CALENDAR ANOMALIES ON THE NAMIBIAN STOCK EXCHANGE:

DAY OF THE WEEK AND MONTH OF THE YEAR EFFECTS

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ABSTRACT

This study examines calendar anomalies, specifically day of the week and month of the year effects on the Namibian stock exchange using daily and monthly data from January 4th, 2000 to March 31st, 2017 obtained from the Namibian stock exchange. In an attempt to select a model best fit to account for return and volatility in the Namibian stock market, the symmetric GARCH (1,1) and two other asymmetric models EGARCH(1,1) and TARCH(1,2) models were estimated. The empirical results derived from the GARCH models indicate the existence of day-of-the-week effects on stock returns and volatility of the Namibian stock market. GARCH (1,1) and EGARCH(1,1) models reveals that returns on Thursdays are the highest (positive) and significant. Contrary, the TARCH(1,2) model exhibits high and significant mean returns on Tuesdays. Results from the EGARCH(1,1) and TARCH(1,2) models shows that Friday has negative mean daily returns that are significant. The month of the year analysis confirms the subsistence of the month of the year anomaly. Results from the mean equation of the GARCH(1,1), EGARCH(1,1) and TARCH(1,2) models shows that October exhibits the highest returns which are significant, implying an October effect. This implies that stock market returns in October differ significantly with the other months of the year. Also, there is evidence of persistence in shocks to the conditional variance in the NSX overall index.

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AWKNOLEDGEMENTS

Above all, I praise God for taking care of me during my study period.

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DEDICATION

For my parents, Thomas and Sarti Johannes, who taught me that everything is possible through Christ. It is impossible to thank you adequately for everything you have done.

DECLARATIONS

I, Meameno Tangeni Johannes, 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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CHAPTER ONE

INTRODUCTION

1.1. Orientation of the proposed study

A well-regulated stock market leads to good performance which is a strong indicator of a healthy economy as it stimulates economic growth and promotes economic activities within a country. As such, stock traders keenly observe any movement of stock index which may affect their future profitability or help them to evaluate their portfolios. They also observe the economy for any sudden incident or change that may affect their decisions of buying and selling stocks. According to Nawaz and Mirza (2012), Stock market anomalies are defined as unusual patterns of stock returns that exist within the stock markets. These anomalies can be broadly classified as calendar, fundamental and technical anomalies. Calendar anomalies sometimes referred to as seasonality in stock returns is the tendency of securities to show higher or lower yield during certain days, months or periods of the year. The most documented calendar anomalies are the day of the week and month of the year effect. The effect of the day of the week indicates that the returns are abnormally high over certain days of the week than other days. More precisely, the results resulting from several empirical studies showed that the average return of Friday is abnormally raised, and the average return of Monday is abnormally low; see (Gibbson & Hess, 1981; Mills & Coutts 1995 and Al-Loughani & Chappell 2001). A month of the year effect exists if returns tend to be higher or lower in a specific month, when compared with the other months of the year. Although January is the most commonly reported month effect for returns to be higher, other month effects have also been reported. These seasonal patterns in returns are clear contradictions to the EMH as prices should follow a random walk and not be predictable based on certain time periods. Hence, it should be impossible for an investor to continuously earn abnormal returns based on some seasonal patterns.

Furthermore, Haugen and Jorion (1996) documented that calendar effects should not be long lasting, as market participants can learn from past experience. That is, if any effect exists, trading based on exploiting those patterns of return should yield extraordinary profits at least for a short period. Since the first anomaly studies emerged, a vast number of calendar anomalies have been discovered in various markets. The anomalies have often been reported to weaken, diminish or even reverse over time. This has been an incentive to shift focus on emerging markets, especially during the last two decades. However, the Namibian stock market has gotten very little attention.

The EMH states that, an efficient market is one in which information is readily and widely available to investors, and all relevant and ascertainable information is already reflected in security prices, (Brealey, Myers, Allen & Mohanty, 2012). Market efficiency is divided into three forms based on the type of the information that is reflected in the stock prices. These are weak, semi-strong and strong forms of market efficiency. Weak form of efficiency implies that all historical information in the markets is comprised in the stock prices and analysis of past information does not help to predict future price travels. Semi-strong form of market efficiency states that all the publicly available information is integrated in the stock prices. It relates to the thought that the stock prices immediately adjust to the incoming news. Strong form of market efficiency comprises both weak and semi-strong forms. It implies that all information, as well as not publicly available information, is reflected in the stock prices.

1.2. Statement of the problem

An efficient market is one which responds to new information and does not experience rapid price fluctuations or other instabilities, for it is assumed that all investors in the market have similar, accurate information (Fama 1998). If markets are efficient, anomalies are chance events that should disappear within a short period of time. The efficient market hypothesis has been studied from time to time to allow investors to predict stock prices more efficiently and accurately. Sheefeni (2015) analyzed the strong form efficiency of the capital market in Namibia covering the period of 16 years, 1997 to 2012 and found no evidence of strong form efficiency in Namibia's stock market. Furthermore, Sheefeni (2016) conducted a study on the weak form of market efficiency using data from 1997 to 2012 and found evidence of weak form of market efficiency.

According to Sheefeni (2015) and Sheefeni (2016), in Namibia, with regard to the firms, securities of firms cannot outperform the market and the present market price is to a certain extend a true reflection of the present situation of their security and that past values cannot be used to predict the future values. Many researchers have however found evidence that contradict the efficient market hypotheses pointing out that stock returns vary depending on time, day or month, an occurrence known as calendar anomaly. This entails that prior share prices can be used to predict future share prices. Many investors try to outperform the market and according to Oke and Azeez (2012) which can only happen if the market is operationally inefficient, implying that there is friction in the trading process. The existence of calendar effects renounces the efficiency of the efficient market hypothesis which states that the market is information efficient and thus abnormal gains would not be achievable, Plimsoll, Saban, Spheris and Rajaratnam (2013). Review of the studies above shows no agreement on whether calendar anomalies which violate the efficient market hypotheses exists on the Namibian stock exchange which is widely attributed to the lack of published papers on this topic regarding the Namibian stock market

1.3. Objectives of the study

The main objective of the study is to investigate the calendar anomalies on the Namibian stock market using daily time series data from 4th January 2000 to 31st March 2017. The main objective is divided into the following specific objectives:

- To investigate the day-of-the-week effects on the Namibian stock exchange
- To investigate the month-of-the-year effects on the Namibian stock exchange

1.4. Significance of the study

Since the introduction of seasonal anomalies in the financial literature by Rozeff and Kinney (1976), almost all other studies on this topic have focused on developed countries with large markets while neglecting and giving minimal attention to the emerging markets. In recent years however, there has been an increase in the number of studies done on developing countries on calendar effects. In Namibia, not many studies, if at all, have been conducted on the calendar effects on the NSX (Namibian stock exchange). This study will be significant but not limited to:

Academicians and scholars

Academicians and scholars will find the study useful especially when researching further on related areas and use it as a reference. They will also use the findings to improve on the gaps in the study.

Individual and potential investors

A rational investor takes into account several parameters when making investment decisions. This study will also be valuable to shareholders and to potential investors while investing in shares at the Namibian Stock Exchange so that they can make correct decisions at the right time.

The stockbrokers and the Namibian Stock Exchange

The stockbrokers will find the report valuable as it will assist them strengthen their internal governance that will install investor confidence. Stockbrokers can also use the findings of the study when educating potential investors on profitable time to make investments. This paper will help the NSX to come up with policies and procedures to improve efficiency involving the stock market

1.5. Limitations

Owing to the fact that there is little, if any, studies done on calendar anomalies in Namibia, the researcher could not review studies done on Namibia regarding the topic. The study is limited to Namibian data from the period January 4th, 2000 to March 31st, 2017.

Following the introduction, the rest of thesis is organized as follows: Chapter two discusses the overview and development of the Namibian stock market. Chapter three examines the theoretical and empirical literature relevant to the subject under study. Chapter four describes the data used, source, econometric methodology. Chapter five give the data analysis, results and discussion while the summary, conclusions and recommendations end the thesis in chapter six.

CHAPTER TWO

OVERVIEW OF THE NAMIBIAN STOCK MARKET

2.1. Introduction

A stock market is a market where shares or stocks are traded. Shares in the stock market represent ownership by investors of the productive assets of listed companies and they have no fixed maturity, Mkhize and Msweli-Mbanga (2006). The development of a stock market presents opportunities for greater fund's mobilization, improved efficiency in resource allocation and provision of relevant information for appraisal. This Chapter gives a short overview of the development and performance of the Namibian stock market.

2.2. Development of the Namibian Stock Exchange

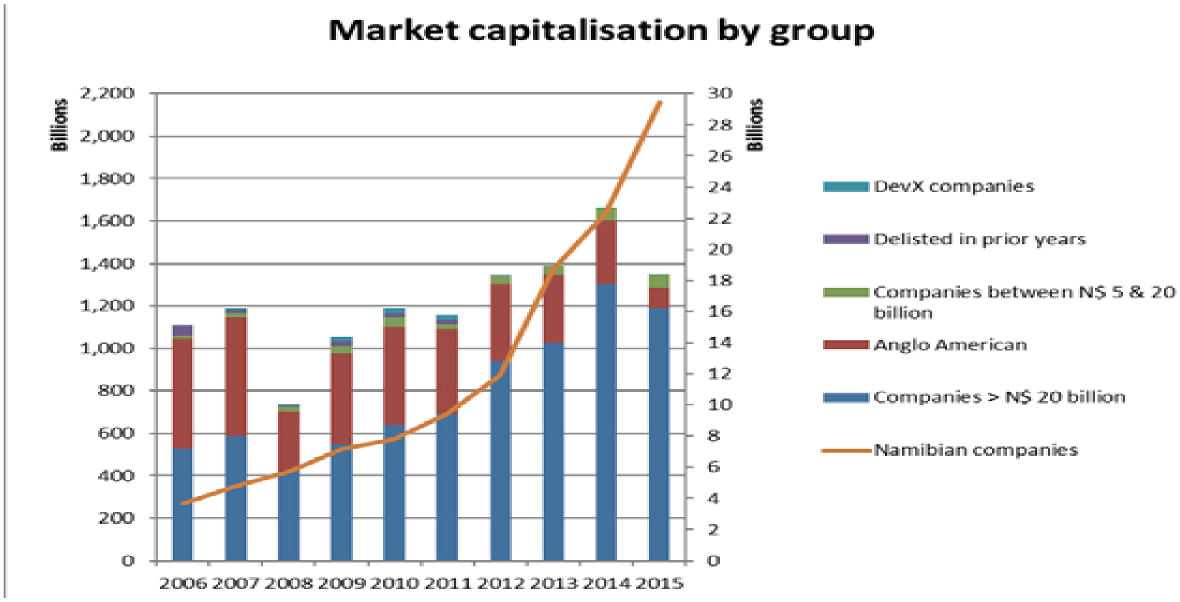
According to the Namibia Stock Exchange (NSX) website Annual Report 2015, the first stock exchange in Namibia was established in Luderitz in 1904 due to a diamond rush under the name Luderitz stock Exchange. After a few years, the rush was over and by 1910, the exchange was closed and there was no more business. Plans for a second stock exchange came in 1990 when the country gained its independence from South African occupation. With preparation to build an independent economy, government gave full moral and legislative support, while funding came from 36 leading Namibian businesses representing the full cross section of interested parties in developing capital markets: each donated N$10.000 as start-up capital.

In October 1992, the Namibian stock Exchange was launched as a non-profit making association, licensed in terms of the Stock Exchange Controls Act No. 1 of 1985. Namibian stock Exchange was formed as a self-regulatory organization with the capacity to perform functions such as approving listing applications, surveillance, licensing stockbrokers, trading and listing rules and1 manual clearing and settlement. Namibian Stock Exchange (NSX) came into existence with one dual listed firm and one stockbroker as a vehicle for locally registered companies to raise capital through public flotation, for widening of share ownership amongst the Namibian public, and for outside investors to participate in Namibian enterprises.

2.3. Namibia stock Exchange Performance and Growth

According to the Namibia Stock Exchange Annual Report 2015, since its launch in 1992 the market capitalization of shares listed on the NSX has grown significantly. Over 70 companies have listed on the Main Board and the Development Capital Board (DevX), but attrition through takeovers, transfers to other exchanges and two liquidations have reduced the number to 41.

Figure 2.1 Market capitalization by group



Primary listed on the stock exchanges in:

Namibia- NSX	8
Australian –ASX	4
London –LSE	2
South Africa –JSE	19
South Africa –JSE-ETF	4
Toronto –TSX	4

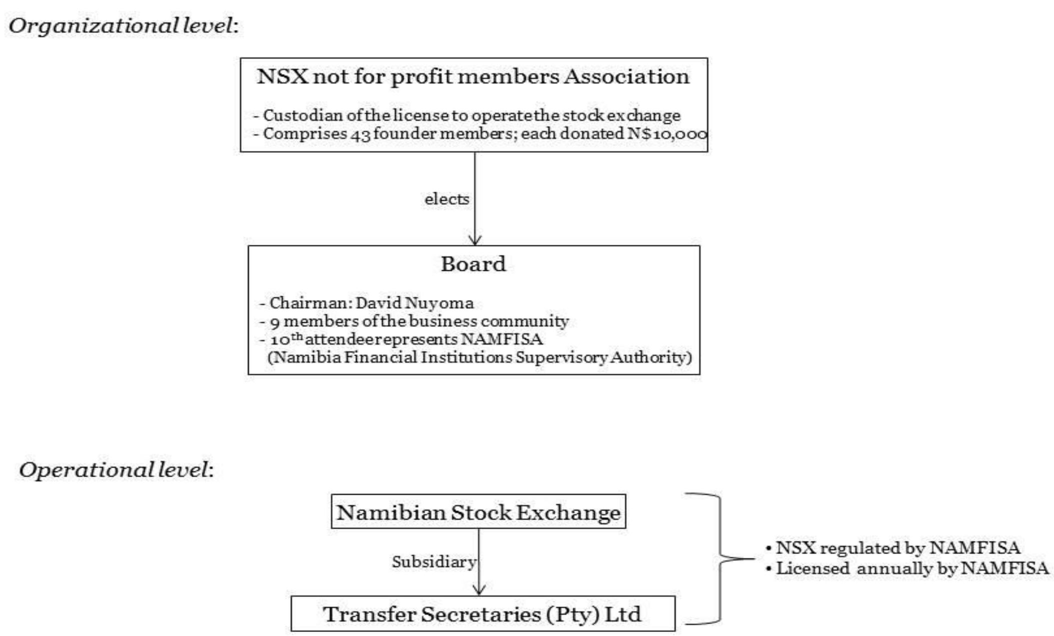
Total 41

Source: ***Namibia Stock Exchange Annual Report 2015***

The NSX has over the years benefited from the Namibian asset requirements of Regulation 28 for Pension Funds and the similar Regulation 15 for long-term insurance companies by the dual / cross / secondary listing of companies listed on other international exchanges which have significant investments in the Namibian economy. Since 1994 pension funds have been required to invest 35% of their respective assets in deemed Namibian assets which include dual listed shares purchased through a Namibian Stock Broker on the NSX.

2.4. Structure of the Namibian stock Exchange

Figure 2.2 Structure of the Namibian stock exchange



Source: Namibia Stock Exchange Annual report (2015)

Listing Requirements

a. Share equity amounting to N$1 million.

b. Minimum of 1,000,000 shares in issue.

c. Profitable trading record for three years

d. Current audited profit of at least N$500,000 annual before taxation and interest.

e. Minimum of 20% of the shares should owned by the public.

f. Minimum of 150 shareholders in the company.

g. Companies should provide audited reports for the previous three years.

h. Companies should have an acceptable record of business practice and management integrity.

Source: ***Namibia Stock Exchange Annual report (2015)***

2.5. Summary

Given the evidence from the figures above, Namibian stock market has seen major growths and developments since its establishment in 1992. The market capitalization continues to widen as more companies continue to list from time to time.

CHAPTER THREE

LITERATURE REVIEW

3.1. Introduction

This chapter provides theories relevant to the study. It covers the theoretical literature with a focus on the market efficient theory, the Random walk theory, behavioral finance and theories behind the explanation of calendar anomalies. It also covers the empirical evidence on day-of-the-week and month-of-the-year effect and the summary to conclude the chapter.

3.2. Theoretical Literature

This component is concerned with the concept and description of the three forms of market efficiencies, the random walk theory and behavioral finance theory. Also, the theories behind the explanation of calendar anomalies with emphasis on the day-of-the-week and month-of-the-year effect are explained.

3.2.1. Efficient Market Hypotheses (EMH)

Efficient capital markets relate to the fact that stock prices reflect all available information such that stock price movements are random, Fama (1970). That is, every time new information is released into the market example, earnings and dividend, historical stock prices, macroeconomic data or private information, will reflect in the price of the securities which could be minutes or even seconds. Fama (1970) categorized market efficiency into three forms, namely, weak form, semi-strong form and strong form.

Weak Form of market efficiency

According to Fama (1970), the weak-form efficiency hypothesis assumes that security prices reflect any information that may be contained in the past history of the security itself. This includes the past market trading data such as the historical sequence of prices, rates of return, trading volume and other market generated data, such as odd-lot transactions. The weak-form EMH implies that trend analysis is not useful as past information is publicly available and virtually costless to obtain. If such information ever conveyed reliable signals about future performance, all investors would already have learned to exploit the signals. Ultimately, the signals lose their value as they become widely known. The weak-form EMH therefore contends that the investor should gain little from using any trading rule that decides whether to buy or sell a security based on past market data.

Semi-strong Form of market efficiency

This states that current security prices reflect all the information constant of historical prices but also reflects all information that is publicly available about the companies. The semi-strong form hypothesis encompasses the weak-form hypothesis because all past information – considered by the weak-form EMH – is public. Public information also include non-market information, such as earnings and dividend announcements, dividend yields, price-earnings ratios, stock splits, news about the economy and political news, Post and Levy (2005). The implication of this hypothesis is that traders cannot realize above-average risk-adjusted returns by using important new information that has already been made public. This is because security prices already mirror such new public information.

Strong Form of market efficiency

The strong form of efficient market hypothesis states that security prices fully reflect all information, both private and public. This means that no group of investors has monopolistic access to information relevant to the formation of prices, Post and Levy (2005). The implication here is that no group of investors – including company insiders – can consistently derive above-average risk-adjusted returns. Those who acquire inside information act on it, buying and selling the security. Their actions affect the price of the security, which quickly adjust to reflect the inside information.

3.2.2. The Random Walk Theory

The random walk hypothesis was introduced by Kendall (1953). He studied irregularities in the price fluctuations in the US stock market and discovered that price fluctuations were not regular but instead followed an unsystematic path; what's more, stock price fluctuations are all together autonomous of each other. The random walk states that successive returns are independent and that the returns are identically distributed over time, i.e. the stock prices follows a random walk. In a random walk market, stock prices fluctuate randomly around their intrinsic values, return quickly towards the equilibrium and fully reflect the latest information available in the market, Fama (1965) and Kendall (1953). Poshakwale (1996), further described the random walk as consecutive prices variations autonomous of each other, therefore today's stock prices have no bearings on tomorrows stock prices so price changes do not exhibit any trend.

3.2.3. Behavioral finance

According to conventional financial theory, most people are rational in their quest to maximize their wealth. However, there are many cases where emotions and psychology influence our decisions, which can then become unpredictable or irrational. Behavioral finance aims to combine behavioral and cognitive psychological theories with traditional economics and finance in order to understand what influences investors that make irrational decisions.

"Traditional" or "modern" descriptions of finance are based on rational and logical theories, such as the capital asset pricing model (CAPM) or the efficient market hypothesis (EMH). Traditional finance tries to explain and understand financial markets with models that assume agents to act rationally. That is, after receiving new information they adjust their beliefs correctly according to Bayes' law and given their beliefs, make choices that are consistent with the expected utility theory (Barberis & Thaler, 2003). These theories assume that people tend to behave in a rational and predictable manner. Behavioral finance theory has been used to explain stock prices anomalies related to overreaction, under reaction and herding behavior. For a long time, the theoretical and empirical evidence suggested that the CAPM, EMH and other sound financial theories did a good job predicting and explaining certain events. However, finance and economics scholars have found anomalies and behaviors that cannot be explained by these theories. These theories can explain certain "idealized" events but in reality the world is a place where people's behavior is often unpredictable. Essentially, behavioral finance attempts to explain the what, why, and how of finance and investing, from a human perspective.

3.2.4. Month of the year effect

This effect states that returns on common stock are not the same for all the months of the year. Although significant deviations in stock returns are found in different months of the year for different countries, researchers have observed that returns are higher in the month of January for many countries. Hence, this effect is known as the January effect. Alagidede (2008) in his study covered seven African countries and found that January returns were positive and significant for Egypt, Nigeria and Zimbabwe. The explanation to this anomaly was proposed to be among the following prominent ones:

Window Dressing Hypothesis

This hypothesis was developed by Haugen and Lakonishok (1988). They suggested that institutional managers are evaluated based on their performance and their investment philosophy. That is, to improve their performance, the institutions buy both risky stocks and small stocks but sell them before the end of the year so that they do not show up in their year-end holdings. At the beginning of the following calendar year (in January), investment managers reverse the process by selling winners, large stocks, and low risk stocks while replacing them with small and risky stocks that typically include many past losers, Bahadur, Fatta, Joshi and Nayan (2005). The window dressing hypothesis represents an alternative but not necessarily an exclusive explanation for the month-of-the-year effect.

Tax-Loss Selling Hypothesis

The tax-loss selling hypothesis has been the most frequently cited explanation for the January effect since Branch (1977), who documents high January returns for stocks that earned negative returns during the previous year (Starks, Yong & Zheng, 2006). The hypothesis theorizes that in (late) December investors sell securities in which they have losses in order to lower their taxes on net capital gains, thereby further increasing the downward price pressure of losing securities. In January the proceeds from these sales will be reinvested, resulting in large January returns.

3.2.5. Day of the week effect

Osborne (1962) was the first to document the day of the week effects in the United States (US) stock market. The day of the week effect indicates that the returns are unusually high over certain days of the week than other days. In particular, results resulting from several empirical studies showed that the average return of Friday is abnormally raised, and the average return of Monday is abnormally low, Derbali and Hallara (2016). Many researchers have suggested a number of hypotheses that may explain the day of the week effect. The more prominent among them are as follows:

Information Processing Hypothesis

Miller (1988) and Lakonishok and Maberly (1990) argued that although gathering and processing information is costly for all investors it is more costly for individual investors to do so during the week as they are engaged in other activities. Thus, it becomes convenient to do so during the weekends as it provides a low cost opportunity to reach an investment decision and when the market reopens, the individual investors might be expected to be more active. Although stock brokers may advise them to put some buying orders during other days of the week, they rely on their own analysis for selling orders. Thus, selling pressure exceeds demand on Mondays.

Information Release Hypothesis

French (1980) demonstrate that firms trend to report bad news on weekends (Friday) and this delayed announcement of bad news might cause the negative Monday effect. Also, Steeley (2001) offered a part explanation that the Monday phenomenon is related to the systematic pattern of market wide news arrivals that concentrate between Tuesdays and Thursdays.

Settlement Regime Hypothesis

Gibbons and Hess (1981), Lakonishok and Levi (1982) reported that the delay in the cash payment for the security can lead to enhancements in the rates of return on specific day due to the extra credit occasioned by the two days of the weekend.

Trading Activities of Investors

Osborn (1962) suggested that individual investors have more time to take financial decisions during the weekend; they are relatively more active in the market on Monday. He also reported that institutional investors are less active in the market on the Monday because Monday tends to be a day of strategic planning.

3.2.6. Other calendar anomalies

Turn of the month effect

According to Nawaz and Mirza (2012), Turn of the month effect is the occurrence of higher returns towards the last few days of the previous month and first few days of the following month as compared to the returns on the rest of the trading days of the month. Ariel (1987) was the first to identify turn of the month effects in his study for

US equity market covering a period of nineteen years (1963-1981). He observed that the mean returns are higher at the end of one month and at the beginning of the next month. Considering last day of one month and the first three days of upcoming month he observed that changes in stock prices in these days were found positive. The explanation to this anomaly was believed to be one of these prominent ones:

Pay Day Hypothesis

Corporate investors usually need cash to pay the compensation of employees or for other business purposes like dividend and interest. Individual investors receive the money and reinvest a portion of this sum back in the market. Investors take their money out of the market at end of month for payment purpose and reinvest the amount in the new month. This gives birth to high stock prices at turn of month, with the assumption that investors invest their funds immediately in the market and as they do so the stock prices are pushed up, Ogden (1990).

Time of Releasing Information

Acording to Bollersleve, Cia and Song (2000) the concentration of corporate announcements as well as the macroeconomic announcement during the first-half of the month is responsible for the turn-of-the-month effect, as positive returns along with new announcement are observed especially in beginning of month.

Window Dressing Hypothesis

At the end of month, investors particularly institutional investors tend to clean their weak portfolios in order to turn up with only winners in hand. As the month changes, investors start buying back the stocks which pushes the stock prices up in market, Thaler (1987) and Lakonishok and Maberly (1991).

Holiday effect

Holiday effect was first identified by Fields (1934). This effect states that Holiday effect demonstrates that pre holidays, a day immediately before the holiday in particular, stocks earn a much higher return as compared to the returns generated on post holidays, Nawaz and Mirza (2012). The major explanations extended in the literature for the presence of holiday-effect are as follows:

Investor Psychology

This hypothesis suggests that investors tend to buy shares before holidays because of high spirits and holiday excitement, Brockman and Michayluk (1998) and Vergin and McGinnis (1999).

3.3. Empirical literature

Various studies have been done on calendar anomalies in both developed and developing economies. This part looks at the empirical evidence on month-of-the-year and day-of-the-week effect.

3.3.1. Day-of-the-week studies

Mbululu and Chipeta (2012) tested directly for the day-of-the-week effect on skewness and kurtosis on the nine listed economic stock market sector indices of the Johannesburg stock exchange for the period July 1995 to May 2011. They found no evidence of the day-of-the-week effect on skewness and kurtosis for eight of the nine JSE stock market sectors. However, they detected a Monday effect for the basic materials sector only.

Osarumwense (2015) used the GARCH (2,1) and EGARCH (2,1) models to assess the influence of error distributional assumption on appearance or disappearance of day-of-the-week effects in returns and volatility using daily price data of the Nigerian stock exchange for top thirty leading companies (NSE-30) from 31st May 2011 to May 2nd 2015. Results revealed that day-of-the-week effects were sensitive to error distribution. They also found evidence that good or bad news in volatility does not only depend on the asymmetric model but also the choice of the error distribution.

Enowbi, Guidi and Mlambo (2010) investigated the day of the week effect on stock returns and volatility in four emerging African stock markets namely Egypt, Morocco, Tunisia and South Africa, by employing a GARCH model. The sample covered the period from January 2000 to March 2009 and results showed the existence of day of the week effects, that is, the typical negative Monday and Friday positive effects in several stock markets. Even after making adjustments for the equity risks, these effects seemed to be present also in the multivariate EGARCH (M-EGARCH) models that was estimated.

Ndako (2003) examined the day of the week effect for the Nigerian and South African equity markets over pre-liberalization and post-liberalization periods using daily return series for the period August 1st, 1995 to November 30th for Nigeria, and daily return series for the period January 1st 1990- November 30th, 2010, for South Africa. They used Exponential Generalized Autoregressive Conditional Hetroskedasticity (EGARCH) model to estimate the day of the week effect both in the mean and variance equations. The post-liberalization period for the Nigerian equity market revealed day of the week effect on Fridays only in the mean equation. While in the variance equation, there was evidence of day of the week effect on Tuesdays and Thursdays respectively. In South Africa, there was significant evidence of the day of the week effect on Mondays and Fridays during the pre-liberalization period. During the post-liberalization period, there was evidence of day of the week effect on Thursdays in the mean equation and Fridays only in the variance equation.

Mazviona and Ndlovu (2015) analyzed the day of the week effect on the Zimbabwe Stock Exchange (ZSE) by taking into account volatility of returns using industrial and mining daily closing indices data from 19 February 2009 to 31 December 2013. They employed a non-linear approach in modelling the day of the week effects in particular the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) and the Exponential GARCH (EGARCH) models. In order to test the null hypothesis of equality of daily mean returns, a Wald test was carried out. The Wald F-statistic rejected the null hypothesis of equality of mean returns for the industrial index. They found the traditional negative Monday and positive Friday effect for the industrial index in GARCH (1,1) and EGARCH (1,1) models. They also detected a negative Friday effect in the GARCH (1,1) model and a negative Wednesday effect for the mining index in the EGARCH (1,1) model.

Chukwuogor-Ndu (2006) analyzed the financial markets movements in fifteen developing and developed European countries for the period 1997 to 2004. Tests for daily returns and day of the week effect provided evidence for the existence of day of the week effect as seven out of fifteen European financial markets experienced negative Monday and Wednesday returns. Generally, highest daily returns occurred on Mondays, Thursdays and Fridays for some country indices. A test which was conducted for testing the day of the week effect found significant results for equality of mean returns in nine countries out of the total fifteen. These results supported the notion that day of the week effect did exist and so the null hypothesis which stated that there is no difference in the returns across all days of the week was therefore rejected.

Ariss, Rezvanian and Mehdian (2011) investigated calendar anomalies in the stock markets of Gulf Cooperation Council (GCC) for the period 1981 to 2008. Ordinary least squares (OLS) with vigorous standard errors were the regression technique applied on the data. Positive and significant Wednesday returns were observed from the study, Wednesday being the last trading day of the markets. These Wednesday returns were also the highest when compared with the returns on the rest of the trading days of the week for five indices out of seven. Also, it was documented that similar returns' pattern was detected for Thursdays, where Thursday was the last trading day for some indices.

Caporale and Zakirova (2017) studied calendar anomalies at the Russian stock market using daily data for the MICEX market index over the period Sept. 1997–Apr. 2016. They found day of the week effect and the January effect at the Russian stock market using OLS, GARCH (1,1), TGARCH (1,1), EGARCH (1,1) models. However, after factoring in the transaction cost using bid-ask spreads as a proxy for transaction costs, the anomalies disappears.

AL-Mutairi (2010) found evidence of the presence of the day-of-the-week effect in the stock exchange of Kuwait from January 2002 to September 2011. Their empirical results show that the outputs of Saturday have a positive and higher impact than other days of the week except Wednesday, which suggests that the Kuwaiti stock exchange market is ineffective.

Gharaibeh and Al Azmi (2015) investigated the day-of-the-week effect on the available data of daily returns on the weighted index in the Kuwait stock exchange (KSE) during the period of January 2002 to September 2011. Their findings showed that the KSE exhibits positive returns on the first and the last day of the week with significant negative returns on the second day of the trading week.

Hussain, Hamid, Akash and Khan (2011) used OLS regression to test for Day of the week effect on the equity market practices in Pakistan using daily stock prices concerned to KSE-100 Index, for the period January 2006 to December 2010. They concluded that stock market returns for Tuesday are higher and more volatile than other days of the week. This inferred that there exists a day effect in Pakistani stock market.

Using the dummy variable regression and the GARCH (1,1) model, Rahman (2009) examined the presence of day of the week effect anomaly in Dhaka Stock Exchange (DSE). The study included daily closing prices of DSE indices such as DSE all share prices index (DSI), DSE general index (DGEN) and DSE 20 index DSE 20)for a period of 04.09.2005-08.10.2008. The results showed that Sunday and Monday returns were negative and only positive returns on Thursdays were statistically significant. The results also revealed that the mean daily returns between two consecutive days differ significantly for the pairs Monday-Tuesday, Wednesday-Thursday and Thursday-Sunday. Dummy variable regression result shows that only Thursdays have positive and statistically significant coefficients. Results of the

GARCH (1, 1) model show statistically significant negative coefficients for Sunday and Monday and statistically significant positive coefficient for Thursday dummies.

Farooq, Bouaddi and Ahmed (2013) investigated the day of the week effect in the volatility of the Saudi Stock Exchange for the period January 7, 2007 and April 1, 2013 using a conditional variance framework and found presence of the day of the week effect. Their results showed that the lowest volatility occurred on Saturdays and Sundays. They argued that due to the closure of international markets on Saturdays and Sundays, there was not enough activity in the Saudi Stock Exchange and as a result, the volatility was the lowest on these days. Their results also showed that the highest volatility occurred on Wednesdays. They argued that, Wednesday being the last trading day of the week, corresponded with the start of four non-trading days (Thursday through Sunday) for foreign investors. Fearing that they will be stuck up with stocks in case some unfavorable information enters the market, foreign investors tend to exit the market on Wednesdays and as a result of excessive trading, there was high volatility on Wednesdays.

Using a regression-based approach Marrett and Worthington (2009) examined the day-of-the-week effect in Australian daily stock returns at the market and industry levels and for small capitalization stocks from Monday 9 September 1996 to Friday 10 November 2006. Their results provided no evidence of daily seasonality but there was evidence of a small cap day-of-the-week effect with systematically higher returns on Thursdays and Fridays.

Cifuentes and Córdoba (2013) used the GARCH and IGARCH models with covariates to estimate the day-of-the-week (DOW) effect on both volatility and daily returns of the stock exchange markets for the CIVETS. They used daily returns of the Colombian, Indonesian, Vietnamese, Egyptian Turkish and South African stock markets. All samples ended on the last trading-day of July 2012 for the six countries. They found a DOW effect on the daily returns for all of the CIVETS' stock markets. DOW effect was also found for the daily returns' volatility of some of the stock markets.

Haroon and Shah (2013) examined the day-of-the-week effect in stock returns in the primary equity market Karachi Stock Exchange (KSE) of Pakistan by employing OLS regression approach. The sample consisted of daily closing prices of KSE-100 Index from January 01, 2004 to December 30, 2011. They proposed five separate models to statistically find significant effect on each trading day of the week. Non-parametric Kolmogorov-Smirnov (K-S) test confirmed abnormal distribution of returns. Robust Standard Error addressed heteroscedasticity of returns; proved by abnormal distribution. They found mixed results due to the effect of political instability on the anomaly. No effect was found in Sub Period I. While, negative Monday and Positive Friday effects were revealed in Sub Period II.

3.3.2. Month-of-the-year studies

John (2012) examined the presence of calendar anomalies in stock returns at Nairobi stock exchange using 50 companies listed in the NSE from 2002 to December 2011. A simple regression and correlation analysis was used to analyze the data and it was concluded that January effect had no significant relationship with the stock returns at the NSE. Contrary, Onyuma (2009) found that January had the largest positive returns thus confirming a January effect on the NSE. Nyamosi (2011) also reported existence of the January effect in this market.

Alagidede (2013), examined the month of the year and the pre-holiday effects, and their implications for stock market efficiency in the biggest markets in Africa. He used monthly market indices for the markets namely; NSE All Share Index for Nigeria, N20I for Kenya, Tunnindex for Tunisia, MASI index for Morocco and FTSE/JSE All Share index, CASE30 Share Index and ZSE Industrial index for South Africa, Egypt and Zimbabwe respectively. January effect was evident in Egypt, Nigeria and Zimbabwe while a February effect was evident in Morocco, Kenya, Nigeria and South Africa. The hypothesis that returns for all months are equal was rejected for Egypt, Nigeria and Zimbabwe. For Morocco, Kenya, Tunisia and South Africa there was insignificant variation between monthly returns, and none of them exhibit any January seasonality.

Wong, Agarwal and Wong (2006) analyzed the January effect inherent in the Singaporean stock market over the recent period of 1993-2005. The study revealed that during the pre-crisis period the average returns in January were higher than the average returns for the rest of the year; however the difference was not very noticeable. Average daily returns for the Straits times' index were negative for the entire time period under consideration, depicting a vanishing January effect in the later years.

Ariss et al. (2011) questioned about the January anomaly in the Gulf Cooperation Council (GCC) indices for the period 1981 to 2008. The pattern of returns observed in the GCC indices showed that instead of January, high, positive and significant returns were obtained in the month of December. These returns were also significantly higher than the returns on all the other months of the year. Therefore, it was concluded that GCC countries had a December effect instead of January effect as in other markets of the world.

Wyeme and Olfa (2011) examined the month of the year effect on the Tunis stock exchange (TSE) over the period January 2^{nd}, 2003 to December 31^{st}, 2008. They discovered the month of April had an effect in which they documented mean daily market returns which were largely higher in April than the rest of the year.

Alagidede and Panagiotidis (2006) examined calendar anomalies in Ghana stock market and found evidence of an April effect for Ghana stock prices contrary to the usual January effect.

Friday and Hoang (2015) found significant positive April returns and material July negative returns in Vietnam stock exchange for the period July 28th, 2000 to

December 31st, 2010. They however found no evidence of the January effect in this market.

Using data from January 2000 to March 2005 Yakob, Beal and Delpachitra (2005) examined calendar effects in ten Asian Pacific stock markets. The study showed statistically significant negative returns in March and April whereas statistically significant positive returns were found in May, November and December. Of these five statistically significant monthly returns, November generated the highest positive returns whereas April generated the lowest negative returns.

Mills and Coutts (1995) investigated the presence of calendar anomalies on the FT-SE 100, Mid 250 and 350 indices, and the accompanying industry baskets, for the period January 1986 to October 1992. Their results support similar evidence found for many countries concerning stock market anomalies. They found evidence of the January, weekend, half of the month and holiday effects to be present in at least some of the indices.

Mills, Siriopoulos, Markellos and Harizanis (2000) studied calendar effects in the Athens Stock Exchange. They analyzed not only basket indices but also calendar effects for each of the constituent stocks of the Athens Stock Exchange General Index for the period from October 1986 to April 1997. Their results support similar evidence found in other countries concerning the existence of the day-of-the week, month of the year, trading month and holiday effects. The intensity of these effects for various stocks on the basis of capitalization, beta coefficients and company type were examined and the results indicated that the calendar regularities vary significantly across the constituent shares of the General Index and that aggregation introduces a considerable bias in unravelling these regularities. They also found that factors such as the beta coefficient and company type influence significantly the intensity of calendar effects.

Fountas and Segredakis (2002) tested for Seasonal effects in stock returns using monthly stock returns in eighteen emerging stock markets for the period 1987–1995. Even though considerable evidence for seasonal effects applied in several countries, very little evidence was found in favor of the January effect and the tax-loss selling hypothesis. Their results also provided some support to the informational efficiency aspect of the market efficiency hypothesis.

Garg, Bodla and Chhabra (2010) examined whether seasonal anomalies still persist in the developed and developing markets. The Indian and U.S markets are taken as the representative of emerging and developed markets, respectively. They used data for the period January 1998 to December 2007, which was further broken into two sub periods: (i) January 1998 to December 2001, and (ii) January 2002 to December 2007. In order to measure the significant difference between the monthly returns, one-way ANOVA (Analysis of Variance) technique was employed. The study examined the turn of the month effect, semi-monthly effect, monthly effect, Monday effect and Friday effect. The analysis provided evidence about the presence of the Monday effect only in India but the semi-monthly and turn of the month effects were found in both the markets. In contrast, month effect was not evident in any of the two countries.

Asteriou and Kovetsos (2006) tested for the presence or not of the January effect on eight transition economies, namely the Czech Republic, Hungary, Lithuania, Poland, Romania, Russia, Slovakia, and Slovenia. They utilized monthly dataset that spans from 1991 till the early months of 2003 using monthly time series data of the stock markets of each country. Their main results supported the existence of seasonal effects and particularly of the January effect for most of the countries in our sample. Stronger evidence (in terms of statistical significance) was evident for the cases of Hungary, Poland and Romania; while for Hungary and Romania the results also suggested evidence in favor of the tax-loss selling hypothesis.

Tangjitprom (2011) examined the existence of calendar anomalies namely, month-of-year effect, turn-of-month effect, and weekend effect in Thai stock market using data from 1988 to 2009. The unit root test was performed to ensure that the stock return series had no unit root. The multiple regression techniques using dummy variables were employed to test the difference of the return during each calendar anomalies period. If the regression model suffered from conditional heteroskedasticity, the GARCH (1,1) model was used instead of normal ordinary least square regression. It was found that the calendar anomalies exist in Thai stock market and that returns are abnormally high during December and January, which was addressed to be the turn-of-year effect. Their results also revealed abnormally high Fridays returns but abnormally low on Monday returns, which was addressed as weekend effect.

The researcher has not come across any study on calendar anomalies on the Namibian stock exchange.

3.4. Summary

This chapter has reviewed the theories surrounding calendar anomalies, efficient market theory and the random walk theory. It has also covered empirical evidence on calendar the day-of-the-week and month-of-the-year effects for various stock markets in both developed and developing economies. Some findings have been consistent while others have not been consistent based on the location of the market, time period of the study and methodologies employed in conducting these studies. Researchers have given explanations on the calendar anomalies although some authors have not been able to provide any hypotheses that may explain these anomalies.

CHAPTER FOUR

METHODOLOGY

4.1. Introduction

This chapter describes the methodology used to conduct the study. In an attempt to shed more light on the day of the week and month of the year effects on the Namibian stock exchange, the researcher employed the ARCH family models (GARCH (p,q), EGARCH and TGARCH to test for the day of the week and month of the year effects.

4.2. Research Design

Research design refers to the formation used in finding answers to the study questions. A quantitative research approach was adopted to examine the day-of-the-week and month-of-the-year effect.

4.3. Data collection

This enquiry employed already existing data on stock prices. The daily and monthly closing prices of the NXS overall Index from the 4^{th} January 2000 to 31^{st} March 2017 were sourced from the official NXS website.

4.4. Sample and Procedure

In statistical studies the price of stock is fluctuating all the time, while returns have a steady trend, therefore, daily closing stock price will be converted into logarithmic returns as proposed by (Strong 1992).

$$R_t = \ln\left(\frac{P_t}{P_{t-1}}\right) \qquad \ldots\ldots\ldots\ldots\ldots\ldots (4.1)$$

Where R_t is the daily returns of NSX overall index, ln is the Natural logarithm, P_t is the index closing value at time t and P_{t-1} is the Index closing value at time t-1. Stock indices were used because indices truly represents the traits and performance of overall market and anomalies are more easily detected in indices as compared to individual shares (Pandey, 2002).

4.5. Data Analysis

The data was analyzed using E-views econometrics software package version 8. ARCH family models (symmetric GARCH (p,q) and asymmetric EGARCH and TGARCH) were used to test for the subsistence of day of the week and month of the year effect.

4.5.1. Generalized Autoregressive Conditional Heteroscedasticity (GARCH (p,q)) Model

Bollerslev (1987) introduced GARCH (p,q) as an extension to the ARCH model. The extension was purposed to streamline the application of ARCH model and to provide a good fit for financial time series. It is where the variance of the residuals is expressed as the sum of a moving-average polynomial of order *q* on past residuals (the ARCH term) plus an autoregressive polynomial of order *p*, on past variances (the GARCH term) Borges (2009). The simplest form is GARCH (1.1) which is estimated by maximum likelihood, and includes only one lag both in the ARCH term (last period's volatility) and in the GARCH term (last period's variance). A GARCH (p,q) process is represented as follows:

$$R_t = \sum_{i=1}^{5} \beta_i D_i + \varepsilon_t \qquad \text{…………………….. (4.2)}$$

$$h_t = \omega_1 + \sum_{i=1}^{p} \gamma_i \varepsilon_{t-i}^2 + \sum_{i=1}^{q} \delta_i \sigma_{t-i}^2 + \sum_{i=1}^{4} \beta_i D_i \qquad \text{…………………. (4.3)}$$

Where, equations (4.2) and (4.3) denote the conditional mean equation and the conditional variance equation respectively. In equation (4.2), D_i represents the five dummies for respective trading days (Monday to Friday), β_i are the estimated coefficients and ε_t is the error term. The dummy variable trap is avoided with the exclusion of the constant in the mean equation. In the conditional variance equation (4.3) ω_1, γ_1, δ_1 and α_1 are the parameters to be estimated and the Friday dummy has been excluded to prevent perfect co-linearity in the regression model. The GARCH (1,1) is weakly stationary if $\gamma_i + \delta_i < 1$ and γ_i and δ_i are non-negative. γ_i is the ARCH parameter which represents the news about volatility from the previous period and δ_i is the GARCH parameter which represents a persistence coefficient. If the sum of ARCH and GARCH coefficients ($\gamma + \delta$) is close to unity, it implies that variability persist over a longer period. Moreover, if the sum is equal to (or greater) than unity, it implies the volatility tends to increase over time. The argument above can be used to test for the month of the year effect; however, D_i is replaced by M_i which represents the dummies for the twelve respective month (January to December). In the variance equation of the month of the effect, the dummy variable for December is dropped in order to avoid perfect co-linearity in the regression model.

Brook and Burke (2003) suggested that GARCH (1,1) model is adequate to account for all volatility clustering present in financial time series data. However, Piesse and Hearn (2002) recommended the Exponential GARCH (EGARCH) model and the Threshold GARCH (TGARCH) model proposed by Nelson (1991) and Glosten, Jagannathan and Runkle (1993) respectively for use in African markets because they are specifically designed to capture the asymmetry shock to the conditional variance and their accuracy to successfully capture asymmetric effects of both good and bad news.

4.5.2. Exponential Generalized Autoregressive Conditional Heteroscedasticity (EGARCH) Model

Nelson (1991) proposes the exponential GARCH (EGARCH) in order to overcome some weaknesses of the GARCH model in handling financial time series model. This model expresses the conditional variance of a given variable as a nonlinear function of its own past values of standardized innovations that can react asymmetrically to good and bad news (Drimbetas, Sariannidis, & Porfiris, 2007). Specifically, log likelihood ratio tests on an EGARCH model for p, $q \in \{1, 2, \ldots, 5\}$ are employed in order to find the most parsimonious EGARCH representation of the conditional variance of returns. The EGARCH (1,1) model can be specified as follows:

$$R_t = \sum_{i=1}^{5} \beta_i D_i + \varepsilon_t \quad \text{……………..} \ (4.4)$$

$$log(h_t) = \omega_1 + \gamma_1 \left| \frac{u_{t-1}}{\sqrt{h_{t-1}}} \right| + \delta_1 \frac{u_{t-1}}{\sqrt{h_{t-1}}} + \alpha_1 \log(h_{t-1}) + \sum_{i=1}^{4} \beta_i D_i \quad \text{……………..} \ (4.5)$$

Equation (4.4) is the mean equation and equation (4.5) is the variance equation. In equation (4.4) D_i represents the five dummies for respective trading days (Monday to Friday), β_i are the estimated coefficients and ε_t is the error term. The dummy variable trap is avoided with the exclusion of the constant in the mean equation. In equation (4.5) ω_1, γ_1, δ_1 and α_1 are the parameters to be estimated and the Friday dummy has been excluded to prevent perfect co-linearity in the regression model. The log of the variance series on the left hand side makes the leverage effect exponential rather that quadratic, and therefore the estimates of the conditional variance equation are guaranteed to be non-negative. EGARCH models allow testing for asymmetries. If α_1 < 0, than positive shocks (good news) generate less volatility than negative shocks (bad news). The argument above can be used to test for the month of the year effect; however, D_i is replaced by M_i, which represents the twelve dummies for the respective months (January to December). In the variance equation of the month of the effect, the dummy variable for December is dropped in order to avoid perfect co-linearity in the regression model.

4.5.3. Threshold Generalized Autoregressive Conditional Heteroskedasticity (TGARCH) Model

Glosten et al. (1993) introduced the Threshold GARCH model (TGARCH) which captures asymmetric in terms of negative and positive shocks and adds multiplicative dummy variable to check whether there is statistically significant different when shocks are negative. According to Black (1976) it has been observed that in this model positive and negative shocks of equal magnitude have a different impact on stock market volatility, which may be attributed to a leverage effect. In the same sense, negative shocks are followed by higher volatility than positive shocks of the same magnitude (Engle and Ng, 1993). The TGARCH (1,1) model can be specified as follows:

$$R_t = \sum_{i=1}^{5} \beta_i D_i + \varepsilon_t \qquad \text{…………………} (4.6)$$

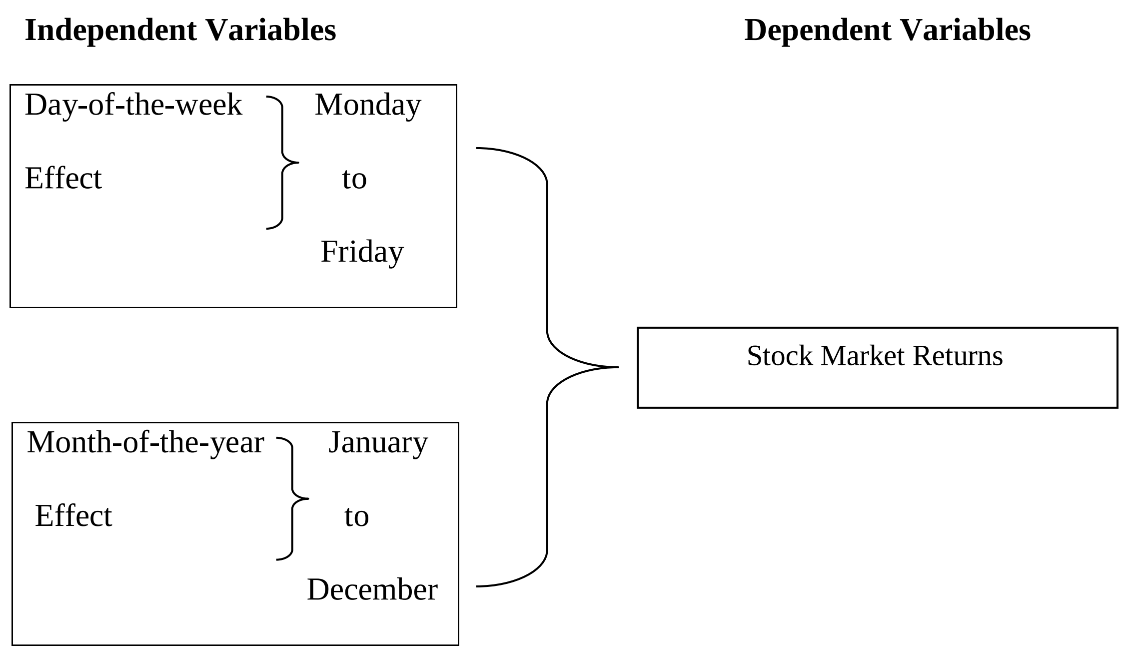
$$h_t = \omega_1 + \gamma u_{t-1}^2 + \delta_1 u_{t-1}^2 d_{t-1} + \alpha_1 h_{t-1} + \sum_{i=1}^{4} \beta_i D_i \qquad \text{……………….. } (4.7)$$

Equation (4.6) and (4.7) represents the mean and variance equation respectively. In equation (4.6), D_i represents the five dummies for respective trading days (Monday to Friday), β_i are the estimated coefficients and ε_t is the error term. The dummy variable trap is avoided with the exclusion of the constant in the mean equation. In equation (4.7) ω_1, γ_1, δ_1 and α_1 are the parameters to be estimated and the Friday dummy has been excluded to prevent perfect co-linearity in the regression model. d_t, takes the value of 1 if u_t < 0, and 0 otherwise. Thus, 'good news' and 'bad news' have different impacts. Good news has an impact of γ while bad news has an impact of γ +δ_1. If $\delta_1 > 0$ we conclude that there is asymmetry, while if $\delta_1 = 0$ the news impact is symmetric. The argument above can be used to test for the month of the year effect; however, D_i is replaced by M_i which represents the twelve dummies for the respective months (January to December). In the variance equation of the month of the effect, the dummy variable for December is dropped in order to avoid perfect co-linearity in the regression model.

4.6. Conceptual Framework

According to Mugenda (2008), the conceptual framework seeks to define in measurable terms the research study concept. The researcher seeks to find out the subsistence of day-of-the-week and month-of-the-year phenomenon in stock return at the Namibian Stock Exchange (NSX). These conceptualize in the figure below:

Figure 4.1 The conceptual framework



CHAPTER 5

DATA ANALYSIS, RESULTS AND DISCUSSION

5.1. Introduction

This chapter presents analysis, results and discussion of the day of the week and month of the year calendar effect at the Namibian Stock Exchange. The study used secondary monthly and daily data from January 2000 to March 2017. Data was analyzed using econometrics software E-views package 8. The chapter covers the descriptive statistics for the NSX overall index daily and monthly returns and summary statistics for GARCH (p,q), EGARCH and TARCH models to determine the existence of day of the week and month of the year calendar anomalies at the NSX. A diagnostic test to test for ARCH effects in the three models is also conducted.

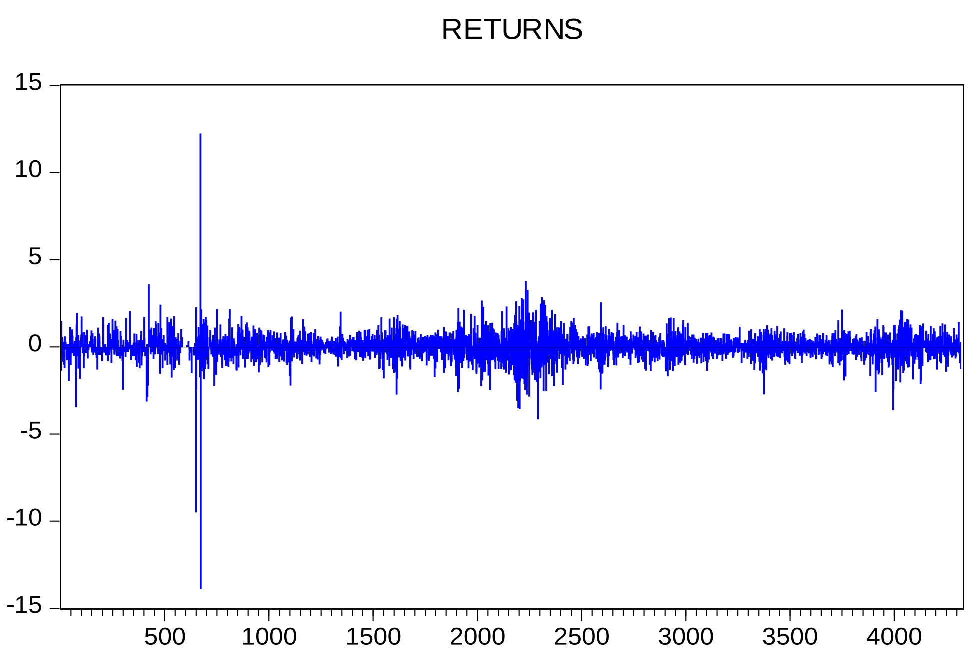
5.2. Day of the week analysis

Table 5.1: Descriptive statistics- NSX overall index daily returns

	Mean	Max	Min	Std. Dev	Skewn	Kurtos	Obs.
MON	9.06E-05	0.032708	-0.035057	0.006718	-0.334951	6.682259	833
TUE	0.000308	0.037767	-0.034472	0.006688	-0.059182	6.452822	871
WED	0.000271	0.122355	-0.035452	0.007617	4.564326	78.85294	871
THU	0.000175	0.035887	-0.138858	0.00839	-5.231491	90.38129	865
FRI	-0.00019	0.026142	-0.094844	0.007158	-2.908475	40.31264	855
ALL DAYS	0.00013	0.122355	-0.138858	0.007324	-1.131914	58.8778	4320

Table 5.1 reports respective measures in each day of the week. The table explains that all the days of the week have a positive mean return except for Fridays (-0.0019). Monday mean return is higher than Friday mean returns proposing that after the weekend the market has a positive start. As measured by the standard deviation, Thursdays exhibit the highest volatility (0.00839) while Tuesdays show the lowest volatility (0.006688). All the days of the week reported negative skew values except for Wednesdays. Furthermore, the kurtosis values on all weekdays are quite higher which represents sharper peaks and presence of extreme values in mean returns. As such ARCH/GARCH models have to be employed to reduce the excess kurtosis.

Figure 5.1: NSX overall index daily returns from January 4th, 2000 to March 31st, 2017



5.2.1. Unit root test

Table 5.2: Augmented Dicker-Fuller test results-Daily returns

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-41.50884	0.0000
Test critical values:	1% level	-3.431681	
	5% level	-2.862013	
	10% level	-2.567065	

Null hypothesis : Daily return have unit root

Alternative hypothesis : Daily return do not have unit root

To check for stationarity in the return series, the unit root tests - the Augmented Dickey-Fuller (ADF) is applied to the NSX overall index daily returns. The probability of Augmented Dickey-Fuller statistics is below 5%, hence dismiss the null hypothesis and take the alternative hypothesis, returns do not have unit root and so there is no need for differencing. This is desirable for the returns to be modeled.

5.2.2. GARCH models

Table 5.3: Day of the week GARCH (1.1), EGARCH (1.1) and TARCH (1.2) estimation of the mean an variance equation

	GARCH (1.1)	EGARCH(1.1)	TARCH(1.2)
Variable	**coefficient**	**coefficient**	**Coefficient**
MEAN EQUATION			
MONDAY	0.000370 (1.697539)*	0.000441 (2.448455)**	-0.000264 (-1.140970)
TUESDAY	0.000374 (1.126546)**	0.000368 (2.345094)**	0.001386 (5.547347)***
WEDNESDAY	0.000253 (1.304371)	0.000238 (1.253541)	0.000766 (2.034564)**
THURSDAY	0.000384 (1.685738)*	0.000558 (2.748973)***	0.000409 (1.162972)
FRIDAY	5.79E-05 (0.215528)	-0.000396 (-1.875117)*	-0.000823 (-1.672890)*
VARIANCE EQUATION			
ω_1	6.43E-06 (9.283792)***	-0.163580 (-8.692597)***	4.77E-05 (31.65524)***
γ_1	0.052394 (15.75520)***	0.058026 (16.46257)***	0.150193 (6.474731)***
δ_1	0.923637 (249.9568)***	-0.133057 (-38.71155)***	0.051459 (2.042744)**
α_1		0.986213 (709.1259)***	0.595082 (30.70725)***
MONDAY	-1.40E-05 (-10.90667)***	-0.266242 (-7.740453)***	-6.59E-05 (-31.73754)***
TUESDAY	-1.05E-05 (-6.98768)***	-0.090805 (-2.124255)**	-3.58E-05 (-14.59227)***
WEDNESDAY	-3.69E-06 (-3.033218)***	0.144222 (3.879818)***	-1.22E-05 (-3.306549)***
THURSDAY	1.69E-06 (1.069735)	0.096449 (2.677132)***	-2.70E-05 (-10.67700)***

*** Significant at 1% level, ** significant at 5% level, * significant at 10% level. The values in the parentheses are the z-Statistics.

From the table above, the mean equation of the GARCH (1.1) shows that return on Thursday is the highest (positive) and significant at 10% level. The results also reveal Friday has the lowest returns although it is not significant. The variance equation reveals the highest variability is exhibited on Thursday, though it is not significant. The lowest volatility is observed on Wednesday which is significant at 1% level. Friday has the second highest volatility which is significant. The total ARCH and GARCH parameters (γ and δ, respectively) is near unity (0.976031), implying persistence in shocks to the conditional variance. Also, since $\gamma + \delta < 1$ and γ and δ are non negative, this implies that the GARCH (1,1) is weakly stationary. From the mean equation of the EGARCH(1,1), Thursday also exhibit the highest mean returns which is significant at 1% level. Wednesday mean returns are the lowest although the results are not significant. Friday reveals negative returns which are significant at 10% level. From the mean equation of the TARCH (1,2), Tuesday mean returns are the highest and significant at 1% level. Also, like in the EGARCH(1,1), Friday has negative mean daily returns that are significant at 10% level.

5.2.3. Diagnostic test-GARCH (1,1) model

Testing for ARCH effect in the GARCH model

Table 5.4: ARCH test results GARCH (1.1)

Heteroskedasticity Test: ARCH			
F-statistic	1.339929	Prob. F(1,4317)	0.2471
Obs*R-squared	1.340134	Prob. Chi-Square(1)	0.2470

Null hypothesis : ARCH effect is absent

Alternative hypothesis : ARCH effect is present

Since the p-value of observed R^2 is greater than 5%, null hypothesis cannot be dismissed. (ACRH effect is absent). This is desirable.

5.2.4. Diagnostic test-EGARCH (1,1) model

Testing for ARCH effect in the EGARCH model

Table 5.5: ARCH test results EGARCH (1.1)

Heteroskedasticity Test: ARCH			
F-statistic	6.412248	Prob. F(1,4317)	0.0114
Obs*R-squared	6.405704	Prob. Chi-Square(1)	0.0114

Null hypothesis : ARCH effect is absent

Alternative hypothesis : ARCH effect is present

Since the p-value of observed R^2 is less than 5%, the null hypothesis is dismissed. (ACRH effect is present) This is not desirable.

5.2.5. Diagnostic test-TARCH model

Testing for ARCH effect in the TARCH (1,2) model

Table 5.6: ARCH test results TARCH (1,2)

Heteroskedasticity Test: ARCH			
F-statistic	9.180391	Prob. F(1,4317)	0.0025
Obs*R-squared	9.165154	Prob. Chi-Square(1)	0.0025

Null hypothesis : ARCH effect is absent

Alternative hypothesis : ARCH effect is present

Since the p-value of observed R^2 is less than 5%, the null hypothesis is dismissed. (ACRH effect is present) This is not desirable.

From the diagnostic of the three models, ARCH effects are present in the EGARCH(1,1) and TARCH(1,2) models except for the GARCH(1,1) model. Thus the results of the EGARCH(1,1) and TARCH(1,2) model are not as reliable as those of the GARCH(1,1) model.

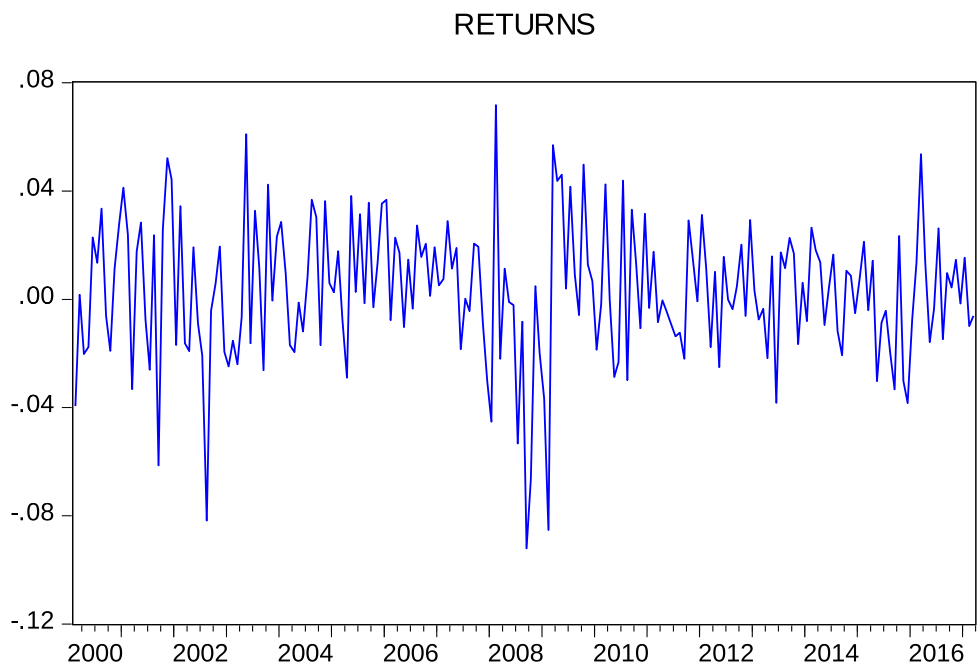
5.3. Month of the year analysis

Table 5.7: Descriptive statistics- NSX overall index monthly returns

	Mean	Max	Min	Std. Dev.	Skewness	Kurtosis	Observ.
JAN	0.059191	4.112218	-4.52381	2.491651	-0.045325	2.229019	17
FEB	0.483978	7.168218	-8.53124	3.252083	-0.854214	5.089819	18
MAR	0.355031	5.691138	-3.32701	2.720707	0.730293	2.346207	18
APR	0.207894	4.369281	-2.90098	1.920135	0.098328	2.505352	17
MAY	0.485382	6.09165	-3.03028	2.715875	0.532821	2.257496	17
JUN	-0.50255	2.281667	-3.82333	1.513502	-0.135562	2.949249	17
JUL	0.6416	4.379497	-5.33069	2.581833	-0.520204	2.853126	17
AUG	-0.21009	3.669044	-8.17925	2.811241	-1.119193	4.912977	17
SEP	-0.59015	3.557484	-9.20777	3.449257	-0.963612	3.469004	17
OCT	1.030259	4.965623	-6.64942	2.66981	-1.327408	5.202043	17
NOV	0.676217	5.207361	-3.01745	1.938589	0.415151	3.456129	17
DEC	0.668051	4.42828	-3.84087	2.405757	-0.282695	2.087841	17
ALL	0.002768	0.071682	-0.09208	0.025716	-0.492238	4.261886	206

Table 2 reports respective measures in each month of the year. From the table, October reported the highest mean return (1.030259) while September reported the lowest mean returns (-0.59015). Most of the months of the year have positive mean returns except for June, August and September. In terms of turbulence of yields (Risk) as captured by the standard deviation, September has the highest volatility (3.449257) while June has the lowest volatility (1.513502). The results in table 2 may have ignored some features of financial time series that may be present such as, financials returns may be serially correlated, residuals may not be normally distributed, residuals may not be homoscedastic and there could be ARCH effect in residuals. Thus the ARCH/GARCH models are employed to deal with some of these features.

Figure 5.2: NSX overall index monthly returns from January, 2000 to March, 2017



5.3.1. Unit root test

Table 5.8: Augmented Dicker-Fuller test results-Monthly returns

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-13.67993	0.0000

Test critical values:	1% level	-3.462253
	5% level	-2.875468
	10% level	-2.574271

Null hypothesis : Monthly returns have unit root

Alternative hypothesis : Monthly returns do not have unit root

To check for stationarity in the return series, the unit root tests - the Augmented Dickey-Fuller (ADF) is applied to the NSX overall index monthly returns. The probability of Augmented Dickey-Fuller statistics is below 5%, hence we dismiss the null hypothesis and take the alternative hypothesis, returns do not have unit root and so there is no need for differencing. This is desirable for the returns to be modeled.

5.3.2. GARCH models

Table 5.9: Month of the year GARCH (1,1), EGARCH (1,1) and TARCH (1,2) estimation of the mean an variance equation

	GARCH (1,1)	EGARCH(1,1)	TARCH(1,2)
Variable	**coefficient**	**coefficient**	**coefficient**
	MEAN EQUATION		
JAN	0.006827 (1.241549)	0.006528 (1.333177)	0.006521 (1.233217)
FEB	0.008763 (1.842783)**	0.006637 (1.076987)	0.007064 (1.435148)
MAR	0.007226 (1.413386)	0.002133 (0.401734)	-0.002075 (-0.354498)
APR	0.002165 (0.286150)	0.001514 (0.340350)	0.002148 (0.429595)
MAY	0.001460 (0.247869)	-0.004723 (-0.790440)	-0.002130 (-0.374000)
JUN	-0.006862 (-1.465632)	-0.006839 (-2.028328)**	-0.008245 (-2.281309)**
JUL	0.006331 (1.173801)	0.003511 (0.623336)	0.007114 (1.079415)
AUG	-0.003802 (-0.632694)	-0.004399 (-0.610226)	-0.002873 (-0.461435)
SEP	0.003436 (0.480673)	0.000468 (0.065471)	-0.002366 (-0.337365)
OCT	0.017929 (5.372953)***	0.012324 (2.547112)**	0.012763 (2.127107)**
NOV	0.001958 (0.441859)	0.003123 (0.737794)	0.003596 (1.028953)
DEC	0.008794 (1.440719)	0.008145 (1.584768)	0.009880 (1.928424)**
	VARIANCE EQUATION		
ω_1	2.36E-05 (0.097098)	-1.311516 (-1.559534)	0.000142 (0.672576)
γ_1	0.202342 (2.613334)***	0.279298 (1.423266)	-0.088177 (-1.038355)
δ_1	0.716424 (7.364580)***	-0.277884 (-2.958610)***	0.433975 (2.514356)**
α_1		0.858920 (11.49765)***	0.643912 (4.794524)***

*** Significant at 1% level, ** significant at 5% level, * significant at 10% level. The values in the parentheses are the z-Statistics.

From the mean equation of the GARCH(1,1), EGARCH(1,1) and TACRCH(1,2) models, October exhibit the highest returns which are significant. The mean equation of the GARCH (1.1) shows that return in August and June are the lowest although they are not significant. Also, from the mean equation of the EGARCH(1,1) and TARCH(1,2), August and June are one of the months with the lowest mean returns among others with June results being significant at 5% level in both equations. From the GARCH (1.1) variance equation, ARCH and GARCH (γ and δ, respectively) parameters are material confirming suitability of the model. Total of the coefficients of the ARCH and GARCH parameters is very near to unity (0.918766), implying shocks to the conditional variance equation is persistent.

5.3.3. Diagnostic test-GARCH (1,1) model

Testing for ARCH effect in the GARCH(1,1) model

Table 5.10: ARCH test results GARCH (1,1)

Heteroskedasticity Test: ARCH			
F-statistic	0.063900	Prob. F(1,203)	0.8007
Obs*R-squared	0.064509	Prob. Chi-Square(1)	0.7995

Null hypothesis : ARCH effect is absent

Alternative hypothesis : ARCH effect is present

Since the p-value of observed R^2 is greater than 5%, null hypothesis cannot be dismissed. (ACRH effect is absent). This is desirable.

Testing for Serial Correlation in the GARCH(1,1) model

Table 5.11: Correlogram of Standardized Residuals Squared (GARCH (1,1))

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
.|. |	.|. |	1	-0.018	-0.018	0.0652	0.798
.|* |	.|* |	2	0.110	0.109	2.5858	0.274
*|. |	*|. |	3	-0.107	-0.105	5.0031	0.172
.|. |	*|. |	4	-0.059	-0.075	5.7532	0.218
.|. |	.|. |	5	0.022	0.045	5.8577	0.320
.|. |	.|. |	6	-0.007	-0.002	5.8668	0.438
.|* |	.|* |	7	0.151	0.132	10.756	0.150
.|* |	.|* |	8	0.079	0.090	12.115	0.146
.|* |	.|. |	9	0.094	0.071	14.046	0.121
*|. |	.|. |	10	-0.071	-0.062	15.162	0.126
.|. |	.|. |	11	0.005	0.019	15.167	0.175
*|. |	*|. |	12	-0.116	-0.089	18.131	0.112
.|. |	.|. |	13	0.067	0.057	19.141	0.119
*|. |	*|. |	14	-0.094	-0.106	21.115	0.099
.|. |	.|. |	15	0.011	-0.044	21.140	0.132
*|. |	*|. |	16	-0.108	-0.130	23.776	0.095
.|. |	.|. |	17	0.045	0.049	24.231	0.113
.|. |	.|. |	18	0.008	0.013	24.245	0.147
*|. |	*|. |	19	-0.097	-0.090	26.413	0.119
.|. |	.|. |	20	-0.004	-0.022	26.417	0.152
*|. |	.|. |	21	-0.105	-0.042	28.972	0.115
.|. |	.|. |	22	0.067	0.054	30.015	0.118
.|. |	.|. |	23	-0.061	0.002	30.897	0.125
.|. |	.|. |	24	0.013	-0.016	30.937	0.156
.|. |	.|. |	25	-0.049	-0.030	31.504	0.173
.|. |	.|. |	26	0.000	-0.012	31.504	0.210
.|. |	.|. |	27	-0.042	-0.014	31.932	0.235
*|. |	*|. |	28	-0.083	-0.085	33.601	0.214
.|. |	.|. |	29	-0.013	-0.010	33.641	0.253

.|. |	.|. |	30	-0.019	-0.029	33.728	0.292
.|. |	.|. |	31	0.040	-0.002	34.114	0.320
.|. |	.|. |	32	0.034	0.054	34.396	0.354
.|* |	.|* |	33	0.097	0.100	36.748	0.299
*|. |	*|. |	34	-0.117	-0.109	40.162	0.216
.|. |	.|. |	35	0.029	0.000	40.370	0.245
*|. |	.|. |	36	-0.078	-0.005	41.910	0.230

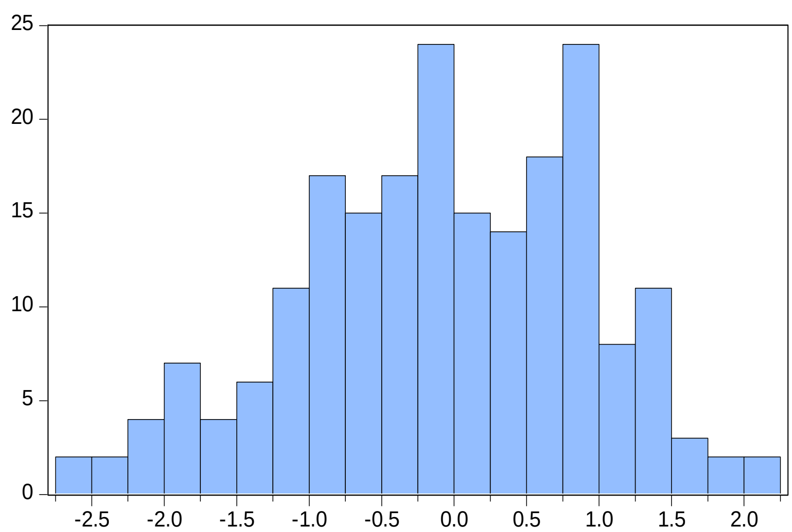
Null hypothesis : There is no serial correlation

Alternative hypothesis : There is serial correlation

Since the probability of Q-statistic (36 lags) are more than 5%, the null hypothesis is not rejected. Residuals are not serially correlated.

Histogram-Normality test

Figure 5.3: Histogram normality test results (GARCH(1,1))



Series: Standardized Residuals
Sample 2000M02 2017M03
Observations 206

Mean	-0.079593
Median	-0.089777
Maximum	2.140250
Minimum	-2.745931
Std. Dev.	1.008011
Skewness	-0.287553
Kurtosis	2.591590
Jarque-Bera	4.270595
Probability	0.118209

Null hypothesis: Normal distribution

Alternative Hypothesis: Non-normal distribution

If the p-value of Jarque-Bera statistic is smaller than five percent, the null hypothesis is dismissed and the alternative is taken. If p-value of Jarque-Bera statistic is greater than five percent, the null hypothesis is not dismissed.

Since the p-value of Jarque-Bera statistic is 11.8%, which is greater than 5%, the null hypothesis cannot be dismissed. Residuals are normally distributed, which is desirable.

From the diagnostic tests conducted on the GARCH (1, 1) model, there is no ARCH effect, the residuals are not serially correlated and the residuals are normally distributed. Thus GARCH (1, 1) results are reliable.

5.3.4. Diagnostic test-EGARCH (1,1) model

Testing for ARCH effect in the EGARCH(1,1) model

Table 5.12: ARCH test results EGARCH (1,1)

Heteroskedasticity Test: ARCH			
F-statistic	1.171012	Prob. F(1,203)	0.2805
Obs*R-squared	1.175766	Prob. Chi-Square(1)	0.2782

Null hypothesis : ARCH effect is absent

Alternative hypothesis : ARCH effect is present

Since the p-value of observed R^2 is greater than 5%, null hypothesis cannot be dismissed. (ACRH effect is absent). This is desirable

Testing for Serial Correlation in the EGARCH(1,1) model

Table 5.13: Correlogram of Standardized Residuals Squared (EGARCH (1,1))

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
*|. |	*|. |	1	-0.075	-0.075	1.1821	0.277
.|* |	.|* |	2	0.127	0.122	4.5676	0.102
.|. |	.|. |	3	-0.052	-0.035	5.1341	0.162
*|. |	*|. |	4	-0.076	-0.099	6.3483	0.175
.|. |	.|. |	5	0.042	0.043	6.7219	0.242
.|. |	.|* |	6	0.071	0.100	7.8166	0.252
.|* |	.|* |	7	0.170	0.169	14.054	0.050
.|* |	.|* |	8	0.142	0.150	18.410	0.018
.|* |	.|* |	9	0.192	0.207	26.452	0.002
.|. |	.|. |	10	-0.055	-0.021	27.121	0.002
.|. |	.|. |	11	0.024	0.009	27.243	0.004
*|. |	*|. |	12	-0.116	-0.093	30.217	0.003
.|* |	.|. |	13	0.099	0.067	32.390	0.002
.|. |	.|. |	14	-0.017	-0.063	32.457	0.003
.|* |	.|. |	15	0.132	0.026	36.348	0.002
.|. |	.|. |	16	0.050	-0.020	36.912	0.002
.|* |	.|. |	17	0.076	0.044	38.238	0.002
.|. |	.|. |	18	0.067	0.065	39.266	0.003
*|. |	.|. |	19	-0.094	-0.047	41.284	0.002
.|. |	.|. |	20	0.043	0.024	41.708	0.003
.|. |	.|. |	21	-0.044	-0.002	42.164	0.004
.|* |	.|. |	22	0.087	0.023	43.910	0.004
.|* |	.|. |	23	0.077	0.065	45.286	0.004
.|. |	.|. |	24	0.032	-0.032	45.528	0.005
.|. |	.|. |	25	0.027	-0.000	45.705	0.007
.|. |	.|. |	26	0.008	-0.013	45.722	0.010
.|. |	.|. |	27	-0.053	-0.041	46.407	0.011
.|. |	.|. |	28	-0.033	-0.048	46.665	0.015
.|. |	.|. |	29	0.026	0.006	46.822	0.019
.|. |	.|. |	30	0.014	-0.007	46.873	0.026
.|* |	.|. |	31	0.086	0.018	48.690	0.023
.|* |	.|* |	32	0.101	0.119	51.196	0.017
.|. |	.|. |	33	0.049	0.071	51.799	0.020
.|. |	.|. |	34	-0.056	-0.030	52.572	0.022
.|. |	.|. |	35	0.016	0.033	52.637	0.028
.|. |	.|. |	36	-0.060	-0.018	53.557	0.030

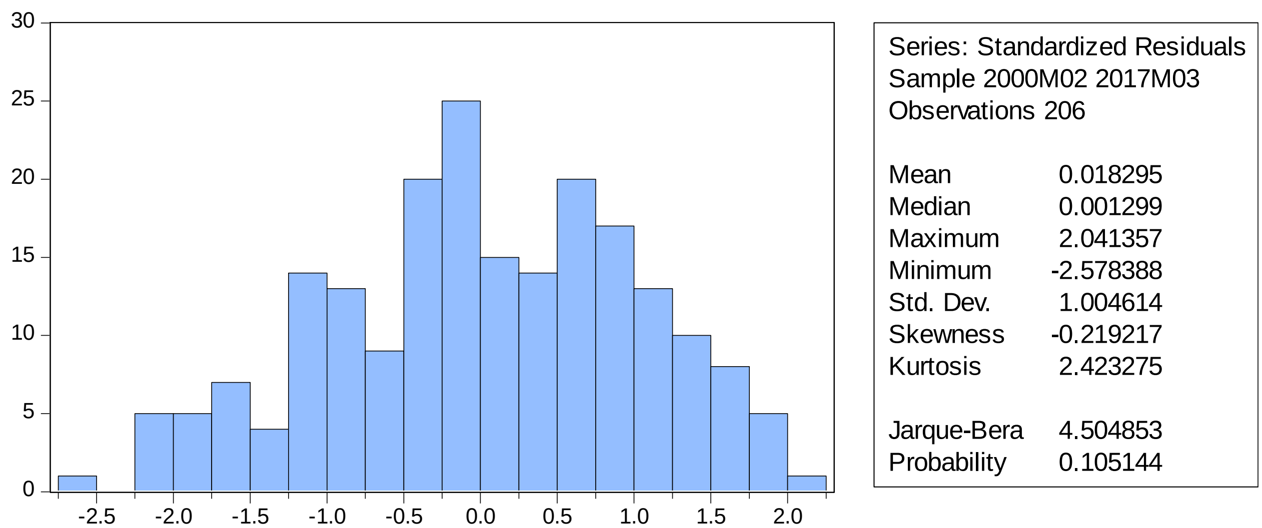
Null hypothesis : There is no serial correlation

Alternative hypothesis : There is serial correlation

Since the probability of Q-statistic (36 lags) are more than 5%, the null hypothesis is not rejected. Residuals are not serially correlated.

Histogram-Normality test

Figure 5.4: Histogram normality test results (EGARCH (1,1))



Null hypothesis : Normal distribution

Alternative Hypothesis : Non-normal distribution

Since the p-value of Jarque-Bera statistic is 10.5%, which is greater than 5% the null hypothesis cannot be dismissed. Residuals are normally distributed, which is desirable.

From the diagnostic tests conducted on the EGARCH (1,1) model, there is no ARCH effect, the residuals are not serially correlated and the residuals are normally distributed. Thus EGARCH (1,1) results are reliable.

5.3.5. Diagnostic test-TARCH (1,2) model

Testing for ARCH effect in the TARCH model

Table 5.14: ARCH test results (TARCH (1,2))

Heteroskedasticity Test: ARCH			
F-statistic	0.294035	Prob. F(1,203)	0.5882
Obs*R-squared	0.296502	Prob. Chi-Square(1)	0.5861

Null hypothesis : ARCH effect is absent

Alternative hypothesis : ARCH effect is present

Since the p-value of observed R^2 is greater than 5%, null hypothesis cannot be dismissed. (ACRH effect is absent). This is desirable.

Testing for Serial Correlation in the TARCH(1,2) model

Table 5.15: Correlogram of Standardized Residuals Squared (TARCH (1,2))

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
.|. |	.|. |	1	-0.037	-0.037	0.2921	0.589
.|* |	.|* |	2	0.103	0.102	2.5345	0.282
*|. |	*|. |	3	-0.082	-0.076	3.9538	0.266
.|. |	.|. |	4	-0.039	-0.055	4.2704	0.371
.|. |	.|. |	5	0.056	0.071	4.9410	0.423
.|. |	.|. |	6	0.042	0.050	5.3103	0.505
.|* |	.|* |	7	0.138	0.122	9.3878	0.226
.|* |	.|* |	8	0.088	0.099	11.062	0.198
.|* |	.|* |	9	0.148	0.149	15.833	0.070
.|. |	.|. |	10	-0.057	-0.042	16.534	0.085
.|. |	.|. |	11	0.029	0.019	16.721	0.116
*|. |	*|. |	12	-0.135	-0.118	20.761	0.054
.|* |	.|. |	13	0.089	0.057	22.515	0.048
.|. |	*|. |	14	-0.053	-0.076	23.137	0.058
.|* |	.|. |	15	0.096	0.034	25.195	0.047
.|. |	.|. |	16	0.011	-0.020	25.225	0.066
.|. |	.|. |	17	0.068	0.062	26.266	0.070
.|* |	.|* |	18	0.102	0.105	28.649	0.053
*|. |	.|. |	19	-0.086	-0.042	30.337	0.048
.|. |	.|. |	20	0.054	0.042	31.010	0.055
*|. |	.|. |	21	-0.071	-0.009	32.185	0.056
.|* |	.|. |	22	0.108	0.062	34.922	0.039
.|. |	.|. |	23	0.042	0.052	35.334	0.048
.|* |	.|. |	24	0.081	0.020	36.877	0.045
.|. |	.|. |	25	0.014	0.007	36.923	0.059
.|. |	.|. |	26	0.042	0.011	37.344	0.070
.|. |	.|. |	27	0.009	0.016	37.362	0.088
.|. |	.|. |	28	-0.020	-0.024	37.459	0.109
.|. |	.|. |	29	-0.021	-0.045	37.570	0.132
.|. |	.|. |	30	0.053	0.056	38.251	0.143
.|* |	.|. |	31	0.077	0.018	39.720	0.135
.|* |	.|* |	32	0.144	0.157	44.850	0.065
.|* |	.|. |	33	0.086	0.056	46.678	0.058
*|. |	.|. |	34	-0.068	-0.040	47.818	0.058
.|. |	.|. |	35	0.011	-0.013	47.846	0.073
*|. |	.|. |	36	-0.076	-0.041	49.300	0.069

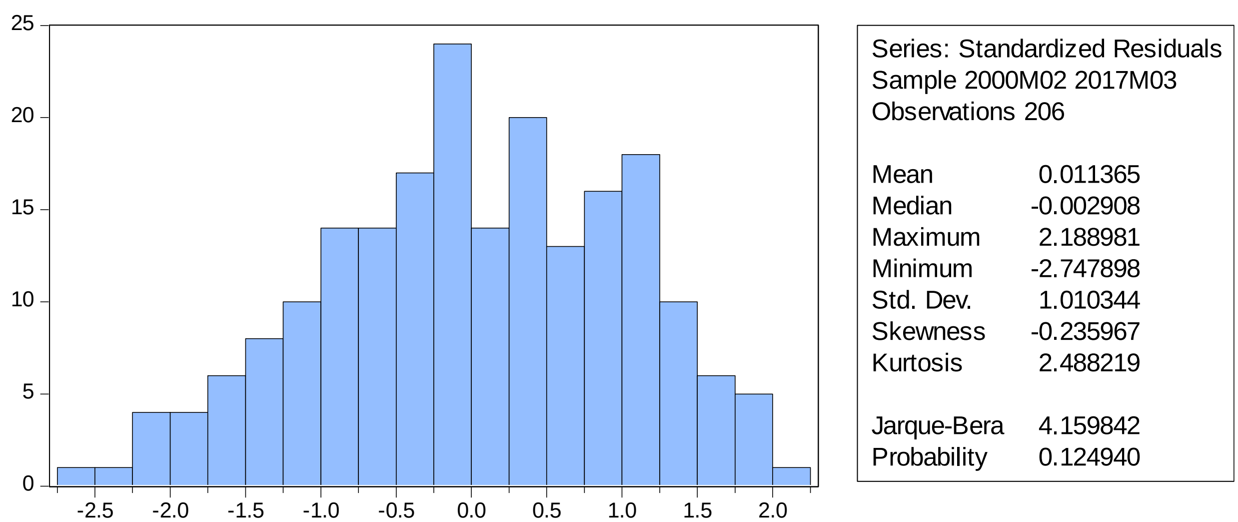
Null hypothesis : There is no serial correlation

Alternative hypothesis : There is serial correlation

Since the probability of Q-statistic (36 lags) are more than 5%, the null hypothesis is not rejected. Residuals are not serially correlated.

Histogram-Normality test

Figure 5.5: Histogram normality test results (TARCH (1,2))



Null hypothesis : Normal distribution

Alternative Hypothesis : Non-normal distribution

Since the p-value of Jarque-Bera statistic is greater than 5%, the null hypothesis cannot be dismissed. Residuals are normally distributed, which is desirable.

From the diagnostic tests conducted on the TARCH (1,2) model, there is no ARCH effect, the residuals are not serially correlated and the residuals are normally distributed. Thus TARCH (1,2) results are reliable.

CHAPTER 6

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1. Introduction

This chapter presents the summary of data findings, conclusion and recommendations from the study. The conclusions and recommendations are drawn after addressing the research question which is: does the day of the week and month of the year calendar effect exist in the Namibian Stock Exchange?

6.2. Summary

The objective of the study was to investigate the existence of calendar anomalies, particularly day of the week and month of the year phenomenon on the Namibian stock exchange using NSX overall index data for the period 4th January 2000 to 31st March 2017. In an attempt to select a model best fit to account for return and volatility in the Namibian stock market, the symmetric GARCH (1,1) and two other asymmetric models EGARCH(1,1) and TARCH(1,2) models were estimated. The ARCH-family models were chosen because of their robustness in capturing the various features of financial returns e.g. volatility clustering, leptokurtosis, heteroscedasticity, serial correlation and the leverage effect that cannot be modeled using the OLS model. Diagnostic test were employed on each of the estimated model to test for the suitability of each model and the reliability of the results thereof. Results of the day of the week phenomenon revealed that there are ARCH effects in the EGARCH(1,1) and TARCH(1,2) models (which is not desirable) and no presence of ARCH effects in the GARCH (1,1) model. Conversely, results of the month of the year phenomenon revealed that there are no ARCH effects, the residuals are not serially correlated and the residuals are normally distributed for all the three estimated models. Thus results of the GARCH(1,1), TARCH(1,2) and EGARCH(1,1) model are reliable.

6.3. Conclusion and implications

The analysis of the day of the week effect confirms the presence of this anomaly on the Namibian stock market. GARCH (1,1) and EGARCH(1,1) models reveals that returns on Thursdays are the highest (positive) and significant. Contrary, the TARCH(1,2) model exhibits high and significant mean returns on Tuesdays. Results from the EGARCH(1,1) and TARCH(1,2) models shows that Friday has negative mean daily returns that are significant. In the variance equation, GARCH(1,1) reveals that the lowest volatility is observed on Wednesdays and is significant. The total ARCH and GARCH parameters is near unity (0.976031), implying persistence in shocks to the conditional variance.

The month of the year analysis confirms the subsistence of the month of the year anomaly. Results from the mean equation of the GARCH(1,1), EGARCH(1,1) and TACRCH(1,2) models shows that October exhibits the highest returns which are significant, implying an October effect. This implies that stock market returns in

October differ significantly with the other months of the year. The results are evidence that the NSX is not efficient. This is consistent with what has been found in developed and emerging markets. Total of the coefficients of the ARCH and GARCH parameters is near to unity (0.918766), implying that shocks to the conditional variance equation is persistent.

6.4. Limitations and further research

The study covered the period of 4th January 2000 to 31st March 2017 because of the availability of the data from the Namibian stock exchange. As time and resources could not allow it, the researcher failed to factor in aspects such as transaction costs and dividends that might have provided different results if they were considered. Caporale and Zakirova (2016) observed the DOW and the January phenomenon when they didn't adjust the returns for the transactional cost. However upon adjusting the returns for the transactional cost, they observed that the calendar anomalies disappear. This study is limited to one type of distribution; the normal distribution, however, according to Osarumwense (2015) error distributional assumptions influences the appearance or disappearance of calendar effects. This study also failed to explain why this anomaly exists at the Namibian Stock Exchange. Further research can be directed toward investigating the existence of day-of-the week and month of the year anomalies on firm basis rather than focusing on stock market indices. Also, other anomalies such as turn-of-the-month, other January and holiday effect could be included to the analysis. A different model or methodology could be employed to test for the day of the week and month of the year anomalies.

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