THE EFFECT OF EXCHANGE RATE RISK ON STOCK MARKET RETURNS AT THE NAMIBIA STOCK EXCHANGE

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ABSTRACT

Studies on the effect of exchange rate risk on stock market returns have received prominent attention in literature. This is due to the important role that stock markets play in the mobilization of capital that has the potential to create economic and social development. The researcher used an experimental research design to evaluate the magnitude and statistical significance of the effects of exchange rate risk on stock market returns on the Namibian Stock Exchange (NSX). Secondary data in the form of monthly time series for the period 2010-2018 was sourced from the Central Bank of Namibia (BoN), Namibia Statistics Agency (NSA) and the Namibia Stock Exchange (NSX). An Error Correction Model (ECM) framework was used in the parameter estimation after extracting exchange rate risk. Thereafter, granger causality was employed to examine the direction of causality between exchange rate and stock market returns. Several interesting results were obtained. Firstly, empirical results indicate that, in the long-run, exchange rate risk (-0.61), CPI (1.69), and prime rate (-1.35) are significant variables while GDP growth is an insignificant variable on NSX stock returns. Furthermore, an increase in exchange rate risk and prime rate negatively affect the NSX stock returns while it is positively affected by increases in CPI. Secondly, there exists a significant long-run relationship between exchange rate risk and NSX stock market returns with no significant short-run relationship. Lastly, the direction of causality runs from stock prices to exchange rate risk which is consistent with the portfolio adjustment theory. Based on these findings, the study recommends for the Government of Namibia to put in place policies that promote stable exchange rates thereby reduce the exchange rate risk and ultimately enhance stock market returns.

Keywords: Exchange rates, Stock returns, ARDL, Bound Testing Approach, Namibia Stock Exchange, and Macroeconomics.

JEL Classification: C22; E44; G10

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LIST OF ABBREVIATIONS AND/OR ACRONYMS

CMA	Common Monetary Area
CPI	Consumer Price Index
DevX	Development Capital Boards
ER	Exchange Rates risk
ETF	Exchange Traded Funds
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
GDP	Gross Domestic Products
IFE	International Fisher Effect
M2	Money Supply
NAMFISA	Namibia Financial Institutions Supervisory Authority
NSX	Namibian Stock Exchange
PPP	Purchasing Power Parity
SMR	Stock Market Returns
SSMR	Sectoral Stock Market Returns
UNAM	University of Namibia
IMF	International Monetary Fund
NSA	Namibia Statistics Agency
REER	Real Effective Exchange Rate

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DEDICATION

I dedicate this thesis to my late Father, Mr. Thimotheus Mushishi Shinkeva, for being a strong and yet gentle pillar of strength in my life. Your essence of love, kindness and dedication to pursuing excellence shall forever live with me. I will miss your humor and fine sarcasm. Your spirit shall forever live on, rest in peace Dad.

DECLARATIONS

I, Lazarus Mangundu Shinkeva, hereby declare that this study is my own work and is a true reflection of my research, and that this work, or any part thereof has not been submitted for a degree at any other institution.

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Name of Student Signature Date

CHAPTER 1: INTRODUCTION

1.1 Background of the study

Stock markets play a key role in the mobilization of capital in developed and emerging countries, including Namibia, with the potential to bring about economic and social development (Rakhal, 2018). Furthermore, stock market investment decisions ought to incorporate available information about the macroeconomic environment and monetary policy, which is reflected in stock prices (Gupta & Reid, 2013). Even though financial markets may not have perfect information due to market inefficiencies, investors behave in a forward looking manner by constantly monitoring the economy for new information that could impact on the profitability of their investment decisions. It is therefore self-evident that the Namibian Stock Exchange (NSX) has the potential to generate national development within an enabling economic environment.

The first stock exchange in Namibia was founded in Lüderitz (the Lüderitz Stock Exchange) in the 1900s as a result of the diamond rush which brought hundreds of prospectors to the Namib Desert (Namibia Stock Exchange). The Lüderitz Stock Exchange closed after a few years due to a sudden end of the diamond rush. It was however relaunched as the Namibian Stock Exchange in Windhoek in 1992 with full legislative support from the Government. The NSX is licensed by the Namibia Financial Institutions Supervisory Authority (NAMFISA) and is regulated through the Stock Exchanges Control Act 1 of 1985, as amended. The 36 founding members, comprising of leading Namibian businesses, donated N$10,000 each to act as start-up capital for the

first three years of the exchange. NSX has experienced substantive growth over the years due to its respectable performance and the enabling environment such as the government's financial sector strategy which has recently increased the domestic asset requirement for Namibian registered medical aid funds, insurers and pension funds from 35% to 45% (Ministry of Finance, 2018). To date, it is one of the largest stock exchanges on the African continent with a market capitalization of N$2 trillion (Sep 2018) and 44 listed companies which include 4 commodity Exchange Traded Funds (ETF) and 5 Development Capital Boards (DevX).

Stock market returns are the gains that investors generate from their investments in the stock market which can be in the form of dividends received within the primary market or changes in the stock price within the secondary market (Koskei, 2017). Dividends payout is significantly influenced by factors such as profitability, cash flow, sales growth and market-to-book value which are entity specific (Amidu & Abor, 2006).The share price, on the other hand, is the present value of the markets expectation regarding the firms' future cash flows. Share price can be considered to be a comprehensive measure of returns because share price incorporates all information available to investors. The stock market returns earned by foreign investor is further affected by exchange rates.

Exchange rate is the mechanism in which foreign currencies are valued and exchanged to facilitate international transactions (Madura, 2018). Exchange rate can be valued using either direct quotation or indirect quotation. Direct quotation is when one unit of foreign currency is expressed in terms of domestic currency. Similarly, indirect

quotation is when one unit of domestic currency is expressed in terms of foreign currency. The extent and nature of government involvement in currency markets define the three broad categories of exchange rate systems. Firstly, a free-floating system in which governments and central banks do not actively influence the foreign exchange market which results in exchange rates that are set purely by private market forces of demand and supply. Secondly, a managed-float system whereby exchange rates are still free to float based on supply and demand but with additional influence from governments through the buying or selling of their own currencies. Lastly, a fixed rate system whereby the exchange rate between two currencies is set through government policies. Namibia adopted a fixed exchange rate system in 1992 by joining the Common Monetary Area (CMA) and effectively pegging the Namibian Dollar to the South African Rand. Within the CMA, consisting of South Africa, Lesotho, Namibia, and Swaziland, South Africa has a significant influence on the exchange rate and monetary policies because it accounts for more than 90% of the CMA's nominal GDP (Masha, Harris, Wang, & Shirono, 2007). Despite the significant influence of South Africa, Namibia remains committed to the CMA in pursuance of stable exchange rate capable of maintaining price stability and economic growth.

Exchange rate risk can thus be defined as the variability of a firm's value (returns), due to changes in the exchange rate (Madura, 2018). Similarly, Prasad and Suprabha (2015) defined foreign exchange risk as the ambiguity resulting from the unexpected exchange rate movements between currencies. This variability of firm's value may be examined through a regression analysis of the time series data of the exchange rate movements and stock return. The exchange rate movement is measured using the Real Effective

Exchange Rate index which is the aggregated exchange rate for all Namibian major currencies with their respective weights and the stock returns is measured using the stock market prices. For multinational corporations, globalization and subsequent increase in economic interaction and integration of companies and governments have created new sources of risk associated with exchange rate movements (Tai, 2010). The exchange rate risk can thus negatively or positively affect the firm's cash flow and performance and ultimately affect the firm returns. It is therefore important for individual and institutional investors to understand the extent to which their individual investments within a portfolio may be affected by changes in the exchange rate. Above all, investors ought to understand the impact of the exchange rate on their investments. Additionally, firms should manage their exchange rate risks to stabilize their cash flow and returns so that the risk of declining stock price is reduced (Madura, 2018).

Stock markets are inherently part of economic policies transmission mechanism through which exchange rate risk may affect stock market returns. In spite of the above, there is limited empirical literature for Namibia in the subject area. Therefore, this study aims to evaluate the effect of exchange rate risk on Namibia Stock Exchange (NSX) stock return.

1.2 Statement of the problem

Globalization and the growth of international trade has resulted in exchange rate risk being a major source of risk for corporations, especially those involved in international trade, as it directly affects the corporate cash flow and ultimately the corporate returns (Prasad & Suprabha, 2015; Salifu, Osei & Adjasi, 2007). Based on the efficient market

hypothesis, unexpected changes in the exchange rate should be priced into share prices immediately and thus it is imperative to understand the effect of exchange rate risk on stock market returns (Fama, 2016). Furthermore, stock exchange plays a vital role in creating wealth and stimulating economic growth and development. A key role of the stock exchange includes capital formation, thus the returns at the NSX is crucial to achieving Namibia's Vision 2030 objective of transforming Namibia into an industrialised nation that is globally competitive. In addition, stock market returns is critical to investors, particularly foreign investor as they require a positive real return on their investments over time. Ordinary Namibians are also affected by the returns at the NSX through institutional investors, such as pension funds, medical aid funds and insurers, who may hold investments in NSX listed shares. The recent political uncertainties in South Africa and subsequent Namibian Dollar depreciation have demonstrated the extent of Namibia's exchange rate exposure. Therefore, examining the effects of exchanges rate risk on stock market returns is imperative.

1.3 Research objectives:

- To examine the effect of foreign exchange risk on stock market return on the NSX
- To determine the direction of causality between stock market returns and exchange rate on the NSX

1.4 Hypotheses of the study

H_{01}: Exchange rate risk has no effect on stock returns

H_{11}: Exchange rate risk has an effect on stock returns

H_{02}: There is no causal relation between exchange rate and stock returns

H_{12}: There is a causal relation between exchange rate and stock returns

1.5 Significance of the study

The study will assess the exchange rate risk of NSX listed companies thereby highlighting the extent to which the exchange rate appreciations and depreciations are responsible for returns of listed companies. The study will complement the body of literature on the relationship between exchange rate risk and stock returns, particularly in Namibia. In addition, the findings of the study will aid investors and portfolio managers in formulating effective diversification policies and portfolio strategies that warrants a positive real return on investments over time. Additionally, the study provides useful findings that will assist executives of NSX listed companies in making more informed management decisions that result in the maximization of shareholders' wealth. Furthermore, the findings will inform governmental institutions, such as the Bank of Namibia, in the formulation and implementation of monetary policies and exchange rate regulations that promote exchange rates that are suitable for the performance of the Namibian equity market and growth of the economy. This will contribute to the reduction of unemployment and the achievement of Namibia's Vision 2030 objective of transforming Namibia into an industrialised nation that is globally competitive.

1.6 Limitation of the study

Like every other research, the study faced challenges and limitations. The main limiting factor for the study is the availability and significant reliance on secondary data of which its validity could limit the findings in the study albeit to a less extent due to the credibility of the source institution (BoN, NSA) and NSX).

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction and Conceptual Framework

This chapter discusses the theoretical foundation and relevant empirical studies. Moreover, it provides an overview of all economic phenomenon related to the effect of exchange rate risk on stock market returns. The researcher employed the conceptual framework as shown in Figure 2.1 to explain the natural progression of the phenomenon based on relevant theories, concepts and empirical research. Section 2.2, therefore, discusses the theoretical foundation which forms the basis for examining the effect of exchange rate risk on stock market returns. Section 2.3 provides an overview of the empirical literature. Lastly, the chapter is concluded in section 2.4.

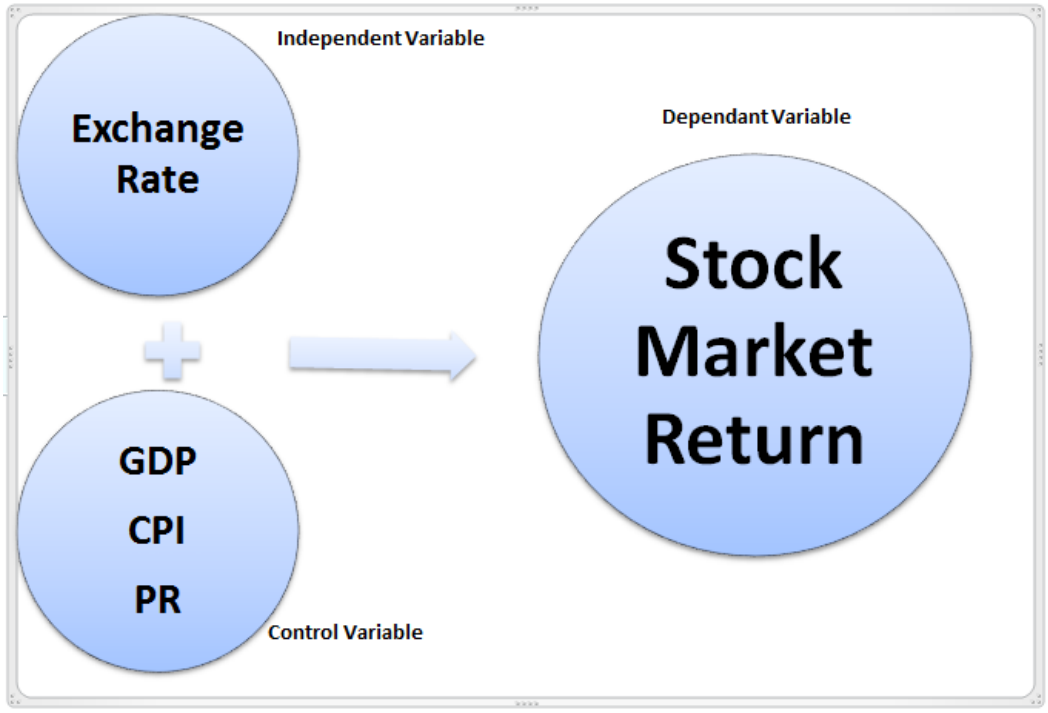

Figure 2.1: Conceptual Framework. *Adapted from "The effect of exchange rate changes on stock market returns at the Nairobi Securities Exchange (Unpublished masters research project)", by N. Makori, 2016, University of Nairobi, Nairobi, Kenya.*

2.2 Theoretical foundation

Many early scholars such as Keynes (1937), Kendall and Bradford (1953), Fama (1970) and Aggarwal (1981) have attempted to explain the phenomenon relating to exchange rates and stock returns through the development of various theories. Though these theories have some limitation, general assumptions can be made by applying these theories. These relevant theories are discussed below.

2.2.1 Efficient Market Hypothesis and Random Walk

Efficient markets ought to effectively evaluate all information and should result in stock prices that are an unbiased reflection of all available information at all times (Sheefeni, 2015). The efficient market hypothesis postulates that at any point in time the actual stock price will be a good estimate of its intrinsic value (Fama, 2016, 1970). The efficient market hypothesis is based on the fair game model and recognises that investors can be confident that a current market price fully reflects all available information about a stock and its expected return, thus price is consistent with risk (Naseer & Tariq, 2014).

Lee, Finnerty, Lee and Lee (2012) define market efficiency as the extent to which both accounting and market-based information is continuously incorporated in current stock prices. Fama (2016, 1970) further classifies the market efficiency into three forms; weak, semi-strong and strong forms. These forms are determined based on how rapidly information is factored into stock prices and thus it is influenced by dynamic forces such as transactional costs, informational costs and the level to which investors agree on the implication of current information. The weak form EMH suggests that all past

information is priced into stock and therefore technical analysis of stock returns is not possible while as fundamental analysis can only produce returns above market averages in the short term. On the other hand semi-strong form EMH suggests that new public information is instantly priced into stock and thus neither fundamental analysis nor technical analysis can provide returns above market averages. Lastly strong form EMH implies that all information which is public and private is priced into stocks and that no investor can gain advantage over the market as a whole.

The random walk hypothesis looks at the time-series behavior of prices and supports the empirical testing of the EMH (Lee, Finnerty, Lee, & Lee, 2012). It is a financial theory which suggests that stock prices change according to a random walk and consequently the stock prices cannot be predicted (Lim, Lim, & Zhai, 2012). Lim et al. (2012) found that the idea of random walk (also known as Brownian motion) is based on Robert Brown's study in which he observed that grains of pollen suspended in water have a rapid and random oscillatory motion when viewed under a microscope. Kendall and Bradford (1953) officially applied the random walk theory to stock prices and established that stock prices similarly move randomly. Random walk theory goes parallel with the EMH, in that information is considered to be inherently unpredictable, thus the stock movement of stock prices will be unpredictable if the stock price is responsive to the information. The theory of the random walk is also supported by Malkiel (1999) who found that the short-run changes in stock prices are continually independent and random, hence stock returns is unpredictable.

2.2.2 Economic Theories

Economic theories such as Monetarist theory (Friedman & Paden, 1983) and Keynesian theory (Keynes, 1937) maintain that for one to understand the changes in stock returns, it is crucial to consider economic variables such as supply of money, interest rate and inflation in forecasting movement in exchange rate. The monetarist theory is an economic concept which contends that changes in the money supply are the most significant determinants of the rate of economic growth and the behavior of the business cycle (Jones, 2016). Monetarist theory, in particular, explains the link between quantities of money and economic variables such as GDP, the inflation, economic fluctuations, and interest rates (Friedman & Paden, 1983). Monetarist theory further highlights the contrast between nominal money and real money. Nominal money is the amount of money in a country and is not adjusted for the effects of inflation. Real money, on the other hand, is not the pieces of paper but what those pieces of paper will buy and therefore is adjusted for the effects of inflation. In addition, a monetarist view advocates that changes in money supply are the chief determinant of GDP in the short run and inflation in the long run (Jahan & Papageorgiou, 2014).

Keynesian theory, however, advocates that demand for goods and services is the key to economic output (Jahan & Papageorgiou, 2014). Aggregate output therefore depends on the savings culture driven by interest rates, the quantity of money, the prospective yield of capital-assets, the propensity to spend and lastly the social factors which influence the level of nominal income (Keynes, 1937). Various frameworks such as the New Keynesian model were developed based on the Keynesian theory as reference for understanding fluctuations in economic activity and inflation and their relation to

monetary and fiscal policies (Galí, 2018). Despite the failure of the New Keynesian model in predicting the global financial crisis (2007-2008), it has remained dominant in the classroom, academic research, and in policy modeling. Galí (2018) argues that the model has remained relevant by continuously widening its scope to include the criticism raised against it such as the incorporation of financial frictions post the global financial crisis. Lioudis (2019) explained the difference between Monetarist and Keynesian theories as:

> Simply put, the difference between these theories is that Monetarist economics involves the control of money in the economy, while Keynesian economics involves government expenditures. Monetarists believe in controlling the supply of money that flows into the economy, while allowing the rest of the market to fix itself. In contrast, Keynesian economists believe that a troubled economy continues in a downward spiral unless an intervention drives consumers to buy more goods and services. (para. 1)

Though these theories differ on the direction of the causal relationship amongst the macroeconomic variable, they both contend on the existence of the codependency amongst the variables. Therefore a study of one variable ought to consider the causal relationship with other macroeconomic variables.

2.2.3 Traditional Approach and Portfolio Adjustment theory

The causal relationship between exchange rate and stock price is explained by mainly two theoretical approaches (Dar, Bhanja, & Tiwari, 2014). Firstly, the traditional approach which supports the view that there is a positive relationship between stock

price and exchange rate whereby the causality runs from exchange rate to stock prices. Aggarwal (1981) links exchange rate movements to stock returns by asserting that currency depreciation will result in higher exports and therefore higher stock returns through increased profits. Secondly, the portfolio adjustment approach which supports the opposite view that there is a negative relationship between stock price and exchange rate whereby the causality runs from stock prices to exchange rate. This phenomenon is explained by Suriani et al. (2015) in their finding that domestic investors invest more in domestic market in times of increasing stock prices which in turn increase the demand for local currency. The increased demand in local currency will force an increase in interest rate which will ultimately attract the foreign investors. This in turn will result in the appreciating of local currency against that of foreign currency. Therefore, the traditional approach is viewed as a "flow-oriented" exchange rate model, suggesting a Granger causality running from exchange rates to stock prices (Huy, 2016). On the other hand, the portfolio approach is viewed as a "stock- oriented" exchange rate model, indicating that the effect is from stock prices to exchange rates.

2.2.4 PPP and IFE theories

Purchasing Power Parity (PPP) and the International Fisher Effect (IFE) theories both focus on how the exchange rate will change over time. The PPP theory as proposed by Cassel (1918) postulates that the exchange rate will change in accordance with the inflation differential between countries. The theory of PPP is founded on the "law of one price" which states that prices of similar goods in two different countries should be equal when measured in a common currency (Hyrina & Serletis, 2010). Madura (2018)

further explains that the PPP theory is supported by the understanding that a country with higher inflation will experience a decrease in the demand for its currency due to decreased export (resulting from higher local prices) and increased import (resulting from lower foreign prices). Hence, the exchange rate will adjust accordingly based on the resultant change in the currency demand.

The two major forms of PPP theory are the absolute form and the relative form (Officer, 1978). The absolute PPP asserts that, in absence of international barriers, the equilibrium exchange rate is determined by the ratio of the price level of the domestic country to the price level of the foreign country. However, the existence of tariffs, transportation costs and quotas renders the absolute PPP impractical (Madura, 2018). The relative PPP therefore accounts for such market imperfections and states that the ratio of the equilibrium exchange rate in a current period (t) to the equilibrium exchange rate in a base period (o) is determined by the ratio of the domestic country's price index in period (t) to the foreign country's price index in period (t), where both indexes are measured relative to period (o) (Madura, 2018). The relative PPP can be expressed as:

$$e_f = \frac{1+I_h}{1+I_f} - 1$$

Where e_f is the percentage change in the foreign currency; I_h is the home currency inflation rate; and I_f is the foreign currency inflation rate.

On the other hand the IFE theory developed by Fisher (1930) suggests that exchange rate will change according to the nominal interest differential between counties. Hence, the difference between the nominal interest rates in two countries is directly proportional to the changes in their currencies at any given time (He, 2018). Madura (2018) explains

that the IFE theory is founded on the understanding that local investors would require a return from local savings deposit that is greater than the expected rate of inflation such that;

Nominal interest rate = Real interest rate + Expected inflation rate

Thus,

Expected inflation rate = Nominal interest rate – Real interest rate

Therefore, if investors require the same real interest rate in all countries, the expected inflation differential between home country and foreign country can be expressed as;

$$\text{Expected inflation differential} = (i_h - \text{Real}_h) - (i_f - \text{Real}_f)$$

$$= i_h - i_f$$

Where i_h is the home country nominal interest rate; i_f is the foreign country nominal interest rate; Real_h is the home country real interest rate; and Real_f is the foreign country real interest rate. The expected inflation differential can then be applied to the PPP theory to estimate the change in the exchange rate. The IFE is thus expressed as:

$$e_f = \frac{1+ i_h}{1+i_f} - 1$$

The critical assumptions of the IFE theory are, firstly, that interest rates are independent of other monetary variables and that they provide a strong indication of how the currency of a specific country is performing (Cooray, 2002). Secondly, changes in inflation do not impact real interest rates, since the real interest rate is simply the nominal rate minus inflation. Though the theory has some limitation, general

assumptions can be made by applying the IFE such as that, high inflation counties tent to have a high nominal interest rate which in turn tends to weaken their currencies over time (Madura, 2018).

2.2.5 Foreign Exchange Risk

Foreign exchange risk is increasingly becoming an important variable that affects international competitiveness and performance of firms due to globalization. Prasad and Suprabha (2015) defined foreign exchange risk as the ambiguity resulting from the unexpected exchange rate movements between currencies. They further classified the risk into Transactions risk, Translation risk and Economic risk. Transaction risk results from the time delay between entering into a contract and settling it. The greater the time differential between the entrance and settlement of the contract, the higher the transaction risk. Translation risk results from doing business internationally or holding assets in a foreign country. Economic risk is the chance that macroeconomic conditions like exchange rates, government regulation, or political stability will affect an investment. At firm level, exchange rate risk denotes the degree to which the firm value is affected by movements in exchange rates (Hyde, 2007). The effect of exchange rate on stock market returns, as a transmission mechanism from money market to the capital market, is significant in retaining the value of investment in the financial market (Sichoongwe, 2016). Ajaz, Nain, Kamaiah and Sharma (2017) found that depreciation of local currency raises the cost of imported and thereby increasing the cost of production for importing firms. These higher production costs may result in either, lower profits or expectation of lower profits and, hence, decreasing stock prices.

McDonald (2014) argues that risk is an inherent part of all economic activities and therefore should be minimised through risk management. Currency derivatives could be utilised in hedging from foreign exchange risk. Firms have various approaches in managing exchange rate risk, either by using operational hedging, financial hedging or both (Chong, Chang, & Tan, 2014). McDonald explains the use of derivatives for risk management as follows:

> Derivatives are a tool for companies and other users to reduce risks. With derivatives, a farmer – a seller of corn- can enter into a contact that makes a payment when the price of corn is low. This contract reduces the risk of loss for the farmer, who we therefore say is hedging (p. 25).

2.3 Empirical literature

Globalization and the growth of international trade brought about an increase in research interest in the relationship between exchange rates and stock prices/returns. This includes Mozumder, De Vita, Larkin & Kyaw, 2015; Bahmani-Oskooee & Saha, 2016; Adjasi, Biekpe & Osei, 2011; Eita, 2012; among many others. In general, scholars support the view that exchange rate is one of the contributing factors to business profitability and stock prices. However, causal relation between exchange rate risk and stock market returns is the subject of much debate.

The literature about the relationship between stock markets and exchange rate has found diverse evidence of the impact of exchange rate on stock returns. There are studies (Al-

abdallah, Ibrahim, & Aljarayesh, 2017; Bernard & Galati, 2000; Suriani et al., 2015) that have found no impact of exchange rates on firm's stock returns, while there are some studies (Aggarwal, 1981; Ajaz et al., 2017; El-Masry, Abdel-Salam, & Alatraby, 2007; Koskei, 2017) that have found that stock returns are significantly affected by exchange rate. Bin Omar, Nisham, Mohammad and Ahmad (2017) reviewed studies that examined the exchange rate exposure of various economies and found that developed and closed economies tend to have lower level of exposure as a result of lower imports and export, the contrary was however true for developing economies.

2.3.1 Empirical Evidence from Americas, Europe and Asia

Mozumder et al. (2015) employed the Jorion two-factor model to investigate the sensitivity of firm value to exchange rate movements. They found that European firms' stock returns are positively affected by depreciation of exchange rates and negatively affected by appreciations. Furthermore, the exposure was found to be higher during the financial crisis. Similarly, Bahmani-Oskooee and Saha (2016) observed the stock markets from Brazil, Canada, Chile, Indonesia, Japan, Korea, Malaysia, Mexico, and the U.K and found that exchange rate changes have asymmetric effects on stock prices which are mostly short-run. On the contrary, Sohail and Hussain (2009) employed the Vector Error Correction Model (VECM) and found long-run with no short-run relationships in their study that investigated the relationships between five macroeconomic variables (consumer price index, industrial production index, real effective exchange rate, money supply and treasury bill rate) and stock prices in Lahore Stock Exchange in Pakistan. Furthermore, Türsoy (2017) found both long-run and

short-run relationships in the study that employed the autoregressive distributed lag (ARDL) model and the Error Correction Model (ECM) to investigate the relationship between stock prices and real exchange rates using monthly data from Turkey for the period between January 2001 and September 2016. The study found strong long-run co-integration with bidirectional causality between stock prices and real exchange rates. In the short run, however, unidirectional causality runs from the real exchange rates to the stock prices.

2.3.2 Empirical Evidence from Africa

Considering an African context, Adjasi et al. (2011) investigated the long and short-run relationship between stock prices and exchange rate movement in seven African countries by using the vector autoregressive (VAR) co-integration and impulse response analysis. Their findings show that exchange rate depreciation drives down stock prices in Tunisia both in the long and short-run. The rest of the countries did not depict a long-run relationship between stock market prices and exchange rate, however in the short-run the stock returns in Ghana, Kenya, Mauritius and Nigeria reduce when induced by exchange rate shocks but increase in Egypt and South Africa. Mwaanga and Njebele (2017) however found long-run but no short-run relationships in their study in which they employed the Auto Regression distribution lag (ARDL) bound tests and Error Correction Model (ECM) to investigate the relationship between the exchange rate and the stock market price in Zambia. Similarly, Sichoongwe (2016) found a negative relationship between exchange rate volatility and stock market returns in Zambia in his study where he employed the GARCH (1,1) model.

2.3.3 Empirical Evidence from Namibia

Eita (2012) investigated the macroeconomic determinants of stock market prices in Namibia using the vector error correction model (VECM) and revealed that Namibian stock market prices are predominantly determined by economic activity, interest rates, inflation, money supply and exchange rates. Eita (2012) further concluded that money supply, exchange rate, inflation and GDP move stock market prices away from equilibrium which can only be corrected through adjustments in the stock market itself. Sheefeni (2015) found that the Namibian stock market shows evidence of weak form efficiency and therefore NSX investors cannot predict stock prices or returns in the short term based on historical data.

2.3.4 Determinants of stock market returns

Empirical literature outlines three main determinants of stock market return. Firstly, exchange rate which is widely accepted to affect balance sheet items and ultimately affect firm equity and returns in keeping with the economic theories. Stock return and exchange rate relationship has therefore been of interest to researchers because it is considered to be crucial to portfolio diversification and risk hedging strategies. Chkili, Aloui, and Nguyen (2012) used a univariate and multivariate GARCH-type models to investigate the properties of conditional volatilities of stock returns and exchange rates, as well as their empirical relationships by taking three European stock markets and two popular US dollar exchange rates as a case study. Their findings show that bilateral relationships between stock and foreign exchange markets are highly significant for France and Germany. Similarly, Mouna and Anis (2016) investigated the sensitivity of

financial sector stock returns to market, interest rate, and exchange rate risk in three financial sectors (financial services, banking, and insurance) and found significant effects of the stock market returns, interest rate, and exchange rate volatility in eight countries across Europe, the US and China. In addition, Suriani et al. (2015) affirm that the relationship between exchange rate and stock return may vary depending on the firm's geographical area, economic conditions, relations with international world and domestic conditions etc.

Secondly, economic factors such as GDP, consumer price index (CPI) and interest rate have significant influence on the financial performance of firms. This view is supported by Rakhal (2018) who found that that money supply and remittance has a positive effect on the stock returns whereas interest rate and exchange rate have a negative effect on stock market returns. GDP as a measure of the total goods and services produced by a country is the most comprehensive indicator of the overall state of the economy. Since a strong economy helps boost corporate returns, over the long run, stock market returns tend to reflect economic performance. CPI as a measure of the rate at which the prices of consumer goods and services are changing over time is an overall indicator of the decreasing purchasing power and ultimately decreasing value of the economy. Increasing CPI tends to negatively impact corporate profits through higher input costs. Cohen, Polk, and Vuolteenaho (2005) support this view based on their study which found that high inflation coincides with low prices for stocks and is consistent with Modigliani and Cohn's hypothesis which suggest that stock market investors suffer from money illusion. Money supply is a measure of the total amount of money held by

households and companies in the economy which can be used to make payments or to hold as short-term investments (IMF, 2015). Real activity economists maintain that an increase in money supply will lead to an increase in stock prices (Maskay, 2007).

Lastly, governments regulate the environment in which the private sectors operate and these rules may change from time to time, prompting price reactions in stock markets (Pástor & Veronesi, 2012). These reactions tend to be weak if the change is widely expected; on the other hand they can be strong if the markets are caught by surprise. Monetary policy of a country affects firm performance through the cost of debt and the availability of money, which could affect a firm's ability to access external sources of funding (Egbunike & Okerekeoti, 2018). Fiscal policies, however, affect a firm's after tax returns, its cost of capital, and potentially the demand for its products.

2.4 Conclusion

This chapter reviewed theoretical and empirical literature that aims to explain the phenomenon between exchange rate risk and stock market returns. The theories discussed illuminate on the stock market returns (Efficient Market Hypothesis, Random Walk Hypothesis and Economic Theories) and the exchange rate risk (Purchasing Power Parity and International Fisher Effect) which are the two key variables necessary in achieving the research objectives. Furthermore, the exchange rate risk and stock market returns are linked together by the Traditional Approach and Portfolio Adjustment theories. Empirical literature suggest that, in general, scholars support the view that

exchange rate, economic factors and government regulations are the contributing factors to business profitability and stock returns. However, causal relation between the variables and stock market returns is the subject of much debate.

The next chapter will discuss the research methods employed in this study which forms the foundation from which the results and findings will be obtained.

CHAPTER 3: RESEARCH METHODS

3.1 Introduction

This chapter presents the research methods for the study which is divided into 8 sections; Section 3.2 presents the underlying philosophical assumptions underpinning the research. Sections 3.3 and 3.4 present the research design and procedures respectively. Section 3.5 discusses the data analysis process employed in the study which includes the model specification, ARCH/GARCH modeling, unit root testing, correlation testing and bounds co-integration test. Next, section 3.6 presents the hypothesis testing procedures and section 3.7 discusses the variables employed in the study. Finally, the chapter is concluded with the research ethics employed in the study.

3.2 Philosophical Assumptions

All research is based on some underlying philosophical assumptions about what constitutes satisfactory research and the appropriate research methods for the development of knowledge in the study. The philosophical assumptions consider the nature of reality and truth (Ontological), what counts as knowledge and how it is justified (Epistemological), the role of values and ethics in the research process (Axiological), and finally the process and methods of research (Methodological) (Antwi & Kasim, 2015). This study was therefore guided by the philosophical assumptions outlined in the postpositivism interpretive framework. Postpositivism is a framework that determines the validity of knowledge based on empirical evidence. Postpositivism relies on empirical theory and is objective, quantitative and deductive and for this reason the postpositivist approach is widely assumed as science by researchers. The

potpositivist framework assumes that a single reality exists based on facts which can be constructed through research and statistics. In addition, the approach to enquiry should be scientific and the researcher's biases need to be controlled and not expressed in a study. The postpositivism framework is relevant to this study because the researcher used findings derived from the employment of scientific methods in order to create legitimate knowledge.

3.3 Research Design

The study employs an experimental research design. A quantitative research method to determine the effects of exchange rate risk on stock market returns is used. This design is deemed appropriate because it enables the researcher to evaluate the magnitude and statistical significance of the variables understudy.

3.4 Procedure

The e-views statistical software package was used to estimate the model by employing secondary data sourced from the Central Bank of Namibia, Namibia Statistics Agency (NSA) and the Namibia Stock Exchange. The variables to be captured in the model are the monthly Stock Market Returns (SMR) being the dependent variable and Exchange Rates risk (ER) being the independent variable for the periods 2010 to 2018, yielding 108 observations. Adjasi et al. (2011) advocates for incorporation of macroeconomic variables in the modeling of stock return exposure to exchange rate risk. The researcher will therefore incorporate the following control variables: Gross Domestic Product (GDP), Consumer Price Index (CPI) and Money Supply (M2).

3.5 Data analysis

The researcher firstly used the Autoregressive Conditional Heteroskedasticity (ARCH) model and its extension, the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model to extract exchange rate risk/volatility. ARCH/GARCH models were developed to estimate the volatility of financial time series data as a measure of risk (Kingsley & Peter, 2019). Hence, the GARCH variance series was employed as a proxy for exchange rate risk.

Thereafter, the estimation model was selected based on the "Method selection for time series data" matrix as shown in Figure 3.1 below. Consequently, the study employed the Autoregressive Distributed Lag model (ARDL) as suggested by Pesaran, Shin and Smith (2001) for co- integration investigation and error correction analysis. ECM models are commonly used for data where the underlying variables are stationary at first difference and co-integrated (Durr, 1992; Engle & Granger, 1987; Yan, Liu, & Li, 2014). ECMs are a theoretically-driven approach useful for estimating both short-term and long-term effects of one time series on another. If a long-run relationship is identified between the variables, the ECM is required in order to establish the speed at which a dependent variable adjusts to equilibrium (Sgammini, 2016).

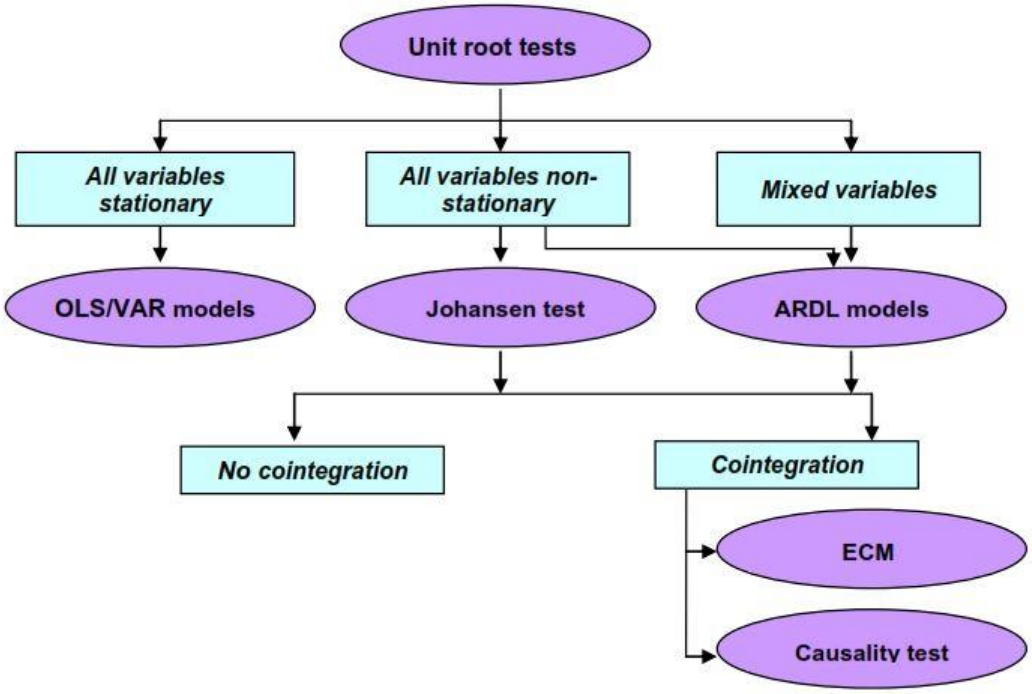

Figure 3.1: Method selection for time series data. *Reprinted from "Selecting appropriate methodological framework for time series data analysis", by Shrestha & Bhatta, 2018, retrieved from https://www.sciencedirect.com*

3.5.1 Model specification

In this regard the study employed the long-run and short-run multiple regression model adopted from Ali Shah, Kouser, Aamir and Saba (2012); Mechri, Ben Hamad, de Peretti and Charfi (2019). Equation (1) below shows the representation of the long-run regression model that explains the long-run effect of the independent variables on stock market returns:

$$SMR_t = \beta_0 + \beta_1 ER_t + \beta_2 GDPG_t + \beta_3 CPI_t + \beta_4 PR_t + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where;

SMR_t is the stock market return at time t,

β_0 is the constant term,

β_{1-4} is the long-run coefficients of estimation ,

ER_t is the exchange rate risk at time t,

$GDPG_t$ is the gross domestic product growth at time t,

CPI_t is the consumer price index at time t,

PR_t is the prime rate at time t, and

ε_{it} is the stochastic residual term

Equation (2) below shows the representation of the short-run regression model that explains the short-run effect of the independent variables on stock market returns:

$$\Delta SMR_t = \beta_5 + \beta_6 \Delta ER_t + \beta_7 \Delta GDPG_t + \beta_8 \Delta CPI_t + \beta_9 \Delta PR_t + \pi_1 ECT + \varepsilon_{it} \quad \ldots\ldots(2)$$

Where; all the variables are as defined before, and:

β_5 is the constant term,

β_{6-9} is the short-run coefficients of estimation,

π_1 is the error correction coefficient,

The selected ARDL bounds testing approach to co- integration is supported by previous studies such as Ali Shah et al. (2012); Kwofie and Ansah (2018); Mechri et al. (2019); Türsoy (2017) that also adopted an ARDL model when determining the relationship

between economic variables. Emeka and Uko (2016) believe that the ARDL model has several advantages. Firstly, ARDL technique is not sensitive to the order of integration and can be applied irrespective of whether the underlying variables are co-integrated to order I(0) or I(1) or mutually co-integrated. Secondly, endogeneity is a minor issue in the ARDL technique because it is free of residual correlation as a result of each underlying variables standing as a single equation. Lastly, the ARDL technique has the ability to identify co-integrating vectors where there are multiple co-integrating vectors. Shrestha and Chowdhury further argue that the relative flexibility of ARDL and the ease of deriving an ECM through a simple linear transformation further promote the ARDL model (as cited in Sgammini, 2016). Although ARDL co-integration technique does not require pre-testing for unit roots, Sgammini (2016) recommends the pre-emptive unit root testing to avoid ARDL model crash in the presence of variables integrated to the order of I(2) or higher. Of course, the model is not flawless and therefore determination of the suitability and goodness of fit requires diagnostic and stability tests such as unit root test, correlation test, bounds co-integration test, serial correlation LM test and CUSUM test. The discussion for the tests is presented in the next section.

3.5.2 Unit Root Test

A time series data is stationary if its mean and variance are constant over time while the value of the covariance between two time periods depends only on the gap between the periods and not the actual time at which this covariance is considered (Kwofie & Ansah, 2018). The presence of unit root in the time series indicates that the variable is non-

stationary, hence the degree or order of integration will be one or higher. A variable X, is said to be integrated of order d, I(d), if it attained stationary after differencing d times (Engle & Granger, 1987). Therefore, if a variable is found to be non-stationary at the levels and it is determined to be stationary in its first -difference, then it is said to be integrated of order one, I(1). Kwofie and Ansah (2018) support the view that macroeconomic time series variables have a tendency to be nonstationary. Shrestha and Bhatta (2018) state that the first step in determining the suitability of the ECM model for a study involves performing the unit root test on the time series variables to establish whether they are stationary or not. This study therefore employed the two prominent unit root tests, namely, Augmented Dickey Fuller (ADF) and Phillips Perron (PP) to test for stationarity. The two tests encompass testing the null hypothesis of non-stationarity of the variables against the alternative hypothesis of stationarity. The PP test was used in addition to the ADF test because the PP test controls for serial correlation by modifying the t-ratio of the standard error coefficient so that serial correlation does not affect the asymptotic distribution of the test statistic (*EViews 10 User's Guide II*, 2017).

3.5.3 Correlation Test

Multicollinearity can be defined as the phenomenon in which two or more variables in a multiple regression model are highly correlated which can have a negative impact on the analysis as a whole thereby severely limiting the conclusions of the research study (Schreiber-Gregory, 2017). The correlation values are interpreted between 0 (showing no relationship) and 1 (showing perfect relationship). The study adopted the scale used by Sgammini (2016) whereby a measure of 0.6-0.8 indicates strong correlation, 0.4-0.6

indicates moderate correlation and 0.2-0.4 indicates weak correlation. Multicollinearity raises a concern regarding the reliable measure of individual coefficients for the independent variables in a model because it may lead to incorrect conclusions about the relationship between dependent and independent variables. Hence some researchers such as Daoud (2017) argue that multicollinearity should be resolved by removing highly correlated variables from the model or combining the highly correlated variables through principal component analysis. O'Brien (2017) however refutes the notion of dropping an independent variable from a regression model even when it is highly correlated with other independent variable as doing so conflicts with one of the major purposes of multiple regression which is to control for the effects of each of the independent variables that are considered relevant to the model based on theory and/or substantive research. In addition, Allison (2012) shows that, amongst others, multicollinearity can be ignored when the variables concerned are control variables in a regression model whose coefficients are not to be interpreted and the variables of interest do not display co-linearity and do not have high variance inflation factors (VIF).

3.5.4 Bounds Co-integration Test

The study employed the autoregressive distributed (ARDL) bounds test proposed by (Pesaran et al. (2001) which is suitable for variables that are I(0), I(1) or a combination of both to examine the co-integration relationship between the variables. The bounds co-integration test involves estimating the error correction model below:

$$\Delta SMR_t = \beta_{10} + \beta_{11} SMR_{t-1} + \beta_{12} ER_{t-1} + \beta_{13} GDPG_{t-1} + \beta_{14} CPI_{t-1} + \beta_{15} PR_{t-1}$$
$$+ \sum_{i=1}^{p} a_{1i}\, \Delta SMR_{t-i} + \sum_{i=0}^{p} a_{2i}\, \Delta ER_{t-i} + \sum_{i=0}^{p} a_{3i}\, \Delta GDPG_{t-i}$$
$$+ \sum_{i=0}^{p} a_{4i}\, \Delta CPI_{t-i} + \sum_{i=0}^{p} a_{5i}\, \Delta PR_{t-i}$$
$$+ \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where; all the variables are as defined before, and the rest are parameters.

Wong (2018) demonstrates the five basic steps for the bounds co-integration test. The first step involves the identification of a tentative model based on the selected lag length based on the model order selection criteria such as; the Akaike Information Criterion(AIC), Schwarz Criterion (SC) or Hannan-Quinn Criterion(HQC). The second step involves the estimate the Equation (3) by using Ordinary Least Square (OLS) technique. The third step involves performing diagnostic check on the model to determine suitability. The diagnostic checks include the serial correlation test using the Breusch-Godfrey LM test and the CUSUM test for stability. The fourth step involves using the Wald test (F-test) to test the null and alternative hypothesis of co-integration. The Wald test null and alternative hypothesis representation for the co-integration test derived from equation (3) is:

H_{03}: $\beta_{11} = \beta_{12} = \beta_{13} = \beta_{14} = \beta_{15} = 0$

H_{13}: $\beta_{11} \neq \beta_{12} \neq \beta_{13} \neq \beta_{14} \neq \beta_{15} \neq 0$

The final step involves comparing the computed F-statistic with Pesaran et al. (2001) two sets of critical values of the upper- and lower-bounds. If the estimated F-statistics

value is higher than the upper- and lower-bound critical values, then the null hypothesis of no co-integration is rejected. If it lies between the two critical values, the conclusion is indecisive. If the F-statistics value is lower that the critical values, the null hypothesis of no co-integration is accepted. Co-integration can also be confirmed by the stationarity of the significant residual (error correction term) from the equation in levels which is the long run relationship, using OLS. After the bounds test confirms the co-integration between the variables, the long-run (Equations (1)) and short-run (Equations (2)) coefficients can be investigated.

3.6 Hypothesis testing

The first null hypothesis of the study states that exchange rate risk has no effect on stock market return and shall be tested as follows:

H_{01}: $\beta_1 = 0$

H_{11}: $\beta 1 \neq 0$

The null hypothesis is accepted if and only if exchange rate risks' coefficient for estimation in the regression is zero. The null hypothesis is tested by means of the t-statistic, to test whether the estimated coefficient differs from zero at a significance level of 5%.

Furthermore, the study employs the Granger causality test to examine the direction of causality between exchange rate and stock market returns. The conceptual framework for analysing the causal relationship between stock returns and exchange rate movement is based on the influence of the exchange rate on firm profitability and hence stock

returns (Adjasi et al., 2011). The bivariate Granger causality test shall be applied as per Equations 4 and 5 to determine the direction of causality.

$$SMR_t = \sum_{i=0}^{n} \varphi_i SMR_t + \sum_{i=1}^{n} \partial_j \, ER_{t-i} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

$$ER_t = \sum_{i=0}^{n} \alpha_i \, ER_t + \sum_{i=1}^{n} \beta_j \, SMR_{t-i} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

Where; all the variables are as defined before, and the rest are parameters.

The second null hypothesis of the study states that there is no causal relation between exchange rate risk and stock returns which is accepted if and only if no lagged values of the variables are retained in the regressions. The F-test is then used to determine whether the coefficients of i-lag values of the exchange rate risk and stock returns are jointly equal to zero at a significance level of 95% and shall be tested as follows:

H_{02}: $\beta_j = \partial_j = 0$

H_{12}: $\beta j \neq \partial j \neq 0$

3.7 Variables

3.7.1 Stock Market Return

Stock market return is the dependent variable in the study and is measured by the NSX Overall Index as a proxy. The NSX Overall Index is computed as a weighted average market price of all 44 listed companies. The NSX Overall Index is therefore a measure of the combined performance of all shares listed on the NSX. NSX does not trade on

weekends and public holidays and thus the monthly stock index is computed based on the stock market prices on the last trading day of each month.

3.7.2 Exchange Rate Risk

The real effective exchange rate (REER) is used to measure the value of a specific currency in relation to an average group of major currencies and is considered to be an important measure when assessing a country's' trade capabilities. In addition, the computation of the REER incorporates the deflation of the trade-weighted bilateral nominal exchange rates with the relative consumer price indices, that is, the ratios of Namibia's CPI and that of the major trading partners. The use of the REER index in the study is further supported by the understanding that the NSX listed firms are affected by numerous currencies of countries where Namibian goods are exported or imported. The REER indices used were obtained from the Bank of Namibia of which 2015 is the base year and comprises of a basket of the following major currencies (with their respective weights): South African Rand (0.54), Botswana Pula (0.12), Euro (0.11), Swiss Franc (0.07), Zambian Kwacha (0.04), Angolan Kwanza (0.02), Chinese Yuan (0.05) and United States Dollar (0.05). The REER index is quoted using the indirect quotation, thus an increase in the index represents an appreciation of the Namibian currency and a decrease in the index represents currency depreciation.

Exchange rate risk is the independent variable in the study and since it is not an observed variable it will be estimated by the volatility in the REER using the ARCH/GARCH model. ARCH model by Engle and its generalization GARCH by

Bollerslev represent the major and widely used methodologies in modeling and forecasting stock market volatility (as cited in Ahmed & Suliman, 2011). Similarly, Miah and Rahman (2016) affirm that ARCH/GARCH models provide a volatility measure like a standard deviation that is central to financial decision making concerning risk analysis and portfolio selection. Equation (6) below shows the general specification of GARCH (p, q) model:

$$\sigma_t^2 = \omega + \sum_{i=1}^{q} a_i \varepsilon_{t-i}^2 + \sum_{j=1}^{p} \beta_j \sigma_{t-j}^2 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \,(6)$$

Where, σ_t^2 is the conditional variance, ε_{t-i}^2 is the ARCH term, σ_{t-j}^2 is the GARCH term, p is the number of lagged σ terms and q is the number of lagged ε terms. The ARCH/GARCH model that has the lowest Akaike info criterion,Schwarz criterion and Hannan-Quinn criterion is considered as the best volatility model (Kingsley & Peter, 2019).

3.7.3 Gross Domestic Product Growth

Gross domestic product growth is a control variable in the study which is an inflation-adjusted measured of the change in value of goods and services produced during specific period, usually a year. The growth in the GDP constant price, also known as real GDP, is used in the study as published by the NSA which is measured quarterly each year based on the constant 2010 prices. Thus for the purpose of the study requiring a monthly GDPG, the frequency was converted from quarterly to monthly using e-views quadratic-

match sum function which fits a local quadratic polynomial for each observation of the quarterly series, then this polynomial was used to complete all the monthly observations.

3.7.4 Consumer Price Index

Consumer price index (CPI) is a control variable in the study which measures the price changes of goods and services commonly consumed in a country. The CPI is calculated as weighted averages of the percentage price changes for a specified ‘‘basket’’ of goods and services. In Namibia, the ‘‘basket’’ weights are obtained from the household income and expenditure survey which is generally conducted every five years by the Namibia Statistics Agency. As such, the “basket” has been rebased once, in 2012, during the period of study. The Namibian “basket” contains over 350 items, grouped into 12 categories and 55 sub-categories, for which prices are collected on a monthly basis from more than 900 retail outlets. The NSA published monthly CPI (all items) is therefore used in the study as a proxy for the general rate of inflation.

3.7.5 Money Supply

Money supply is a measure of total amount of money held by households and companies in the economy which can be used to make payments or to hold as short-term investments. Money supply is a control variable in the study which measures the total amount of money held by households and companies in the economy which can be used to make payments or to hold as short-term investments. Money is represented in various types of financial instruments as a medium of exchange and/or store of value. Higher money supply results in liquidity to the stock markets since the excess money is directed

into the stock markets, thus pushing up the market capitalization (Mlambo, Maredza, & Sibanda, 2013). Hence, stock valuations move up as an immediate reaction to an increase in money supply. Interest rate has an inverse relationship with money supply because people prefer to save when the interest rates is high thereby decreasing money supply in the economy.

Namibia mainly relies on the interest/repo rate channel to implement monetary policy due to its fixed exchange rate system and the characteristics of the Namibia securities market (*Namibia ' s Monetary Policy Framework*, 2008). Duong and Albany (2017) found that interest rate policy following a Taylor rule is an effective means of controlling money supply because when the central bank cuts rates, money supply increases through the bank rate channel. The study therefore used the prime rate as published by the BON as a proxy of money supply.

3.8 Research Ethics

The research was conducted with the highest level of ethical standards and in compliance with the UNAM Research Ethics Policy. Although the research employed secondary data, the researcher sought informed consent from the institutions and use all data collected for research purposes only.

3.9. Conclusion

This chapter discussed and motivated the research methods employed in the study from which we obtain research results and findings. Firstly, the underlying philosophical assumption that informs the research design and procedures was discussed. Next, the

model specification with its determination of the suitability and goodness of fit was discussed together with the procedures for hypothesis testing. Thereafter, the definition and measurement of the variables employed in the study was presented. Lastly, the chapter discussed the research ethics employed in addressing potential ethical dilemmas.

The next chapter presents the analysis and discussion of empirical results obtained through the research methods discussed.

CHAPTER 4: ANALYSIS AND DISCUSSION OF EMPIRICAL RESULTS

4.1 Introduction

This chapter presents the findings from the study which is divided into three sections, Section 4.2 presents a discussion on the descriptive statistics and Section 4.3 presents discussion on detailed estimation carried out, empirical findings of the effect of exchange rate risk on stock market return at the Namibian Stock Exchange and on the direction of causality between exchange rate risk and stock market returns. The techniques employed include the Augmented Dickey-Fuller (ADF) for the unit root tests, the Johansen co-integration for the co-integration test and the Granger causality for the variance decomposition. All discussions are supported with figures and tables presenting the empirical findings. Finally, the chapter concludes with the empirical discussions in section 4.4.

4.2 Descriptive statistics

This section presents the descriptive statistics of the five variables, namely NSX overall index, real effective exchange rate index, gross domestic product, Consumer price index and prime rate. Figure 4.1 presents the trend in the NSX overall index for the period 2010 -2018.

4.2.1 Summary Descriptive Statistics

The summary descriptive statistics is presented in Table 4.1 below. It indicates that all variables have a positive skewness which indicates that the variables are asymmetrically distributed and that the distribution has a long right tail. The Kurtosis further shows that the data distribution for SMR, REER, CPI and PR is flat (platykurtic) relative to the normal whereas data distribution for GDPG is the distribution is peaked (leptokurtic) relative to the normal. Finally, the Jarque-Bera statistics show that the hypothesis of normal distribution is rejected at the 5% significance level for REER, GDPG and CPI and accept the hypothesis for SMR and PR. At 1% level of significance the hypothesis of normal distribution for GDPG is not rejected. To overcome the problem of non-normal distribution, the variables were transformed into logs. After transforming the data into logs the hypothesis of normal distribution for all variables at 1% level of significance was not rejected

Table 4.1: Summary descriptive statistics

	SMR	**REER**	**GDPG**	**CPI**	**PR**
Skewness	0.489906	0.231647	0.454464	0.130053	0.109323
Kurtosis	2.675166	1.875201	7.305243	1.826368	1.875611
Jarque-Bera	4.794968	6.659165	86.31899	6.502806	5.904251
Probability	0.090946	0.035808	0.0000	0.03872	0.052229
Observations	108	108	107	108	108

Furthermore, the results of the correlation test in Table 4.2 below shows that there are no perfect linear relationships amongst the variables. CPI however has a strong positive

linear relationship (0.86) with SMR and a strong negative linear relationship (-0.74) with REER. The rest of the relationships vary between moderate to weak.

Table 4.2: Correlation test

	SMR	CPI	GDPG	REER	PR
SMR	1.00	0.86	-0.10	-0.53	0.12
CPI	0.86	1.00	-0.10	-0.74	0.33
GDPG	-0.10	-0.10	1.00	0.05	-0.05
REER	-0.53	-0.74	0.05	1.00	-0.14
PR	0.12	0.33	-0.05	-0.14	1.00

4.2.2 NSX Overall Index 2010-2018

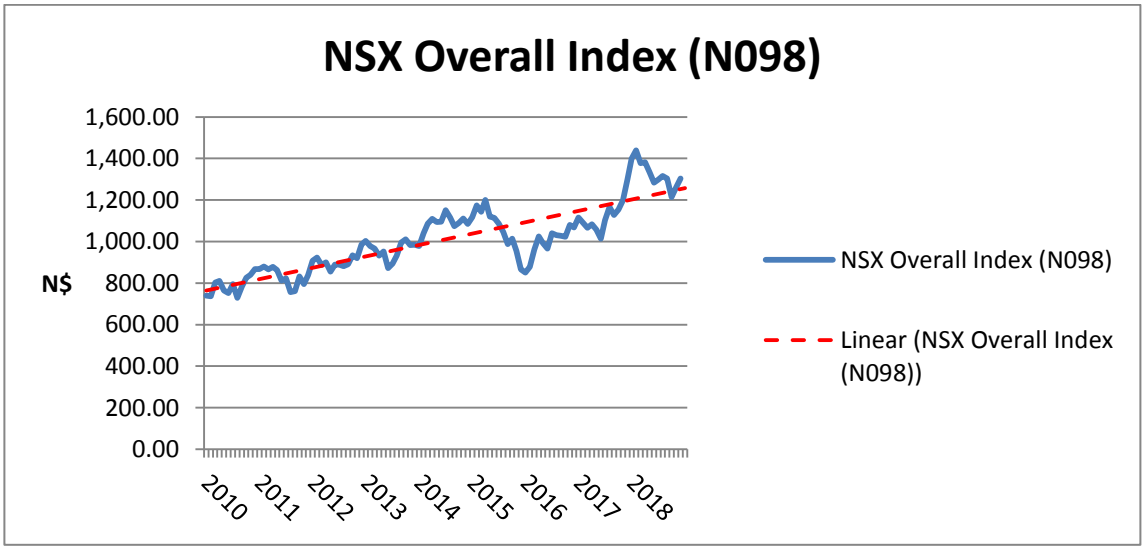

Figure 4.1: NSX Overall Index 2010-2018

Source: Namibia Stock Exchange, 2018

From Figure 4.1, it can be observed that the NSX overall index generally increased over the study period. However from the 4th quarter of 2015 to the 1st quarter of 2016, the NSX overall index decreased due to depressed commodity prices and a weak global recovery leading to a flow of funds out of the economy (Brown, Van Zyl, & Conradie, 2016). Thereafter the index generally increased again from the 2nd quarter of 2016 to 2018.

4.2.3 Real Effective Exchange Rate Index 2010-2018

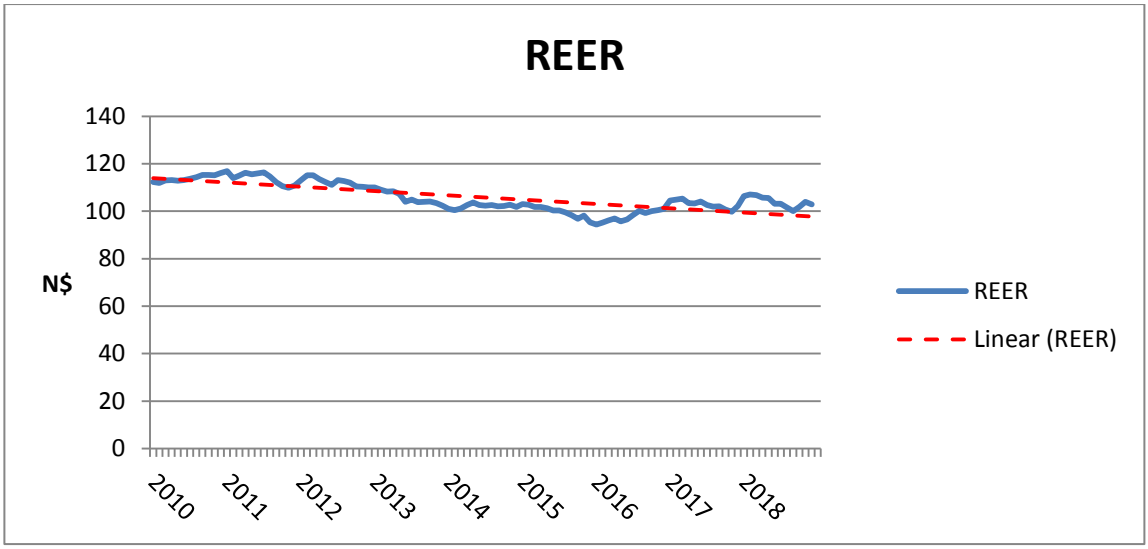

Figure 4.2: Real Effective Exchange Rate Index 2010-2018

Source: Bank of Namibia, 2018

As shown in Figure 4.2 the REER has generally decreased over the study period which indicates a depreciation of the Namibian currency in real value. A depreciation of the Namibian currency is a favourable development for trade, particularly for exporting firms, as it implies that Namibian products gained competitiveness on the international

market (*Bank of Namibia*, 2018). The opposite however is true for importing firms. Factors that contributed to the decline in the REER during the study period include low commodity prices, negative sentiments towards the Rand and capital outflows from emerging markets (*Bank of Namibia*, 2010-2018). Furthermore, the following factors amongst others contributed to the negative sentiments towards the rand; subdued economic growth, sustained high level of unemployment, socio-political issues and uncertainty regarding the credit-rating downgrades (*Bank of Namibia*, 2015).

4.2.4 Gross Domestic Product 2010-2018

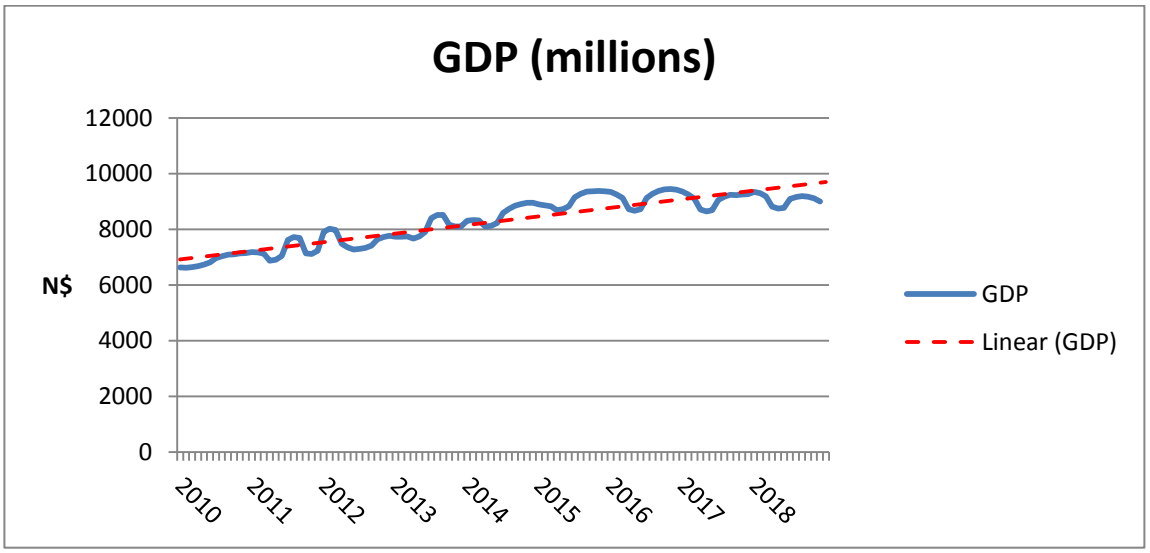

Figure 4.3: Gross Domestic Product 2010-2018

Source: Namibia Statistics Agency, 2018

Figure 4.3 reflects that GDP has generally increased over the study period which indicates an inflation-adjusted increase in the value of goods and services produced over the study period. More specifically GDP increased during the periods 2010-2016 and

then decreased during the periods 2017-2018. The increase in the GDP during 2010-2016 was mainly driven by robust construction activities, sustained growth in mining activities, public investment in infrastructure as resilient growth in wholesale, retail trade and transport activities due to rising consumer demand and improved domestic economic conditions (*Bank of Namibia*, 2010-2016). On the other hand the decrease in GDP during periods 2017-2018 was mainly caused by the decline in construction activities, metal ores, and diamond mining, as well as slower activities in the public sector. The severe drought also negatively impacted on the agricultural sector, and the overall performance of the economy.

4.2.5 Consumer Price Index 2010-2018

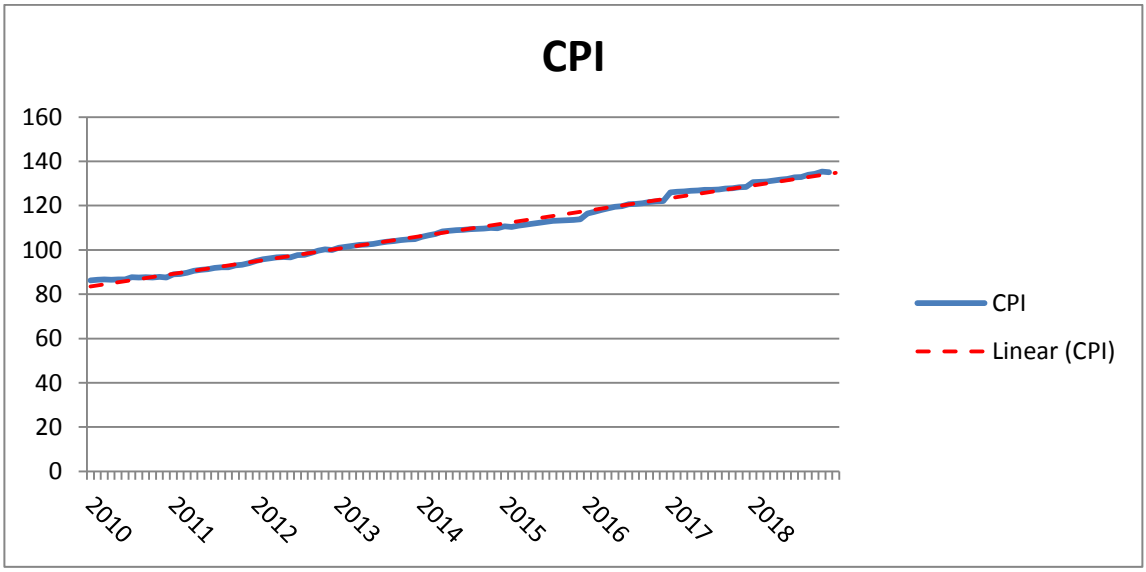

Figure 4.4: Consumer Price Index 2010-2018

Source: Namibia Statistics Agency, 2018

Figure 4.4 indicates that CPI has generally increased over the study period thereby indicating an increase in prices of goods and services. The increase in CPI is mainly attributed to rising prices for food and non-alcoholic beverages; transport and housing, water, electricity, gas and other fuels which were largely influenced by developments in the global markets. Rental payments for dwelling were the largest contributor to the rise in inflation for the housing, water, electricity, gas and other fuels category (*Bank of Namibia*, 2010-2018)

4.2.6 Prime Rate 2010-2018

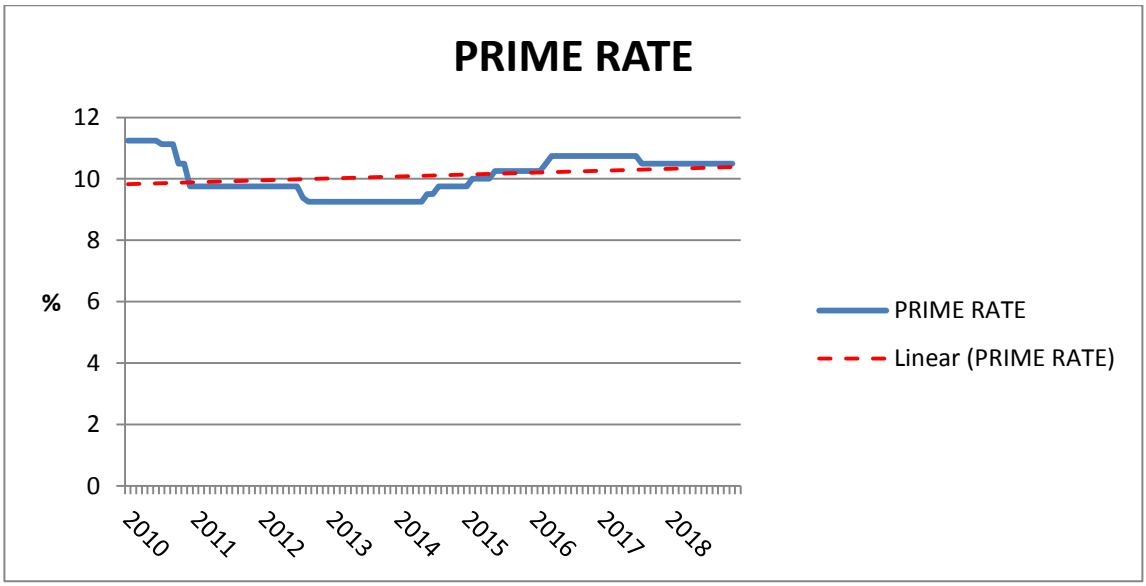

Figure 4.5: Prime Rate 2010-2018

Source: Bank of Namibia, 2018

Figure 4.5 indicates that the prime rate has generally remained unchanged over the study period consistent with the accommodative monetary policy stance that supports domestic growth and safeguards the exchange rate dispensation. In addition, growth in private sector credit extension (PSCE) also contributed to the increasing money supply during the study period with exception of the years 2017-2018 which showed a low appetite for credit by both businesses and individuals, in line with the slow pace of economic activity (*Bank of Namibia*, 2010-2018).

4.3 Empirical estimation and findings

4.3.1 Exchange rate risk

The exchange rate risk was measured by extracting volatility from the REER using the ARCH/GARCH model. Table 4.3 shows that GARCH (0, 1), which is the same as ARCH (1) is the best model that captures volatility as it has the lowest Schwarz and Hannan-Quinn criterion.

Table 4.3: GARCH Information Criterion

Model Identified	Information Criterion		
GARCH(p,q)	AIC	SC	HQ
GARCH(0,1)	3.373	**3.499**	3**.424**
GARCH(0,2)	3.390	3.540	3.451
GARCH(1,1)	**3.365**	3.516	3.426
GARCH(1,2)	3.388	3.564	3.460
GARCH(2,1)	3.371	3.547	3.442
GARCH(2,2)	3.376	3.577	3.457

Furthermore, the ARCH LM-test results support the absence of heteroscedasticity in the residual as shown in Table 4.4. With the Prob. Chi-Square of 0.6646 we fail to reject the null hypothesis of no ARCH-effects.

Table 4.4: Heteroskedasticity Test (ARCH)

F-statistic	0.184795	Prob. F(1,104)	0.6682
Obs*R-squared	0.188015	Prob. Chi-Square(1)	0.6646

The Log form of the extracted GARCH variance series is presented in Figure 4.6 below. The variance series suggest that volatility increase during the period 2010 – 2014 thereafter remained relatively constant.

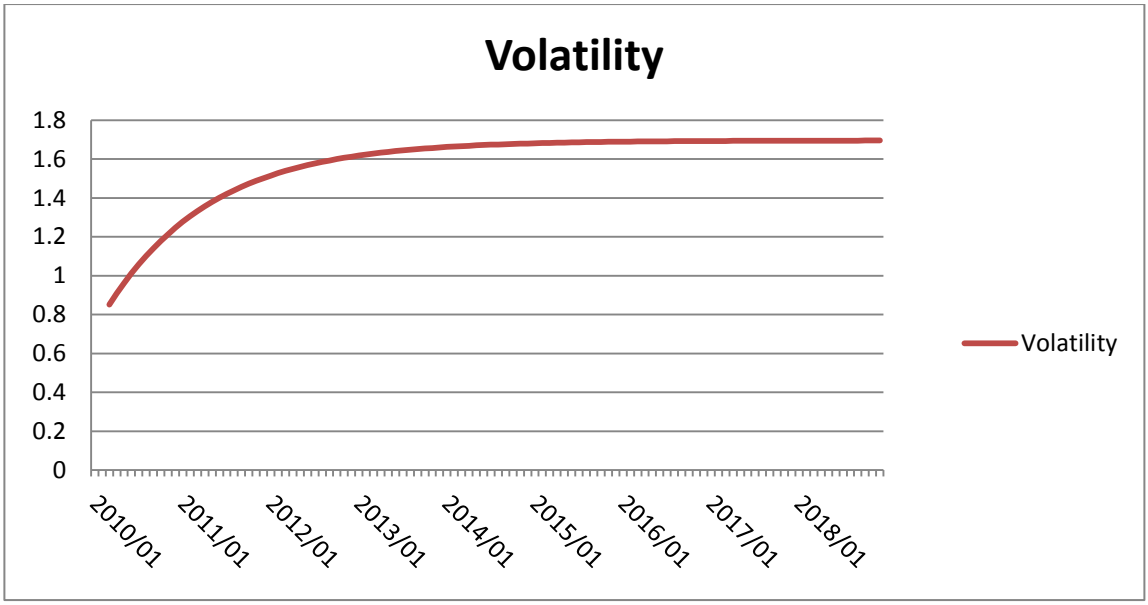

Figure 4.6: GARCH variance series

4.3.2 Unit Root Test

The test results for both ADF and PP tests show that all variables are non-stationary in levels and only become stationary when differenced with the exception of GDPG which is stationary in level. Table 4.5 and 4.6 below shows the PP and ADF unit root test results.

Table 4.5: Phillips-Perron Fisher (PP) Unit Root Test Results

VARIABLE	TEST EQUATION INCLUSION	LEVEL	1st DIFFERENCE
SMR	Individual intercept	0.5148	0.0000*
	Individual Intercept and trend	0.1272	0.0000*
	None	0.9461	0.0000*
REER	Individual intercept	0.5961	0.0000*
	Individual Intercept and trend	0.7532	0.0000*
	None	0.4153	0.0000*
GDPG	Individual intercept	0.0011*	0.0001*
	Individual Intercept and trend	0.0005*	0.0001*
	None	0.0000*	0.0000*
CPI	Individual intercept	0.9405	0.0000*
	Individual Intercept and trend	0.1505	0.0000*
	None	1	0.0000*
PRIME RATE	Individual intercept	0.3650	0.0000*
	Individual Intercept and trend	0.3709	0.0000*
	None	0.5032	0.0000*

*, **, *** denotes rejection of the hypothesis of non-stationarity (unit root) at 1%, 5%, and 10% significance levels respectively.

Table 4.6: Augmented Dickey Fuller (ADF) Unit Root Test Results

VARIABLE	TEST EQUATION INCLUSION	LEVEL	1st DIFFERENCE
SMR	Individual intercept	0.5215	0.0000*
	Individual Intercept and trend	0.1710	0.0000*
	None	0.9422	0.0000*
REER	Individual intercept	0.6266	0.0000*
	Individual Intercept and trend	0.8299	0.0000*
	None	0.4072	0.0000*
GDPG	Individual intercept	0.0000*	0.0001*
	Individual Intercept and trend	0.0000*	0.0001*
	None	0.0000*	0.0000*
CPI	Individual intercept	0.9388	0.0000*
	Individual Intercept and trend	0.1622	0.0000*
	None	1.0000	0.5891
PRIME RATE	Individual intercept	0.4250	0.0000*
	Individual Intercept and trend	0.3506	0.0000*
	None	0.4528	0.0000*

*, **, *** denotes rejection of the hypothesis of non-stationarity (unit root) at 1%, 5%, and 10% significance levels respectively.

4.3.3 Bounds Co-integration Test

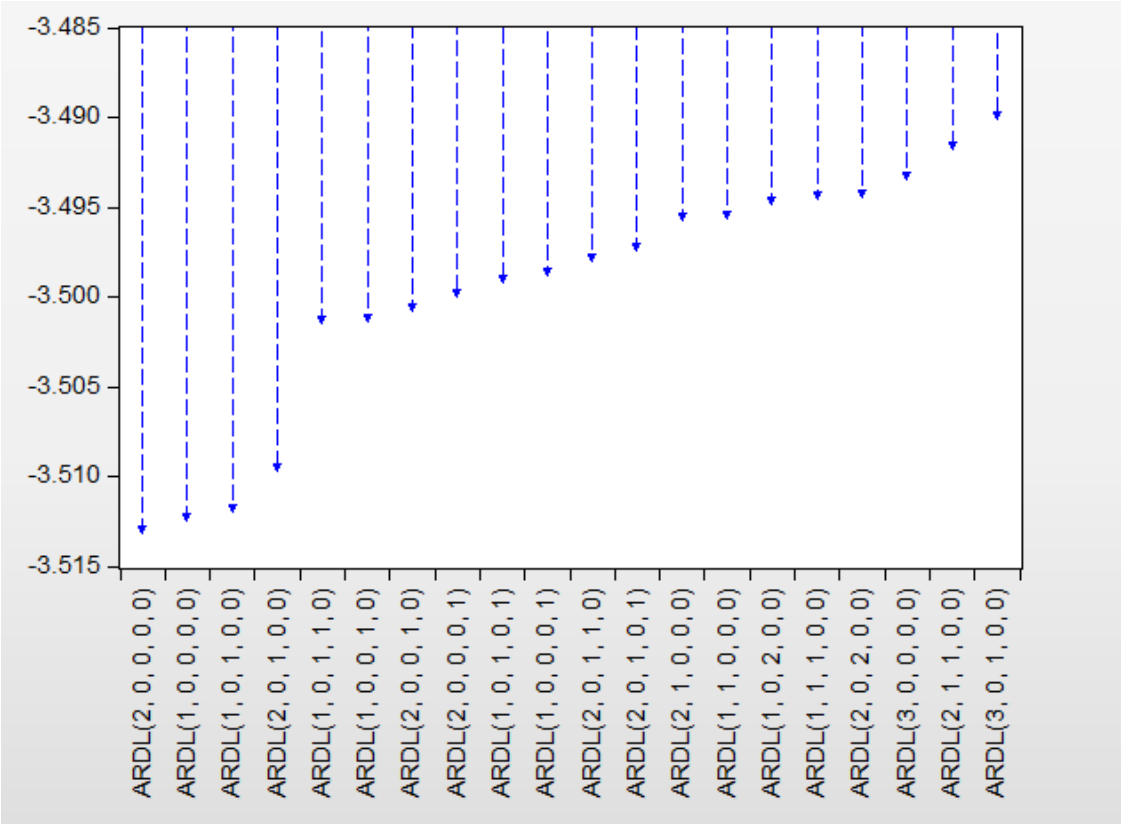

Figure 4.7: ARDL Model Selection Summary

The ARDL [2, 0, 0, 0, 0] was selected in order to test the co-integration relationship between the variables. The lag lengths were selected based on the Akaike Information Criterion (AIC) as shown in Figure 4.7 above. Next, the ARDL [2, 0, 0, 0, 0] model was transformed into its OLS form as per equation (3) to run the bound co-integration test. Table 4.7 reports the estimated F-statistics values for testing the existence of long-run relationship between the variables.

Table 4.7: Results of the Bounds Co-integration Test

Dependant Variable	SMR_t	
F-statistics	3.216***	
Critical Values of F-statistic[a]	10%	5%
Lower bounds	2.20	2.56
Upper bounds	3.09	3.49

*, **, *** denotes significance at 1%, 5%, and 10% significance levels respectively.
[a]Source: Pesaran et al. (2001), Table CI(ii) Case II: Restricted intercept and no trend.

The F-statistics value of 3.216 is above the upper bound critical value at 10% significance. Therefore, the null hypothesis of no co-integration is rejected, meaning that a long run relationship among the variables exists. Furthermore, model diagnostic test was conducted using the Breusch-Godfrey serial correlation LM test. The test results shows an Obs *R-square of 0.88218 and prop.Chi Square(2) of 0.6414. These LM test results therefore indicated that there is no serial correlation in the residuals since the p-values are greater than 5% significance level.

4.3.4 ECM Results

In the previous section it was established that the variables are stationary at first difference and co-integrated, thus the suitability of the ECM. The results of the long run equation in level are presented in Table 4.8 below.

Table 4.8: Long-run (OLS)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ER	-0.60561	0.132855	-4.55841	0.0000
GDPG	-0.00306	0.007863	-0.38862	0.6984
CPI	1.690284	0.145116	11.64778	0.0000
PR	-1.35308	0.230116	-5.87996	0.0000
C	2.385908	0.334622	7.130156	0.0000
R-squared	0.808882	Mean dependent var		6.909172
Adjusted R-squared	0.801313	S.D. dependent var		0.158941
S.E. of regression	0.070847	Akaike info criterion		-2.41057
Sum squared resid	0.506946	Schwarz criterion		-2.28494
Log likelihood	132.7604	Hannan-Quinn criter.		-2.35965
F-statistic	106.8677	Durbin-Watson stat		0.398359
Prob(F-statistic)	0.000000			

Note: The dependent variable is stock market return (SMR).

The result of the long-run relationships between stock market returns, exchange rate risk, gross domestic product growth, consumer price index and prime rate indicates that the coefficient of exchange rate risk, gross domestic product growth and prime rate is negative while consumer price index is positive. The established regression equation is:

$$SMR = 2.386 – 0.606ER + 0.003GDPG + 1.690CPI – 1.353PR$$

From the above regression equation, it can be established that a one percent (1%) increase in exchange rate risk and prime rate will reduce stock market return by 0.61 and 1.35 percent respectively. In contrast, a one percent (1%) increase in gross domestic product growth and consumer price index will increase stock market return by 0.003 and 1.69 percent respectively. All the coefficients are significant at 5% or lower level of significance with exception of GDP growth which is insignificant. The adjusted R

squared is the coefficient of determination which measures the fraction of the dependent variable variance explained by the independent variables (*EViews 10 User's Guide II*, 2017). From the results in Table 4.8 above, the value of adjusted R squared was 0.801 an indication that 80.1% of change in stock returns was due to changes in foreign exchange risk, consumer price index and prime rate at 95% confidence interval. The coefficient diagnosis of the long-run model shows that the centered variance inflation factor (VIF) lies between 1 and 9, which is generally within the acceptable bound (Yoo et al., 2014). VIF measures and quantifies how much the variance is inflated by correlation between the independent variables (Daoud, 2018). Furthermore, the CUSUM test in Figure 4.8 shows that the long run model is stable.

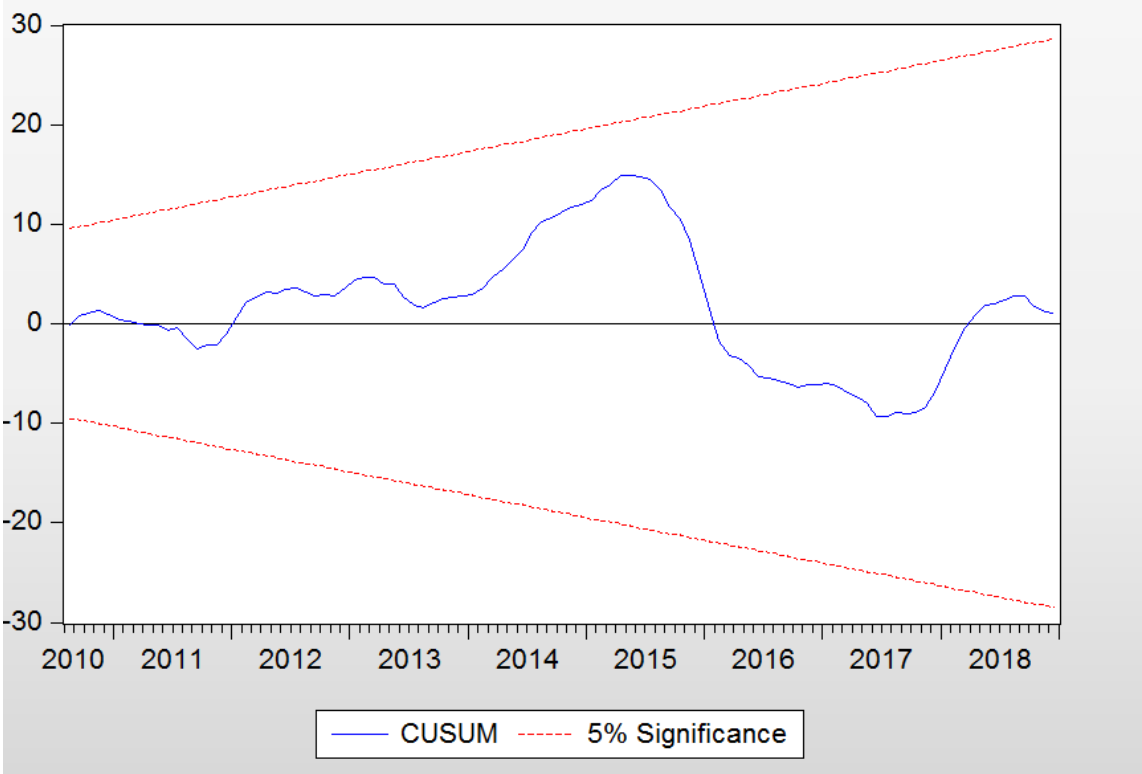

Figure 4.8: CUSUM Test for Stability

Next, the error correction version of the main model (equation in differences) is estimated to measure the speed at which the dependent variable adjust to equilibrium. In Table 4.9 below, the results of the ECM model shows an error correction coefficient of -0.1901 (P value 0.002) which is significant and negative therefore validating the convergence to equilibrium. The error correction coefficient of -0.1901 indicates that 19.01 percent of the disequilibrium between the exchange rate risk and the stock market return is corrected each month. Furthermore, the exchange rate risk takes approximately 5.26 months (1/0.1901) to influence the stock market return. The result additionally shows that exchange rate risk, gross domestic product growth, consumer price index and prime rate have no short-term effect on stock market return. Although this may be true, the error correction term has a statically significant negative sign which confirms the presence of the long-run relationship among the variables. Similar studies by Mwaanga and Njebele (2017); Sohail and Hussain (2009) also solely established long-run relationships with absence short-run relationship amongst variables in explaining their effect on stock returns.

Table 4.9: ECM (OLS)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ER)	-0.1645	0.330882	-0.49717	0.6202
D(GDPG)	-0.0063	0.004868	-1.29424	0.1986
D(CPI)	1.337598	0.837332	1.597452	0.1134
D(PR)	-0.41544	0.35131	-1.18255	0.2398
ECT(-1)	-0.19009	0.058512	-3.24866	0.0016
C	-0.00029	0.005865	-0.04992	0.9603
R-squared	0.144705	Mean dependent var		0.004607
Adjusted R-squared	0.101508	S.D. dependent var		0.043399
S.E. of regression	0.041138	Akaike info criterion		-3.48833
Sum squared resid	0.16754	Schwarz criterion		-3.33668
Log likelihood	189.1374	Hannan-Quinn criter.		-3.42688
F-statistic	3.349912	Durbin-Watson stat		1.834906
Prob(F-statistic)	0.00774			

Note: The dependent variable is stock market return (SMR).

4.3.5 Causality Analysis

Causality analysis is suitable in determining whether one time series is useful in forecasting another (Granger, 1969). Granger (1969) further argued that causality in economics could be tested for by measuring the ability to predict the future values of a time series using prior values of another time series. The Granger causality results in Table 4.10 below support the hypothesis of a unidirectional causality from stock market return to exchange rate risk as per the "stock- oriented" exchange rate model (portfolio approach) discussed in the literature review.

Table 4.10: Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
D(SMR) does not Granger Cause D(REER)	105	3.18181	0.0457
D(REER) does not Granger Cause D(SMR)		1.89377	0.1559

Note: 2 lags included.

4.4 Discussions

This chapter presented the results of the study which was conducted by examining the descriptive statistics of the variables; conducting statistical test to validate the selected error correction model; running the actual model and testing for goodness of fit; and finally testing for causal relationship stock market return and exchange rate.

The exchange rate risk was firstly measured by extracting volatility from real effective exchange rate using the GARCH (0,1) model which was found to be suitable based on the Schwarz and Hannan-Quinn criterion. The descriptive statistics further shows that the raw data is skewed and peaky or flatly distributed hence not normally distributed. However after transforming the data into logs the Jarque-Bera statistics reveals that all logged variable are normally distributed, hence logged data was used in the study. Furthermore, the stationarity test was conducted using the Augmented Dickey Fuller and Phillips Perron test which revealed that all variables (SMR, REER, CPI and PR) are non-stationary at levels and only become stationary after first differencing with the exception of GDPG which is stationary in level. The results of the unit root test show that the ECM should be used provided the variables are co-integrated. The bounds co-integration test shows that the variables are co-integrated based on the F-statistics value of 3.216 which is above the upper bound critical value at 10% significance.. The resulting unit root and co-integration test therefore validate the use of the ECM for the study based on the model selection process presented in Figure 3.1.

The empirical finding shows that, in the long run, exchange rate risk (ER), inflation (CPI) and interest rate (PR) have statically a significant effect on stock returns whereas Gross Domestic Product (GDPG) is insignificant. Furthermore, a one percent increase in exchange rate risk, ceteris paribus, would lead to a 0.61% decrease in stock market returns whereas inflation would lead to a 1.69% increase and interest rate would lead to a 1.35% decrease. These findings suggest that exchange rate risk, which is the degree to which the firm value is affected by movements in exchange rates, has a negative impact on stock market returns by creating uncertainty for investors in deciding as to whether to invest or not in the Namibian Stock Exchange. The movement in the exchange rates can be positive or negative and hence the finding is supported by both the traditional approach and portfolio adjustment theories. This finding is consistent with that of Bin Omar et al (2017) which suggests that emerging and developing economies are exposed to higher level of foreign currency exposure due to high level of openness and large amount of import and exports. Therefore there is room for improvement in managing exchange rate risk by NSX listed firms.

The positive impact of inflation on stock market returns is consistent with the findings of Kaakunga and Matongela (2013), even though it being insignificant, they argued that inflation could cause an increase in future sales even without production increases. Therefore companies can increase the prices of their products at a rate greater than inflation and operational costs, resulting in an increase in their stock market returns. Moreover, the negative impact of interest rate on the stock market returns is supported both by economic theory and empirical literature such as that of Eita (2012). Higher

interest rates decrease investments and stock market returns in that the discounted cash flows would be worth less. Additionally, increases in interest rates upsurges the opportunity cost of holding money and thus investor will substitute stocks for interest bearing securities and hence falling stock prices.

Furthermore, the Granger causality test was conducted to establish the causal relationship between stock market return and exchange rate. The findings indicate a unidirectional causality that runs from stock market returns to exchange rate risk which is consistent with the findings of Sheefeni (2015) which states that the Namibian stock market has a weak form of efficiency and thus the NSX cannot predict stock returns. On the other hand, the unidirectional causal relationship can be explained by applying the portfolio balance approach; in that rising (failing) of the NSX stock prices would attract capital flows from foreign investors which may cause an increase in the demand for a Namibian currency and ultimately an appreciation (depreciation) in exchange rates.

In testing the first hypothesis of the study, of which the null hypothesis states that exchange rate risk has no effect on stock market return, it was found that the exchange rate risk coefficient ($\beta 1$) of -0.605607 is statistically significant at 99% confidence interval (t-statistic -4.558414) as shown in Table 4.8. Therefore there is enough evidence to support the hypothesis that the coefficient is different from zero; $\beta 1 \neq 0$. The alternative hypothesis, which states that exchange rate risk has an effect on stock returns, is therefore supported. In testing the second hypothesis of the study, of which the null hypothesis states that there is no causal relation between exchange rate and stock

returns, it was found that the stock market returns granger causes exchange rate risk at 95% confidence interval as shown in Table 4.10. Hence the alternative hypothesis, which states that there is a causal relation between exchange rate and stock returns ($\beta j \neq \partial j \neq 0$), is accepted. The unidirectional causality is consistent with Sheefeni's (2015) findings of a weak form efficiency in Namibia's capital market in that past exchange rate information cannot be used to predict future stock market returns.

4.5 Conclusion

This chapter presented and discussed the empirical results. The results indicate that the logged variables is normally distributed and non-stationary at levels and only become stationary after first differencing with the exception of GDPG which is stationary in level. Furthermore, the bounds co-integration test indicates that the variables are co-integrated which validates the use of the ECM. Additionally, the results show that, in the long run exchange rate risk, inflation and interest rate have statically a significant effect on stock returns whereas Gross Domestic Product is insignificant. Lastly, the granger causality test reveals a unidirectional causality that runs from stock market returns to exchange rate risk.

The next chapter will provide the conclusion and recommendations of the study.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

This study examined the impact of exchange rate risk on stock returns at the Namibian Stock Exchange. Furthermore, it examined the causal linkage between exchange rate and stock returns. The empirical investigation is based on monthly data for the periods 2010 to 2018, yielding 108 observations. On the empirical level, the real effective exchange rate risk was measured by extracting volatility by using the GARCH (0,1) model. The empirical results can be summarized in three main points. Firstly, in the long run, real effective exchange rate risk has negative and statistically significant effects on stock returns at the Namibian Stock Exchange which is however insignificant in the short run. Secondly, the disequilibrium in the short run between exchange rate risk and the stock market return is corrected at a rate of 19.01 percent each month. Lastly, the study found a unidirectional causal relationship that runs from stock market returns to exchange rate risk which is consistent with the portfolio adjustment theory. All research objectives were therefore met and the study rejected the null hypothesis of exchange rate risk having no effect on stock returns as well as the null hypothesis of having no causal relation.

5.2 Recommendations

From the conclusions above, the study recommends for the Namibian government to put in place policies that stabilize the economy thereby promote stock market stability. The Bank of Namibia needs to maintain a stable foreign currency exchange to reduce the exchange rate risk and consequent negative effect on stock market returns. This is

because huge appreciations or depreciations in exchange rate will result in investors guessing the next cause of action because they may not be able to estimate with certainty the future performance of the stock market. Namibia Stock Exchange listed firms should also consider reducing the exchange rate risk by employing the various approaches, such as operational hedging and financial hedging, in managing the exchange rate risk. The study further recommends similar kind of research to be conducted at sectoral level that will incorporate sector specific variables. The sectoral analysis may allow for an in-depth examination because of the varying degree to which the macroeconomic variables may affect the sectoral stock market returns. Furthermore future studies could expand on the current study by using weekly or daily data to enlarge the insights and strengthen the conclusion.

REFERENCES

Adjasi, C. K. d., Biekpe, N. B., & Osei, K. A. (2011). Stock prices and exchange rate dynamics in selected African countries: a bivariate analysis. *African Journal of Economic and Management Studies*, *2*(2), 143–164. https://doi.org/10.1108/20400701111165623

Aggarwal, R. (1981). Exchange rates and stock prices. A study of US Capital Market under floating exchange rates.pdf. *Akron Business and Economic*, *12*(May), 7–12.

Ahmed, E. A., & Suliman, Z. S. (2011). Modeling Stock Market Volatility Using Garch Models Evidence from Sudan. *International Journal of Business and Social Science*, *2*(23), 114–128. Retrieved from http://ijbssnet.com/journals/Vol_2_No_23_Special_Issue_December_2011/13.pdf

Ajaz, T., Nain, M. Z., Kamaiah, B., & Sharma, N. K. (2017). Stock prices, exchange rate and interest rate: evidence beyond symmetry. *Journal of Financial Economic Policy*, *9*(1), 2–19. https://doi.org/10.1108/JFEP-01-2016-0007

Al-abdallah, S. Y., Ibrahim, N., & Aljarayesh, A. (2017). Influence of Interest Rate , Exchange Rate and Inflation on Common Stock Returns of Amman Stock Exchange , Jordan. *International Journal of Economics, Commerce and Management*, *V*(10), 589–601. Retrieved from http://ijecm.co.uk/wp-content/uploads/2017/10/51037.pdf

Ali Shah, A., Kouser, R., Aamir, M., & Saba, I. (2012). Empirical Analysis of Long and Short Run Relationship among Macroeconomic Variables and Karachi Stock Market: An Auto Regressive Distributive Lag (ARDL) Approach RehanaKouser (Corresponding Author). *Pakistan Journal of Social Sciences*, *32*(2), 323–338.

Allison, P. (2012). When Can You Safely Ignore Multicollinearity? [Blog post]. Retrieved July 7, 2019, from https://statisticalhorizons.com/multicollinearity

Amidu, M., & Abor, J. (2006). Determinants of dividend payout ratios in Ghana. *Journal of Risk Finance*, *7*(2), 136–145. https://doi.org/10.1108/15265940610648580

Bahmani-Oskooee, M., & Saha, S. (2015). On the relation between stock prices and exchange rates: a review article. *Journal of Economic Studies*, *42*(4), 707–732. https://doi.org/10.1108/JES-03-2015-0043

Bahmani-Oskooee, M., & Saha, S. (2016). Do exchange rate changes have symmetric or asymmetric effects on stock prices? *Global Finance Journal*, *31*, 57–72. https://doi.org/10.1016/j.gfj.2016.06.005

Bank of Namibia Annual Report - 2014. (2014). Retrieved from https://www.bon.com.na/Publications/Annual-Reports.aspx

Bank of Namibia Annual Report - 2015. (2015). Retrieved from https://www.bon.com.na/Publications/Annual-Reports.aspx

Bank of Namibia Annual Report - 2016. (2016). Retrieved from https://www.bon.com.na/Publications/Annual-Reports.aspx

Bank of Namibia Annual Report – 2018. (2018). Retrieved from https://www.bon.com.na/Publications/Annual-Reports.aspx

Bernard, H. J., & Galati, G. (2000). *III . Special feature : The co-movement of US stock markets and the dollar* (No. Quarterly Review). Retrieved from https://www.bis.org/publ/r_qt0008e.pdf

Brown, R., Van Zyl, E., & Conradie, J.-H. (2016). *IJG Economic Outlook 2016*. Retrieved from https://www.ijg-research.net

Cassel, G. (1918). Abnormal Deviations in International Exchanges. *The Economic Journal*, *28*(112), 413–415. https://doi.org/DOI: 10.2307/2223329

Chkili, W., Aloui, C., & Nguyen, D. K. (2012). Asymmetric effects and long memory in dynamic volatility relationships between stock returns and exchange rates. *Journal of International Financial Markets, Institutions and Money*, *22*(4), 738–757. https://doi.org/10.1016/j.intfin.2012.04.009

Cohen, R. B., Polk, C., & Vuolteenaho, T. (2005). Money illusion in the stock market: The modigliani-cohn hypothesis. *Quarterly Journal of Economics*, *120*(2), 639–668. https://doi.org/10.1162/0033553053970133

Cooray, A. (2002). The Fisher Effect: A Review of the Literature. *Macquarie University Economics Research Papers*, (#5), 1–25. Retrieved from http://www.econ.mq.edu.au/website_administration/economics_studies_macquarie_university/Econ_docs/research_papers2/2002_research_papers/6-2002Cooray.PDF

Daoud, J. I. (2017). Multicollinearity and regression analysis in practice. *Journal of Physics: Conference Series*, (Icm), 0–6. https://doi.org/10.1088/1742-6596/949/1/012009

Daoud, J. I. (2018). Multicollinearity and Regression Analysis. *Journal of Physics: Conference Series*, *949*(1). https://doi.org/10.1088/1742-6596/949/1/012009

Dar, A. B., Bhanja, N., & Tiwari, A. K. (2014). Exchange Rate and Stock Price Relationship : A Wavelet Analysis for India. *Indian Economic Review*, *49*(1), 125–142. Retrieved from www.jstor.org/stable/24583410

Duong, N., & Albany, S. (2017). Interest on reserves and monetary policy of targeting both interest rate and money supply. *MPRA*, (81579). Retrieved from https://mpra.ub.uni-muenchen.de/81579/

Durr, R. H. (1992). An Essay on Cointegration and Error Correction Models. *Political Analysis*, *4*, 185–228. Retrieved from https://www-jstor-org.ezproxy.unam.edu.na/stable/23321236

Egbunike, C. F., & Okerekeoti, C. U. (2018). Macroeconomic factors, firm characteristics and financial performance A study of selected quoted manufacturing firms in Nigeria. *Asian Jounal of Accounting Research*, *3*(2), 142–168. https://doi.org/10.1108/AJAR-09-2018-0029

Eita, J. H. (2012). Modelling macroeconomic determinants of stock market prices: Evidence from Namibia. *Journal of Applied Business Research*, *28*(5), 871–884. https://doi.org/10.19030/jabr.v28i5.7230

El-Masry, A., Abdel-Salam, O., & Alatraby, A. (2007). The exchange rate exposure of UK non-financial companies. *Managerial Finance*, *33*(9), 620–641. https://doi.org/10.1108/03074350710776217

Emeka, N., & Uko, K. A. (2016). Autoregressive Distributed Lag (ARDL) cointegration technique: application and interpretation. *Journal of Statistical and Econometric Methods*, *5*(4), 63–91.

Engle, R. F., & Granger, C. W. J. (1987). Co-Integration and Error Correction : Representation , Estimation , and Testing. *Econometrica*, *55*(2), 251–276. https://doi.org/10.2307/1913236

EViews 10 User's Guide II. (2017) (2nd Editio). Irvine CA: IHS Global Inc.

Fama, E. (2016). American Finance Association Efficient Capital Markets : A Review of Theory and Empirical Work Author (s): Eugene F . Fama Source : The Journal of Finance , Vol . 25 , No . 2 , Papers and Proceedings of the Twenty- Eighth Annual Meeting of the American. *The Journal of Finance*, *25*(2).

Friedman, M., & Paden, D. (1983). A Monetarist View Author (s): Milton Friedman and Donald W . Paden Source : The Journal of Economic Education , Vol . 14 , No . 4 (Autumn , 1983), pp . 44-55 Stable URL : http://www.jstor.org/stable/1182527 A Monetarist View. *The Journal of Economic Education*, *14*(4), 44–55. Retrieved from https://www.jstor.org/stable/1182527

Galí, J. (2018). The State of New Keynesian Economics: A Partial Assessment. *The Journal of Economic Perspectives*, *32*(3), 87–112.

Granger, C. W. J. (1969). Investigating Causal Relations by Econometric Models and Cross-spectral Methods. *Econometrica*, *37*(3), 424–438. https://doi.org/10.2307/1912791

Gupta, R., & Reid, M. (2013). Macroeconomic surprises and stock returns in South Africa. *Studies in Economics and Finance*, *30*(3), 266–282. https://doi.org/10.1108/SEF-Apr-2012-0049

He, Y. (2018). A Study on the International Fisher Effect : An Investigation from South Korea and China. *Journal of Industrial Distribution & Business*, *9*(7), 33–42. https://doi.org/10.13106/ijidb.2018.vol9.no7.33

Huy, T. Q. (2016). The Linkage Between Exchange Rates and Stock Prices: Evidence

from Vietnam. *Asian Economic and Financial Review*, *6*(7), 363–373. https://doi.org/10.18488/journal.aefr/2016.6.7/102.7.363.373

Hyde, S. (2007). The response of industry stock returns to market, exchange rate and interest rate risks. *Managerial Finance*, *33*(9), 693–709. https://doi.org/10.1108/03074350710776244

IMF. (2015). *Monetary and Financial Statistics Manual*. *Monetary and Financial Statistics Manual*. https://doi.org/10.5089/9781557759740.049

Jahan, S., & Papageorgiou, C. (2014). What is monetarism? *International Monetary Fund - Finance & Development*, *51*(1), 5–7. Retrieved from https://www.imf.org/external/pubs/ft/fandd/2014/03/basics.htm

Jones, B. (2016). F. In *Dictionary of World Biography* (3rd ed., p. 308). ANU Press. Retrieved from https://www.jstor.org/stable/j.ctt1bw1h8n.10%0AJSTOR

Kaakunga, E., & Matongela, A. (2013). Inflation and stock market development in Namibia: Evidence from co-integration and error correction modelling. *Journal for Studies in Humanities and Social Sciences*, *2*(2), 1–14. https://doi.org/2026-7215

Kendall, M., & Bradford, H. (1953). The Analysis of Economic Time-Series-Part I : Prices. *Journal of the Royal Statistical Society*, *116*(1), 11–34. https://doi.org/doi:10.2307/2980947

Keynes, J. M. (1937). The General Theory of Employment. *The Quarterly Journal of Economics*, *51*(2), 209–223. Retrieved from www.jstor.org/stable/1882087

Kingsley, A., & Peter, U. (2019). Volatility Modelling using Arch and Garch Models (A Case Study of the Nigerian Stock Exchange). *International Journal of Mathematics Trends and Technology*, *65*(4), 58–63. https://doi.org/10.14445/22315373/ijmtt-v65i4p511

Koskei, L. (2017). The Effect of Exchange Rate Risk on Stock Returns in Kenya's Listed Financial Institutions. *Research Journal of Finance and Accounting Www.Iiste.Org ISSN*, *8*(3), 1–5. Retrieved from www.iiste.org

Kwofie, C., & Ansah, R. K. (2018). A Study of the Effect of Inflation and Exchange Rate on Stock Market Returns in Ghana. *International Journal of Mathematics and Mathematical Sciences*, *2018*. https://doi.org/10.1155/2018/7016792

Lim, T. C., Lim, X. Y., & Zhai, R. (2012). History of the Efficient Market Hypothesis. *International Journal of Management Sciences and Business Research*, *1*(11), 26–33. Retrieved from https://www.academia.edu/23165186

Lioudis, N. (2019). Keynesian and Monetarist economics : How do they differ ? Retrieved April 28, 2019, from https://www.investopedia.com/ask/answers/012615/what-difference-between-keynesian-economics-and-monetarist-economics.asp

Masha, I., Harris, L., Wang, J.-Y., & Shirono, K. (2007). The Common Monetary Area in Southern Africa: Shocks, Adjustment, and Policy Challenges. *IMF Working Papers*, *07*(158), 1. https://doi.org/10.5089/9781451867220.001

Maskay, B. (2007). Analyzing the effect of change in Money supply on stock prices. *The Park Place Economist*, *15*(1), 72–79.

Mechri, N., Ben Hamad, S., de Peretti, C., & Charfi, S. (2019). The Impact of the Exchange Rate Volatilities on Stock Markets Dynamics: Evidence from Tunisia and Turkey. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3304040

Miah, M., & Rahman, A. (2016). Modelling volatility of daily stock returns: is GARCH (1,1) enough? *American Scientific Research Journal for Engineering Technology and Science*, *18*(1), 29–39.

Mlambo, C., Maredza, A., & Sibanda, K. (2013). Effects of Exchange Rate Volatility on the Stock Market : A Case Study of South Africa, *4*(14), 561–570. https://doi.org/10.5901/mjss.2013.v4n14p561

Mouna, A., & Anis, J. (2016). Market, interest rate, and exchange rate risk effects on financial stock returns during the financial crisis: AGARCH-M approach. *Cogent Economics and Finance*, *4*(1), 1–16. https://doi.org/10.1080/23322039.2015.1125332

Mozumder, N., De Vita, G., Larkin, C., & Kyaw, K. S. (2015). Exchange rate movements and firm value: Evidence from European firms across the financial crisis period. *Journal of Economic Studies*, *42*(4), 561–577. https://doi.org/10.1108/JES-02-2014-0029

Mwaanga, C., & Njebele, N. (2017). The Long-Run and Short-Run Relationship between the Exchange Rates and Stock Market Prices. *Journal of Financial Risk Management*, *06*(04), 315–324. https://doi.org/10.4236/jfrm.2017.64023

Namibia ' s Monetary Policy Framework. (2008). Windhoek. Retrieved from http://www.bon.com.na

Naseer, M., & Tariq, Y. bin. (2014). the Efficient Market Hypothesis: a Critical Review of Literature and Methodology. *Ekonomika*, *93*(2), 7–23. https://doi.org/10.15388/ekon.2014.2.3549

O'Brien, R. M. (2017). Dropping Highly Collinear Variables from a Model: Why it Typically is Not a Good Idea*. *Social Science Quarterly*, *98*(1), 360–375. https://doi.org/10.1111/ssqu.12273

Officer, L. H. . (1978). The Relationship Between Absolute and Relative Purchasing Power Parity. *The Review of Economics and Statistics*, *60*(4), 562–568. Retrieved from https://www.jstor.org/stable/1924249

Pástor, Ľ., & Veronesi, P. (2012). Uncertainty about Government Policy and Stock Prices. *The Journal of Finance*, *67*(4), 1219–1264.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds Testing Approaches to the Analysis of Macroeconomic Relationships In Nigeria. *Journal of Applied Econometrics*, *16*(3), 289–326. https://doi.org/10.1002/jae.616

Prasad, K., & Suprabha, K. R. (2015). Measurement of Exchange Rate Exposure: Capital Market Approach versus Cash Flow Approach. *Procedia Economics and Finance*, *25*(15), 394–399. https://doi.org/10.1016/S2212-5671(15)00750-9

Rakhal, R. (2018). Determinants of Stock Market Performance. *NCC Journal*, *3*(1), 134–142. https://doi.org/10.3126/nccj.v3i1.20255

Salifu, Z., Osei, K. A., & Adjasi, C. K. D. (2007). Foreign exchange risk exposure of listed companies in Ghana. *Journal of Risk Finance*, *8*(4), 380–393. https://doi.org/10.1108/15265940710777324

Schreiber-Gregory, D. N. (2017). Multicollinearity: What Is It, Why Should We Care, and How Can It Be Controlled? In *Proceedings of the SAS® Global Forum 2017 Conference*. Cary, NC: SAS Institute Inc. https://doi.org/10.1016/j.hrthm.2017.11.018

Sgammini, M. (2016). Effect of exchange rate volatility on returns of investment portfolios in South Africa, (November). Retrieved from https://dspace.nwu.ac.za/bitstream/handle/10394/24919/Sgammini_M.pdf?sequence=1&isAllowed=y

Sheefeni, P. J. (2015). Testing the Strong-Form Efficiency of the Namibian Stock Market. *International Review of Research in Emerging Markets and the Global Economy*, *1*(4), 474–486. Retrieved from http://globalbizresearch.org

Shrestha, M. B., & Bhatta, G. R. (2018). Selecting appropriate methodological framework for time series data analysis. *The Journal of Finance and Data Science*, *4*(2), 71–89. https://doi.org/10.1016/j.jfds.2017.11.001

Sichoongwe, K. (2016). Effects of Exchange Rate Volatility on the Stock Market : The Zambian Experience, *7*(4), 114–119.

Sohail, N., & Hussain, Z. (2009). LONG-RUN AND SHORT-RUN RELATIONSHIP BETWEEN MACROECONOMIC VARIABLES AND STOCK PRICES IN PAKISTAN: The Case of Lahore Stock Exchange. *Pakistan Economic and Social Review*, *47*(2), 183–198.

Suriani, S., Kumar, D., Jamil, F., & Muneer, S. (2015). Impact of Exchange Rate on Stock Market. *IOSR Journal of Business and Management*, *5*(Special Issue), 385–388. Retrieved from http: www.econjournals.com

Tai, C. S. (2010). Foreign exchange risk and risk exposure in the Japanese stock market. *Managerial Finance*, *36*(6), 511–524. https://doi.org/10.1108/03074351011042991

Türsoy, T. (2017). Causality between Stock Prices and Exchange Rates in Turkey: Empirical Evidence from the ARDL Bounds Test and a Combined Cointegration

Approach. *International Journal of Financial Studies*, *5*(1), 8. https://doi.org/10.3390/ijfs5010008

Wong, K. (2018). Peasaran et al. (2001) Bound Test and ARDL cointegration Test. *Journal of Applied Econometrics*, (January).

Yan, C., Liu, W., & Li, F. (2014). The Error Correction Model and Empirical Study of Open-end Fund Scale in China Based on the Season Serial Data. *Journal of Applied Sciences*, *14*(11), 1230–1233. https://doi.org/10.3923/jas.2014.1230.1233

Yoo, W., Mayberry, R., Bae, S., Singh, K., Peter He, Q., & Lillard, J. W. (2014). A Study of Effects of MultiCollinearity in the Multivariable Analysis. *International Journal of Applied Science and Technology*, *4*(5), 9–19. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/25664257%0Ahttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC4318006

APPENDIX A: Research Permission Letter

CENTRE FOR POSTGRADUATE STUDIES

University of Namibia, Private Bag 13301, Windhoek, Namibia
340 Mandume Ndemufayo Avenue, Pioneers Park
☎ +264 61 206 3275/4662; Fax +264 61 206 3290; URL.: http//www.unam.edu.na

UNAM
UNIVERSITY OF NAMIBIA

RESEARCH PERMISSION LETTER

Student Name: Mr. Lazarus Shinkeva

Student number: 200730444

Programme: Master of Science (Accounting and Finance)

Approved research title: The Effect of exchange rate risk on stock market returns at the Namibian Stock Exchange

TO WHOM IT MAY CONCERN

I hereby confirm that the above mentioned student is registered at the University of Namibia for the programme indicated. The proposed study met all the requirements as stipulated in the University guidelines and has been approved by the relevant committees. Permission is hereby granted to carry out the research as described in the approved proposal.

The proposal adheres to ethical principles. Permission is hereby granted to carry out the research as described in the approved proposal.

Best Regards

17/05/19

Name: Prof. M. Hedimbi **Date**

Director: Centre for Postgraduate Studies

Tel: +264 61 2063275

E-mail: directorpgs@unam.na

APPENDIX B: NSX Listed Companies (28 Dec 2018)

NAMIBIAN STOCK EXCHANGE: 28 December 2018	Share Code
Basic Materials	
Sector - Industrial Metals	
Anglo-American plc	ANM
Sector - Mining	
Paladin Energy Limited	PDN
B2Gold Corporation	B2G
Sector - Chemicals	
Afrox	AOX
Industrials	
Sector - General Industrials	
Barloworld Limited	BWL
Consumer Goods	
Sector - Beverages	
Namibia Breweries	NBS
Sector - Food Processors	
Bidvest Namibia Limited	BVN
Clover Industries Limited	CLN
Sector - Food Producers	
Oceana Group Limited	OCG
Health Care	
Sector - Health Care Providers	
Mediclinic International Plc (prev Al Noor Hospitals Gr)	MEP
Consumer Services	
Sector - General Retailers	
Nictus Holdings - Nam	NHL
Truworths	TRW
Sector - Food & Drug Retailers	
Shoprite Holdings	SRH

Financials	
Sector - Banks	
Capricorn Investment Group Ltd	CGP
Firstrand	FST
FirstRand Namibia Ltd (prev. FNB Namibia Holdings Ltd)	FNB
Nedbank Group Limited	NBK
Standard Bank Group	SNB
Sector - Nonlife Insurance	
Santam Limited	SNM
Sector - Life Insurance	
MMI Holdings Limited	MIM
Old Mutual Ltd	OMM
Sanlam Limited	SLA
Sector - Real Estate	
Oryx Properties Limited	ORY
Vukile Property Fund Limited	VKN
Sector - General Financial	
Astoria Investments Ltd	ARO
Bravura Holdings Ltd (prev CMB International Ltd)	CMB
Investec Limited	IVD
Letshego Holdings (Namibia) Ltd	LHN
Namibia Asset Management Limited	NAM
PSG Konsult Limited	KFS
Stimulus Investments Limited - Pref	SILP
Tadvest Limited NM	TAD
Trevo Capital Limited	TRVP
Trustco Group Holdings Limited - Par value	TUC
Sector - Technology Hardware & Equipment	
Nimbus Infrastructure Ltd	NUSP
Number of listed shares	35