.062845	0.0467	2.029384
9	Stndchrt	2018	1.195339	8.45546	-0.00112	0.066797	0.0711	2.033424
9	Stndchrt	2019	1.187757	8.480205	0.058633	0.063299	0.0683	2.037426
10	Equity	2015	1.202671	8.631507	0.279432	0.079246	0.0814	1.041393
10	Equity	2016	1.20671	8.674598	0.10431	0.088455	0.0494	1.079181
10	Equity	2017	1.215945	8.719717	0.109479	0.071633	0.0509	1.113943
10	Equity	2018	1.198478	8.758446	0.093274	0.072241	0.0425	1.146128

10	Equity	2019	1.198925	8.828455	0.174923	0.066772	0.071	1.176091
11	Co-op	2015	1.168158	8.53466	0.200086	0.057761	0.086	1.672098
11	Co-op	2016	1.208176	8.546331	0.027237	0.069868	0.073	1.681241
11	Co-op	2017	1.125574	8.552495	0.014294	0.067263	0.0627	1.690196
11	Co-op	2018	1.206334	8.616655	0.159204	0.075665	0.0785	1.69897
11	Co-op	2019	6.460202	8.660005	0.104968	0.069978	0.0635	1.70757
12	city	2015	1.282327	7.945209	0.110198	0.06442	0.111	1.612784
12	city	2016	1.234526	8.014199	0.172169	0.060003	0.0672	1.623249
12	city	2017	1.258503	7.992253	-0.04928	0.055161	0.0835	1.633468
12	city	2018	1.458123	7.984843	-0.01692	0.054896	0.086	1.643453
12	city	2019	1.104679	7.93267	-0.1132	0.06171	0.1219	1.653213
13	ABC	2015	1.154711	7.354449	0.024673	0.060655	0.0544	1.322219
13	ABC	2016	1.156681	7.359171	0.010931	0.051012	0.0659	1.342423
13	ABC	2017	1.14539	7.407712	0.118255	0.047773	0.0992	1.361728
13	ABC	2018	1.146616	7.446941	0.094534	0.047381	0.0633	1.380211
13	ABC	2019	1.142366	7.468285	0.050374	0.045762	0.075	1.39794
14	BOA Kenya	2015	1.45615	7.84061	0.113622	0.045472	0.0859	1.041393
14	BOA Kenya	2016	0.921216	7.748154	-0.19175	0.053978	0.1142	1.079181
14	BOA Kenya	2017	1.185193	7.733929	-0.03222	0.023159	0.0951	1.113943
14	BOA Kenya	2018	1.143326	7.684969	-0.10661	0.024433	0.2023	1.146128
14	BOA Kenya	2019	1.107647	7.643414	-0.09125	0.022664	0.2103	1.176091
15	BOB KE	2015	1.198105	7.833641	0.10062	0.054384	0.0475	1.792392
15	BOB KE	2016	1.207111	7.918594	0.216052	0.060192	0.0489	1.799341
15	BOB KE	2017	1.228805	7.982868	0.159511	0.060079	0.0455	1.80618
15	BOB KE	2018	1.198976	8.089956	0.279639	0.052329	0.0519	1.812913
15	BOB KE	2019	1.190603	8.156281	0.164996	0.047001	0.0547	1.819544
16	Consolidated	2015	1.129008	7.150312	-0.043	0.072076	0.0537	1.414973

16	Consolidated	2016	1.112113	7.143574	-0.03541	0.049295	0.0469	1.431364
16	Consolidated	2017	1.086252	7.128908	-0.03321	0.037043	0.0637	1.447158
16	Consolidated	2018	1.077358	7.110163	-0.04224	0.049895	0.0713	1.462398
16	Consolidated	2019	1.202161	7.074145	-0.07959	0.045647	0.0764	1.477121
17	Credit Bank	2015	1.156485	7.012292	0.160476	0.060139	0.0247	1.322219
17	Credit Bank	2016	1.252461	7.08643	0.186144	0.065793	0.0248	1.342423
17	Credit Bank	2017	1.225865	7.161688	0.189208	0.06726	0.0201	1.361728
17	Credit Bank	2018	1.051911	7.251055	0.228477	0.072638	0.0228	1.380211
17	Credit Bank	2019	1.161905	7.335748	0.215327	0.059344	0.0182	1.39794
18	DVLPMNT	2015	#DIV/0!	7.228979	-0.02785	0.028796	0.005	1.278754
18	DVLPMNT	2016	1.216043	7.215147	-0.03135	0.029668	0.005	1.30103
18	DVLPMNT	2017	1.220214	7.212429	-0.00624	0.024453	0.004	1.322219
18	DVLPMNT	2018	0.123335	7.184765	-0.90603	0.027728	0.0078	1.342423
18	DVLPMNT	2019	1.348502	7.185684	0.002118	0.026559	0.0235	1.361728
19	Eco bank	2015	1.256489	7.719551	0.141333	0.032612	0.0684	0.845098
19	Eco bank	2016	1.125896	7.673241	-0.10115	0.006145	0.0477	0.90309
19	Eco bank	2017	1.945859	7.727995	0.134368	0.041513	0.0851	0.954243
19	Eco bank	2018	1.588518	7.736109	0.018859	0.031553	0.0743	1
19	Eco bank	2019	1	7.877244	0.383997	0.02798	0.0301	1.041393
20	Family	2015	1.168517	7.909991	0.314501	0.078738	0.0759	0.90309
20	Family	2016	1.183522	7.841933	-0.14505	0.0966	0.079	0.954243
20	Family	2017	1.13694	7.839698	-0.00513	0.070775	0.0816	1
20	Family	2018	1.133352	7.826147	-0.03072	0.071222	0.0937	1.041393
20	Family	2019	1.095448	7.897174	0.177681	0.070357	0.0883	1.079181
21	FCB	2015	1.173918	7.164735	-0.04354	0.018532	0.1685	0.845098
21	FCB	2016	1.224812	7.174992	0.023899	0.017663	0.1486	0.90309
21	FCB	2017	1.204826	7.239549	0.160264	0.01398	0.134	0.954243

21	FCB	2018	1.208925	7.252379	0.029982	0.014984	0.1271	1
21	FCB	2019	1.190289	7.273299	0.049349	0.01307	0.1678	1.041393
22	Guardian	2015	1.124091	7.164635	0.002513	0.064814	0.0904	1.30103
22	Guardian	2016	1.116184	7.167475	0.006561	0.065985	0.1042	1.322219
22	Guardian	2017	1.109209	7.198733	0.074627	0.051711	0.0782	1.342423
22	Guardian	2018	1.076529	7.209139	0.024249	0.056518	0.0863	1.361728
22	Guardian	2019	1.084506	7.214485	0.012386	0.046083	0.0961	1.380211
23	GA Bank	2015	1.157185	7.392813	0.250965	0.081366	0.089	0.90309
23	GA Bank	2016	1.177299	7.43387	0.09915	0.075496	0.1278	0.954243
23	GA Bank	2017	1.176839	7.495769	0.153186	0.062364	0.1095	1
23	GA Bank	2018	1.187628	7.522778	0.064163	0.066175	0.0866	1.041393
23	GA Bank	2019	1.200856	7.545591	0.053935	0.055377	0.0642	1.079181
24	ME Bank (K)	2015	1.18608	6.458697	-0.02346	0.043652	0.0456	1.544068
24	ME Bank (K)	2016	1.192081	6.718794	0.010087	0.051339	0.0575	1.556303
24	ME Bank (K)	2017	1.164312	6.709358	-0.02149	0.050755	0.1582	1.568202
24	ME Bank (K)	2018	1.154828	6.729235	0.046832	0.045496	0.066	1.579784
24	ME Bank (K)	2019	1.152026	6.927693	0.579276	0.039098	0.0615	1.591065
25	M-Oriental	2015	1.286598	6.929232	0.081302	0.04937	0.0765	1.380211
25	M-Oriental	2016	1.294973	6.996522	0.167589	0.065157	0.0801	1.39794
25	M-Oriental	2017	1.293458	7.024343	0.066155	0.061536	0.0921	1.414973
25	M-Oriental	2018	1.275489	7.02181	-0.00582	0.057059	0.1104	1.431364
25	M-Oriental	2019	1.158099	7.093204	0.178674	0.040954	0.0855	1.447158
26	Paramount	2015	1.358055	7.022321	0.012024	0.052835	0.0958	1.30103
26	Paramount	2016	1.419458	6.974412	-0.10445	0.031363	0.0812	1.322219
26	Paramount	2017	1.401138	6.979598	0.012012	0.039091	0.1153	1.342423
26	Paramount	2018	1.411431	6.995046	0.036211	0.03671	0.1249	1.361728
26	Paramount	2019	1.325452	7.018792	0.056199	0.038914	0.0866	1.380211

27	Prime	2015	1.170806	7.812924	0.18362	0.051599	0.0575	1.361728
27	Prime	2016	1.21119	7.815167	0.005178	0.054347	0.0413	1.380211
27	Prime	2017	1.226151	7.892027	0.193603	0.04653	0.0611	1.39794
27	Prime	2018	1.205867	8.00059	0.283993	0.037571	0.0876	1.414973
27	Prime	2019	1.205414	8.044054	0.105258	0.039657	0.0531	1.431364
28	Sidian	2015	1.155042	7.281182	0.209166	0.109075	0.1559	1.20412
28	Sidian	2016	1.198773	7.319637	0.092583	0.104742	0.1486	1.230449
28	Sidian	2017	1.224513	7.285325	-0.07597	0.064663	0.1991	1.255273
28	Sidian	2018	1.312369	7.403274	0.312045	0.042	0.0846	1.278754
28	Sidian	2019	1.298712	7.422591	0.045484	0.035295	0.125	1.30103
29	Spire	2015	1.251324	7.160455	-0.12778	0.118266	0.0544	1.531479
29	Spire	2016	1.227486	7.139958	-0.0461	0.10427	0.0712	1.544068
29	Spire	2017	1.219243	6.964876	-0.33178	0.006618	0.0305	1.556303
29	Spire	2018	1.191983	7.047195	0.208702	0.025486	0.0445	1.568202
29	Spire	2019	1.182318	6.836343	-0.38461	0.010102	0.0205	1.579784
30	Trans-Ntnl	2015	1.166833	7.019228	-0.00566	0.082385	0.0974	1.477121
30	Trans-Ntnl	2016	1.151621	7.015881	-0.00768	0.083709	0.1242	1.491362
30	Trans-Ntnl	2017	0.899546	7.010358	-0.01264	0.067069	0.1391	1.50515
30	Trans-Ntnl	2018	1.119251	7.01011	-0.00057	0.055506	0.129	1.518514
30	Trans-Ntnl	2019	0.92553	6.969329	-0.08963	0.066221	0.0869	1.531479
31	Victoria	2015	1.241427	7.301466	0.108976	0.056069	0.0659	1.278754
31	Victoria	2016	1.25112	7.350316	0.119051	0.055265	0.0598	1.30103
31	Victoria	2017	1.254606	7.414725	0.159872	0.055313	0.0673	1.322219
31	Victoria	2018	1.232166	7.509699	0.244439	0.046391	0.0816	1.342423
31	Victoria	2019	1.242387	7.557175	0.115517	0.044841	0.078	1.361728
32	UBA	2015	1.212708	6.891049	-0.68759	0.0142	0.0312	0.778151
32	UBA	2016	1.291755	6.568352	-0.52433	0.059622	0.0366	0.845098

32	UBA	2017	1.275454	6.813229	0.757427	0.048491	0.0733	0.90309
32	UBA	2018	1.226136	7.185602	1.357071	0.048283	0.086	0.954243
32	UBA	2019	1.213908	7.206511	0.049321	0.046583	0.0256	1

APPENDIX 3: DATA OTPUT FROM GRETL 2021

Model 1: Pooled OLS, using 160 observations
Included 32 cross-sectional units
Time-series length = 5
Dependent variable: CAPITALSTRUCTURE

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	5.02747	2.76862	1.816	0.0713	*
GROWTHRATE	0.0357916	0.390563	0.09164	0.9271	
PROFITABILITY	−5.10685	8.29575	−0.6156	0.5391	
LIQUIDITY	−1.30162	0.506201	−2.571	0.0111	**
AGE	−0.694253	0.436983	−1.589	0.1142	
SIZE	0.265187	0.186423	1.422	0.1569	

Mean dependent var	5.406248	S.D. dependent var	2.773720
Sum squared resid	1150.363	S.E. of regression	2.733110
R-squared	0.059600	Adjusted R-squared	0.029068
F(5, 154)	1.952021	P-value(F)	0.088883
Log-likelihood	−384.8429	Akaike criterion	781.6858
Schwarz criterion	800.1369	Hannan-Quinn	789.1782
rho	0.389781	Durbin-Watson	1.021484

White's test for heteroskedasticity -
Null hypothesis: heteroskedasticity not present
Test statistic: LM = 80.6459
with p-value = P(Chi-square(20) > 80.6459) = 3.04919e-09

Wooldridge test for autocorrelation in panel data -
Null hypothesis: No first-order autocorrelation (rho = 0)
Test statistic: t(31) = 1.81386
with p-value = P(|t| > 1.81386) = 0.0793895

Analysis of Variance:

	Sum of squares	df	Mean square
Regression	72.9069	5	14.5814
Residual	1150.36	154	7.46989
Total	1223.27	159	7.69352

R^2 = 72.9069 / 1223.27 = 0.059600
F(5, 154) = 14.5814 / 7.46989 = 1.95202 [p-value 0.0889]

Summary Statistics, using the observations 1:1 - 32:5

Variable	Mean	Median	S.D.	Min	Max
CAPITALSTRUCTURE	5.41	5.06	2.77	-9.95	15.5
GROWTHRATE	0.119	0.0666	0.575	-0.906	6.82
PROFITABILITY	0.0566	0.0554	0.0272	0.000	0.277
LIQUIDITY	1.22	1.19	0.434	0.123	6.46
AGE	3.55	3.57	0.613	2.08	4.83
SIZE	17.8	17.8	1.45	14.2	20.6

Variance Inflation Factors
Minimum possible value = 1.0
Values > 10.0 may indicate a collinearity problem

GROWTHRATE	1.072
PROFITABILITY	1.080
LIQUIDITY	1.027
AGE	1.525
SIZE	1.558

VIF(j) = 1/(1 - R(j)^2), where R(j) is the multiple correlation coefficient
between variable j and the other independent variables

Belsley-Kuh-Welsch collinearity diagnostics:

variance proportions

lambda	cond	const	GROWTHRA~	PROFITAB~	LIQUIDITY	AGE	SIZE
4.796	1.000	0.000	0.003	0.007	0.004	0.001	0.000
0.944	2.254	0.000	0.933	0.001	0.000	0.000	0.000
0.167	5.361	0.001	0.001	0.729	0.170	0.000	0.000
0.075	8.007	0.008	0.000	0.248	0.790	0.036	0.006
0.015	17.814	0.122	0.000	0.013	0.032	0.772	0.020
0.003	42.887	0.869	0.063	0.002	0.002	0.191	0.974

lambda = eigenvalues of inverse covariance matrix (smallest is 0.00260764)
cond = condition index
note: variance proportions columns sum to 1.0

According to BKW, cond >= 30 indicates "strong" near linear dependence,
and cond between 10 and 30 "moderately strong". Parameter estimates whose
variance is mostly associated with problematic cond values may themselves
be considered problematic.

Count of condition indices >= 30: 1

Variance proportions >= 0.5 associated with cond >= 30:

```
  const    SIZE
  0.869   0.974
```

Count of condition indices >= 10: 2
Variance proportions >= 0.5 associated with cond >= 10:

```
  const     AGE    SIZE
  0.991   0.962   0.994
```

White's test for heteroskedasticity
OLS, using 160 observations
Dependent variable: uhat^2

	coefficient	std. error	t-ratio	p-value	
const	−213.551	469.591	−0.4548	0.6500	
GROWTHRATE	−552.124	149.644	−3.690	0.0003	***
PROFITABILITY	−4486.94	1414.16	−3.173	0.0019	***
LIQUIDITY	−122.027	230.308	−0.5298	0.5971	
AGE	113.682	69.2970	1.641	0.1032	
SIZE	33.4499	46.4981	0.7194	0.4731	
sq_GROWTHRATE	−4.50479	4.40947	−1.022	0.3087	
X2_X3	106.721	488.458	0.2185	0.8274	
X2_X4	233.579	74.8264	3.122	0.0022	***
X2_X5	−47.9186	15.6397	−3.064	0.0026	***
X2_X6	23.8168	8.55127	2.785	0.0061	***
sq_PROFITABILITY	−327.479	2441.22	−0.1341	0.8935	
X3_X4	1924.09	561.123	3.429	0.0008	***
X3_X5	148.961	160.415	0.9286	0.3547	
X3_X6	96.2099	82.0858	1.172	0.2432	
sq_LIQUIDITY	14.6016	8.79602	1.660	0.0992	*
X4_X5	−80.3135	37.2677	−2.155	0.0329	**
X4_X6	8.75904	15.4049	0.5686	0.5706	
sq_AGE	−2.44478	6.50552	−0.3758	0.7076	
X5_X6	0.0346567	4.67446	0.007414	0.9941	
sq_SIZE	−1.48746	1.33440	−1.115	0.2669	

Unadjusted R-squared = 0.504037

Test statistic: TR^2 = 80.645890,
with p-value = P(Chi-square(20) > 80.645890) = 0.000000

Auxiliary regression including lagged residual:

	coefficient	std. error	t-ratio	p-value	
const	5.43099	2.19143	2.478	0.0189	**
GROWTHRATE	−0.374734	0.499288	−0.7505	0.4586	
PROFITABILITY	−7.81500	6.66662	−1.172	0.2500	

LIQUIDITY	−1.06995	0.268718	−3.982	0.0004 ***
AGE	−0.797338	0.391713	−2.036	0.0504 *
SIZE	0.259771	0.127969	2.030	0.0510 *
uhat(-1)	0.418057	0.230479	1.814	0.0794 *

n = 128, R-squared = 0.2185

Wooldridge test for autocorrelation in panel data -
Null hypothesis: No first-order autocorrelation (rho = 0)
Test statistic: t(31) = 1.81386
with p-value = P(|t| > 1.81386) = 0.0793895

Correlation coefficients, using the observations 1:1 - 32:5
5% critical value (two-tailed) = 0.1552 for n = 160

CAPITALSTRUCTURE	GROWTHRATE	PROFITABILITY	LIQUIDITY	AGE	SIZE	
1.0000	0.0235	-0.0599	-0.1879	-0.0993	0.0211	CAPITALSTRUCTURE
	1.0000	0.0157	0.0366	0.0619	0.2441	GROWTHRATE
		1.0000	-0.0609	0.2616	0.1273	PROFITABILITY
			1.0000	0.0469	0.1415	LIQUIDITY
				1.0000	0.5493	AGE
					1.0000	SIZE