



Effect of Monetary Policy Rate Announcements on Stock Prices in Zambia

A Thesis
presented to

The Graduate School of Business
University of Cape Town

In Partial Fulfilment
of the requirement for the
Master of Commerce in Development Finance Degree

by
Ireen Nunsa Samate

December 2016

Supervised by: Lungelo Gumede



The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.

PLAGIARISM DECLARATION

I know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own.

I have used a recognised convention for citation and referencing. Each significant contribution and quotation from the works of other people has been attributed, cited and referenced.

I certify that this submission is my own work.

I have not allowed and will not allow anyone to copy this essay with the intention of passing it off as his or her own work

Ireen Nunsa Samate

Signed by candidate

ABSTRACT

In many countries including Zambia, stock markets are perceived to be crucial for economic development because of the financial intermediary role that they have assumed in the financial system. Stock markets are sensitive to the arrival of new information, especially those that are macroeconomic like monetary policy announcements. This study sought to determine the extent to which the Lusaka Stock Exchange reacts to monetary policy actions by examining the response of all companies listed on the stock exchange to policy rate announcements, with the exception of ZCCM holdings. The study also aimed to look at the differential response of bank stock returns to policy rate announcements. In order to examine the impact of the policy rate announcement on the Lusaka Stock Exchange, the event study methodology was adopted to analyse data from January 2011 to June 2016. The data was collected from the LuSE daily trading reports and monetary policy publications from the Bank of Zambia. It was found that the policy rate announcement has an insignificant negative impact on stock prices in the event of a policy rate increase and an insignificant positive impact on stock prices when the policy rate is maintained. Similar findings were observed for bank stock prices and non-bank stock prices. The impact of the policy rate on stock prices has important implications for the monetary policy transmission mechanism, risk and investment management strategies of financial market participants, as well as government policy and actions towards financial markets. This study makes a unique contribution to existing literature because it is the only study in Zambia to have measured the impact of monetary policy on stock prices using the event study approach.

TABLE OF CONTENTS

PLAGIARISM DECLARATION	i
ABSTRACT	ii
TABLE OF CONTENTS	iii
ACKNOWLEDGEMENTS	v
CHAPTER ONE – INTRODUCTION AND BACKGROUND TO THE RESEARCH	1
1.1 Introduction	1
1.2 An Overview of the Lusaka Stock Exchange (LuSE)	2
1.2.1 Structure, Operations and Regulation	3
1.2.2 Main Characteristics	3
1.3 Problem Definition	6
1.4 Research Questions	7
1.5 Research Objectives	7
1.6 Hypothesis	8
1.7 A Brief on the Methodology	8
1.8 Significance of the Research	9
1.9 Conclusion	9
CHAPTER TWO – LITERATURE REVIEW	10
2.1 Introduction	10
2.2 The Concept of the Monetary Policy Rate	10
2.3 The Effect of the Monetary Policy Rate on Stock Prices	12
2.4.1 Efficient Market Hypothesis	14
2.4.2 Dividend’s Valuation Theory	14
2.4.3 Sharpe’s Capital Asset Pricing Model	15
2.5 Empirical Evidence	16
2.5.1 Evidence from Developed Countries	17
2.5.2 Evidence from Developing Countries	19
2.5.3 Effect of the Policy Rate on Bank Stock Returns	22
2.6 Conclusion	24
CHAPTER – THREE RESEARCH METHODOLOGY	26
3.1 Introduction	26
3.2 Selection of Key Variables	26
3.3 Data Collection and Sampling	26
3.3.1 Data Collection	26

3.3.2 Data Sampling	27
3.4 Data Analysis Tools	27
3.5 Background of the Event Study Methodology	27
3.6 Steps for an Event Study	28
3.6.1 Event Definition	28
3.6.2 Event and Estimation Window	29
3.6.3 Calculation of Index Returns	30
3.6.4 Estimation of the Normal Returns	30
3.6.5 Measuring the Abnormal Returns	31
3.6.6 Measuring the Average Abnormal Returns (AAR)	31
3.6.7 Measuring the Cumulative Average Abnormal Returns (CAAR)	32
3.6.8 Test for Significance	32
3.6.9 Hypothesis Testing	32
3.6.10 Limitations of the Event Study	32
3.7 Conclusion.....	33
CHAPTER FOUR – DATA ANALYSIS AND DISCUSSION OF FINDINGS	34
4.1 Introduction	34
4.2 Major Findings and Implications.....	34
4.2.1 Results for all Sampled Listed Companies	34
4.2.2 Results for Bank Stock Returns	37
4.2.3 Results for Non-bank Stock Returns	40
4.3 Testing the Hypothesis	43
4.4 Relating the Major Findings to Theory	44
CHAPTER FIVE – CONCLUSIONS AND RECOMMENDATIONS	46
5.1 Major Findings and Implications.....	46
5.2 Limitations of the Research.....	48
5.3 Conclusion and Recommendations for Future Research.....	48
6.0 REFERENCES	50
7.0 APPENDICES.....	57

ACKNOWLEDGEMENTS

The completion of this dissertation has only been possible with the grace of the Lord God Almighty, to whom I am grateful.

I dedicate this dissertation to my family; firstly to my dear husband Kapepula Mweemba, my mother and my sister for their emotional and physical support through it all, and secondly to my daughter Lubomba and my niece Gloria who endured moments without me so that I could work on the dissertation.

I am grateful to my supervisor Mr. Lungelo Gumede for his patience, guidance, motivation and making it possible for me to complete this dissertation.

My gratitude also goes to Professor Paul Alegidede for enlightening me about event studies and to Professor Sichelwe Kasanda for his insightful comments.

To my course mates, Lerato Riba, Andrew Muyaba and Larry Anderson, I could not have found better people to run this race with. Your encouragement gave me strength to carry on when I was on the verge of giving up.

I also express my gratitude to everyone who in one way or another helped me to get through with the dissertation. It stands as a testimony of your support.

CHAPTER ONE – INTRODUCTION AND BACKGROUND TO THE RESEARCH

1.1 Introduction

There is an increasing attachment to financial sector development and deepening in the world today because of the perceived influence of financial intermediation on economic development. The financial sector is seen to play a critical role in facilitating economic growth and broadening access to finance by mobilising savings, reducing liquidity risk, providing a vehicle for risk diversification and promoting efficient allocation of resources (Zhuang et al. 2009). The emphasis that well-functioning financial intermediaries are crucial for sustained economic growth is now on stock markets and their effects on the economy as noted by Levine and Zervos (1996). The Zambian financial sector has recorded considerable developments since Zambia gained independence in 1964. During that time, the financial sector comprised of bank and non-bank financial institutions providing debt finance. There was no other alternative source of capital because the capital market did not exist. The then government had adopted a socialist economic model with all forms of capital being owned by the government. In 1992, Zambia initiated financial reforms as part of the broader economic reform package. “The reforms were in recognition that a well-functioning and competitive financial system is critical to the country’s overall economic development” (Simpasa, 2013, p. 6).

In an effort to further develop the financial sector through the capital market, the government established the Lusaka Stock Exchange (LuSE) and the Securities Exchange Commission (SEC) in 1993. The establishment of the stock exchange was critical to the success of the privatisation of state owned companies, and was also expected to facilitate foreign direct investment as well as broaden the capital base by enabling businesses to raise relatively cheaper long term capital in the form of equity. LuSE has shown some growth, though not significantly as evidenced by the small number of listed companies and thin trading characteristics. It is one of the few stock exchanges trading automatically in Africa with a market capitalisation of 64.3 billion ZMW (5.849 million US dollar) as at December 2015 (LuSE Annual Report 2015).

Empirical evidence suggests that stock markets respond to many internal or external variables which may positively or negatively affect their performance. Internal variables are company specific in nature, such as a change in the performance of the company, its dividend policy, management or key staff such as the chief executive officer, rumours of acquisitions or even

threats of a takeover. External variables include key government actions and macroeconomic indicators such as interest, exchange and inflation rates. Not only will the stock market be affected by movements in these variables but also by any news related to them, and by the future expectations of financial market participants.

The monetary policy rate is one of the key macro-economic variables that has sparked research interest in its relationship with stock prices and the impact of its announcement on the stock market. Finance institutions borrow money from the Central Bank at this rate for liquidity needs. The policy rate affects equity prices through its effects on interest rates, the level of money supply in circulation, inflation, and the financial market participants' expectations about future economic activity. The effect of monetary policy actions on equity prices is further linked to the real economy because changes in stock prices have investment and consumption spending implications.

There is a hypothesised inverse relationship between interest rates and stock prices, such that an increase in interest rates resulting from restrictive monetary policy is expected to reduce stock prices. This inverse relationship is supported by some stock valuation models such as the Discounted Cash Flow Model, Gordon's Dividend Valuation Model and the Capital Asset Pricing Model. According to these theories, interest rates affect stock prices through the interest rate channel by altering the discount factor and making fixed income securities more attractive to holding stocks, as well as influencing market participants' expectations of future economic activity.

1.2 An Overview of the Lusaka Stock Exchange (LuSE)

“The Lusaka Stock Exchange was established in 1993 with the help of the International Finance Corporation and the World Bank which provided preparatory technical support” (Mulunda, 2007, p.2). It officially opened for trading on 21st February 1994. The establishment of LuSE was part of the broader economic reform package, seen as critical to the privatisation of state owned companies. The stock exchange was also expected to facilitate foreign direct investment, enable savings by empowering citizens through ownership of shares and to broaden the capital base by enabling businesses to raise relatively cheaper long term capital in the form of equity.

1.2.1 Structure, Operations and Regulation

“LuSE is the principal stock exchange in Zambia, licenced for dealing in equities (shares), bonds and other securities in accordance with the Securities Act No. 38 of 1993” (Mulunda, 2007, p.6). It operates as a unified primary and secondary market and is regulated by the Securities Exchange Commission (SEC). The exchange is incorporated as a non-profit limited liability company “with a core mandate to provide a fair and efficient platform for raising capital through transparent and equitable trading of listed securities” (Mbao, 2005, p.13). It also ensures protection of investors from unscrupulous market players. LuSE received financial support from the government until 2009, when its sustainability became dependent on the proceeds from its operations.

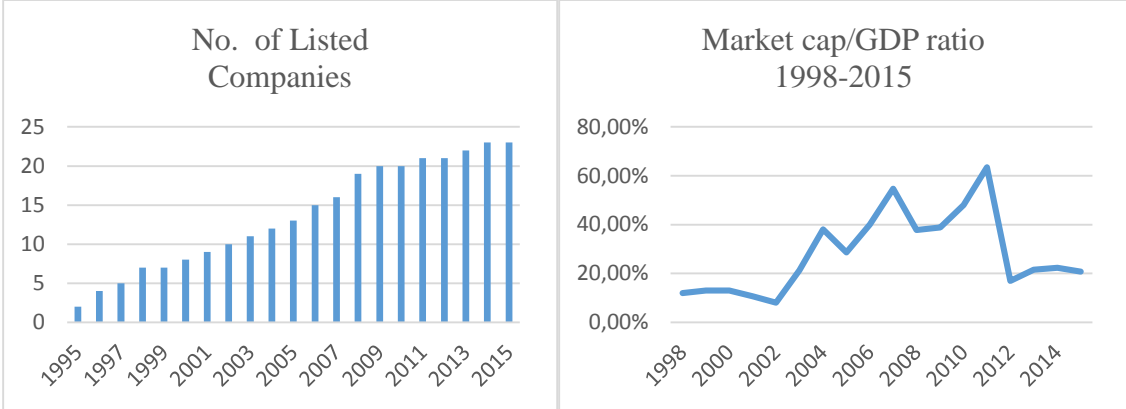
1.2.2 Main Characteristics

The development of a stock market cannot be measured by a single variable as noted by Levine and Kunt (1996). However, there are some identifiable indicators that can measure all aspects of stock market development and these include the following:

1.2.2.1 Stock Market Size

The size of a stock market is measured by the number of listed companies, capitalisation ratio and concentration. A well-developed stock market is characterised by a large number of listed companies and a high capitalisation ratio. LuSE now has 23 listed companies and the capitalisation ratio was at 20.76% as at December 2015. LuSE’s market capitalisation increased from 436 million US\$ in 1994 to 5 849 million US\$ in 2015. The low capitalisation ratio indicates that debt finance is still the principal source of finance for most borrowers. The stock exchange is also highly concentrated with only a few companies accounting for a larger ratio of the market capitalisation. Shoprite alone accounted for 50% of the stock exchange’s market capitalisation as at 31 December 2015. These statistics show that the stock exchange is still relatively small. The graph below shows LuSE’s listing trend and the capitalisation ratio from 1995 to 2015.

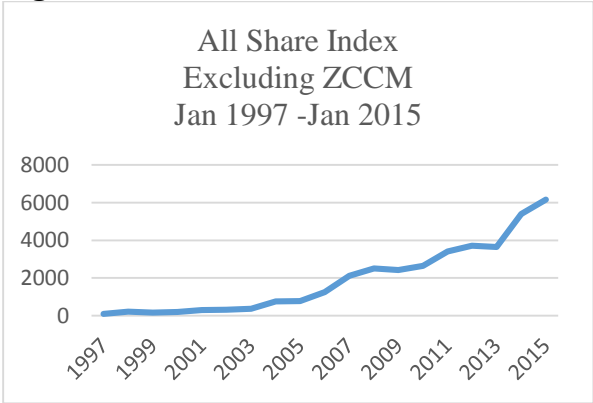
Figure 1.1 Stock market size indicators



1.2.2.3 All Share Index

The All Share Index is a broad measure of the movement share prices. LuSE’s All Share Index is referred to as the Lusaka All Share Index (LASI). The LASI was introduced in 1997 with a 100 points Base Value. It was at 6 160.66 points in January 2016. The fluctuations in the all share index are attributed to share price and market capitalisation movements. LuSE uses two (2) indices, one that excludes the market capitalisation of Zambia Consolidated Copper Mines Investment Holdings (ZCCM-IH) and one that includes it. The LASI excluding ZCCM-IH is preferred because there is little trade for the ZCCM-IH shares. The graph below shows the trend in the movement of the LASI excluding ZCCM-IH from 1997 to 2015.

Figure 1.2 All share index trend

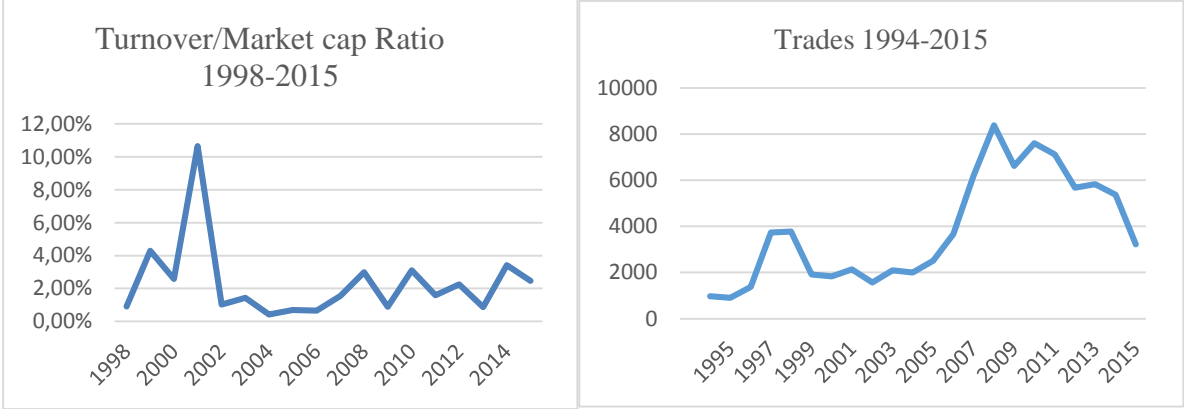


1.2.2.4 Stock Market Liquidity

Liquidity is a measure of the ability to easily buy and sell shares. Measures of stock market liquidity include the turnover/market capitalisation ratio and the number of trades. The turnover/market capitalisation ratio was 2.47% as at December 2015. There has not been significant improvement in the turnover/market capitalisation ratio since the establishment of the stock exchange. Also, the declining trend in the number of trades shows that the stock

market is highly illiquid. The figure below shows the trend in some of LuSE’s liquidity indicators.

Figure 1.3 Stock market liquidity indicators



The stock exchange has grown but not significantly as evidenced by the indicators above and in comparison to stock markets in other developing countries as shown in Table 1.1 below. The Lusaka Stock Exchange is characterised by very few listed companies and it is generally illiquid with thin trading and a low free float of shares. The stock exchange is also highly concentrated. In his study, Marone (2003, p.25) found that the stock exchange’s development is affected by the low rate of domestic savings, high return on treasury bills, low participation of institutional investors, and the low supply of stocks. He further notes that the performance of LuSE is a “function of a weak economic environment and less of the legal and technical constraints on the exchange”. Despite this, LuSE’s continued existence could have important implications for Zambia’s economic development.

Table 1.1 Stock market indicators for some developing countries as at December 2011

Country	No. of Listed companies	MKT cap ratio	Turnover ratio
Chile	229	107,76	18,97
Egypt	231	20,7	32,54
Ghana	29	7,83	8,2
India	5112	55,47	64,08
Indonesia	440	43,69	27,04
Kenya	58	24,32	8,99
Malawi	14	17,29	3,2
Malaysia	932	132,78	32,94
Mauritius	63	69,72	6,5
Mexico	128	34,89	24,41

Morocco	75	59,28	6,81
Nigeria	196	9,48	9,92
South Africa	347	189,4	28,62
Thailand	545	72,44	80,18
Tunisia	57	21,09	10,87
Uganda	8	38,13	0,361
Zambia	20	13,57	0,64

Source: World Bank data base.

1.3 Problem Definition

Monetary policy is one of the government's most important economic tools, with its major goal being to attain financial stability. This can be achieved by controlling money supply through targeting the interest or inflation rate and by use of monetary aggregates. One of the tools used by the Central Bank to influence the money supply in circulation is the monetary policy rate (sometimes referred to as the discount rate or repo rate). "It is the rate at which the Central Bank lends money to finance institutions for short term liquidity needs" (Talreja, 2014, p.93). The "policy rate also signals the price of credit in the market by serving as a benchmark for the level of short - term interest rates" such that any shifts will influence interest rates on overdrafts and loans extended by the banks, thereby affecting their lending activities and consequently altering the money supply in circulation (Matemilola, Bany-Arifin and Muhtar, 2014, p. 54).

"Stock prices are among the most closely monitored asset prices because of their sensitivity to the arrival of new information" (Ioannidis and Kontonikas, 2006, p. 1). This sensitivity can cause price volatility and lead to stock market bubbles which can be damaging for the economy. Stock prices are particularly sensitive to macroeconomic announcements because the "monetary environment is an important determinant of the investor's required rate of return" and investors generally take into consideration the required rate of return when making investment decisions (Hojat, 2015, p. 3).

One of the major macroeconomic announcements worldwide is that of the monetary policy. Consistent with the Efficient Market Hypothesis (EMH), prices are expected to incorporate all available information including anticipated changes in the monetary policy rate. Therefore, news about already anticipated monetary policy rate changes is unlikely to trigger any stock market reaction unless the policy changes are different from what was anticipated. In that case, the stock market reaction, if any should influence the behaviour of stock prices. Empirical

evidence suggests that the immediate impact of the policy rate on commercial bank operations is because of its effect on the lending activities of financial institutions. As such, it is apparent that the impact of the policy rate announcement is more on bank stock returns than on non-bank stock returns. There is a hypothesised inverse relationship between interest rates and stock market prices such that an increase in the policy rate is expected to negatively affect stock prices, causing them to fall. Reducing the policy rate is expected to have a positive impact on the stock prices while the stock market should behave as usual in the event that it is maintained.

The response of a “stock market to monetary policy depends not only on its efficiency but on the degree of development of the financial system and the equity culture” (Sourial, 2002, p. 1). While there has been considerable growth in the capitalisation ratio of stock markets in emerging countries since the early 1990s, most of these stock markets, particularly in sub-Saharan Africa are still considered to be in their early stages of development because of the low level of financial intermediary development, and that the stock markets are small, characterised by few listed companies, low liquidity and thin trading as observed by Yartey and Adjasi (2007). Henceforth, it is apparent that the response of emerging stock markets to monetary policy, especially those in sub-Saharan Africa could be different from that of the more mature stock markets in developed countries. The aim of this research is to determine the extent to which monetary policy rate announcements affect the behaviour of stock prices for companies listed on the Lusaka Stock Exchange which is still in its infancy.

1.4 Research Questions

In view of the presented background to the research and the problem statement the research seeks to answer the following questions.

1. What is the impact of monetary policy rate announcements on the Lusaka Stock Exchange prices?
2. What is the relationship between the policy rate and the Lusaka Stock Exchange prices?

1.5 Research Objectives

The research undertook to attain the following objectives based on the posed research questions.

1. To establish the impact of monetary policy rate announcements on the Lusaka Stock Exchange prices.

2. To establish the relationship between the policy rate and the Lusaka Stock Exchange prices.
3. To establish the impact of monetary policy rate announcements on commercial bank stock prices for the Lusaka Stock Exchange.
4. To establish the relationship between the policy rate and commercial bank stock prices for the Lusaka Stock Exchange.
5. To establish the impact of policy rate announcements on non-bank stocks prices for the Lusaka Stock Exchange
6. To establish the relationship between the policy rate and non-bank stock prices for the Lusaka Stock Exchange.

1.6 Hypothesis

The following hypothesis was tested by the research.

Hypothesis 1

H_0 : The policy rate announcement has no significant impact on stock exchange prices.

H_1 : The policy rate announcement has significant impact on stock exchange prices.

Hypothesis 2

H_0 : There is no significant inverse relationship between the policy rate and the stock exchange prices.

H_1 : There is a significant inverse relationship between the policy rate and the stock exchange prices.

1.7 A Brief on the Methodology

For the purpose of this research, the event study approach was adopted to examine the effect of the policy rate announcements on the Lusaka Stock Exchange with data being collected from the Lusaka Stock Exchange daily trading reports and the Bank of Zambia monetary policy press releases. The study assumed that the event is the day of the announcement of the policy rate by the Bank of Zambia. A 15 day event window and a 90 day estimation window were considered adequate for the study. The constant mean return model was used to determine normal returns and the T- test was used to test significance at 5% and 10% confidence levels.

1.8 Significance of the Research

This study contributed to existing literature by providing empirical evidence on the link between the policy rate announcements and stock market prices in Zambia. The measurement of a stock market's reaction to the policy rate announcement has important implications for monetary policy makers and financial market participants. Having an estimate of how the stock market will react to the policy rate announcement is an indicator of the stock market's future performance for policy makers. Also, the link between monetary policy and stock prices will "allow policy makers to have a better understanding of the transmission mechanism of monetary policy as well as to assess the effectiveness of stock markets as a channel for monetary policy transmission" (Aziza, 2010, p. 8). Financial market participants are aware that macro-economic variables such as the policy rate have an impact on stock prices hence they pay close attention to these, as part of their investment and risk management strategies.

1.9 Conclusion

This chapter presented a brief background to the study by considering an overview of the Lusaka Stock Exchange and its main characteristics which indicate that LuSE, like most stock markets in other developing countries is still at an early stage of development. The chapter also showed that stock markets, despite their stage of development are still relevant for economic development because of the role they have assumed in financial intermediation. The chapter also outlined the purpose for the study, hypothesis to be tested, as well as the significance of the study. Since the study aims to determine the extent to which the announcement of the policy rate by the Bank of Zambia has significant impact on the Lusaka Stock Exchange, the event study methodology is considered relevant for the analysis.

The rest of the thesis is structured as follows; chapter two (2) provides an analysis of the literature review which includes definition of key concepts, an analysis of the theoretical framework and empirical evidence related to the study; chapter three (3) explores the research methodology that will be used to answer the research questions and test the hypothesis for the research; chapter four (4) explains how the data was analysed in order to present findings for the research while chapter five (5) presents discussions and conclusions based on the research findings, the theoretical framework, conceptual framework and empirical evidence. It also makes recommendations for policy makers and future research.

CHAPTER TWO – LITERATURE REVIEW

2.1 Introduction

This chapter aimed to define key concepts, highlight existing theories, conceptual frameworks and models as well as provide empirical evidence relating to the link between the policy rate and stock prices.

2.2 The Concept of the Monetary Policy Rate

Holtrop (1963, p.7) defined monetary policy as the “art of managing money”. He notes that the use of money has a potential threat to the economic system hence the need for monetary policy to manage it. Ekene (2016, p. 1778) also recently defined monetary policy as a “set of actions through which the monetary authority determines the conditions under which it supplies the money that it circulates in the economy”. From these definitions, it can be seen that the main goal of monetary policy is to attain financial stability by influencing the money supply in circulation. Two forms of monetary policy exist, which are restrictive and expansionary. Expansionary monetary policy is “where a decrease in the policy rate aims to increase the money supply in circulation through an increase in the non-borrowed reserves” (Garg, 2008, p. 2). In the restrictive monetary policy, “increasing the policy rate will reduce the money supply in circulation through a reduction in the non-borrowed reserves” (Garg, 2008, p. 2). In Many countries including Zambia, “monetary policy is the responsibility of the Central Bank through its formulation and implementation role on behalf of the government” (Aziza, 2010, p.2).

The Central Bank makes use of various tools to achieve its monetary policy objectives. These tools include but are not limited to the policy rate, the cash rate (sometimes referred to as the overnight policy rate), the interbank rate, the reserve ratio and open market operations. The policy rate is basically the interest rate at which private banks can borrow money from the Central Bank. It communicates the Central Bank’s stance on monetary policy, signals how the Central Bank views the economy and how it will change the monetary policy going forward. The monetary policy rate is set by the Monetary Policy Committee (MPC) of the Central Bank and it is announced after the MPC sitting. The cash rate is the rate at which commercial banks can borrow funds from the Central Bank overnight while the interbank rate is the rate charged on loans between commercial banks.

The Zambian monetary policy has undergone several changes since independence in 1964 in an effort to improve the country's economic performance. Prior to 1992, the objectives for Zambia's monetary policy were not well defined and mainly "relied on direct instruments such as interest rate restrictions and direct credit allocation" (Chileshe et al. 2014, p. 9). With these measures, the Bank of Zambia had little control over the monetary policy transmission mechanism, and macroeconomic conditions deteriorated. The change of government in 1992 led to a new era in monetary policy with the main aim of stabilising the economy. Further changes were made in 1996 which saw the Bank of Zambia being in control of the monetary policy transmission mechanism by adopting the money targeting monetary policy. Under this regime, the objective was to influence economic activity by targeting monetary aggregates or quantities. The changes led to a growth in money supply and a decline in inflationary pressure, the improvements which also began to weaken after some time. Table 1.1 illustrates the trend in some monetary variables up to 2012.

Table 2.1 Trend of some monetary variables 1961-2012

	1961-1970	1971-1980	1981-1990	1991-2000	2001-2010	2011	2012
Real GDP growth(annual % growth)	3,9	1,5	1,1	0,8	5,6	6,8	7,3
Average annual inflation rate %		11,1	76,9	68,1	15,5	6,4	6,6
Real interest rate %		0,8	-15,5	3,1	11,3	5,6	5,6

Source: Bank of Zambia and World Bank database

In response to the "weakening relationship between money growth and inflation, the Bank of Zambia adopted the inflation targeting monetary policy through the introduction of the policy rate in March 2012" (Chileshe et al. 2014, p. 10). The aim was to influence economic activity by targeting interest rates or prices, as well as to improve the effectiveness of the Bank of Zambia's communication about policy changes and their rationale. A total of thirty (30) monetary policy announcements have been made since the introduction of the policy rate by the Bank of Zambia in March 2012 from which the policy rate has been adjusted upwards six (6) times and maintained for the rest of the other announcements.

2.3 The Effect of the Monetary Policy Rate on Stock Prices

According to Aziza (2010) the policy rate influences stock prices through its function as a channel for monetary policy transmission. Figure 2.1 below shows a chart for the monetary policy transmission mechanism adopted from the Bank of Zambia.

From the monetary policy transmission mechanism chart it can be seen that the most direct and immediate impact of a change in the policy rate is through the interest rate channel. These interest rates are short term and long term lending rates, as well as deposit rates. “Changes in short-term rates move in the same direction as the policy rate, although these changes may not be exactly the same as those of the policy rate” (George et al. 1999, p. 2). A change in the policy rate triggers banks to adjust their prime rates by the amount of the change in the policy rate, and usually on the same day, to maintain their profit margins. The “impact of the policy rate on long term interest rates can go in the same direction as the change in the policy rate or not because long term interest rates are influenced by an average of the current and expected future short- term rates” (George et al. 1999, p. 2). The alterations in the marginal costs of lending and borrowing in turn produce changes in money supply, savings, investment and asset prices.

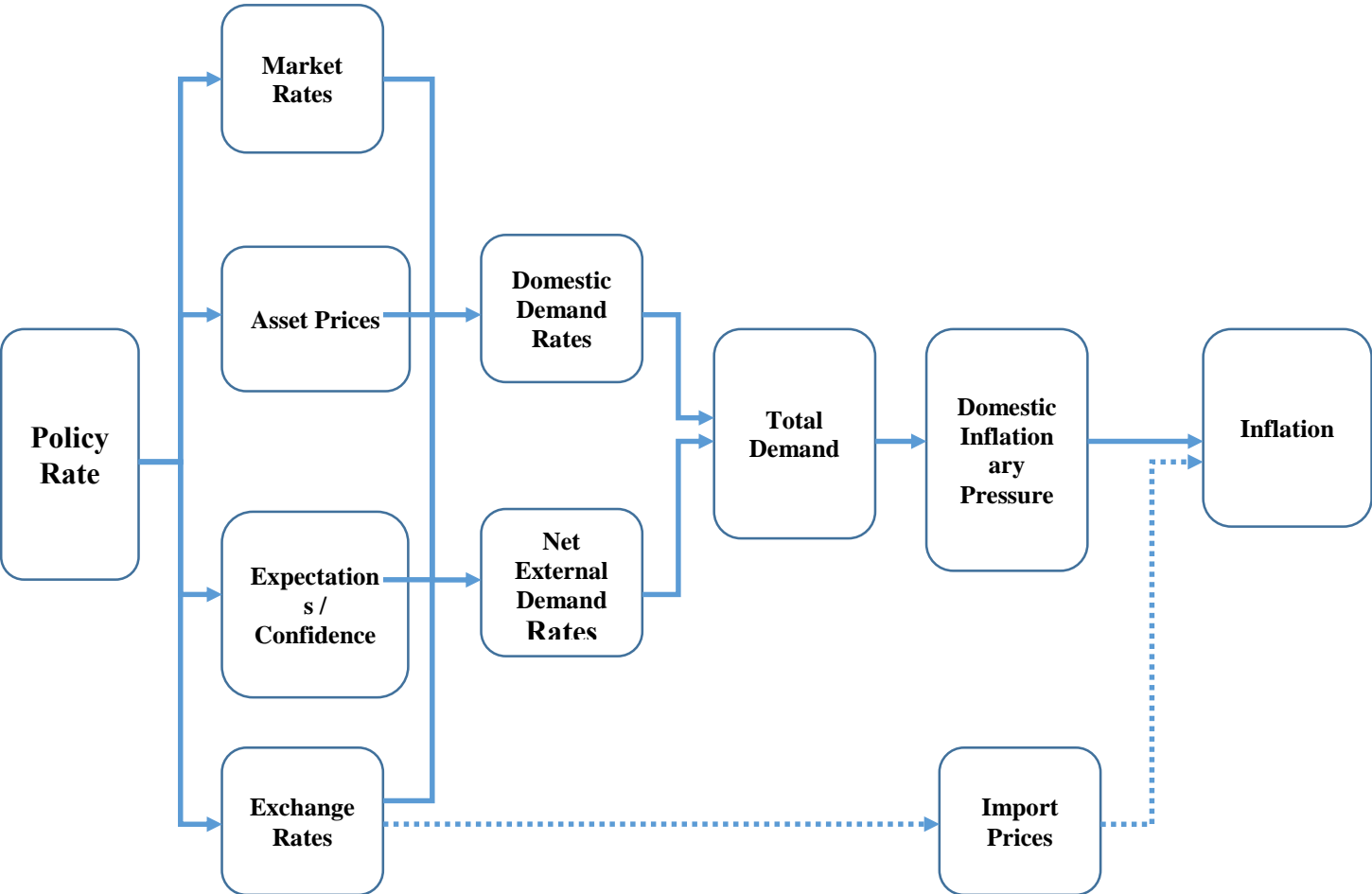
Empirical evidence from Africa suggests that the interest rate channel is generally a weak form of the monetary policy transmission mechanism as observed by Buigut (2009) and Al-Mashat et al. (2007). Similarly the findings in Zambia have indicated that the monetary transmission mechanism has “generally been weak and more closely connected to monetary aggregates than interest rates” (Chileshe et al. 2014, p. 22). The ineffectiveness of the interest rate channel as a monetary policy transmission mechanism could be indicative of how much impact the policy rate can have on stock prices in Africa.

The chart also indicates that the policy rate influences economic activity through the asset price channel. According to Bernanke and Kuttner (2004), monetary policy has effects on asset prices, with more significant effects on returns and prices of financial assets. The policy rate affects stock prices from two perspectives; through the interest rate channel and by influencing investor’s expectations of future economic activity. The interest rate is used to determine the discount rate which is used in the valuation of asset prices in financial markets. For example, the Dividend Growth Model assumes that the current stock price is equal to the discounted expected future dividends. Shifts in the market rates as a spill over effect from the policy rate can alter the expected future dividends and the discount factor.

Stock prices are perceived to have an inverse relationship with long term interest rates on fixed income securities. Stone (1974) argues that “individual equity securities exhibit varying degrees of sensitivity to interest rates and that the opportunity to invest in risky debt securities may present an attractive alternative to risk-less assets and risky equity securities”. Ahmad, Muhammad and Masron (2009) further argue that long term interest rates tend to affect stock prices because of the portfolio switching behaviour of investors. According to them, stock prices are inversely related to long term interest rates on fixed income securities because “high market rates make fixed income securities more attractive as an alternative to holding stocks”.

The policy rate also influences asset prices by influencing investors’ expectations of future economic activity. Changes in the policy rate have implications for the risk and return which financial market participants take into consideration when making their investment decisions. In their research, Bernanke and Kuttner (2004) found that the response of the stock market to policy actions is to a large extent attributed to the policy’s effect on the expected future dividends and excess returns. Hojat (2015) also recently confirmed these findings.

Figure 2.1: The Monetary Policy Transmission Mechanism



Source: Adopted from Chileshe et al. (2014), Bank of Zambia and George et al. (1999), Bank of England Report.

2.4 Theoretical Framework

The theoretical framework described the existing theories to support and justify the research. The following theories were considered relevant for the research.

2.4.1 Efficient Market Hypothesis

Despite being among the most controversial theories, the Efficient Market Hypothesis is one of the most referenced theories in financial economics research. It is premised on the random walk theory which states that “past prices cannot be used to predict the future in any meaningful way” (Fama, 1965, p. 34). The Efficient Market Hypothesis measures the ability of the stock markets to incorporate known and unknown information about stock prices. Fama (1970, p. 384)) first defined the EMH as “markets where stock prices at any time fully reflect all available information”. This means that if a market is efficient, it will quickly and efficiently incorporate all available information in to stock prices such that the available information cannot be used to predict the behaviour of future stock prices or assist investors to earn excess returns. Three forms of EMH were proposed according to the different kinds of information that influence stock prices. These are weak, semi strong and strong form.

This research will focus on the semi strong form of Efficient Market Hypothesis which “describes a market in which prices do not just reflect information contained in past prices but all publicly available information” (Brealey, Myers and Marcus, 1995, p. 211). Since the policy rate is publicly available information, it is expected that this information is fully reflected in stock prices according to the efficient market hypothesis so there is no chance of beating the market using “something that everybody knows”.

2.4.2 Dividend’s Valuation Theory

Investors take into consideration the expected return and the risks inherent in their investment decisions, while businesses need to know how to decide on the price of securities when they are trying to raise capital by offering new securities on the stock exchange (Hojat, 2015). These considerations are significant factors in asset price determination. One of the valuation methods which can be used is the dividend valuation model.

Gordon (1962) derived this model to value a firm by “stipulating that the value of a firm is equal to the discounted expected future dividend”. Although sometimes criticised, the theory was later explained by Brealey, Myers and Marcus (1995), who suggested that the current value of a stock can be computed using the equation below:

$$P_0 = \frac{\text{Div}_1}{r - g}$$

This model assumes that the value of a specific asset is derived using three factors, the expected “future dividends, the expected rate of return used to discount the expected future dividends and the time pattern of the occurrence of the dividend” (Brealey, Myers and Marcus, 1995, p. 198). The policy rate can affect asset prices through its influence on the expected future dividends as well as the expected rate of return.

The model is limited by the fact that it does not explicitly take in to account the equity premium, however, Bernanke and Kuttner (2005) argue that the policy rate incorporates this element.

2.4.3 Sharpe’s Capital Asset Pricing Model

Sharpe (1964) and Lintner (1965) built the Capital Asset Pricing Model based on the previous models by Markowitz. It elaborates “the relationship between risk and return that investors expect to obtain from purchasing a specific asset” (Hojat, 2015, p. 33). The model in its simplest form is denoted using the following.

$$R_i = R_f + \beta_i(R_m - R_f)$$

Where R_i is the expected security return, $(R_m - R_f)$ is the market premium, β_i is the risk of the asset, R_f is the risk free rate and R_m is the market return. In practice, the interest rate on government traded bonds is used as a proxy for the risk free rate.

The CAPM explicitly considers the equity premium “which is the excess return provided by the stock market over the risk free rate” (Garg, 2008, p.10). The size of the equity premium varies with the risk associated with an individual stock or the stock market as a whole. Investors generally take in to consideration the required rate of return and elements of risk involved in investing in a particular asset. The risk faced by investors is from two perspectives; that is the firm specific risk and that related to macroeconomic conditions such as monetary policy.

2.5 Empirical Evidence

Stock markets are generally associated “with relatively long economic expansions boosting investors’ confidence towards economic fundamentals, future companies’ productivity and expectations of future growth” (Sourial, p.3, 2002). However, a change in stock prices may sometimes not correspond with these, such as “during periods of low and stable inflation or when monetary and credit aggregates are growing faster than nominal output” (Souria, 2002, p3). As such, stock market participants take in to consideration the stance of monetary policy as inferred by changes in its indicators when making their investment decisions.

Many financial economics researchers have highlighted the objectives of monetary policy to be financial stability, output and employment. However, Ioannidis and Kontonikas (2006, p.2) note that “policy actions do not have direct and immediate effects on these variables, as considerable lags have been observed in the monetary policy transmission mechanism”. Financial markets, on the other hand, are “forward looking and quicker to incorporate all available information such as the effect of a change in monetary policy on stock prices and returns” Bernanke and Kuttner, 2004, p. 2). Monetary policy actions affect equity prices through their effects on interest rates, the level of money supply in circulation, inflation, and the financial market participants’ expectations about future economic activity. The effect of monetary policy actions on equity prices is further linked to the real economy because changes in stock prices have investment and consumption spending implications.

Existing theory suggests that there is an inverse relationship between interest rates and stock prices on the one hand. However, this “relationship may be offset with changes in money demand so that a positive relationship exists between money supply and stock markets” on the other hand (Garg, 2008, p. 2). The EMH also posits that stock prices are expected to react more to unexpected monetary policy changes because they are forward looking, and should be able to incorporate all available information. The major issue, however, is how to “distinguish between expected and unexpected monetary policy actions and what to use as a measure for unexpected monetary policy actions” (Bernanke and Kuttner, 2004, p. 2). Many researchers have examined the effects of monetary policy on stock prices using a number of models including regression analysis, time series analysis, vector auto regression models and event studies. The results generally depend on the level of maturity of the stock markets and the channel used for the monetary policy transmission mechanism. Therefore, the empirical

evidence for this research will be presented according to whether it is from developed or developing countries.

2.5.1 Evidence from Developed Countries

Monetarists led by Milton Friedman (1968) observed that the effect of monetary policy actions on money supply can have implications for price stability and output, and concluded that the best monetary policy is characterised by predictability in money supply growth. Following this, a number of researches were undertaken to consider the impact of monetary policy (with money supply as an indicator) on stock prices. In 1969, Tobin used the Q ratio approach (which later came to be known as Tobin's Q theory) to illustrate the monetary policy transmission mechanism through asset prices. He concluded that monetary policy can affect equity prices through money supply, and that there is a positive relationship between money supply and equity prices. Franco Modigliani and Cohn (1979) also confirmed these findings when they illustrated the monetary transmission mechanism through wealth effects on consumption. According to them, altering the money supply has an effect on asset prices which in turn affects consumption spending through the wealth effect. .

These findings are consistent with the hypothesised positive relationship between money supply and stock prices. Money supply affects stock prices through its effect on interest rates and inflation (Hardouvelis, 1987). Alatiqi and Fazel (2008) further note that this relationship is from the assumed short term liquidity effect which stems from the perceived relationship between money supply and interest rates, as well as the real output and price effects.

In contrast, Kraft and Kraft (1977) analysed the "impact of money supply on stock markets" using the time series model and found that there is no causal relationship from money supply to stock prices. Pearce and Roley (1985) also found a negative relationship between anticipated money supply increases and stock prices and an absence "of a causal relation from money supply to interest rates" using time series on a panel of data.

It can be seen that earlier research efforts were focussed on the effects of monetary policy on stock markets with money supply and output as monetary policy indicators. However from the 1980s, many researchers began to adopt interest rate variables as measures of monetary policy. The relationship between interest rates and stock prices is perceived to be inverse such that an increase in interest rates resulting from restrictive monetary policy is expected to reduce stock

prices. This inverse relationship is supported by some stock valuation models, such as the Discounted Cash Flow Model, Gordon's Dividend Valuation Model and the Capital Asset Pricing Model. According to these theories, interest rates affect stock prices through the interest rate channel by altering the discount factor and making fixed income securities more attractive to holding stocks, as well as influencing market participants' expectations of future economic activity.

Smirlock and Yawitz (1985) analysed the "interaction of asset returns, discount rate changes and market efficiency" in the USA. They observed that discount rate changes can affect equity prices by altering the rate at which the expected future cash flows are discounted as well as the expectations about future earnings resulting in a negative relationship between interest rates and stock prices.

Research conducted by Jensen and Johnson (1995) argued that "monetary developments are associated with the behaviour of stock returns". Using the discount rate, they observed an inverse relationship between long term stock returns and the discount rate. Their study also showed that the discount rate acts as a signal for monetary policy and economic development by altering financial market expectations about future economic activity.

These findings are consistent with the hypothesis that interest rate variables of monetary policy have an inverse relationship with stock prices so that an increase in interest rates causes stock prices to decrease while a decrease will cause them to increase. While these researchers have shown this relationship, they do not explain why stock prices respond as they do.

The results of Iannidis and Kontonikas (2006)'s investigation of 13 OECD countries also show that changes in monetary policy have significant impact on stock returns in these countries. This supports the notion that stock markets can be a channel for the monetary policy transmission mechanism, since short term interest rates and the discount rate had effects on stock prices in the context of the present value model for the majority of the countries under investigation. Hussain (2010) also observed that monetary policy announcements by the European Central Bank and the Federal Open Market Committee matter for European and US stock markets in that they exert a significant negative influence on the stock returns.

Hojat (2015) recently examined the “impact of monetary policy on stock market returns” and found that the Federal funds rate has a significant negative impact on equity prices and an indirect effect on the market rate of return and the company’s rate of return on equity. These findings support the importance of expectations in equity prices in that policy actions affect the equity market as far as it changes the financial market participant’s expectations.

A general conclusion from these findings is that there is a negative relationship between interest rates and stock prices, and a positive relationship between money supply and stock prices. On the contrary, other researchers found that this hypothesised relationship does not hold. Durham (2003) studied the “effect of the discount rate on stock returns” from 16 countries and argues that there is a weak insignificant relationship between the discount rate and the stock returns. Lapodis (2006) also observed that there is an inconsistent “dynamic relationship between monetary policy and stock prices” as it varies across monetary regimes. More recently, Brown (2014) explored the “impact of monetary policy announcements on Australian equity prices” while distinguishing between surprise and expected components. He observed that the surprise components of monetary policy are only a small portion of the explanation for the overall variability of stock returns. Cash rate announcements generally have little effect on the Australian stock market, and no strong relation is observed between these variables.

2.5.2 Evidence from Developing Countries

As indicated by Sourial (2002) the reaction of a stock market to monetary policy does not only depend on its efficiency but also on the degree of development. Some researchers such as Aziza (2010) and Pennings, Ramayadi and Tang (2011) put forward arguments that the response of stock markets in developing countries to monetary policy maybe different compared to the response of those in developed countries because most stock markets in developing countries are considered to be at an early stage of development as evidenced by the small number of listed companies, large institutional holdings, thin trading, low capitalisation ratio and turnover ratio. Regardless, monetary policy actions are still expected to affect equity prices through their effects on interest rates, the level of money supply in circulation, inflation, and the financial market participants’ expectations about future economic activity, and the theories supporting the study should hold. There is a dearth of literature and empirical evidence on the link between monetary policy and stock markets in most developing countries, particularly sub-Saharan Africa.

Barakat, Elgazzar and Hanafy (2016) recently explored the nature of the “relationship between stock markets and macroeconomic variables in Egypt and Tunisia”. Their findings were that interest rates have a long run negative impact on the Egyptian stock market index, consistent with existing theory. However, there was no significant effect in Tunisia and this was attributed to the level of development of the Tunisian stock exchange.

These findings are in contrast with findings from earlier studies, the variation, which can be attributed to the variables used as a measure of monetary policy. In 2009, Bernnaceur, Boughrara and Ghazouani examined the “link between monetary policy and MENA stock markets”. One of their observations was that the Tunisia and Egypt stock prices did not react to the Central Bank interest rate but had a positive relationship with money supply. Similarly, Sourial (2002) examined the “impact of monetary policy on the Egyptian stock market” and found that the discount rate has little impact on stock market performance.

In Nigeria, Ekene (2016) also recently examined the “impact of monetary policy on stock markets”. The estimation results showed that the equity market did not significantly absorb the monetary policy impulses as evidenced by the insignificant negative relationship between the interbank rate (IBR), the 91 day Treasury bill rate (TBR) and the stock markets. However, the response from the TBR was more significant than the IBR. This is so because Treasury Bills are substitutes with stocks and investors usually switch between them depending on the required rate of return.

In Kenya, Muthama (2014) examined the “relationship between stock market returns and monetary policy decisions”. It was observed that money supply has a positive relationship with stock returns, but the Treasury bill rate, cash reserve requirement and repo rate were seen to have an insignificant effect.

Aziza (2010) studied the “effects of monetary policy on the stock market performance and how monetary policy shocks are transmitted to the stock market” for both developing and developed countries. The research also sought to investigate if the stock market reaction to money supply, lending rates and inflation in developing countries is different from that in developed countries. It was observed that in developing countries, money growth exert negative shocks on stock market capitalisation in Chile, India, Indonesia, South Africa and Nigeria. There was no stable relationship between inflation and the lending rate in Nigeria and New Zealand.

This study provided evidence that research in developing countries, particularly in Africa, has focused more on the relationship between long term interest rates and stock prices as well as money supply and stock markets. The findings are consistent with Stone (1974)'s arguments that debt securities may represent an attractive alternative to risk-less assets and risky equity securities as well as the portfolio switching behaviour of financial market participants.

Measuring the reaction of the stock market to monetary policy with the models adopted by these researchers has its limitations. One of them is endogeneity which arises from the joint effects of an independent variable on both the monetary policy and stock price variables such that it can be difficult to tell if the impact on stock prices is from monetary policy or that independent variable. It can also stem from joint causality between monetary policy and stock prices. Also, changes in the policy rate can coincide with changes in business cycle conditions and other relevant macro-economic variables. Literature suggests that these problems can be overcome using the event study methodology which makes use of a short event window around the policy rate announcement to isolate these limitations. The event study measures the reaction of stock prices to monetary policy by examining changes in monetary policy over a short event window.

Bernanke and Kuttner (2004) were one of the first researchers to have used the event study to measure the impact of unanticipated changes in the Federal funds rate (using the Federal futures) on equity markets. According to them, "the immediate effect of a change in monetary policy is on financial markets". They explained that markets are unlikely to respond to already anticipated policy actions because they are forward looking and always incorporate already anticipated information. However, markets will react to unanticipated policy actions because of their "effects on expected future dividends and excess returns associated with holding the stocks". Their findings were that the effect of monetary policy on stock markets is of reasonable size. However, "policy surprises were accountable for only a small portion of the overall variability of stock prices". They also attempted to explain why stock prices respond the way they do to monetary policy by adopting the Campbell – Armer framework. With this framework, it was observed that the reaction of stock prices to monetary policy for the "most part is not directly attributable to the policy's effect on the real interest rate but on its effect on expected future excess returns or expected future dividends". This implied that the federal funds rate did not have significant effect on stock prices through the 'discount channel', that is, on the discount rate used in stock valuation.

Vithessonthi and Techarongrojwong (2013) examined if monetary policy in developing countries matters for stock markets by looking at the impact of the policy rate announcement on the stock market in Thailand. Their study adopted Bernanke and Kuttner's event study model to isolate expected from unexpected monetary policy actions. It was observed that only unexpected monetary policy actions had a significant positive impact on the stock exchange, contrary to existing theory and to the findings of Bernanke and Kuttner (2004).

2.5.3 Effect of the Policy Rate on Bank Stock Returns

Economic sectors cannot have the same reaction to monetary policy actions because their interest rate sensitivities vary based on the balance sheet effects of these actions. For instance, altering the policy rate is assumed to have significant impact on finance sector stocks. This is because according to the monetary policy transmission mechanism, altering the policy rate affects short term interest rates which have a direct effect on the balance sheets of finance sector institutions especially commercial banks. The policy rate serves as a bench mark for short term interest rates such that banks adjust their lending and deposit rates with each change in the policy rate in order to maintain their profit. On the contrary, it is argued that monetary policy actions should not have a significant effect on commercial banks because they affect both sides of their balance sheets. The impact can therefore only be measured by the differential effect. Other researchers have also argued that the impact could be attributed to expectations of financial market participants and not the balance sheet effect of monetary policy actions. Previous studies have been conducted to investigate how interest rate changes affect bank stock returns.

Flannery and James (1984) explained why the effect of interest rate movements on common stocks returns varies among stocks by examining the "interest rate sensitivity of commercial bank returns". They observed that the "movement of bank stock returns with interest rates is positively related to the size of the maturity differences between the commercial bank nominal assets and liabilities" (Flannery and James, 1984, p.1151). This means that the effect of the interest rates on commercial bank stock returns is largely attributed to the differential impact on bank assets and liabilities (balance sheet maturity composition). This research together with that for Lyngne and Zumwalt (1980) are consistent with the hypothesis which states that the movement of bank stock returns is positively related with the balance sheet maturity composition.

Vaz, Mohamed and Brooks (2008) examined how bank stock returns react to publicly announced changes in the target cash rate of the Reserve Bank of Australia and found that bank stock returns are not negatively impacted by increases in the target cash rate, contrary to existing theory. This was attributed to the market power of dominant commercial banks and the economic environment.

Garg (2008) conducted a “sector wise analysis of the reaction of stock markets to anticipated and unanticipated monetary policy changes”. He observed a positive relationship of all sectors with the Federal fund rate which is contrary to the discounted cash flow valuation theory. Also, “the most interest sensitive sectors were utilities, finance, telecommunications and basic materials sector in that order”. The utilities and telecommunications sector exhibited high interest rate sensitivity to the Federal funds rate because their balance sheets had a large proportion of long term liabilities. The sensitivity of finance sector institutions was attributed to the direct effect of the Federal funds rate on their revenues and costs.

The study further observed that the interest rate sensitivity of sector profits can be determined by a number of factors, which are, “the sectors’ debt heaviness, the average firm size and the age of firms in the sector” (Garg, 2008, p.13). Interest rate changes will alter the debt burden of firms in heavy debt characterised sectors and cause them to be interest rate sensitive. The size and age of a firm determine its access to alternative sources of funding which can make it vulnerable to interest rate changes.

These findings show varied interest rate sensitivity of various sector stock prices. It is clear that the reaction of stock markets in different sectors is determined by a number of factors such as those observed by Garg (2008). The presented findings also show that although interest rates changes have a direct impact on commercial bank operations, the impact can only be transmitted to commercial bank common stocks through the balance sheet maturity composition and by influencing investor expectations. According to Cai and Wang (2006, p. 5) interest rate risk is the most significant risk for commercial banks. However, “most commercial banks manage this risk by matching the maturity of their assets and liabilities” at an acceptable level so that there is minimal impact from interest rate changes.

2.6 Conclusion

The heterogeneous findings presented in the empirical evidence show that there is yet to be a consensus by those who have conducted research on the link between monetary and stock market prices. Research on effects of monetary policy has evolved with different monetary policy variables being evaluated, as well as different methodologies being adopted. From the research findings, it is evident that the policy rate affects stock prices through its effects on money supply, interest rates, inflation and financial market participant's expectations about future economic activity.

Tobin (1969) illustrated the monetary transmission mechanism through asset prices and found a positive relationship between money supply and equity prices, consistent with existing theory while other researchers such as Kraft and Kraft (1977) and Pearce and Roley (1985) argue otherwise. From the early 1980s, most researchers began to adopt interest rate variables as measures of monetary policy such as Smirlock and Yawitz (1985), Hardouvelis (1987), Jensen and Johnson (1995), Iannidis and Kontonikas (2006) and more recently Hojat (2015). While these researchers generally find a negative relationship between interest rates and stock prices, others such as Brown (2014) observed no strong relations between the cash rate and the Australian stock market. Durham (2003) also observed a weak insignificant relationship between the discount rate and stock returns. Also, existing empirical evidence in Africa has focussed more on the relationship between long term interest rates and stock prices and less on the effect of the policy rate on stock prices.

The empirical evidence also shows that event studies are more likely to accurately measure the reaction of stock markets to monetary policy actions as they make use of short event windows. Researchers such as Bernanke and Kuttner (2004) and Vithessonthi and Techarongrojwong (2013) used the event study to measure the impact of monetary policy on stock prices. The Efficient Market Hypothesis expects stock prices to incorporate all available information including monetary policy actions so that any significant impact of monetary policy actions should be that which is unanticipated. The major challenge is, however, how to isolate expected and unexpected monetary policy actions and how to measure the unexpected component of monetary policy actions. Only those researchers who adopted the event study methodology attempted to isolate unexpected from expected monetary policy actions. This study also observed that there is a dearth of empirical evidence on the link between monetary policy and stock markets using the event study methodology in Africa

The research findings also show that while it is expected that interest rate changes have a direct impact on commercial bank operations, this impact may not be directly transmitted to stock prices because of the balance sheet maturity composition of commercial banks. It is argued that the impact can be measured by the differential effect and/or expectations of financial market participants. Lynge and Zumwalt (1980) found a statistically negative relation between bank stock returns and changes in interest rates. Other researchers such as Vaz et al. (2008) and Garg (2008) note that commercial bank stock returns are not interest rate sensitive. Garg (2008) also observed that the interest rate sensitivity of sector profits can be determined by factors such as the sector's debt heaviness, average size of the firm and age of the firms in the sector.

CHAPTER – THREE RESEARCH METHODOLOGY

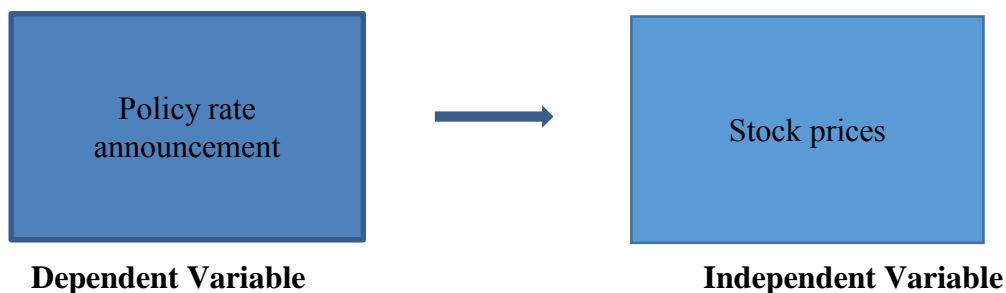
3.1 Introduction

The purpose of this study was to determine the effect of monetary policy rate announcements on stock prices in Zambia. The chapter provided insight on the research design required to adequately investigate the research problem.

3.2 Selection of Key Variables

Key variables were deduced from the problem statement. These variables can be dependent or independent. Independent variables are “those that are manipulated in the research in order to see their effect on some other variable”. (Leacock, Warrican and Rose, 2009, p 33). The dependent variable responds to the impact or effect of the independent variable. The research assumed that the policy rate was the independent while the stock prices were dependent variables. The graph below depicts the conceptual framework for these variables.

Figure 3.1 Conceptual framework



3.3 Data Collection and Sampling

3.3.1 Data Collection

The positivist method was used as a method for data collection. By adopting this method, the researcher approached the study in an impersonal way by merely gathering data about the research as it is without having any influence on it.

Data was obtained from secondary sources such as the Lusaka Stock Exchange website and the monetary policy press releases from the Bank of Zambia website. These sources were preferred because they are consistent and reliable data sources. For example, the stock prices are reconciled by LuSE’s automated trading system after the close of every trading day. Literature review sources included articles from “credible academic journals and reputable professional

journals, text books from academic authors, government and organisational reports as well as specific dictionaries” as advised by (Leacock, Warrican and Rose, 2009, p 40).

3.3.2 Data Sampling

The data was collected using daily stock prices for a target sample of 22 out of the 23 companies that are listed on the Lusaka Stock Exchange. Zambia Consolidated Copper Mines Investment Holdings (ZCCH-IH) was excluded from the analysis because it is very illiquid with little to no trading, such that the stock exchange has two (2) indices, one that includes it and one that excludes. Daily data was preferred because the analysis was for a short 15 day window. Weekly and monthly data would not have been appropriate. Although daily data for stock returns tends to exhibit some conditions of non-normality Brown and Warner (1985) note that this has “no obvious impact on event study methodologies”. A population of 30 policy rate announcements was considered for the study. This is all the policy rate announcements from April 2012 to June 2016 because the policy rate was only introduced in March 2012.

3.4 Data Analysis Tools

The event study was used to analyse the collected data by measuring the valuation effect of the policy rate announcement. While others have attempted to do this research using Vector Auto – Regression (VAR) and Heteroscedasticity models, the event study was preferred because it measured the impact of the policy rate on stock returns in the short run and observed the behaviour of the stock prices during the event window. Several studies have measured the impact of monetary policy returns on stock returns using the event study methodology around the world. These studies include Thorbecke (1997), Ekanayake, Rance and Halkides (2008), Zeng (2010), Pennings (2011), Yakob, Tzeng, and McGowan (2014) and most recently Ghani and Kotli (2016). However the study by Bernanke and Kuttner (2004) addressed an important aspect of the event study by distinguishing between expected and unexpected policy actions. This was done by constructing a measure of surprise using a method proposed by Kuttner (2001). This study could not distinguish between the expected and unexpected policy actions due to non-availability of data.

3.5 Background of the Event Study Methodology

The event study methodology tests how a share return responds to a corporate event which in most cases is a piece of news such as an earnings announcement, an announcement for a merger or an acquisition and even macroeconomic related announcements. Mackinlay (1997, P. 13)

defined an event study as “a measure of the impact of a specific event on the value of a firm using financial market data”. The event study analyses the response of stock prices around the announcement of the event and assumes that stock prices take in to account all available information and financial market participants’ expectations. Event studies can be traced back to the work of Dolley (1933) who examined the effect of stock splits on share prices using a sample of 95 splits from 1921 to 1931. Since then, a number of modifications have been made to accommodate new research requirements. The most profound improvement was Fama, Fisher, Jensen and Roll’s table layout in 1969 which is still in use today. Brown and Warner’s modifications were focussed on statistical issues. Their 1980 paper highlighted issues in using monthly data while the 1985 paper highlighted issues in using daily data. Also, Kothari and Warner (2006) made some recommendations which were focussed on resolving econometric issues. Other significant improvements include elimination of the effect of confounding events, the move from the use of monthly data to daily or intraday data and the use of statistical techniques to measure the significance of the research findings. These developments have generally helped to improve the accuracy of the results obtained using the event study.

Within the context of this study, the event is the announcement of the policy rate by the Bank of Zambia. Monetary policy actions are expected to have immediate effect on asset prices, especially financial assets because financial markets are forward looking and quicker to incorporate all available information. The policy rate is one of the tools of monetary policy and its announcement is an appropriate event for this study because it affects asset prices through its influence on the level of money supply in circulation, inflation, exchange rates, as well as short term and long term interest rates.

3.6 Steps for an Event Study

This section provides an explanation of the steps involved in an event study as outlined by Mackinlay (1997).

3.6.1 Event Definition

The starting point to conducting an event study is to define the event. The event in this study was defined as the day of the policy rate announcement by the Bank of Zambia. In order to ensure validity of the measured stock market’s reaction, there was need to check for the effect of other common events which can signal similar reaction to that of the policy rate announcement. All the events were considered in the research because there were no such

events that could have generated a coincidental impact during the period of study. The study measured the impact of the policy rate on stock prices for all the announcements and according to whether the policy rate was increased or maintained. Table 3.1 in the appendices shows the dates for the policy rate announcements that were used as events in the study.

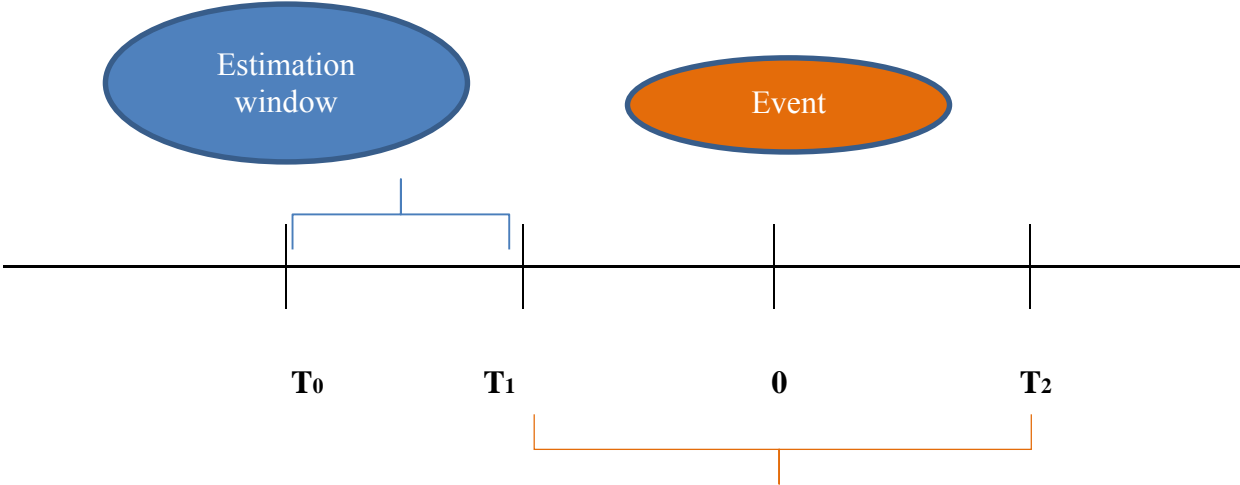
3.6.2 Event and Estimation Window

The event study methodology requires that an event window is determined which constitutes of some days before the event, the day of the event and some days after the event. The event window is used to compute the abnormal returns and to assess the trend of the stock prices leading to the event. As the market anticipates the event, stock prices tend to follow a certain trend before the event, which should change after the event because then, the trend will have been corrected by the market. Brown and Warner (1985) note that careful consideration must be given when determining the event window because uncertain events can yield inaccurate results. “The estimation window is the period before the event used to estimate normal returns” (Gumede, 2014, p. 26).

Literature on event studies shows that the length of the event and estimation period is subjective as it is merely defined by the researcher. For example, Ekanayake et al. (2008) used an event window of 7 days and a 210 days estimation period. Vaz et al. (2008) used a 15 day event window and an estimation window of 200 days. It is generally recommended that the estimation period must be long enough to be able to accurately estimate the normal returns while the event window must be short enough to eliminate unnecessary effects.

For purposes of this study, a 15 days event window with 7 days prior and 7 days after the event was considered adequate to measure the short term impact of the policy rate announcement on the stock prices. The estimation window of 90 days prior to the event was considered adequate for the study. Since the event study assumes that the measure for the impact is the abnormal returns, “the event window should not overlap with the estimation window” (MacKinlay, (1997, p.20). The figure below shows a time line for the event window.

Figure 3.1 Event study timeline



Source: Adopted from Mackinlay (1997)

The estimation period is T_0 to T_1 , the event date is 0 and the event period is T_1 to T_2 .

3.6.3 Calculation of Index Returns

The returns for this study were computed using continuous compounding as recommended by Fama (1976). The return was computed using equation 1 below.

$$R_t = \text{Ln}\left(\frac{P_t}{P_{t-1}}\right) \tag{1}$$

3.6.4 Estimation of the Normal Returns

In order to measure abnormal returns, it is required that normal or expected returns are observed if no event occurs. The normal returns are estimated using data from the estimation window. Mackinlay (1997) highlights two (2) main statistical models that can be used to measure normal performance of the stock returns; the constant mean return model and the standard market model. The constant mean return model simply averages the returns in the estimation window to get a constant mean return which is applied to all the days in the event window. The market model is a more improved model over the constant mean return model as it reduces the variance of the abnormal return by “removing the portion of the return that is related to the variation in the market’s return” (Mackinlay, 1997, p 18). Using the market model to estimate abnormal returns depends on the R^2 of the market model regression. A low R^2 implies that the model does not completely explain the variation in returns for all stock prices. The market model could not be adopted for this study because the R^2 was too low and the stock market is too concentrated. The constant mean return model was instead adopted to estimate the normal

returns. Despite it being limited by its simplicity, Brown and Warner (1980) argue that it still yields results similar to those of more complicated models. The expected return from the constant mean return model was estimated using equation 2 below.

$$ER_{it} = \mu_i + \varepsilon_{it} \quad (2)$$

Where $E(\varepsilon_{it}) = 0$ and $\text{var } \varepsilon_{it} = \sigma_{\varepsilon_i}^2$

$E(\varepsilon_{it})$ is the error term for the stock i .

μ_i is estimated by the arithmetic mean of the returns in the estimation window using equation 3 below.

$$\mu_i = \frac{1}{M_i} \sum_{t=t_0+1}^{t_1} R_{it} \quad (3)$$

Where M_i is the number of non-missing returns over the estimation window.

3.6.5 Measuring the Abnormal Returns

The abnormal returns were computed by obtaining the difference between the actual returns and the expected returns for the individual securities on the stock exchange. “The abnormal return is the return over and above those predicted by the general trend of the market on a given day” (MacKinlay, 1997, p. 15). The abnormal return was computed using equation 4 below.

$$AR_{it} = R_{it} - ER_{it} \quad (4)$$

3.6.6 Measuring the Average Abnormal Returns (AAR)

The average abnormal return determines the pattern of abnormal returns for all the individual securities in the index. The returns were averaged using cross sectional aggregation across events to see the impact of the policy rate announcements through all the events. The distribution of the abnormal returns is used to the hypothesis. For a sample of n events the cross-sectional mean abnormal at each instant t within the event window was mathematically computed using equation 5 below.

$$AAR_{it} = \sum_{i=1}^n \frac{AR_{it}}{n} \quad (5)$$

Where

AAR_{it} is the average abnormal returns, t is the days in the event period, n is total number of events i is the number of securities in the research.

3.6.7 Measuring the Cumulative Average Abnormal Returns (CAAR)

The CAAR is the mean value of the cumulative abnormal returns across time (t_1 to t_2). For purposes of this study, it measures the reaction of the stock prices to the policy rate announcement. The CAAR was mathematically computed using equation 6 below.

$$CAAR_i(t_1, t_2) = \sum_{i=t_1}^{t_2} AAR_{it} \quad (6)$$

3.6.8 Test for Significance

Testing for significance ensures reliability of the research by examining if the research outcome is attributed to chance or not. Significance levels are used to measure the probability that the research outcome is not as a result of sampling error. The choice of the significance level is usually subjective and depends on the researcher. For purposes of this research, the T-test was used to test the significance of the impact of the policy rate at 5% and 10% levels. The T-statistic was calculated using the AAR and the standard error according to equation 7 below.

$$T \text{ statistic} = \frac{AAR_{it}}{S(AAR_{it})} \quad (7)$$

The research outcome was considered statistically significant if the absolute T values were greater than 1.96 and 1.645, and statistically insignificant if they were less than 1.96 and 1.645.

3.6.9 Hypothesis Testing

The null hypothesis tests if the mean abnormal return at a time t is equal to zero. The hypothesis was tested using the T-statistic which was computed with the CAAR and standard error according to equation 8 below.

$$T \text{ statistic} = \frac{CAAR_{it}}{S(CAAR_{it})} \quad (8)$$

The null hypothesis is accepted if the T value is equal to zero.

3.6.10 Limitations of the Event Study

The event study methodology is limited by confounding effects such that it can be difficult to evaluate the precise impact of an event. This was avoided by using a short event window to ensure only the impact of the policy rate announcement on stock prices. Also, other events that could have signalled similar impact to that of the monetary policy around the event window were checked for.

Daily data for stock returns tends to exhibit some conditions of non-normality which can be a limitation. Brown and Warner (1985) note that this has “no obvious impact on event study

methodologies because the mean excess return in a cross section of securities converges to normality as the number of sample securities increases”.

3.7 Conclusion

This chapter gave insight on the research design required to adequately answer the research questions for the study. An explanation of the data collection method, types of data, data collection tools, sampling frame, and how the key variables were deduced was provided. The chapter also explained how the collected data would be analysed. The event study approach was considered a reliable way of measuring the impact of the policy rate announcements on stock prices.

CHAPTER FOUR – DATA ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter reports the empirical findings of the research using descriptive statistics in order to answer research questions, test the hypothesis and provide a basis for conclusions to the research. Daily stock prices were collected from the Lusaka stock exchange daily trading reports. The stock returns were computed using continuous compounding and the event study (using the constant mean model) was used for further analysis. The results of the event study were reported according to how the abnormal returns were aggregated and analysed. Also, an assessment of the response of the stock exchange to policy rate announcements and changes in the policy rate was done, as well as separately examining the response of commercial bank and non-bank stocks.

4.2 Major Findings and Implications

A day wise analysis was performed to look at the overall impact of all the thirty (30) policy rate announcements for each of the days in the event window, for all the sampled listed companies, for commercial bank stock and non-commercial bank stocks. A 15 day event window was used in the study and significant tests were conducted at 5% and 10% significance levels to ensure reliability of the study. The following are the results of the analysis.

4.2.1 Results for all Sampled Listed Companies

22 out of 23 listed companies were analysed over 30 events (observation dates). ZCCM - H was left out of the analysis because it has little to no trading on the stock exchange. Cross section averaging was used to compute average abnormal returns for all events. Table 4.1 below shows that although there is a presence of abnormal returns, there are no days in the event window that exert significant negative or positive impact on the stock prices for all the announcements.

Table 4.1 Sampled listed companies – all events

Day	AAR	CAAR	T-stat	Significance
-7	0,0233	0,0233	0,0701	INSIG
-6	-0,0123	0,0110	-0,1665	INSIG
-5	-0,0234	-0,0124	-0,2859	INSIG
-4	-0,0365	-0,0489	-0,2526	INSIG
-3	0,0001	-0,0488	0,0011	INSIG

-2	-0,0242	-0,0729	-0,3027	INSIG
-1	0,1775	0,1046	0,1613	INSIG
0	-0,0044	0,1002	-0,0581	INSIG
1	0,0086	0,1087	0,1160	INSIG
2	-0,0265	0,0822	-0,2569	INSIG
3	-0,0162	0,0661	-0,2352	INSIG
4	-0,0356	0,0305	-0,4297	INSIG
5	0,0016	0,0320	0,0170	INSIG
6	-0,0043	0,0277	-0,0542	INSIG
7	0,2076	0,2353	0,2267	INSIG

Note:

“The cross section abnormal returns were calculated by taking an average for each event day across all sampled companies and across all events on a day by day basis for each of the events in the event window. The CAARs are computed by cross section average of the cumulative abnormal returns during each event on a day by day basis.”

Adopted from Vaz et al. (2008, p. 231).

The abnormal returns were also sub-sampled based on policy rate events (increases or decreases). Only increases in the policy rate were analysed in this study because the policy rate has not been reduced from the time it was introduced. A total of 6 policy rate increases were made in the period of the study. Table 4.2 below shows existence of a statistically insignificant negative impact of an increase in the policy rate on the stock exchange.

Table 4.2 Sampled listed companies – policy rate increases

Day	AAR	CAAR	T-stat	Significance
-7	-0,0163	-0.0163	0,0701	INSIG
-6	-0,0202	-0.0366	-0,1665	INSIG
-5	0,0094	-0.0271	-0,2859	INSIG
-4	-0,0228	-0.0499	-0,2526	INSIG
-3	-0,0065	-0.0564	0,0011	INSIG
-2	-0,0271	-0.0835	-0,3027	INSIG
-1	-0,0211	-0.1045	0,1613	INSIG
0	-0,0406	-0.1451	-0,0581	INSIG
1	-0,0040	-0.1491	0,1160	INSIG
2	-0,0354	-0.1845	-0,2569	INSIG
3	-0,0180	-0.2024	-0,2352	INSIG
4	-0,0415	-0.2440	-0,4297	INSIG
5	0,0465	-0.1975	0,0170	INSIG
6	-0,0487	-0.2462	-0,0542	INSIG
7	-0,0118	-0.2580	0,2267	INSIG

Note:

“The cross section abnormal returns were calculated by taking an average for each event day across all sampled companies and across policy rate increase events on a day by day basis for each of the events in the event window. The CAARs are computed by cross section average of the cumulative abnormal returns during each event on a day by day basis.” Adopted from Vaz et al. (2008, p. 231).

The abnormal returns were also sub-sampled based on events when the policy rate was maintained. Table 4.3 below shows a CAAR of 0.3586, an insignificant positive impact of the policy rate announcement on the stock market over the event window.

Table 4.3 Sampled listed companies – maintained policy rate

Day	AAR	CAAR	T-stat	Significance
-7	0,0332	0.0332	0,0893	INSIG
-6	-0,0103	0.0229	-0,1303	INSIG
-5	-0,0317	-0.0087	-0,4939	INSIG
-4	-0,0399	-0.0486	-0,2482	INSIG
-3	0,0018	-0.0468	0,0155	INSIG
-2	-0,0234	-0.0703	-0,2701	INSIG
-1	0,2272	0.1569	0,1846	INSIG
0	0,0046	0.1615	0,0568	INSIG
1	0,0117	0.1732	0,2027	INSIG
2	-0,0243	0.1489	-0,2320	INSIG
3	-0,0157	0.1332	-0,2190	INSIG
4	-0,0341	0.0991	-0,3760	INSIG
5	-0,0097	0.0894	-0,1063	INSIG
6	0,0068	0.0962	0,0868	INSIG
7	0,2624	0.3586	0,2571	INSIG

Note:

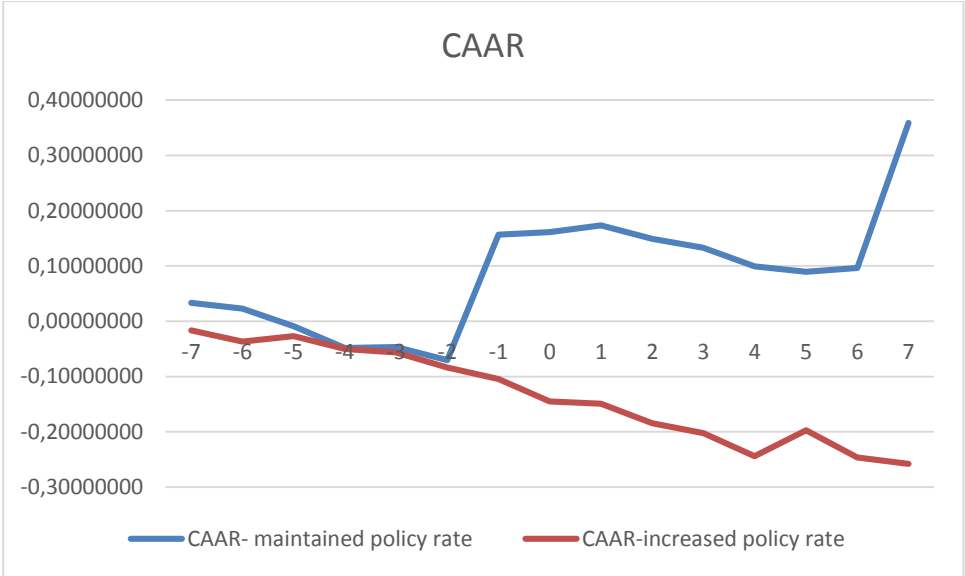
“The cross section abnormal returns were calculated by taking an average for each event day across all sampled companies and across maintained policy rate events on a day by day basis for each of the events in the event window. The CAARs are computed by cross section average of the cumulative abnormal returns during each event on a day by day basis.” Adopted from Vaz et al. (2008, p. 231).

This research does not confirm the finding of Chen et al. (1998) and Bernanke and Kuttner (2004) who found a statistically significant negative impact of the discount rate and the federal funds rate on stock prices in the US.

The CAAR measures the reaction of the stock prices and also depicts the progressive anticipatory aspects of the market through the event window. Figure 4.1 below shows the

CAARs of sampled companies for events when the policy rate was increased and maintained plotted from day -7 to day 7 in the event window.

Figure 4.1 Sampled listed companies CAARs – increased and maintained policy rate events



Note:

“The figure presents cumulative average abnormal returns for all sampled stocks graphed during event time on a day by day basis. The vertical axis is the abnormal return. The horizontal axis is the days relative to the event window. 0 is the vent day.” Adopted from Vaz et al. (2008, p. 231)

The graph depicts non-anticipatory effects of the news of the policy rate on the market for both the events. Schweitzer (1989) and Vaz et al. (2008) observed that when a market is anticipating an increase in the policy rate, the CAAR should follow a downward trend in the early days of the event window, which should stabilise when approaching the event day. An upward trend should be seen after the day of the event. If a market follows this pattern, it shows that the market already anticipated a negative impact from policy rate announcements but corrects it at the time of the announcement. Similarly when the rate is maintained, the CAAR should maintain a constant trend during the event window.

4.2.2 Results for Bank Stock Returns

Existing theory puts forward that the impact of monetary policy actions could be more for commercial bank stock returns because the policy rate has a direct impact on commercial bank operations through its effect on short term and long term interest rates. The study sought to determine the differential response of bank stock returns to the policy rate announcement. Only

4 commercial banks are listed on the Lusaka Stock Exchange and these were analysed over all the 30 events. Table 4.4 shows similar results to those for all sampled listed companies in that despite the variation of normal or expected returns from actual returns, there are no days in the event window that exert significant negative or positive impact on the stock prices for all the announcements.

Table 4.4 Bank stock returns – all events

Day	AAR	CAAR	T-stat	Significance
-7	0,0554	0,0554	0,1679	INSIG
-6	0,0020	0,0574	0,0467	INSIG
-5	-0,0036	0,0538	-0,0843	INSIG
-4	-0,0244	0,0294	-0,1994	INSIG
-3	0,0198	0,0492	0,1981	INSIG
-2	0,0017	0,0509	0,0339	INSIG
-1	0,1962	0,2471	0,1792	INSIG
0	-0,0014	0,2457	-0,0326	INSIG
1	0,0212	0,2669	0,4237	INSIG
2	-0,0067	0,2602	-0,1069	INSIG
3	-0,0037	0,2564	-0,0887	INSIG
4	-0,0075	0,2490	-0,2556	INSIG
5	-0,0011	0,2479	-0,0196	INSIG
6	0,0051	0,2530	0,0838	INSIG
7	-0,0002	0,2528	-0,0045	INSIG

Note:

“The cross section abnormal returns were calculated by taking an average for each event day across all commercial bank stocks and across all events on a day by day basis for each of the events in the event window. The CAARs are computed by cross section average of the cumulative abnormal returns during each event on a day by day basis.” Adopted from Vaz et al. (2008, p. 231).

The commercial bank stock returns were also analysed to measure their response to policy rate increases and when the policy rate was maintained. Table 4.5 below shows an insignificant negative impact on stock prices from policy rate increases. Table 4.6 shows an insignificant positive impact on stock prices when the policy rate is maintained.

Table 4.5 Bank stock returns – policy rate increase

Day	AAR	CAAR	T-stat	Significance
-7	-0,0094	-0,0094	-0,4986	INSIG
-6	0,0049	-0,0045	0,3989	INSIG

-5	-0,0041	-0.0086	-0,0769	INSIG
-4	0,0067	-0.0019	0,3495	INSIG
-3	-0,0065	-0.0084	-0,4106	INSIG
-2	-0,0006	-0.0091	-0,1967	INSIG
-1	-0,0019	-0.0109	-0,3703	INSIG
0	0,0015	-0.0095	0,0877	INSIG
1	-0,0037	-0.0132	-0,3440	INSIG
2	-0,0147	-0.0279	-0,4921	INSIG
3	0,0036	-0.0243	0,2426	INSIG
4	-0,0131	-0.0374	-0,6375	INSIG
5	0,0407	0.0033	0,8571	INSIG
6	-0,0161	-0.0128	-0,5538	INSIG
7	0,0002	-0.0126	0,0530	INSIG

Note:

“The cross section abnormal returns were calculated by taking an average for each event day across all commercial bank stocks and across policy rate increase events on a day by day basis for each of the events in the event window. The CAARs are computed by cross section average of the cumulative abnormal returns during each event on a day by day basis.” Adopted from Vaz et al. (2008, p. 231).

Table 4.6 Bank stock returns – maintained policy rate

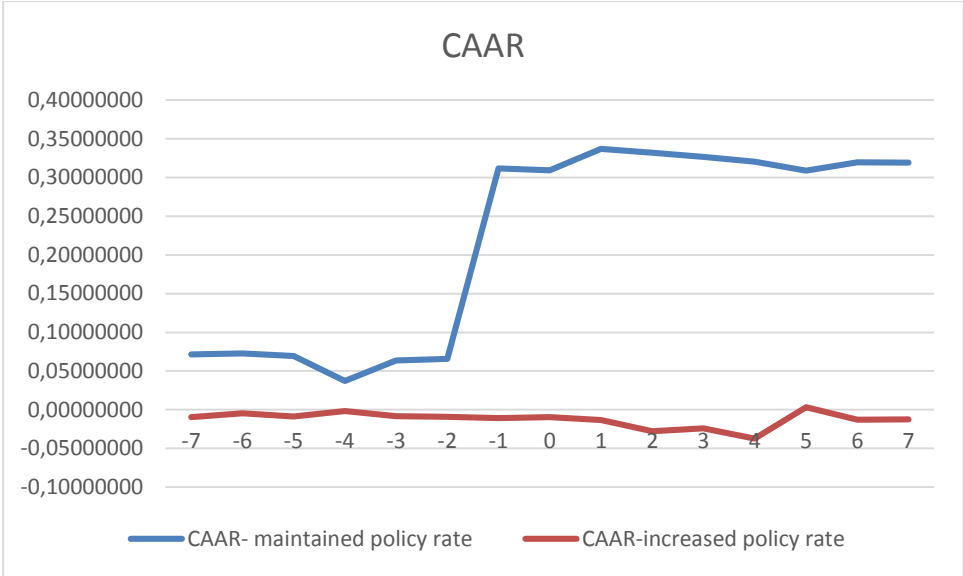
Day	AAR	CAAR	T-stat	Significance
-7	0,0716	0,0716	0,1985	INSIG
-6	0,0013	0,0729	0,0270	INSIG
-5	-0,0034	0.0695	-0,0867	INSIG
-4	-0,0322	0.0373	-0,2418	INSIG
-3	0,0263	0.0636	0,2428	INSIG
-2	0,0023	0.0659	0,0415	INSIG
-1	0,2458	0.3116	0,2050	INSIG
0	-0,0022	0.3094	-0,0451	INSIG
1	0,0275	0.3369	0,5179	INSIG
2	-0,0047	0.3322	-0,0701	INSIG
3	-0,0055	0.3266	-0,1220	INSIG
4	-0,0061	0.3205	-0,1986	INSIG
5	-0,0115	0.3090	-0,2259	INSIG
6	0,0104	0.3195	0,1610	INSIG
7	-0,0003	0.3192	-0,0063	INSIG

Note:

“The cross section abnormal returns were calculated by taking an average for each event day across all commercial bank stocks and across maintained policy rate events on a day by day basis for each of the events in the event window. The CAARs are computed by cross section average of the cumulative abnormal returns during each event on a day by day basis.” Adopted from Vaz et al. (2008, p. 231).

The graph in Figure 4.2 shows the CAARS of commercial bank stocks aggregated for policy rate increase events, and for the events when the policy rate was maintained plotted from day -7 to day 7 in the event window.

Figure 4.2 Bank stock CAARs – increased and maintained policy rate events



Note:

“The figure presents cumulative average abnormal returns for commercial bank stocks graphed during event time on a day by day basis. The vertical axis is the abnormal return. The horizontal axis is the days relative to the event window. 0 is the event day.” Adopted from Vaz et al. (2008, p. 231)

The trend in the graph shows that commercial bank stocks do not have anticipatory effects of news pertaining to monetary policy. This graph is not consistent with the observations of Schweitzer (1989) and Vaz et al. (2008).

4.2.3 Results for Non-bank Stock Returns

The results for non-bank stocks are similar to those for all sampled companies and for bank all bank stocks during all events. Table 4.7 below shows that there is no significant effect from policy rate announcements. Non-bank stocks do not react to the news of policy rate announcements.

Table 4.7 Non -bank stock returns – all events

Day	AAR	CAAR	T-stat	Significance
-7	-0,0321	-0,0321	-0,5753	INSIG
-6	-0,0142	-0,0464	-0,2300	INSIG

-5	-0,0199	-0.0663	-0,3054	INSIG
-4	-0,0120	-0.0783	-0,2113	INSIG
-3	-0,0196	-0.0980	-0,2872	INSIG
-2	-0,0258	-0.1238	-0,3701	INSIG
-1	-0,0187	-0.1425	-0,3608	INSIG
0	-0,0030	-0.1455	-0,0471	INSIG
1	-0,0127	-0.1581	-0,2034	INSIG
2	-0,0198	-0.1779	-0,2697	INSIG
3	-0,0125	-0.1904	-0,2099	INSIG
4	-0,0281	-0.2185	-0,4151	INSIG
5	0,0026	-0.2159	0,0339	INSIG
6	-0,0094	-0.2253	-0,1458	INSIG
7	0,2078	-0.0175	0,2232	INSIG

Note:

“The cross section abnormal returns were calculated by taking an average for each event day across all non-bank stocks and across all events on a day by day basis for each of the events in the event window. The CAARs are computed by cross section average of the cumulative abnormal returns during each event on a day by day basis.”
Adopted from Vaz et al. (2008, p. 231).

The non-bank stocks were further examined to see if they react to rate change announcements in the short term. The results confirm presence of abnormal returns, but they are statistically insignificant. Table 4.8 shows that policy rate increases have an insignificant negative impact on non-bank stock returns while Table 4.9 shows an insignificant positive impact of the policy rate announcements on non-bank stock returns.

Table 4.8 Non - bank stock returns – policy rate increase

Day	AAR	CAAR	T-stat	Significance
-7	-0,0069	-0,0069	-0,2099	INSIG
-6	-0,0252	-0,0321	-0,5582	INSIG
-5	0,0136	-0.0185	0,1403	INSIG
-4	-0,0295	-0.0480	-0,7307	INSIG
-3	0,0000	-0.0480	0,0004	INSIG
-2	-0,0264	-0.0744	-0,5683	INSIG
-1	-0,0192	-0.0936	-0,8518	INSIG
0	-0,0421	-0.1357	-1,0884	INSIG
1	-0,0002	-0.1359	-0,0018	INSIG
2	-0,0207	-0.1566	-0,2223	INSIG
3	-0,0215	-0.1781	-0,3853	INSIG
4	-0,0284	-0.2066	-1,0449	INSIG
5	0,0058	-0.2008	0,0689	INSIG
6	-0,0326	-0.2334	-0,7272	INSIG

7	-0,0120	-0.2454	-0,2931	INSIG
---	---------	---------	---------	-------

Note:

“The cross section abnormal returns were calculated by taking an average for each event day across all non-bank stocks and across policy rate increase events on a day by day basis for each of the events in the event window. The CAARs are computed by cross section average of the cumulative abnormal returns during each event on a day by day basis.” Adopted from Vaz et al. (2008, p. 231).

Table 4.9 Non-bank stock returns – maintained policy rate

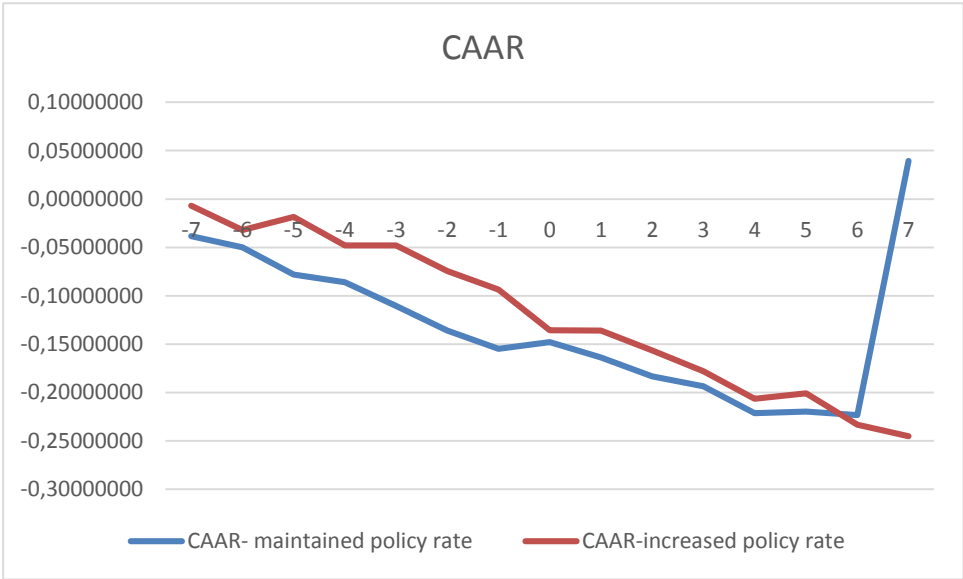
Day	AAR	CAAR	T-stat	Significance
-7	-0,0384	-0,0384	-0,6507	INSIG
-6	-0,0115	-0,0500	-0,1745	INSIG
-5	-0,0282	-0,0782	-0,5207	INSIG
-4	-0,0077	-0,0859	-0,1272	INSIG
-3	-0,0246	-0,1104	-0,3271	INSIG
-2	-0,0257	-0,1361	-0,3410	INSIG
-1	-0,0186	-0,1547	-0,3246	INSIG
0	0,0068	-0,1479	0,1038	INSIG
1	-0,0158	-0,1637	-0,3917	INSIG
2	-0,0196	-0,1833	-0,2793	INSIG
3	-0,0102	-0,1934	-0,1667	INSIG
4	-0,0280	-0,2215	-0,3738	INSIG
5	0,0018	-0,2196	0,0236	INSIG
6	-0,0036	-0,2232	-0,0531	INSIG
7	0,2627	0,0394	0,2532	INSIG

Note:

“The cross section abnormal returns were calculated by taking an average for each event day across all non-bank stocks and across maintained policy rate events on a day by day basis for each of the events in the event window. The CAARs are computed by cross section average of abnormal returns during each event on a day by day basis.” Adopted from Vaz et al. (2008, p. 231).

The graph in Figure 4.2 shows the CAARS of non-bank stocks aggregated for policy rate increase events, and for the events when the policy rate was maintained plotted from day -7 to day 7 in the event window. The trend in the graph shows that the market does not anticipate these events.

Figure 4.3 Non-bank CAARs – increased policy rate and maintained policy rate events



Note:

“The figure presents cumulative average abnormal returns for non-bank stocks graphed during event time on a day by day basis. The vertical axis is the abnormal return. The horizontal axis is the days relative to the event window. 0 is the event day.” Adopted from Vaz et al. (2008, p. 231)

Comparing the response of commercial bank stock prices to non-bank stock prices shows that commercial bank stocks had higher abnormal returns for all events, when the policy rate was increased and when it was maintained, despite the results being insignificant.

These findings confirm that there is inconsistency in the empirical evidence with regard to the reaction of bank stock returns to monetary policy. While Lynge and Zumwalt (1980) find that commercial banks exhibit greater interest rate sensitivity, Vithessonthi and Techarongrojwong (2013) observed a significant positive impact of the policy rate announcements on stock prices in Thailand. The findings of Vaz et al. (2008) and Yakob (2014) are inconclusive with regard to the reaction of bank stock returns in Australia and Malaysia. They observed a significant positive impact of an overnight policy rate cut on bank stock returns but the markets did not respond according to existing theory in the events when the overnight policy rate was increased or maintained.

4.3 Testing the Hypothesis

The hypothesis test was conducted to establish if the policy rate announcement has significant impact on the stock prices of all sampled listed companies as well as to investigate the

relationship between the policy rate and Lusaka Stock Exchange stock prices. The study found an insignificant impact of the policy rate announcement on stock prices for all sampled listed companies for all events, and in events when the policy rate was increased or maintained. A T-value of 3.0 computed for the CAAR of all the sampled listed companies was used to test the hypothesis. We fail to reject the null hypothesis based on these findings.

4.4 Relating the Major Findings to Theory

According to the monetary transmission mechanism, the policy rate affects stock prices by altering the money supply in circulation, inflation, short term and long term interest rates, as well as expectations about future economic activity by financial market participants. It is argued that there is an inverse relationship between interest rates and stock prices, which is supported by some stock valuation models such as the Gordon's Dividend Valuation Model, the Discounted Cash Flow Model and the Capital Asset Pricing Model. According to these models, interest rates affect stock prices by altering the discount factor, future cash flows and influencing the perception of investors. Interest rates influence investors' perception from two perspectives; by affecting the expected return and the risk inherent in their investment decisions. Empirical evidence as observed by Bernanke and Kuttner (2004), Vithessonthi and Techarongrojwong (2013) and more recently Hojat (2015) attributes the effect of the policy rate on stock returns to its impact on the financial market participants' expectations about future economic activity instead of the balance sheet effects on firms and the discount factor.

The inverse relationship between the interest rates and stock prices implies that an increase in the policy rate is expected to have a negative impact on stock prices, causing them to fall. A decrease in the policy rate will have a negative impact on stock prices and cause them to rise while maintaining the policy rate should not have any significant impact on stock returns. The findings for this research are consistent with the supporting theories in the event that the policy rate is raised but not maintained. The policy rate has not been reduced since it was introduced which limits the research to events when the policy rate was increased or maintained. An increase in the policy rate yielded a negative CAAR of 0.2580 at the end of the event window for all the 30 announcements. This means that actual daily returns were less than normal returns by 25.8%. Also, maintaining the policy rate yielded a positive CAAR of 0.3586 so that for all the times when the policy rate was maintained, the actual returns were more than normal returns by 35.86%. Despite the presence of these abnormal returns in both instances, they were statistically insignificant at 5% and 10% significance levels.

The monetary policy transmission mechanism is also assumed to have implications for finance sector stocks. This is because the policy rate is a basis for short term and long term interest rates and banks adjust their deposit and lending rates with each change in the policy rate. As such, changes in the policy rate can affect the balance sheet of finance sector institutions such as commercial banks.

However, it is argued that changes in the policy rate should not have significant effects on commercial banks because these changes affect both sides of the balance sheet. The impact of a change in the policy rate can be measured by its differential effect on commercial bank operations. It is also argued that the effect of the policy rate on bank stock returns can be attributed to its impact on investor expectations and not on the balance sheet of commercial banks. Garg (2008) also note that the interest rate sensitivity of sector profits can be determined by three factors; “sector’s debt heaviness, average firm size and the age of firms in the sector”.

This research finds a negative impact of policy rate increases on bank stock returns with a negative CAAR of 0.0126 in the 15 day event window for all the 30 announcements which is consistent with existing theory. This means that actual daily returns were less than normal returns by 1.3%. Maintaining the policy rate yielded a positive CAAR of 0.3192 implying that the actual daily returns were more by 31.9% which is inconsistent with existing theory. However, these results were not statistically significant at 5% and 10% significance levels.

Although widely debated, the Efficient Market Hypothesis is one of the most applied theories in financial economics. It posits that stock markets are forward looking, and are unlikely to respond to already anticipated policy actions because they tend to incorporate all available information. The graphs for the CAARs for all sampled listed companies, commercial bank stocks and non-bank stocks show no anticipatory effects to the news of either increasing or maintaining the policy rate.

CHAPTER FIVE – CONCLUSIONS AND RECOMMENDATIONS

5.1 Major Findings and Implications.

The purpose for this study was to determine if monetary policy actions matter for stock returns in developing countries like Zambia. The results were obtained by examining all the companies listed on the stock exchange except for Zambia Consolidated Copper Mines Holdings (ZCCM-H) from March 2012 to June 2016. During this period, a total of 30 policy rate announcements were made out of which the policy rate was increased 6 times and maintained for the rest of the announcements. The constant mean return model was used to estimate expected returns as required by the event study. Cumulative abnormal returns were calculated and used to test the null hypothesis. The T statistic was used to test the abnormal returns for significance at 5% and 10% significance level.

In order to answer the research questions, the study examined the effect of policy rate announcements on the sampled companies listed on the Lusaka Stock Exchange. The study found that monetary policy rate announcements do not have significant impact on companies listed on the Lusaka Stock Exchange. While the stock market reacted negatively to policy rate increases, the result was not statistically significant. The stock exchange also reacted positively when the policy rate was maintained. These results are not consistent with the relevant theories as supported by the dividend valuation model and capital asset pricing models that were adopted in this study. They are also contrary to the research findings presented in the empirical evidence of this study, especially those from developed countries. For example, Jensen and Johnson (1995), Bernanke and Kuttner (2004), Iannidis and Kontonikas (2006) and more recently Hojat (2015) found that monetary policy actions through the discount rate and the federal funds rate have a significant impact on some stock markets in some countries in Europe and the United States of America. These studies also found a significant inverse relationship between these variables. On the other hand, the reported results confirmed the findings of Sourial (2002) and Bernnaceur et al. (2009) who observed that the Egyptian stock exchange did not react to the Egyptian Central Bank discount rate. Similarly Vithessonthi and Techarongrojwong (2013) found that the policy rate had a significant positive impact on stock prices in Thailand.

Another aim of this research was to examine the effect of the policy rate on bank stock returns because of the implications that the policy rate has for banking operations according to the monetary policy transmission mechanism. The study found that the policy rate has insignificant

impact on bank stock returns for the Lusaka Stock Exchange. The study also found that bank stock returns react negatively to an increase in the policy rate and positively when the policy rate is maintained. However, these results are not statistically significant. While it is assumed that the policy rate should have a significant impact on bank stock returns because of its effect on short term and long term interest, it is also argued that the policy rate may not have an impact on commercial bank operations because most commercial banks manage their interest rate risk by matching the maturity of their assets and liabilities. Garg (2008, p.13) also established that other factors can determine the interest rate sensitivity of sector profit such as “the sectors’ debt heaviness, the average firm size or the age of the firm”. The empirical evidence revealed that the interest rate sensitivity varies across different economic sectors. These heterogeneous findings show that there is no clear distinction on the effect of the policy rate on bank stock returns between developed and developing countries.

The study also aimed to evaluate the reaction of non-bank stock returns to the policy rate announcement, and it was observed that the policy rate does not have significant impact on non-bank stock returns. The study also established that non-bank stocks exhibit negative abnormal returns when the policy rate is raised and positive abnormal returns when it is maintained. These abnormal returns were not statistically significant.

Therefore, the study provides weak support to the findings of other researchers especially those in developed countries where it has been observed that policy rate announcements have a significant impact on stock prices with a negative relationship between the variables. It also confirms that monetary policy actions through the policy rate may not matter for stock markets especially those in sub-Saharan Africa as they are seen to be in their early stage of development.

As noted earlier, the policy rate can also affect stock prices through its influence on money supply, inflation, and long term interest rates through the monetary policy transmission mechanism. The empirical evidence revealed a significant negative relationship between long term interest rates and stock prices as well as a positive relationship between money supply and stock prices in most developed and some developing countries including sub-Saharan Africa. However, Aziza (2010) notes that money growth exerts negative shocks on stock market capitalisation in some developing countries like Chile, India, Indonesia, South Africa and Nigeria.

5.2 Limitations of the Research

The research was limited by the difficulty in examining the impact of a decrease in the policy rate on the Lusaka Stock Exchange prices. This is because the policy rate has only either been increased or maintained since its introduction in March 2012. This implies that the research findings could not be fully related to existing theory.

The Efficient Market Hypothesis posits that stock markets are more likely to respond to unanticipated monetary policy actions than those that are already anticipated. This can complicate measuring the impact of stock markets to monetary policy actions. One of the ways to resolve this is to distinguish between expected and unexpected components of monetary policy. To do this, a surprise element can be estimated using a technique proposed by Kuttner (2001). The research could not measure the surprise element of monetary policy actions because there is no futures market in Zambia.

In 2013, the Bank of Zambia resolved to rebase the currency in order to enhance its confidence. This was done by dividing the currency unit by 1000. The rebasing of the currency created inconsistency in the daily stock price data set before 2013 and after 2013. In order to make the data set consistent, the daily stock prices before 2013 that were used in the study were treated as if they were also rebased.

Some of the monetary policy press releases from the Bank of Zambia did not have the official release date and time. This made it difficult to deduce the announcement date, in which case the announcement date was taken to be the date when the monetary policy press release was published on the Bank of Zambia website. In other cases, the policy rate announcement date was taken as the day after the monetary policy committee sitting.

Estimating the normal returns was limited to the constant mean return model. The market model could not be adopted because the Lusaka Stock Exchange is highly concentrated so the model could not completely explain the variation in the exchange's stock prices.

5.3 Conclusion and Recommendations for Future Research

Do monetary policy rate announcements matter for stock markets in developing countries especially those in sub-Saharan Africa? This study examined the effect of the monetary policy rate announcements on stock prices in Zambia using daily data from January 2011 to June 2016.

It provided insight on the stock market as a monetary policy transmission mechanism using the event study approach. The study observed that the policy rate announcement by the Bank of Zambia has insignificant impact on equity returns for the Lusaka Stock Exchange. This finding provides weak support to the theoretical framework adopted in the study.

The study has also identified a dearth of empirical evidence on the link between monetary policy and stock prices in Zambia. This raises a need for further research in order to increase the understanding of the link between monetary policy and stock returns. The following topics can be considered for future research purposes.

Researchers can undertake to investigate the determinants of stock market development in Zambia. The research established that the Lusaka Stock Exchange is still in its early stage of development with challenges of a low listing rate and thin trading. Investigating the determinants of stock market developments can provide insight for policy makers on how to improve LuSE's development.

Researchers can also endeavour to investigate the link between inflation, and/or treasury bills and/or bank lending rate, and/or bank deposit rate, and/or money supply. The research established that the policy rate influences these variables through the monetary policy transmission mechanism. In order to better understand if the stock market can be a channel of monetary policy transmission mechanism, it would be inevitable to investigate how these variables influence stock market returns.

The monetary policy transmission mechanism is generally a complex and multifaceted process which may not yield its objectives. As such, it would be inevitable for researchers to investigate the monetary policy transmission mechanism in Zambia to determine the extent to which the policy rate influences other variables such as short term and long term interest rates, inflation, money supply and exchange rates.

6.0 REFERENCES

- Ahmad, N., Muhammad, J. & Masron, T. A. (2009). Factors influencing yield spreads of the Malaysian bonds. *Asian Academy Management Journal*, 14(2), pp 95-114.
- Alatiqui, S. & Fazel, S. (2008). Can money supply predict stock prices? *Journal of Economic Educators*, 8(2).
- Al-mashat, R. & Billmeier, A. (2007). *The monetary transmission mechanism in Egypt*. IMF working paper no. WP/07/285. Retrieved from <https://www.imf.org/external/pubs/ft/wp/2007/wp07285.pdf>
- Aziza, F.O. (2010). The effects of monetary policy on stock market performance: A cross-country analysis. *Journal of Economic Literature*, 3(6), pp. 762-830.
- Barakat, M.R., Elgazzar, S.H., & Hanafy, K. M. (2016). Impact of macroeconomic variables on stock markets: Evidence from emerging markets, 8(1), pp. 195-207.
- Bernanke, B. S. & Kuttner, K. (2004). *What explains the stock market's reaction to Federal Reserve policy?* NBER working paper series, working paper 10402.
- Bernnaceur, S., Boughara, A. & Ghazouani, S. (2009). *On the linkage between monetary policy and MENA stock markets*. Economic Research Forum working paper no. 455
Retrieved from <https://erf.org.eg/wp-content/uploads/2016/04/723.pdf>
- Brealey, A. R., Myers, C. S., & Marcus, A. J. (1995). *Fundamentals of corporate finance*. United States of America. McGraw-Hill International.
- Brown, S. J. & Warner, J. B. (1980). Measuring security price performance. *Journal of Financial Economics*, 8(3), pp. 205-258.
- Brown, S. J. & Warner, J. B. (1985). Using daily stock returns. *Journal of Financial Economics*. 14(1), pp. 3-31

- Buigut, S. (2009). *Monetary policy transmission mechanism: Implications for the proposed East African Community (EAC) monetary union* Retrieved from:
www.csae.ox.ac.uk/conferences/2009-EDiA/papers/300-buigut.pdf
- Cai, H. & Wang, W. (2006). *Effects of interest rate changes on bank stock returns and profitability* (MBA Thesis, Simon Fraser University, Burnaby, Canada). Retrieved from
summit.sfu.ca/system/files/iritems1/3918/etd2477.pdf
- Chen, C.R., Mohan, N. J. & Steiner, L. T. (1998). Discount rate changes, stock market returns, volatility, and trading volume: Evidence from intraday data and implications for market efficiency. *Journal of Banking and Finance*. Vol. 23, pp. 897-924.
- Chileshe, P., Mba, F.Z., Mwanza, B., Mwansa, L., Rasmussen, T., & Zgambo, P. (2014). *Monetary policy transmission mechanism in Zambia*. Bank of Zambia working paper no. WP/ 01/2014. Retrieved from summit.sfu.ca/system/files/iritems1/3918/etd2477.pdf
- Dolley, J.C. (1933). Characteristics and procedure of common stock split-ups. *Harvard Business Review*. Vol. 11, pp. 316-326.
- Durham, J. B. (2003). Monetary policy and stock price returns. *Financial Analyst's Journal*. 59(4): pp. 26-35.
- Ekanayake E.M, Rance R & Halkides M (2008). Effects of federal funds target rate changes on stock prices. *International Journal of Business and Finance Research*, USA, 2(1).
- Ekene, O. C. (2016). Impact of monetary policy on stock returns in Nigeria. *Middle –East Journal of Scientific Research*, 24(5), pp.1779.
- Fama, E. (1965). The behaviour of stock market prices. *Journal of business*. 38(1): pp. 34-105.
- Fama, E. (1970). Efficient capital markets: A review of theory and empirical work. *Journal of Finance*. 25(2), pp. 383-417.

- Fama, E. & Schwert, G. William. (1977). Asset returns and inflation. *Journal of Financial Economics*. Vol. 5, pp. 115-146.
- Flannery, M.J. & James, C.M (1984a). The effect of interest rate changes on the common stock returns of financial institutions. *The Journal of Finance*. Vol. no. XXXIX, pp. 1141-1153.
- Friedman, M. (1965). The role of monetary policy. *The American Economic Review*, Vol. LVIII, Issue 1.
- Garg, K. (2008). The effect of changes in the Federal funds rate on stock markets: A sector-wise analysis. *Undergraduate Economic Review*. 4(1).Gordon, M.J. (1962). *The investment, financing and valuation of the corporation*. Richard D Irwin Inc. Homewood, IL.
- George, E., King, M., Clementi, D., Budd, A., Buiters, W....Vickers, J. (1999). *The transmission mechanism of monetary policy*. Bank of England Report. Retrieved from <http://www.bankofengland.co.uk/publications/Documents/other/monetary/motrans.pdf>
- Ghani, M. & Kotli, A.K. (2016). Stock market response to policy announcement: Evidence from banking sector of Pakistan. *The international Institute of Science, Technology and Education Journal*, 6(1).
- Gordon, M.J. (1962). *The investment, financing and valuation of the corporation*. Richard D Irwin Inc. Homewood, IL.
- Gumede, L. (2014). *Examining the introduction and expiration price effect of warrants on their underlying assets: Evidence from the Johannesburg Stock Exchange* (MCOM Thesis, University of Cape Town, Cape Town, South Africa)
- Hardouvelis, G.A. (1987). Macroeconomic information and stock prices. *Journal of Business and Economics*, Vol. 39, pp. 131-140.
- Hojat, S. (2015). The impact of monetary policy on the stock market (PhD Thesis, Walden University, Minneapolis, USA). Retrieved from: <http://scholarworks.walden.edu/dissertations>

- Holtrop, W. M. (1963). *Monetary policy in an open economy: Its objectives, instruments, limitations and dilemmas*. Essays in international finance, No. 43. Princeton University. Princeton, New Jersey. Retrieved from https://www.princeton.edu/~ies/IES_Essays/E43.pdf
- Hussain, S. M. (2010, August). *Simultaneous monetary policy announcements and international stock market response: An intraday analysis*. Bank of Finland research discussion paper. Retrieved from www.sciencedirect.com/science/article/pii/S0378426610003341
- Ioannidis, C. & Kontonikas, A. (2006). *Monetary policy and stock market: Some international evidence* (PHD Thesis, University of Glasgow, Glasgow, United Kingdom). Retrieved from www.Gla.ac.uk/media/media_219105-en.pdf
- Jensen, G. & Johnson, R. (1995). Discount rate changes and security returns in the US. *Journal of Banking and Finance*, Vol. 19, pp. 79-95.
- Kraft, J. & Kraft, A. (1977). Determinants of common stock prices: A time series analysis. *The Journal of Finance*, 32(2), pp. 417-425.
- Kutnner, K. N. (2001). Monetary policy surprises and interest rates: Evidence from the Fed funds futures market. *Journal of Monetary Economics*, 47(3), pp. 523-544.
- Lapodis, N. T. (2006). Dynamic linkages between monetary policy and the stock market. *Journal of Business and Economic Research*, 4(12), pp. 1-8.
- Leacock, C.J., Warrican, J.S. & Rose, G. C. (2009). *Research methods for inexperienced researchers*. Jamaica. Ian Randle Publishers.
- Levine, R. & Kunt, A. (1996). Stock markets, corporate finance and economic growth: an overview. *The World Bank Economic Review*, 10(2), pp. 223-239.
- Levine, R. & Zervos, S. (1998). Stock markets, banks and economic growth. *The American Economic Review*, 88(3), pp. 537-558.

- Litner, J. (1965). The valuation of risk assets and selection of risky investments in stock portfolios and capital budgets. *The Review of Economic Statistics*, Issue 47, pp. 13-37.
- Lynge, M. J. & Zumwalt, K. (1980). An empirical study of the interest rate sensitivity of commercial bank returns: a multi-index approach. *Journal of Financial and Quantitative Analysis*, 15(3), pp. 731-742.
- Mackinlay, A. C. (1997). Event studies in economics and finance. *Journal of Economic Literature*, Vol. XXXV, pp. 13-39.
- Marone, H. (2003). *Small African stock markets- The case of the Lusaka stock exchange*. IMF working paper no. WP/03/06. Retrieved from <https://www.imf.org/external/pubs/ft/wp/2003/wp0306.pdf>
- Matemilola, B.T., Bany-Ariffin, A.N. & Muhtar, A. F. (2014). The impact of monetary policy on bank lending rate in South Africa. *Borsa Instambul Review*, 15(1), pp. 53-59
- Mbao, F. Z. (2005). *The dynamics of portfolio investment in Zambia's equity market and its impact on Lusaka Stock Exchange market capitalisation* (MBA Thesis, Copperbelt University, Kitwe, Zambia) Retrieved from <http://dspace.cbu.ac.zm:8080/jspui/handle/123456789/145>
- Modigliani, F. & Cohn, R. (1979). Inflation, rational valuation and the market. *Financial Analysts Journal*, Vol. 35, pp. 22-44.
- Mulunda, C.M (2007). *Measuring volatility in stock and Treasury bill markets in Zambia* (MBA Thesis, Copperbelt University, Kitwe, Zambia) Retrieved from <http://dspace.cbu.ac.zm:8080/jspui/handle/123456789/152/1/mulunda>
- Muthama, M.C. (2014). *The relationship between stock market return and monetary policy decisions in Kenya* (MA in Economics Thesis, University of Nairobi, Nairobi, Kenya). Retrieved from economics.uonbi.ac.ke/printpdf/3844
- Mwenda, K.K. (2000). *Legal aspects of corporate finance: The case for an emerging stock market* (PhD Thesis, University of Warwick, Warwickshire, United Kingdom).

- Pearce, D. K. & Roley, V.V. (1985). Stock prices and economic news. *The Journal of Business*, 58(1), pp. 49-67.
- Pennings, S., Ramayandi, A. & Tang, C. H. (2011). *The impact of monetary policy on financial markets in small open economies: More or less effective during the global financial crisis*. Asian Development Bank working paper no. 72. Retrieved from https://aric.adb.org/pdf/workingpaper/WP72_Pennings_Impact_of_Monetary_Policy.pdf
- Schweitzer, R. (July/August 1989). *How do stock returns react to special events?* Federal Reserve Bank of Philadelphia.
Retrieved from <https://www.phil.frb.org/research-and-data/publications/business.../brja89rs.pdf>
- Sharpe, W.F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *The Journal of Finance*, Issue 19, pp. 425-442.
- Simpassa, A. M. (2013). *Competition and market structure in the Zambian Banking Sector*. African Development Bank working paper no.168. Retrieved from <http://www.afdb.org/fileadmin/uploads/afdb/documents/publications/workingpaper>
- Sourial, M.S. (2002). *Monetary policy and its impact on the stock market: The Egyptian case*. Cairo, Egypt, Ministry of economy and foreign trade. Retrieved from www.egx.com.eg/pdf/monetary_policy_and_its_impact_on_egyptian_market.pdf
- Smirlock, M. & Yawitz, J. (1985). Asset returns, discount rate changes and market efficiency. *The Journal of Finance*, 40(4), pp. 1141-1158.
- Stone, B. (1974). Systematic interest-rate risk in a two-index model of returns. *Journal of Financial and Quantitative Analysis*, Issue 9(5), pp. 709-721.
- Talreja, P. (2014). Policy rate changes and the movement of stock market (With special reference to nifty). *Asian Journal of Management Research*, 5(1), PP. 91-100.

- Tobin, J. (1969). A general equilibrium approach to monetary theory. *Journal of Money, Credit and Banking, Vol. 1.*
- Vaz J., Arif, M. & Brooks R. (2008). The effect of interest rate change on bank stock returns, *Investment Management and Financial Innovations Journal, 5(4).*
- Vithessonthi, C. & Techarongrojwong, Y. (2013). Do monetary policy announcements affect stock prices in emerging market countries? The case of Thailand. *Journal of Multinational Financial Management, 23(5)*, pp.446-469.
- Yakob, N.A., Tzeng, Y. Y. & McGowan, C. B. (2014). Overnight policy rate changes and stock market reactions – The experience in Malaysia. *Accounting Finance and Research, 3(3).*
- Yartey, A.Y. & Adjasi, C. K. (2007). *Stock market development in sub-Saharan Africa: Critical issues and challenges*. IMF working paper no. WP/07/209. Retrieved from <https://www.imf.org/external/pubs/ft/wp/2007/wp07209.pdf>
- Zhuang, J et al. (2009). *Financial sector development, economic growth and poverty reduction*. Asian Development Bank working paper no. 173. Retrieved from <http://www.adb.org/site/default/files/publication/28391/economics-wp173.pdf>
- Zeng, J. P. (2010). *Stock market reaction to monetary policy shocks – Study in Australian market*. (MBA Thesis, Auckland University of Technology, Auckland, New Zealand) Retrieved from <Aut.researchgateway.ac.nz/bitstream/handle/10292/950/zengJP.pdf?sequence=3>

7.0 APPENDICES

Table 3.1 policy rate announcements

	Announcement Date	Policy Rate	Remark
1	March 29, 2012	9%	Introduced
2	June 29, 2012	9%	Maintained
3	July 27, 2012	9%	Maintained
4	August 31, 2012	9%	Maintained
5	October 31, 2012	9,25%	Increased
6	November 30, 2012	9,25%	Maintained
7	January 9, 2013	9,25%	Maintained
8	February 27, 2013	9,25%	Maintained
9	March 28, 2013	9,25%	Maintained
10	April 29, 2013	9,25%	Maintained
11	May 31, 2013	9,50%	Increased
12	July 3, 2013	9,75%	Increased
13	July 31, 2013	9,75%	Maintained
14	August 30, 2013	9,75%	Maintained
15	September 30, 2013	9,75%	Maintained
16	November 1, 2013	9,75%	Maintained
17	November 29, 2013	9,75%	Maintained
18	December 27, 2013	9,75%	Maintained
19	February 2, 2014	9,75%	Maintained
20	February 28, 2014	10,25%	Increased
21	March 28, 2014	12%	Increased
22	May 9, 2014	12%	Maintained
23	August 5, 2014	12%	Maintained
24	November 19, 2014	12,5%	Maintained
25	February 12, 2015	12,5%	Maintained
26	May 14, 2015	12,5%	Maintained
27	August 11, 2015	12,5%	Maintained
28	November 3, 2015	15,5%	Increased
29	February 12, 2016	15,5%	Maintained
30	May 13, 2016	15,5%	Maintained