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Effect of Monetary Facets on Dynamic Capital Structure of Selected Commercial Banks Listed at the Nairobi Securities Exchange, Kenya

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Abstract:
Dynamic capital structure is the way firms make adjustments towards the target capital structure which is proxied by debt equity ratio. There has been variation of debt equity ratio of firms at the Nairobi Security Exchange (NSE) in an effort to achieving targeted leverage that would yield targeted revenues and profits for firms. Despite this, most firms still operate at sub optimal level and experience losses. Studies in this respect have attributed the sub optimal operations to monetary facets such as inflation rate, exchange rate and interest rate. However, the studies have yielded mixed results leaving the effect of monetary facets on the dynamic capital structure unresolved. It is on this basis the study sought to establish effect of the monetary facets on dynamic capital structure of selected commercial banks listed at the NSE. The study was anchored on market timing theory and guided by correlational research design. The target population was eight tier one banks at the NSE. Secondary data spanning ten years from 2010 to 2019 were obtained from commercial banks audited financial statements while data on monetary facets was obtained from Central Bank of Kenya database and audited financial statements of the banks. Panel data methodology was adopted to estimate Random and Fixed Effect Models and the Hausman test used to select the appropriate model. Whereas exchange rate had insignificant positive effect, interest rate had significant positive effect on the dynamic capital structure. Inflation however, had significant negative effect on the same. Therefore, to enhance performance of banks, hedging interest rate and inflation rate risks is necessary.

Keywords: *Macroeconomic facets, dynamic capital structure, Kenya*

1. Introduction

Capital structure is the combination of debt and equity that make the total capital of a firm (Mutwiri, 2015). In modern knowledge economy, it is an important variable for managerial decision since it influences shareholder's return as well as risk (Muthama, 2013). Appropriate mix of securities to finance new investments will increase the value of the firm while poor decision on capital structure will lead to loss in firm value (Rehman, 2016). Capital structure is of particular interest because of its influence on firm's value, growth and survivability (Aida, 2016). Existing theories on capital structure have approached capital structure from a corporate policy perspective which determines the proportion of debt to equity at a given mix which then becomes the firm's a greed debt to equity policy. This policy would then operate over a period of time in what may be viewed as static capital structure; however, the dynamics of economic environment more often forces corporate firms to adjust their debt equity mix which scholars like Banerjee and Wilbory (1999), Haron (2014) and Ying Yang (2015) view as dynamics of capital structure.

Modigliani and Miller (1958) developed capital structure irrelevance theorem which stated that capital structure has no significant effect on the value of the firm. The theory was presented with the assumptions of a perfect market where there are no transaction costs, no taxes and no bankruptcy cost. Limitation of the static capital structure models is that they do not consider the firm's optimal capital structure choices in response to fluctuations in asset value over time (Fischer, Henkel and Zechner 1989). Modigliani and Miller talked of maintaining static debt equity ratio but in the actual sense, debt equity ratio observations may not be adequate measures of firm's capital structure policies in a dynamic setting. The assumptions of Modigliani and Miller (1958) have caused a stream of research into alternative theoretical framework where there are incentives for managers or shareholders to make decisions on the level of leverage to obtain a desired or optimal capital structure (Aida, 2016).

Capital structure of a firm is affected by both internal and external factors. Internal factors are associated with specific firm while external factors affect all firms and include macroeconomic variables that influence the firm's optimal capital structure and decisions (Robb and Robinson, 2014). A study by Graham, Leary and Roberts (2015) on century of capital structure concluded that 70% of external factors causes the difference as far as the ability of firms to make optimal decision is concerned. Myer and Majluf (1984) posited that firms prefer to exhaust internally generated funds before going for external funds but macroeconomic facets which are monetary in nature are seen to affect the growth prospect regardless of the choice made by the firm as noted by Sinha and Agnihotri (2015). Capital structure require dynamic setting approach since factors that determine a firm's optimal leverage may change over time. Optimal capital structure of a firm represents the equilibrium between the risk and return which lead to the maximization of the value of the company, the optimal level modifies over time as the economic and financial conditions changes (Vidal, 2009).
Nduri (2013) described interest rate as the price a borrower pays for use of money he does not own and have to return to the lender who receives interest for deferring his consumption by lending to the borrower.

According to Makori (2014), exchange rate risk occurs as a result of investing in foreign stock markets and higher exchange rate uncertainty lead to higher risk premium with drastic exchange rate changes which results into decline in the stock market performance due to lowered discount value of expected future cash flows. Makori stated that exchange rate is measured by home currency against the foreign currency.

Okara and Mutuku (2019) defined inflation as a situation where price level increases on average posing negative externalities on the economy. Jerop (2018) defined inflation as the general rate at which the prices of goods and services rise stating that inflation represents a decline in the purchasing power of a currency which is measured as an annual percentage change in consumer price index.

2. Literature Review

2.1. Theoretical Literature

2.1.1. Modigliani and Miller Theory

Modigliani and Miller theorem (1956) formed the basis of modern evaluation of capital structure. The theory laid the foundation of modern thinking of capital structure. Modigliani and Miller preposition one asserted that in a perfect market where there are no taxes, no transaction costs and no bankruptcy costs, the value of a firm would be independent of the capital structure. The theory is termed as capital structure irrelevance theory since it was formed based on the idea that the value of the firm is independent of the capital structure. The theory however failed to look at capital structure in relation to macro-economic facets that have continued to cause uncertainty and tendency to unpredictable capital structure hence affecting financing decisions and eventually the value of the firm.

2.1.2. Market Timing Theory

Market timing theory was developed by (Baker and wurgler, 2002) According to the theory; the firm issue debt when the interest on the debt is low compared to past and future expected interest rate. Baker and Wurgler asserted that prediction about the future interest rate depends upon the inflationary trend such that when stock prices are overvalued, firms will finance projects through debts. The Market timing theory is important in the study because it plays a role of changes in leverage which is either decrease or increase in leverage of the firm.

2.1.3. Keynesian Economic Theory

This was developed in (1930) Keynes posited that it is the rate that governs the terms on which funds are being currently supplied such that the market interest rate depends on the demand and supply of money and it is the price which brings into balance the willingness to hold wealth in the form of cash. The theory proposed that changes in money supply do not directly influence prices and viable inflation is as a result of economic pressure in the economy expressing themselves in prices. Keynesians further argued that to stabilize the economy, Government should actively intervene otherwise, unpredictable fluctuations would cause damage to investment and thus long-term economic growth.

2.1.4. International Fisher Theory

The theory posited that an estimated change in the current exchange rate between any two currencies is directly proportional to the difference between the two countries nominal interest rates at a particular time. The theory further posited that the real interest rate in a particular economy is independent of monetary variables, the theory assumed that real interest rates are calculated across the countries and the country with lower interest rate would also record lower inflation rate which would make the real value of country's currency to rise over time. According to the theory, the differences in nominal interest rate between countries can be used to predict changes in exchange rate and countries with higher nominal interest rate experience higher rate of inflation which results in currency depreciating against other currencies. The theory is based on the assumption that countries with lower interest rates will likely to witness lower levels of inflation which can result in the real value of the associated currency compared to other nations. Nations with higher interest rates will experience depreciation in the value of their currency. The theory is important in this study since it is explaining factors influencing currency movement in currency market.

2.2. Empirical Literature

2.2.1. Interest Rate and Dynamic Capital Structure

Nduri (2013) described interest rate as the price a borrower pays for use of money he does not own and have to return to the lender who receives interest for deferring his consumption by lending to the borrower. Market timing theory Baker and wurgler (2002) predicted negative relationship between market interest rate and leverage. Rehman (2016) studied the impact of macroeconomic variables on capital structure of textile industry in Pakistan specifically interest rate, inflation, public debt, exchange rate, and stock market development using panel data regression, the study concluded that public debt, exchange rate, and interest rate are negatively related to capital structure whereas corporate taxes, stock market development, inflation and GDP growth rate are positively related with economic leverage, however the study did not look at the effects of interest rate in relation to capital structure in dynamic setting and focus was on textile industry in Pakistan and not Banking sector.

Zein and Angstrom (2016) studied the effects of macroeconomic facets on the choices of capital structure of listed non-financial firms in Sweden using panel data regression with data sampled from the period between 2005 to 2014, the study concluded that interest rates show positive relationship with debt, however the study did not look at effects of interest rates on capital structure in a dynamic setting and the study did not focus on financial firms. Parvaiz (2015) carried out study on dynamism of capital structure of firms listed at Karachi Stock Exchange Pakistan using panel data and concluded that interest rate significantly affects leverage, the study did not look at the causal effects between interest rate and dynamic capital structure. Mokhova and Zinecker (2013) carried out research that was aimed at indicating the influence of macroeconomic factors on corporate capital structure in different European countries and emerging markets for the period 2006-2010 in order to compare the level of the impact on the capital structure according to the countries' specifics, the investigation concluded that interest rate both short term and long term has strong positive significant impact on capital structure of firms in German and France, the study did not look at effect of interest rate on capital structure across the globe.

Yinusa (2016) performed research on impact of macroeconomic factors as determinant of capital structure choices on Nigerian firms based on the data of 115 Nigerian non-financial firms listed on the Nigerian stock exchange using two step system generalized method of moments (GMM). The findings of the study revealed that negative relationship exists between interest rates and leverage, however the study did not focus on financial firms. Ater (2018) studied influence of macroeconomic variables on corporate capital structure of agricultural sector in Kenya using cross sectional time series data collected from annual reports of listed nonfinancial firms from NSE website, the study concluded that there was positive correlation between macroeconomic variables and capital structure and real rate of interest had significant negative impact on capital structure, however the study only looked at the Agricultural sector and not the banking sector.

Jerop (2018) studied macroeconomic factors and corporate capital structure of 25 listed non-financial firms in the NSE, Kenya. The study used panel data regression and concluded that capital structure of NSE's listed non-financial firms in Kenya tends to be positively and significantly affected by inflation, interest rate, GDP growth rate, and foreign direct investment.

Studies have registered inconsistent findings of both positive and negative relationship between interest rate and capital structure. Positive finding includes; Zein and Angstrom (2016), Mokhova and Zinecker (2013) and Jerop (2018) while negative relationship between interest rates and capital structure have been documented by; Market timing theory (Baker and wurgler (2002), Rehman (2016), Yinusa (2016) and Ater (2018

2.2.2. Exchange Rates and Dynamic Capital Structure

Jerop (2018) defined exchange rate as the price of a country's currency in terms of another currency. Study by Zein and Angstrom (2016) on effect of macroeconomic factors on the choices of capital structure of listed non-financial firms in Sweden with sample period of 2005-2014 using panel data regression model, study revealed that exchange rate shows a negative relationship with debt, however the study did not look at capital structure in dynamic setting, causal effect between capital structure and exchange rates was not investigated. Sinha and Agnihotri (2015) carried research on macroeconomic risks and firm's financing decisions in India for the period between 2002-2014 using panel robust two step system GMM estimator the results indicated that foreign exchange risk have sizable and statistically significant negative impact on firms' leverage decisions, however the relationship between capital structure and leverage was not looked at in dynamic setting.

Study by Dong (2011) on foreign exchange rate and capital structure decisions in New Zealand listed property trust using truncated regression model, the study revealed that one year forward appreciation rate of the New Zealand listed property trust against US dollar is found to have a significant negative relationship with changes in the long-term debt ratio, the study indicated that listed property trust tend to reduce long term debt when the market signals a possible appreciation of the New Zealand dollar. This study however did not did not look at adjustments on the dynamic capital structure due to changes in exchange rate. Study by Tehrani and Najafzadehkhoee (2015) on macroeconomic uncertainty and corporate capital structure for firms listed in Tehran stock exchange in Iran the period of the study was 2007-2014 while applying EGARCH,ARCH and panel regression model, the results revealed that exchange rate uncertainty has negative effect on the leverage the study stated that the implication of the result was that the higher exchange rate uncertainty increase the firm's business risk and the volatility of their revenue and costs, thus rise in bankruptcy and therefore firms will use less debt in their capital structure. However, the study did not explore factors that leads to fluctuation of currency.

Ajay and Madhumathi (2012) studied impact of exchange rate on firm's capital structure by considering specifically firm's choice between debt and equity as the source of business financing with respect to its exchange rate risk irrespective of the degree of its international involvements using a sample of 295 Indian non-financial manufacturing firms over a period between 1995-2011,the study obtained mixed result out of 295 non-financial firms, the return of 74.91% were negatively exposed to exchange rate risk and return series of 25.09% firms were positively exposed to exchange rate change, they asserted that a firm with positive exchange rate beta is expected to have positive impact on its stock returns at the time of depreciation of Rupee against the trade weighted exchange rate and firm with negative exchange rate beta is expected to have negative impact on its stock returns, they further noted that 74.91% of Indian non-financial firms are net exporters whose returns are negatively impacted by exchange rate depreciation while the remaining 25.09% firms are net exporters whose returns are positively impacted as a result of rupee depreciation, There is need to study exchange rate in relation to dynamic capital structure since factors affecting currency depreciation rate vary across the globe.

Ater (2018) explored the influence of macroeconomic variables on corporate capital structure decisions of Agricultural Sector for a sample of 7,which are listed at the Nairobi Securities Exchange in Kenya study adopted cross sectional time series data collected from annual reports of listed nonfinancial firms from NSE website and concluded that exchange rate is significantly related to the debt ratio of agricultural firms listed at the NSE, the study concluded that exchange rate has significant positive relationship with corporate capital structure, however the study only looked at the Agricultural sector and not the banking sector, it overlooked the adjustments that are made to capital structure in an effort to achieving optimality.

Jerop (2018) studied macroeconomic factors and corporate capital structure of 25 listed non-financial firms in the NSE, Kenya. The study used panel data regression and concluded that capital structure of NSE's listed non-financial firms in Kenya tends to be positively and significantly affected by inflation, interest rate, GDP growth rate, and foreign direct investment on the other hand, exchange rate, savings as a ratio of GDP, financial development as well as stock market development negatively and significantly affect the capital structure of listed non-financial firms, however the study did not look at capital structure in dynamic approach and explored non-financial firms only.

Empirical studies have registered inconsistent findings, both positive and negative relationship have been reported between exchange rate and capital structure scenario that poses challenges to clear policy formulation ,Studies that registered positive relationship between exchange rate and capital structure included, Ater(2018) and Ajay and Madhumathi (2012)while studies that registered negative relationship between exchange rate and capital structure included, Angstrom (2016),Sinha and Agnihotri (2015),Dong (2011), Tehrani and Najafzadehkhoee (2015) and Jerop (2018).

2.2.3. Inflation and Dynamic Capital Structure

Zein and Angstrom (2016) studied macroeconomic factors of GDP, inflation, taxes and exchange rate and how they explain the choice of capital structure of non-financial firms in Sweden using panel data regression with data sampled from the period between 2005 to 2014 ,the study concluded negative relationship between inflation and debt ,however study overlooked the adjustments that are made to capital structure in an effort of achieving optimality, study did not test on cointegration and only focused on non-financial firms not banking sector.

Rehman (2016) studied the impact of macroeconomic variables of interest rates, inflation, public debt, exchange rates and stock market development on capital structure of textile industry in Pakistan using panel data regression the period of investigation was 2004-2013,the study concluded that public debt, exchange rates, and interest rates are negatively related to capital structure whereas corporate taxes, stock market development, inflation and GDP growth rate are positively related with economic leverage, however the study did not look at the dynamic nature of capital structure, causal effects of macroeconomic variables on capital structure and focus was on textile industry in Pakistan not Banking sector.

Sinha and Agnihotri (2015) studied macroeconomic risks and firm's financing decisions in India for the period between 2002-2014 using panel robust two step system GMM estimator, the study concluded that inflation risk have sizable and statistically significant negative impact on firm's leverage decisions, however developing economies were not taken into account. Tehrani and Najafzadehkhoee (2015) studied macroeconomic uncertainty and corporate capital structure for firms listed in Tehran stock exchange in Iran, the macroeconomic factors studied were GDP, inflation and real exchange rates, the study used panel data regression model on 168 manufacturing firms listed in Tehrani stock Exchange covering period from 2007 to 2014,the results indicated that inflation rate and real exchange rate uncertainty have negative effect on leverage while GDP uncertainty has positive influence on leverage, however the study did not explore capital structure in dynamic setting.

Study by Angga (2014) focus on finding out the relationship between inflation uncertainty and firm's debt to equity ratio according to debt maturities using pooled sample of listed Dutch firms in Euronext Amsterdam, OLS panel data regression was used capital and the period of the study was 1993 to 2012,findings of the study indicated that inflation uncertainty has strong negative relationship with firm's long term leverage, however the study did not look at capital structure in dynamic setting. Taggart (1985) studied corporate capital structures in the United States and concluded that when inflation rate is high, the real value of tax deduction is high thus positive relationship between inflation and leverage, the study did not take the dynamic approach to capital structure and variability of inflation across nations was not tackled. Brigham (1980) studied the effects of inflation on capital structure and cost of capital, the result of the study revealed that investors demand more on their investment when inflation increase since issuing debt at higher rate increases the chances of bankruptcy, however the study gave inconclusive results since the direction of the

relationship between inflation and capital structure was not given. Perera (2015) studied the effect of macroeconomic conditions on corporate capital structure of manufacturing firms listed in Colombo Stock Exchange using panel data analysis for a period of 10 years, 2004-2013 and concluded a positive relationship between inflation and capital structure, study however focused on manufacturing firms only and the dynamic approach to capital structure was not taken into consideration. Haron (2014) investigated the dynamic aspects of capital structure ,existence of target capital structure and speed of adjustment to target capital structure of property firms in Malaysia using dynamic panel data model on specific firm characteristics of non-debt tax shield, asset structure, profitability, firm size, growth opportunity and liquidity, study found that there existed target leverage for property firms in Malaysia and posited that firms do adjust capital structure occasionally due to time varying factors and adjustment towards target leverage ,however the study did not tackle how external factors of inflation, interest rate and exchange rate affect dynamic capital structure of firms.

Huong (2018) study conducted to examine how macro determinants of inflation and corporate income tax affects capital structure of non-financial joint stock companies in Vietnam, Study used two step system GMM to analyze data from financial statements of 464 listed joint stock companies on three main stock exchanges (HOSE, HNX, and UPCOM), obtained world bank database in the period of 2008-2015, the study concluded positive influence between inflation and capital structure.

Chan, Rahman and Sannacy (2017) studied determinants of capital structure of public listed companies in Malaysia, Singapore and Thailand Stock Exchange from 2004 to 2013 using panel data regression model, study investigated firm specific factors such as profitability, firm size tangibility of assets depreciation to total assets and inflation and their influence on capital structure and concluded that Inflation yielded statistically significant positive influence on leverage for Malaysia and Thailand but demonstrated an insignificant relationship for Singapore, the researchers indicated that increase in expected inflation reduces the real value of the cost of debt thus increasing the real value of the tax shield positive influence of inflation on leverage was indicated by the study to be as a result of increased uncertainty and business risk like fluctuations in price earning which reduces potential future cash flows, increases tax shield uncertainty thereby reducing preference for financial leverage, however the dynamic nature of capital structure was not employed in the study. Magwai, (2014) carried out research on effects of macroeconomic conditions on capital structure choice of 230 listed South Africa firms using panel data regression, the result indicated that there was negative relationship between inflation and long term debt while short term leverage was not statistically significant study indicated that changes in inflation rate did not influence firm manager's decision to increase or decrease short term debt ,the study however did not look at capital structure in a dynamic setting.

Yinusa (2017) studied the impact of macroeconomic factors as determinant of capital structure choices on Nigerian firms based on the data of 115 Nigerian non-financial firms listed on the Nigerian stock exchange using two step system generalized method of moments (GMM), the study revealed negative relationship between inflation and leverage. This study however focused on non-financial firms only. Study by Jerop (2018) on macro-economic factors and corporate capital structure of firms listed at the Nairobi Security Exchange using panel data for a period 2007 to 2017 concluded that inflation was positively correlated to the debt equity ratio, however the study did not look at capital structure in a dynamic way.

Studies have registered mixed empirical results between inflation and dynamic capital structure, both negative and positive relationship between capital structure and inflation have been reported. Studies that have registered negative relationship between inflation and capital structure included; Angstrom (2016), Agnihotri (2015), Magwai (2014) and Yinusa (2017) while the studies that registered positive relationship between capital structure and inflation included; Rehman (2016), Najaffzadehkoee (2015), Angga (2014), Taggart (1985), Perera (2015), Huong (2018) and Jerop (2018).)

Studies on dynamic capital structure were performed in more advanced economies than in Kenya. There is lack of information on relationship between interest rate, inflation rate, exchange rate and dynamic capital structure of firms, focus of studies was not on banking sector and financial firms, furthermore, inconclusive and contradictory results in relation to the effect of interest rate, inflation rate and exchange rate on dynamic capital structure has been reported. Studies in developed nations have not factored in the effects of macroeconomic facets which are monetary in nature on dynamic capital structure of firms calling for a study to bridge the gap based on the Kenyan perspective.

3. Research Methodology

Research methodology outlined the methodology employed by the study encompassing the research design, study area, target population, sample frame, data collection, presentation and analysis.

3.1. Research Design

Kumar (2011) argues that 'research design is a plan, structure and strategy of investigation so conceived as to obtain answers to research question or problems, the choice of most appropriate design depends on the objectives of the study. Correlation research design was used to investigate the effect of macroeconomic facets on dynamic capital structure of selected commercial banks listed at the NSE. According to Kumar (2011), correlation research design is appropriate in establishing relationship between variables and therefore appropriate for the study. Longitudinal research design was also used since it tracks changes over time.

3.2. Study Area

Kenya has a total of 43 commercial banks according to the Central Bank of Kenya Supervision Annual Report (2017). According to the report, banks with weighted index of 5% and above are classified in tier one they are also called large banks with weighted market share of 65.99% and included eight commercial banks with market share analysis of

total net assets in millions of Ksh. 2,640,684 and market share analysis of deposit of Ksh. 2,019,840. The key macroeconomic indicators from 2019 economic survey are inflation, interest rate and exchange rate.

3.3. Target Population

The study target population was all the eight tier one commercial banks operating in Kenya by 2019

3.4. Sampling Frame

Sampling frame comprised of eight selected tier one commercial banks that have higher capital base with weighted index of 5% and above. This included Equity bank of Kenya, Kenya commercial bank, Absa bank Kenya, Cooperative bank of Kenya, Standard chartered bank Kenya, Commercial bank of Africa Kenya, Diamond trust bank and Stanbic bank.

3.5. Data Collection and Analysis

Secondary data on the financial statements of the selected commercial banks was collected from company data as published in the audited accounts for a period of ten years from 2010 to 2019.The specific information extracted from the financial statements was debt and equity. Data on the independent variables which are interest rate, inflation and exchange rate was obtained from central bank of Kenya (CBK) website.

3.6. Data Analysis

The study adopted panel data analysis using STATA quantitative Microsoft software. Fixed effect (FE) and Random effect (RE) tests were conducted based on panel analysis model.

$$DER_{it} = \alpha_0 + \alpha_1 R_{it} + \alpha_2 I_{it} + \alpha_3 E_{it} + \varepsilon_{it}$$

Where;

DER - Debt Equity ratio (proxy to dynamic capital structure)

R - Interest rates

I - Inflation

E - Exchange rates

α_0 - Constant

$\alpha_1, \alpha_2, \alpha_3$ - Coefficients

i – Item (Bank)

t – Time period

4. Results and Discussion

This presents data analysis results on the effect of macroeconomic facets of inflation, interest rate and exchange rate on dynamic capital structure of commercial banks listed at the NSE for the period 2010 to 2019. Analysis comprised descriptive statistics, correlation analysis, stationary test and panel analysis test involving pooled, fixed and random effect. The diagnostic tests conducted included houseman, autocorrelation, multicollinearity, residual normality and heteroscedasticity test.

4.1. Descriptive Statistics

This study analyzed debt equity ratio (DER) as a function of exchange rate (E), Inflation rate (I) and lending rate (R) with results captured in Table 1.

	DER	R	E	I
Mean	5.569376	2.806114	4.483072	1.961560
Median	5.383332	2.825833	4.460648	1.891605
Maximum	8.845569	3.012589	4.656745	2.803360
Minimum	3.022843	2.628285	4.329227	1.368639
Std. Dev.	1.127893	0.115573	0.082898	0.378670
Skewness	0.342416	0.062305	0.542242	0.795833
Kurtosis	3.208166	2.040707	2.383935	2.998965
Jarque-Bera	1.707758	3.119239	5.185480	8.444681
Probability	0.425760	0.210216	0.074815	0.014664
Sum	445.5501	224.4891	358.6457	156.9248
Sum Sq. Dev.	100.4993	1.055219	0.542890	11.32792
Observations	80	80	80	80

Table 1: Descriptive Statistics

Note: DER Indicates Debt Equity Ratio, E-Exchange Rates, I-Inflation, R-Lending Rates (Author, 2020)

The data set comprised of 8 cross sections given that the study involved 8 commercial banks listed at the NSE for the period 2010 to 2019 resulting into a total of 80 observations. Debt equity ratio for the commercial banks during the

study period averaged 5.569376, was skewed to the left and had a thick tail (kurtosis value =3.208166 but generally, it was normally distributed given a probability greater than 0.05 for Jaque–Bera (JB) statistic. DER is a financial ratio that compares the owners' equity on capital to debt with the optimal debt to equity ratio expected not to exceed 2.0. Tier one banks experience rapid growth and are capital intensive as they make use of leverage potential to maximize profits with the assumption that management can earn more on borrowed funds than it pays interest and fees on these funds. This may have led to DER which is above the accepted standard.

Interest rate (R) variable had a mean of 2.806114 which was normally distributed, positively skewed and with a thin tail. The value indicated that on average lending rates for the banks increased by an average of 3%. Exchange rate had a mean of 4.483072, normally distributed, positively skewed with a thin tail given the kurtosis value =2.383935. From 2010 to 2019, it is evident that the Kenyan shilling depreciated against the dollar by an average of 4%. The mean inflation rate was 1.961560 that was positively skewed, thick tail given the kurtosis value =2.998965 but normally distributed given a probability value greater than 0.05 for the JB statistic. In the period inflation rose by an average of 2% an indication of the rising cost of living.

4.2. Stationarity Test

Stationarity test was performed to check for the random walk of the variables that will aid in curbing spurious panel analysis results. The test is a precursor for cointegration analysis. This test was conducted using Levin-Lin Chu unit root test to determine whether the variables were stationary at levels or after differencing as shown in Table 2.

Variable	Test in	LLC	Conclusion
		Adjusted t statistic	
DER	Level	-4.0683 (0.0000) ***	Stationary at level
R	Level	-6.4831 (0.0000) ***	Stationary at level
E	Level	-3.0684 (0.0011) ***	Stationary at level
I	Level	-5.6806 (0.0000) ***	Stationary at level

Table 2: Panel Unit Root Test
Note. LLC Is the Levin - Lin – Chu and Values in Parentheses ( ) Are P-Values While
****Indicate Stationarity of the Variables at 5% Level Of Significance*

Stationarity analysis was based on the null hypothesis that the variable is non-stationary. The probability values of 0.000<0.005 for Debt-to-equity ratio, lending rate and inflation and 0.0011<0.05 for exchange rate indicated that the null hypothesis of non-stationarity was rejected. This implied that the variables of debt-to-equity ratio, inflation, exchange rates and lending rates were stationary at 5% level of stationarity. The variables were stationary at levels an indication that they were suitable to be used for analysis but no cointegration.

4.3. Correlation Analysis

Correlation analysis was conducted to examine the association between dynamic capital structure and monetary facets as depicted in Table 3.

	DER	R	E	I
DER	1			
R	.402**	1		
E	.390	.404**	1	
I	-.382**	.545**	.499**	1

Table 3: Pairwise Correlation Coefficient of Study Variables
** *Correlation Is Significant at 5% Level of Significance, DER- Debt Equity Ratio,*
R-Interest Rate, E-Exchange Rate, I-Inflation Rate

The results indicated a positive and significant correlation between the independent variables and capital structure. Particularly, the correlation results showed that dynamic capital structure proxied by debt equity ratio had a positive and significant association with exchange rates (r =.390, ρ>0.05). This implies that 39% of debt equity ratio is associated with the exchange rate .The findings on the association between dynamic capital structure and exchange rates conforms with Ater (2018) and Ajay and Madhumathi (2012) which registered a positive relationship however the findings contradicts Angstrom(2016), Sinha and Agnihotri (2015) who found a negative relationship in their study. Inflation rate was negatively and significantly associated with dynamic capital structure (r =-.382, ρ<0.05) meaning 38.2% decrease in debt-equity ratio is associated with inflation. The study though conforms to the findings of Angstrom (2016), Agnihotri (2015), Magwai (2014) and Yinusa (2017) who registered negative association, it contradicts Perera (2015), Huong (2018) and Angga (2014) who registered positive relationship.

Interest rate was positively and significantly correlated with dynamic capital structure (r =.402, ρ<0.05), meaning 40.2% increase in debt-equity ratio is significantly associated with interest rate. The findings though contradict Yinusa (2016) who conducted study in Nigeria and Ater (2018) who conducted study in Kenya and obtained negative and significant relationship, it conformed to Mokhova and Zinecker (2013) who conducted study in Germany and France and Jerop (2018) who conducted study in Kenya and found positive and significant relationship.

4.4. Panel Analysis

The study conducted panel analysis based on fixed effect and random effect analysis. The appropriate analysis model was selected based on the Hausman test having a Null hypothesis that the random effect model is appropriate in relation to the fixed effect model as depicted in Tables 4.4 to 4.6.

Random effects GLS regression			Number of obs = 80			
Group variable: ID			Number of groups = 8			
R-sq: within = 0.2485			Obs per group: min = 10			
between = 0.6944			avg = 10.0			
overall = 0.3647			max = 10			
			Wald chi2(3) = 42.37			
corr (u_i, X) = 0 (assumed)			Prob> chi2 = 0.0000			
DER	**Coef.**	**Std. Err.**	**Z**	**P>z**	**[95% Conf.**	**Interval]**
R	9.353799	1.690962	5.53	0.000	6.039575	12.66802
E	-6.291806	1.746549	-3.60	0.000	-9.714979	-2.868633
I	-2.809518	0.5047448	-5.57	0.000	-3.7988	-1.820237
_cons	12.91421	7.927886	1.63	0.103	-2.624165	28.45258
sigma_ u	0.09190991					
sigma_ e	0.97705503					
Rho	0.00877123 (fraction of variance due to u_i)					

Table 4: Random Effect Model
Source: Authors (2020)

Fixed- effects (within) regression			Number of obs = 80			
Group variable: ID			Number of groups = 8			
R-sq: within = 0.5044			Obs per group: min = 10			
between = 0.0001			avg = 10.0			
overall = 0.0711			max = 10			
			F (3, 69) = 23.40			
corr (u_i, Xb) = -0.8332			Prob> F = 0.0000			
DER	**Coef.**	**Std. Err.**	**t**	**P>|t|**	**[95% Conf. Interval]**	
R	22.29311	3.226429	6.91	0.000	15.85656	28.72966
E	1.046757	3.538986	0.30	0.768	-6.013328	8.106842
I	-2.005278	0.695417	-2.88	0.005	-3.392597	-0.6179591
_cons	-57.87186	21.75281	-2.66	0.010	-101.2675	-14.47618
sigma_u	2.2157521					
sigma_e	0.97705503					
Rho	0.83720925 (fraction of variance due to u i)					
F test that all u_i = 0: F (7, 69) = 6.89 Prob> F = 0.0000						

Table 5: Fixed Effect Model
Source: Authors (2020)

Coefficients				
	(b)	**(B)**	**(b-B)**	**sqrt(diag(V_b-V_B)**
	Fixed effect	Random effect	Difference	S.E
R	22.29311	9.353799	12.93931	2.747816
E	1.046757	-6.291806	7.338563	3.077985
I	-2.005278	-2.809518	0.8042402	0.4783696
b = consistent under Ho and Ha; obtained from xtreg				
B = inconsistent under Ha, efficient under Ho; obtained from xtreg				
Test: Ho: difference in coefficients not systematic				
chi2(9) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 51.98 Prob>chi2 = 0.0000				
(V_b-V_B is not positive definite)				

Table 6: Hausman Test Results
Source: Authors (2020)

To choose the appropriate model to apply we use the Hausman test as noted by Gujarati (2009). There are two panel data estimator approaches that can be applied in financial research (Brooks, 2008). Brooks noted that, the best way of choosing between the Fixed effect model and Random effect model is running the Hausman test such that if the P-value for the hausman test is less than 0.05, it implies that Random effect model is not appropriate and that fixed effect model is adopted.

The Hausman test results in Table 6 indicated that we reject the null hypothesis since the P-value of the Hausman chi-statistic is 0.0000 which is less than 0.05. The implication of the Hausman test is that the fixed effect model of analysis is suitable in relation to the random effect model. From the fixed model the relationship between monetary facets and dynamic capital structure can be represented as in model 4.1.

$$DER_{it} = -57.872 + 22.293R_{it} - 2.005I_{it} + 1.047E_{it}$$ Equation4.1

Std.Err. [3.226429][0.695417][3.538986]t (6.91)(-2.88)(0.30)

4.5. Effect of Interest Rate on Dynamic Capital Structure

The first objective of the study was to investigate the effect of interest rate on dynamic capital structure of selected commercial banks listed at the NSE which was based on the null hypothesis that interest rate has no effect on dynamic capital structure of selected commercial banks listed at the NSE. The coefficient of regression 22.293 with a p-value 0.000 < 0.005 as in model (4.1) and Table 6 indicated that interest rate had a significant positive effect on the dynamic capital structure of selected commercial banks listed at the NSE at 5% level of significance which corroborates the correlation results. A percentage increase in lending rate significantly increases the dynamic capital structure proxied by debt equity ratio by 22.29311. Thus, we reject the null hypothesis and conclude that interest rate affects dynamic capital structure of commercial banks listed at the NSE. The findings though contradict Yinusa (2016) who conducted study in Nigeria and Ater (2018) who conducted study in Kenya and obtained negative and significant relationship, it conformed with Mokhova and Zinecker (2013) who conducted study in Germany and France and Jerop (2018) who conducted study in Kenya and found positive and significant relationship. The findings of this study may be attributed to the fact that rising lending rates increase profitability and in turn increasing shareholder's return.

4.6. Effects of Exchange Rate on Dynamic Capital Structure

The second objective of the study was to establish the effect of exchange rate on dynamic capital structure of selected commercial banks listed at the NSE that was based on the null hypothesis that exchange rate has no effect on dynamic capital structure of selected commercial banks listed at the NSE. A coefficient of 1.047 with a p-value 0.768 > 0.05 as in model (4.1) and Table 6 indicated that accept the null hypothesis that exchange rate has no effect on dynamic capital structure of selected commercial banks listed at the NSE. The findings on the association between dynamic capital structure and exchange rates contradicts Ater (2018) and Ajay and Madhumathi (2012) who registered positive relationship. The results also contradict Angstrom (2016), Sinha and Agnihotri (2015) who found negative relationship in their study. This finding may be attributed to the fact that lending rate is the main business which is done in local currency and fluctuations in the exchange rate do not really affect the dynamic capital structure.

4.7. Effects of Inflation on Dynamic Capital Structure

The third objective of the study was to determine the effect of inflation on dynamic capital structure of selected commercial banks listed at the NSE based on the null hypothesis that inflation rate has no significant effect on dynamic capital structure of selected commercial banks listed at the NSE. From the Table 6 and model (4.1), a coefficient of -2.005 having a p-value 0.005 < 0.05 indicated that we reject the null hypothesis and conclude that inflation rate affects dynamic capital structure of commercial banks listed at the NSE. A coefficient of -2.005 implied that inflation had a significant negative effect on dynamic capital structure at 5% level of significance such that an increase in inflation causes the dynamic capital structure to decrease by approximately 2 units. This means a percentage increase in inflation rate decreases dynamic capital structure by 20.05%. The study though conforms to the findings of Angstrom (2016), Agnihotri (2015), Magwai (2014) and Yinusa (2017) who registered negative association it contradicts Perera (2015), Huong (2018) and Angga (2014) who registered positive relationship.

4.8. Post Estimation Tests

Classical regression assumes that the residuals are normally distributed; there is no autocorrelation, multicollinearity and heteroscedasticity.

4.8.1. Multicollinearity

Multicollinearity arises when the independent variables are highly correlated. Variance inflation factor (VIF) is used to test multicollinearity problem. According to Gujarati (2004), the inverse of the VIF is called tolerance (TOL).
The study used variance inflation factor (VIF) to test the presence of multicollinearity as in Table 7

Variable	VIF	1/VIF
R	1.96	0.510209
E	1.07	0.933772
I	1.88	0.532217

Table 7: Multicollinearity test
Source: Author (2020)

Gujarati (1995) asserted that multicollinearity will only be a problem if and only if one of the VIF is greater than 10.VIF determines the strength of the correlation between the independent variables such that a value exceeding 10 indicates high collinearity between the independent variable. Table 8 results denote VIF values of 1.96, 1.07 and 1.88 for

interest rate, exchange rate and inflation rate respectively. It is evident that none of the VIF values exceeded 10 an indication that multicollinearity was not a problem.

4.9. Autocorrelation

First order auto correlation occurs where there is correlation between successive errors i.e., error in one-time period correlate with errors of the subsequent time period. Wooldridge autocorrelation test based on the null hypothesis that there is no first order autocorrelation was conducted with results depicted in Table 8.

H0: no First Order Autocorrelation			
F (1, 7) =	3.512	Prob> F =	0.1031

Table 8: Wooldridge Test for Autocorrelation
Source: Author (2020)

A Wooldridge coefficient of 3.512 with a p-value of 0.1031 > 0.05 indicated we accept the null hypothesis at 5% level of significance. Therefore, there was no first order autocorrelation problem in the panel data analysis.

4.10. Heteroscedasticity

Linear classical regression assumes that the residuals have a constant variance an indication that there is no heteroscedasticity. Breusch-pagan test is designed to detect any linear form of heteroscedasticity (William, 2008). As noted by William, a large chi-square would indicate that heteroscedasticity was present and a small chi-square indicates heteroscedasticity is not a problem. To rule out the existence of the problem, the study employed Breusch-Pagan heteroscedasticity test with results depicted in Table 9.

Ho: Constant Variance	
Variables: Residuals	
chi2(1) = 3.60	Prob> chi2 = 0.0577

Table 9: Breusch-Pagan test for heteroscedasticity
Source: Author (2020)

Based on null hypothesis that there is no heteroscedasticity, a chi-square coefficient of 3.60 having a p-value 0.0577 > 0.05 implied that the null hypothesis is not rejected at 5% level of significance. This shows that there was no evidence of heteroscedasticity and therefore the heteroscedasticity assumption of the classical linear regression model was not violated in the analysis.

4.10.1. Residual Normality Test

In analysis residuals are assumed to be normally distributed. To confirm that the assumption was not violated in the analysis this study used Shapiro Wilk test as indicated in Table 10.

Variable	**Obs**	**W**	**V**	**z**	**Prob>z**
Residuals	80	0.97395	1.788	1.274	0.10140

Table 10: Shapiro Wilk Test for Normality
Source: Author (2020)

Shapiro wilk test for normality rejects the hypothesis of normality when the p-value is less than or equal to 0.05. Failing the normality test allows you to state with 95% confidence the data does not fit the normal distribution. Passing the normal test only allows you to state no significant departure from normality was found. The test does not reject the null hypothesis that residuals are normality at 5% level of significance given a p-value of 0.10140 > 0.05 or equal to 0.05.

5. Conclusions and Recommendations

5.1. Conclusions

Based on the findings of this study where inflation and interest rates had significant negative and positive relation with debt-to-equity ratio respectively while exchange rate had insignificant positive relation with debt equity ratio, it is concluded that interest and inflation rates affect the dynamic capital structure of commercial banks listed at the NSE while exchange rate does not. That is an increase in inflation and interest rates reduces and increases the dynamic capital structure of selected commercial banks listed at the NSE respectively, an indication that interest and inflation rates are the key monetary facets that affect dynamic capital structure of selected commercial banks listed at the NSE.

5.2. Recommendations

From the findings, for commercial banks to improve on their dynamic capital structure it will be prudent that the banks management in conjunction with the Capital Market Authority (CMA) and central Bank of Kenya (CBK)should implement policies for hedging interest and inflation rates risks to ensure that increased interest rate and inflation rates do not slow down the performance of banks. Furthermore, though exchange rate doesn't significantly affect dynamic

capital structure, it is necessary for commercial banks management to monitor the monitory direction that the Central Bank intends to take with regards to exchange rate and adjust their policies towards discouraging borrowing in foreign currency when the Kenya shilling is depreciating against the major foreign currencies.

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