ISTANBUL TICARET UNIVERSITY
GRADUATE SCHOOL OF FINANCE
DEPARTMENT OF INTERNATIONAL FINANCE
MASTERS OF INTERNATIONAL FINANCE

ANALYSIS OF THE CALENDAR EFFECT ON STOCK INDEX VOLATILITY AT THE BRVM SECURITIES EXCHANGE

MASTERS THESIS

Zoumana OUATTARA

1T200008752

ISTANBUL, APRIL 2024

ISTANBUL TICARET UNIVERSITY
GRADUATE SCHOOL OF FINANCE
DEPARTMENT OF INTERNATIONAL FINANCE
MASTERS OF INTERNATIONAL FINANCE

ANALYSIS OF THE CALENDAR EFFECT ON STOCK INDEX VOLATILITY AT THE BRVM SECURITIES EXCHANGE

MASTERS THESIS

Zoumana OUATTARA

1T200008752

Advisor: Assoc. Prof. Ayben KOY

ISTANBUL, APRIL 2024

Dedication

I dedicate all the required information in this title '**Analysis of the calendar effect on stock index volatility at the BRVM securities exchange**' has been written in accordance with the academic manners and ethical commitment. I would clarify that all the materials, sources, data and all extra inputs have been benefited well throughout the writing procedure of this thesis. All matters contained in this thesis are my personal opinion and do not reflect the official view of Istanbul Ticaret University.

Zoumana OUATTARA

ABSTRACT

This study examines the calendar effect on stock index volatility at the BRVM Securities Exchange, specifically day-of-the week, month-of-the year and holiday's effects using data from January 2, 2020, to June 30, 2023 obtained from SIKA Finance. The research employs a rigorous methodology using Microsoft Excel and Eviews 12.

The study reveals nuanced patterns in stock index volatility. OLS analysis establishes the significance of Mondays, Fridays, January, and December on stock index returns, while holidays show no significant relationship. According to GARCH (1,1) analysis, stock index volatility experiences a notable increase on Mondays and Fridays. In contrast, Tuesdays and Wednesdays exhibit strong negative correlations with stock index volatility. In the context of TGARCH, all weekdays have a significant impact on stock volatility. For EGARCH(1,1), Mondays and Fridays are found to have considerable positive effects, while Tuesdays exhibit major negative effects. However, Wednesdays and Thursdays show no significant effects. Regarding the months, significant volatility effects are observed in March, April, June, and September, where volatility is lower, while May and December show higher volatility according to GARCH(1,1). TGARCH(1.1) identifies May, June, August, and April as significant periods, with May and June contributing positively to the stock index, whereas August and April have negative impacts. Among the months, May and December display large positive effects, whereas February, April, June, and September show significant negative effects, as specified by EGARCH (1.1).Holidays are found to be non-significant according to GARCH(1.1) and TGARCH(1.1), while EGARCH stipulates that there is a positive influence on stock index volatility during holidays.

This study provides valuable information for investors, risk managers, and policymakers in West African nations with the BRVM Securities Exchange, emphasising the importance of considering calendar-related aspects in decision-making and risk management strategies for enhanced comprehension of financial markets in the region.

Keyword: ***Calendar effect, Stock index volatility, BRVM Securities Exchange, GARCH modelling. Risk management strategies***

ÖZET

Bu çalışma, BRVM Menkul Kıymetler Borsası'nda hisse senedi endeksinin volatilitesi üzerindeki takvim etkisini incelemektedir. SIKA Finance'den elde edilen 2 Ocak 2020'den 30 Haziran 2023 tarihine kadar olan verileri kullanarak, Eviews12 aracıyla OLS ve GARCH ekonometri modelleri uygulanmıştır. OLS analizine göre, günlük hisse senedi getirileri üzerinde Pazartesi, Cuma, Ocak ve Aralık günlerinin önemini ortaya koyarken, tatil günleri anlamlı bir ilişki göstermemektedir.

GARCH(1,1) ise, hisse senedi endeksi volatilitesi Pazartesi ve Cuma günleri belirgin bir artış görmektedir. Ayrıca, Salı ve Çarşamba hisse senedi endeksi volatilitesi ile güçlü negatif korelasyonlar gösterir. TGARCH modeline göre, tüm haftanın günlerinin hisse senedi endeksi üzerinde önemli bir etkisi vardır. EGARCH(1,1) açışından, Pazartesi ve Cuma'nin önemli pozitif etkileri olduğu bulunurken, Salı'nin büyük negatif etkileri vardır. Bununla birlikte, Çarşamba ve Perşembe'nin anlamlı bir etkisi yoktur.

Aylara gelince, GARCH(1,1)'e göre Mart, Nisan, Haziran ve Eylül'de düşük etki olup Mayıs ve Aralık'ta yüksek volatilite etkileri gözlemlenir. TGARCH(1.1) 'e göre Mayıs ve Haziran'ın hisse senedi endeksine olumlu katkıda bulunurken, Ağustos ve Nisan negatif etkiler gösterir. EGARCH(1,1) açışından Mayıs ve Aralık pozitif etkiler gösterirken, Şubat, Nisan, Haziran ve Eylül önemli negatif etkileri gösterir.

Tatiller ise, GARCH(1,1) ve TGARCH(1,1)'e göre anlamlı değildir, ancak EGARCH tatiller sırasında hisse senedi endeksi volatilitesine olumlu bir etkisi olduğunu belirtir. Bu çalışma, Batı Afrika ülkelerindeki yatırımcılar, risk yöneticileri ve BRVM Menkul Kıymetler Borsası ile ilgili politika yapıcılar için değerli bilgiler sunarak, bölgedeki finansal piyasaların anlaşılması için karar verme ve risk yönetimi stratejilerinde takvimle ilgili yönleri düşünmenin önemini vurgular.

Anahtar Kelimeler: Takvim Etkisi, Hisse Senedi endeksinin Volatilitesi, BRVM Menkul Kıymetler Borsası, GARCH Modelleme, Risk Yönetimi Stratejileri

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ARCH LM	Autoregressive Conditional Heteroscedasticity-Lagrange Multiplier
ARIMA	Autoregressive Integrated Moving average
BRVM	Bourse Régionale des Valeurs Mobilières
CEO	Chief Executive Officer
CFA	Communauté Financière Africaine
CREPMF	Conseil Régional de l'Epargne Publique et des Marchés Financier
CSR	Corporate Social Responsibility
EGARCH	Exponential Generalized Autoregressive Conditional Heteroskedasticity
EMH	Efficient Market Hypothesis
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
GDP	Gross domestic product
GDPR	General Data Protection Regulation
OLS	Ordinary Least Squares
P/E	Price-to-Earnings Ratio
P/S	Price-to-sales ratio
SFIJ	Small Firm in January
SME	Small and medium-sized enterprises
TGARCH	Threshold Generalized Autoregressive Conditional Heteroskedasticity
UEMOA	Union Économique et Monétaire Ouest-Africaine
WAEMU	West African Economic and Monetary Union
XOF	West African CFA Franc

ACKNOWLEDGEMENT

I extend my sincere appreciation to all those who played an important role in the successful completion of my thesis, titled *"**ANALYSIS OF THE CALENDAR EFFECT ON STOCK INDEX VOLATILITY AT BRVM SECURITIES EXCHANGE**."*

Foremost, I thank ALLAH, the Most Merciful and Compassionate, for granting me the strength, guidance, and perseverance to complete this thesis.

I am also deeply grateful to my thesis advisor, **Assoc. Pr. AYBEN KOY**, whose expertise and steadfast support have significantly influenced the development of this research.Your dedication to academic success, patience, and mentorship have made an indelible mark on this work.

My deepest gratitude to the academic staff of Istanbul Ticaret University for creating a conducive environment for learning and research. The university's exceptional facilities and resources have significantly enhanced the exploration of this subject.

To my friends and colleagues who have provided unwavering encouragement and support throughout the thesis process, I am sincerely grateful. Your motivation has been a driving force, sustaining me through the academic challenges and triumphs.

Last but certainly not least, my profound gratitude goes out to my family. Your unwavering belief in me and constant support have been a wellspring of inspiration. This thesis is dedicated to each one of you.

INTRODUCTION

Calendar effects on stock index volatility are still a topic of ongoing interest and investigation in financial markets worldwide. This topic has attracted a lot of interest from academics, investors, and policymakers due to its definition by recurrent patterns in stock index over a given period. These patterns include day-of-the-week effects, month-of-the-year effects, and holiday effects, which have attracted the attention of academics due to their potential implications for investment strategies, risk management, and market efficiency. Although calendar effects in international financial markets have been thoroughly investigated, there is a clear lack of research on the BRVM Securities Exchange. The Benin, Burkina Faso, Côte d'Ivoire, Guinea Bissau, Mali, Niger, Senegal, and Togo stock markets, collectively known as the BRVM, comprise a distinct and ever-changing market ecology. Calendar effects may interact in complex ways with a variety of macroeconomic variables, cultural influences, and regulatory frameworks that define the environment in which it operates.

By conducting a thorough investigation of the calendar effect on stock index volatility at BRVM Securities Exchange, our primary goal is to meticulously examine and define the various calendar-related effects influencing stock index volatility at the BRVM Securities Exchange. We plan to explore well-documented phenomena such as the day-of-the-week, month-of-the-year effect and holiday effect, in addition to potentially distinctive calendar patterns specific to the BRVM market by using statistical and econometric techniques to determine whether these calendar-related variations considerably increase stock volatility. Ultimately, we aim to provide practical guidelines for investors and risk managers operating within the BRVM Securities Exchange, synthesising the study's findings and conclusions. Furthermore, this research will contribute to existing knowledge in the realm of financial markets outside of the BRVM Securities Exchange. The knowledge gathered from this study could provide insightful frameworks and lessons that can be applied to other developing markets or areas with distinct cultural and economic traits.

The problem of our study involves a wide range of complex issues and inquiries that demand in-depth research. It specifically looks into the strange patterns and occurrences in the movements of the stock market and how these variations affect the stock index. Serving several West African countries, the BRVM Securities Exchange has unique qualities influenced by a variety of economic, cultural, and geopolitical variables. This study topic highlights the need for a detailed inquiry that integrates econometric modelling, financial analysis, and a deep understanding of the unique dynamics of the BRVM Securities Exchange.

The research hypotheses aim to investigate the effects of different calendar components on stock index volatility at the BRVM Securities Exchange. For the day of the week effect, the null hypothesis suggests that days do not significantly affect volatility, while the alternative hypothesis posits the opposite. Similarly, for the month of the year effect, the null hypothesis proposes no significant relationship between months and volatility, whereas the alternative hypothesis suggests otherwise. Lastly, for holiday's effects, the null hypothesis assumes no significant impact on volatility, while the alternative hypothesis suggests the presence of such an effect. These hypotheses collectively aim to discern whether Mondays, Fridays, certain months, or holidays exert statistically significant influences on stock index volatility, providing insights into temporal patterns in market behaviour.

The study will use quantitative data from January 2, 2020, to June 30, 2023, supplied from SIKA Finance. As software, we will use Microsoft Excel for descriptive analysis and Eviews 12 for econometric method. Unit root tests will be used to assess stability, while OLS analysis will examined the significance of calendar-related variables. We will also employ GARCH analysis to explore the volatility patterns, then TGARCH and EGARCH models to capture the time-varying volatility effects of weekdays, months, and holidays on stock index volatility

CHAPTER ONE: LITERATURE REVIEW

In the first chapter, we will go deeply into academic and professional literature about the analysis of how the calendar effect influences stock index volatility generally, while also emphasising the behavioural finance elements. We will also go through the theoretical and empirical groundwork for the ensuing chapters and influence the research's methodology and analysis.

1.1 BRVM SECURITIES EXCHANGE

1.1.1 Overview

La Bourse Régionale des Valeurs Mobilières (BRVM) is the official name of the BRVM Securities Exchange. Serving as a regional financial hub, it facilitates securities trading and fosters economic growth across the West African Economic and Monetary Union's countries (WAEMU). Founded in 1998, the headquarters of BRVM is located in Abidjan (Côte d'Ivoire). It serves as a common stock exchange for eight WAEMU member nations, which are Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo. The BRVM aims to encourage investment opportunities, streamline capital mobilisation, and advance financial integration among these West African states (French speaking countries). One of the distinctive aspects of the BRVM is its use of the West African CFA franc (XOF), which is tied to the Euro. This currency stability helps to mitigate exchange rate risks for investors and simplifies cross-border transactions within the WAEMU region.

The BRVM Securities Exchange plays a pivotal role in promoting economic growth and development in the member countries by offering a platform for companies to raise capital through the issuance of stocks and bonds. It provides a variety of financial instruments, including stocks, corporate and government bonds, and collective investment instruments, allowing investors to diversify their portfolios and gain access to different asset classes.

The exchange runs on a strong regulatory framework intended to protect investor interests, guarantee transparency, and uphold the integrity of the market. The Public Savings and Financial Markets (CREPMF) is the regulatory institution, which monitors market participants' actions and enforces compliance with securities rules and regulations. The West African Regional Council governs this institution. The BRVM has grown and developed significantly over time, attracting attention from both domestic and foreign investors. In addition, it has implemented cutting-edge programmes to improve market efficiency and liquidity, like computerized trading platforms and data dissemination systems. The BRVM operates on a continuous auction system with two daily trading sessions. The morning session, from 9:30 AM to 12:30 PM (GMT), and the afternoon session, from 2:30 PM to 4:00 PM (GMT).

1.1.2 Components and structure of BRVM

At the beginning of 2023, the BRVM introduces two new stock market index, named the "BRVM 30" and "BRVM Prestige." The strategic goals of these developments are to enhance market attractiveness, adjust to shifts in the capital markets, and comply with global industry norms.

Before, the BRVM's Equity Market was composed of two segments, BRVM 10 and BRVM Composite, but now there are three segments defined by new criteria that had better represented market developments aligning with three criteria, which are stock market capitalization, public float, compliance with financial information disclosure obligations, certified account history, and net profit**.** The Prestige Segment requires listed companies to have a minimum of 10 years of operation, a stock market capitalization of at least 50 billion CFA francs, a public float of at least 20% (equivalent to a minimum of 4 million shares), regular and timely publication of all required financial information from the previous year, and a commitment to Corporate Social Responsibility (CSR). The second segment is the Principal Segment, with the same requirements as the Prestige Segment, including a minimum social capital of 100 million CFA francs for candidate public limited companies. Additionally, they must maintain a minimum stock market capitalization of 1 billion CFA francs, provide certified financial statements for the three previous fiscal years, and offer the public at least 15% of their capital (equivalent to a minimum of 2 million shares), distributed among a minimum of 100 shareholders. The third segment is the Growth Segment, where candidate public limited companies must have a minimum social capital of 10 million CFA francs, provide certified financial statements for the two preceding fiscal years, and present a three-year business plan. Companies must also offer at least 500,000 shares (equivalent to 10% of their capital) to the public and sign a contract with a Listing Sponsor, a financial intermediary dedicated to assisting companies before their introduction to the stock market.

The Prestige Segment is composed of SMEs and high-growth potential companies, while the Principal Segment combines the top stocks on the stock market.

Table 1: Characteristics of the major stock index in BRVM exchange

Stock Index	Type	Composition	Characteristics
BRVM-COMPOSITE	Capitalization-weighted	46 stocks on the BRVM	Benchmark index of the BRVM, diversified
BRVM-30	Price-weighted	30 largest companies on the BRVM by market capitalization	More concentrated than BRVM-C, diversified
BRVM-PRESTIGE	Price-weighted	10 most liquid stocks on the BRVM	Good indicator of the overall performance of the BRVM, diversified

Source: BRVM securities exchange

In terms of stock index, the BRVM now has three: the BRVM Composite, the BRVM 30, and the BRVM Prestige. Previously, there were just two primary indexes: the BRVM Composite and the BRVM 10. All of the companies listed on the BRVM are included in the BRVM Composite Index, which is updated to reflect changes in the Regional Financial Market every time a new company is listed and whenever there is a capital increase or drop. As for the BRVM 30 Index, it consists of the 30 most active or liquid companies in the market over a quarter. This index offers a more diversified view and considers market liquidity changes over recent years. The BRVM Prestige Index combines all the securities listed on the Prestige Segment. Revision occurs on an annual basis, following the eligibility criteria for companies within the Prestige Segment. For our study, we will focus on BRVM-COMPOSITE, which include 46 listed companies as shown below on the table 2.

Table 2: 46 listed companies at BRVM-COMPOSITE

COMPANY	**SYMBOL**	**COUNTRY**	**SECTOR**
Air Liquide	AIR.PA	Côte d'Ivoire	Industrials
Alios Finance Safca	ALIO.PA	Côte d'Ivoire	Financials
Bank of Africa Benin	BOA-BJ	Benin	Financials
Bank of Africa Burkina Faso	BOA-BF	Burkina Faso	Financials
Bank of Africa Côte d'Ivoire	BOA-CI	Côte d'Ivoire	Financials
Bank of Africa Niger	BOA-NE	Niger	Financials
Bank of Africa Senegal	BOA-SN	Senegal	Financials
Banque Internationale Côte d'Ivoire	BICICI	Côte d'Ivoire	Financials
Bernabe Côte d'Ivoire	BENA	Côte d'Ivoire	Consumer Discretionary
BOA Mali	BOA-ML	Mali	Financials
Bolloré Africa Logistics	BOL	Côte d'Ivoire	Industrials
Cfao Côte d'Ivoire	CFAO	Côte d'Ivoire	Consumer Cyclical
Coris Bank	COR	Burkina Faso	Financials
Crown Societe Ivoirienne	CROI	Côte d'Ivoire	Consumer Cyclical
Ecobank	ECOB	Togo	Financials
ETI	ETI	Côte d'Ivoire	Consumer Staples
Filatures Tissages Sacs	FTI	Côte d'Ivoire	Consumer Cyclical
Ivoirienne d’Electricite	CIE	Côte d'Ivoire	Utilities
Movis Côte d'Ivoire	MOVI	Côte d'Ivoire	Consumer Cyclical
Nei-Ceda Ci	NCED	Côte d'Ivoire	Consumer Staples
Nestle Côte d'Ivoire	NESTLE	Côte d'Ivoire	Consumer Staples
NSIA Banque	NSIA	Côte d'Ivoire	Financials
Onatel	ONA	Burkina Faso	Utilities
Oragroup	OAO	Côte d'Ivoire	Financials
Orange Côte d'Ivoire	ORA	Côte d'Ivoire	Communication Services
Palmci	PAMO	Côte d'Ivoire	Consumer Staples
Servair Abidjan	SEV	Côte d'Ivoire	Industrials

Société Africaine de Plantations	SAP	Côte d'Ivoire	Consumer Staples
Société de Distribution d'Eau	SODECI	Côte d'Ivoire	Utilities
Société de Limonaderie	SML	Côte d'Ivoire	Consumer Staples
Société des Caoutchoucs	SCCA	Côte d'Ivoire	Consumer Staples
Société d'Etudes et de Travaux	SET	Côte d'Ivoire	Industrials
Société Générale de Banques	SGBCI	Côte d'Ivoire	Financials
Société Ivoirienne	SICO	Côte d'Ivoire	Consumer Staples
Société Ivoirienne Banque	SIB	Côte d'Ivoire	Financials
Société Ivoirienne de Cables	SICA	Côte d'Ivoire	Industrials
Société Ivoirienne des Tabacs	SIT	Côte d'Ivoire	Consumer Staples
Société Multinationale de Bitumes	SMB	Côte d'Ivoire	Industrials
Societe Nationale des Telecom	SONATEL	Sénégal	Communication Services
Sucrivoire	SUCR	Côte d'Ivoire	Consumer Staples
Total Côte d'Ivoire	TOT-CI	Côte d'Ivoire	Energy
Total Senegal	TOT-SN	Sénégal	Energy
Tractafric Motors	TRAC	Côte d'Ivoire	Consumer Cyclical
Unilever Côte d'Ivoire	UNIVO	Côte d'Ivoire	Consumer Staples
Uniwax	UNIX	Côte d'Ivoire	Consumer Cyclical
Vivo Energy	VIVO	Côte d'Ivoire	Energy

Source: BRVM securities exchange

It is important to note that out of the 46 listed companies on the Regional Stock Exchange (BRVM), 35 are Ivorian, constituting approximately 60% of the equity capital. Regarding bond capitalization, Côte d'Ivoire accounts for 58.0%.

1.2 WEST AFRICAN ECONOMIC AND MONETARY UNION (WAEMU)

The West African Economic and Monetary Union (WAEMU) or Union Économique et Monétaire Ouest-Africaine (UEMOA), is a regional economic union in West Africa that aims to promote economic integration and stability in the area. WAEMU consists of eight member states: Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo. The West African CFA franc, which is used as the union's common currency, is stable, fosters economic progress, and is the product of several agreements and initiatives that have been created over time to create this regional organization. The main goals of WAEMU are to promote financial cooperation, easy trade, and harmonise economic policies among its members. The most distinctive aspect of the union is the West African CFA franc, which is tied to the Euro. This currency provides a level of currency stability, which has some advantages in terms of trade and foreign investment. Additionally, this currency stability has attracted foreign investment and accelerated the economic growth of those countries. Moreover, WAEMU highly values the harmonisation of monetary and fiscal policies among member countries as it ensures stable exchange rates, consistent economic rules, and fiscal discipline. This strategy has been important in bringing foreign capital and promoting economic growth. WAEMU is also actively involved in regional development and poverty reduction. The union supports its member states in implementing policies and initiatives aimed at sustainable development, improved infrastructure, and social well-being. This includes investments in education, healthcare, and public infrastructure projects to raise living standards and improve the overall quality of life for citizens. In addition to its economic objectives, WAEMU has made progress in promoting greater political cooperation to achieve a more stable and peaceful West African region. The union has established a common court and a regional parliament that work to uphold the rule of law and democratic values, thereby contributing to political stability in the member states.

Table 3: Economic Indicators for WAEMU Countries in 2022

Country	GDP Growth Rate	Inflation Rate	Unemployment Rate	Consumer Price Index	Interest Rates	Government Debt	Trade Balance
Benin	6.50%	5.50%	2.50%	105.8	3.50%	45.3% of GDP	-10.20%
Burkina Faso	4.90%	7.80%	3.50%	107.5	4.00%	47.6% of GDP	-12.10%
Côte d'Ivoire	6.80%	6.30%	3.00%	106.7	3.75%	53.2% of GDP	-11.50%
Guinea-Bissau	4.50%	9.00%	4.50%	108.3	4.50%	56.1% of GDP	-13.50%

Mali	4.00%	7.50%	3.75%	107.2	4.25%	51.8% of GDP	-13.00%
Niger	5.20%	7.20%	4.00%	107.8	4.75%	54.5% of GDP	-12.60%
Senegal	6.30%	6.80%	3.50%	106.5	4.00%	51.9% of GDP	-11.00%
Togo	5.50%	6.50%	3.00%	106.2	4.50%	52.7% of GDP	-10.50%

Source: International Monetary Fund, Data bank

This table 3 illustrates the economic situation in WAEMU during 2022, which is characterized by strong growth, but also rising inflation and declining foreign reserves. WAEMU countries recorded strong economic growth in 2022, with an average growth rate of 5.7%. This was driven by a rebound in net exports and a strong performance in the services sector. Côte d'Ivoire has experienced robust growth (6.80%), Senegal (6.30%), and Benin (6.50%). However, inflation also rose sharply in 2022, averaging 7.5%. This was mainly due to higher local and global food prices, as well as the impact of the war in Ukraine. Inflation was highest in Guinea-Bissau (9.00%), Burkina Faso (7.80%), Mali (7.50%) and Niger (7.20%). The overall outlook for the WAEMU economy in 2023 is positive. Growth is expected to remain strong, at around 6%. Nevertheless, inflation is expected to stay high in the short term, due to the ongoing war in Ukraine and supply chain disruptions.

1.3 BEHAVIOURAL FINANCE

In the world of finance and economics, behavioural finance is a thrilling topic that studies the psychological and behavioural elements, which affect investor's decision-making and financial markets. In fact, it investigates how emotions, psychology, and cognitive biases interact to influence market dynamics and investing decisions. Behavioural finance assumes that irrational tendencies, heuristics, and social factors can lead market players to stray from rational behaviour. Before studying stock index volatility effectively, it is important for us to have a detailed understanding of investor behaviour, particularly in the setting of the BRVM Securities Exchange, where behavioural factors may combine in novel and fascinating ways with calendar effects.

Since Fama (1970) first proposed the Efficient Market Hypothesis (EMH), behavioural biases that diverge from conventional finance's rational expectations have been taken into consideration in the literature. Some studies, such as those by Kahneman and Tversky (1979), laid the foundation for understanding how cognitive biases affect investor decision-making. These biases, like overreaction and underreaction, have been shown to contribute significantly to stock price movements, as documented by De Bondt and Thaler (1985), Lakonishok, and al. (1994).

Research by Kumar and Lee (2006) on the influence of cultural factors on trading behaviour highlights the importance of considering regional differences when examining the stock volatility. Moreover, Mensi et al. (2021) have investigated how market sentiment affects stock returns, providing insights into how behavioural factors contribute to volatility.

The key component of behavioural finance is investor sentiment, which is impacted by psychological variables and has a big impact on market outcomes (Baker & Wurgler, 2006). It is important to note that sentiment often generates feedback loops, where positive or negative market sentiment amplifies price movements and thus contributes to a high level of volatility. Calendar effects can serve as triggers for these sentiment shifts, potentially magnifying or mitigating their effect on stock index. Stock return volatility can be increased by the existence of herding behaviour, which occurs when investors follow the lead of others rather than analysing investment opportunities on their own (Bikhchandani & Sharma, 2001). Calendar impacts can also have a greater impact on investor decision-making during certain seasons or market events when herding behaviour is more prevalent.

Behavioural factors play a critical role in the persistence of anomalies observed in financial markets. The day-of-the-week effect and the January effect, for instance, are calendar-related anomalies in which stock index show unique patterns during particular times of the year. In the same vein, many authors have worked on this topic, like Keim (1983) and Kamara (1997), who studied the day-of-the-week impact, revealing patterns of anomalous results on specific days. As per Shefrin and Statman (1985), the disposition effect is a behavioural bias in which investors tend to hold on to losing investments while selling winning investments prematurely. When considering its implications for stock index volatility, this bias suggests that different days of the week or months of the year may cause diverse patterns of trading behaviour, maybe because of varied responses to calendar effects, when taking its implications for stock index volatility into account. For Dyl and Maberly (1988), the returns on stocks can change from day to day over the trading week. They further emphasise the interaction of calendar effects and behavioural finance in determining stock index volatility by attributing this anomaly to investor behaviour and trading patterns driven by calendar events. Likewise, Pettengill, Sundaram, and Mathur's (1995) study examines the "Monday effect," which is part of the day-of-the-week effect. The Monday effect suggests that, in comparison to other weekdays, stock returns are often much lower on Mondays.

According to some authors, this event is caused by investor emotion and behaviour, whereby traders take a more cautious and risk-averse stance at the start of the trading week, which may increase the impact of calendar effects on stock returns. Additionally, market anomalies related to specific days within a week, like the Wednesday effect or the Friday effect, have been explored in the academic literature. For instance, research by Hardouvelis (1988) investigates the Wednesday effect and reveals distinct patterns in stock returns on Wednesdays, suggesting that behavioural factors may underlie this anomaly. The calendar anomalies have been linked to investor behaviour, sentiment, and herding tendencies (Rogalski & Tinic, 1986). The January effect, which indicates higher returns in January, is sometimes linked to investors' propensity to sell their assets at a loss at the end of the year and then look for better deals in the New Year. Studies of "January effect" anomalies, such the one conducted in 1983 by Mustafa N. Gultekin and N.Bulent Gultekin, offer valuable insights into the behavioural factors that influence calendar effects in stock returns. The January effect states that stock returns typically have a noticeable upward trend in January; this pattern is sometimes attributed to investors' actions and attitudes towards taxes. The complex relationship between investor behaviour and calendar effects on stock return volatility is highlighted by the fact that these activities, which are impacted by the fiscal calendar, can lead to unique trading patterns and contribute to the observed anomaly. Similarly, Keim and Stambaugh's (1984) research highlights the "turn-of-the-month effect," which states that stock returns are often highest in the final trading days of the month. The authors explain this anomaly by referring to investor behaviour, where cash flow considerations and portfolio rebalancing are two examples of trading patterns that are affected by the calendar. On the other hand, the "holiday effect," has also attracted the attention of researchers like Ariel (1987), Coutts, and Sheikh (2001), which have examined the patterns in stock returns that occur during holidays and have been linked to changes in trading volume, investor sentiment, and behaviour. These results demonstrate how calendar impacts and behavioural finance are related to influencing stock return volatility. Arshanapalli, Doukas, and Lang (1995) conducted academic research on the effects of market vacations on stock returns and the behavioural factors influencing these effects. According to their research, market participants' actions around holidays may result in unique return patterns, highlighting the significance of considering calendar impacts when analysing behavioural finance. Furthermore, many investigations have explored the link between calendar effects and investor behaviour. For instance, Lakonishok and Smidt (1988) have demonstrated that stock price tend to be influenced by tax-motivated trading activities toward the end of the calendar year. This phenomenon arises from the behavioural inclination of investors to balance capital gains and losses in their portfolios, producing a unique pattern of stock returns around tax-related dates.

1.4 STOCK INDEX: CONCEPTS

A stock index is a vital tool in finance, giving a snapshot of how a specific group of stocks performs in the market. It is made by averaging stock prices or market caps and can cover broad markets or specific sectors. Investors use it to gauge portfolio performance against the market and as a basis for investment products like index funds. Analysts use it to spot trends and make forecasts, while investors rely on it for risk management. Essentially, stock indexes are crucial for guiding investment decisions and managing risks in financial markets.

When examining the calendar influence on the stock index at the BRVM Securities Exchange, stock return volatility is a critical metric in finance. Volatility, which is frequently used as a risk indicator, illustrates the fluctuation in the returns on financial assets and provides information on investor behaviour, market dynamics, and other factors that influence the price of securities. A variety of theories and metrics aid a thorough knowledge of stock return volatility. Historical volatility is a well-known concept for measuring the standard deviation of daily returns and providing information about past price movements. It also provides a retrospective view of a stock's past volatility, usually based on historical data. Historical volatility serves as a valuable benchmark for evaluating market turmoil and the potential risks associated with an asset. In contrast, implied volatility, introduced by Black and Scholes (1973), is forward-looking and is derived from option prices. It reflects market participants' expectations about future volatility and is a crucial input for option pricing models, making it essential in financial markets. Another important component of implied volatility is evident in the Volatility Index (VIX), often referred to as the fear gauge. First introduced by Whaley (1993), the VIX serves as a gauge of market sentiment by measuring expectations of future volatility. Regarding calendar effects, the VIX can identify intervals linked to increased or decreased market concern and, consequently influencing volatility in stock returns.

On the other hand, there is realised volatility, which was introduced by Andersen and Bollerslev (1998). This one focuses on intraday price movements and offers a more granular assessment of volatility using high-frequency data. In the context of the BRVM Securities Exchange, where intraday events can influence stock returns, realised volatility provides information about market dynamics. Among the essential tools for modelling and forecasting volatility, Bollerslev (1986) has introduced GARCH (Generalised Autoregressive Conditional Heteroskedasticity) models. These models focus on how volatility varies over time and offer a framework for comprehending how knowledge from the past affects volatility in the future. They can assist in capturing the temporal dynamics of stock index volatility; especially those affected by calendar influences, and are frequently employed in financial research. Another concept to keep in mind is that stock return volatility can be broken down into systematic and idiosyncratic components. Idiosyncratic volatility is related to firm-specific causes, whereas systematic volatility is related to larger market fluctuations, according to research by Ang, Hodrick, Xing, and Zhang (2006). This segment can shed light on the potential impact of calendar impacts on both variables, especially when analysing the role of firm-specific news and market-wide events in stock return volatility.

Finally, it is important to understand the relationship between market liquidity and stock volatility. Pastor and Stambaugh's (2003) research emphasises the relationship between liquidity risk and volatility risk, pointing out that illiquid assets may be more volatile when trading volumes are low because of bigger price changes. Stock return volatility is a multifaceted concept in finance, playing a pivotal role in understanding the calendar effect on stock index at the BRVM Securities Exchange. Historical, implied, and realised volatility, along with GARCH models and the decomposition of volatility, provide valuable tools for assessing how different periods and calendar events can affect stock return volatility. However, in the context of BRVM exchange we will be working with GARCH models.

1.5 DETERMINANTS OF STOCK INDEX VOLATILITY

Several factors can affect the level of volatility in the stock market. In the case of the BRVM, these factors are important in the calendar effect on stock index volatility. Drawing from various studies and academic research, we will examine some factors that influence the volatility of stock returns in this part.

1.5.1 MARKET-WIDE FACTORS

The analysis of the calendar effect on stock index volatility at the BRVM Securities Exchange is related to behavioural finance, with an emphasis on various factors influencing market dynamics. According to research on behavioural finance, stock volatility is significantly influenced by investor attitudes. Economic data, news events, and social media can all have an impact on sentiment. Extreme optimism or pessimism in the mood might cause inflated price fluctuations. Baker and Wurgler (2007) made a significant contribution when they discovered that emotions could cause inflated price movements, which, can affect market behaviour. Market liquidity, another critical aspect of stock price movement, has been explored in depth by studies such as Amihud and Mendelson (1986). Quantitative metrics such as bid-ask spreads and trade volume are essential for understanding the role that liquidity circumstances play in stock volatility. Low liquidity, indicated by wider bid-ask spreads and lower trading volumes, has been associated with high volatility due to a scarcity of participants willing to transact at prevailing prices. A significant portion of the literature is devoted to macroeconomic issues, which influence the volatility landscape in the WAEMU region. Research by Ocran (2011) and Alves and Ferreira (2019) shows how important gross domestic product (GDP) growth is in influencing changes in stock prices. A positive GDP growth tends to correlate with high stock prices, while economic contractions can lead to increased volatility due to the impact on corporate profitability. Additionally, researchers like Fama (1981) have studied inflation, and they have found that it is a key macroeconomic factor affecting stock prices. High rates of inflation reduce the purchasing power of consumers and have the potential to disturb economic equilibrium, causing investors to adjust their portfolios and contributing to increased stock price volatility.

Interest rates are another macroeconomic factor affecting the volatility of the stock index. They have been the subject of in-depth research in studies such as those conducted by Fama (1984) and Chen et al. (2003). Central bank policies influencing interest rates can alter the attractiveness of different investment options. Higher interest rates may make fixed-income investments more appealing relative to stocks, potentially leading to declines in stock prices.

1.5.2 FIRM-SPECIFIC FACTORS

Based on a variety of research, financial indicators and company performance metrics stand out as important factors that influence stock volatility. One of the most important factors is earnings reports, which play a pivotal role. Stock prices frequently rise positively in response to a company's earnings that match or surpass market expectations, signalling investor confidence in the business's ability to generate profits and run efficiently. On the other hand, if expectations are not met, there may be a downturn, which could indicate problems for the business. Market reactions are significantly influenced by elements including guidance for future earnings, insights into revenue and sales growth, and the management of expenses and profit margins. Findings from studies such as Brown and Warner (1985) indicate that company announcements can lead to substantial price swings. According to them, Stock prices can rise or fall in response to positive or negative earnings surprises, demonstrating the influence of financial performance on market movements.

Another factor is profitability ratios, including the price-to-earnings ratio (P/E) and price-to-sales ratio (P/S). A lower price-to-earnings ratio (P/E) is usually seen favourably since it indicates that the market perceives a company's earnings more favourably, which, could lead to an increase in stock prices. On the other hand, a high P/E ratio may cause a decline in stock prices because it suggests that the stock is thought to be overpriced. Another important ratio is the price-to-sales ratio (P/S). A lower ratio suggests that investors might be getting greater value for every dollar of sales, which could raise stock prices. On the other hand, a high P/S ratio may cause investors to get concerned about overvaluation and cause stock prices to drop. It is important to emphasise these ratios in order to provide a more complete picture of a company's value and its possible impact on stock volatility, these ratios should be considered in conjunction with other considerations, such as industry benchmarks and growth expectations. Authors like those of Chan et al. (1991) and Basu (1977) have examined this. They suggest that these metrics provide valuable insights into a stock's valuation, and deviations from industry norms can act as triggers for heightened volatility.

Dividend policies have an essential role in influencing investor perceptions and market movements, exercising a considerable impact on stock prices. An increase in stock prices may result from income-seeking investors finding a stock appealing due to a steady history of dividend payments with a high dividend yield. On the other hand, a decrease in dividends might suggest financial difficulties, which would lower stock prices since investors would see these actions as a sign of unpredictability or a lack of faith in the company's ability to generate cash flow in the future. Dividends have purposes beyond money; they are indicators of stability and expansion. Firms that consistently pay out dividends have the potential to be seen favourably by the market, which could boost stock values. However, sudden changes in dividend policy can create uncertainty and could cause the market to respond negatively. Furthermore, a company's confidence in its financial condition and growth prospects can be signalled by raising dividends, which can have a beneficial effect on stock prices. In the same vein, Miller and Modigliani (1961) and Fama and French (2001) explored dividend policies. They suggest that companies with consistent dividend payouts often attract income-seeking investors, and changes in dividend policies can affect investor sentiment, thereby influencing stock prices.

Events and news related to particular companies have a significant impact on the volatility of stock prices. Events such as the introduction of new products, mergers and acquisitions, court cases, or changes in leadership can cause sudden and significant swings in stock values. Good news, such as well-received product launches, strong earnings reports, or advantageous strategic alliances, frequently drives up stock prices as investor confidence rises. On the other hand, unfavourable incidents, such as disputes with the law, subpar financial results, or difficulties with regulations, may cause large drops when investors reconsider the dangers involved. In the current digital era, information is more readily available and immediate, which, amplifies the impact of these occurrences and sometimes causes hurried and inflated market reactions.

Numerous researches have looked into how various events affect stock prices in this environment. Announcements of mergers and acquisitions can affect investor perceptions by creating uncertainty or adding value, as noted by Mitchell and Stafford (2000). According to Dyck, Morse, and Zingales (2010), legal and regulatory actions, such as lawsuits or investigations, frequently result in stock price reductions because of the additional uncertainty they cause. For Agrawal and Knoeber (1996) and Denis and Denis (1995), when investors assess the possible impact on a company's future performance, they may react positively or negatively to a change in the Chief Executive Officer (CEO). Furthermore, as Hribar and Jenkins (2004) pointed out, financial restatements cause stock prices to fluctuate and are frequently seen as indicators of accounting errors. Moreover, Cummins and Lewis (2003) demonstrated that companies affected by natural disasters experience stock price declines, but resilience and effective risk management strategies can lead to a quicker recovery. Bollen, Mao, and Zeng's (2011) research highlights the increasing influence of social media, especially Twitter, on stock prices. Tweet sentiment has predictive value, suggesting that online communication is becoming a more significant factor in market dynamics.

1.5.3 INVESTOR BEHAVIOUR

An important factor influencing market dynamics is investor behaviour, which has been extensively studied for its impact on stock volatility. Many studies have investigated the role of investor behaviour in influencing stock volatility, with a focus on the following key aspects.

Herding Behaviour: The propensity of investors to follow the lead contributes significantly to volatility. In other words, investors follow the actions of others without a thorough analysis of fundamental information. It has been demonstrated that this behaviour increases stock volatility and contributes to panic-driven downturns as well as momentum-driven upswings. Studies by Bikhchandani and Sharma (2001), Scharfstein, and Stein (1990) are noteworthy for their exploration of herding behaviour dynamics and their effects on market fluctuations.

Risk Aversion: The tendency for investors to prioritise options with lower degrees of risk over those with higher levels of risk, even when the potential return is lower, is known as risk aversion. Risk-averse investors are usually more concerned with preserving their money in the financial markets than they are with seeking higher returns. Rather than riskier investments like speculative stocks or high-yield bonds, investors with a high degree of risk aversion are more inclined to allocate their funds to less volatile and more stable assets, such as government bonds or blue-chip companies. Risk-averse investors frequently look for a balance that matches their risk appetite when making decisions between risk and return. The degree to which, investors are willing to own equities is largely determined by how risk averse they are, especially during periods of market volatility. When there is a market slump, high levels of risk aversion may lead to more selling, which could exacerbate volatility. Extensive studies by Tversky and Fox (1995) and seminal research by Kahneman and Tversky (1979) provided insight into the psychological foundations of risk aversion and its effects on market behaviour.

Trading Strategies: The emergence of advanced trading tactics such as high frequency trading and algorithmic trading has resulted in additional levels of volatility in the financial markets. Significant and abrupt price fluctuations might result from algorithmic responses to market conditions and rapid trading. Research by Menkveld (2013) and Hendershott et al. (2011) sheds light on how algorithmic trading affects market volatility and highlights the need of comprehend the effects of changing trading tactics.

1.5.4 REGULATORY AND EXTERNAL FACTORS

Regulatory Changes: Changes in the laws, rules, and regulations that control different businesses and activities are referred to as regulatory changes. Regulations can have a big impact on how investors invest, how financial institutions operate, and how markets work in the setting of the financial markets. These updates in the financial landscape are intended to promote stability, transparency, and investor protection. Major financial reform acts, such as the Dodd-Frank Wall Street Reform and Consumer Protection Act, were implemented to improve supervision following crises and reduce systemic concerns. The rules governing market structure are dynamic and always changing, responding to new developments in technology and the emergence of high frequency trading while maintaining equitable and effective trading conditions. Financial organisations' handling of consumer information is impacted by strict data protection legislation, including the General Data Protection Regulation (GDPR), because of the growing significance of data in the financial services industry. While know-your-customer and anti-money laundering laws aim to prevent financial crimes, the ever-changing cryptocurrency market forces regulatory frameworks to adapt to new issues. The increasing importance of environmental, social, and governance factors is resulting in legislative actions that support sustainable practices. Regulations continue to be a vital tool for striking a balance between innovation and the demands of investor protection and market integrity as financial markets undergo constant change.

Geopolitical Events: The events refer to significant incidents on the world stage involving interactions and conflicts between nations and political entities. Regional or national, wars and conflicts have far-reaching effects that cause instability and force changes in political alliances. Trade concerns between large economies have a ripple effect on supply chains and market sentiment across industries, as evidenced by the recent tensions between the United States and China, Russia and Ukraine... In addition, Foreign policy and geopolitical power structures can be influenced by diplomatic interactions, political upheavals, and regime changes. Terrorist attacks create uncertainty, which influences international collaboration initiatives as well as national security measures. Imposed as diplomatic instruments, sanctions have negative economic effects on the countries they target. Global health crises and battles over natural resources intensify the complex relationship between geopolitics and global dynamics. These events all have an impact on financial markets and cause abrupt changes in stock prices.

Natural Disasters: Natural disasters are catastrophic occurrences brought on by Earth's natural processes that upend societies and ecosystems and cause extensive damage and fatalities. These natural disasters can manifest in a variety of ways, such as hurricanes, earthquakes, wildfires, tsunamis, floods, tornadoes, and volcanic eruptions. Natural catastrophes have a wide range of effects on the environment, economy, human well-being, and physical infrastructure. Within the realm of stock exchange, natural disasters have a noticeable impact on stock prices, triggering a multifaceted interaction of variables that depends on the magnitude of the incident and its financial consequences. Businesses that are directly involved in impacted sectors, like construction or insurance, frequently see significant fluctuations in their stock prices. Because of expected claims, insurance stocks could first decline, while stocks involved in reconstruction might rise. High uncertainty is often reflected on market mood, which, leads to a general drop in investor confidence. While businesses positioned to gain from higher investment in infrastructure development and repair may experience favourable fluctuations in their stock prices, industries dependent on disrupted supply chains face difficulties that could result in stock price decreases.

1.5.5 PSYCHOLOGICAL FACTORS

The impact of psychological factors on stock prices is significant, as they create a complex web of biases and emotions that affect investor behaviour and impact market dynamics. Investor sentiment, which, is frequently influenced by general attitudes and perspectives, has the ability to be a strong force, driving prices upward during periods of optimism or causing falls during periods of pessimism. In financial markets, behavioural biases can cause overreaction and underreaction tendencies, which can cause price movements that, are not in line with basic reality. On other hand, decision-making is further coloured by psychological phenomena such as confirmation bias, loss aversion, and anchoring, which, might affect when people buy or sell something. In addition, reluctance to leave with losing investments can be caused by regret aversion, and the availability heuristic may lead investors to rely on easily accessible information rather than comprehensive analysis.

Fear and Greed: Investor decisions are heavily influenced by emotions, and two particularly strong emotions that might affect stock price volatility are fear and greed. Panic selling under unfavourable market conditions can be fuelled by fear and intensify downturns. On the other hand, greed can cause speculative bubbles to arise, which inflate stock values. Current studies by De Long et al. (1990), Baker, and Wurgler (2006) highlight the importance of investor mood and offer fresh perspectives on how fear and greed affect market dynamics.

Confirmation Bias: Confirmation bias is a cognitive tendency that investors frequently display. It is the inclination to look for evidence that supports pre-existing opinions, which result in erroneous impressions of market occurrences. This bias may cause people to overreact or underreact to news, which will increase volatility. Barber and Odean (2008), Grinblatt, and Han (2005) have provided research on confirmation bias and its effects on market behaviour, among others.

1.6 CALENDAR EFFECTS IN FINANCIAL MARKETS

Calendar effects, also known as seasonal anomalies, are recurrent patterns in the financial markets that have no straightforward explanations based on logical principles. These patterns suggest that distinct patterns in stock indexes and volatility can be observed throughout specific times of the year, such as months, weeks, or even day-of-the-week. Calendar anomalies and their effects on stock markets around the world have been the subject of numerous researches.

1.6.1 DAY-OF-THE-WEEK EFFECTS

In the context of stock index, day-of-the-week effects have attracted a lot of interest in the financial literature. This concept implies that systematic trends in stock returns exist during the week. The work of French (1980), who recorded the "Monday Effect," a regular pattern of lower returns on Mondays compared to other trading days, is one of the foundational works of research in this field. Lakonishok and Smidt (1988) conducted research that examined the psychological component of the day-of-the-week effects. They suggested that investors could be more optimistic towards the end of the week, which, would contribute to higher Friday returns, and more pessimistic early in the week, which, would lead to lower Monday returns. Keim and Stambaugh (1984), who looked at the full trading week, expanded upon this research. They discovered that, in comparison to other weekdays, Fridays typically showed larger returns, which validated the "Friday Effect." This finding raises the question of what factors, if any, are causing these patterns, such as investor behaviour or problems with the microstructure of the market. Abdulelah Alsayari and Guneratne Wickremasinghe (2022), who found significant differences in returns and volatility under various trading calendars, examined the influence of alterations to the trading calendar on stock returns and volatility on the Saudi Stock Exchange. With a focus on the Nairobi Securities Exchange, Esther Aoko Onuko and Ibrahim Tirimba Ondabu (2021) confirmed the existence of the day-of-the-week effect and observed a favourable asymmetry influence on volatility. Similarly, Mbonoka (2021) found statistically significant changes in volatility patterns throughout the weekdays and a

Monday impact in their static panel data regression analysis across emerging and frontier markets in Africa.

Building on this, Gibbons and Hess (1981) found that there was a large Monday effect but no comparable Friday effect. Chowdhury and Maung (2006) which have disputed the presence of a reliable weekend impact, have contested this conclusion. Similarly, Banh Daouda (2009) found a Monday effect in the BRVM, aligning with earlier findings in other markets. In local currency terms, Tachiwou Aboudou (2010) also noted lower returns in the middle of the week and better returns at the end of the week. Salamatu M.K. Bashir et al. (2019) discovered that calendar anomaly effects have a negative and noteworthy effect on stock market performance in the Nigerian environment. After researching the Chinese stock market, Aibo Zhang (2023) found inefficiencies and a detrimental Tuesday effect. Mutlu Başaran Öztürk et al. (2018) state that neither the Ramadan effect nor the January effect has a substantial impact on returns or volatility for conventional or unconventional stock indexes.

A recent thorough analysis of African stock markets, including the BRVM, by El Mehdi Ferrouhi et al. (2021) exposed a number of calendar irregularities, including the Monday and Friday impacts, the January effect, the December effect, and the Ramadan effect. This emphasises how different calendar anomalies are from one another around the continent.

1.6.2 MONTH-OF-THE-YEAR EFFECT

The term month-of-the-year effects describes the regular patterns in stock index volatility that happen in particular months. Many ideas have been proposed in an effort to explain these patterns, which have been the focus of much research. The January Effect is one of the most well known month-of-the-year effects, having been initially described by Rozeff and Kinney in 1976. It implies that the January stock index is typically higher than that of other months. Rebalancing of the portfolio and tax-loss selling at the end of the year have been pointed out for this effect.

Ariel (1987), who found that small-cap equities gained more significantly in January than large-cap stocks, did more research on the January Effect. This led to the creation of the

Small Firm in January (SFIJ) effect. The September Effect, sometimes referred to as the "September Syndrome," on the other hand, asserts that stock index prices typically decline in September. Furthermore, Jaffe and Westerfield (1989), who offered theories about the influence of the fiscal year-end on investor behaviour and business budget cycles, carried out a thorough investigation of this phenomenon.

Furthermore, Godwin Olasehinde (2018) found a weak but positive correlation between the stock index and volatility in the BRVM, indicating that investors in the local stock market do not receive a substantial return on their risks.

1.6.3 HOLIDAY EFFECTS

The term "holiday effects" describes how certain special days and occasions affect market returns. Certain holidays, like Christmas and Ramadan, have been linked to anomalous market returns. These may be the result of shifting investor attitudes, a decline in trade, or tax-related factors. Lower trading volumes correlate with these holiday effects, which, can cause volatility to increase and occasionally cause inflated price fluctuations. According to many researchers, holiday effects may change over time due to changes in trading practices and market efficiency.

A holiday staple that is most commonly known is the "Santa Claus Rally." The tendency for stock index prices to increase in the final trading days of December and the first trading days of January is referred by this term. Moreover, the "Sell in May and Go Away" method, often known as the Halloween Indicator, suggests that stock market returns are generally lower in the May–October timeframe than in the November–April timeframe. Bouman and Jacobsen (2002) have presented an extensive investigation of this seasonal trend. They suggested that because of lower trading volumes and decreased liquidity throughout the summer, investors may lessen their exposure to stocks.

Finally, the literature on the impact of the calendar effect on stock index volatility at the BRVM Securities Exchange, as well as in other international markets, emphasises the complexity and diversity of the calendar effect.

CHAPTER TWO: METHODOLOGY

In Chapter 2, we will discuss the methodical approach and techniques applied in our research. We will explain the study's research strategy, data collection procedures, and methods for analysis. We will also talk about research period, which, data sources we used for the analysis. Moreover, this chapter will provide an explanation about the statistical and econometric models that will be utilised to investigate the calendar effect, emphasising its impact on the volatility of the stock index.

2.1 DATA COLLECTION

Comprehensive data collection and preparation are necessary steps in the pursuit of our analysis. In that context, Sika Finance was the principal data source, a well-known financial data supplier with an emphasis on African markets. Sika Finance provides an abundance of historical data, including daily stock index prices, which are critical to achieving the goals of the research. In order to capture any potential calendar effects on stock index volatility, a sizable data covering the period from January 2, 2020, to June 30, 2023, was selected for data collection. In order to generate dummy variables, Excel has been used for each independent variable using the data gathered from SIKA Finance. This period selection is important because it can include a range of economic events and market situations that could affect the volatility of stock index. The study eliminates concerns about data quality by using Sika Finance as the data source, which, guarantees access to precise and trustworthy financial information.

2.2 RESEARCH DESIGN

Our research employs a quantitative and empirical research design. In order to detect, quantify, and understand calendar impacts and their influence on stock index volatility at the BRVM Securities Exchange, quantitative data is gathered and analysed. To investigate the link between calendar-related temporal patterns and stock index volatility over a given historical period, a time-series analysis approach has been used.

2.3 VARIABLES

The figure 1 shows the dependent and independent variables, which will be used in the scope of our study. The "day-of-the-week effect," "month-of-the-year effect," and "holidays effects" are the independent variables. They each represent unique temporal aspects that may affect the stock index volatility at the BRVM Securities Exchange. The term "day-of-the-week effect" describes the regular patterns or irregularities in the stock index that are linked to particular days, like Fridays or Mondays. The "month-of-the-year effect" refers to the analysis of whether specific months show recurring trends in the stock returns. Furthermore, the "holiday's effects" variable aims to understand the ways in which, holidays and other special occasions affect the stock index. As dependent variable, we will use "Stock returns," which, stand for the financial performance of assets traded on stock market.

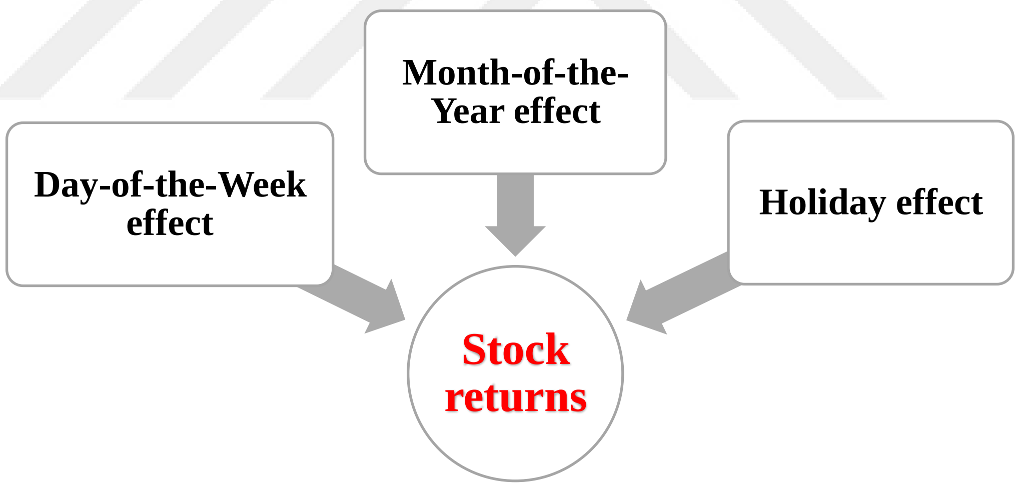


Figure 1: The dependent and independent variables

2.3.1 MEASUREMENT OF STOCK RETURN VOLATILITY

As the dependent variable, measuring stock returns is indispensable for our study. Generally, stock returns provide information about the performance and dynamics of assets in the market. We will determine stock returns by calculating the percentage change in the company's price or stock index price from one trading period to the next, which is one of the most widely, used metrics for assessing stock returns. This method is consistent with Fama and French's (1993) work, which highlights the significance of daily returns in asset pricing models. In terms of maths, the return is calculated as followed:

$$\boldsymbol{Rt} = ln(\frac{Pt}{Pt - 1})$$

Where :

Rt represents the stock returns of day, Month or holidays
Pt represents the closing price of the stock on day, Month or holidays,
Pt−1 is the closing price on the previous trading day, Month or holidays.
ln = the natural logarithm

Depending on the goals of the research, different stock return metrics, such as cumulative returns and logarithmic returns, may be taken into consideration in addition to daily returns. For example, cumulative returns provide information about a stock's overall performance over a given time period, and because of its mathematical characteristics, logarithmic returns are frequently utilized in financial modelling.

2.3.2 DAY-OF-THE-WEEK DUMMIES

French (1980) introduced this method, which includes binary variables for each day of the trading week. These day-of-the-week dummies are used to examine whether specific weekdays show different patterns in the volatility of stock returns. The most prominent of these patterns is the "Monday effect," which, supposes that returns on Mondays are different from those on other trading days. There is a wealth of information on the phenomenon of Monday stock returns being lower than those of other weekdays, as demonstrated by numerous studies. In dummy, each trade day is usually allocated a binary variable, with a value of 1 indicating the existence of that specific day and 0 otherwise, in order to successfully incorporate day-of-the-week dummies. As many authors have experienced, the study on day-of-the-week dummies can provide important details about market anomalies, potential trading methods, and investor psychology. Furthermore, this methodology is consistent with the findings of other scholars, such as Ariel (1987), Gibbons, and Hess (1981), who have investigated the impact of weekdays on stock market behaviour.

2.3.3 MONTH-OF-THE-YEAR DUMMIES

Another independent variable is month-of-the year, which, is essential to understanding how the calendar affects the volatility of stock index at the BRVM Securities Exchange. Manela and Moreira's (2020) recent empirical research has focused on month-of-the-year effects. According to their research, these effects could not be consistent throughout the entire month, highlighting the need to take the particular calendar months into account when examining the volatility of stock index. On the other hand, January tends to show abnormally large returns, as Lakonishok and Smidt (1986) showed. This phenomenon is called the "January effect." This oddity, which, is frequently linked to investor sentiment and tax-related variables, might have an impact on stock return volatility. Furthermore, research by Hameed and Ting (2000) shows that market volatility is generally lower, which, may be related to fewer trades during the summer vacation season. Moreover, Harris's (1986) research indicates that market players might sell for tax reasons at the end of the year, which would raise volatility.

2.3.4 HOLİDAYS DUMMIES

One of the most important aspects of analysing the calendar effect on stock index volatility at the BRVM Securities Exchange is looking at the impact of holiday dummies. Liu, Siganos, and Zhou (2020), who proposed that stock returns over holidays are marked by higher volatility and erratic trading patterns, have studied Holiday-related effects on financial markets recently. Considering the distinct cultural and religious calendar of the West African region in which, the BRVM Securities Exchange is situated, it is crucial to comprehend how holiday affects the volatility of stock return. Interestingly, Ariel (1990) draws attention to the possible "holiday effect," which, is the tendency for market returns to be disproportionately high prior to holidays. This phenomenon is related to the investor’s behaviour, who may exhibit greater optimism before the holidays, resulting in high volatility of stock returns. Furthermore, Kamstra, Kramer, and Levi (2000) present the "Halloween indicator," which, assumes that stock returns tend to be greater during the time that spans multiple holidays from Halloween to May. The observed seasonality in returns. Their finding has been connected to investor attitude and behaviour, which, is one of the factors in stock returns volatility.

2.4 TOOLS AND MODELS

In our analysis, we will first use Microsoft Excel and its features for performing tests, computing returns, coding the dummy variables, and doing descriptive analysis. Then, we will use the statistical software EViews 12 to run linear regression alongside dummy variables and the GARCH family model.

2.4.1 SOFTWARE

2.4.1.1 EXCEL

Developed by Microsoft, Microsoft Excel is a software that serves to organize tasks like data input, financial calculations, statistical evaluations, and data visualization or presentation. MS Excel is widely used in a variety of industries, including finance, accounting, data analysis, and research, because of its ability to efficiently organise and work with data for a wide range of purposes.

2.4.1.2 EVIEWS

An abbreviation for "Econometric Views," is a one of the most commonly used statistical software for econometric modelling and time-series analysis. Its goal is to make processing economic and financial data for a variety of activities, including data analysis, statistical analysis, and predictive modelling, easier for researchers, economists, and data analysts. In our context, we will use ***Eviews12*** to make all the analysis like the unit root test and OLS, GARCH, EGARCH, and TGARCH modelling.

2.4.2 MODELS

2.4.2.1 UNIT ROOT TEST

The unit root test is an analytical method used to assess whether data is stationary and non-stationary. Unit root tests have been widely used in research studies to evaluate stock return stationarity, which, is a fundamental need for conducting meaningful analyses of calendar effects. For instance, Aziakpono, Wilson, and Williams (2009) examined the possibility of unit roots in stock returns from the Johannesburg Stock Exchange (JSE) in the context of African stock markets. They evaluated the stationarity of stock index using the widely used Augmented Dickey-Fuller (ADF) test, which allowed them to move forward with the volatility analysis. In the case of our research, the utilisation of unit root tests is imperative to confirm the stationarity of the stock index data. We assume that will be an important step since the existence of unit roots can affect the reliability of statistical conclusions and the results of other analyses

The ADF test is based on the following formula:

$$\Delta y_t = \rho y_{t-1} + \alpha(\Delta y_{t-1}) + \beta_1 \Delta y_{t-2} + \ldots + \beta_k \Delta y_{t-k} + \varepsilon_t$$

Where:
Δy_t represents the first difference of the time series at time *t*.

ρ is the coefficient to be tested for unit root presence.

α and βi are coefficients.

ε_t is the error term.

2.4.2.2 ORDINARY LEAST SQUARES (OLS)

Ordinary Least Squares (OLS), a popular regression analysis technique is used to evaluate the correlations between variables and provides a strong framework for examining the possible effects of calendar anomalies on the volatility of stock index. Recent studies by Barunik and Kočenda (2016) showed the usefulness of OLS in financial research, especially when examining the connection between calendar impacts and stock market movements. Researchers that want to include variables such as day-of-the-week dummies, month-of-the-year dummies, and holiday dummies in their regression model can do so by using OLS. With this method, the effects of calendar effects on stock index volatility can be measured, with the possibility of providing important insights into the temporal patterns of market dynamics.

The formula for a simple OLS model is as follows:

$$Yi = \beta 0 + \beta 1Xi + \varepsilon i$$

Where:

Yi is the stock returns volatility for the i-th observation.

Xi is the independent variable (calendar effect variables, such as day-of-the-week dummies, month-of-the-year dummies, or holiday dummies) for the i-th observation.

$\beta 0$ is the intercept, representing the expected value of Y when X is 0.

$\beta 1$ is the slope coefficient, representing the change in Y for a one-unit change in X.

εi is the error term, representing the difference between the observed and predicted values of Y.

2.4.2.3 THE GENERALIZED AUTOREGRESSIVE CONDITIONAL HETEROSKEDASTICITY (GARCH)

Given the possibility of heteroscedasticity in financial time series data, after the OLS test, we intend to use Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model. Robert Engle introduced the GARCH model in 1982, and it has since become a crucial tool in the analysis of financial time series data. The GARCH model facilitates the estimation of conditional variances and covariance, which are important in describing the change in stock index volatility over time. Many researchers and practitioners for understanding and forecasting volatility in financial markets used this model, like Emmenike (2016) and Solomon (2016), who used a variant of GARCH (1,1) to assess the calendar effects on the volatility of the stock index on the Nigerian Stock Exchange. They found large differences in volatility between different trading days, attributing it to calendar effects such as the day-of-the-week effect. Alagidede and Panagiotidis (2016) used the GARCH model to estimate the conditional variance to investigate volatility patterns and observed a similar pattern when investigating the calendar effect in African stock markets.

The model is represented by the following formula:

$$\sigma_t^2 = \omega + \alpha\boldsymbol{\varepsilon}_{\boldsymbol{t-1}}^{\boldsymbol{2}} + \boldsymbol{\beta}\sigma_{t-1}^2$$

Where:

σ_t^2 represents the conditional variance of stock returns at time ***t***.

$\boldsymbol{\omega}$ is the constant of the GARCH model.

$\boldsymbol{\alpha}$ and $\boldsymbol{\beta}$ are parameters that account for the persistence and lagged volatility effects, respectively.

$\boldsymbol{\varepsilon}_{\boldsymbol{t-1}}^{\boldsymbol{2}}$ is the squared error term at time ***t-1***.

2.4.2.4 THE EXPONENTIAL GENERALIZED AUTOREGRESSIVE CONDITIONAL HETEROSCEDASTICITY (EGARCH)

Introduced by Nelson in 1991, the EGARCH model is a revised version of the traditional GARCH model. It stands as a useful tool to study market volatility. This model has grown in prominence in the field of financial research because of its exceptional capacity to capture asymmetric and leverage effects in time series data. Nelson's EGARCH model recognises the existence of asymmetry in financial markets by acknowledging that market players frequently respond to positive and negative returns differently. When analysing calendar effects, this attribute is especially important because different days may exhibit different levels of sensitivity to favourable or unfavourable news, events, or trading patterns.

The EGARCH model is expressed by using the following formula:

$$\mathbf{log}(\sigma_t^2) = \boldsymbol{\omega} + \boldsymbol{\alpha}|\varepsilon_{t-1}| + \boldsymbol{\beta}\mathbf{log}(\sigma_{t-1}^2) + \sum^{p}{}_{i=1}\ \gamma i\ \mathbf{log}(\sigma_{t-i}^2)$$

Where:

log(σ_t^2) represents the log conditional variance of stock returns at time ***t***.

ω is the EGARCH model's constant. **α** captures the asymmetric response to past shocks.

β represents the persistence of conditional volatility.

$|\varepsilon_{t-1}|$ is the absolute value of the standardised error term at time ***t-1***.

The term $\sum^{p}_{i=1} \gamma i \log(\sigma^2_{t-i})$ accounts for any additional lag terms.

2.4.2.5 THE THRESHOLD GENERALIZED AUTOREGRESSIVE CONDITIONAL HETEROSCEDASTICITY (TGARCH)

Introduced by Zakoian in 1994, the TGARCH model, an extension of the GARCH framework, is a powerful tool for examining the influence of calendar effects on the volatility of stock indexes. This model incorporates threshold effects, providing a thorough understanding of how market volatility reacts to different circumstances and trading days. This model is renowned for its capacity to capture the nonlinear relationship between returns and volatility, which, is especially relevant when studying calendar effects. It assumes that various market participants may respond differently to good and bad news or events, leading to threshold effects where volatility may change quickly under certain circumstances.

The TGARCH model’s formula is shown as following:

$$\sigma_t^2 = \omega + \alpha\varepsilon^2_{t-1} + \beta\sigma^2_{t-1} + \gamma\sigma^2_{t-1}\mathbf{I}\,[\varepsilon_{t-1<0}]$$

Where:

σ_t^2 represents the conditional variance of stock returns at time ***t***.

ω is the constant of the TGARCH model.

α and ***β*** are parameters representing the persistence and lagged volatility effects, respectively.

ε_{t-1} is the squared error term at time ***t*-1**.

γ represents the threshold effect parameter, and **I** $[\varepsilon_{t-1<0}]$ is an indicator function that activates the threshold effect when the previous error term is negative.

In our research, the application of GARCH, EGARCH, and TGARCH models helps identify accurately the calendar impact. TGARCH captures threshold effects, EGARCH accounts for asymmetry, and GARCH assesses total volatility, providing a comprehensive understanding of how stock index volatility reacts to variations in time periods. By examining the consistency of results across these models, our methodology enhances the robustness of the analysis and facilitates a more reliable interpretation of how calendar effects influence stock return volatility. The combination of GARCH, EGARCH, and TGARCH models enables a thorough investigation into the intricate connection between calendar impacts and stock index volatility at the BRVM Securities Exchange. When assessing the impact of calendar effects on stock index volatility at the BRVM Securities Exchange, the ARCH-LM test is employed to confirm the suitability of model specifications before utilizing more complex volatility models such as GARCH or EGARCH. This ensures adherence to the fundamental premise of constant variance and aligns with the central theme of our thesis, which, seeks to comprehend the temporal dynamics of stock returns.

Furthermore, the ARCH-LM test enhances the overall reliability of our research by reinforcing the validity of subsequent findings regarding the calendar effect on stock index volatility. It provides a statistical foundation for inferences about the presence of heteroscedasticity

2.5 DESCRIPTIVE ANALYSIS

We computed the average, standard deviation, skewness, and kurtosis for the daily and monthly returns in terms of descriptive statistics. After that, we compared and analysed these results, giving particular attention to any significant variations. The results provided an initial view of the dataset and offered insights into the potential presence of seasonal irregularities. Nevertheless, we will conduct additional examinations to validate the existence of any such anomalies.

2.5.1 DAY-OF-THE-WEEK EFFECT

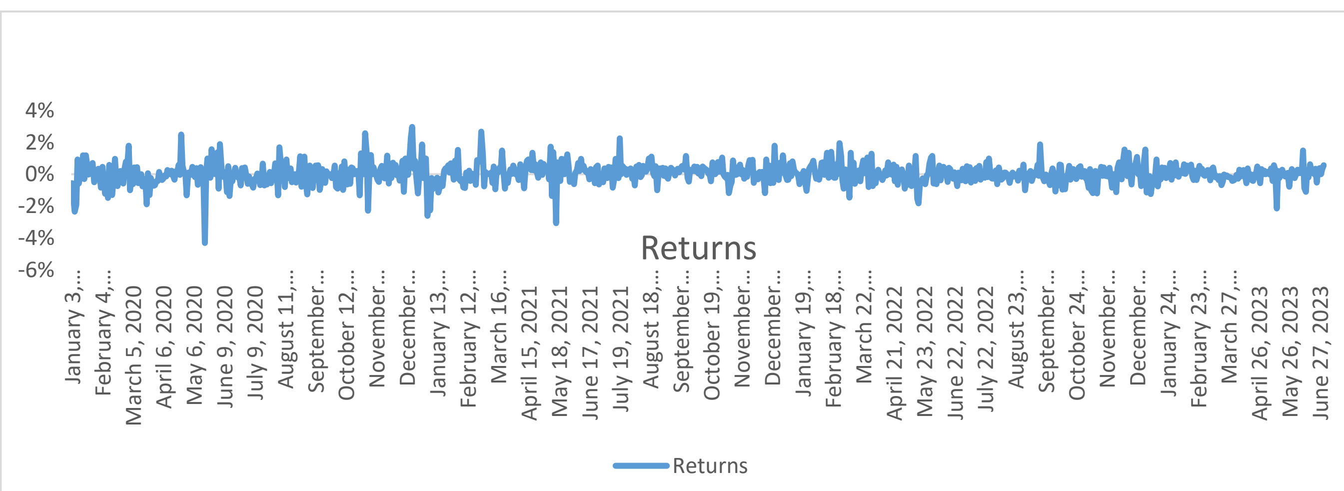
Table 4: Descriptive statistics BRVM Composite daily returns

	MEAN	MODE	STD DEV	MAX	MIN	SKEWNESS	KURTOSIS	OBSERVATION
MONDAY	0.1010242	0	0.30116	1	-0.04309	2.651472	5.038409	182
TUESDAY	0.101024176	0	0.30116	1	-0.04309	2.651472	5.038409	182
WEDNESDAY	0.100472908	0	0.300428	1	-0.04309	2.661599	5.092297	181
THURSDAY	0.100472908	0	0.300428	1	-0.04309	2.661599	5.092297	181
FRIDAY	0.100472908	0	0.300428	1	-0.04309	2.661599	5.092297	181

Source: Author's calculation in Microsoft Excel

This table 04 provides a comprehensive view of the BRVM Composite Index's daily returns sorted by weekdays. The mean daily return remains relatively steady at approximately 0.1004 across the days, indicating consistent average performance throughout the week except Monday and Tuesday, which, play around 0.1010. The mode consistently registers as zero, implying that zero returns are most common in the dataset due to the use of dummy variables. Standard deviations of 0.3012 for Monday and Tuesday, and around 0.3004 for other days suggest similar levels of volatility on these days. The highest daily return is consistently 1, setting an upper limit on index returns, and the minimum return hovers around -0.0431 for all weekdays, indicating limited extreme negative returns. Positive skewness values (approximately 2.6515) across all days suggest a right-skewed distribution, reflecting more positive return days and market optimism. High kurtosis values of about 5.0384 indicate heavier-tailed returns, signifying increased risk and the potential for outlier events. These statistics paint a comprehensive picture of the BRVM Composite Index's daily returns, with stable means, limited extreme negative returns, and signs of market optimism tempered by increased risk and potential outliers.

Figure 2: Daily stock returns



2.5.2 MONTH-OF-THE-YEAR EFFECT

Table 05: Descriptive statistics Brvm composite monthly return

	MEAN	MODE	STD DEV	MAX	MIN	SKEWNESS	KURTOSIS	OBSERVATION
January	0.047025844	0	0.21253	1	-0.04309	4.258328476	16.16146722	85
February	0.044267984	0	0.20656	1	-0.04309	4.407975446	17.46102734	80
March	0.050335276	0	0.219433	1	-0.04309	4.094313243	14.78875901	91
April	0.047025844	0	0.21253	1	-0.04309	4.258328476	16.16146722	85
May	0.046474272	0	0.211352	1	-0.04309	4.287250758	16.40912902	84
June	0.04868056	0	0.216015	1	-0.04309	4.20189475	15.68305873	88
July	0.036545976	0	0.18863	1	-0.04309	4.908364651	22.13302031	66
August	0.036545976	0	0.18863	1	-0.04309	4.908364651	22.13302031	66
September	0.036545976	0	0.18863	1	-0.04309	4.908364651	22.13302031	66
October	0.035442832	0	0.185901	1	-0.04309	4.992190359	22.96485269	64
November	0.035994404	0	0.187271	1	-0.04309	4.949820026	22.54263263	65
December	0.03764912	0	0.191313	1	-0.04309	4.828066493	21.34942881	68

Source: Author's calculation in Microsoft Excel

The Table 05 presents a comprehensive analysis of monthly returns in the BRVM Composite Index and shows the index's performance throughout the year.

While monthly average returns vary slightly, with peaks in January, March, April and June then lows in the rest of the months, the mode consistently registers zero, indicating the most frequent return value across all months.

Monthly standard deviations fluctuate; there is high volatility from January to june and low volatility from July to December. Maximum monthly returns remain at 1, while the minimum return stays around -0.0431, ensuring that even less favourable months don't yield extreme negative returns. Positive skewness values across all months indicate right-skewed distributions, reflecting a relatively higher occurrence of positive returns and a degree of market optimism.

High kurtosis values signify heavy-tailed return distributions, indicating increased risk and the potential for extreme market events. These statistics provide a detailed view of monthly returns in the BRVM Composite Index, revealing variations in average returns, right-skewed distributions, and a risk profile with potential for extreme market events, offering valuable insights for informed decision-making and risk assessment throughout the year.

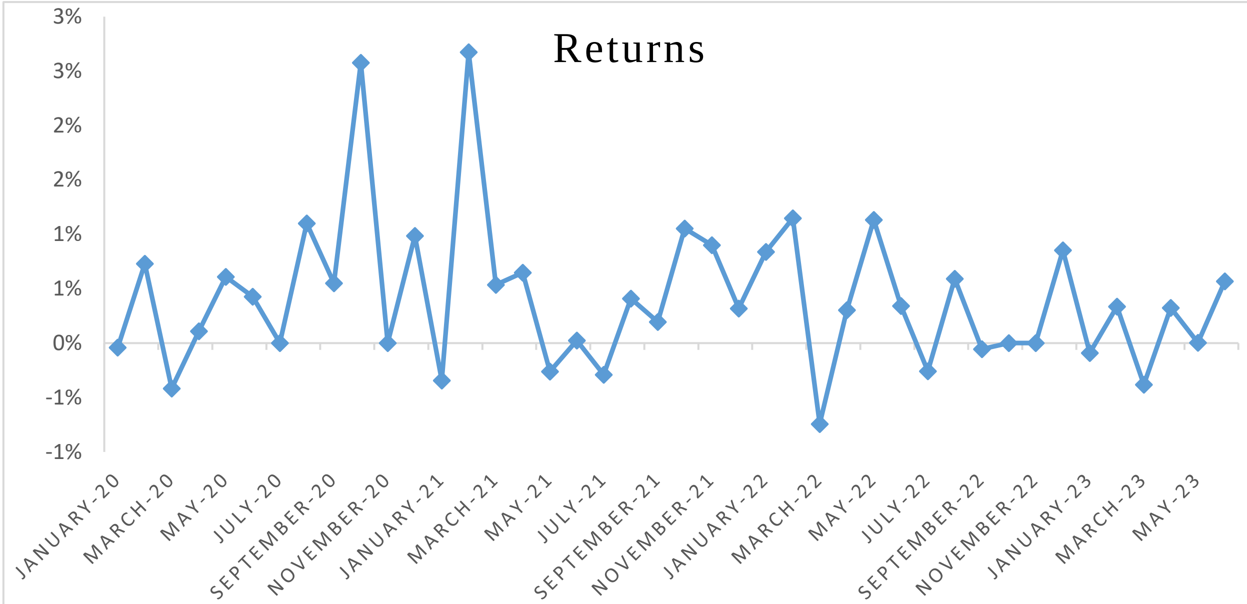


Figure 03: Monthly stock returns

2.5.3 HOLIDAY EFFECTS

Table 06 : Descriptive statistics Brvm composite index holidays returns

	MEAN	MODE	STD DEV	MAX	MIN	SKEWNESS	KURTOSIS	OBSERVATION
Holidays	0.001797	0	0.047122	1	-0.04309	20.93585	441.0113	3

Source: Author's calculation in Microsoft Excel

Table 06 delves into the descriptive statistics of the "Holidays" dataset, shedding light on its key features. The mean of 0.001797 suggests a slight positive deviation during holidays, possibly reflecting holiday-specific patterns, while the mode of zero highlights its recurrent presence. The standard deviation of 0.047122 indicates moderate variability around the mean, emphasising notable dispersion in the dataset's data points during holidays. The maximum value of 1 signifies the upper limit, alerting to potential exceptional values, and the minimum of -0.04309 shows that the dataset occasionally exhibits slightly negative values even during holidays. A strikingly high positive skewness value of 20.93585 points to an extreme right-skewed distribution, with a strong inclination towards positive values and limited negative values during holidays. The kurtosis value of 441.0113 underlines the substantial presence of heavy tails, indicating the potential for extreme values during holiday periods, which, is crucial for risk assessment.

2.6 UNIT ROOT TEST

2.6.1 DAY-OF-THE-WEEK

Table 7: Unit Root Test for daily Return

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-28.26019	0.0000
Test critical values:	1% level	-3.437353	
	5% level	-2.864521	
	10% level	-2.568410	

Source: Author's calculation on Eviews

Null hypothesis: Daily return have unit root

Alternative hypothesis: Daily return do not have unit root

As shown in the table 07, the Augmented Dickey-Fuller statistics indicate daily return is significant at level and intercept with a probability of less than 5%. Therefore, we reject the null hypothesis and accept the alternative hypothesis, suggesting that the returns lack a unit root. Consequently, there is no requirement for differencing, which is a favourable condition for modelling the returns.

2.6.2 MONTH-OF-THE-YEAR

Table 8: Unit Root Test for Monthly return

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.415625	0.0000
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

Source: Author's calculation on Eviews

Null hypothesis: Daily return have unit root

Alternative hypothesis: Daily return do not have unit root

As shown in the table 08, the Augmented Dickey-Fuller statistics indicate monthly return is significant at level and intercept with a probability of less than 5%. Therefore, we reject the null hypothesis and accept the alternative hypothesis, suggesting that the returns lack a unit root. Consequently, there is no requirement for differencing, which is a favourable condition for modelling the returns.

2.7 ORDINARY LINEAR SQUARES (OLS)

2.7.1 DAY OF THE WEEK

We conducted the least squares test in order to examine the relationship between different weekdays and their impact on daily stock returns by using dummy variables. In conducting the econometric analysis, each day was analysed separately to assess its individual impact. Due to the extensive nature of the analysis, the results have been summarised in Table.

Table 9*:* Ordinary Least Squares Test for day of the week variable

Variables	Coefficient	Std Error	T-Statistic	Prob.
Monday	-0.001291	0.000498	-2.593744	0.0096
Tuesday	-0.000600	0.000572	-1.049485	0.2942
Wednesday	8.58E-05	0.000556	0.154326	0.8774
Thursday	0.000689	0.000573	1.202760	0.2294
Friday	0.001130	0.000526	2.147765	0.0320

Source: Author's calculation on Eviews

The table 9 shows that the p-values for the Monday (0.0096) and Friday (0.0320) effects are all less than 0.05. This indicates that these days have statistically significant effects on daily stock index at the BRVM Securities Exchange. In contrast, the p-value for the Tuesday (0.2942), Wednesday (0.8774) and Thursday (0.2294) effect is greater than 0.05, suggesting these days do not have a statistically significant impact on stock index. Therefore, we reject the null hypothesis and accept the alternative hypothesis, suggesting that the day of the week has significant effect on stock index volatility at the BRVM Securities Exchange.

2.7.2 MONTH OF THE YEAR

We conducted the least squares test in order to examine the relationship between different months and their impact on stock returns by using dummy variables. In conducting the econometric analysis, each month was analysed separately to assess its individual impact. Due to the extensive nature of the analysis, the results have been summarised in Table.

Table 10: Ordinary Least Squares Test for month of the year

VARIABLES	COEFFICIENT	STD ERROR	T-STATISTIC	PROB.
January	-0,001917	0.000241	-2.808211	0.0051
February	0.001058	0.000759	1.394570	0.1635
March	-0.001511	0.000781	-1.935044	0.0533
April	0.000713	0.001024	0.695723	0.4868
May	-0.000673	0.000652	-1.031619	0.3025
June	0.000173	0.000915	0.189236	0.8500
July	-0.000211	0.001089	-0.193720	0.8464
August	-0.0000211	0.001089	-0.193720	0.8464
September	-0.000283	0.001143	-0.247281	0.8047
October	0.000623	0.000912	0.683012	0.4948
November	-0.000431	0.000934	-0.461873	0.6443
December	0.002590	0.000727	3.564289	0.0004

Source: Author's calculation on Eviews

The table 10 shows that the p-values for the January (0.0051) and December (0.0004) effects are all less than 0.05. This indicates that these months of the year have statistically significant effects on daily stock index at the BRVM Securities Exchange. In contrast, the p-value for the February (0.1635), March (0.0533), April (0.4868), May (0.3025), June (0.8500), July (0.8464), August (0.8464), September (0.8047), October (0.4948) and November (0.6443) effect is greater than 0.05, suggesting that they do not have a statistically significant impact on stock index. Therefore, we reject the null hypothesis and accept the alternative hypothesis, suggesting that the day of the week has significant effect on stock index volatility at the BRVM Securities Exchange.

2.7.3 HOLİDAYS

We conducted the least squares test in order to investigate the relationship between holidays and their impact on stock index by using dummy variables.

Table 11: Ordinary Least Squares Test for holidays

Variables	Coefficient	Std Error	T-Statistic	Prob.
Holidays	0.002720	0.004225	0.643709	0.5199

Source: Author's calculation on Eviews

The p-value for the holidays (0.5199) effect is greater than 0.05, suggesting that they do not have a statistically significant impact on stock index. Therefore, we reject the alternative hypothesis and accept the null hypothesis, suggesting that the holidays has no significant effect of holidays on stock index volatility at the BRVM Securities Exchange.

2.8 AUTOREGRESSIVE INTEGRATED MOVING AVERAGE (ARIMA)

In our research, we assume that it is essential to do automatic ARIMA forecasting prior to applying GARCH models because it breaks down time series into its constituent parts, which, reduces data complexity and gets it ready for GARCH modelling.

Table 12: Automatic ARIMA forecasting for daily, monthly and holidays returns

Number of estimated ARMA models	25
Number of non-converged estimations	0
Selected ARMA model	(3,3) (0,0)

Source: Author's calculation on Eviews

The ARMA results are shown in Table 12, where a specific autoregressive (AR) component of 3.3 is indicated. The ARIMA model reveals three moving average components and three autoregressive components.

2.9 GARCH ANALYSIS

2.9.1 DAY-OF-THE-WEEK EFFECT

In conducting the econometric analysis, each day of the week was analysed separately to assess its individual impact. Due to the extensive nature of the analysis, the results have been summarised in Table.

Table 13: GARCH for Day of the week on BRVM Composite index

Variables	Coefficient	Std Error	T-Statistic	Prob.
Monday	0.0000141	0.00000232	6.083670	0.0000
Tuesday	-0.0000230	0.00000268	-8.589070	0.0000
Wednesday	-0.0000120	0.00000334	-3.584141	0.0003
Thursday	0.00000189	0.00000386	0.490549	0.6237
Friday	0.0000166	0.00000302	5.506595	0.0000

Source: Author's calculation on Eviews

The table. 13 shows the results of GARCH (1,1) test which, reveals that Monday and Friday have significant impact on increasing stock index volatility as indicated the coefficient (0.0000141, 0.00000189) and Prob-value respectively, while Tuesday and Wednesday have significant impact and negative relationship with stock index volatility. In contrast, Thursday exhibits has no statistically significant impact on stock index volatility (Prob-value: 0.6237 >0.05)

Diagnostic test-GARCH (1, 1) model

TESTING FOR ARCH EFFECT IN THE GARCH MODEL

Table 14: ARCH test results GARCH (1.1)

Monday	F-statistic	0.330523	Prob. F(2,898)	0.7186
	Obs*R-squared	0.662766	Prob. Chi-Square (2)	0.7179
Tuesday	F-statistic	0.242153	Prob. F(2,898)	0.7850
	Obs*R-squared	0.485662	Prob. Chi-Square (2)	0.7844
Wednesday	F-statistic	0.236244	Prob. F(2,898)	0.7896
	Obs*R-squared	0.473818	Prob. Chi-Square (2)	0.7891
Thursday	F-statistic	0.152246	Prob. F(2,898)	0.8588
	Obs*R-squared	0.305407	Prob. Chi-Square (2)	0.8584
Friday	F-statistic	0.233751	Prob. F(2,898)	0.7916
	Obs*R-squared	0.468819	Prob. Chi-Square (2)	0.7910

Source: Author's calculation on Eviews

The table 14 shows the results of ARCH LM test that we used to investigate the presence of autocorrelation in squared residuals, thereby assessing the adequacy of the GARCH model in capturing volatility patterns for each weekday (Monday, Tuesday, Wednesday, Thursday, and Friday). We can observe consistently low F-statistic and Obs*R-squared values, coupled with high associated p-values for all weekdays. Thus, there is no statistically significant autocorrelation in squared residuals for any of the weekdays, indicating that the GARCH model effectively captures volatility patterns.

Table 15: TGARCH for Day of the week on BRVM Composite index

Variables	Coefficient	Std Error	z-Statistic	Prob.
Monday	0.0000161	0.00000309	5.203084	0.0000
Tuesday	-0.0000140	0.00000300	-4.672124	0.0000
Wednesday	-0.0000120	0.00000334	-3.58141	0.0003
Thursday	-0.00000821	0.00000254	-3.232756	0.0012
Friday	0.0000156	0.00000316	4.950894	0.0000

Source: Author's calculation on Eviews

The table 15 shows the results of TGARCH (1, 1) test, which indicate that all weekdays, have a significant impact on stock index volatility with the prob-value less than 0.05. However, Mondays(0.0000161) and Friday(0.0000156) exhibit a significant positive impact, indicating increased volatility following prior market shocks, while Tuesdays(-0.0000140), Wednesdays(-0.0000120), and Thursdays(-0.00000821) show negative effects, suggesting decreased volatility on these days after past shocks.

Diagnostic test-TGARCH (1,1) model

Testing for ARCH effect in the T-GARCH model

Table 16: ARCH test results T-GARCH (1.1)

Monday	F-statistic	6.106768	Prob. F(2,898)	0.0023
	Obs*R-squared	12.08990	Prob. Chi-Square (2)	0.0024
Tuesday	F-statistic	5.757079	Prob. F(2,898)	0.0033
	Obs*R-squared	11.40637	Prob. Chi-Square (2)	0.0033
Wednesday	F-statistic	0.426211	Prob. F(2,898)	0.6531
	Obs*R-squared	0.854458	Prob. Chi-Square (2)	0.6523
Thursday	F-statistic	5.038747	Prob. F(2,898)	0.0067
	Obs*R-squared	9.998950	Prob. Chi-Square (2)	0.0067
Friday	F-statistic	0.405422	Prob. F(2,898)	0.6668
	Obs*R-squared	0.812819	Prob. Chi-Square (2)	0.6660

Source: Author's calculation on Eviews

The table 16 shows the results of ARCH LM test that we used to investigate the presence of autocorrelation in squared residuals, thereby assessing the adequacy of the TGARCH model in capturing volatility patterns for Wednesday and Friday, as indicated by the p-values (0.6531, 0.6668) associated with the F-statistics for those days. These findings suggest that the TGARCH model successfully accounts for conditional volatility patterns on these specific weekdays. However, the model appears to face challenges in capturing volatility dynamics on Monday, Tuesday, and Thursday with p values less than 0.05. This contrast with the TGARCH model's conclusions suggests that the model do not adequately capture the autocorrelation patterns for these weekdays.

Table 17: EGARCH for Day of the week on BRVM Composite index

Variables	Coefficient	Std Error	z-Statistic	Prob.
Monday	0.424308	0.0088592	4.789437	0.0000
Tuesday	-0.641768	0.119308	-5.379107	0.0000
Wednesday	-0.094965	0.110177	-0.861934	0.3887
Thursday	0.034776	0.119274	0.291561	0.7706
Friday	0.301688	0.096490	3.126615	0.0018

Source: Author's calculation on Eviews

The table 17 shows the results of EGARCH (1,1) test, which indicate the intricate patterns of weekday-specific effects on stock index volatility at BRVM Securities Exchange. As demonstrated by the large coefficient (0.424308 and 0.301688) and the P-value (0.0000 and 0.0018), which, is less than 5% significance level, Monday and Friday show a strong positive impact and increased volatility. Tuesday, on the other hand, shows a significant negative influence, indicating lower volatility as evidenced by the P-value (0.0000), which, is below than the 5% significance level, and the coefficient (-0.641768). Conversely, Wednesday and Thursday seem to have little bearing on volatility; their respective Prob-values are 0.7706 and 0.33887, which are non-significant at the 5% significance level.

Diagnostic test-EGARCH (1,1) model

Testing for ARCH effect in the E-GARCH model

Table 18 : ARCH test results E-GARCH (1.1)

MONDAY	F-statistic	6.574413	Prob. F(2,898)	0.0015
	Obs*R-squared	13.00237	Prob. Chi-Square (2)	0.0015
TUESDAY	F-statistic	1.011350	Prob. F(2,898)	0.3641
	Obs*R-squared	2.024896	Prob. Chi-Square (2)	0.3633
WEDNESDAY	F-statistic	0.649952	Prob. F(2,898)	0.5223
	Obs*R-squared	1.302361	Prob. Chi-Square (2)	0.5214
THURSDAY	F-statistic	0.639445	Prob. F(2,898)	0.5278
	Obs*R-squared	1.281337	Prob. Chi-Square (2)	0.5269
FRIDAY	F-statistic	0.655200	Prob. F(2,898)	0.5196
	Obs*R-squared	1.312862	Prob. Chi-Square (2)	0.5187

Source: Author's calculation on Eviews

The EGARCH (1, 1) model's diagnostic tests show complex patterns. As indicated in table 18, Mondays exhibit a low p-value and a significant F-statistic, showing increased conditional volatility and the presence of ARCH effects. In contrast, non-significant F-statistics and higher p-values are noticed on Tuesdays, Wednesdays, Thursdays, and Fridays, indicating that there is not be any significant ARCH effects on these weekdays. The non-significant results for the remaining weekdays, however, might point to a restriction in the model's capacity to represent the dynamics of volatility on those particular days.

2.9.2 MONTH OF YEAR

In conducting the econometric analysis, each month of the week was analysed separately to assess its individual impact. Due to the extensive nature of the analysis, the results have been summarised in Table.

Table 19 : GARCH for Month of year effect on BRVM Composite index

Variables	Coefficient	Std Error	T-Statistic	Prob.
JAN	-0.00000327	0.00000185	-1.773665	0.0761
FEV	0.00000315	0.00000213	1.474187	0.1404
MAR	-0.00000254	0.00000115	-2.212693	0.0269
APR	-0.00000289	0.00000103	-2.798528	0.0051
MAY	0.00000148	0.00000283	5.218760	0.0000
JUN	-0.00000402	0.00000101	-3.973992	0.0001
JUL	-0.00000218	0.00000150	-1.451694	0.1466
AUG	-0.00000218	0.00000150	-1.451694	0.1466
SEP	-0.00000327	0.00000122	-2.692525	0.0071
OCT	-0.00000161	0.00000157	-1.021286	0.3071
NOV	-0.00000225	0.00000195	-1.151626	0.2495
DEC	0.0000114	0.00000526	2.163472	0.0305

Source: Author’s calculation on Eviews

According to the results of GARCH (1,1) test January, February, July, August, October and November do not have significant effect on stock index as indicated by coefficients and prob-value in table 19 with Prob value more than 5%. Conversely, March, April, June and September also demonstrate statistically significant negative coefficients, suggesting potential periods of decreased market volatility. Similarly, May and December display significant positive coefficients, indicating an uptick in volatility.

Diagnostic test-GARCH (1,1) model

Testing for ARCH effect in the GARCH model

Table 20: ARCH test results GARCH (1.1)

JAN	F-statistic	0.165625	Prob. F(2,898)	0.8474
	Obs*R-squared	0.332235	Prob. Chi-Square (2)	0.8469
FEV	F-statistic	0.159848	Prob. F(2,898)	0.8523
	Obs*R-squared	0.320650	Prob. Chi-Square (2)	0.8519
MAR	F-statistic	0.169190	Prob. F(2,898)	0.8444
	Obs*R-squared	0.339383	Prob. Chi-Square (2)	0.8439
APR	F-statistic	0.220233	Prob. F(2,898)	0.8024
	Obs*R-squared	0.441720	Prob. Chi-Square (2)	0.8018
MAY	F-statistic	0.389751	Prob. F(2,898)	0.6773
	Obs*R-squared	0.781428	Prob. Chi-Square (2)	0.6766
JUN	F-statistic	0.178310	Prob. F(2,898)	0.8367
	Obs*R-squared	0.357669	Prob. Chi-Square (2)	0.8362
JUL	F-statistic	0.185851	Prob. F(2,898)	0.8304
	Obs*R-squared	0.372790	Prob. Chi-Square (2)	0.8299
AUG	F-statistic	0.173435	Prob. F(2,898)	0.8408
	Obs*R-squared	0.347891	Prob. Chi-Square (2)	0.8403
SEP	F-statistic	0.205448	Prob. F(2,898)	0.8143
	Obs*R-squared	0.412080	Prob. Chi-Square (2)	0.8138
OCT	F-statistic	0.166584	Prob. F(2,898)	0.8466
	Obs*R-squared	0.334157	Prob. Chi-Square (2)	0.8461
NOV	F-statistic	0.172102	Prob. F(2,898)	0.8419
	Obs*R-squared	0.345221	Prob. Chi-Square (2)	0.8415
DEC	F-statistic	0.316637	Prob. F(2,898)	0.7287
	Obs*R-squared	0.634943	Prob. Chi-Square (2)	0.7280

Source: Author's calculation on Eviews

The table 20 shows The ARCH LM tests which, were conducted for each month (January through December) to examine the presence of conditional heteroscedasticity in the residuals. The results indicate that there is no significant evidence of conditional heteroscedasticity in the residuals for any of the months. For all months, the F-statistics are relatively low, and the associated p-values (Prob. F(2,898) are high, well above the typical significance level of 0.05. Additionally, the Obs*R-squared statistics and their associated p-values (Prob. Chi-Square (2)) also suggest the absence of conditional heteroscedasticity in the residuals. That is to say, the GARCH model effectively captures and models the volatility patterns in the data for each month, and there is no compelling evidence of time-varying volatility within the individual months.

Table 21: TGARCH for Month of year effect on BRVM Composite index

Variables	Coefficient	Std Error	T-Statistic	Prob.
JAN	-0.00000238	0.00000185	-1.285354	0.1987
FEV	0.00000241	0.00000224	1.075728	0.2820
MAR	-0.00000149	0.00000111	-1.347627	0.7972
APR	-0.00000372	0.00000106	-3.523334	0.0004
MAY	0.0000136	0.00000241	5.661343	0.0000
JUN	0.0000300	0.00000685	-4.382595	0.0000
JUL	-0.0000183	0.00000167	-1.100057	0.2713
AUG	-0.0000183	0.00000121	-3.181502	0.0015
SEP	-0.0000383	0.00000167	-1.100057	0.2713
OCT	-0.0000931	0.00000172	-0.542441	0.5875
NOV	-0.0000125	0.00000198	-0.634040	0.5261
DEC	0.0000965	0.00000518	1.860511	0.0628

Source: Author's calculation on Eviews

According to the results of TGARCH (1,1) test January, February, March, July, September, October, November, and December, demonstrate non-significant impact on stock index, as indicated by coefficients and prob-value in table 21 with Prob value more than 5%. On the other hand, April stands out with a statistically significant negative coefficient, suggesting a potential decrease in volatility, while May and June show significant positive coefficients, indicating a potential increase in volatility during these months. August also stands out with a highly significant negative coefficient, suggesting a substantial decrease in volatility.

Diagnostic test-TGARCH (1,1) model

Testing for ARCH effect in the T-GARCH model

Table 22: ARCH test results T-GARCH (1.1)

JAN	F-statistic	0.324924	Prob. F(2,898)	0.7227
	Obs*R-squared	0.651547	Prob. Chi-Square (2)	0.7720
FEV	F-statistic	0.336109	Prob. F(2,898)	0.7146
	Obs*R-squared	0.673959	Prob. Chi-Square (2)	0.7139
MAR	F-statistic	0.340864	Prob. F(2,898)	0.7112
	Obs*R-squared	0.683487	Prob. Chi-Square (2)	0.7105
APR	F-statistic	0.220223	Prob. F(2,898)	0.8024
	Obs*R-squared	0.441720	Prob. Chi-Square (2)	0.8018
MAY	F-statistic	0.632042	Prob. F(2,898)	0.5317
	Obs*R-squared	1.266524	Prob. Chi-Square (2)	0.5309

JUN	F-statistic	0.596927	Prob. F(2,898)	0.5507
	Obs*R-squared	1.196253	Prob. Chi-Square (2)	0.5498
JUL	F-statistic	0.357608	Prob. F(2,898)	0.6944
	Obs*R-squared	0.717034	Prob. Chi-Square (2)	0.6987
AUG	F-statistic	4.465793	Prob. F(2,898)	0.0118
	Obs*R-squared	8.873363	Prob. Chi-Square (2)	0.0118
SEP	F-statistic	0.447858	Prob. F(2,898)	0.6391
	Obs*R-squared	0.897813	Prob. Chi-Square (2)	0.6383
OCT	F-statistic	0.325584	Prob. F(2,898)	0.7222
	Obs*R-squared	0.652870	Prob. Chi-Square (2)	0.7215
NOV	F-statistic	0.335414	Prob. F(2,898)	0.7151
	Obs*R-squared	0.672566	Prob. Chi-Square (2)	0.7144
DEC	F-statistic	0.459310	Prob. F(2,898)	0.6319
	Obs*R-squared	0.920748	Prob. Chi-Square (2)	0.6310

Source: Author's calculation on Eviews

According to the results of the ARCH LM test, January, February, March, April, May, June, July, September, October, November and December display non-significant F-statistics, suggesting a lack of evidence for ARCH effects during these months as shown in the table 22**.** In contrast, there is a presence of conditional heteroscedasticity in the residuals for August as indicated a highly significant F-statistic and a low p-value of 0.0118.

Table 23: EGARCH for Month of year effect on BRVM Composite index

Variables	Coefficient	Std Error	T-Statistic	Prob.
JAN	-0.041272	0.046410	-0.889296	0.3738
FEV	0.037211	0.042574	0.874010	0.3821
MAR	-0.050335	0.028221	-1.783629	0.0745
APR	-0.103138	0.037217	-2.771272	0.0056
MAY	0.221861	0.035020	6.335208	0.0000
JUN	-0.110115	0.027595	-3.990317	0.0001
JUL	-0.047088	0.045580	-1.033080	0.3016
AUG	-0.047088	0.045580	-1.033080	0.3016
SEP	-0.106238	0.042283	-2.512533	0.0120
OCT	-0.008579	0.043045	-0.199309	0.8420
NOV	-0.043583	0.050923	-0.855854	0.3921
DEC	0.158851	0.065002	2.443789	0.0145

Source: Author's calculation on Eviews

According to the results of TGARCH (1,1) test January, February, March, July, August, October and November, demonstrate non-significant impact on stock index, as indicated by coefficients and prob-value in table 23 with Prob value more than 5%. On the other hand, April, June and September stand out with a statistically significant negative coefficient, suggesting a potential decrease in volatility, while May and December show significant positive coefficients, indicating a potential increase in volatility during these months.

Diagnostic test-EGARCH (1,1) model

Testing for ARCH effect in the E-GARCH model

Table 24: ARCH test results E-GARCH (1.1**)**

JAN	F-statistic	0.664142	Prob. F(2,898)	0.5150
	Obs*R-squared	1.330753	Prob. Chi-Square (2)	0.5141
FEV	F-statistic	6.206794	Prob. F(2,898)	0.0021
	Obs*R-squared	12.28565	Prob. Chi-Square (2)	0.0021
MAR	F-statistic	0.735927	Prob. F(2,898)	0.4793
	Obs*R-squared	1.474355	Prob. Chi-Square (2)	0.4785
APR	F-statistic	0.816531	Prob. F(2,898)	0.4423
	Obs*R-squared	1.635543	Prob. Chi-Square (2)	0.4414
MAY	F-statistic	1.163240	Prob. F(2,898)	0.3129
	Obs*R-squared	2.328220	Prob. Chi-Square (2)	0.3122
JUN	F-statistic	1.019265	Prob. F(2,898)	0.3613
	Obs*R-squared	2.040708	Prob. Chi-Square (2)	0.3605
JUL	F-statistic	0.638164	Prob. F(2,898)	0.5285
	Obs*R-squared	1.278774	Prob. Chi-Square (2)	0.5276
AUG	F-statistic	0.638164	Prob. F(2,898)	0.5285
	Obs*R-squared	1.278774	Prob. Chi-Square (2)	0.5276
SEP	F-statistic	0.773946	Prob. F(2,898)	0.4615
	Obs*R-squared	1.550391	Prob. Chi-Square (2)	0.4606
OCT	F-statistic	0.639986	Prob. F(2,898)	0.5275
	Obs*R-squared	1.282419	Prob. Chi-Square (2)	0.5267
NOV	F-statistic	0.635050	Prob. F(2,898)	0.5301
	Obs*R-squared	1.272544	Prob. Chi-Square (2)	0.5293
DEC	F-statistic	0.842392	Prob. F(2,898)	0.4310
	Obs*R-squared	1.687246	Prob. Chi-Square (2)	0.4301

Source: Author's calculation on Eviews

According to the results of the ARCH LM test, January, March, April, May, June, July, August, September, October, November and December display non-significant F-statistics, suggesting a lack of evidence for ARCH effects during these months as shown in the table 24. In contrast, there is a presence of conditional heteroscedasticity in the residuals for February as indicated a highly significant F-statistic and a low p-value of 0.0021.

2.9.3 HOLİDAYS

Table 25: GARCH for Holidays effect on BRVM Composite index

Variables	**Coefficient**	**Std Error**	**T-Statistic**	Prob.
HOLIDAYS	-0.000244	0.000138	1.763792	0.0778

Source: Author's calculation on Eviews

The table 25 shows the results of GARCH (1,1) test, which indicate varying effects of holidays on stock index volatility. The GARCH analysis conducted on the holiday's effect variable reveals a coefficient of -0.000244. However, the associated statistical tests, particularly the t-statistic with a value of 1.763792 and the p-value of 0.0778, do not provide statistically significant evidence to support the notion that holidays exert a substantial impact on stock returns within the framework of this GARCH model.

Diagnostic test-GARCH (1,1) model

Testing for ARCH effect in the GARCH model
Table 26: ARCH test results GARCH (1.1)
Heteroskedasticity Test ARCH

HOLIDAYS	F-statistic	0.110336	Prob. F(2,898)	0.8955
	Obs*R-squared	0.221354	Prob. Chi-Square (2)	0.8952

Source: Author's calculation on Eviews

The table 26 suggest that the ARCH LM test for the holiday's effect is not statistically significant at conventional significance levels. The elevated p-value for the F-statistic (0.8955) implies a lack of compelling evidence supporting the presence of autoregressive conditional heteroscedasticity (ARCH effects) in the residuals linked to the holiday's effect within the GARCH model. Consequently, based on the results of the ARCH LM test, it does not appear that the holiday's effect is associated with substantial ARCH effects within the model's residuals.

Table 27: TGARCH for Holidays effect on BRVM Composite index

Variables	Coefficient	Std Error	z-Statistic	Prob.
HOLIDAYS	0.000237	0.000133	1.780668	0.0750

Source: Author's calculation on Eviews

The table 27 shows the results of TGARCH (1,1) test, which indicate varying effects of holidays on stock index volatility. The results reveal a coefficient of 0.000237, the z-statistic is 1.780668, and the associated p-value (Prob.) is 0.0750. Given that the p-value substantially exceeds the conventional significance level (e.g., 0.05), there is no statistically significant evidence to suggest that holidays exert a significant impact on stock returns volatility within this TGARCH model. In simpler terms, the holiday's effect variable does not appear to significantly influence stock returns volatility in our analysis employing the TGARCH model.

Diagnostic test-TGARCH (1,1) model

TESTING FOR ARCH EFFECT IN THE T-GARCH MODEL

Table 28: ARCH test results T-GARCH (1.1)
Heteroskedasticity Test ARCH

HOLIDAYS	**F-statistic**	0.254813	**Prob. F(2,901)**	0.7751
	Obs*R-squared	0.511039	Prob. Chi-Square (2)	0.7745

Source: Author's calculation on Eviews

The table 28 suggest that the ARCH LM test for the holiday's effect is not statistically significant at conventional significance levels. The elevated p-value for the F-statistic (0.7751) implies a lack of compelling evidence supporting the presence of autoregressive conditional heteroscedasticity (ARCH effects) in the residuals linked to the holiday's effect within the TGARCH model. Consequently, based on the results of the ARCH LM test, it does not appear that the holiday's effect is associated with substantial ARCH effects within the model's residuals.

Table 29: EGARCH for Holidays effect on BRVM Composite index

Variables	Coefficient	Std Error	z-Statistic	Prob.
HOLIDAYS	1.213922	0.438405	2.768951	0.0056

Source: Author's calculation on Eviews

The table 29 shows the results of EGARCH (1,1) test, which, indicate varying effects of holidays on stock index volatility. The Holidays effect coefficient is 1.213922, signifying a positive impact on stock returns' volatility during holidays. With a z-Statistic of 2.768951, statistically significant at the 0.05 significance level, and a low associated p-value of 0.0056, the results confirm that holidays increase stock returns' volatility.

Diagnostic test-EGARCH (1,1) model

Testing for ARCH effect in the E-GARCH model

Table 30: ARCH test results E-GARCH (1.1)

HOLIDAYS	**F-statistic**	0.413626	**Prob. F(2,901)**	0.6614
	Obs*R-squared	0.829252	Prob. Chi-Square (2)	0.6606

Source: Author's calculation on Eviews

The table 30 suggest that the ARCH LM test for the holiday's effect is not statistically significant at conventional significance levels. The p-value (0.6614) implies a lack of compelling evidence supporting the presence of autoregressive conditional heteroscedasticity (ARCH effects) in the residuals linked to the holiday's effect within the EGARCH model. Consequently, based on the results of the ARCH LM test, it does not appear that the holiday's effect is associated with substantial ARCH effects within the model's residuals.

CHAPTER THREE: RESULTS AND DISCUSSION

This chapter includes the study's findings, comparison to international markets, and research limitations.

3.1 SUMMARY OF FINDINGS

In our analysis of stock index volatility at the BRVM Securities Exchange, the descriptive statistics reveal a stable mean daily return throughout the week, with Mondays and Tuesdays showing exceptions. The Positive skewness values indicate a right-skewed distribution, reflecting market optimism, while high kurtosis values signal a high risk and potential outlier events. Additionally, monthly average returns show slight variations, peaking in months like January, March, April, and June, and reaching lows in the remaining months. The Positive skewness values across all months indicate right-skewed distributions, suggesting a relatively higher occurrence of positive returns and a degree of market optimism. High kurtosis values underscore heavy-tailed return distributions, pointing to increased risk and the potential for extreme market events. Furthermore, the mean suggests a slight positive deviation during holidays, possibly reflecting holiday-specific patterns. A remarkably high positive skewness value points to an extremely right-skewed distribution, indicating a strong inclination toward positive values and limited negative values during holidays. The kurtosis value highlights the substantial presence of heavy tails, indicating the potential for extreme values during holiday periods, crucial for risk assessment. To verify the stationarity of the stock index data, we conducted unit root tests. According to the ADF statistics, the null hypothesis is rejected on day-of-the-week and month-of-the-week, indicating a lack of unit root, hence confirming the stability of the modelling. After the unit root test, we conducted OLS to evaluate the correlations between our independent variables and stock returns. The results of the OLS test show that Mondays (with a negative coefficient) and Fridays (with a positive coefficient) have statistically significant effects on the daily stock index at the BRVM Securities Exchange. The influence of Tuesdays, Wednesdays, and Thursdays on stock returns is not statistically significant. Moreover, statistically significant effects are observed in January (with a negative coefficient) and December (with positive coefficient) on stock returns, but not in the other months. On the other hand, there is no statistically significant correlation between stock index volatility and holidays.

Given the possibility of heteroscedasticity in financial time series data, after the OLS test, we decided to use Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model including GARCH (1,1), TGARCH (1,1) and EGARCH (1,1). According to GARCH (1,1), Mondays and Fridays have a significant positive impact on enhancing stock index volatility; while Tuesdays and Wednesdays show substantial negative associations with stock index volatility, conversely, there is no statistically significant effect on Thursdays. The ARCH LM test also showed that GARCH model effectively captures volatility patterns. Moreover, the TGARCH model confirms the impact of all weekdays on stock index volatility, even though the ARCH LM test reveals difficulties in capturing the volatility dynamics on Mondays, Tuesdays, and Thursday. On the other hand, according to EGARCH (1,1), Monday and Friday have a significant impact on the stock index with a positive relationship, while Tuesday has a significant negative influence on stock index. Wednesday and Thursday are not significant. The ARCH LM test also reveals that EGARCH (1,1) model does not effectively capture the volatile effect for only Monday. For the Month of the year, GARCH (1,1) indicates significant impacts on volatility for March, April, June, September, May, and December. However, March, April, June, and September show decreased market volatility, while May and December exhibit increased volatility. According to the GARCH (1,1) model, stock index volatility is not significantly affected by January, February, July, August, October, and November.These results are supported by the ARCH LM test, which, showed that the GARCH model effectively captures volatility patterns. Moreover, TGARCH (1,1) identifies April, May, June and August as impactful with a significant positive coefficients for May and June and negative coefficients for August and April. The rest of month remains as insignificant. These results are supported by the ARCH LM test, which, showed that GARCH model effectively captures volatility patterns for all the months except August. According to the EGARCH (1,1), February, April, June, and September exhibit a significant negative effect, denoting a decrease in volatility. While May and

December show a significant positive effect on volatility. Significant ARCH effects in residuals support the model except February.

GARCH (1,1) and TGARCH(1,1) indicates insignificant impacts on volatility during holidays. The results are supported by the ARCH LM test**,** which implies a lack of compelling evidence supporting the presence of autoregressive conditional heteroscedasticity. On the other hand, EGARCH (1,1) suggests a positive influence on the volatility of index returns during holidays, which, is supported by ARCH LM test.

Table 31: Summary of findings

MODELS	DAY-OF-THE-WEEK EFFECT	MONTH-OF-THE-YEAR EFFECT	HOLIDAYS EFFECTS
UNIT ROOT TEST			
Null Hypothesis (H0)	Rejected	Rejected	Rejected
Alternative Hypothesis (H1)	Accepted	Accepted	Accepted
ORDINARY LINEAR SQUARES			
Null Hypothesis (H0)	Rejected for Mondays and Fridays	Rejected for January, March, April, and June	Accepted
Alternative Hypothesis (H1)	Accepted for Mondays and Fridays	Accepted for January, March, April, and June	Rejected
GARCH(1,1)			
Null Hypothesis (H0)	Rejected for Mondays, Tuesday, Wednesday and Friday	Rejected for March, April, June, September, May, and December	Accepted
Alternative Hypothesis (H1)	Accepted for Mondays, Tuesday, Wednesday and Friday	Accepted for March, April, June, September, May, and December	Rejected
TGARCH (1,1)			
Null Hypothesis (H0)	Rejected for All the weekdays	Rejected for April, May, June and August	Accepted
Alternative Hypothesis (H1)	Accepted for All the weekdays	Accepted for April, May, June and August	Rejected
EGARCH (1,1)			
Null Hypothesis (H0)	Rejected for Mondays, Tuesday, Friday	Rejected for February, April, June, September, May and December	Rejected
Alternative Hypothesis (H1)	Accepted for Mondays, Tuesday, Friday	Accepted for April, June, September, May and December	Accepted

3.2 COMPARISON WITH GLOBAL MARKETS

The study, which, focuses on the BRVM Securities Exchange, raises an important question regarding how calendar effects align with global market findings. Diverse authors have studied this field and found that, although marketplaces have distinct features, common patterns can also appear. The study emphasizes important effects on Mondays and Fridays, a global tendency that has been seen by others. For example, French and Roll's (1986) published "Monday Effect" suggests reduced returns on Mondays. Reductions in returns on Mondays are consistent with other international research, such as the analysis of the day-of-the-week effect by Al-Fayoumi and Nassar (2006). In a similar vein, the study identifies significant effects in December and January, which is similar to the commonly accepted "January Effect," stating that stock returns often rise in January. Several investigations in advanced and developing markets have examined this issue, including those by Rozeff and Kinney (1976) and Ariel (1987). The study addresses the possible positive impact on stock return volatility of during holidays based on the EGARCH model, despite the inconsistent results. Varied perspectives on holiday effects exist, exemplified by studies like Hammoudeh et al.'s (2004) exploration of the "Holiday Effect" in Middle Eastern stock markets. Research such as "Market Anomalies: A Historical Perspective" by Haugen and Baker (1996) and "Stock Return Predictability and the Imbalance of Orders" by Lo and Wang (2000) illustrate the broad range of studies conducted on market anomalies worldwide. Although the calendar effects between the BRVM Securities Exchange and global markets are similar, it is important to remember that each market has its own distinctive characteristics. A number of factors, including cultural influences, regulatory environments, and economic conditions, drives variations in market behaviour. Studies that compare developing and developed markets provide significant clarity on the common and unique characteristics of calendar impacts in the financial markets.

3.3 RESEARCH LIMITATIONS

While this study aims to contribute to our understanding of the calendar effect on stock index volatility at the BRVM Securities Exchange, it is essential to acknowledge and address some boundaries that may affect the generalizability and robustness of the findings. First, the data utilised in this research is limited to the specific period from January 2, 2020, to June 30, 2023. Although this timeframe provides a substantial dataset for analysis, it might not capture the full spectrum of calendar effects over longer periods. Some calendar effects, such as those tied to macroeconomic trends or policy changes, might require a more extended dataset to be adequately assessed.

Second, based on historical data, the analysis recognised the inherent dynamism of financial markets. Calendar effects and their influence on stock index volatility can evolve over time due to changes in market structure, trading technologies, and global events. Thus, the findings from this study might not account for the impact of such evolving factors.

Third, the research model, while comprehensive, simplifies the complexity of financial markets by focusing on a limited set of independent variables. There are numerous other variables, including economic indicators, global events, and market sentiment, that can influence stock index volatility. These variables are not explicitly included in the analysis, which, could limit the ability to fully capture all determinants of stock returns volatility. Moreover, the study's focus is limited to the BRVM Securities Exchange, which primarily serves West African countries. The characteristics of this market may differ from those of more extensive and diverse global exchanges, potentially limiting the applicability of the findings to other financial markets.

It is wise to approach every investment opportunity, including the BRVM Stock Exchange, with a set of strategic considerations in mind. In order to reduce risk, diversification is essential, distributing investments across a range of industries and asset types. Thorough investigation of the financial standing, management, and growth potential of listed companies on the BRVM is essential, as is a dedication to remaining up to date on market circumstances and economic developments in the WAEMU area. Maintaining a long-term outlook and being aware of the risks involved can make an investment strategy more resilient and in line with the main objective of sustained financial growth. It can be especially beneficial to look into regional investment prospects and the effects of economic changes on all of the member countries of the WAEMU.

Sustainable investment methods, which, are informed by environmental, social, and governance (ESG) factors, are also in line with the expanding global trend of responsible investing. Other foundations of a solid investing strategy include consulting a professional, keeping discipline in the face of market volatility, and routinely evaluating and changing portfolios.

Economic crises and geopolitical events are examples of external factors and events that are recognised as potential influences on the volatility of stock returns but are not specifically included in the study.

CONCLUSION

The performance and activities of stock markets within the UEMOA region are influenced by various factors, including domestic economic conditions, global economic trends, political stability, regulatory frameworks, and investor sentiment. As with any stock market, investors need to conduct thorough research and analysis to make informed investment decisions. In that context, we analysed the calendar effect on stock index volatility at the BRVM Securities Exchange by using statistical and econometric techniques. The investigation revealed multifaceted results. Using OLS regression, GARCH, TGARCH and EGARCH modelling, the study examined three key hypotheses about the day-of-the-week impact, month-of-the-year effect, and holiday's effect. According to the OLS analysis, Mondays and Fridays had statistically significant effects on daily stock returns, indicating a strong influence from the beginning and end of the trading week. Similarly, January and December exhibited significant effects on daily stock index returns, indicating potential seasonal trends. Nevertheless, there was no correlation between market returns and holidays. After delving deeper into the volatility patterns, GARCH (1,1) modelling revealed that Mondays and Fridays considerably increase stock index volatility, but Tuesdays and Wednesdays show strong negative correlations, according to GARCH (1,1). Despite difficulties on some days, the TGARCH model supports weekday impacts. EGARCH (1,1) shows that Mondays and Fridays have considerable positive effects, Tuesdays have major negative effects, and Wednesdays and Thursdays have no significant effects. Significant volatility effects are found in March, April, June, September, May, and December for monthly impacts, according to GARCH (1,1). On the other hand, volatility is lower in March, April, June, and September and higher in May and December. TGARCH (1,1) identifies May, June, August, and April as the most influential months; May and June have substantial coefficients, whereas August and April have negative coefficients. EGARCH (1,1) shows that whereas May and December show large positive effects, February, April, June, and September show a significant negative effect. GARCH(1,1) and TGARCH(1,1) show no significant impact on volatility during holidays In contrast, EGARCH(1,1) suggests a positive influence on stock index volatility during holidays,

For investors and other market participants, the BRVM Securities Exchange's calendar effect research has a wide range of implications. Firstly, the study underlines the importance of the day-of-week effect, especially on Mondays and Fridays, regarding strategic trading and investment planning. Investors and traders could adjust their strategies and risk management methods to match the higher volatility on Monday and Friday as well as the lower volatility on Tuesday and Wednesday in response to these patterns. It is important to take into account a stable trading environment on Thursday. Taking a more cautious position on Mondays and Fridays and accepting that there will be more volatility on these days and it could be one strategy. On the other hand, investors could actively look for possibilities to reduce volatility on Tuesdays and Wednesdays. Secondly, being aware of seasonal trends, specifically the month-of-the-year effect in May and December will help portfolio management strategies. During these months, investors can think about making portfolio adjustments to take into account potential changes in volatility and market dynamics. Market volatility may be higher in months like May and December, which, have large positive coefficients, and lower in months like August and April, which have large negative coefficients. Despite mixed results, the study suggests a positive influence on stock returns' volatility during holidays according to the EGARCH model. This makes it necessary to implement improved risk management procedures during the holidays in order to mitigate the possibility of market volatility. Besides, the identification of calendar-related patterns provides long-term investing techniques with new information. Across a range of periods, investors can define their strategies and align holdings with temporal patterns to potentially maximise profits and minimise risks. Moreover, better portfolio diversification is possible by being aware of the temporal fluctuations in stock volatility. Investors can build portfolios that balance risk and return across different times by considering the day-of-the-week and month-of-the-year effects.

Furthermore, given the constant change in the financial markets, it is imperative that market players regularly monitor and modify their strategies. This adaptability to adjust to shifting market circumstances, financial developments, and international influences is essential to maintaining a solid and successful investing strategy. In addition, regulators and legislators can benefit from the research's insights, which, help shape and carry out policies that support investor confidence and market stability. The choice of model in volatility analysis is another important factor. The observable differences in outcomes between the TGARCH, EGARCH, and GARCH models highlight the importance of thorough analysis. Researchers as well as practitioners should understand the strengths and limits of each model. A more thorough understanding of volatility patterns can be achieved by carefully combining findings from several models.

The observed discrepancies in the results for specific weekdays and holidays indicate the necessity for additional investigation. In order to represent more accurately the complex behaviours that occur during these particular times, researchers should explore different modelling strategies or improve their current models. A closer examination of any external influences or events coinciding with these times could provide insightful information about the observed effects, thereby advancing our understanding of the nuances of market dynamics. In summary, the study goes beyond theoretical considerations and provides useful applications that improve risk management techniques, decision-making processes, and portfolio performance overall in the dynamic environment of the BRVM Securities Exchange.

REFERENCE

Abdulelah Alsayari and Guneratne Wickremasinghe (2022). Changes to the trading calendar and the day of the week effect in returns and volatility of the Saudi Stock Exchange. Investment Management and Financial Innovations, 19(4), 160-170

About - BRVM. (n.d.). Retrieved September 14, 2023, from https://www.brvm.org/en/node/61597

About- ECOWAS (n.d.). Retrieved September 14, 2023, https://en.wikipedia.org/wiki/ECOWAS#:~:text=The%20West%20African%20Economic%20and,customs%20union%20and%20currency%20union.

Aibo Zhang(2023): An Empirical Study on The Calendar Effect of The Shanghai Index in China Frontiers in Business, Economics and Management,9(3),

Agrawal, A., & Knoeber, C. (1996). Firm Performance and Mechanisms to Control Agency Problems between Managers and Shareholders. Journal of Financial and Quantitative Analysis, 31(3), 377-397

Alexander Dyck, Adair Morse, Luigi Zingales(2010).Who Blows The Whistle On Corporate Fraud? The journal of American finance association, 65(6), 2213-2253

Alves, P., & Ferreira, M. A. (2019). Stock Return Predictability and the Implied Cost of Equity. Journal of Financial and Quantitative Analysis, 54(3), 1281–1313.

Alagidede, P., & Panagiotidis, T. (2016). Calendar anomalies in an emerging African market: Evidence from the Ghana Stock Exchange. Applied Economics, 48(22), 2033-2047.

Amihud, Y., & Mendelson, H. (1986). Asset Pricing and the Bid-Ask Spread. Journal of Financial Economics, 17(2), 223–249.

Andersen, T. G., & Bollerslev, T. (1998). Answering the Skeptics: Yes, Standard Volatility Models Do Provide Accurate Forecasts. International Economic Review, 39(4), 885-905.

Ang, A., Hodrick, R. J., Xing, Y., & Zhang, X. (2006). The Cross-Section of Volatility and Expected Returns. Journal of Finance, 61(1), 259-299.

Andrew W. Lo, Jiang Wang(2000), Trading Volume: Definitions, Data Analysis, and Implications of Portfolio Theory, The Review of Financial Studies, 13(2), 257–300, Ariel, R. A. (1990). High Stock Returns before Holidays: Existence and Evidence on Possible Causes. The Journal of Finance, 45(5), 1611-1626.

Ariel, R. A. (1990). High stock returns before holidays: Existence and evidence on possible causes. The Journal of Finance, 45(5), 1611-1626.

Aziakpono, M., Wilson, M., & Williams, T. (2009). Modelling South African stock returns with a Markov switching regime model that exhibits the leverage effect. International Review of Financial Analysis, 18(4), 244-253.

Baker, M., & Wurgler, J. (2006). Investor Sentiment and the Cross-Section of Stock Returns. Journal of Finance, 61(4), 1645-1680.

Baker, M., & Wurgler, J. (2007). Investor Sentiment in the Stock Market. Journal of Economic Perspectives, 21(2), 129–152.

Bala Arshanapalli a, John Doukas b, Larry H.P. Lang(1995), Pre and post-October 1987 stock market linkages between U.S. and Asian markets,Pacific-Basin Finance Journal, 3(1),57-73

Ban, Daouda (2009), Analysis of the day-of-the-week-effect in the BRVM, Revue Ivoirienne des Sciences Economiques et de Gestion, 2(2), 53-59

Barber, B. M., & Odean, T. (2008). All That Glitters: The Effect of Attention and News on the Buying Behavior of Individual and Institutional Investors. Review of Financial Studies, 21(2), 785–818.

Barunik, J., & Kočenda, E. (2016). Comovement of Energy Commodities Revisited: Evidence from Wavelet Coherence Analysis. Energy Economics, 53, 111-120.

Basu, S. (1977). Investment Performance of Common Stocks in Relation to Their Price-Earnings Ratios: A Test of the Efficient Market Hypothesis. Journal of Finance, 32(3), 663–682.

Ben Jacobsen, Sven Bouman(2002):The Halloween Indicator, "Sell in May and Go Away": Another Puzzle, American Economic Review,92(5),1618-1635

Bikhchandani, S., & Sharma, S. (2001). Herd Behavior in Financial Markets. IMF Staff Papers, 47(3), 279–310.

Bikhchandani, S., & Sharma, S. (2001). Herd Behavior in Financial Markets. IMF Staff Papers, 47(3), 279-310.

Bollerslev, T. (1986). Generalized Autoregressive Conditional Heteroskedasticity. Journal of Econometrics, 31(3), 307–327.

Brennan, M. J., & Cao, H. H. (1997). International Portfolio Investment Flows. The Journal of Finance, 52(5), 1851-1880.

Brown, S. J., & Warner, J. B. (1985). Using Daily Stock Returns: The Case of Event Studies. Journal of Financial Economics, 14(1), 3–31.

Campbell, J. Y., Grossman, S. J., & Wang, J. (1997). Trading Volume and Serial Correlation in Stock Returns. The Quarterly Journal of Economics, 112(2), 565–593.

Campbell, J. Y., Lo, A. W., & MacKinlay, A. C. (1997). The econometrics of financial markets.

Chan, K. C., Chen, N. F., & Hsieh, D. A. (1991). An Exploratory Investigation of the Firm Size Effect. Journal of Financial Economics, 29(2), 327–351.

Chordia, T., Sarkar, A., & Subrahmanyam, A. (2005). An Empirical Analysis of Stock and Bond Market Liquidity. Review of Financial Studies, 18(1), 85-129.

Claessens, S., Kose, M. A., & Terrones, M. E. (2012). How Do Business and Financial Cycles Interact? Journal of International Economics, 87(1), 178-190.

Cummins, J.D., Lewis, C.M. (2003). Catastrophic Events, Parameter Uncertainty and the Breakdown of Implicit Long-Term Contracting: The Case of Terrorism Insurance. Journal of Risk and Uncertainty, 15, 55-80

Cutler, D. M., Poterba, J. M., & Summers, L. H. (1991). Speculative Dynamics. Review of Economic Studies, 58(3), 529–546.

Damodaran, A. (2012). Investment valuation: Tools and techniques for determining the value of any asset (3rd ed.).

David J. Denis, Diane K. Denis(1995). Performance Changes Following Top Management Dismissals,The Journal Of American Finance Association ,50(4), 1029-1057

De Bondt, W. F. M., & Thaler, R. H. (1985). Does the Stock Market Overreact? The Journal of Finance, 40(3), 793–805.

De Long, J. B., Shleifer, A., Summers, L. H., & Waldmann, R. J. (1990). Noise Trader Risk in Financial Markets. Journal of Political Economy, 98(4), 703-738

Dyl, Edward A., Maberly, Edwin D. (1988) : A Possible Explanation Of The Weekend Effect. Financial Analysts Journal, 44(3), 83.

E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. Journal of Finance, 25(2), 383–417

Edwin D. Maberly, Raylene M. Pierce (2011), Reconciling Theory with Post-Reverse Split Return Patterns: Empirical Findings Based on Recent Events, The Journal of Finance & Data Science, 55

El Mehdi Ferrouhi, Omar Kharbouch, Samir Aguenaou & Muhammad Naeem (2021) Calendar anomalies in African stock markets, Cogent Economics & Finance, 9(1), 1978639,

Emenike, K. O., & Solomon, O. A. (2016). Calendar anomalies in stock returns: Evidence from the Nigerian stock market. Cogent Economics & Finance, 4(1), 1241200.

Engle, R. F. (1982). Autoregressive Conditional Heteroscedasticity with Estimates of the Variance of United Kingdom Inflation. Econometrica, 50(4), 987–1008

Engle, R. F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. Econometrica, 50(4), 987-1007.

Esther Aoko Onuko, Ibrahim Tirimba Ondabu(2021): Day of The Week Anomaly and Stock Returns Volatility at Nairobi Securities Exchange, International Journal of Interdisciplinary Research in Social Science, I(I)

Fama, E. F. (1981). Stock Returns, Real Activity, Inflation, and Money. American Economic Review, 71(4), 545–565.

Fama, E. F., & French, K. R. (2001). Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay? Journal of Financial Economics, 60(1), 3–43

Fama, E. F., & French, K. R. (2001). Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay? Journal of Financial Economics, 60(1), 3–43.

Fischer Black and Myron Scholes(1973), The Pricing of Options and Corporate Liabilities, journal of Political Economy, 81(3)

Forbes, K. J., & Rigobon, R. (2002). No Contagion, Only Interdependence: Measuring Stock Market Comovements. Journal of Finance, 57(5), 2223-2261.

Gikas A. Hardouvelis (1988): Economic news, exchange rates and interest rates, Journal of International Money and Finance, 7(1), 23-35

Glenn N. Pettengill, Sridhar Sundaram and Ike Mathur (1995): The Conditional Relation between Beta and Returns, Journal of Financial and Quantitative Analysis , 30(1) , 101 – 116

Godwin Olasehinde, Williams (2018): An Examination of the Relationship between Volatility and Expected Returns in the BRVM Stock Market, Journal of International Business Research and Marketing, 3(5), 7-11

Grinblatt, M., & Han, B. (2005). Prospect Theory, Mental Accounting, and Momentum. Journal of Financial Economics, 78(2), 311–339.

Guilaire, D. K. E., Lord, M. E., Léopold, D. W., & David, K. (2017). La Réaction Des Cours Boursiers Suite À Une Nouvelle Annonce Des Entreprises: Cas De La Bourse Régionale Des Valeurs Mobilières (BRVM). European Scientific Journal, ESJ, 13(22), 282.

Hameed, A., & Ting, S. K. (2000). Trading Volume and Short-Horizon Return Anomalies in the Singapore Stock Market. Pacific-Basin Finance Journal, 8(5), 523-547.

Hendershott, T., Jones, C. M., & Menkveld, A. J. (2011). Does Algorithmic Trading Improve Liquidity? The Journal of Finance, 66(1), 1–33.

Hermalin, B. E., & Weisbach, M. S. (2003). Boards of Directors as an Endogenously Determined Institution: A Survey of the Economic Literature. Economic Policy Review, 9(1), 7-26.

Hirshleifer, D., & Shumway, T. (2003). Good Day Sunshine: Stock Returns and the Weather. Journal of Finance, 58(3), 1009-1032.

Idris, Mohammed, Siam, Yousef Abu and Nassar, Mahmoud(2018) "Board independence, earnings management and the moderating effect of family ownership in Jordan" Management & Marketing,13(2),985-994

Jean-Michel Zakoian(1994),Threshold heteroskedastic models,Journal of Economic Dynamics and Control, 18(5), 931-955,

Jeffrey Jaffe, Randolph Westerfield(1989): Is there a monthly effect in stock market returns?: Evidence from foreign countries, Journal of Banking & Finance, 13(2), 237-244

Johan Bollen, Huina Mao, Xiaojun Zeng(2011),Twitter mood predicts the stock market,Journal of Computational Science, 2(1), 1-8,

Kamara, A. (1997). New Evidence on the Monday Seasonality. Journal of Business Finance & Accounting, 24(7–8), 1033–1047.

Kamstra, M. J., Kramer, L. A., & Levi, M. D. (2000). Winter Blues: A SAD Stock Market Cycle. American Economic Review, 90(1), 324-343.

Kenneth R. French, Richard Roll(1986),Stock return variances: The arrival of information and the reaction of traders,Journal of Financial Economics, 17(1), 5-26,

Kumar, A., & Lee, C. M. C. (2006). Retail Investor Sentiment and Return Comovements. Journal of Finance, 61(5), 2451–2486.

Lakonishok, J., & Smidt, S. (1986). Volume of Trading and the Dispersion in Financial Analysts' Earnings Forecasts. Financial Analysts Journal, 42(5), 61-75.

Lakonishok, J., & Smidt, S. (1988). Are Seasonal Anomalies Real? A Ninety-Year Perspective. Review of Financial Studies, 1(4), 403-425.

Liu, Q., & Tang, K. (2019). The Intraday Pattern of Information Asymmetry: Evidence from the Chinese Stock Market. Journal of Banking & Finance, 105, 76-87.

Liu, W., Siganos, A., & Zhou, D. (2020). Holidays, Days of the Week, and Monthly Seasonality in the Stock Returns: Evidence from China. Pacific-Basin Finance Journal, 61, 101363.

Lorraine Rupande , Hilary Tinotenda Muguto , Paul-Francois Muzindutsi (2019), Investor sentiment and stock return volatility: Evidence from the Johannesburg Stock Exchange , Cogent Economics & Finance 7(1)

Lorraine Rupande, Hilary Tinotenda Muguto & Paul-Francois Muzindutsi | (2019) Investor sentiment and stock return volatility: Evidence from the Johannesburg Stock Exchange, Cogent Economics & Finance, 7(1), 1600233

Malcolm , Jeffrey Wurgler, (2006). Investor sentiment and the cross-section of stock returns . The Journal of American finance association, 61(4), 1645-1680

Manela, A., & Moreira, A. (2020). Text Selection. Journal of Financial Economics, 135(1), 1-24.

Mbonoka, F. M. (2021). Day of the week effect on stock returns and volatility in emerging and frontier markets in Africa [Thesis, Strathmore University].

Mensi, W., Hammoudeh, S., & Yoon, S.-M. (2021). Do fear and risk aversion predict the risk premium in commodity futures? Applied Economics, 53(1), 35-51.

Mitchell, M. L., & Stafford, E. (2000). Managerial Decisions and Long-Term Stock Price Performance. The Journal of Business, 73(3), 287–329

Mutlu Başaran ÖZTÜRK, Mustafa UYSAL, Halil ARSLAN, Temur KAYHAN(2018): The Impact Of Calendar Anomalies On Stock Return And Volatility: Evidence From Turkish Stock Market, Academic Review of Economics and Administrative Sciences, 11(1), 221 - 238

Nelson, D. B. (1991). Conditional heteroskedasticity in asset returns: A new approach. Econometrica, 59(2), 347-370.

Ocran, M. K. (2011). Macroeconomic Factors and Stock Market Movement: Evidence from Ghana. Journal of Risk Finance, 12(4), 265–282.

Pastor, L., & Stambaugh, R. F. (2003). Liquidity Risk and Expected Stock Returns. Journal of Political Economy, 111(3), 642-685.

Poon, S. H., & Granger, C. W. (2003). Forecasting Volatility in Financial Markets: A Review. Journal of Economic Literature, 41(2), 478-539.

Robert A. Haugen, Nardin L. Baker(1996),Commonality in the determinants of expected stock returns,Journal of Financial Economics, 41(3),401-439,

Robert A. Ariel (1987): A monthly effect in stock returns, Journal of Financial Economics, 18(1), 161-174

Roll, R. (1984). A Simple Implicit Measure of the Effective Bid-Ask Spread in an Efficient Market. Journal of Finance, 39(4), 1127-1139.

Rogalski, R. J., & Tinic, S. M. (1986). The January Anomaly: Effects of Low Share Price, Transaction Costs, and Bid-Ask Bias. Journal of Finance, 41(3), 795-808.

Salamatu M.K Bashir(2019); A.A Alexander; B.U.K Farouk and Adeneye Olawale Adeleke(2019), Impact Of Calendar Anomaly On Stock Returns And Volatility: Evidence From Nigerian Stock Market, International Journal of Business, Economics and Management,6(3),36-43

Sariye Elif Firat(2020); The relationship between stock market returns and exchange rate changes,International Journal of Finance, Accounting and Economics Studies,6(2),32-40

Sarwar, G., & Ahmed, S. (2011). The Relationship between Exchange Rate and Stock Prices: A Study of Pakistan. World Applied Sciences Journal, 15(10), 1461–1471.

Scholes, M., & Williams, J. (1977). Estimating Betas from Nonsynchronous Data. Journal of Financial Economics, 5(3), 309–327.

Shapira, Z., & Venezia, I. (2001). Patterns of Behavior of Professionally Managed and Independent Investors. Journal of Banking & Finance, 25(8), 1573–1587.

Shleifer, A., & Vishny, R. W. (1997). A Survey of Corporate Governance. The Journal of Finance, 52(2), 737-783.

Shleifer, A., & Vishny, R. W. (1997). A Survey of Corporate Governance. The Journal of Finance, 52(2), 737–783.

Shumway, T. (1997). The Delisting Bias in CRSP Data. Journal of Finance, 52(1), 327-340.

Soenen, L. A., & Hennigar, E. S. (1988). An Analysis of Exchange Rate Behaviour and Price Levels in the Foreign Exchange Markets. Financial Review, 23(4), 535-547.

Sogorb-Mira, F. (2019). Herd behavior in the Spanish stock market: an empirical study using daily data. Spanish Journal of Finance and Accounting, 48(1), 79-96.

Stanton, R. (1997). A Nonparametric Model of Term Structure Dynamics and the Market Price of Interest Rate Risk. The Journal of Finance, 52(5), 1973–2002.

Stein, J. C. (2002). Information Production and Capital Allocation: Decentralized versus Hierarchical Firms. Journal of Finance, 57(5), 1891–1921.

Stiglitz, J. E. (1974). On the Irrelevance of Corporate Financial Policy. American Economic Review, 64(6), 851–866.

Stulz, R. M. (1988). Managerial Control of Voting Rights: Financing Policies and the Market for Corporate Control. Journal of Financial Economics, 20(1–2), 25–54.

Sunil S. Poshakwale(2003),Information transmission and the determinants of volatility: empirical evidence from the Bombay Stock Exchange,Journal of International Financial Markets, Institutions and Money, 13(1),49-67

Sunil S. Poshakwale(2003),Information transmission and the determinants of volatility: empirical evidence from the Bombay Stock Exchange,Journal of International Financial Markets, Institutions and Money, 13(1),49-67

The BRVM Overview. (n.d.). Retrieved September 14, 2023, from https://www.brvm.org/en/node/61704

Wang, J., Wang, L., & Wu, C. (2016). Intraday Seasonal Anomalies and Market Efficiency: A Multi-Scale Entropy Approach. Applied Economics Letters, 23(5), 337-343.

Wang, Q. (2021). The Day-of-the-Week Effect in the Cryptocurrency Market. Finance Research Letters, 40, 101686.

Watanabe, K., Watanabe, T., & Watanabe, T. (2020). Seasonal Stock Markets, Market Efficiency, and Calendar Effects. Journal of Economic Behavior & Organization, 172, 146-160.

William J. Breena, Alvaro G. Taboada (1990),Stock price reaction to announcements in New Zealand,Journal of Banking & Finance, 14(1),79-90

William J. Breena, Alvaro G. Taboada (1990),Stock price reaction to announcements in New Zealand,Journal of Banking & Finance, 14(1),79-90

Xie, S., Wang, S., & Su, C. W. (2011). Is There a Monday Effect in Stock Prices? Fresh Evidence from Twenty-Three Stock Markets. Applied Financial Economics, 21(3), 173-186.

Xing, Y., & Zhang, X. (2000). On the Relation between the Market-to-Book Ratio, Growth Opportunity, and Leverage Ratio. Journal of Business, 73(1), 119-139.

Yan-Leung Cheung, Yin-Wong Cheung (1998): A Calendar Time Analysis of Selected Asian Stock Markets Transactions: The Day-of-the-Week Effect, Journal of Financial Management and Analysis, 11(2), 55-68

Yiannis Asimakopoulos, Mohammed A. Shehadeh, Rangan Gupta(2017), Calendar Anomalies during Different Market Regimes: Evidence from the European Union, Economic Modelling, 67, 275-284,

Yongmiao Hong, Jun Tu, Guofu Zhou(2007),Asymmetries in Stock Returns: Statistical Tests and Economic Evaluation,Review of Financial Studies, 20(5),1547-1581, Yongmiao Hong, Jun Tu, Guofu Zhou(2007),Asymmetries in Stock Returns: Statistical Tests and Economic Evaluation,Review of Financial Studies, 20(5),1547-1581,

Yuan, K. (2005). Asymmetric Price Movements and Borrowing Constraints: A Rational Expectations Equilibrium Model of Crises, Contagion, and Confusion. Review of Financial Studies, 18(3), 637-678.