THE EFFECT OF SELECTED MACRO ECONOMIC VARIABLES ON TRADE FINANCE LOANS OF COMMERCIAL BANKS IN KENYA

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DECLARATION

I declare that this is my original work and has not been submitted at any academic institution for examination purposes.

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D63/71094/2014

This research Project has been submitted for presentation with my approval as the university supervisor.

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To Michael and our little Jeremy, you have made this journey that much more meaningful to me.

DEDICATION

I dedicate this project to my dad, Professor Mwangi Ndirangu of Egerton University.

You have been the wind beneath my sails.

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LIST OF ABBREVIATIONS

CBK: Central Bank of Kenya

CEO: Chief Executive Officer

CESEE: Central, Eastern and South Eastern Europe

CPI: Consumer Price Index

CRB: Credit Reference Bureau

DW Test: Durbin Watson

GDP: Gross Domestic Product

GMM: Generalized Method of Moments

KNBS: Kenya National Bureau of Statistics

NPL: Non Performing Loans

OLS: Ordinary Least Squares

PPI: Producer Price Index

ABSTRACT

The paper sought to find out the effect of effects of selected macro-economic variables on the performance of trade finance loans issued by commercial banks in Kenya. The dependent variable was the performance of trade finance loans originated by the banks and the independent variable were selected macroeconomic variables such as inflation, interest rate, and exchange rate. The size of the loan portfolio outstanding was also used as an independent variable. Data was collected from the CBK and CRB detailing trade finance loans issued by the 43 banks. The macro economic data was collected from KNBS registry. The justification for the study was premised on the conflicting empirical findings advanced by other previous studies. Moreover, the theories anchoring the relationship in the performance of macroeconomic variables and the performance of loans give conflicting prepositions. The liquidity preference theory and the financial accelerator theory proposes a positive relationship between contractionary macro-economic variables and defaults, yet the moral hazard theory opines that there is no relationship between the, macroeconomic variables and default. The theory avers that managers are able to predict the movements in macro-economic variables and price it at the origination of the loan. It therefore proposes that defaults are created because of excess risk assumed by manager in order to qualify for bonuses. A non-directional two tailed test indicate that the model as constituted above contributes to 68 % of the changes in performance. The Pearson correlation matrix indicates that inflation and interest rate are positively correlated. Exchange rate and size was found to have a negative relationship. The paper used the ordinary least square regression model to assess the impact of explanatory variable on the dependent variable at 95% level of significance. The research found a positive association between interest rate and performance and a negative statistically significant relationship between exchange rate and performance. These results validate the assumptions advanced by the liquidity preference theory of interest and money and the financial accelerator theory. These theories aver that inflation worsens the welfare of lenders thus making them to increase interest rates to cover up for the lost value of money. These multiplier effects increase the debt burden and consequently leads to defaults. The research also concludes that the moral hazard theory as proposed by Meckling (1976) does not hold because the macro economic variables were found to be statistically significant as opposed to its general assumption that thy are insignificant in explaining defaults. Given the findings the study therefore recommends to banks and regulators to consider restructuring the loans during high inflationary moments.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Nderitu (2012) concluded that trade was the greatest contributor to economic growth in Kenya during the periods between 2008 to 2011. Therefore trade finance facilities issued by commercial banks in Kenya had a significant role to play in the double digit growth witnessed during the period under the study. Kahuthu (2016) defined trade finance as a highly specialized tripartite agreement comprising of the bank, an overseas seller of goods and a domestic buyer of goods. Each of the parties in this agreement are faced with different kinds of risk in the transaction; the seller is not sure he will be paid, while the buyer on the other side not being sure whether the seller will deliver goods in the right quantity and quality as per contract. Commercial banks therefore come in to play an intermediary role in these agreements by reducing the risk associated with trade. They provide an assurance to the seller that their dues will be paid once goods are delivered. On the other hand they allow the buyer to buy goods on credit from the seller and inspect the quality of goods delivered payment is made.

The concept of trade finance is grounded on transaction cost theory. The theory as proposed by Keynes (1936) assumes that two rational economic agents will endeavour to minmize their joint transaction costs. Trade finance arrangements reduce the transaction costs by eliminating the need for a company to hold idle cash in anticipation of payment for purchase of goods. In the absence of commercial banks, sellers of raw materials would demand for cash on order. Buyers on the other hand will be worried about the seller's ability and willingness to deliver the goods in the

quality and quantity demanded. The banks therefore act as trusted intermediaries between the two parties and secure the trade for both sides. Moreover, a trade finance facility extinguishes the need for buyers to hold precautionary cash because the seller's bank provides a guarantee which assures the buyers that goods will be delivered within an agreed credit period (Kahuthu, 2016).

Empirical literature on finance and economic development has found a bidirectional relationship between macroeconomic events and the development of financial systems. Some scholars have found a negative relationship yet others aver that there is a positive relationship. The general explanation on the linkage between the economy and financial development is premised on the fact that movements in the macroeconomic environment affect the earning power of both individuals and companies adversely. The other argument for the positive association is based on the fact that bank credit could cause an economy to move from a recessionary period to a boom (Schumpeter, 1933).

External economic shocks can be key drivers in the performance of banks assets. The performance of these assets is typically measured by the NPL ratio for a particular class of bank asset. Empirical evidence has documented that inflation can either impair or improve the quality of bank assets. The classical theorists such as Keynes (1936) argue that inflation leads to high loan defaults. The classical scholars opine inflation leads to reduced aggregate demand and consequently reduced free cash flows. These conditions will make it practically impossible for companies to repay their loans. On the other hand there is modern evidence pointing towards negative correlation between inflation and NPLs. Nkusu (2011) postulated that inflation

increases the pricing power of companies and hence leads to increased free cash flow and reduced debt burden.

1.1.1 Macro Economic Variables

Moynihan and Titley (2000) defined inflation as the persistent overall increase of prices of goods and services. The monetarist approach blames excess supply of money for propelling inflation. On the other hand, the fiscal approach opines that lack of output is the main driver of inflation. Government expenditure which increases the money supply without a corresponding increase of output, creates a situation where there is too much money chasing for too few goods and hence inflation. Griffiths and Wall (2007) defined inflation as an adverse change in the purchasing power of money. During inflationary moments more money is needed to purchase the same level of commodities and services hence inflation leads to a decline in the purchasing power of money.

Vodová (2011) researched liquidity and its determinants in Czech financial institutions. His research concluded that inflation has a negative influence on banks liquidity. He demonstrated that banks increased their interest rates and lending standards in an inflationary environment. This makes the loans more expensive and less accessible to the both individuals and companies. Moreover the period under study was characterized with a lot of defaults which made it difficult for Czech banks to maintain their statutory liquidity ratios. Choi and Kim (2001) also found evidence supporting the hypothesis that inflation is a major determinant of liqudity. Their study concluded that monetary tightening can lead to a decline in the volume of credit issued by commercial banks.

The most common measurement of inflation is Consumer Price Index. This index assesses the general price level of goods selected randomly across the markets relative to a base month. CPI= (Total expenditure of a basket of goods in the current month/Total Shilling expenditure on the same basket of goods for the base month)*100 (Froyen, 2009). This measurement however is riddled with four challenges. Cunningham (1996) opined that a substitution bias exist when customers chose cheaper goods over the expensive goods. The second bias is the outlet bias where buyers move from expensive outlets to cheaper outlets. The third bias is the quality improvement bias; CPI does not consider quality improvement to resolve this bias. Case, Fair and Oster (2009) recommends the use of Producer Price Index/wholesale price index. The PPI detects prices early in the production process; they are therefore leading indicators of future consumer prices as they foreshadow future changes in consumer prices.

1.1.2 Trade Finance Loans

Trade finance represents the monetary activities related to commerce and international trade. According to the World Bank (2004), trade finance can be offered in many forms; directly to businesses through loans to finance purchases, prepayments to buyers, and delayed payments to sellers; indirectly through forms of insurance, guarantees, and lending with accounts receivables as collateral.

Banks therefore help buyers through their intermediation services to reduce the transaction costs of doing business. In the absence of banks, most buyers would be expected to pay cash. This will increase the real cost of doing business because these companies will be expected to hold precautionary stocks of money (Kahuthu, 2016). The opportunity cost of holding idle cash is therefore avoided by partnering with a bank to provide reasonable assurance to the sellers through a bank guarantee in the

sale transaction (Pandey, 2010). Off balance sheet transactions involves a transfer of credit risk from the sellers to the banks which are in the best position to assess the credit risk of buyers because these are their customers. Moreover local banks have business experience in their jurisdictions and as such can assess risk more objectively than the international sellers.

The CBK (2016) report defines trade finance loans as contractual agreements between a financial institution and its customer where the bank undertakes to pay a third party on behalf of the purchases made by the institution's customers. Initially, the institution gives an undertaking through a letter of credit or a performance guarantee to the sellers. Subsequently liability is deemed to crystallize on the bank when the buyer fails to pay the seller or when the buyer delays to pay. The prudential guidelines expects the banks to classify the off balance sheet obligation as a performing loan and subsequently reclassify it as a non performing loan upon the lapse of 90 days of non-payment (CRB regulations, 2013).

1.1.3 Macro Economic Variables and Trade Finance Loans

The association between inflation and the performance of trade finance loans issued by commercial banks in Kenya is bidirectional. The common economics knowledge leans towards a negative relationship; high inflation leads to a decline in the loan book performance. The theoretical explanation for this negative relationship is premised on the fact that inflation reduces the real disposable income for individuals and households. The reduced purchasing power and the erosion of the value of money therefore increase the debt burden of companies and consequently, loan defaults increase. Pandey (2010) offers a theoretical explanation of the correlation between inflation and loan book performance. His study explains that inflation pushes up the liquidity requirements of companies because companies will need more money for the

same level of stock holding. Eventually these conditions weaken the debt serviceabilty of a firm particurlarly if the firm can not pass down the inflated prices to the cusommers.

Moreover, with variable loan rates, a borrowers' loan servicing capacity is likely to be reduced by inflation as banks seek to maintain their real returns by adjusting lending rates. They can also pass on plicy rate hikes due to monetary policy actions to borrowers in an effort to combat inflation. Klein (2013) concluded that inflation would generally reduce the debt serviceability capacity of businesses whose products exhibit elastic demand pattern. This is because the cost push inflation will reduce the profitability and cash flow of these businesses because they cannot pass down the costs to the customers.

High inflation rates may reduce the real outstanding amount. This is particularly true if a firm is able to increase the prices of goods by a rate that is slightly higher than the rate of inflation. Businesses whose goods and services exhibit an inelastic demand are capable of passing down the high cost of interest to their customers. These businesses respond to inflation by producing more of their goods at higher prices and in turn benefit from the increased free cash flow. This reduces their debt service burden significantly. Nkusu (2011) concluded that if prices of goods increase without a corresponding decline in aggregate demand and wages remain constant then inflation will have positive impact on the asset quality of trade finance facilities.

1.1.4 Commercial Banks in Kenya

Ahmed (2010) concluded that commercial banks propel GDP growth by transforming savings into investments. His research found that the Kenyan economy performance is greatly linked to the financial sector's performance. Rose and Spiegel (2012)

reiterated the role banks play in the distribution of resources. They maintain that banks distribute idle resources to households and business for consumption and investments respectively. This redistribution function also ensures efficiency in the economy. Banks will usually assess the viability of investments before investing. Through this vetting process they ensure that resources are only awarded to companies producing goods and services which are required by the economy. However non-performing loans discourage lending because of the losses associated with loan delinquencies.

The banking industry in Kenya plays a significant role in the operationalization of the monetary policy. Banks have a fiduciary role because they take deposits from households in the economy and lend it back to those in need (Mugume, 2010). The importance of the banking sector is more pronounced in Kenya because the financial market is still developing and to this extent, the banking industry acts as the major providers of capital and in the same breath as the main depository of savings (Arun and Turner, 2002). The Banking Survey of Kenya Report (2008) attributes the growth in the Kenyan economy to the financial sector's growth. This sector has experienced a tremendous growth, with total profit before tax growing from Kshs 6 .0 Billion in 2002 to Kshs 48.9 Billion in 2009. This represents an 81.5 per cent growth rate in seven years. This growth is attributed to liberalization of the economy, a healthy regulatory structure and an efficient and effective supervisory system (Central Bank of Kenya, 2005-2009).

Commercial banks in Kenya are the main providers of trade finance facilities to businesses. The banks play a critical role in facilitating trade between domestic buyers and international suppliers by providing trade finance products which lead to a

reduction in the risk of the exporting/importing business, Niepmann and Schimdt-Eisenlohr (2014).

Omondi (2014) considered inflation's effect on the lending practices of commercial banks in Kenya. He established there was a positive connection between inflation rate and the base lending rates charged by banks. He concluded that a rise in inflation often led to an increase in the lending rates for the financial institutions which also contributed to the reduction of lending volumes. The banks demanded higher margins to cover for the perceived loss in purchasing power of money occasioned by a rise in inflation.

1.2 Research Problem

Trade finance has been lauded by many researchers as one of the greatest contributors to GDP of any country. In Kenya there was double digit economic growth in the period 2008 to 2011 and Nderitu (2012) concluded that commercial banks played a role by enhancing cross border trade in providing trade finance facilities to exporters and importers. Kahuthu (2016) opines that trade finance facilities reduce the cost of business transactions by enabling buyers to get access to goods without necessarily paying cash at the onset of these transactions. This eliminates the need to hold precautionary cash, which can therefore be put to productive use by the buyers.

Past empirical studies documents conflicting results about the association between inflation and asset quality. Locally Kariuki (2014) used an error correction model and found a positive relationship between inflation and NPLs. Other local studies conducted by Musau (2014) and Mboka (2013) also found similar results. On the international front, Nir (2013) and Abid, Ouertani and Ghorbel (2014) concluded that inflation and NPLs are positively correlated. Proponents of positive relationship argue

that inflation impairs the debt serviceability capacity of companies as a result of reduced free cash flows available to firms.

However other scholars opine that inflation increase the pricing power of companies. The resulting free cash flows available to the firms increase with the increase in prices and this reduces the debt burden and consequently NPLs reduce. Warue (2013) used poled panel data to look into the outcome of inflation on the asset quality of banks in Kenya. Her study concluded that inflation and NPLs have a negative relationship.

Most of the empirical studies on the subject matter under consideration have been carried out in advanced economies with strong market efficiency. Aver (2008) studied the effects of the macroeconomic variable in the Slovenian banking system. Das and Ghosh (2007) did a similar research in India. These environments are under the advanced regulatory regime as compared to emerging economies such as Kenya. Previous empirical studies in Kenya have majorly concentrated on researching the effect of macro-economic variables on an entire loan portfolio's performance. These studies include Warue (2013), Musau (2014) and Mboka (2013) who examined the effects macroeconomic variables have on loan defaults in Kenyan commercial banks.

The justification for the study is premised on the conflicting results evidenced by the empirical findings. Additionally there is a contextual justification for studying the effects of inflation on the performance of trade finance loans. Most studies both local and international have concentrated on the performance of the entire portfolio. However the research done by Nkusu (2011) supported the hypothesis that macroeconomic developments and business cycles influence each class of bank assets differently. To this extent therefore it is important to assess the impact of inflation on a specific class of bank asset like trade finance loan. Therefore this study attempts to

answer the question; what is the effect of the macroeconomic variables on the performance of trade finance facilities issued by commercial banks in Kenya?

1.3 Research Objective

To investigate the effect of selected macroeconomic variables on trade finance loans of commercial banks in Kenya.

1.4 Value of the Study

The paper aims to highlight the relationship between inflation and the performance of trade financing loans issued by commercial banks in Kenya. It will corroborate or rebuff the assumptions of the liquidity preference theory, financial accelerator theory and the moral hazard theory. Moreover the study will contribute to empirical literature where existing literature does not agree on the direction of the variables under study. Finally the study will contribute towards policy formulation. With clarity on the association of the variables, banks will therefore be able to formulate policy in terms of pricing and risk analysis of their trade finance products.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter covers empirical works that have been done on the area of trade finance by other scholars both locally and globally. The chapter also covers the theories explaining the relationship between inflation and Trade Finance. Finally, the chapter looks at the conceptual framework portraying the pictorial representations of the variables.

2.2 Theoretical Review

This section will involve a examination of the relevant theories behind the link between asset quality and inflation.

2.2.1 Financial Accelerator Theory

The financial acceleratory theory was advanced by Bernanke, Gertler, and Gilchrist (1999). The theory postulates that small economic shocks affect bank assets' performance to a great degree. The theory also presumes that small incidences of default in bank loans affect the entire economy adversely. Kiyotaki and Moore (1997) opine that there is a pro-cyclical relationship between defaults and the general welfare of the economy. Their study concluded that banks usually reduce their lending if their projections reveal that there will be an increase in defaults. This flight to quality hurts the economy because of reduced investments in productive sectors. The reduced lending also reduces the aggregate economic output and causes an increase in inflation. The multiplier effect of these events leads to increased loan interest rates which consequently increases a firm's debt burden and consequently, loan defaults. According to Carlstrom and Fuerst (1997), lenders tend to pass down their

inefficiency in monitoring real interest rates by charging a premium on risk. This premium consequently increases the risk profile of a bank asset and may lead to an increase in defaults because the premium is not consistent with economic conditions but perceived expectations.

The theory assumes that small macro-economic shocks such as inflation will trigger big shocks in the performance of a class of bank assets. The theory also hypothesizes that markets are not perfect; interest rates do not reflect economic realities, only perceptions of lenders. These perceptions create unnecessary panic in the market and consequently lead to credit rationing that is not supported by economic facts. The theory assumes that borrowers cannot pass down the high cost of credit to their customers without losing a significant amount of sales or market share. If this assumption does not hold then high inflation will actually lead to less loan defaults because of the increase in cash flows (Sinkey et al., 1991). The theory also assumes that money supply is fixed by the government and that the government does not increase money supply through the open market operations. This is because expansionary market operations tend to shift the demand for bank loans. The government injections will destabilize the frictions and restore normalcy. Given these assumptions it is therefore expected that inflation will lead to an increase in defaults (Saunders and Marcia, 2001).

The importance of the financial accelerator theory is evidenced by the fact that it offers an explanation on the relationship between inflation and the preference toward trade finance loans. According to the theory expansionary open market operations causes a reduction of aggregate liquidity in the market. The appetite for government bonds reduces the available funds to be advanced to companies and households. Banks prefer to lend to the government because of the risk free elements inherent in

the treasury bills. Therefore higher domestic borrowing can cause an increase in loan interest and consequently an increase in the debt burden and defaults. Moreover, lenders will be reluctant to advance loans to individuals and companies if they have the option of lending the government. Borrowers will also reduce their demand for credit because inflations crowds out their opportunities. Therefore, the high interest rate payable to lenders diminishes the profits and hence discourages investment (Brueggeman and Fisher, 2008)

2.2.2 The Liquidity Preference Theory of Interest and Money

The liquidity preference theory of interest and money was proposed by Keynes (1936). The theory opines that the welfare of lenders and borrowers are affected by the movements in inflation. Where interest rates on the debt instruments are nominal in nature, banks lose and borrowers gain. This is particularly true if real interest rates are above the contractual interest rates envisioned in the contracts entered into by lenders and borrowers. Therefore Keynes's (1936) liqudity preference theory posit that the demand for money at any point in time is reliant on interest rate movement Cosequently, holders of money usually demand compensation for parting with the liqudity in form of interest rate. The interest rate also compensates investors for the loss of value in money with the passage of time due to inflation.

A key tenet of this theory includes the assumption that money supply is fixed. This assumption requires that there should be no government intevention to influence the supply of money in circulation. The theory also assumes that investments in treasury bonds are risk free; that is to say that a government can not default in its own tresurry bills. Rationally, commercial banks are therefore expected to reduce their lending to inviduals and companies and invest in treasury bills given that it is risk free. The theory also assumes that treasury bills can be traded easily in the market, where all

player are given an equal oportunity to buy and sell the treasury bills freely without incurring heavy transaction fees or legal resttrictions on the amounts transacted. Finally, the theory assumes that the interest rates are free from government manipulation. This means that movements in interest rates are influenced by the market forces of demand and supply only. To this extent, the theory assumes that there is no interest rate capping..

This theory is relevant for the study because its fundamental assumptions predict that there is a positive association between the performance of trade finance loans and inflation. This is due to the fact that as inflation increases, the owners of funds will demand for compensation due to negative effects of inflation, that is decrease in the value of money in real terms. The push to increase interest decreases the repayment capacity of the borrowers to settle existing loans and hence leads to loan defaults. Past empirical evidence has supported the liquidity preference theory. Klein (2013) concluded that commercial banks issued less loans during inflationary periods in the economy. He also concluded that banks preferred to invest in treasury bills during those times, as opposed to giving loans to individual borrowers due to the higher returns and lower risk occasioned by investing in government securities during periods of high inflation.

2.2.3 Moral Hazard Theory

The moral hazard theory was brought forth by Jensen and Meckling (1976) in their seminal works on the theory of the firm. This work assessed the managements' behavior in a corporate firm environment and concluded that management cannot take care of the business with the same vigilance the shareholders would have due to differing interests. The theory concluded that where owners of capital and managers are separate, the interest of owners will always clash with the interest of managers.

Shareholders are therefore forced to incur additional costs to monitor their interest, these additional cost manifest themselves in terms of audit fees. In the financial sector the moral hazard problem occurs when bank managers assume more risk in making investment decisions than what the risk shareholders would have assumed. In the case of a commercial bank, this typically happens when loan underwriting standards are relaxed and loans given to high risk projects where their success, and chances of repayment are doubtful.

The moral hazard problem also occurs when the shareholders of banks assume more risk than the deposit holders. The shareholders would typically instruct the management boards to fund high risk projects because they know they will share the risk with unsuspecting depositors. In Kenya, Warue's (2013) research concluded that government owned banks exhibited these moral hazard problems. She found out that state owned banks financed projects based on political motives even though some of those projects had a negative return on investment. The Business Daily (2017) also reported on some unfortunate events at Shelter Afrique, a pan African finance institution mandated with the development of real estate and housing in Africa. The commentary reported that some of the loans issued by the institution to various parties, were lent out without proper due diligence by the institution. The Board of the firm found out that the said funds had been lent out against the provisions of the firm's credit policy by the CEO.

The near collapse of Chase bank in Kenya in 2016 was blamed on corporate governance concerns (Gathaiya, 2017). In a study done in 2017, he found that the major reasons the bank was put under statutory management by the CBK were its inability to meet the statutory banking ratios as well as hiding the extent of insider

loans lent to its directors. Another issue was management willfully under provisioning of nonperforming loans to hide the true extent of the performance of its loan book.

The fundamental tenet of the moral hazard theory includes the assumption of the conflict of interest. The theory assumes that managers will take advantage of their vantage position to exploit the shareholders to take riskier positions. The theory opines that managers will finance pet projects either in anticipation of kickbacks from the borrowers, or to meet their performance targets. At the same time the shareholders may adopt high risk appetites because they know they can share the risk with the depositors. This is the case for banks which issues loans without regard to the inherent underlying risks, Zhang et al. (2015). The theory also assumes that the monitoring activities instituted by the regulators would not be able to pick the sophisticated methodologies employed by managers and shareholders. For instance the directors of Chase Bank and Shelter Afrique's CEO managed to reclassify the non-performing loans by extending the respective loan tenures to hide the true extent of their NPLs. These sophisticated fraudulent methods may be difficult for regulators or shareholders to pick up in good time.

The moral hazard theory is important in this study because it brings another perspective in explaining the relationship between the performance of trade finance loans and inflation. The theory opines that managers' decisions do affect the performance of loans. This is because some of the decisions to give loans are affected by conflicts of interest, particularly when assessment of the credit risk is not based on objective analysis of the borrowers but on personal bias by the lender's management. Given these assumptions it can be concluded that inflation has no impact at all on the performance of trade finance facilities. This is because if loans are awarded on

objective underwriting standards, inflation risk would be considered and priced at origination.

2.3 Determinants of the Performance of Trade Finance Loans

Several factors determine the financial performance of trade finance facilities as summarized below.

2.3.1 Inflation

Nicholas (2011) defined inflation as the constant decrease in the purchasing power of money. During inflationary periods, baskets of goods cost more when compared to a base year. According to the monetarist approach, the mismatch between money supply and the physical output of goods and services is responsible for putting inflationary pressures in an economy. Any printing of additional currency that is not matched with an increase in output in the economy will result in inflation on the long run. The nexus between inflation and defaults is premised on the fact that lenders tend to adjust their interest rates in order to take care of the reduced purchasing power. High interest rates further worsen the firm's debt load and consequently increases the loan default rate (Plosser, 2008).

Most of the empirical evidence available find that inflation and NPLs are positively correlated. An increase in inflation without a corresponding increase in the production of goods is generally expected to reduce aggregate demand. This leads to a reduction in the cash flow because of reduced sales. As cash flow reduces, the real debt burden increases because repayments of loans are based on cash projections. Khemraj and Pasha (2009) concluded that most businesses were unable to repay their bank loan obligations because they were unable to achieve their set cash flow budgets. Saba et al (2012) also concluded that inflation led to a decline in the US bank asset quality.

Their study found that inflation and defaults move in the same direction. Similarly, Sinkey et al. (1991) concluded that inflation and actual loan loss rate are positively related. Their study found out that economic recession lead to a reduction in aggregate demand and this forced many businesses out of production thus leading to chronic loan defaults.

Whilst many authors have concluded that inflation is positively related with loan defaults, some studies have actually found a negative relationship between the two variables. Warue (2013) considered the connection between inflation and loan default rates in commercial banks in Kenya and established a statistically significant negative relationship. She imports new reasoning by finding that inflation increases the pricing power of companies. This therefore increases the cash flow available to the company and consequently the excess cash flow reduces the real debt burden. This argument is factual as the ability to repay financial obligations is based on the projected future firm cash flows. Inflation can therefore improve the debt serviceability capacity of company where a firm can pass on the increase in raw material costs its customers without losing a significant chunk of its sales.

2.3.2 Economic Growth Rate

Empirical evidence indicates that a statistically significant negative association exists between the growth in real GDP and a decline in a banks' asset quality. Growth in real GDP typically increases aggregate returns which improves the debt repayment capacity of borrowers. On the contrary, slowdown in GDP growth leads to a reduction in disposable income and hence a deterioration of credit quality. The performance of trade finance loans is pro-cyclical in nature, they are positively related to the performance of the general economy. Marcucci and Quagliariello (2009) found results

supporting the hypothesis that NPLs are pro-cyclical in nature. Their study concluded that NPLs are negatively correlated with GDP.

It is generally assumed that economic growth affects the performance of loans issued by commercial banks positively. Consequently, a worsening of economic conditions leads to an upsurge in loan defaults (Salas and Saurina, 2002). According to the findings of Thiagarajan et al. (2011), business conditions deteriorate during economic recessions. This is because recessions reduce the aggregate demand and consequently the cash flows received by businesses. These conditions impair the capacity of business to repay their outstanding financial obligations.

According to Espinoza and Prasad (2010), slow economic growth and high loan rates increase NPLs. Economic growth increases the demand for goods and services. A firm's sales and cash flow also increase as a response to increase in demand. Glen and Mondragón-Vélez (2011) also concluded that loan loss provisions were mostly determined by GDP growth. Similarly, NPLs have a negative association with growth in an economy (Shu, 2002). This is because a surge in non-performing loans sends negative signals to the market hence making banks to reduce their lending appetite. This flight to quality by banks means less credit flow to the market which in turn reduces investments and hence lowers economic growth.

2.3.3 Foreign Exchange Rate

A currency's exchange rate is the ratio at which it trades against a foreign currency. It can also be used to measure the relative strength of several currencies against a domestic currency. Movements in the exchange rates are heavily dependent on the trading relationship between two countries. If a country relies more on foreign imports then its currency is likely to be weaker as compared to the foreign country it

imports from. An exchange rate appreciation on the other hand occurs when foreign countries demand for more local currencies in order to purchase local goods and services. According to Sirpal (2009) sub-Saharan countries face the risk of local currency depreciation against their foreign trading partners' currencies because of the trade deficits that exist between them and the western countries. Most countries in Africa are producers of primary goods and generally import finished products.

Depreciation in the value of the local currency greatly impairs the asset quality of trade finance loans. This is because companies applying for these facilities are exposed to foreign exchange risk in two ways. The first exposure relates to the increases in prices of raw materials due to an appreciation of foreign currency relative to the domestic currency. To this end, firms will need more money to buy a similar quantity of goods in foreign currency terms. This situation will lead to reduced cash flow to the firm and therefore reduce the debt serviceability capacity of the borrower. The other exposure relates to the depreciation of foreign currency which makes exports expensive and therefore less competitive in the foreign markets. If this condition is persistent and the demand for the exports exhibit an elastic curve then sales will reduce significantly thus reducing the debt serviceability capacity of local companies.

On the other hand, Beck (2015) revealed that currency depreciation can improve the asset quality of trade finance. The economic explanation for the negative relationship between NPLs and foreign currency appreciation is premised on the fact that exporters will gain from the proceeds. The effect of local currency appreciation is that same basket of goods will be sold for more cash.

2.3.4 Interest Rate

Crowley (2007) defined interest rate as a price charged to a borrower for the use of money over a period of time. It can also be defined as rent for capital, that is, the price a firm pays for using money that belong to someone else. According to Ngugi (2001), interest rate reflects the change in purchasing power of money at any given point in time. Most empirical studies conducted on the relationship between interest rates and loan default rates have concluded that they are positively related. This is because interest rates increase the real outstanding loan balances therefore increasing a firm's debt burden (Ngugi, 2001). This condition is compounded if the prices of goods offered by the borrowing companies remain sticky.

Love (2013) concluded that the loan interest rate has a statistically significant explanatory power on the performance of trade finance facilities. An increase in interest rate reduces the firm's debt repayment capability, particularly if businesses are unable to pass down the increase in the cost of finance to their customers. On the other hand a reduction in the variable component of the interest rate increases the repayment capacity because it reduces the real loan outstanding balance.

2.4 Empirical Review

Kariuki (2014) studied the consequence of macroeconomic variables on the credit risk of the banking industry. He examined the aggregate NPLs of all the 43 commercial banks registered in Kenya. The dependent variable (credit risk was calculated by the proportion of non-performing to performing loans) while data for the macro economic variables was obtained from the KNBS database. The study used a combination of OLS and error correction model to analyze the interrelationships at 95% confidence interval. The study concluded that the rate of exchange between the Kenyan shillings

and the US dollar rate was negatively related with NPLs. Similarly, he found that inflation and credit risk exhibited a negative relationship. Yet he also found that interest rate had a positive relationship with loan defaults. He found all these variables to be statistically significant at 95% confidence levels.

Musau (2014) sought to model the changes in non-performing loans in Kenya. The research used annual data from CBK over a period of 13 years (2000 to 2013). A dynamic econometric model was used to analyze the census of all the 43 banks in operation during the period under study. The independent variable was NPLs and the dependent variables included macroeconomic variables and bank specific variables. The regression model concluded that there was a positive association between inflation, rate of interest, credit growth and loan defaults. GDP was found to exhibit a negative association with loan defaults. The economic explanation of the findings is premised on the fact that adverse macroeconomic events increase the real debt burden yet economic booms create more demand and consequently more sales and cash flows. The increased cash flow reduces the real debt burden and hence low defaults.

Muthami (2016) investigated the relationship between growth in the economy and asset quality of loans originated by the commercial banks in Kenya. Quarterly macroeconomic and bank specific data was collected from KNBS, CBK and KBA for the periods 1980Q1–2015Q4. Asset quality was measured by gross NPLs while the dependent variables include selected macro-economic variables such as economic growth, aggregate deficit, domestic borrowing, exchange rate, inflation, aggregate savings and lending rates. OLS regression model was used to estimate the model. The research concluded that economic growth was negatively correlated with NPLs. A percentage increase in economic growth was found to reduce NPLs by 0.2%. This is concurs with the general economic hypothesis which posits that economic growth

enhances the repayment capabilities of borrowers. Hence making it easier for them to repay outstanding balances.

Njenga (2016) wanted to ascertain the association between the macroeconomic variables and loan default rates in banks. The chosen macroeconomic variables were inflation rate, exchange rate and GDP. Default was represented by the gross loan loss. Secondary data was collected from CBK's publications for a period of 7 years; 2006-2013. Using the OLS regression model with Newey-West standard errors the results indicated that public debt had a positive relationship with defaults. Inflation and interest rates were found to have a positive association with NPLs. These conclusions are consistent with the findings made by İslamoğlu (2015) whose research concluded that an increase in inflation reduces the real loan value thus reducing the debt burden of borrowers. These findings are robust in circumstances where wages are non-sticky. Conversely the lower the interest rate, the lower the default. This is because the loans are easier to pay.

Patra and Padhi (2016) sought to find out the determinants of NPLs in India using the GMM and panel estimation method. The purpose of the study was to survey the impact of macroeconomic and bank specific factors on loan book performance for banks over a period of 15 years 2000-2015. The study concluded that economic growth, market capitalization and stock market index have a negative association with the loan performance whereas expansionary fiscal policies which increase government spending but increases taxation were found to have a positive association with loan defaults. A study done by US (2017) on Turkish banks over a period of 15 years revealed that loan losses are significantly increased during economic shocks characterized by high interest rates and inflation.

Rajha (2016) investigated the impact of interest rate on loans issued by the Jordanian Banking Sector. The research paper used macroeconomic variables and bank specific factors to identify the most statistically significant factors affecting NPLs for a period of 5 years; 2008-2012 across 12 banks. Panel data regression technique was used to examine the impact of explanatory variables on the dependent variable. The results indicated that interest rate was positively correlated with NPLs. This is because higher rates weaken the repayment power of borrower. On the other hand, economic growth rate and inflation were established to have a statistically significant negative outcome on NPLs. The global financial crisis also affected led to higher NPLs. These results concur with the findings of other empirical evidence (Ekanayake and Azeez, 2015; Ghosh, 2015; Patra and Padhi, 2016). These studies concluded that expansionary fiscal policies led to increase in NPLs.

Dimitrios et al. (2016) sought to spot the determinants of asset quality in the Euro-area. The research used GMM method of estimation, data was collected from a census of all banks between the periods 1990 -2015. The results indicate that inflation, interest rate and bad management, increases in income tax and output gap are positively related with NPLs. These results concur with the findings of research done on Tunisian banking system. Abid et al. (2014) their research focused on the impact of fiscal policy on loan defaults. Tanaskovi and Jandri (2015) also found similar results with Central and Eastern and South-Eastern Europe (CESEE) economies.

Kjosevski and Petkovski (2017) analyzed the linkage between macroeconomic variables and bank specific factors on the performance of 27 banks of Baltic States. The research used two approaches to structure their data into a pooled panel data. Annual data for a period of 10 years from 2005 -2014, their results point to a positive correlation between inflation, unemployment and default. Moreover bank specific

factors like the size of the loan book were found to be positively connected with loan defaults. On the other hand return on assets was found to be negatively related with NPls. These findings amplify the conclusions of Gerhardt and Vennet (2017) who concluded that higher cost to income ratio led to an increase in loan default rates.

Mataba (2018) investigated the factors influencing NPLs in Tanzanian community banks. The paper used explanatory sequential research design to explore the drivers of NPLs in the community based banking. They collected data from the publications of Bank of Tanzania and audited financial statements for the periods 2007-2009. Random effects and fixed effect regression models were used to examine the data in Stata. The research concluded that inflation and interest rates are negatively related with NPLs, while economic growth was found to have a statistically significant positive relationship with NPL. These results desert the general economic theory which assumes that economic growth leads to more disposable income which influences the repayment capacity positively thus leading to less defaults. This research concurs with the conclusion of Warue (2013) who found a negative connection between inflation and NPLs in the Kenyan banking system.

Umar and Sun (2018) explored the impact of selected macroeconomic variables on the on NPLs in the Chinese banking sector. The study selected the following macro-economic variables; GDP, growth rate effective interest rate and foreign exchange rate. Generalized method of moments (GMM) technique was applied to regress the coefficients because they are robust with macro-economic variables. The results found an inverse relationship between GDP and asset quality, yet interest rate and inflation were found to have a positive association with NPLs. This being in line with other studies which inferred that economic meltdown and asset quality exhibited an inverse relationship. Ghosh (2015) found similar results with the American banks, his

study focused on the effects of macroeconomic variables and bank specific factors on loan defaults.

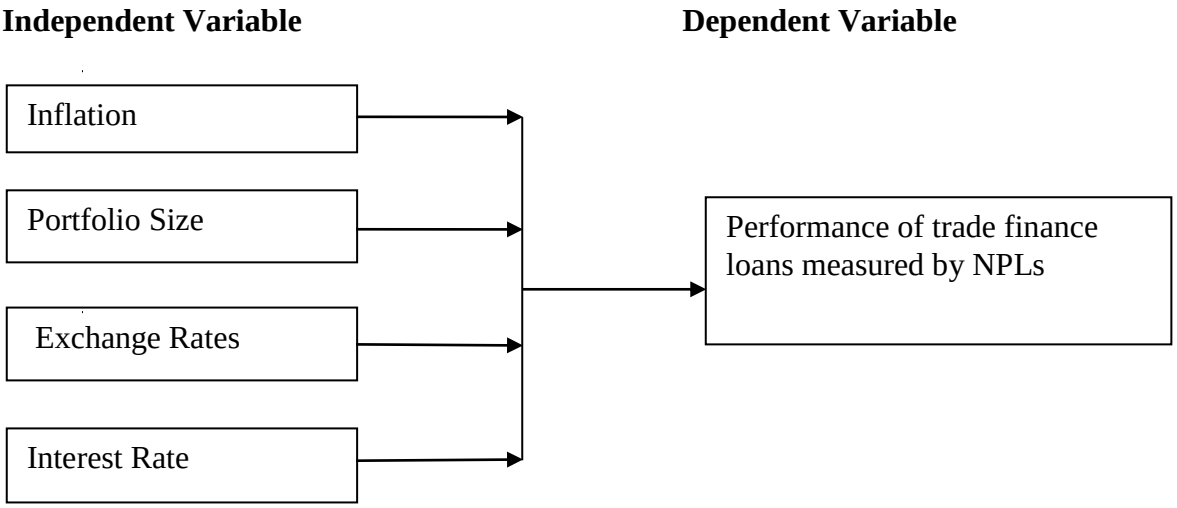
Kumar, Stauvermann, Patel and Prasad (2018) sought to find out the factors affecting non-performing loans in Fiji's banking sector over a period of 14 years (2000-2013). The repressors in this study included both bank specific indicators in the control of the bank management and macro-economic factors such as economic growth rate, unemployment, dollar rate and changes in real interest rate. The study employed the use of fixed effects, random effects and pooled OLS to approximate the influence of the independent variables on the dependent variables. The results indicated that unemployment and growth rate have a statistically important relationship with defaults yet inflation and interest rate has been found to have a positive relationship with defaults. These findings concur with the research done by Kishore (2012) who concluded that high interest rates and inflation are the major causes of defaults in the banking sector. This is because these macro-economic shocks reduce the payment capacity of individuals.

2.5 Conceptual Framework

The main focus of the research is to examine the effects of inflation on the performance of trade finance loans issued by commercial banks in Kenya. The study will also investigate whether other macroeconomic variables such as exchange rate, interest rates, and GDP influence the asset quality of this class of bank asset.

The empirical evidence postulates that inflation, interest rate and deterioration in exchange rate have a positive correlation with the performance of trade finance loans, while economic growth is expected to have a negative association with the performance of the trade finance loans. An increase in economic growth increases the

debt repayment capacity of borrowers. This explains the negative relationship. Given below is the pictorial representation of the relationship between the independent variables and the dependent variables.



Source: Author (2018)

Figure 2.1: Conceptual Model

2.6 Summary of the Literature Review

The empirical studies reviewed, both local and global, bring out mixed results. Proponents of liquidity theory opine that inflation has a positive association with loan defaults. They explain that inflation reduces the real disposable income of the firm and increase the real loan outstanding balances. This makes it more difficult for the firm to repay its financial obligations. Kariuki (2014), Musau (2014), Mboka (2013), Nir (2013) and Abid, Ouertani and Ghorbel (2014) concluded that inflation and the performance of trade finance loans are positively correlated.

Conversely, some empirical studies indicated a negative association. They argue that inflation increases the price power of borrowers more than it increases bank interest rates. Therefore, the increased free cash flow improves the payment capability of borrowers and hence the negative relationship. Warue (2013), Business Economics (2010) and Chiodo and Owyang's (2003) research conclude that inflation affects NPLs negatively.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section discusses the research methodology and research approaches that were used in the study. The methodology includes the research design, the sample and sampling procedures, instruments of data collection, data collection methods and data collection techniques that were used to conduct the study. The chapter also addresses issues around data validity and data reliability. The regression model used was also discussed in this chapter.

3.2 Research Design

Fraenkel, Wallen and Hyun (1993) defined research design as the methods by which the researcher intends to answer the research question. Research design involves planning, organizing, data collection and analysis geared towards solving the research problem. The type of research design is heavily dependent on the nature of the variables under the study.

A descriptive research design was used to study the impact of inflation on the NPLs of trade finance facilities issued by the commercial banks in Kenya. Mugenda and Mugenda (1999) described descriptive statistics as an organized, empirical investigation where the researcher does not directly control the variable under study because of its historical nature; it has already happened, therefore it cannot be manipulated. This method was deemed appropriate because it is diagnostic in nature. The variables under study having already occurred in the past. Kothari and Garg (2014) support the use of descriptive research design in situations where the

researcher has no control over the variables. Ngechu (2002) also supports the use of descriptive design in financial research because it allows for both hypothesis testing and model testing.

3.3 Population of the Study

The population is the entire enumeration of all possible items in an environment, Mugenda and Mugenda (2003). The items, individuals, and observation must have a shared or a common characteristic. The targeted population for this study was the 43 registered banks by the CBK as at 31st December 2017 (CBK, 2017). The study used a census survey since the numbers were manageable, refer to Appendix 3.3. The data was collected from a Credit Reference Bureau (Metropol) as there were challenges with the form of data available from the CBK. The data shared by the banks to both CBK and the Bureaus are typically the same as relates to non performing loans.

3.4 Data Collection Methods

The study made use of secondary data from the CRB over a 8 year period (2011 – 2017). The CRB regulations (2013), mandates banks to share information about the performance of their different classes of assets. The regulations define non performing accounts as those accounts where interest plus principal has not been paid for the last three years. The regulations also allow for the sharing of positive data; that is accounts which are regularly paid as per contract. The study also used the statistical abstract published by KNBS to extract monthly data on the selected macroeconomic variables.

3.5 Diagnostic Tests

These are procedures conducted on the data sets to test for normality, serial correlation amongst the independent variable and hereroskedasticity in the data sets. The regression model was preceded by diagnostic tests. The diagnostic tests included: Durbin Watson (DW) test, multicollinearity tests, Breusch-Pagan test for heteroskedasticity and White Heteroskedasticity Test (LM) for constant variance of residual over time.

Cooper and Schindler (2010) concluded that secondary data is more reliable than primary data. The validity and reliability of this data was further enhanced by the fact that it is collected from a CRB, which is mandated by law to maintain a database of all loans issued by commercial banks and the official government records KNBS. The data shared by banks to both CBK and CRBs is reliable because banks use the CRB mechanism to collect outstanding balances. Moreover the Finance Act put heavy fines around data management.

3.6 Data Analysis

The study used the ordinary least square regression model to analyze the effects the macro economic variables had on NPLs of trade finance facilities using STATA software.

3.6.1 Analytical Model

$Y_i = Lo + \beta_1 I_i + \beta_2 Ir_i + \beta_3 Fx_{3+} e_i$

Where

Y_i = Trade finance loans (as measured by the natural log of Total NPLs of aggregate trade finance loans issued by the 43 commercial banks in Kenya)

β_1 = the expected change in performance of trade finance loan given a unit change of inflation

$\beta 2$ = a unit change in performance of trade finance loan given a unit change in the interest rate.

B3= a unit change in performance of trade finance loan given a unit change in portfolio size

I_i = rate of inflation measured by Consumer Price index

Ir_{ii} = interest rate measured by the 91 day Treasury bill.

Fx_i = is the exchange rate: mean US dollar to Kenya shilling rate

e_i = error term

3.6.2 Test of Significance

Two tailed bidirectional P-test was used to test for the statistical significance of the individual explanatory variables on the changes in asset quality. The F-statistics tested the overall validity of the model in explaining the variations in NPLs at 95% confidence level.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter will cover the following areas; data analysis, the results of research and the discussion of the outcomes with reference to other empirical studies and the theories. More specifically this section will look at general descriptive statistics of the variables and the normality of the data sets. The chapter will also look at the regression results and the correlation of variables.

4.2 Descriptive Statistics

Descriptive statistics are simple summary statistics used to describe the data. They include mean, mode, median, standard deviation, maximum and minimum values, skewness and kurtosis. Table 4.1 below indicates the results of the analysis.

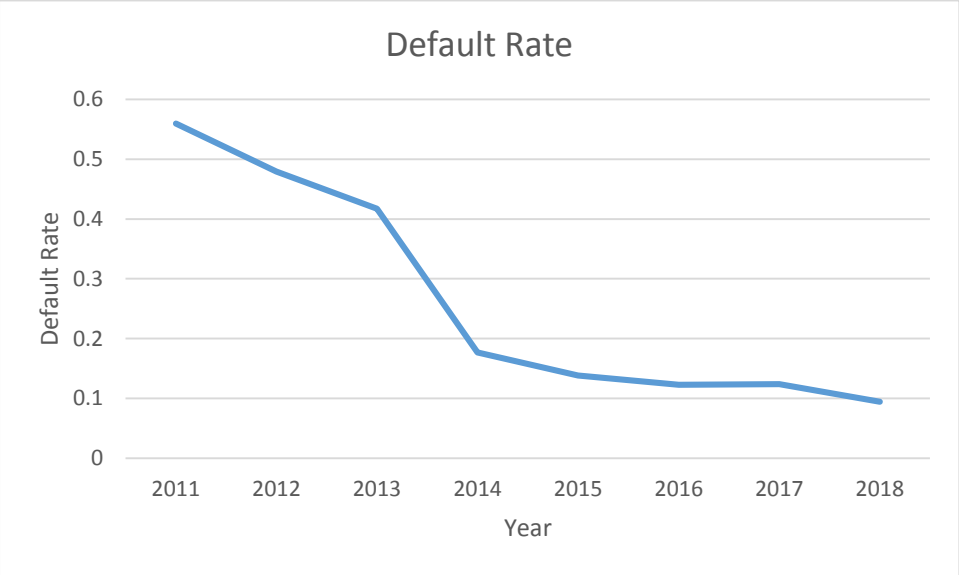
Table 4.1: Descriptive Statistics

Descriptive Statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Default rate	89	.000122649940	1.000000000000	.24609616300000	.206020946000000
Inflation	89	3.20	19.72	7.5543	3.89577
Interest rate	89	6.25	18.00	10.4775	2.82306
United States dollar	89	82.8970000	105.2750000	94.511945070	7.6919191960
Size	89	6.48423860700	13.527731580000	11.213912460000000	1.763207421000000
Valid N (list wise)	89				

Source: Research findings

The above descriptive statistic table provides the general statistical aggregation of data. It shows the standard deviation, the mean, the minimum and maximum figure of each variable under study. The study covered five years and had 89 observations.

Data was keyed in on a monthly basis for each variable. The average rate for the default rate was 0.24. which means that on average 24% of the trade finance loans would go bad. The minimum value of default rate registered under this study is 0.01%. The average inflation rate stood at 7.5% with a minimum figure of 3.3% and a maximum figure of 19.72%. The deviation from the mean score of this variable stood at 3.9%. The deviation on a month by month basis stood at 1.76 Billion Kenya shillings.



Source: Research findings

Figure 4.1: Performance of Trade Finance Loans

Figure 4.1 above shows the maximum default rate of the trade finance loans was witnessed in 2011. The default rate declined sharply by up to 83%. Using 2011 as a base year, the figure above indicates that trade finance loans default rate decreased on a year by year basis in the following manner; 14%, 25%, 68%, 75%, 78%, 78%, and 83% for the years 2012, 2013, 2014, 2015, 2016, 2017 and 2018 respectively. This decrease can be attributable to better credit underwriting standards employed by the commercial banks before issuance of trade facilities to businesses. Moreover, the credit reference bureaus were instituted in 2011 which led to improved credit

information sharing in the banking industry. The CRBs are primarily used by financial institutions as a mechanism to curb intentional loan default. This is because a negative (default) listing in the CRB data base leads to the financial exclusion of the borrower. Borrowers are wary of being negatively listed and this consequently leads to improved loan performance.

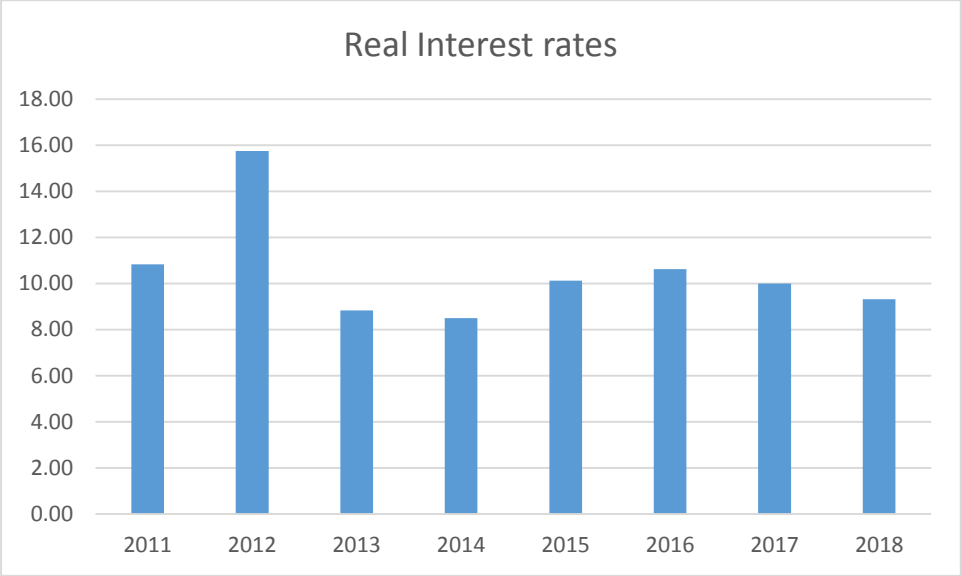


Figure 4.2: Real Interest Rates

Source: Research findings

The table above shows that real interest rate increased from an average of 10.83% in 2011 to 15.75% in 2012 signifying a 45% increase. This increase in real interest rates could be attributable to the economic shocks experienced in the period preceding the general elections in Kenya in early 2013. These elections typically increase business uncertainty in the country, and consequently increase investment risk and as a result, investors will want to be compensated for the additional risk assumed.

However, real interest rates did not increase as significantly in 2017 during the period preceding the general elections held in that year. This is because of the interest rate capping law which had been in pace since late 2016 and which introduced a ceiling on

how much interest rate banks could charge to customers. Indeed, the graph shows a marginal increase of 7%, 2%, 8% and 5% for the years 2015, 2016, 2017 and 2018. These changes can be attributed to the regular revision of the base lending rate by the CBK as a monetary policy tool.

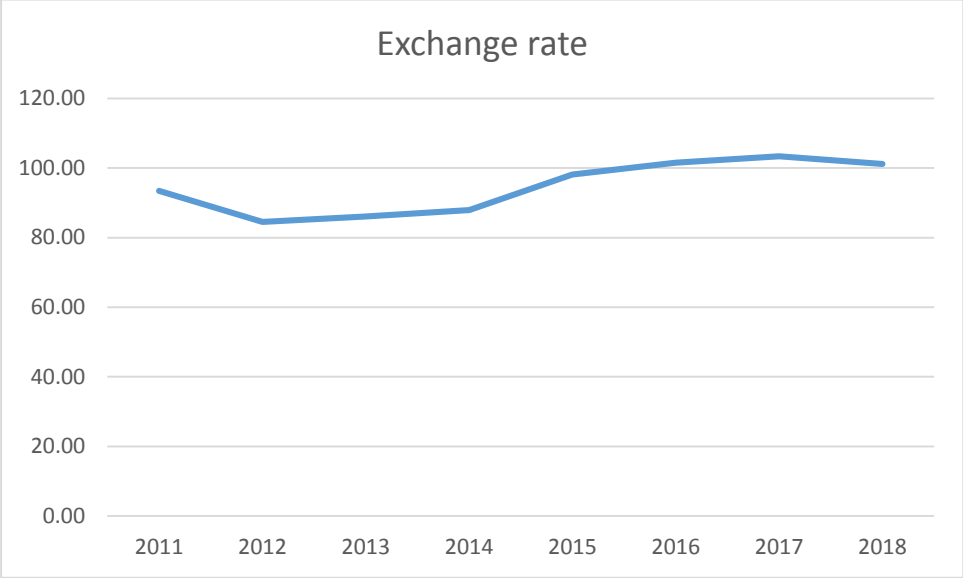


Figure 4.3: Exchange Rate

Source: Research findings

The above table shows the movements of Kenya shillings against the US dollar. After weakening significantly in 2011 due to an increasing current account deficit, in part exacerbated by higher oil and food costs, the table shows the shilling strengthening against the dollar during the years ended 2012, 2013 and 2014 by 10%, 8% and 6% respectively. This was largely in part due to monetary policy interventions by the CBK to move the shilling back closer to its long term average. Government borrowing foreign denominated debt, as was the case with the Euro bond issue in 2014 also resulted in an increase of the US dollar reserves at the CBK which pushed down the value of the dollar against Kenya shilling because of the low demand.

On the other hand, the dollar grew stronger by 5%, 9%, 11% and 8% during the years ended 2015, 2016, 2017and 2018. This can be attributed in part due to lower foreign

exchange inflows from tourism after a spate of terrorism attacks in Kenya, and lower exports of tea to key Arab markets due to political uprisings in those markets. Severe drought experienced in the country in 2016/2017 as well as the general election period in 2017 served to destabilize the foreign exchange market in Kenya, which caused the Kenya shilling to weaken against other major world currencies including the dollar. The maturity of foreign denominated debt further depleted the country's dollar reserves in this period as well.

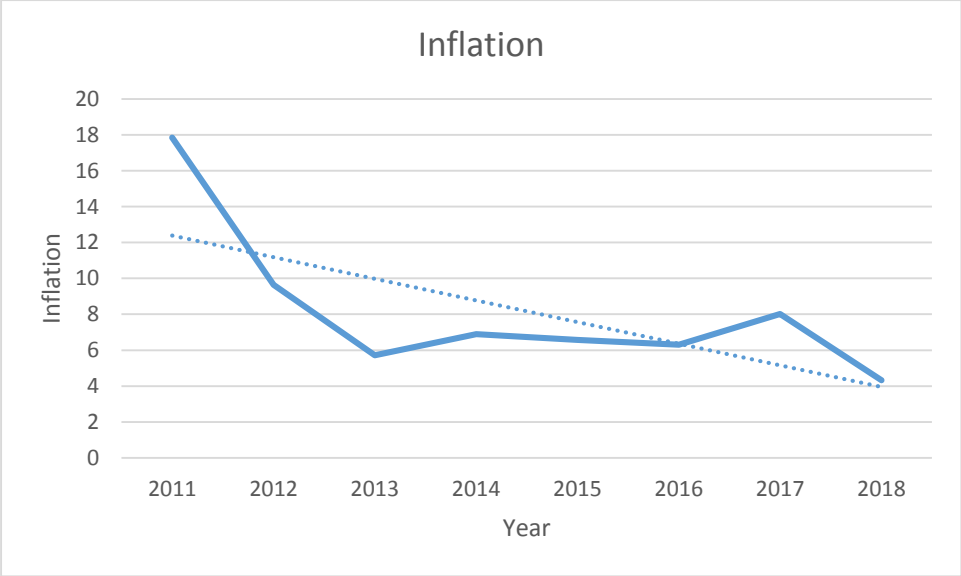


Figure 4.4: Inflation Rate

Source: Research findings

In figure 4.4 above, the trend line indicates that inflation has been decreasing over the years. A deep analysis reveal that inflation has decreased over the years by the following percentages 46%, 68%, 61%, 63%, 65%, 55% and 76% for the years 2012, 2013, 2014, 2015, 2016,2 017 and 2018 using 2011 as a base year. This reduction can be attributable to increased government expenditure and the regulation of prices of key commodities such as fuel and interest rate. Moreover, the economy has

experienced economic growth in the last six years and this contributes heavily to the reduction in inflation.

4.3 Pearson Correlation

Table 4.2: Pearson Correlation

Correlations	Default Rate	Inflation	Interest Rate	Exchange Rate	Size
Default Rate	1				
Inflation	.544**	1			
Interest rate	.487**	.446**	1		
Exchange Rate	-.620**	-0.153	-.225*	1	
Size	-.737**	-.468**	-.298**	.611**	1

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Source: Research findings

Table 4.2 shows the correlation analysis between performance of trade finance loans and the macroeconomic variables being studied. The Pearson correlation statistic is a unidirectional test of the association between the variables being studied. In this instance, the null hypothesis assumes there is no correlation among the variables under the study. This null was tested at 95 % significance level with an alpha value of 0.05; therefore the null hypothesis is discarded if the significance value is more than 0.05.

The results given above indicate that default is positively correlated with interest rate and inflation. Therefore an inflation increase and interest rate hike will likely to lead to an increase in default. This correlation is statistically significant at 95% confidence level. On the converse, exchange rate and default rate are negatively related this is means that a depreciation of the Kenya shilling is likely to reduce default rate. This relationship is also found to be statistically significant at 95% confidence level.

4.4 Diagnostic Tests

Diagnostic tests are tests done to evaluate the assumptions about the error term. The classical linear models assume the normal distribution of error terms, that they have a constant variance. The model also assumes no correlation of the error terms and that they are also not correlated with the explanatory variables. The study therefore tested for normality of errors, homoscedasticity and for serial autocorrelation.

4.4.1 Test for Normality

Table 4.3: Shapiro Wilk Test of Normality

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
default_rate	.280	89	.000	.732	89	.000
12- month inflation	.241	89	.000	.777	89	.000
Interest rate	.253	89	.000	.756	89	.000
United States dollar	.258	89	.000	.837	89	.000
Size	.204	89	.000	.879	89	.000
a. Lilliefors Significance Correction						

Source: Research findings

The Shapiro–Wilk Test examines whether the variables under the study are statistically different from a normal distribution. The null hypothesis tested in this here assumes that the variables under the study (default rate, inflation, exchange rate, real interest rates and loan portfolio size) are not normally distributed. The alpha for this test is 0.05 and the significance figure indicates the probability of the null hypothesis is true. Therefore, the null is rejected if the significance figure is more than 0.05. The significance figures above indicate that the probability of the null being true is 0.0%. The null is therefore rejected and we conclude that the data is normally distributed.

4.4.2 Test of Serial Correlation

Table 4.4: Durbin Watson Test of Serial Correlation

Model Summary[b]					
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson**
1	.833[a]	.694	.679	.11666	1.357

a. Predictors: (Constant), Size , Interest rate , 12- month inflation, United States dollar

b. Dependent Variable: default_rate

Source: Research findings

The research employed the use of Durbin Watson test to investigate whether there were serial correlations between the independent variables over time. The Durbin Watson test requires data to have a natural ordering i.e. the variables have to be in some kind of time series. The data in this study meets this criteria, interest rate, inflation, and exchange rate and size of the loan portfolio have a monthly natural ordering. The recalculated statistic takes the values between 0-4. The null hypothesis under test assumes that there is auto correlation. Values between 0-2 indicate that there is no correlation while the range between 2.1 – 4 indicates the presence of serial correlation. The Durbin Watson value in the table above table is 1.357; the null hypothesis is therefore rejected and we conclude that there is no serial correlation.

4.5 Regression Analysis and Hypothesis Testing

Table 4.5: Analysis of Variance

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	2.592	4	.648	47.607	.000[b]
	Residual	1.143	84	.014		
	Total	**3.735**	**88**			

Source: Research Findings

The ANOVA test is a statistical evaluation technique designed to give assurance that the dependent and the independent variables chosen in the model are statistically significant. The null hypothesis for this model assumes the independent variables in the model have no statistical significance on the dependent variable. The significance figure in the ANOVA test provided the probability that the null hypothesis is true. Therefore, the null is accepted if the value is more than 0.05, otherwise the null is rejected.

In this case the significance figure is 0.0000; this means that the probability of the null being true is 0. 0000. The null hypothesis is therefore discarded and the alternate hypothesis accepted. The study therefore concludes that the model is statistically significant at 95% confidence level. This means the independent variables have explanatory power over the dependent variables.

Table 4.6: Model Summary

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.833[a]	.694	.679	.11666458300000

a. Predictors: (Constant), Size , Interest rate , 12- month inflation, United States dollar

Source: Research Findings

The model summary statistic in SPSS shows the share of movements in the dependent variable which can be attributed to the selected independent variables in the model. The statistic appreciates that the model explains just a portion of the changes in the independent variable. The adjusted R square value of 0.694 indicates that the model as set contributes to 69.4% of the changes in the independent variable.

Table 4.7: Hypothesis Testing of Independent Variables

Coefficients[a]						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	1.275	.175		7.293	.000
	12- month inflation	.012	.004	.228	3.021	.003
	Interest rate	.015	.005	.203	2.957	.004
	United States dollar	-.008	.002	-.305	-3.894	.000
	Size	-.045	.010	-.383	-4.413	.000

a. Dependent Variable: default rate

Source: Research Findings

Y= $-0.012X_1 + 0.015X_2 - 0.008\ X_3 - 0.045X_4 + 1.275$

The research employed the use of ordinary least square method to establish the effect of dependent variables on the seletced independent variables. These coefficients were tested for statistical significance at 95% confidence intervals. The null hypothesis tested in this case assumed that the coefficients of the independent variables were not different from zero; meaning the coefficients were not statistically different from zero. This null is accepted if the significance value is more than 0.05. This is because the significance value measures the probability that the null is true and any figure more than 5% is an indication that the null could be true.

From the figures in table 4.7 it is concluded that the confidents of all the variables under the study are statistically significant. This is because they have a significance value of less than 0.05. Therefore the possibility of the null hypothesis being true is less than 5%. The outcome indicates that there is a statistically significant positive constant. This is the amount of default which is experienced independent of any variable. This means that for every 1000 shillings originated by a bank 1.275 shillings

will not be paid back irrespective of the economic condition or any bank specific condition.

The result also indicates there being a statistically significant positive association between the performance of trade finance loans and inflation. When the inflation rate increases by 1% the default rate increases by 1.2 %. The economic justification for this positive relationship is premised on the fact that inflation increases the prices of raw materials. This consequently reduces free cash flows available to the firm. The repayment capability of the firm is equally reduced and hence leading to increases in default rate. These results indicate that the borrowers were not able to transfer price increases to the consumers meaning that they were dealing in goods which are sensitive to price changes.

The results also points to a positive association between the real interest rate and default rate. An interest rate increase by 1% increases the default rate by 1.5 %. Increases in interest rate generally decrease the capacity of the borrower to repay their obligation. This is because the loans become more expensive to pay particularly if the businesses are not able to adjust the prices of their goods and services to cater for the changes in interest rates. Moreover, most banks tighten their underwriting standards during high interest rate regime. This deprives the business of the ad-hoc opportunities which would have been financed during the low interest rate regime. This deprivation reduces the projected cash flows and thus leads to a reduction the repayment capacity of the borrowers.

An increase in the exchange rate is found to have a negative association with default. This result shows that an increase in the dollar rate by 1 shilling leads to a decline in default by 0.8%. This is because the depreciation of Kenya shilling makes the exports

more competitive. The repayment capacity of borrowers is enhanced by the depreciation of the Kenya shilling. Most loans under the study have originated in Kenya shillings. Yet the borrowers receive their revenues in dollars irrespective of the movements in the exchange rates. This means that the borrowers are able to convert their dollars to Kenya shillings at higher rates, this leads to increased free cash flows to the firms and hence the reduction in default rate.

The size of the loan portfolio was found to have a statistically significant negative association with the default rate of the trade finance loans. A shilling increase in the loan portfolio led to a decrease in default by 0.45%. This negative association is attributable to the fact that commercial banks are able to benefit from the learning curve; they learn from previous mistakes made by tightening the underwriting standards and eliminating adverse selection. Moreover, increases in portfolio sizes allow the banks to diversify their risk thus reducing the systematic risk and defaults.

4.6 Interpretation of Research Findings

The results from the OLS regression model above established a positive association between inflation and default rate. These findings concur with some of the findings of the empirical studies reviewed in this document. Kariuki (2014); Musau (2014); Mboka (2013); Abid, Ouertani & Ghorbel (2014) and Nir (2013) sought to find out the impact of inflation amongst other selected macro-economic variables on the performance of loans originated by commercial banks. These studies established there was a positive statistically significant connection between inflation and loan performance. These studies aver that inflation impairs the debt serviceability of most companies. A general increase in prices of goods and services increases the prices of inputs. This decreases the free cash flow to the firms which are unable to transfer this

increases in prices to the customers. These hypotheses are true for all companies dealing with goods experiencing price elasticity. The cash flows of these companies are severely affected by increases in input prices because the selling prices remain sticky. This reduction reduces the payment capabilities and eventually leads to defaults.

However, our conclusion is in direct contrast with the findings of Warue (2013); Business Economics (2010) and Chiodo and Owyang's (2003) who found a negative association between inflation and performance. Proponents of the negative association between inflation and performance argue that inflation increases the earning power of the organization. This is particularly true if the input costs remain sticky but selling prices increase. This combination of low input costs and high selling prices increases the free cash flow available to the firm and consequently the repayment capacity of borrows increase and default decrease.

The research found a positive association between interest rate and default. An interest rate increase was found to lead to an increase in default. These results confirm the findings of Ghosh (2015) & Umar and Sun (2018) who found a positive association between interest rate and NPLs. The economic explanation of this positive relationship is based on the classical argument which states that increases in interest rate increases the real outstanding loan balances. This situation is worsened by the fact that businesses are not able to adjust their selling prices to cover up for the increased cost of finance. This leads to a reduction of free cash flows available to the firm hence causing difficulties for borrowers to repay loans.

However, these findings contradict the findings of Mataba (2018) who found negative relationship between interest rate and defaults. His study investigated the drivers of

NPLs in the community based banks in Tanzania and concluded there was a negative association between default and interest rate. The economic reasoning behind this relationship is premised in the assumption that most of the borrowers were able to transfer the increases in interest rates to their customers by adjusting the prices of their goods. On the consumer front it can be assumed that increases in interest rate triggered an increase in inflation. In this case it is assumed that there was a positive disproportionate increase in wages by a rate higher than interest rate. This led to an increase in disposable income and consequently eased the debt burden for the individual consumers, thus leading to a decrease in defaults.

There was a negative association between performance of business loans and depreciation of Kenya shilling against the dollar. These findings confirm the conclusions made by Beck (2015). His study revealed that currency depreciation can improve the asset quality of trade finance. The economic explanation for the negative relationship between NPLs and foreign currency appreciation is premised on the fact that exporters usually gain from currency depreciation. The decrease in purchasing power of the Kenya shilling increases the competitiveness of Kenya products abroad. This increases the aggregate demand for goods and also increases the free cash flows available to the firm. Exporters get paid in dollars which is converted to Kenya shilling at higher rates. This positive relationship will only be present if their loans are denominated in Kenya shillings.

However, these findings contradict the general economic theory which postulates that depreciation in the value of the local currency greatly impairs the asset quality of trade finance loans. This is because it increases directly the cost of raw materials. Importers will be required to have more of the local currency to purchase the same quantity of raw materials. Default will increase in circumstances where the traders are

not able to pass down the cost to the customers thus leading to a decrease in free cash flows and consequently an increase in defaults. Indeed, there are empirical evidence indicating a positive relationship. Kumar, Stauvermann, Patel & Prasad (2018) and Kishore (2012) sought to find the effect of exchange rate on default and found a statistically significant positive association.

The research indicates that there is a negative association between size and performance of trade finance loans. This could be attributable to the increased underwriting standards developed over time by the banks. Warue (2013) found similar results with privately owned banks. Increases in portfolio were found to have a negative association with the performance of commercial loans issued by banks. However, the same research found positive association between NPL and the size of portfolio.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter documents the summary of research findings and its conclusions. This chapter additionally provides advisory to policy makers and offers recommendations supported by statistical facts from the research. The chapter also covers the discussion on the limitations met during the study and how the challenges were resolved. Finally, the chapter gives recommendation for further studies as a result of the research findings.

5.2 Summary

The study sought to establish the effect of selected macro-economic variables on trade finance loans issued by the commercial banks in Kenya. The dependent variable under consideration was the performance of trade finance loans issued by these financial institutions. This variable was calculated by total nonperforming trade finance loans as a percentage of the total trade finance loans issued by commercial banks in Kenya. This variable was taken at the aggregate level; a sum of all the trade finance loans issued by the banks. The macro-economic variables in the study were; inflation, interest rate and foreign exchange rate between the Kenyan shilling and the dollar.

To provide the theoretical perspective, three theories were reviewed to anchor the study. The theories include the financial accelerator theory, the liquidity preference theory and the moral hazard theory. The financial accelerator theory opines that macro-economic variables will affect the performance of business loans negatively. The liquidity preference theory as proposed by Keynes (1936) proposes that the

welfare of lenders is significantly afected by inflation. This is paticurlaly true in circumstances where the interest raes are fixed as is the Kenyan situation today. This is because during inflationary moments, lenders get paid a fixed amount of money which has actually lost value due to inflation. On the other hand, the moral hazard theory postulates that performance of loans should not be affected by macro economic variables because these factors can be incorporated into the decision making process at the point of loan origination. The theory avers that NPLs are primarily caused by managers' bad lendign practises and not macro economic variables.

Descriptive research design methodology was used in this study. This was chosen because the variables under the study had already happened therefore the study corroborated the data to find meaningful patterns. The research employed the use of descriptive statistic and graphs to collate and analyze the raw data. A unidirectional Pearson correlation matrix was used to establish the correlation between variables. Ordinary least square regression technique established the statistically significant influence between the selected macro-economic variables and performance. Data was collected from a universe of all the 43 banks licensed by the CBK as at 31st December 2017.

Preliminary analysis using the two tailed Pearson correlation matrix indicated a positive correlation between inflation, interest rate and default. On the converse, default was found to have a negative association with exchange rate and the size of the trade finance portfolio. These correlations were tested for statistical significance at 95% confidence level and were found to be significant and consistent with the regression analysis results.

The research found a positive association between interest rate and performance. These findings support the conclusions made by previous studies such as Kariuki (2014); Musau (2014); Mboka (2013); Abid, Ouertani & Ghorbel (2014) and Nir (2013). However, these findings differ with the conclusions made by Warue (2013); Business Economics (2010) and Chiodo and Owyang (2003) who found negative association between interest rate and non performing loans. These findings also confirm the assumptions of the financial accelerator theory which points to a positive connection between adverse macroeconomic theory variables and performance of loans. The financial accelerator theory assume that borrowers cannot pass down the high cost of credit to their customers without losing a significant amount of sales or market share (Sinkey et al., 1991). It is the stickiness of the selling prices which contributes to reduced free cash flows available to the firm and hence leading to increased defaults.

The results found that there was a positive association between inflation and defaults. An increase in inflation is therefore associated with an increase in default. These findings support the conclusions of previous research such as Njenga (2016); Muthami (2016); Kjosevski and Petkovski (2017) and Kishore (2012). However, these findings conflict with the findings of Mataba (2018) who found negative relationship between inflation and defaults. These results validate the assumptions advanced by the liquidity preference theory of interest and money. This theory avers that inflation worsens the welfare of lenders thus making them to increase interest rates to cover up for the lost value of money. These multiplier effects increase the debt burden and consequently lead to defaults.

The research found a peculiar negative association between the depreciation of the Kenya shilling and trade finance loan performance. These findings confirm the conclusions of Beck (2015), whose study revealed that currency depreciation improves the asset quality of loans issued by commercial banks. However, these findings contradict the contemporary economic findings which assume that depreciation in the local currency should impair the repayment capacity of the borrowers. Previous studies like Kumar, Stauvermann, Patel & Prasad (2018) and Kishore (2012) support the classical hypothesis of a positive relationship. The study also found a negative correlation between loan portfolio size with loan defaults. This means that most of the financial institutions were able to improve their underwriting standards with an increase in the loan portfolio.

5.3 Conclusions

The study concluded inflation and interest rate have a positive correlation. This indicates that contractionary macroeconomic events which reduce the cash flow available to the firms increase the debt burden and eventually lead to an increase in default. These results support the contemporary economic belief that predicts a positive relationship. It also supports the conclusions made by Njenga (2016) and Muthami (2016) in their respective works.

The research concluded that most of the borrowers are adversely affected by the inflation rate increases and interest rate hikes. The economic justification is based on the fact that these businesses cannot pass down the increases in finance costs without necessarily losing a significant market share (Sinkey et al., 1991). The research therefore concludes that the prices in the macroeconomic environment for this

segment are sticky. That is say that the goods traded by the holders of the trade finance loans are sensitive to price changes.

The study also found there was a negative association between exchange rate and default rate. These results challenge the general contemporary economic expectations. The general economic theory expects that depreciation in a local currency will lead to increased loan default. These findings have already been supported academic studies done by Kariuki (2014); Musau (2014) and Mboka (2013). However, this study pointed to a negative correlation between exchange rate and default rate. Indeed, these peculiar findings support the conclusions of previous research done by Mataba (2018) in Tanzania and Warue (2013) in Kenya.

The research also concluded that borrowers of the trade finance loans are exporters. The study also concludes that most of the trade finance loans originated in Kenya are denominated in Kenyan shillings. The results indicate that there is a negative association between the depreciation of local currency and default meaning that the loans become easier to repay with a decrease in the purchasing power of the Kenya shilling. This situation can only happen in instances where the borrowers are exporters and where they have taken loans denominated in Kenya shillings. The decrease in purchasing power of the Kenya shilling increases the competitiveness of Kenya products abroad. This increases the aggregate demand for goods and also increases the free cash flows available to the firm. Exporters get paid in dollars which is converted to Kenya shilling at higher rates.

The research concludes that the moral hazard theory as proposed by Meckling (1976) does not hold. The theory avers that managers use their vantage position and superior information to take more than optimal risk. It therefore assumes that default occurs

because of the risky decisions assumed by managers. Indeed, Warue's (2013) research concluded that government owned banks exhibited these moral hazard problems. This theory therefore invalidates the effect of macro-economic variables on defaults. However, the results of the study indicate that the macro-economic variables under study have a statistical significance on the default rates.

5.4 Recommendations for Policy and Practice

The study concluded that most companies under the study were negatively affected by inflation. The negative association between inflation and default is a clear indication that most companies were unable to increase their selling prices in proportion to the increase in the prices of inputs. This led to decreased cash flow to the firm and consequently increased cases of loan default. In line with the above analogy, the study therefore recommends that the commercial banks watch out for changes in inflation and take measures geared towards safeguarding increases in default of trade facilities. The study proposes for banks to restructure the loans terms during inflationary moments. This will help the borrowers to repay the loans but for longer periods.

The study also recommends to banks and regulators to monitor moments in interest rates. This is for the reason that interest rate hikes have been found to negatively affect the performance of trade finance loans. The study has also established that most borrowers within this class of loans cannot pass down the increased cost of finance ro their customers. Therefore, the study recommends to the banks to restructure their loan facilities in line with the decreased repayment ability during inflationary periods. This will allow the business to repay the loans though in longer periods than anticipated

5.5 Limitations of the Study

One of the fundamental challenges encountered while undertaking the research was finding detailed data of the specific loan products. Most banks are often unwilling to provide in depth data of their loan portfolios and their performance due to confidentiality concerns and the risk of the information exposing them to competition. This challenge was overcome by approaching the CRBs and the CBK for the consolidated data as received from the financial institutions.

The other challenge faced was aggregation of the data. The CBK database is saved in a format that is not easily accessible for external analysis. They accepted to give access to the database but there was no option of pulling the information from the database. This is a serious challenge for academic purposes because there is a requirement by the university to provide an appendix of the data used in the analysis. This challenge was resolved by approaching the CRBs to provide an excel version of what sits at the CBKs database.

5.6 Suggestion for Further Studies

Given the conflicting findings between the selected macro-economic variables and defaults in different countries in East Africa; Mataba (2018) from Tanzania finding negative results between interest rate and default, yet Njenga (2016) who investigated similar variables in Kenya found a positive relationship. The research suggests that a study be done to cover the East African region to establish whether a statistically significant difference exists between the effect of macroeconomic variables on trade finance loan performance in the different countries.

The study also established a positive correlation between inflation and default, which means that high inflation increases loan default. On the other hand, other studies like

İslamoğlu (2015) concluded that inflation and defaults have a negative relationship because inflation reduces the real loan values thus improving borrower's ability to repay them. They also concluded that these findings are only robust in circumstances where wages are non-sticky. This study recommends that further research should be done to find out if wages are sticky under the Kenyan context. This research will help to confirm the logical explanation of the relationship between inflation and default.

The study concludes that the moral hazard theory does not hold given the findings. On the other hand, Warue's (2013) research affirmed the assumptions of the moral hazard theory. Her study found that government owned banks suffered from the moral hazard problems because most of the loans were originated were politically instigated. This led to an increased default rate in government owned banks as compared to purely private banks. Therefore, the study recommends a research to be commissioned to validate this hypothesis of the moral hazard.

Further the study recommends a stand-alone research on the relationship between inflation and default rate not only in Kenya but the entire East Africa. This is because there is no consensus as to the relationship between inflation and default. These studies will contribute heavily to the existing literature and shed more light to the already existing hypotheses.

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APPENDICES

Appendix I: Commercial Banks in Kenya as at 31st December 2017

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

(Source: CBK Bank Supervision Annual Report 2017)

Appendix II: Performance Data for Trade Finance Loans for the Periods 2011- 2018

year_loaded	month_loaded	default_rate	Inflation	Interest rate	Exchange Rate	Size
2011	7	1.0000	15.53	6.25	89.90	6.4842
2011	8	0.0795	16.67	6.25	92.79	8.6815
2011	9	0.1980	17.32	7	96.36	8.6713
2011	10	0.3725	18.91	11	101.27	8.6726
2011	11	0.9194	19.72	16.5	93.68	8.5670
2011	12	0.7895	18.93	18	86.66	8.8489
2012	1	0.7542	18.31	18	86.34	8.8476
2012	2	1.0000	16.69	18	83.18	8.5210
2012	3	0.3736	15.61	18	82.90	8.9706
2012	4	0.4776	13.06	18	83.19	8.8644
2012	5	0.4265	12.22	18	84.38	8.9599
2012	6	0.4211	10.05	18	84.79	8.9598
2012	7	0.4545	7.74	16.5	84.14	8.9638
2012	8	0.4038	6.09	16.5	84.08	8.7980
2012	9	0.2264	5.32	13	84.61	8.8521
2012	10	0.4000	4.14	13	85.11	10.4918
2012	11	0.4364	3.25	11	85.63	10.4919
2012	12	0.3793	3.2	11	85.99	10.4892
2013	1	0.4516	3.67	9.5	86.90	10.4916
2013	2	0.4407	4.45	9.5	87.45	10.4916
2013	3	0.4328	4.11	9.5	85.82	10.4918
2013	4	0.3939	4.14	9.5	84.19	8.9363
2013	5	0.3889	4.05	8.5	84.15	9.1122
2013	6	0.3971	4.91	8.5	85.49	9.1083
2013	7	0.4267	6.03	8.5	86.86	9.0115
2013	8	0.4706	6.67	8.5	87.49	8.7794
2013	9	0.5098	8.29	8.5	87.41	8.9087
2013	10	0.4565	7.76	8.5	85.31	8.7036
2013	11	0.3117	7.36	8.5	86.10	8.9535
2013	12	0.3256	7.15	8.5	86.31	8.9792
2014	1	0.3253	7.21	8.5	86.21	9.0032
2014	2	0.1170	6.86	8.5	86.28	11.2294
2014	3	0.1672	6.27	8.5	86.49	12.1107
2014	4	0.2616	6.41	8.5	86.72	11.5379
2014	5	0.2533	7.3	8.5	87.41	11.8547
2014	6	0.1408	7.39	8.5	87.61	11.8578
2014	7	0.1460	7.67	8.5	87.77	11.6019
2014	8	0.1415	8.36	8.5	88.11	11.5123
2014	9	0.1355	6.6	8.5	88.84	11.5494
2014	10	0.1278	6.43	8.5	89.23	13.5249
2014	11	0.1655	6.09	8.5	89.96	13.5259
2014	12	0.1429	6.02	8.5	90.44	13.5251
2015	1	0.1471	5.53	8.5	91.36	13.5247
2015	2	0.1442	5.61	8.5	91.49	13.5252
2015	3	0.1514	6.31	8.5	91.73	13.5239

2015	4	0.1263	7.08	8.5	93.44	13.5243
2015	5	0.1161	6.87	8.5	96.39	13.5254
2015	6	0.1590	7.03	10	97.71	13.5270
2015	7	0.1185	6.62	11.5	101.20	13.5262
2015	8	0.1518	5.84	11.5	102.43	13.5261
2015	9	0.1128	5.97	11.5	105.28	13.5266
2015	10	0.1479	6.72	11.5	102.78	13.5264
2015	11	0.1722	7.32	11.5	102.17	13.5275
2015	12	0.1115	8.01	11.5	102.20	13.5277
2016	1	0.1321	7.78	11.5	102.31	13.3540
2016	2	0.1338	6.84	11.5	101.93	13.5272
2016	3	0.1283	6.45	11.5	101.49	12.0366
2016	4	0.1496	5.27	11.5	101.23	11.8858
2016	5	0.1299	5	10.5	100.73	11.8861
2016	6	0.1157	5.8	10.5	101.15	11.9536
2016	7	0.1060	6.4	10.5	101.33	12.0831
2016	8	0.1011	6.26	10	101.41	12.2194
2016	9	0.1235	6.34	10	101.27	12.0307
2016	10	0.1166	6.47	10	101.32	11.9780
2016	11	0.1179	6.68	10	101.75	12.0141
2016	12	0.1202	6.35	10	102.13	12.0519
2017	1	0.1145	6.99	10	103.75	11.9916
2017	2	0.1254	9.04	10	103.64	12.0122
2017	3	0.1240	10.28	10	102.85	11.9848
2017	4	0.1202	11.48	10	103.33	11.9946
2017	5	0.1185	11.7	10	103.26	11.9990
2017	6	0.1464	9.21	10	103.49	12.0389
2017	7	0.1464	7.47	10	103.88	11.9789
2017	8	0.1266	8.04	10	103.56	12.1453
2017	9	0.1129	7.06	10	103.12	11.9824
2017	10	0.1047	5.72	10	103.39	12.0272
2017	11	0.1287	4.73	10	103.57	12.2040
2017	12	0.1181	4.5	10	103.10	12.0041
2018	1	0.1279	4.83	10	102.92	12.0399
2018	2	0.1181	4.46	10	101.40	12.0111
2018	3	0.1124	4.18	9.5	101.18	11.9846
2018	4	0.1072	3.73	9	100.61	12.0489
2018	5	0.0823	3.95	9	100.66	12.0053
2018	6	0.1037	4.28	9	101.00	11.9897
2018	7	0.1064	4.35	9	100.67	11.9835
2018	8	0.0999	4.04	9	100.61	12.0811
2018	9	0.1081	5.7	9	100.61	11.6182
2018	10	0.0737	4.04	9	100.61	11.0345
2018	11	0.0001	4.04	9	100.61	9.6097