EFFECT OF INFLATION TARGETING ON THE INFLATION RATE IN KENYA

BY

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DECLARATION

This Research Project is my original work and has not been submitted for examination in any other University.

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This Research Project has been submitted for examination with my approval as University Supervisor.

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DEDICATION

This Research Project is dedicated to my late dad, Samuel T. Kamau, my mom, Mary Wanjiru and to myself.

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ABSTRACT

Inflation targeting has been widely adopted as monetary policy tool by both developed and developing economies. Kenya, through the Central Bank of Kenya formally adopted inflation targeting as a major monetary policy framework in 2013. This study sought to determine the effect of inflation targeting on the inflation rate in Kenya since adoption. The specific objectives included; to determine whether inflation rates had reduced and, to determine whether inflation rate volatility had reduced since the adoption of inflation targeting. In meeting these research objectives, the study adopted a quantitative method to investigate the behavior of inflation rates before the adoption of inflation targeting (2005-2013) and after the adoption of inflation targeting (2013-2018). Secondary quantitative data was collected from the Central Bank of Kenya. The tool used for the study was SPSS V21where test of difference in means between the pre and post inflation targeting periods was conducted. Regression analysis was used to determine the relationship as well as the degree of the relationship between inflation targeting and the inflation rate.The results from the study revealed that there was significant difference in mean inflation rates between the two periods. The mean inflation rate post inflation-targeting period was found to be significantly less than the mean inflation rate pre inflation-targeting period. The study also revealed that Inflation targeting had a statistically significant effect to reduce inflation

The study concluded by supporting the argument in the literature that Inflation targeting affects inflation rate negatively and also reduces inflation volatility.

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CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

An inflation targeting regime aims to achieve its target through its use of the nominal interest rates as a policy instrument (Divino, 2009). Theoretically the main achievement of an inflation targeting regime would be that it anchors (long run) inflation expectations, which influences price- and wage-setting behaviour, such that, when an exogenous shock on inflation occurs, economic agents won't anticipate equal or higher inflation in the future, but rather recognize that inflation will be brought down. In order to anchor these expectations a central bank needs to enjoy a certain degree of credibility which should stem from the framework inflation targeting brings with it.

One of the most relied upon indicators of financial globalization is the Interest Rate Parity (IRP). The origin of IRP dates back centuries ago and can be traced to David Hume, David Ricardo before being formalized in the twentieth century by John Maynard Keynes (1923). The IPR theory states that the interest rate differentials between two countries will be reflected in the premium or discount for the forward exchange rate on the foreign currency provided there is no arbitrage profit (Keynes, 1923). When the parity relationship holds, covered interest rates between two countries are identical on assets that are similar in all important aspects except for their currency of denomination. Due to its major role in global macroeconomic models, IRP is viewed as a benchmark for perfect capital mobility between markets. This study will therefore be grounded on this theory as it will help in explaining the relationship between the study variables.

Inflation targeting is a particular example of the neo-liberal approach to central banking. A neo-liberal central bank attempts to keep inflation at a very low level, reduces support for government fiscal deficits helps to manage the country's integration into world trade and financial markets, reduce the influence of democratic social and political forces on central bank policy (Eipstein, 2003). Since early 90's, inflation targeting has been adopted by many industrialized countries (New Zealand, Canada, the United Kingdom, Sweden, Israel, Australia and Switzerland), by several emerging market countries (Chile, Brazil, Korea, Thailand, and South Africa) and by several transition countries (Czech Republic, Poland and Hungary) (Mishkin, 2001).

High Inflation rates and volatility in many developing countries, have posed a serious a threat to the growth and development of the economy. Full-fledge Inflation targeting would be the practical solution to such economies however the preconditions for the policy implementation are not inplace. Such economies lack a high degree of independence of the central bank, well developed financial institutions as well as high policy credibility which are essential in the implementation of IT. (Stone, 2003). Laurens *et al*. (2015) noted that such economies may be unable to adopt a full-fledged inflation targeting immediately but can adopt transitional arrangements. He further states that transitional arrangements enable the Central bank to take advantage of the informational content of monetary aggregates, developing an economic analysis capacity, and concentrating on monetary operations aimed at steering money market interest rates. Kenya being one of the developing economies started its transitioning journey towards inflation targeting in 2013. This study therefore seeks to examine whether inflation targeting by the government has been effective in controlling inflation in Kenya.

1.1.1 Inflation Targeting

Bernanke et al. (1999) define inflation targeting (IT) as a framework for monetary policy characterized by the public announcement of official quantitative targets or target ranges for the inflation rate over one or more time horizons and by the explicit acknowledgement that low, stable inflation is monetary policy's primary long run goal. Mishkin (2007) argues that inflation targeting involves 5 main elements, and these are: Public announcement of medium-term numerical targets for inflation, an institutional commitment to price stability as the primary long run goal of monetary policy and a commitment to achieve the inflation goal, an information-inclusive strategy in which many variables and not just monetary aggregates are used in making decisions about monetary policy, increased transparency of the monetary policy strategy through communication with the public and the market about the plans and objectives of monetary policy makers and increased accountability of the central bank for attaining its inflation objectives."

Inflation refers to the increase in the general level of price of a basket of goods and services that is representative of an economy over a period of time. Inflation is measured by the percentage change in a price index, which is the average price level for a set of goods and services, relative to a base year (Romer, 2009). As such, inflation therefore generally means a sustained increase in the aggregate or general price level in an economy. There is a general concensus that high levels of inflation have a negative impact to individual businesses, consumers and also to the economy as a whole. Three main benefits, all interrelated, are associated with inflation targeting. First, inflation targeting successfully lowers inflation and makes it less volatile (Bernanke et al. (1999). Second, it reduces the real costs of disinflation (Gonçalves and Salles, 2008). Third, it

anchors long-run inflation expectations at, or very close to, the inflation target (Vega and Winkelried, 2005).

In recent years, various economists have supported the implementation of inflation targeting regime. Svensson (1997) supports inflation targeting regime because it decreases output fluctuations and time inconsistency problems. According to Svensson (1997), inflation targeting regime reduces inflation volatility and it helps to stabilize output level. Bernanke et al. (1999) emphasize that inflation targeting regime reduces the cost of disinflation and also acts as an anchor for the public's expectations and therefore it can reduce the inflation level. Mishkin (1999) indicates that inflation targeting regime is successful in both decreasing inflation expectations and reducing the actual inflation rate. Moreover King (2002) implies that inflation rate is not only low after the beginning of inflation targeting regime; it is also less volatile and more persistent in the inflation targeting countries. According to Filho (2010), inflation targeting regime helps to increase GDP and to reduce unemployment level in the countries which practice inflation targeting regime. Also Abo-Zaid and Tuzemen (2011) while comparing the inflation targeting countries and non-inflation targeting countries concluded that inflation targeting countries are associated with lower levels and more stable inflation, as well as higher and more stable GDP growth even if they are developed or developing countries.

Although there are a number of positive ascriptions to the inflation targeting regime, the number of studies criticizing the inflation targeting regime has increased after the global financial crisis has started in 2008. Initial critics belong to Eipstein and Yeldan (2007). According to them, the world economy is growing too slowly to generate sufficient jobs and it is allocating a smaller

proportion of its income to fixed capital formation nowadays. Similarly, Akyuz (2006) emphasizes that the main challenge for policy makers is not inflation, but unemployment and financial stability. Often in developing countries, the central banks focus mostly on inflation targeting regime instead of poverty, employment, investment or economic growth. In this regard, implementation of inflation targeting has generated significant costs: slow growth, lower employment growth and high real interest rates. Besides, Frankel (2011) states that many countries have experienced highly variable terms of trade in recent years, as a result of unusually high volatility in world price of oil, minerals and agricultural products. Terms of trade volatility poses a serious challenge to the inflation targeting approach to monetary policy. This study therefore seeks to assess the effect of inflation targeting on inflation rate in Kenya.

1.1.2 Inflation Rate

Inflation is defined as the sustained increase in the general price level in an economy. World Bank (2007) defines inflation rate as an annual increase in the price of a basket of goods and services that are purchased by consumers in an economy. The London oxford economic dictionary (2009) defines inflation as the consistent tendency for nominal prices to increase which leads to a decline in the purchasing power in a country's currency. Inflation rate therefore measures the changes over time of the consumer prices of goods and services produced in the country. This percentage cost of living is calculated using the consumer price index in Kenya. Generally, the inflation rate is used to measure the price stability in the economy. A low inflation rate scenario will exhibit a rising currency rate, as the purchasing power of the currency will increase as compared to other currencies. Contrary, a high inflation scenario will translate to a depreciating currency meaning the value of money becomes less valuable.

Studies in Kenya looks at the determinants of inflation in Kenya using the Phillips curve approach and fail to how inflation targeting affects inflation rate which is the main foundation, with which this study sought to address. Similarly studies on inflation in Kenya have looked at the relationship between inflation and GDP growth, interest rates and the impact of monetary policy tools on inflation and in their estimations consider a linear relationship between the variables in the models (Ochieng, 2016). This study seeks to take a different approach by looking at how inflation targeting impacts on the inflation rates in Kenya.

1.1.3 Influence of Inflation Targeting on Inflation Rate

The main objectives of inflation targeting are to reduce inflation volatility and keep the inflation rate within a given range. The success of inflation targeting in achieving these primary objectives is debatable. Lin and Ye (2009) used a variety of propensity score matching methods to show the effect of inflation targeting on inflation variability in thirteen inflation targeting countries. From the study, Lin and Ye (2009) empirical results indicated that the adoption of inflation targeting led to a reduction in the level of inflation by about 300 basis points and significantly reduced inflation variability. Mishkin and Schmidt-Hebbel (2007), did a study on a cohort of inflation targeting countries while using another group of high-income non-inflation targeting countries as control and concluded that inflation targeting helps countries to achieve lower inflation rate and inflation variability compared to non-inflation targeting countries.

There has been a number of researches which emphasize the importance and significance of inflation targeting regime in controlling inflation rate in the countries where it has been implemented (Svensson, 1997, 1998; Bernanke et al., 1999; Mishkin, 1999; King, 2002; Filho, 2010; Abo-Zaid and Tuzemen, 2011). However, recently inflation targeting regime in developing

countries has been heavily criticized in a number of ways (Eipstein and Yeldan, 2007; Stiglitz, 2008; Frankel, 2011, 2012). The reason for these critics is that the central banks mainly focus on inflation targeting regime instead of poverty, employment, investment or economic growth. In this regard, implementation of inflation targeting has generated significant costs: slow growth, lower employment growth and high real interest rates. The current global financial crisis and economic stagnation mainly in developed countries brings another point into mind.

1.1.4 Inflation targeting and Inflation rates in Kenya

The role of the Central Bank of Kenya (CBK) is anchored in Article 231 of Kenya's Constitution. The principal objectives of the CBK as established in the Central Bank Kenya Act, Cap 491, are: formulation and implementation of monetary policy directed to achieving and maintaining stability in the general level of prices; fostering the liquidity, solvency and proper functioning of a stable, market-based, financial system; and offering support to the economic policy of the Government (CBK, 2017).

The CBK is mandated to formulate and conduct monetary policy with the aim of keeping overall inflation within the allowable range of between 2.5% to 7.5% as prescribed by the National Treasury in the annual Budget Policy Statement. Generally domestic savings and private investments are boosted by and environment of low and stable levels of inflation which inturn translates into improved growth of the economy and increased employment opportunities. The CBK's monetary policy is therefore aimed at supporting the Government's desired growth in the economy through achieving and maintaining a low and stable rate of inflation (CBK, 2017).

Kenya started its transitioning journey towards inflation targeting in 2013. This was evidenced by the CBK Monetary Policy goal of maintaining the Government's price stability inflation target band 2.5% above or below the ideal rate of 5%. This study therefore seeks to examine whether to strategies towards inflation targeting by the government has been effective. Recent statistics show that the inflation rate in Kenya has been increasing: 2012 (9.38%) 2013 (5.72%), 2014 (6.88%), 2015 (6.58%), 2016 (6.32%) and 2017 (7.99%) (Statista, 2018).

1.2 Research Problem

Inflation is a major issue in many economies around the world when it comes to the management of these economies. It is one main indicator of the performance of an economy and so assumes a role of importance where every economy tries as much as possible to bring it under control. Inconsistencies within the formulation and application of policies have made it very difficult for many economies to hit their targeted inflation levels and thus exposing their citizens to the full effects of inflation (Mishkin, 2007). Over time, most countries have moved to adopt inflation targeting for the conduct of monetary policy. Under inflation targeting, the central bank releases a targeted rate of inflation. The central bank then tries to move actual inflation towards the target mostly through the use of interest rate. Inflation Targeting gives the monetary authority direct control of the likely path of inflation by reducing the role of intermediary guidelines (Gyebi and Boafo, 2013). In as much as the inflation targeting strategy has been used in different countries in controlling inflation, little has been done to assess its effectiveness especially in the developing countries.

Kenya inflation rate fluctuated substantially in recent years, it tended to increase through 1998 - 2017 period ending at 8 % in 2017. Even after the introduction of inflation targeting in 2013 in

Kenya, the statistics show that the inflation rates has been increasing: 2013 (5.72%), 2014 (6.88%), 2015 (6.58%), 2016 (6.32%) and 2017 (7.99%) (Statista, 2018). This statistical trend drew the interest of the research into findings out the effect of inflation targeting on inflation rate.

A number of studies have been done on inflation targeting. Lynch (2008) carried out a study on whether inflation targeting is a monetary policy regime change and found that and found that it was indeed a rule regime. Sattarow (2011) studied the impact of inflation on economic growth and found that there existed a positive long-run relationship between inflation and economic growth in Finland. Kurihara (2013) carried out a study to determine whether adoption of inflation targeting reduces exchange rate volatility and enhance economic growth in Japan. The study found that inflation targeting reduces exchange rate volatility and causes economic growth. Puni, Osei and Bamor (2014) studied the effects of inflation targeting policy on inflation rates and gross domestic product in Ghana. The Results revealed the inflation rate for the post inflation targeting period is significantly less than the pre-inflation targeting period.

Kirimi (2014) studied the determinants of inflation in Kenya and found that Money supply (M2) and exchange rate had a positive relationship with the inflation rate while GDP growth rate and the corruption perception had a negative relationship with inflation. Okoth (2013) studied the effect of interest rate on exchange rates in Kenya and found that the relationship between inflation and interest rates against exchanges rates is very significant at 0.05 level of significance level with a p-value of 0.016. Koila (2016) studied the effect of monetary policy on inflation in Kenya and found that that there is a relationship between monetary policies and inflation. This

study therefore seeks to fill the existing knowledge gap by answering the question: is inflation targeting effective in controlling inflation rate in Kenya?

1.3 Objective of the Study

The objective of this study is to assess the effect of inflation targeting on the inflation rate in Kenya.

1.4 Value of the Study

The findings of this study will be important to Central Bank of Kenya. By assessing the effectiveness of inflation targeting in reducing inflation, the government will be able to assess whether the adoption of the strategies has impact on controlling inflation. Currently, CBK has a Monetary Policy goal of maintaining the Government's price stability inflation target of 5% with a 2.5% band. The findings of the study will therefore help in the evaluation of this function bu focusing on the inflation targeting strategies.

The findings of the study will also be of importance to policy makers. By informing policy makers on the possible effects on inflation targeting in controlling inflation, they will be able to come up with recommendations on how different inflation targeting strategies can be used to control inflation. The formulation of policies on interest and exchanges rates will be more informed as their effectiveness will ensure the effectiveness of inflation targeting strategies by the central bank.

The findings of this study will finally be of benefit to scholars. By contributing to the body of literature on how inflation targeting helps in controlling inflation, the study will contribute in building the knowledge gap. Research will get to understand how the new concept of inflation

targeting can be used to control inflation rate and thus build on more literature on the same through other relevant studies which will be done.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section presents the literature which will be used in the study. The chapter describes how different theories will be used in the study. It also presents review of different empirical students relevant to the study variables.

2.2 Theoretical Review

This section presents the theories to be used in the study. Two theories have been adopted for this study: The Quantity Theory of Money and Interest Rate Parity theory.

2.2.1 Quantity Theory of Money

The quantity theory has its origins from Nicolaus Copernicus and various other economists who noted an increase in prices following the import of gold and silver, used in the coinage of money, from the New World in the 15th century (Copernicus, 1517). This theory refers to a proposition that there is a positive relationship between changes in the money supply and the long- term price of goods. The theory explains that increasing quantity of money supply would lead to an almost equal percentage of the increase in price of commodities. The theory affirms that general changes in price are primarily caused by changes in the money in circulation (Ricardo, 1817).

Most of the modern day financial events can be best analyzed and interpreted courtesy of the quantity theory of money. The theory asserts that if the money supply growth rate is greater than the growth of real output, then velocity moves in the opposite direction in the short run. Excess money supply growth causes velocity to slow down momentarily, until prices can adjust.

Cosgrove (2005) explains that in a socialist country, a large number of economic and political factors influences the money; this is more felt when the government is responsible for providing the purchasing power, industrial and agriculture procurements, wage payments to city workers and other state financing. Critics of the theory argue that money velocity is not stable and, in the short-run, prices are sticky, so the direct relationship between money supply and price level (Cheruyot, 2012).

The main implication of the QTM is that long run movements in the price level are determined primarily by long run movements in the excess of money over real output. However, conventional economic growth theories suggest that inflation negatively affects overall economic performance of any country. Several economic studies also reveal that high inflation distorts the decisions of private agents concerning investment, saving, production which in turn slower economic growth. There is also evidence that even moderate levels of inflation damage real growth. Considering various negative consequences of inflation on the economy, there is a consensus among world's leading economists that the price stability should be the prime objective of monetary policy and the central banks should be committed to maintain low inflation (Blejer *et al*, 2000).

One of the weaknesses of this theory is that it states that the total quantity of money paid for goods and services must equal their value. But it cannot be accepted today that a certain percentage change in the quantity of money leads to the same percentage change in the price level. Besides the weakness of this theory, it will be used in this study to explain the relationship between inflation targeting and inflation rate.

2.2.2 Interest Rate Parity Theory

This theory was developed by Keynes in 1923 and it suggests that interest rate differential noted between two countries is equal to the differential spot exchange rate and forward exchange rate between the two countries (Keynes, 1923). This theory plays a critical role in exchange markets by explaining the relationship between spot exchange rates, foreign exchange rate and interest rates. Interest rates, inflation and exchange rates are all highly correlated and hence a change in one parameter has an offsetting effect in the other. Central banks influence both inflation and exchange rates by manipulating the interest rates (Alexius, 2001). Higher interest rates in a country attract foreign capital owing to the expected higher return by lenders and this causes the exchange rate to rise. However, if inflation in a country is higher than in others or the currency weakens relative to other countries, the impact of higher interest rates is lessened.

Interest rate parity theory states that the spot price, the futures and the forward price of a currency incorporates the interest rate differentials between the two currencies with the assumption that there are no taxes or transaction costs (Alexius, 2001). The theory states that discount or premium of one currency against another currency reflects the interest differential between the two currencies. The currency whose interest is lower should have a forward premium in relation to the high rate currency. In an efficient market where no transaction costs are experienced, interest rate differential should approximately equal the forward differential and once this condition is met, forward rate is said to be at the interest rate parity where equilibrium prevails in the money market. Interest parity ensures return of a hedged foreign investment is equal to the interest rate that would be realized on an identical domestic investment meaning that the difference between hedged foreign interest rate and a domestic rate is zero.

As stated by Chinn and Meredith (2004), Euro currency markets use interest differential between the specified two currencies (using no-arbitrage condition) when calculating the forward interest. Interest rate parity plays a critical role in foreign exchange markets by connecting foreign exchange rates and spot exchange rates. To sum it, interest rate differential for two countries equals the differential between a spot exchange rate and a forward exchange rate. This theory suggests that foreign exchange trading is what brought about interest rate parity theory. This theory suggests that domestic interest rate should be equal the foreign country's interest rate plus speculated change in exchange rate. One of the weaknesses of the interest parity theory is that it is built on two assumptions; the theory assumes that markets are efficient, with capital mobility and that the domestic and foreign assets are perfectly substitutable. This theory is therefore relevant in understanding the relationship between the study variables such as inflation rate and interest rate.

2.3 Determinants of Inflation Rate

This section presents literature on inflation targeting, interest rate and exchange rate.

2.3.2 Inflation Targeting

Inflation targeting is based upon announcing a forward-looking medium inflation forecast, either in a range or point form. The announcement of the policy target allows the market agents to perceive the direction of monetary policy and act in accordance with the path of inflation target. It is thought that central banks under IT could prolong the effect of the main monetary instrument, i.e., interest rates, the benefit which works out to settle the market expectations (Thornton, 2012). Hence, it is widely believed that IT is an inflation expectation anchor (Mishkin, 2004), which leads to decrease inflation uncertainty, and eliminates the volatility of

inflation rates (Drew and Karagedikli, 2008). Indeed, with the privilege of establishing a clear link with the public, and making the economic information available for the market, inflation targeters are ranked among the most transparent central banks in the world (Eijffinger and Geraats, 2006).

The successful implementations of IT across developed and emerging market countries have led monetary authorities and researchers to question adopting this strategy. However, one of the challenges that faces countries which seek to adopt IT is the level of development of monetary institutions and constitutions that may hamper building the credibility of low inflation domestically (Lin and Chu, 2013). Therefore, adopting IT or building the base to move towards a domestic reputation for the price stability goal, particularly in developing and emerging market economies, requires intensive considerations of the economic conditions to assess the level of monetary institutional development, or what kind of reforms should be implemented to successfully manage the transition to the low inflation framework. From the inflation targeters' experience, there are some key features associated with IT framework, agreed among economists to be preconditions for adopting the framework. These preconditions are: central bank independence, transparency, credibility, the existence of a well-developed financial market, and the presence of a stable and predictable relationship between inflation and monetary instruments. This study therefore seeks to assess the effect of inflation targeting on inflations rates in Kenya

2.3.2 Interest Rates

An interest rate is described as the price paid by the borrower for the use of money he does not own, and has to return back to the lender who defers his consumption by lending the money to the borrower. Interest can also be expressed as a percentage of money taken over the period of

one year (Devereux and Yetman, 2002). An interest rate is well stated as the rate of increase over time of a bank deposit. An Interest, which is charged or paid for the use of money, is often expressed as an annual percentage of the principal. It is calculated by dividing the amount of interest charged by the amount of principal. Government policies on inflation directly affects interest rates and as a result, interest rates change often change because of the change in policies. The real interest rate is obtained by subtracting the inflation rate from the nominal interest rate. A negative real interest rate means that the inflation rate is higher than the nominal interest rate (Gagnon and Ihrig, 2004). The central bank of a country keeps check on any major currency fluctuations and volatility in interest rates by manipulating the interest rate. Upward review of interest rates is used to stabilize the depreciating currency and to curb the inflationary pressure and thus helps to avoid the various economic consequences.

2.3.3 Exchange Rate

The exchange rate is one of the most important determinants of a country's relative level of economic health apart from interest rates and inflation. Exchange rates play a vital role in a country's level of trade, which is critical to most free market economy in the world. For this reason, exchange rates are among the most watched analyzed and governmentally manipulated economic measures. Moreover, exchange rates matter on a smaller scale as well since they impact the real return of an investor's portfolio (Gudmundsson, 2012).

According to Mishkin, (2008), the exchange rate of the currency in which a portfolio holds the bulk of its investments has a significant influence on the portfolio's real return. A declining exchange rate works to reduce the purchasing power of income and capital gains derived from any returns. Moreover, the exchange rate influences other income factors such as interest rates,

inflation and even capital gains from domestic securities. Despite the complexity in analyzing the exchange rates, investors and other stakeholders should have some understanding of the important role played by the currency values and exchange rates in the rate of return of their investments. Exchange rates are prices that are determined by supply and demand. For some countries, the exchange rate is the single most important price in the economy because it determines the international balance of payments. (Levich, 2001) There is no general theory of exchange rate determination, but Eiteman et al (2001) divides the potential exchange rate determinants into five areas: parity conditions, infrastructure, speculation, cross-border foreign direct investment and portfolio investment, and political risks.

Generally, the inflation rate is used to measure the price stability in the economy. A low inflation rate scenario will exhibit a rising currency rate, as the purchasing power of the currency will increase as compared to other currencies.

2.4 Empirical studies

This section presents empirical literature on each of the study variables. The literature focuses on relevant studies done on how inflation targeting relates to variables such as: Interest rates, exchange rate, and growth rate. In an early analysis, Da Silva and Portugal (2002) attempted to find out whether inflation targeting improves the macroeconomic performance in Brazil during the (1980 1999) period and based their study on an autocorrelation test of the inflation rate during both periods) before and after inflation targeting. They found that the strategy of inflation targeting positively influences the level of inflation. These economists have tried to introduce other variables such as their model; the growth rate, inflation rate, interest rate, and the real

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exchange rate. The clear result shows that inflation targeting makes a more efficient anchoring of private inflation expectations as that performed by the exchange rate regime.

Mohanty and Michela (2003) in their study found out that, out of the 13 leading emerging economies, only two had not adopted inflation targeting (IT), a related type of rule- based policy. The study found out that inflation targeting leads to a more systematic reaction to inflation. The study mainly concluded that in emerging economies, central banks, most of the time, change short-term interest rate in response to deviations in inflation and exchange rate movements. Beggs (2010), study on the relationship between the macroeconomic policies and inflation, found that in Australia financial deregulation was not compatible with monetary targeting; it was quite compatible with monetary policy and further facilitated a policy based on open market operations and setting up of stable instrument for the future. The study found out that monetary policy tools are very important in ensuring stable markets.

Ball and Sheridan (2005) employ cross-section difference-in- differences ordinary least squares estimation to compare economic improvements in seven OECD IT countries to thirteen OECD NIT countries. They discover that after countries adopt IT, the level and variability of inflation and output growth of these countries do improve. Non-targeting countries, however, also experience these improvements around the same time. They argue that better economic performance reflects factors other than the monetary regime and conclude that IT does not produce a major effect. They also note, however, that adopting IT does not appear to affect the economy negatively.

Rasche and Williams (2005) did a study on the effectiveness of monetary policy. In their analysis they addressed changing views of the role and effectiveness of the monetary policy in inflation targeting. The study found out that central banks were successful in hitting targets for on the medium term horizon. However the study revealed that it was not very clear of the marginal contribution of inflation targeting beyond commitment to price stability. The study also showed that the central banks operate in the environment of many dimensions and uncertainty that it is problematic for consistently short run money stabilization policies. Adam (2009) in his study on the conduct of monetary policy in Uganda, evaluated aspects of the conduct of monetary policy in Uganda with the starting point being the perception held by some that while Uganda had been amongst the most consistently successful countries in Africa in controlling inflation since the early 1990s, this had come at a high fiscal cost and that the conduct of monetary policy had stifled rather than encouraged the development of the financial sector.

Vega and Winkelried (2005), sampled 109 inflation targeting countries of which 23 are developing countries, using the propensity scoring methodology they revealed lower inflation rates when inflation targeting policies were implemented. This is however consistent with earlier conclusions of Corbo et al. (2000), Neumann and von Hagen (2002), and Petursson (2004). A study by Goncalvas and Salles (2008) revealed that inflation lowered from 17% to 6.55% among inflation targeting developing countries between the pre and post inflation era. Consistent with the above Ball and Sheridan (2005) concluded that there were statistically and economically significant reductions in inflation among sampled inflation targeting countries surveyed. This study seeks to compare the trends of inflation rates before the introduction of inflation targeting in Kenya and the period after the introduction of inflation targeting.

Batini and Laxton (2006) examine the macroeconomic impact of inflation targeting on inflation, the volatility of inflation and the growth volatility in 35 emerging countries (13 countries adopting inflation targeting and 22 countries non- inflation targeting) during the (1985-2004) period and based on the Ball Sheridan's method of difference- (2003). The results of the estimate of the inflation targeting effect on the inflation trend are negative and significant. So the emerging countries adopting inflation targeting record a decrease in the average inflation and its volatility. However, there is no significant evidence between inflation targeting and output growth. The current study therefore focuses on how the adoption of inflation targeting affects inflation rate in the developing country context.

Gonçalves and Salles (2008) applied the Ball-Sheridan method to test whether the adoption of IT affects inflation and output growth of developing countries. They show that IT countries lower average inflation (BL and GS), inflation volatility (BL), and output growth volatility (GS) relatively more than non-inflation targeting (NIT) countries. Brito and Bystedt (2010) used panel-data difference and system generalized method of moments (GMM) analysis for 46 developing countries, showing that IT lowers inflation, but at the cost of lower output growth. Additionally, reductions of inflation and output growth volatility prove insignificant. Their findings cast some doubt on the effectiveness of IT for developing countries.

Petursson (2009) tried to find whether a relationship existed between inflation targeting and excessive exchange rate volatility, this is the part of exchange rate fluctuations which are not related to economic fundamentals. A sample of 44 countries was used which were made up of lower-medium income countries to more developed countries. If inflation targeting reduces the

volatility of the excessive exchange rate, the specific currency's shock absorber improves which is also another important effect of inflation targeting. However if inflation targeting rather increases this volatility, then it means that the shock absorber of the currency in question is reduced. This work used a signal-extraction approach in estimating the volatility of the excessive exchange rate. GARCH specifications were used for estimations for each country and a panel model which has inflation targeting nations as the treatment group and the non-targeting nations as the control group was used. The results according to Petursson showed that inflation targeting does not have any effect on the exchange rate volatility that can be backed by evidence. Though the GARCH results showed that volatility increased in some countries after the adoption of inflation targeting but also declined in others. Petursson argues that this may be as a result of the characteristics of the foreign exchange markets as well as the institutional support for inflation targeting but not the adoption of inflation targeting itself.

Barasa (2009) carried out a study on the relationship between inflation and exchange rates in Kenya. Data for a ten year period between 1998 to 2008 was used in the study conducted a study. Granger-Causality test was used to determine whether causal relationship existed between inflation and the exchange rates. The findings of the study revealed that there was a causal relationship between inflation and exchange rates in Kenya for a short run in the use USD and Britain Pound. Furthermore, all the currencies showed a causal relationship with the inflation rates except the Ugandan shilling in the long run. The results therefore showed that inflation differentials can only be used to predict future exchange rates for USD and Britain Pound. The current study fills this gap by including more variables in the model. Additionally the study

failed to analyze the monetary and non-monetary determinants of inflation an area that the current study sought to address.

Odhiambo (2011) did a study to examine the long and short run relationship between investment, inflation and economic growth in Tanzania. ARDL-bounding approach for testing was adopted where the study results revealed that there was unidirectional causal flow from inflation to economic growth. Chimobi (2010) carried out a study on the relationship between inflation and economic growth using VAR granger causality test in Nigeria and found unidirectional causal flow from inflation to growth. Gillman and Nakov (2003) carried out a study in Poland and Hungary where they found that there was a causal relationship from money to inflation and from inflation to growth. Furthermore, Erbaykal and Okuyan (2008) did an analysis of the relationship between inflation and economic growth where they found that there was causal relationship from inflation to economic growth.

Fang, Miller, and Lee (2012) compare the effects of IT on inflation and output growth and their volatilities in eight developed countries and 13 developing countries, addressing short-run and long-run treatment effects. The propensity scoring exercise sheds light on different effects of IT over time in developed and developing countries. First, they find that IT lowers inflation rates for all IT countries. This effect decays and becomes insignificant in the short run in developed countries, but remains significant in developing countries. Second, short-run costs emerge in reduced output growth as well as increased inflation and output growth variabilities in developed countries, but no such costs occur in developing countries. Third, while the short-run costs disappear over time in developed countries, inflation, inflation

variability, and output growth variability remain lower from the short-run to the long-run in developing countries. The present study focuses on Kenya as one of the developing countries with the intention of comparing the inflation rates before and after the introduction of inflation targeting in 2013.

Vargas (2012) conducted a study on inflation targeting in Columbia through monetary policies concluded that in Colombia, monetary policy converged fully fledged inflation targeting with an independent floating regime. The performance of the strategy was found satisfactory overall. Starting from a deep recession the study found that a policy stance that was expansionary led to decline in inflation along the targets, the output had recovered and international reserves had reached levels that limit the external vulnerability of the economy. However, the study found that drawbacks of substantial intervention were difficulty of communicating policy to the public and the market. The study further found that fiscal imbalances posed a credibility and power of the monetary policy through several political channels.

In his research on Ghana, Coleman (2012) used monthly time series data to analyse the effect of Inflation targeting on inflation. Two periods were considered in his work, the pre and the post inflation targeting periods. The pre inflation targeting period was between 1990 and 2001 while the post inflation targeting period was between 2002 and 2008. The data was sourced from the Bank of Ghana and the Ghana Statistical Service. Coleman used a model by Petursson (2004) which he simplified for his work. He used an Autoregressive model of the first order (AR1 model) and used inflation targeting and other macroeconomic variables as exogenous variables. Coleman specified inflation as a function of its first lag and used a dummy to represent inflation

targeting and added a control for external shocks. He used a regression based on Newey-West standard errors because he assumed the error term to be heteroskedastic and also may be correlated and so using ordinary least squares will give inefficient estimates. The results obtained showed a variation in inflation over the two periods. Volatility of inflation was also found to have declined significantly over the two periods with the standard deviation falling from 15.6 to 5.2. This study seeks to do a comparison of 10 year period; five year period before the introduction of inflation targeting in Kenya and five years period after the introduction of inflation targeting.

Tumkou and Caroline (2012) studied the relationship between inflationand interest rates in Kenya. The purpose of the study was to investigate whether there was a relationship between the expected inflation rates and nominal rates of interest in Kenya and to establish whether the hypotheses of Fisher effect hold in the relationship. Secondary data between 1999 and 2011 was used in the study. Regression analysis method was used to analyze the data where it was found partial Fisher effect based on the fact that the inflation rate and interest rates did move with one on-one across the study period. The study however adopted the use of interest rate as the independent variable making it not adequate in explaining the determinants of inflation.

Okoth (2013) carried out a study to assess the effect of interest rate on exchange rates in Kenya. Secondary data were collected from KBS and Central bank where descriptive research design was used. The study covered a period between 2007 to 2012. Multiple linear regression analysis model was used to test the relationship between the variables where a response variable was used by fitting a linear equation from the data. Test of goodness of fit, R^2, test of Multicollinearity and F test ANOVA were also used. The findings revealed that the co-efficient of multiple determinations R-

square value was 0. 871 meaning that the variables under study could explain 87.1%. The study concluded that interest rate increase was necessary to stabilize the exchange rate. In this study, interest rate and exchange rates will be used as control variables in assessing the effect of inflation targeting on inflation rate in Kenya.

Kirimi (2014) carried out a study to establish the determinants inflation rates in Kenya. Data between 1970-2013 was used in the study. Ordinary least square was used to estimate time series data for the period between 1970-2013. The findings of the study revealed a negative relationship between the level of inflation and prices of food. The findings further revealed that exchange rate and the supply of money (M2) and had a positive relationship with the rate of inflation while the growth rate of GDP and perception on corruption had -ve relationship with inflation. The coefficient of wage rate was found to be insignificant as far as the changes in inflation was concerned and at the same time, political instability was found to have no effect on inflation. The present study therefore seeks to fill the existing knowledge gap by assessing the effect of inflation targeting on inflation rate in Kenya

Koila (2016) studied monetary policy effect inflation rates in Kenya. Descriptive research design was adopted for the study where a period of five year was covered (2009-2013). Monetary policy aggregates by the central bank was used the population of interest. The study focuses on variables such as CBR rates, reserve ratios and inflation rates. SPSS was used to analyze the data to realize the study objectives. The findings of the study revealed that there was a significant relationship between inflation and monetary policies. The statistical evidence showed that the coefficients of central bank rate were +ve while that of reserve ratio was -ve. The findings thus implied that there was a -ve relationship between reserve ratio requirement and inflation rate

while the central bank rate was positive. The relationship was suggested to be used in the formulation of a targeted policy aimed at attaining acceptable level of inflation at 5% in Kenya.

2.5 Conceptual Framework

The conceptual Framework below presents the relationship between the study variables. In the framework, the independent variable is inflation targeting with Interest rate and exchange rate as control variables while the dependent variable is the Inflation rate.

Independent Variable

Dependent Variable

| Inflation Targeting |

Control Variables

| Interest Rate |

| Exchange Rate |

| Inflation Rate |
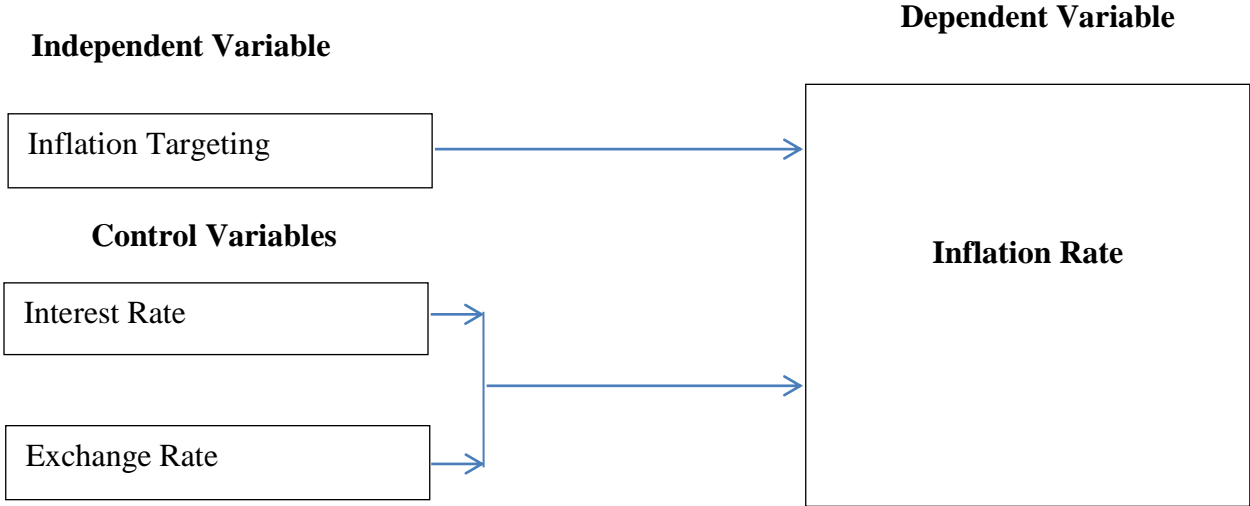
Figure 2.1 Conceptual Model

2.6 Summary of Literature Review

This chapter presented the theories used in the study to explain the relationship between the study variables. Different empirical literature have also been presented to depict on how inflation targeting impacts on inflation control in different economic. This study therefore sought to fill the gap in the literature by assessing the effectiveness of inflation targeting in the developing countries perspective especially in economies like Kenya, which is in the process of transitioning to inflation targeting. A summary of the research gaps as identified in the Literature are presented in Table 2.1 below.

Table 2.1 Summary of Research Gaps

Author of study	Focus of Study	Methodology	Findings	Knowledge Gaps	Focus of current study
Tumkou and Caroline (2012)	Relationship between inflation and interest rates in Kenya.	Descriptive research design was used for the study.	The study found partial Fisher effect based on the fact that the inflation rate and interest rates did move with one on-one across the study period.	Secondary data between 1999 and 2011 was used in the study.	The current study focuses on how inflation targeting impacts on the inflation rate in Kenya
Okoth (2013)	Effect of interest rate on exchange rates in Kenya	Descriptive research design was used where secondary data was used	The study found that interest rate increase was necessary to stabilize the exchange rate.	The study covered a period between 2007 to 2012	The current study focuses on how inflation targeting impacts on the inflation rate in Kenya
Kirimi (2014)	Determinants inflation rates in Kenya	Descriptive research design where secondary data was used	The findings further revealed that exchange rate and the supply of money (M2) and had a positive relationship with the rate of inflation.	Ordinary least square was used to estimate time series data for the period between 1970-2013	The study will focus on a period of 13.5 years i.e between 2005 and June 2018.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This purpose of this study was to determine the effect of Inflation targeting on inflation rates in Kenya. This chapter covered the methodology be used for the study and was organized into subtopics that include, research design, data collection, and data analysis and model specification

3.2 Research design

The study used descriptive research design. Time series empirical data on the variables was used to describe and examine the effect of inflation targeting on the inflation rates in Kenya. Time series can be defined as a succession of observations which are ordered in space or time. The main feature of time series data which makes it important to this research is its trend properties. This is the movements in time series over time. The study covered periods between years January 2005 and June 2018. The analysis involved checking the difference in means for the pre and post inflation targeting periods and also computing the correlation coefficients between the inflation and Inflation targeting, Interest rates, and exchange rates.

3.3 Data collection

This study used secondary data that was sourced from the Central Bank of Kenya (CBK) on the following macroeconomic variables; Inflation rates, Exchange rates and interest rates. The inflation rates represents annual changes on Consumer Price index(CPI), exchange rates represents the percentage change in the monthly average value of the buying rate of USD (CBRT exchange rates determined the previous day) and Interest rate will be given by the 91Day treasury bill rate. The thirteen year period data was analyzed on quarterly basis to study the relationship between inflation and inflation targeting.

3.4 Data analysis

This study used SPSS 21 version for the quantitative analysis. Based on Least Squares Method, multivariate analysis model was adopted for the study and as such multiple regression analysis technique was used to analyze the relationship between the inflation rates and inflation targeting. The analysis was two stage where firstly, the researcher carried out a preliminary analysis, in order to have a general opinion on the influence of inflation targeting on inflation and the performance of the selected macroeconomic variables then followed by regression analysis to confirm the degree of the relationship between inflation and inflation targeting. For the preliminary analysis, the researcher employed descriptive measures and analyzed the mean and standard deviation of the values of Inflation rate, exchange rate and interest rate between the pre and post inflation-targeting periods. The mean gave the arithmetic mean of the macroeconomic variable for the periods before and after inflation targeting whereas the standard deviation measured the variability of these macroeconomic variables. The data was thus divided between periods before inflation targeting (Jan 2005 – Sept 2013) and after (Oct 2013 – June 2018) in order to best assess the impact of Inflation targeting on inflation rate. The researcher used the test of mean differences to ascertain the differences in means of inflation between the pre and post inflation-targeting period. Further analysis involved multiple regression analysis.

3.5 Model specification

The study used multivariate regression model to regress Inflation rate against Inflation targeting, interest rates, and exchange rates as below. The data points for all the variables were based on quarterly periods.

$$Y_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + u_t$$

Where:

Y_t is the Inflation rate (dependent variable)

X_{1t} is the dummy variable for inflation targeting (Takes a value of 0 for pre IT periods and 1 for post IT periods).

X_{2t} is Interest rate

X_{3t} is exchange rate

β_0 is the constant term

β_1, β_2 and β_3 are constants to be estimated from the model

e_t denotes the error term distributed as in $e_t \sim N(0, \sigma^2)$

The dummy variable for the target inflation was assigned a value of zero (0) for periods before Inflation targeting and one (1) for periods after inflation targeting. In the regression analysis based on the above equation, the coefficient of X_t variable gave the effect of inflation targeting on Y_t variable; the inflation rate. Therefore, β_1 was the basic coefficient of the study. The researcher used the least square method to examine if the sign and size of this parameter would satisfy our expectation. This was be done by conducting a test of hypothesis using the model specified above at 5% level of significance.

3.6 Diagnostic tests

Before analyzing the data, it is necessary and important to check whether the variables included in the model fulfill the assumption of normality and whether there is similarity between the independent variables. The test for normality was done using the Shapiro-Wilk test while the test for similarity was done through collinearity statistic.

In addition, the data was also checked for stationarity. According to Tari (2005) Use of non-stationary data might cause the researcher to arrive at deceptive conclusions. Gujarati (1999) defines stationarity as a situation where the mean and the variance of a stochastic process are constant over time and the covariance between the two time periods depends only on the distance or gap or lag between the two time periods and not the actual time at which the covariance is computed. Thus the variables used in our analysis should have a constant mean and constant variance.

Unit root test is the most common way of testing for stationarity and there are varieties of unit root test. The unit root test adopted in this study is the Philips-Perron (1988) test. Philips-Perron test is different and advantageous over the Dickey-Fuller unit root test in that a non –parametric test was developed for the PP test and hence the parameter in the first autoregressive (AR1) process is regulated making it more suitable in situations where there are moving average components in the time series.

If the variables are found to be stationary, the multiple linear regression model can be estimated as highlighted above. If some variables are found to be non-stationary, logarithmic transformations are taken and used in the regression model in order to save the analysis from possible heteroscedasticity and autocorrelation series.

CHAPTER FOUR

DATA ANALYSIS AND RESULTS AND INTERPRETATION

4.1 Introduction

This chapter presents the results and findings obtained from data analysis. The data was collected for thirteen years and six months (Jan 2005 – June 2018) from the Central Bank of Kenya (CBK) to determine the effect of inflation targeting on the inflation rate in Kenya. The data used was quarterly average inflation rates (in %), quarterly average 91Day Treasury bill rate (in %) and KES/USD quarterly Average Exchange. Inflation targeting was assigned a value of 0 for periods before Inflation Targeting (Jan 2005 – Sept 2013) and 1 for periods after Inflation Targeting (Oct 2013 – June 2018.

4.2 Diagnostic Tests

Various diagnostic tests were done on the data before commencing the analysis as detailed below.

4.2.1 Normality Test

Statistical data analysis requires that the data used for analysis should be normally distributed. In order to check whether this assumption is violated a normality test was conducted on the dataset used for the study. Since our data set has 54 elements, we used the Shapiro-Wilk test for our case. The null hypothesis (H0) and alternative hypothesis (H1) for the normality test could be expressed as below;

H0: the data series comes from a normal distribution

H1: the data series does not come from a normal distribution

Table 4.1 Test of Normality for Inflation Rate

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
INFLATION RATE	.219	54	.761	.872	54	.362

a. Lilliefors Significance Correction

Table 4.2 Test of Normality for Interest Rate

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
INTEREST RATES	.217	54	.872	.847	54	.552

a. Lilliefors Significance Correction

Table 4.3 Test of Normality for Exchange Rate

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
EXCHNGE RATE	.131	54	.922	.938	54	.638

a. Lilliefors Significance Correction

From the above tables for tests of normality for inflation rate, Interest rate and exchange rate, the p-values in the sig column are all above our alpha of 0.05 and hence we do not reject the null hypothesis for the three cases and conclude that the data series come from a normal distribution

4.2.2 Multicollinearity Test

Multicollinearity test helps the researcher to determine whether there is similarity between the independent variables. Similarities between the independent variables results in a strong correlation resulting in partial effect of the independent variable on the dependent variable compromising the output.

Based on the coefficient output on table below, the collinearity statistics obtained VIF values of, 2.757, 1.1144 and 2.983 for Inflation targeting, Interest rates and exchange rates respectively. Since the VIF values obtained are between 1 and 10, we conclude that there was no multicollinearity in the data.

Table 4.4 Test of Similarity

Coefficients[a]

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
1 (Constant)	2.852	5.318		.536	.594		
INFLATION TARGETING	-3.143	1.720	-.354	-1.827	.074	.363	2.757
INTEREST RATES	.769	.185	.519	4.160	.000	.874	1.144
EXCHNGE RATE	-6.953E-05	.071	.000	-.001	.999	.335	2.983

a. Dependent Variable: INFLATION RATE

4.2.3 Stationarity Test

The data used for analysis was first tested for stationarity using both the Dicky-Fuller Unit root test and the well as the Philips-Perron (1998) test. The software used for the stationarity test was XLSTAT 2017. Time series data is said to be stationary if the mean and variance are constant over time and the and the value of the covariance between the two time periods depends only on the distance or gap or lag between the two time periods and not the actual time at which the covariance is computed. The use of non-stationary data might cause the researcher to arrive at biased findings or conclusions.

Table 4.5 Unit root test for Inflation Rate

Dickey-Fuller test (ADF(stationary) INFLATION RATE):

Tau (Observed value)	-5.418
Tau (Critical value)	-3.468
p-value (one-tailed)	0.000
alpha	0.05

Test interpretation:
H0: There is a unit root for the series.
Ha: There is no unit root for the series. The series is stationary.

Phillips-Perron test (PP(no intercept)   INFLATION RATE):

Tau (Observed value)	-1.790
Tau (Critical value)	-1.947
p-value (one-tailed)	0.040
alpha	0.05

Test interpretation:
H0: There is a unit root for the series.
Ha: There is no unit root for the series. The series is stationary.

From the above tables since p-values is lower than the significance level alpha=0.05, we reject

the null hypothesis H0, and accept the alternative hypothesis Ha, that the series is stationary.

Table 4.6 Unit root test for Interest Rate

Dickey-Fuller test (ADF(stationary) (INTEREST RATES):

Tau (Observed value)	-3.612
Tau (Critical value)	-3.468
p-value (one-tailed)	0.036
alpha	0.05

Test interpretation:
H0: There is a unit root for the series.
Ha: There is no unit root for the series. The series is stationary.

Phillips-Perron test (PP(no intercept) (INTEREST RATES):

Tau (Observed value)	-0.941
Tau (Critical value)	-1.947
p-value (one-tailed)	0.045
alpha	0.05

Test interpretation:
H0: There is a unit root for the series.
Ha: There is no unit root for the series. The series is stationary.

From the above tables, the p-values is lower than the significance level alpha=0.05 and thus we reject the null hypothesis H0, and accept the alternative hypothesis Ha, that the series is stationary.

Table 4.7 Unit root test for Exchange Rate

Dickey-Fuller test (ADF(stationary) (EXCHNGE RATE):	
Tau (Observed value)	-3.031
Tau (Critical value)	-3.468
p-value (one-tailed)	0.50
alpha	0.05
Test interpretation: H0: There is a unit root for the series. Ha: There is no unit root for the series. The series is stationary.	
Phillips-Perron test (PP(no intercept) (EXCHNGE RATE):	
Tau (Observed value)	1.014
Tau (Critical value)	-1.947
p-value (one-tailed)	0.616
alpha	0.05

Test interpretation:
H0: There is a unit root for the series.
Ha: There is no unit root for the series. The series is stationary.

From the above tables, Dickey-Fuller test concludes that the series is stationary but the Phillips-Perron test concludes otherwise. The analysis was carried out based on the above findings of stationarity including the exchange rate variable since one of the test was positive

4.3 Descriptive Statistics

The table below illustrates the descriptive statistics of the variables for the entire period of the study. From table 4.4 on the descriptive measures, we can see that after the implementation of Inflation Targeting, the average inflation rate went down from 8.88% to 6.69%. On the other hand, interest rates and the exchange rates increased from 7.86% to 9.89% and 77.59% to 97.56% respectively. The standard deviation values of these macroeconomic variables indicate

that variability declined after the implementation of inflation targeting. The measure of variability declined in the inflation rate from 5.04% to 1.61%, which means that inflation rates became more consistent after the adoption of inflation targeting.

Table 4.8 Descriptive measures

	REPORT					
	PRE INFLATION TARGETING			POST INFLATION TARGETING		
	Mean	Std. Deviation	Std. Error of Mean	Mean	Std. Deviation	Std. Error of Mean
INFLATION RATE	8.8820	5.0414	0.8522	6.6890	1.6113	0.3696
INTEREST RATES	7.8514	3.3063	0.5589	9.0884	1.7024	0.3906
EXCHNGE RATE	77.5855	7.7131	1.3037	97.5642	6.7916	1.5581

An independent test statistic was also done to determine if the difference in the means of Inflation rate between the two periods at 5% level of significance was statistically different. From the group statistics box below, the mean for inflation pre-inflation targeting is 8.88% and the mean post-inflation targeting is 6.89%. The standard deviation before inflation targeting is 5.04% after inflation targeting is 1.61%.

Table 4.9 Group Statistics

Group Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Pre-inflation targeting	35	8.882	5.0414	.8522
Post-inflation targeting	19	6.689	1.6113	.3696

The null hypothesis (H0) and alternative hypothesis (H1) of the Independent Samples *t* Test being tested could be expressed as below;

H0: $\mu 1 = \mu 2$ ("the Inflation mean pre-IT and Post-IT are equal")

H1: $\mu 1 \neq \mu 2$ ("the Inflation mean pre-IT and Post-IT not equal")

From the Sig column, since p < .001 is less than our chosen significance level $\alpha = 0.05$, we reject the null hypothesis, and conclude that the mean inflation rate pre-inflation targeting is significantly different from the mean inflation rate post-inflation targeting.

Table 4.10 Independent Sample Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
									Lower	Upper	
INFLATION RATE	Equal variances assumed	30.942	0	1.839	52	0.07163	2.19327	1.19265	-0.2	4.58650	
	Equal variances not assumed			2.361	44.99	0.02261	2.19327	0.92888	0.3224	4.06414	

This is further supported by the curve on inflation figures over the thirteen-year period that shows consistent decline in inflation from the year 2013.

Table 4.11 Historical Inflation
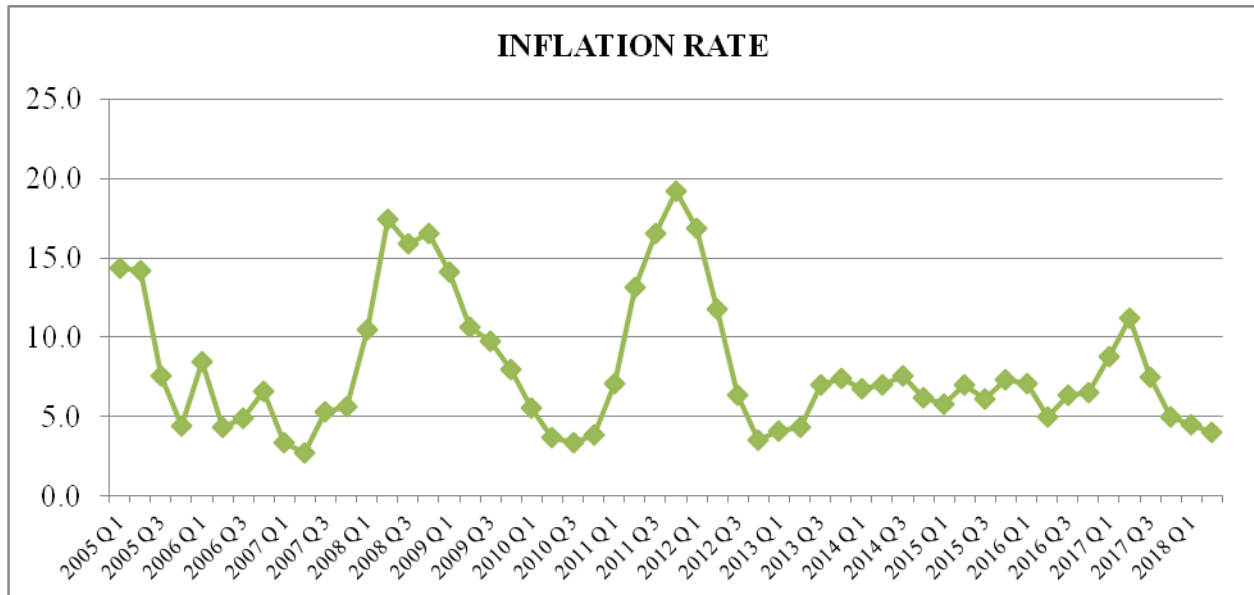
4.4 Regression Analysis

From the model summary table below a value of 0.749 for R indicates a good level of prediction for our model. In addition, the value of 0.561 for the "R Square" column shows the proportion of variation accounted for by the regression model. This means that our independent variables explain 56.1% of the variability of our dependent variable; the inflation rate.

Table 4.12 Model Summary

Model Summary			
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.749[a]	.561	.515	3.6345

a. Predictors: (Constant), EXCHNGE RATE, INTEREST RATES, INFLATION TARGETING

4.5   Statistical Significance

The F-ratio in the ANOVA table below tests whether the overall regression model is a good fit for the data. Since the Sig. value is less than 0.05 at 5% significance level, this implies that the regression model is a good fit of the data.

Table 4.13 ANOVA Table

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	309.643	3	103.214	7.814	.000[b]
1	Residual	660.472	50	13.209		
	Total	970.115	53			

a. Dependent Variable: INFLATION RATE

b. Predictors: (Constant), EXCHNGE RATE, INTEREST RATES, INFLATION TARGETING

4.6 Model Coefficients

The unstandardized coefficients indicate how much the dependent variable varies with an independent variable. From the regression analysis performed in this data, the coefficient of Inflation targeting was negative (as expected from the test of mean difference above) which means that it had an impact to reduce inflation.   From the coefficients table below, the unstandardized coefficient, β_1, for inflation targeting is equal to -3.143. This means that the change to inflation targeting causes a decrease in inflation rates by 3.143%.

Table 4.14 Model Coefficients

		Coefficientsª						
Model+		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.852	5.318		.536	.594	-7.829	13.534
	INFLATION TARGETING	-3.143	1.720	-.354	-1.827	.074	-6.597	.311
	INTEREST RATES	.769	.185	.519	4.160	.000	.398	1.140
	EXCHNGE RATE	-6.953E-005	.071	.000	-.001	.999	-.143	.143

a. Dependent Variable: INFLATION RATE

Thus, the general form of the equation to predict inflation rate from Inflation targeting, Interest rates and exchange rates, is:

Inflation rate = 2.85 – (3.14 x Inflation targeting) + (0.77 x Interest rate) – (0.000069 x Exchange rate)

From the "Sig." column above, all independent variable's coefficients are statistically significantly different from 0 (zero) and hence these variables are significant predictors of inflation rate as per the above model.

4.7 Discussion of Findings

Kenya adopted inflation targeting in 2013 as a key monetary policy pillar and an anchor of public expectations the future of inflation. This was evidenced by the CBK's monetary goal of maintaining the government's price stability inflation target of 5% with a band of 2.5% above or

below the targeted rate. Bernanke et al. (1999) defined inflation targeting (IT) as a framework for monetary policy characterized by the public announcement of official quantitative targets or target ranges for the inflation rate over one or more time horizons. The main objectives of inflation targeting are to reduce the volatility of inflation and lower inflation rates by keeping them within the given range.

Previous research has indicated that the adoption of inflation targeting results to reduced levels of inflation. Mishkin and Schmidt-Hebble (2007) did a study on a cohort of inflation targeting countries while using another group non-inflation targeting countries as control and concluded that inflation targeting helps countries to achieve lower inflation rate and inflation variability compared to non-inflation targeting countries. Lin and Ye(2009) studied inflation targeting on thirteen countries and their results indicated that inflation targeting led to a reduction in the level of inflation by about 3% and also significantly reduced inflation variability

The findings of this study confirmed that for Kenyan case, the adoption of inflation targeting resulted in reduced levels of inflation and also reduction in the volatility of inflation rates. The descriptive analysis of inflation rates before and after the adoption of inflation targeting revealed that the average inflation rate reduced from 8.9665 before inflation targeting to 6.156% after the adoption of inflation targeting. This translates to 24.7% reduction inflation rates after the adoption of inflation targeting. This reduction is significant as was confirmed by statistical test for independent means that the mean before inflation targeting is significantly and statistically different to the mean after inflation targeting.

The findings of this study also the revealed that variability of inflation rate reduced significantly over the two periods. Inflation rate volatility before inflation targeting was 5.0414% compared to

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1.6133 after inflation targeting. These finding were similar to other findings in Africa where Coleman (2012) conducted a study on Inflation targeting in Ghana. From his findings, he concluded that variability of inflation rates declined significantly over the two periods from 15.6% to 5.2%. The study findings thus conclude by answering the research question that Inflation targeting has had the effect of reducing inflation rate and inflation volatility in kenya

CHAPTER FIVE

SUMMARY CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter summarizes the study and makes conclusions based on the results highlighted form the findings. The chapter outlines the summary of the findings and conclusions, policy implications and recommendations from the findings, limitations of the study and suggestions for further studies.

5.2 Summary of Findings

This study set to determine the effect of inflation targeting on the inflation rate in Kenya. The study began by giving a theoretical background to inflation targeting followed by a detailed aspect of inflation targeting around the world and in Kenya. Chapter two of the study detailed the theoretical background to the conduct of inflation targeting by covering theories underpinning this study and how they would be used in the study. This chapter also reviewed empirical literature on inflation targeting highlighting the studies done and their findings on the topic of study.

This was followed by chapter three, which outlines the methodology used for the study and gave an idea of how the analysis would be done. The next part was chapter four, which covered the analysis of data for the study. The analysis was carried out on four variables namely; inflation rates given by the change in the consumer price index, exchange rates given by the average value of the buying rate of USD and Interest rate given by the 91-Day Treasury bill rate. The first part of the analysis involved descriptive statistics by comparing the means and variance of inflation rate between the pre-inflation targeting era and the post-inflation targeting era. The results showed

that the average inflation rates as well as inflation volatility were reduced after the adoption of inflation targeting. The t-test was used to confirm the significance in the difference of means between the two periods. This confirmed that inflation targeting has had an impact of reducing inflation rates in Kenya.

The second part of the analysis involved regression analysis in order to determine the degree of the relationship between inflation targeting and inflation rate.

From the regression equation, important variable was the inflation-targeting dummy and its coefficient was of great interest here. The value of the inflation dummy coefficient was negative signifying a negative relationship between the adoption of inflation targeting and the inflation rate. The regression analysis thus bolstered the findings in the descriptive analysis that indeed Inflation targeting has had a negative and statistically significant impact on the inflation rate.

5.3 Conclusions

This study sought to determine the effect of inflation targeting on the inflation rates in Kenya. From the analysis, the study found out that Inflation targeting has had the effect of reducing inflation rates in Kenya. This implies that inflation targeting as a form of monetary policy has achieved the objective for which the Central Bank of Kenya intended. The study also found out that volatility of inflation rates has also significantly reduced since the adoption of inflation targeting. This is a very important aspect to the economy since it reduces the uncertainty surrounding the movement of inflation rates and it also the CBK's monetary policy more control on the likely path of inflation rates.

5.4 Policy Recommendation

From this study, Inflation targeting has been effective in lowering inflation rate and maintaining stability in general price levels. With this success, Inflation targeting should not be limited but further developed with greater goals beyond inflation. The Central Bank of Kenya should incorporate the critical principles of transparency and accountability brought about by the adoption inflation targeting to in generating investments and economic benefits.

Also despite the level of inflation reducing over the years after the adoption of inflation targeting, it still seems to be high compared to the theoretical levels of optimal inflation rates. This study therefore recommends that the policy makers should also explore other channels of maintaining stable foreign exchange to ensure optimal inflation levels are attained.

5.5 Limitations of the Study

This study relied on secondary data for the analysis. However, part of the data set required for study was not readily and publicly available and hence the researcher had to liaise with the relevant authority to access the same. In addition, the data provided was for monthly periods and therefore the researcher had to convert the same to quarterly movements in order to fit the data points in the study design.

Another limitation for the study is the time period covered for the study. Since Kenya started the transitional journey towards inflation targeting in the year 2013, this meant that the researcher could only cover five years post inflation targeting era for the study.

This study was carried the study at a macro level meaning the impact of inflation targeting was being assessed in relation the Kenyan economy. However, Inflation rate affects many parameters of the economy more so at household level. The study thus doesn't bring out the impact of

inflation targeting to Kenyans at individual household level or even to the performance of companies in Kenya.

The study also explored only one model for the analysis, namely the regression model. The regression model has been widely used in research giving little focus to alternate models which would equally bring out the study findings.

Another limitation would arise from the number of variables used for the study. Inflation rate has diverse implications in an economy and consequently many parameters in an economy are affected. This study only focused on three factors namely the targeting of inflation, interest rate and exchange rate.

5.6 Suggestions for Further Study

Future studies should consider a different methodological approach to the study and especially in the analysis of data and establish whether similar results would still be obtained. This will help strengthen the findings of this study.

In addition, a study on this topic should be considered in the future after lapse of sometime in order to have a longer period after the adoption of inflation targeting to cover in the study. Currently, Inflation targeting has been inexistence for five years and it would be imported to see whether the findings obtained in this study would still hold when looking at ten years of historical data on inflation targeting. Furthermore, longer periods will enable the researcher to use annual data points, which might be more appropriate because short-time frame data tends to remains constant over a period.

Further study is also suggested for this topic of study but on a micro level in the economy. Since inflation affects different stakeholders at an individual level, it would also be important to see

how households are affected by the adoption of inflation targeting. For example, it will be important to find out the effect of inflation targeting on the performance an individual companies in the fast moving consumer goods sector whose clients are highly sensitive to price movements.

Future studies should also consider adopting more variable in the model for the study since inflation affect many parameters in an economy. By using more variables, future studies will contribute towards refinement of these findings by providing a more holistic effect of inflation targeting in the economy.

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APPENDICES

Appendix 1. Data on Inflation (Consumer price Index changes) Base period February 2009=100

Year	Quarter Ending	CPI	Inflation Rate
2005	March	70.41	14.3
	June	73.22	14.2
	September	73.23	7.5
	December	73.43	4.4
2006	March	76.35	8.4
	June	76.39	4.3
	September	76.80	4.9
	December	78.27	6.6
2007	March	78.90	3.4
	June	78.46	2.7
	September	80.90	5.3
	December	82.68	5.6
2008	March	87.18	10.5
	June	92.14	17.4
	September	93.75	15.9
	December	96.38	16.6
2009	March	99.50	14.1
	June	101.91	10.6
	September	102.90	9.8
	December	104.07	8.0
2010	March	105.01	5.5
	June	105.65	3.7
	September	106.32	3.3
	December	108.07	3.8
2011	March	112.41	7.0
	June	119.56	13.2

	September	123.88	16.5
	December	128.81	19.2
2012	March	131.36	16.9
	June	133.63	11.8
	September	131.78	6.4
	December	133.35	3.5
2013	March	136.72	4.1
	June	139.46	4.4
	September	140.99	7.0
	December	143.25	7.4
2014	March	145.99	6.8
	June	149.27	7.0
	September	151.62	7.5
	December	152.09	6.2
2015	March	154.48	5.8
	June	159.71	7.0
	September	160.93	6.1
	December	163.27	7.4
2016	March	165.45	7.1
	June	167.68	5.0
	September	171.12	6.3
	December	173.89	6.5
2017	March	179.96	8.8
	June	186.42	11.2
	September	183.99	7.5
	December	182.55	5.0
2018	March	188.03	4.5
	June	193.85	4.0

Appendix 2.   Data on 91 treasury bills rate (% Annual Interest rates)

YEAR	Period	91-Day T-Bill Rate
2005	Quarter 1	8.49
	Quarter 2	8.61
	Quarter 3	8.61
	Quarter 4	8.03
2006	Quarter 1	7.95
	Quarter 2	6.88
	Quarter 3	6.1
	Quarter 4	6.32
2007	Quarter 1	6.18
	Quarter 2	6.65
	Quarter 3	7.06
	Quarter 4	7.31
2008	Quarter 1	7.04
	Quarter 2	7.61
	Quarter 3	7.91
	Quarter 4	8.24
2009	Quarter 1	7.77
	Quarter 2	7.37
	Quarter 3	7.26
	Quarter 4	7.1
2010	Quarter 1	6.25
	Quarter 2	4.12
	Quarter 3	1.82
	Quarter 4	2.2
2011	Quarter 1	2.61
	Quarter 2	5.85
	Quarter 3	10.05

	Quarter 4	16.41
2012	Quarter 1	19.35
	Quarter 2	12.43
	Quarter 3	10.22
	Quarter 4	9.03
2013	Quarter 1	8.78
	Quarter 2	8.68
	Quarter 3	8.51
	Quarter 4	9.73
2014	Quarter 1	9.13
	Quarter 2	9.14
	Quarter 3	8.82
	Quarter 4	8.63
2015	Quarter 1	8.56
	Quarter 2	8.31
	Quarter 3	12.24
	Quarter 4	14.6
2016	Quarter 1	10.24
	Quarter 2	8.11
	Quarter 3	7.57
	Quarter 4	8.14
2017	Quarter 1	8.64
	Quarter 2	8.64
	Quarter 3	8.17
	Quarter 4	8.04
2018	Quarter 1	8.03
	Quarter 2	7.94

Appendix 3.   Data on USD /Ksh Exchange Rate

Year	Quarter	USD/KES
2005	Quarter 1	76.55
	Quarter 2	76.42
	Quarter 3	75.38
	Quarter 4	73.84
2006	Quarter 1	72.11
	Quarter 2	72.21
	Quarter 3	73.12
	Quarter 4	71.04
2007	Quarter 1	69.60
	Quarter 2	67.42
	Quarter 3	67.02
	Quarter 4	65.56
2008	Quarter 1	67.90
	Quarter 2	62.64
	Quarter 3	68.52
	Quarter 4	77.62
2009	Quarter 1	79.61
	Quarter 2	78.44
	Quarter 3	76.26
	Quarter 4	75.14
2010	Quarter 1	76.51
	Quarter 2	78.97
	Quarter 3	80.94
	Quarter 4	80.58
2011	Quarter 1	82.31
	Quarter 2	86.20
	Quarter 3	93.06

Year	Quarter	Value
	Quarter 4	93.86
2012	Quarter 1	84.12
	Quarter 2	84.17
	Quarter 3	84.27
	Quarter 4	85.54
2013	Quarter 1	86.74
	Quarter 2	84.59
	Quarter 3	87.24
	Quarter 4	85.88
2014	Quarter 1	86.33
	Quarter 2	87.25
	Quarter 3	88.24
	Quarter 4	89.85
2015	Quarter 1	91.53
	Quarter 2	97.25
	Quarter 3	102.76
	Quarter 4	102.37
2016	Quarter 1	101.90
	Quarter 2	101.04
	Quarter 3	101.34
	Quarter 4	101.74
2017	Quarter 1	103.39
	Quarter 2	103.36
	Quarter 3	103.51
	Quarter 4	103.37
2018	Quarter 1	101.86
	Quarter 2	100.75