# The Impact of Cryptocurrencies on the Stock Market Performance of Nigeria

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# ABSTRACT

A comparative analysis was conducted to distinguish the impact of Bitcoin on the Nigerian Stock Exchange. For analysis, daily Bitcoin and Nigerian stock market indices were used for the period 6 May 2013 – 6 May 2019. Three methods were used to achieve the aim of the study. Firstly, several unit root tests were conducted to confirm the integration order to find whether the variables are stationary or not and if the data have a constant covariance and variance over time. Secondly, QR was used as a method to solve various problems related to modern economics and finance. However, it can help to get a better picture of the factors that influence individual happiness, while traditional regressions focus on the mean. Finally, the recently developed quantile on quantile (QQR) approach (Sim and Zhou, 2015) was used. Compared to previous methods, the QQR approach can provide a broader and more complete picture of the overall pattern of dependence structure between the variables under investigation. which is an extension of the ordinary and standard quantile regression model that allows the evaluation of the effects of the quantile of one variable on the other. Moreover, results of quantile regression show that Bitcoin returns affect Nigerian stock exchange returns only in the upper quantiles negatively, while the quantile-on-quantile regression results suggest that there are substantial areas in the Nigerian stock return distributions and Bitcoin return distributions where these variables appear to be uncoupled. To improve the financial system's performance and increase Nigeria's economic wellbeing, policymakers should evaluate the chances given to investors in the cryptocurrency market and replicate them in the stock market.

**Keywords**: Bitcoin, Cryptocurrency, Nigerian Stock Exchange.

# ÖZ

Bu tezde Bitcoin'in Nijerya Menkul Kıymetler Borsası üzerindeki etkisini araştırmak için karşılaştırmalı bir analiz yapılmıştır. Analiz için 6 Mayıs 2013 – 6 Mayıs 2019 dönemi için günlük Bitcoin ve Nijerya borsa endeksleri kullandı. Araştırmanın amacına ulaşmak için üç yöntem kullanılmıştır. İlk olarak, değişkenlerin durağan olup olmadığını belirlemek için birim kök testleri yapılmıştır. İkinci olarak, modern ekonomi ve finansla ilgili çeşitli sorunları çözmek için kullanılan Kantil (QR) regresyon yöntemi kullanıldı. QR regresyonunun yanında yakın zamanda geliştirilen QQR regresyon (Sim and Zhou, 2015) yaklaşımı kullanıldı. Önceki yöntemlerle karşılaştırıldığında, QQR methodu, incelenen değişkenler arasındaki genel bağımlılık yapısının daha geniş ve eksiksiz bir resmini sağlamaktadır. Bu, bir değişkenin niceliğinin diğeri üzerindeki etkilerinin değerlendirilmesine izin veren sıradan ve standart kantil regresyon modelinin bir uzantısıdır. Ayrıca kantil regresyon sonuçları, Bitcoin getirilerinin Nijerya borsa getirilerini yalnızca üst niceliklerde olumsuz etkilediğini gösterirken, QQR regresyon sonuçları, Nijerya hisse senedi getirisi dağılımlarında ve Bitcoin getiri dağılımlarında bu değişkenlerin ayrılmamış gibi göründüğü önemli alanlar olduğunu göstermektedir. Finansal sistemin performansını iyileştirmek ve Nijerya'nın ekonomik refahını artırmak için politika yapıcılar, kripto para piyasasında yatırımcılara verilen şansları değerlendirmeli ve bunların aynısını borsada da yapmalıdırlar.

**Anahtar Kelimeler**: Bitcoin, Kripto Para Birimi, Nijerya Menkul Kıymetler Borsası.

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# TABLE OF CONTENTS

# LIST OF TABLES

# LIST OF FIGURES

# LIST OF ABBREVIATIONS

| | |
|---|---|
| BTC | Bitcoin |
| NSE30 | Nigerian Stock Exchange |
| NGN | Nigerian Naira |
| OLS | Ordinary Least Square |
| QR | Quantile Regression |
| QQR | Quantile on Quantile Regression |
| RRBTC | Returns of Bitcoin |
| RRNSE30 | Return of Nigerian Stock Exchange |
| USD | United States Dollar |

# Chapter 1

# INTRODUCTION

The global financial sector has grown dramatically from the twentieth to the first decades of the twenty-first century, creating an environment conducive to the effective role of commodity money and financial relations (Mikhaylov, 2020). Furthermore, financial systems are effectively involving, improving, and modulating to economic and technological necessity, and financial systems are regarded as the nerve system of the economy. Furthermore, due to the expansion of risk in the world economy, a new process containing globalization and digitalization has emerged through innovations under conditions connected to regulatory necessities that support and strengthen payment systems and instruments (Tkachenko et al., 2020).

Cryptocurrencies have emerged as one of the most talked-about subjects in recent economic and financial discussions. Since the Dotcom bubble burst, internet commerce, or e-commerce, has been quickly growing, and the retail industry has been through a transformation as internet sales have exploded as more and more tech-savvy customers buy online.

Despite doubts about the future of the internet after the dotcom bubble burst and severe concerns about the safety of online credit card purchasing, stock market investors appeared to have an insatiable taste for e-commerce shares, since investments in internet retailers were substantially inflated. Prior to the introduction of the first

cryptocurrency, Bitcoin, in 2009, internet commerce was mostly handled by financial institutions acting as trusted third parties to execute electronic payments. Although this system was adequate for most transactions, it was sluggish to respond owing to financial institution restrictions such as privacy and trust issues, and it was relatively costly concerning the transaction and commission costs (Sovbetov, 2018).

For several years scientific research at the academic level has focused on the relationship between economic activity and its power to develop the financial sector. Besides concentrating on the development of financial technologies and financial markets, coming to a time where many companies have contributed to involve the financial technologies strategy as cryptocurrency and blockchain technology to their business and investments, as well as those financial sectors have attracted significant public attention but researchers have rarely studied them (Liang et al., 2019). To assess the cryptocurrency market's dynamic features, researchers compared it to two classic financial markets: foreign exchange and stocks. They proved through tests that the correlation matrix and asset tree are useful tools for analyzing the cryptocurrency market, just as they are for analyzing the foreign exchange and stock markets. They discovered parallels and contrasts across these markets using these two techniques, which may provide insight on investment decisions, regulation, and legislation. The behavior of the cryptocurrency market is more comparable to that of the stock market. Furthermore, the foreign exchange market is stable, but the stock market is less stable, whereas the cryptocurrency market is fragile. The cryptocurrency market's fragility may be attributed to economic drivers, public awareness and interest, and technological drivers.

However, as cryptocurrencies and FinTech gain traction, certain dangers emerge, raising questions and worries about the feasibility of future virtual currency integration into the monetary and financial system, particularly in the absence of law and regulatory norms. In recent years, the number of people using the internet to sell illegal goods has increased. Bitcoin has already resurrected underground markets and provided numerous chances due to its quasi-anonymity, which makes it hard to verify the identity of the operators and users (Rejeb et al., 2021).

In developed economies, the stock market is much more active in terms of transactions than in less developed nations, because stock exchanges in developed nations have higher involvement in terms of listed businesses than in less developed nations. In contrast to less-developed countries, this involvement makes the market more active and encourages citizens to invest their money in the financial market, where the volume of transactions is relatively low due to the limited number of listed companies (Keelson, 2016).

Policymakers, researchers, and investors all benefit from studying the impact of cryptocurrencies on the stock market. If the cryptocurrency market has a good influence, the crypto money markets might be used as a supplement to the stock market.

Nowadays, the world is witnessing an evolution in cryptocurrency adoption where many financial institutions have engaged in the process of adoption, and many people start to treat payments and purchases in crypto.

However, some countries start to accept the idea of the improvement of their industry and its benefits by making better regulations and environment for cryptocurrencies and their functions where cryptocurrency can really grow.

At the beginning, it was difficult to measure the adoption process and usage of cryptocurrencies around the world, but now there is a so-called worldwide Crypto Adoption Index which helps to measure the differences in adoption between countries across all the world where index assure grassroots adoption by everyday users and indicate which countries are leading the way of adoption of cryptocurrency by the size of its economy and the value of cryptocurrency received and transferred, also the number of crypto deposits, and exchange trade volume (chainalysis team, 2020).

The index created by chainalysis provide a statistic for every country's population and economy size and also measuring cryptocurrency activity besides how much shares of financial are shifted to cryptocurrency by the residents, after analyzing 154 countries it found that Ukraine, Russia, and Venezuela lead the planet in terms of crypto adoption, rounding out the highest 10 in Kenya, the U.S.A, the African nation, Nigeria, Colombia, and Vietnam (Lanz, 2020).

Nigeria one of the highest countries that adopt cryptocurrencies, and the reason of this ranking back to that Nigeria became a susceptible state for all kinds of experimental economic exploitation in the aftermath of the federation's economic crisis in 2016. The citizens sought to survive the huddles of economic collapse, the reason for this is that any country under economic hardship serves as a testing ground for economic fraud in all over the world. When the government cripples the conventional remittance sector and makes it unable to stem the depreciation of the local currency, the Nigerian naira,

in relation to its foreign currency counterparts, therefore the interest in Bitcoin rises in Africa's largest economy. This was due to the government's remittance regulation, which prohibited all other money transfer companies from operating in the country, leaving only Western Union, MoneyGram, and Rio to conduct cash remittances. People resorted to using the online medium to transfer and receive cash from and across the country in response to the government's action remitting cash in the country (Ogochukwu and Jarrar, 2018).

According to the Statista data platform, over 62 thousand Nigerians, or 3.3 percent of the entire population, hold at least one cryptocurrency, and 32 percent of Nigerians use and invest in cryptocurrency, even looking for "Bitcoin" and "Crypto" in Google. (triple-a.io, 2021). Moreover, Nigeria in the last five years has traded 60,215 bitcoins, valued at approximately over $566 million apart from the US which is the biggest volume worldwide on Paxful making Nigeria the second largest bitcoin market in the world followed by China. According to data from "Coin Dance," from the beginning of May 2015 to the middle of November 2020, bitcoin trade volume in Nigeria increased by a minimum of 19 percent annually since 2017, with the best volume (20,504.50) traded in 2020. Bitcoin trade had its highest spike of 30 percent in the year 2020 during the country's national lockdown, and the best volume traded was in 2020 during the peak of the pandemic between January and September, Paxful reported a 137 percent rise in new registrations. So far in the year 2020, the bitcoin market in Nigeria is valued at $213.7 million, which confirms that Nigerians are increasingly adopting cryptocurrencies, especially bitcoin to conduct business, transactions, invest and move funds (Okafor,2020).

This can infer that cryptocurrency markets in Nigeria have a beneficial impact on stock market performance, and investors prefer to diversify their portfolios as a result of the markets' ability to encourage investors to invest. on the other hand, the influence of cryptocurrencies is negative, this may conclude that these markets are negatively impacting Nigerian stock market performance and that investors prefer to invest in other markets.

The aim of this thesis is to investigate the dynamic interaction between the cryptocurrencies and the stock market performance for the case of Nigeria during the period 6 May 2013 to 6 May 2019. However, the research is motivated by certain trend models to explore the influence of Bitcoin as a cryptocurrency on the Nigerian stock exchange. The quantile-on-quantile regression approach (QQR) by Sim and Zhou (2015) was employed because it gives a more flexible approach to obtaining a fuller picture of stock market and Bitcoin returns. The relationship between Bitcoin returns and stock market performance can be analysed under different market conditions by adopting QQR approach. The QQR approach calculates the quantiles of dependent and independent variables and measures the relationship between the quantiles of dependent variable and the quantiles of independent variable. Estimated quantiles of the stock market indicate how well stock market performs while estimated quantiles of bitcoin returns indicate the performance of Bitcoin under different conditions.

## 1.1 Definition of Cryptocurrencies

A cryptocurrency or virtual currency is a digital asset that could be a style of online payment and a medium of exchange for goods and services using cryptography to avoid any theft or fraud and that by securing the operations and transactions between individuals and by controlling all value units that have been created, also to survey the

transfer of assets and verify transactions made. There is a quite number of different cryptocurrencies and platforms, each one work under specific rules and characteristics, one of the common websites is coinmarketcap.com (Härdle et al., 2020).

Cryptocurrencies are distinct from traditional money in that they do not exist in physical form. They also lack a centralized body or central bank to oversee the issuance of currencies and currency transactions. They're also distinct from digital payment systems and services. Because digital payment services are just means for making online payments in fiat money, they are often denominated in that fiat currency. on the other hand, cryptocurrencies are digital representations of money that aren't denominated in fiat currency (Abdul, 2018).

## 1.2 Types of Cryptocurrencies

Academics, private investors, and investment firms have all been interested in cryptocurrencies since their creation. More than a hundred cryptocurrencies are traded now on markets. CoinMarketcap ranked more than 10,204 different cryptocurrencies are traded publicly, with a number of 387 exchange market of cryptocurrencies, where this number of cryptocurrencies are increasing and set up money over initial coin offerings (ICO's). The market capitalization of cryptocurrencies has reached on 05/2021 over $1.6 trillion and a total value of all bitcoins has pegged about 653 billion (Coinmarketcap accessed in May 2021). However, numerous other cryptocurrencies have attracted the attention of the media and investors, including Ethereum (over $300 billion in market capitalization), XRP (over $46 billion), and Litecoin (over $12billion) (Coinmarketcap, accessed in May 2021).

## 1.3 Bitcoin (BTC)

Bitcoin is today considered as the biggest cryptocurrency with a capitalization of over 653 billion U.S. dollars (CoinMarketCap, accessed in May 2021) where the market capitalization can be calculated by multiplying the entire number of Bitcoins in circulation by the Bitcoin price. Bitcoin was commenced in 2009 by Satoshi Nakamoto but the origin is not completely known. Furthermore, Bitcoin function under the blockchain technology, which is that the backbone of the decentralized currency system. Moreover, Bitcoin transactions are recorded on the blockchain with the transfer of bitcoin ownership from one user to another, like how actual currency is transferred from one wallet to another. The blockchain has a complete record of this transaction. Around 2013 Bitcoin had a bad reputation where mostly been linked to illegal activities, until cryptocurrencies became more acknowledged by the people in recent years but after that Bitcoin were used in a legal context. Additionally, Bitcoins has prespecified stride of mining and quantity that has reached about 21 million coins, and some statics shows that this number is going to increase within the year 2140 (Asplund and Ivarsson,2018).

## 1.4 Blockchain Technology

Blockchain technology is defined as a group of knowledge consists of a series of blocks. While each block contains a unique name or Hash value and includes data about transactions that have occurred from the beginning and those transactions made can be verified, in other words, it must be marked with both a time and a random number (nonce) which make the verification easier.

The first cryptocurrency applied in the blockchain technology was bitcoin which the owner is the founder Satoshi Nakamoto and his considered as the creator of the block

(Asplund and Ivarsson ,2018), and to support this technology it had to be some specific functions that provide a different type of nodes to be part of the network, it can be summarized in four functions which are mining, storage, wallet services, and routing, where each function has an essential role in the mechanism of blockchain.

These mentioned functions operate in a circle to mitigate the danger and solve the problem related to trust in information systems under blockchain technology (Reyna et al., 2018). By providing a safe and verifiable transaction, blockchain technology helps to create confidence in the network. The technology's decentralized structure eliminates the need for confidence in a central authority. Opportunism may be eliminated in the system by using tokenization and a verified smart contract. The asset can be assigned to the recipient when the smart requirements have been met, and the requirement for a third-party to function as a guarantor of services and transactions will be eliminated since the blockchain technology's underlying structures supply all of the services.

The advantages of blockchain technology over traditional ledger systems for transactions are numerous. Blockchain, on the other hand, keeps track of all transactions and distributes an identical copy to every user on the network, because all users in the network agree on the blockchain's rules, the technique is democratic. As for the transactions they are secured using some methods of protecting such as cryptography, digital keys, and digital signatures. Moreover, several blockchains allow the network to be private by authorizing only specific digital signatures to access a section of the blockchain or one transaction. However, transaction records are often updated, and once a block has been added to the blockchain, it cannot be removed or changed. As a result, it creates a tamper-proof permanent record of the transaction.

9

Smart contracts may be created using blockchain technology and utilized to conduct different activities that a firm or market does (Ahluwalia et al., 2020).

Despite its intricacy, blockchain's potential as a decentralized record-keeping system is nearly limitless. The blockchain age may very likely see uses beyond the foregoing possibilities, ranging from increased individual privacy and enhanced security to cheaper processing costs and fewer mistakes. First, improved accuracy by eliminating the need for human verification, since transactions on the blockchain network are authorized by a community of hundreds or thousands of computers to reduce mistakes. Second, blockchain reduces costs by eliminating the requirement for third-party engagement and verification, which implies that third-party verification is no longer required. Another option of blockchain is decentralized, and that by making it more difficult to tamper with; in other words, if a copy of the blockchain fell into the hands of a hacker, only a single copy of the information would be compromised rather than the entire network. Additionally, transactions are protected, which means the blockchain network must verify their validity, and any disparity makes it exceedingly difficult for records on the blockchain to be changed without notice. A considerable blockchain networks can operate as public databases, in the concept of that anybody with an internet connection may view the network's transaction history and record. Despite the fact that users can obtain more information about transactions, they do not have access to comprehensive information on the users of that information, and Transactions may be completed in as little as ten minutes and seen secured in as little as a few hours, which is very important for cross-border exchanges or trades. Lastly, the term "transparent technology" simply indicates that, while an individual's record on the blockchain network is safe, the technology itself is open to the world. Simply said, individuals on the blockchain network can govern the code as they see

appropriate as long as they have the support of a majority of the network's computational authority (Ebelogu et al., 2019).

Nevertheless, blockchain technology not considered a perfect technology and it's the same for all technologies and it's obvious that there are advantages and disadvantages, it must face some problems during the period of using and one of these issues is when the number of block increase will affect the speed of confirmations, communication and transaction made in blockchain within the network to decrease and this is due to the digital nature of blockchain technology which helps to provide a possibility of theft. Additionally, the absence of intermediaries as the third part in the transaction also must be a database of the users to facilitates the trace of ownership and the consequences of anonymity (Asplund and Ivarsson, 2018).

Furthermore, to avoid the issues related to fraud miners' network should agree and approve the historical data of transactions by validating and verify all transaction within the ledger, in case of neglecting the process fraudulent users would take the opportunity to possess a large amount of computer power to breed all the hash values both old and newly created (Asplund and Ivarsson, 2018).

## 1.5 Structure of the Thesis

This thesis is organized as follows: chapter two discusses the literature review about the determinants of the stock market performance and previous studies about cryptocurrencies following by the relationship between cryptocurrency and Nigerian stock exchange. Information on the Nigerian economy and the stock exchange of Nigeria is provided in the third chapter. The fourth chapter presents the data and the

empirical methodology. Chapter 5 discusses the main results. Conclusion and recommendations are represented in the last chapter of the thesis.

# Chapter 2

# LITERATURE REVIEW

## 2.1 Determinants of Stock Market Performance

Stock markets in many countries are becoming an important and essential element of the economy. The fact that stock market indexes have become one of the measures used to evaluate the health of a country's economy demonstrates the stock market's importance. Furthermore, technological advancements as well as globalization, which has created a borderless globe, have made it simpler for investors to access stock markets all over the world. As well as, macroeconomics considered as an important part of economic activity and has an impact on stock market performance.

Daferighe and Charlie (2012) examined the impact of inflation on stock market performance in Nigeria using a time series data containing the firms listed in Nigerian Stock Exchange for the period 1991-2010. By conducting regression analysis to examine the influence of inflation on several measures of stock market performance, beside the total value traded ratio, percentage change in All-share Index, market capitalization and turnover ratio (TOR). As a result, except for TOR, which deviates from a priori expectations as evidenced by the positive connection between inflation and the turnover ratio, all of the indicators have a negative association with inflation. These low levels of inflationary effect on stock market performance indicate that stock market investments are viewed as a solid inflation hedge in Nigeria. The Securities and Exchange Commission beside the Nigerian Stock Exchange should work together

in order to increase market capitalization by attracting new listings and increasing trading activity, which leads to give the stock market's importance to economic development. The current condition of the Nigerian stock market is linked to a lack of literacy and weak corporate governance.

Mbulawa (2015) analyzed how inflation innovations affect stock market performance and vice versa, in order to better understand how inflation affects stock market performance. This was accomplished by analyzing time series data from 1980 to 2008. The Zimbabwe stock exchange industrial index and consumer price index were used to assess stock market performance and inflation, respectively. Fisher's (1930) hypothesis implies that stocks are a decent hedge, but Fama's (1981) hypothesis claims that stock prices do not offer a hedge against inflation's evils, implying a positive and negative connection between the variables. The conclusion was that the connection was statistically insignificant, implying that stocks did not provide perfect protection from inflation impacts, especially in the long run.

Iheanacho (2016) investigated the short and long-term link between oil price fluctuations, exchange rate behavior, and stock market performance in Nigeria from January 1995 through December 2014. Iheanacho (2016) concluded that in the short run there is a positive relationship between the exchange rate and the Nigerian stock market. Also, the exchange rate is positively related to crude oil price changes in the near term, with the causation moving from crude oil prices to the exchange rate. However, in the long term, the findings of a multi-variate Johansen cointegration test show that three variables have a negative association. The long-term negative link between Nigerian stock market performance and oil price movements, exchange rate

behavior, and stock market performance revealed the dynamic interaction between oil price movements, exchange rate behavior, and stock market performance in Nigeria. Boachie et al. (2016) used monthly data obtaining from the Ghana Stock Exchange and the Bank of Ghana from 2010 to 2013 about the influence of interest rates and liquidity growth on stock market performance in Ghana. According to the results of this study, the performance of the Ghana Stock Exchange is primarily influenced by liquidity expansion, positive inflation, and a negative exchange rate. Interest rate effects on the GSE index are modest yet favorable, according to the study. The implications for policymakers are that sensible macroeconomic policies should be simplified to stabilize the domestic currency, offer some economic stimulus in periods of low economic activity to assure stability, and keep inflation at a moderate level to minimize stock market slowdowns. Followed by another study of Singh and Kapil (2016), which attempt to investigate the dynamic relationship between exchange rate, crude oil price, and Indian stock market by using daily data including crude oil price, Nifty returns Dollar-Rupee value from the period April 2010 to March 2015. To accomplish the study's goal, they used correlation, regression, and Granger-causality approach and VAR model. Following by the Augmented Dickey and Fuller test to see if it was stationary or not.

As a result, beginning with Jarque-Bera which affirmed all the variables are non-normal distribution, following by the ADF test was used to check the series' stationarity, which revealed stationarity at all levels for all of the series. while the variables coefficient of correlation, indicates a negative correlation between the exchange rate and nifty returns. In the other hand, a positive correlation between nifty returns and crude oil. After using correlation regression analysis, it was discovered that the price of crude oil and the currency rate had a substantial impact on the nifty

15

returns. Granger Causality test indicate unidirectional causality between nifty returns and exchange rates, as well as crude oil prices and nifty returns. Accompanied by a study about the causal link between inflation and stock market performance in Pakistan from 2009 to 2015, Ramzan (2016) analyzed this study by using the VAR model, as well as the unit root approach to test the stationary level and the Johansen test for co-integration, were used to illustrate the link between inflation and stock market performance in Pakistan. The association was broken down through the VAR model and direction with the assistance of the granger test. as a result, he discovered that inflation affects stock market performance and an existing negative correlation between the two variables. As a result, it is necessary to lower inflation through monetary policy, which will increase investor confidence both locally and internationally.

The economic progress considered as an essential part in the development of countries, and the stock market performance, Nyanaro and Elly (2017) investigated the relationship between stock market performance and economic progress in the East African Community in 15 years from 2000- 2015. By setting market capitalization, market liquidity, and share price volatility were the stock market factors studied. As a measure of economic growth, GDP growth has been utilized. Furthermore, to define the nature of the link between the variables, quantitative research methodologies were used. However, a long-term link was established between stock market performance metrics (market capitalization and liquidity) and East African economic growth, according to the study. According to the findings, there is no link between stock market share price volatility and economic growth. The magnitudes of influence on economic advancement were different for each measure of stock market development. Each parameter shown a varied level of capacity to impact economic growth. Market

16

capitalization and GDP growth have a significant long-term connection, according to the research. They conclude that in the short term, the relationship was negative, but in the long run, it was beneficial. Another study of Qamruzzaman and Wei (2018) studied the link between Bangladesh's economic growth, financial innovation, and stock market development for the period 1980–2016. The autoregressive distributed lagged (ARDL) method was used to examine long-run cointegration. In addition, under the error correction term, the Granger-causation test is used to determine directional causality between study variables. However, the results of the ARDL technique indicate that financial innovation, stock market development, and economic growth have a long-term relationship. Following by the Granger-causation test that also shows that there is bidirectional causality between economic growth, financial innovation, and stock market development, as well as long and short-term economic growth. These findings strongly suggest that financial innovation and market-based financial development may help the economy develop. Another example giving by Eze et al. (2019) investigated the influence of stock market liquidity on Nigeria's manufacturing sector performance from 1981 to 2017. In their research they used a multiple regression analysis with the ARDL model for the investigation. However, the findings suggest that increasing stock market liquidity improves manufacturing sector performance in Nigeria, and that increasing the All-Share Index (LASI) boosts manufacturing sector output. As a result, the study suggests that the government should step up efforts to promote stock market activities in the economy, as this will provide more liquidity for investors to make more investments in the country, resulting in increased manufacturing sector capacity to produce more goods and services for the economy.

The economic growth regarded as an important determinant of the stock market performance. Amaresh and Anandasayanan (2019) examined in their study the effect of economic growth on the stock market performance and what the link is between economic growth and stock market performance in Sri Lanka. The analysis is based on secondary data. Annual data from 2002 to 2018, with correlation analysis to determine the relationship between independent and dependent variables, regression analysis to determine the impact of the independent variable on the dependent variable, descriptive statistics, unit root test to account for time series data, and residuals normality test to ensure model fitness. The findings show that economic growth and stock market performance have a strong and positive relationship, and that economic growth has a significant influence on stock market performance. The performance of the stock market is significantly influenced by economic growth. The Sri Lankan government must take the appropriate steps to mitigate the negative effects of economic growth in order to boost the country's economy and make it more efficient and stable. If this is not the case, people will not invest in the stock market. Followed by Asiedu et al. (2020) study by using panel data random effect model to assess the efficacy of monetary policy on stock market performance in ten (10) African countries with sub-regional considerations from 1993 until 2019. The study employed the vector error correction model (VECM) to establish short and long-run causalities after performing preliminary tests of unit root, lag selection, and co-integration. The findings from the random effect model lend significant evidence to the current research on monetary transmission mechanisms. Furthermore, the VECM's findings indicate a strong connection between monetary policy and the financial market. Favorable adjustments in the money supply have a long-term positive influence on stock market performance. It also offers monetary policymakers and capital market authorities more

information on the direction and size of their interventions in their individual countries' financial markets. Setiawan's research (2020), by including four independent factors and one dependent variable were observed and investigated. The independent variables are GDP, inflation, interest rate, and exchange rate, the dependent variable is Indonesia's stock market during 21 years, from 1999 to 2019, utilizing GDP as a measure of economic growth, inflation as a limit to consumption, interest rate, and exchange rate as macroeconomic factors that influence stock market performance. GDP and inflation both contribute to the growth in stock market value, according to multiple regression research, although the influence of inflation is not significant. Interest rates and exchange rates, on the other hand, have a negative impact on stock market performance, primarily the interest rate, which has a significant impact. Mentioning also that before applying the regression, the classic assumption test was also carried out, such as a normality, heteroscedasticity, autocorrelation, and multicollinearity tests, were performed initially. As a result, macroeconomic variables have a variety of effects on the Indonesian stock market, which can be positive or negative, significant or insignificant. The results reveal that the independent factors and dependent variable have a strong positive connection. Another study by Ullah and Jan (2020), they examined the impact of economic freedom on the liquidity and performance of the stock market. For variables, data is collected from 2000 to 2017. Time-series data was used economic freedom, trading volume, KSE-100 Index returns, market capitalization, inflation rate, GDP growth, and interest rate as independent variables. However, many tests were conducted beginning with cointegration technique to determine the connection between variables. The Granger Causality method is used to determine the effect connection. They identified a clear link between economic freedom and the KSE-100 Index's return, market capitalization, and trading

volume. And there is no link between economic freedom and stock market performance. They also find that economic independence has long-term implications on stock market performance and liquidity. Moreover, market capitalization, stock market indexes, and trade volume are all linked to GDP growth, interest rates, and inflation. Furthermore, the findings of the study may be useful to regulators and policymakers in recommending rigorous changes to strengthen Pakistan's economic independence, which would have a major impact on stock market returns and liquidity.

Elhussein and Warag (2020) studied the drivers of stock market performance in Sudan between the years 2003 to 2017. They investigated linkages in both short or long-term between the Khartoum Stock Exchange all-share price index as a scale of market performance and considering the factors Inflation, capital costs, foreign exchange rates, broad money supply, and crude oil prices as proxies for macroeconomic indicators. Market capitalization, market trading system, and market trading volume are examples of market-oriented indicators. However, researchers used a several statistical approaches beginning with time series regression, following by Johansen cointegration test, then vector error correction model, and lastly Toda-Yamamoto Granger causality test.

The findings show that long-term fluctuations in inflation, currency rates, money supply, and crude oil prices have a substantial impact on the KSE. As well as, the money supply and the cost of capital are the short-run which drivers of stock market performance. In terms of micro variables, the research shows that the stock market's market capitalization and trading system automation have a favorable impact on its performance. Trading volume, on the other hand, has no bearing on market

performance. The causality test reveals a one-way link between the determinants and KSI, but only a bi-directional causality relationship between KSI and CCPT.

Nordin et al. (2014) analyzed how commodity prices (palm oil, oil, and gold prices), interest rates, and currency rates affected the performance of the Malaysian stock market. The possible impact of commodity prices on the stock market index was also investigated, with findings indicating the presence of cointegration connections for all models using different commodity prices. Furthermore, the variables utilized may contain important data that may be used to anticipate stock market performance, there may be opportunities for investors to generate extra profits as a result of these cointegrating interactions. The price of palm oil had a substantial impact on the stock market index, according to the findings. on the other hand, the prices of oil and gold showed no substantial impact. Interest rate and exchange rate had substantial effects on the stock market index, which is consistent with previous empirical studies. Palm oil price had a large impact on the stock market index. The interest rate and the exchange rate both had substantial effects, which is consistent with previous empirical research.

Bassar et al. (2021) investigated the influence of inflation, currency rate, Sharia stock trading volume SBI, and interest rate on the performance of Sharia equities in businesses listed on the Indonesian Sharia Stock Index from January 2014 to December 2018. It covers all 392 businesses that used the purposive sampling method. Furthermore, 278 firms that match the standards were utilized as examples. Using multiple regression models and panel data, it has been demonstrated that the rate of inflation has little impact on the performance of Sharia stocks. there is a large negative impact on Sharia stock performance regarding the exchange rate and the SBI interest

rate, while Sharia stock trading volume has no impact on Sharia stock performance. When inflation is high, the study's findings suggest that Sharia stocks might be a viable financial option. Moreover, Sharia stocks can be used as an effective hedging mechanism in times of high inflation. while Interest rates and Rupiah Exchange Rates indicate a substantial negative impact on Sharia Stock Performance. This demonstrates that interest rates and the rupiah currency rate continue to impact the performance of Sharia stocks.

## 2.2 Previous Studies about Cryptocurrencies

Wong et al. (2018) investigated whether cryptocurrencies such as Bitcoin (BTC), Litecoin (LTC), and Ripple (XRP), as well as other asset classes such as bonds (Merrill Lynch World Sovereign Bond Index), gold (Gold Bullion London Bullion Market US$/Troy Ounce), and stocks, can be legitimate investments with the potential to be used as a hedging tool (S&P 500), for the period May 8, 2013 to August 1, 2018. They concluded that Bitcoin and Litecoin may be used as hedges, but Ripple can be used as a diversifier. Bitcoin is a hedge against stocks, bonds, and gold since it is strongly negatively connected with the S& P500 and insignificantly linked with the other asset classes. Litecoin has a strong negative correlation with bonds and gold, as well as a weak connection with equities, making it a good hedge against these asset classes. Ripple has applications in a variety of financial areas; Bitcoin and Litecoin are hedging tools, whereas Ripple may be a diversified investment. Investing in cryptocurrencies might enhance the risk-reward ratio for risk-averse investors.

Tibay et al. (2018) attempted to create a time series model that depicted the dynamic connections between the closing prices of the Philippine Stock Exchange, the exchange rate, and Bitcoin with a daily data from January 1/2014 to May 26/2018.

They were able to uncover both the underlying/latent connections between Bitcoin and the Philippine stock exchange. Several techniques are used, including the Vector Auto Regressive (VAR) Model and the ADF.

As a consequence, after running the VAR model, it predicts a drop in the Philippine stock exchange index for the following two days, day 9 and day 10. However, due to the high volatility and inconsistency, the shock to the Philippine Stock Exchange does not endure long, and that one-time spike in Bitcoin closing prices can cause the Philippine stock market index to rise for day 5. On the other hand, a one-time increase in the peso to dollar exchange rate will result in a two-day gain in the Philippine stock market. Furthermore, the future projection error variance decomposition of PSEi that can be explained by both Bitcoin closing prices and the Peso-Dollar Exchange is quite minimal, demonstrating that the Exchange Rate and the Philippine Stock Exchange Rate do indeed have an underlying link. Bitcoin and the exchange rate have been shown to explain a large portion of the stock market's fluctuation. Beside the study of Durcheva and Tsankov (2019), by analyzing the stock exchange and cryptocurrency networks. In other words, the data set contains time series for 100 NASDAQ stocks for a period of 500 business days between 10-Apr-17 and 08-Apr-19. The key findings provide that the topology of networks produced from cryptocurrency is quite similar to the structure of networks created from NASDAQ stock data. Both economies have comparable node degree distributions, where it can't rule out the possibility that they follow a power law. Although the edge degree distributions are not fundamentally different, additional data is required for a thorough study. According to the metrics employed, they discovered that the economy of cryptocurrencies is more correlated than the economy of NASDAQ equities; dissimilarities of nodes are less. Moreover, on the graphs created from NASDAQ data, they noticed clusters of stocks. This is most

likely due to asset sector-specific interdependencies and significant economic connections. High-capitalization cryptocurrencies and equities, such as BTC, ETH, XMR, MSFT, GOOG/GOOGL, and AMZN, are tightly linked or hold important places on the graphs.

Cheng and Yen (2020) studied the correlation between cryptocurrency returns and the economic policy uncertainty (EPU) index. The sample period is February 2014 to June 2019, whereas the Ethereum period is September 2015 to June 2019. They looked at how different nations' EPU indexes can forecast the returns of key cryptocurrencies. They created a monthly data set of cryptocurrencies such as Bitcoin, Ethereum, Ripple, and Litecoin with the monthly EPU index. According to the data used in their study, the EPU index in China can forecast bitcoin returns, while the EPU indexes in the United States, Japan, and Korea cannot. Furthermore, the change in China's cryptocurrency trading policy in September 2017 appears to have improved the EPU's predictive power for Bitcoin returns. As a result, the findings of their research can assist regulators in regulating crypto-market activity. Accompanied with a study about the influence of the cryptocurrency market on the Middle East and North Africa stock markets by Sami and Abdallah (2020). They have provided that this influence is differentiated across Gulf nations and other economies in the area using a comparative study. The study is based on daily data from cryptocurrency and stock market indexes in Gulf nations for the years 2014–2018. To achieve the study's aim, two methods were used: testing approach that used cointegration method and Granger causality beside a regression strategy that mostly used the instrument variable with generalized method of moments technique. The empirical findings indicated that in the MENA area, there is a substantial link between bitcoin market and stock market performance. In other words, the performance of the stock market in the MENA area is not affected by

changes in the cryptocurrency market. The IV-GMM method's findings show that real GDP, oil production, and institutional quality all have a substantial beneficial influence on stock market performance in both Gulf and non-Gulf nations. In terms of the cryptocurrency impact, an increase in cryptocurrency returns causes stock market performance in Gulf nations to decline while increasing in non-Gulf countries and encourage the investors to include cryptocurrencies in their diversified portfolios alongside stock market assets by the support of empowerment of the cryptocurrency market, thereby decreasing the informal economy and leads the money supply in the financial system expands.

Akyildirim et al. (2020) examined the link between the price volatility of a wide range of cryptocurrencies and the implied volatility of both US and European financial markets, as assessed by the VIX and VSTOXX, respectively, using a dataset that spans the time period from June 22, 2017 to June 24, 2018. They implied that cryptocurrencies show signs of greater volatility during times when investors' 'fear' is high. They discovered that not only has cryptocurrency volatility shown significant correlations with volatility products like the VIX and VSTOXX during such high implied volatility events, but that cryptocurrencies themselves show strong increases in GARCH-calculated volatility during the highest deciles of stock market implied volatility, incorporating the highest levels of implied volatility.

However, there is conflicting evidence regarding the interactions between cryptocurrencies and a variety of international financial market products, they found an evidence supporting the influence of option denoted implied volatility on the price volatility of this new financial product using high frequency data across a range of liquid, highly-capitalized cryptocurrencies. Including another study which

investigated by Chi-Ming (2020), he studied how the value of financial equities is impacted by home country cryptocurrencies using the Capital Asset Pricing Model and foreign exchange exposure theory for a period from July 2016 to March 2019. To put it another way, the effect of cryptocurrency development on the exchange exposure of financial equities in two distinct markets. Bitcoin's value, which is not supported by fundamentals, is subject to rapid price fluctuations due to the general environment, which might help to stabilize the financial system to some extent. It's impossible to explain why there's such a strong risk aversion impact. Attempts to explain as well. Data about cryptocurrencies was obtained from the New York Stock Exchange's NYXBT, and financial stock data from the two emerging economies. Taiwan Economic Journal provided the control variable. Providing that cryptocurrency development causes structural change in the financial industry, while the influence of home country cryptocurrency exposure is greater in financial equities in China than financial stocks in Taiwan. Moreover, three key variables in CAPM have a greater impact on financial stocks in China as well in Taiwan market. Between the two financial markets, there are considerable disparities. The characteristics of the cryptocurrency evolution and monetary system adjustment process are critical answers for both sectors.

Another example of the study by Hau et al. (2021) used trade volumes, the number of unique Bitcoin transactions, and the number of unique Bitcoin addresses to quantify Bitcoin transaction activity. Researchers looked at the predictive potential of transaction activity for Bitcoin returns from January 2013 to December 2018. By detecting the significant impacts of variability affecting the quantiles of transaction activity, which cannot be adequately described by the standard quantile regression approach, the start of structural fractures may be considered. They discovered that the

lagged transaction activity series had a favorable impact on high Bitcoin returns in the upper quantiles and a negative impact on low Bitcoin returns in the lower quantiles. Furthermore, by estimating how the quantiles of transaction activity affect the quantiles of Bitcoin returns, the QQR approach identifies the local effect with respect to different states of transaction activity, and identifies considerable heterogeneity effects concerning the quantiles of transaction activity.

# Chapter 3

# CRYPTOCURRENCIES, ECONOMY AND STOCK MARKET IN NIGERIA

## 3.1 The Relationship Between Cryptocurrency and Stock Exchange of Nigeria

The cryptocurrency industry has been growing over time and continues to develop as new cryptocurrencies emerge. Bitcoins, Litecoin, Zcash, Dash, Ripple, Ethereum, NEO, Altcoins, and Tether are some of the primary types of cryptocurrencies now in use in Nigeria. In the world of cryptocurrencies, Bitcoin is widely regarded as a pioneer and the most extensively utilized. Bitcoin was initially made available to the general public in 2009, and it has maintained the highest market capitalization ever since. Despite its flaws, cryptocurrency has the potential to significantly alter Nigeria's existing economic situation, beginning with the ease of cross-border transfers and ending with the payment of employee wages in bitcoin. Current blockchain platforms, on the other hand, are constrained by the borders of their own ecosystems, and they no longer communicate with one another in the same way, resulting in a loss of global scalability (Ebelogu et al., 2019).

The blockchain technology and the virtual currencies built on top of it have the potential to radically reduce the cost of global transactions while also making them truly free. Uncertainty and trust have been constant issues in trade at all levels. Banks, companies, governments, and even colleges are products of unpredictability and a lack

of confidence among transaction partners. These centralized institutions have become the lubricant that keeps the financial wheel spinning. Institutions, on the other hand, have grown much too strong and are now attempting to consolidate their control. Despite the fact that blockchain generation was first used in 2009, it remains a unique method of reducing uncertainty among transacting parties (Ebelogu et al., 2019).

## 3.2 Cryptocurrencies and the Nigerian Economy

In a developing nation like Nigeria, the emergence of Bitcoin as a virtual currency has caused waves in the global economy. Following the outbreak, there has been a lot of discussion on the importance of crypto currencies in the Nigerian economy, both positive and negative. In comparison, the Nigerian government has attempted to ban crypto currency through regulatory agencies such as the Central Bank of Nigeria (CBN) and the Securities and Exchange Commission (SEC), though its legal status remains ambiguous, unlike in countries like Morocco and Algeria, where there is a clear ban on trading in Bitcoins, with heavy fines if a breach occurs. The alerts are primarily intended to inform citizens about the differences between genuine currency, which is issued and guaranteed by the government, and crypto currency, which is not. Nigerian legislators have asked the regulatory authorities to speed up efforts to create a legal framework for crypto currencies in the nation, after the CBN and SEC's actions (Peter and Akadiri, 2020).

Although the Central Bank of Nigeria has published a cryptocurrency rule, the applicable CBN Regulation does not ban crypto-businesses from operating in Nigeria. The Securities and Exchange Commission (SEC) has also published a public notice advising people to be cautious while investing in cryptocurrencies. The SEC has yet to issue a definite rule on crypto-business investment or Initial Coin Offerings (ICOs).

Additionally, if bitcoin or other cryptocurrencies are classified as commodities, for example, sales tax obligations may arise. Furthermore, a categorization as a commodity will remove bitcoins and other cryptocurrencies off the Nigerian constitution's exclusive legislative list where they are not legal money, and give state governments the legislative authority to control cryptocurrencies. However, a commodity categorization for bitcoin identifies it as a distinct type of property over which particular title can be exercised in terms of property rights. A currency categorization, on the other hand, will be seen as a simple claim to worth in the eyes of the law (BalogunHarold.com, 2018).

Stakeholders such as banks, the government and its agencies, corporations, professional accountants, and some people are concerned about the growing nature of crypto-currencies and their prospects. The advent of cryptocurrencies has caused considerable consternation among Nigerians and the government. As a result, the Central Bank of Nigeria (CBN) has warned Nigerians against adopting privately produced crypto-currencies. Though there are some potential benefits for the Nigerian economy in using crypto-currencies (Acho, 2021).

## 3.3 Impact of Cryptocurrencies on Monetary Policy of Nigeria

Currently cryptocurrencies coexist with traditional currencies. The present volumes are insignificant and do not pose a threat to the status of official money as the primary currency. However, as algorithms develop to reduce cryptocurrency volatility, their popularity and use are likely to rise. As a result, different official currencies would be able to coexist.

Moreover, some academics examine the relationship between cryptocurrencies and central bank monetary policy in depth, proposing a theoretical model that predicts that the coexistence of central bank and private money is contingent on the latter's monetary policy. Privately produced currencies, in instance, would be utilized if official currencies failed to maintain price stability, but they would lose their usefulness as a medium of exchange if the central bank could reliably guarantee the true worth of money balances. The consequences are two-fold. First, it is not theoretically impossible for government money and cryptocurrencies to coexist as means of trade. Second, central banks have the benefit of being able to prevent cryptocurrencies from becoming valued as a medium of exchange by employing a certain form of monetary policy (but they could still be valued for other reasons, for instance as a pure speculative asset). In this light, rather than constituting a threat, the cohabitation of government money and cryptocurrencies might be beneficial by functioning as a self-regulatory mechanism for central banks. Currency competition has the potential to reduce inflation and avoid the type of interest rate and price manipulation that governments have been known to engage in in the past (Peter and Akadiri, 2020).

## 3.4 Stock Exchange of Nigeria

The establishment of a stock exchange in a capital market serves to widen the share ownership base of businesses and to equitably distribute the nation's wealth by allowing people in various areas to purchase shares in a firm in another region through the capital market's simple mechanism. The stock market is important in the growth of the country's industry and commerce, since it diverts idle money from surplus to deficit units, which has a substantial influence on the country's economy. In order to keep up with the rapid expansion of a country's economy, more resources are necessary. The

stock market is a vehicle for mobilizing and effectively allocating savings to achieve economic growth.

Moreover, the stock market considers as the reflection public opinion on the economy and the financial sector in particular. It represents the productive sector's strength as well as hopes for financial system stability. The stock market's relevance in every economy may be seen in the crucial role it plays in mobilizing individual resources and channeling them to investors. These let businesses to swiftly get much-needed money, therefore enabling capital allocation, investment, and growth. It also helps to reduce investment risks thanks to the ease with which shares can be exchanged, and it plays an important role in determining the amount of economic activity in most nations (Lawal and Ijirshar, 2013).

The stock market index is the parameter that gives a vivid picture of the overall performance of the stock market. According to Adjasi et al. (2011), The Nigerian Stock Exchange (NSE) which originally known as the Lagos Stock Exchange, was founded in 1960 and has been renamed the Nigerian Stock Exchange in 1977. It presently has almost 300 companies listed. The enlisting firm chooses an issuing house to create the instrument and generate cash through the issue of shares at a predetermined price. The issuing company also appoints reporting accountants, underwriters, trustees, and attorneys.

## 3.5 Economy in Nigeria

According to World Bank, Nigeria has a population of over 200 million Africans, and pundits and political experts are quick to point out that it can lead other African nations in the development and growth process. Nigeria is probably Africa's most naturally

endowed country, with vast mineral, agricultural, and forest resources, notably more favorable weather conditions, and a varied human resource base. Nigeria has the power and potential to enhance the level of life of its inhabitants, attract international investors, and maintain unprecedented economic growth and development if well exploited (Oshikoya, 2008).

According to Lawal et al. (2018), the Nigerian economy has been a source of inspiration for most rising economies everywhere in the world in recent years. The economy of Nigerian has had a significant development for the past two decades, with a remarkable average growth rate of 6.9%. It has successfully transitioned from a developing economy to a global growth generator (3GC).

Nigeria considering as the largest economy in Africa, where it mixed economy country with a lower-middle-income economy. Every day, its financial, business, information and communication technology, and entertainment industries develop fast. Additionally, in the world's largest economies, Nigeria's economy was also within the top 25 largest economies, in terms of GDP and PPP. The influence of the capital market on the entire economy is primarily responsible for Nigeria's exceptional growth. For example, the capital market capitalization increased from less than 4 trillion Naira in 1996 to more than 12 trillion Naira in 2008. (NSE, 2011). Because it is Africa's largest economy, substantial changes in her economy can have an influence on other African countries, as well as other rising economies across the world.

# Chapter 4

# DATA AND METHODOLOGY

## 4.1 Type and Source of Data

Data utilized in this thesis are daily data, factors are Nigerian Stock Exchange (NSE30) used as a dependent variable, obtained from Thomson Reuters Data stream database for the period 6 May 2013 to 6 May 2019.

Return of Bitcoin calculated from daily closing prices of Bitcoin denominated from USD to Nigerian Naira a (RRBTC) and used as an independent variable. The data were extracted from Coingecko.com for the period 6 May 2013 to 6 May 2019, by excluding the weekend days. The period of the Bitcoin is chosen based on the availability of data, because some cryptocurrencies were not traded in 2013. The returns of the cryptocurrency (Bitcoin) are calculated as follow:

$$RRBTC = 100 * d \log(Closing\ price) \text{ or } RRBTC = (p1 - p0) / P0$$

## 4.2 Methodology

In this thesis three kinds of analyses were used, the first studies were performed by Augmented Dickey-Fuller (ADF), Phillips-perron (PP) and Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) to test unit root of RRNSE30, RRBTC. Followed by quantile regression to find the effects of quantiles of the independent variable on quantiles of the dependent variable. Finally, quantile on quantile regression is an extension of the ordinary and standard regression model, and it was used to predict the impact of quantiles of the explanatory variable on the quantiles of the dependent

variable. This approach provides more efficient informations compared to the other models.

**4.2.1 Unit Root Tests**

As a first step in econometrics analysis, unit root testing should be conducted to review the stationarity properties of time series data. Stationarity is one of the most remarkable properties of a variable and it extremely affects the behaviour of the variable. Also, to find whether if the variables are stationary or not and if the data have constant covariance and variance over the time. When it confirms that variable is stationary, the impact will be temporal or regular. In addition, to find the potential integration and degree of integration between the variables. There are several unit roots tests or strategies to apply and analyze the integration properties of variables.

Augmented Dickey-Fuller Test **(ADF)** is recognized as one of the phenomenal tests which utilize to test whether the series are stationary or not, The ADF test spread the equation to add a high order regressive process in the model and make an adjusted inference to analyze if the series is stationary or not. Moreover Phillips- Perron test **(PP)** is similar to Dickey-Fuller test **(ADF)**. Anyhow, **PP** deal with serial correlation and heteroskedasticity of errors in a different aspect (Gokmenoglu, Azin and Taspinar, 2015). The **PP** method test the existence of unit roots and it is used as an alternative to the **ADF** test. The two tests are applied to test the integration level and the potential co-integration between the variables computes the residual root test. To figure the variance that is safe and regular for auto-correlation (Dickey – Fuller 1981; Phillips – Perron 1988).

The PP test is a non-parametric procedure used to solve the autocorrelation problem without a need to enter a lag length rather than Dickey and Fuller test which make it

an advantage for this property. As well as PP is considered as the robust to heteroscedasticity in the error term as well. The Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test is different from most other integration tests in that its null of stationarity is a simple hypothesis, a sequence of observations is represented in KPSS model as the sum of three components: a deterministic trend, a random walk, and a stationary error term. The KPSS test assumes that a series is non-stationary because it has a unit root, whereas the alternative assumes that a series is non stationary because it contains a linear trend or a mean. In this way, it differs from Dickey-fuller or Perron type tests, in which the null hypothesis presupposes the presence of a unit root (Syczewska, 2010).

### 4.2.2 Quantile Regression

The quantile regression method is used to determine the impact of the independent variable on the dependent variable's quantiles. Koenker and Bassett (1978) introduced the quantile regression model, which is an expanded version of the traditional linear regression model. By default, OLS estimation only considers the average effects of one variable on the other variable. Quantile regression, on the other hand, allows us to investigate the influence of an independent variable throughout the whole distribution of the dependent variable, rather than just at the center. Followed by local linear regression it has been used to determine the local effect of certain quantiles of the independent variable on the regression, and local linear regression, which was developed by Stone (1977) and Cleveland (1979), avoids the problem of the "curse of dimensionality" which is associated with nonparametric models. Furthermore, the local linear regression model's important characteristic is that it finds a linear regression locally around the neighborhood of each data point in the sample by assigning closer neighbor's greater weights. As a result, combining these two

techniques allows the quantiles of one variable to regress on the quantiles of another variable.

Uribe & Guillen (2020) identify the quantile regression method as a precise and adaptable econometric method, that may be used to solve a variety of issues related to modern economics and finance. Quantile regression can be used to determine any effects of various environmental and market factors on people's and businesses daily production, and consumption decisions or simulating a series of prices over time in response to market and seasonality.

Given specific variables, quantile regression tries to match the quantile of the cumulative distribution of the response variable with a defined confidence level. As a result, a response variable quantile is defined as a linear combination of covariates, and estimating the model necessitates determining the coefficients for that linear combination (Uribe & Guillen, 2020).

To conclude, quantile regression allows researchers to explore the relationship between a collection of factors not just in the center, but throughout the dependent variable's conditional distribution. The quantiles of a dependent variable are believed to be linearly linked to a set of conditioning variables in quantile regression models. When looking at the whole distribution, this usually leads to a nonlinear relationship between the dependent and independent variables. Consider the dependent and independent variables in the context of the overall distribution.

Regression is a strategy for identifying what variables influence the amplitude of a response in places that are not necessarily symmetric with respect to the mean and are

far from the central value. Quantile regression models are known to be resistant to outliers in the sample, which is important for studying financial time series because crises and booms are frequently accompanied by extreme data. When modeling intricate dynamics like those reported for financial pricing and returns, quantile regression models are also semi-parametric, which means they just require a few distributional assumptions about the data production process. When it comes to analyzing diverse market conditions, quantile regression approaches are also more flexible than linear regression models (Koenker and Bassett, 1978).

Binder & Coad (2011) mentioned in their study that quantile regression approaches can help us to get a better picture of the factors that influence individuals. While traditional regressions focus on the mean, quantile regressions may represent the dependent variable's whole conditional distribution. Furthermore, concentrating on average impacts may cause the relevant coefficient estimates to be underestimated or overestimated, or even miss essential interactions. As a result, a focus on the average is inappropriate for analyzing complicated interactions of variables in distributions with heterogeneous individuals.

A quantile regression methodology further removes the constraining assumption that the error components are uniformly distributed throughout the conditional distribution. We may acknowledge individual variability and examine the potential that predicted slope parameters change at various quantiles of the conditional happiness distribution by loosening this assumption (Binder & Coad, 2011).

### 4.2.3 Quantile on Quantile Regression

Finally, to evaluate the overall relationship between Bitcoin return and Nigeria stock indexes using Sim and Zhou's (2015) Quantile-on-Quantile regression methodology. This method is primarily dependent on the use of nonparametric estimates and quantile regression. To begin, standard quantile regression is used to investigate the influence of an explanatory variable on various quantiles of the outcome variable. However, this method is essentially a variant on standard quantile regression, which concentrates on the effects of a single independent variable's quantiles on the different quantiles of the dependent variable. Moreover, The QQR method has gained popularity among academics because it allows researchers to study the influence of explanatory variable quantiles on dependent variable quantiles, providing more complete information than traditional models. The QQR technique may be seen as a broadening of the ordinary quantile regression method. A mix of quantile regression and nonparametric estimates is used in the QQR method.

To conclude, this approach is an extension of the ordinary and standard quantile regression model that allows for the evaluation of the impacts of the quantile of one variable over another. It also combines two techniques: first, quantile regression, which looks at the effects of a predictor variable on a criterion variable's quantiles, and second, non-parametric estimation.

In this thesis, the QQR approach is utilized to find the possible variation of the bitcoin in the Nigerian stock exchange. Beginning with the following nonparametric quantile regression equation:

$$NSE30t = \beta\theta \ (BTCt) + \cup t\theta \tag{1}$$

where NSE30t denotes the NSE30 market returns of a given exchange rate in period t, BTCt represents the BTC market returns for that commodity in period t, $\theta$ is the $\theta$th quantile of the conditional distribution of the NSE30 returns and $Ut\ \theta$ is a quantile error term who's conditional $\theta$th quantile is equal to zero. $\beta\theta$ is an unknown function because we have no prior information about the nexus between NSE30 and BTC returns.

# Chapter 5

# EMPIRICAL RESULTS

## 5.1 Graphical Representations

These empirical results for the variables used in this study which are data estimates and model testing were done with EVIEWS 10 software, R and MATLAB programs were also used in the analysis of the variables. Before proceeding with formal tests of stationarity, it is necessary to plot the time series variables first, as illustrated in figure 1. These graphics help to clarify the nature of the series.
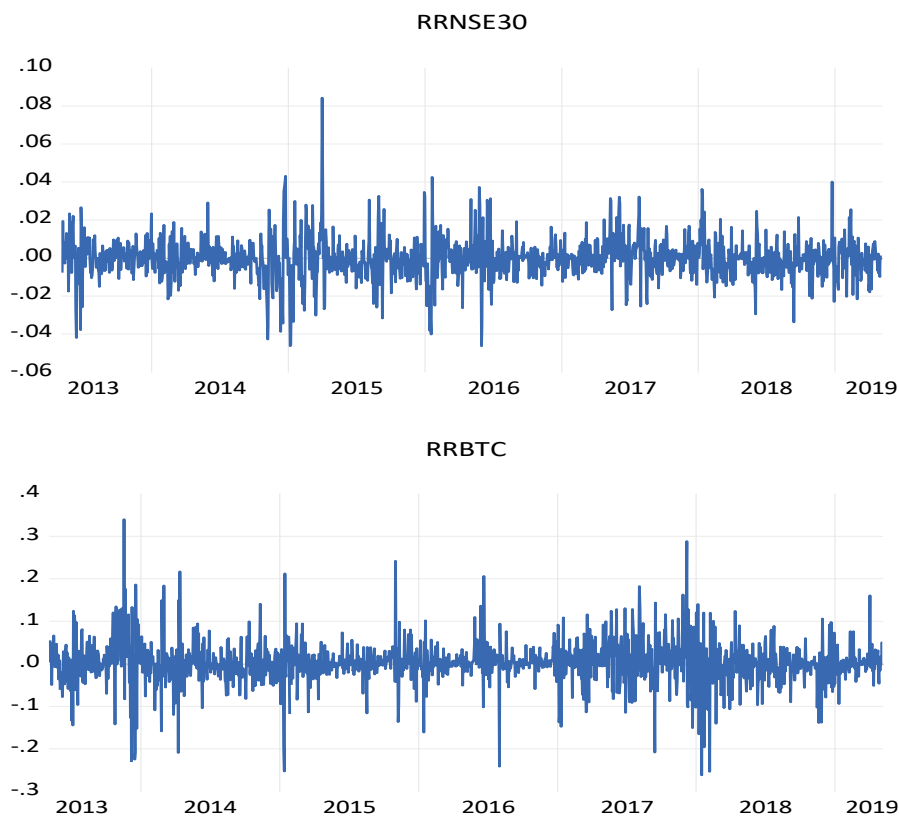


Figure 1: Trend plot of return of bitcoin and Nigerian stock exchange.

Starting with RRNSE30, it exhibits a high fluctuation trend over time. In other words, over the study period the RRNSE30 went through periods of decreasing and increasing, with both up and down trends since the beginning of the period, this fluctuation indicates that RRNSE30 mean has been changing, and the series may not be stationary. Lastly, the RRBTC shows a high fluctuation also since the beginning of the period and affirm that the mean is changing a lot during the period which suggests that the series is not stationary.

To summarize, visual inspection is a strong tool that offers us a first impression and provide us with an opinion on the nature of the data, as well as indicating whether there are any issues such as unit root problem. Looking at our variables, we can see that we have stationary series.

## 5.2 Descriptive Statistics Results

Table 1 provides the results of the descriptive statistics for both dependent and independent variables. The RRNSE30 has the most negative values in all categories starting with a mean value of -0.000155, and a decrease from a maximum of 0.084 to a minimum of -0.046. Same case for RRBTC which shows a decrease from a maximum of 0.339 to -0.261.

Table 1: Descriptive statistics

|  | **RRNSE30** | **RRBTC** |
|---|---|---|
| Observations | 1565 | 1561 |
| Mean | -0.000155 | 0.003093 |
| Median | 0.000000 | 0.002711 |
| Maximum | 0.084238 | 0.339520 |
| Minimum | -0.046311 | -0.261724 |
| Std. Dev. | 0.010530 | 0.050557 |
| Skewness | 0.304601 | -0.058055 |
| Kurtosis | 8.446289 | 9.070468 |
| Jarque-Bera | 1958.415 | 2397.700 |
| Probability | 0.000000 | 0.000000 |
| Sum | -0.242659 | 4.828200 |
| Sum Sq. Dev. | 0.173433 | 3.987451 |

In general, the descriptive statistics of our database for natural form of variables used in our research work illustrate as follow:

Jarque-Bera test shows that all of our variables are not normally distributed at all significance level, and Skewness for all of our variables was not far from zero, and Kurtosis for all of our variables was more than three.

Standard Deviation shows us the deviation from the mean for each of the variables as the RRBTC standard deviation was greater than the variable RRNSE30, which imply that the Nigerian stock exchange returns is weakly related to Bitcoin returns and we are unable to provide any evidence on the relationship between Nigerian stock performances and Bitcoin returns.

## 5.3 Unit roots Tests Results

Financial time series may, in the meanwhile, indicate trending behavior. The unit root tests are the ones to employ when investigating the series integration properties. Unit root tests have varying degrees of power and size. Thereby several unit root tests were conducted to confirm the integration order of the variables. Table 2 shows the results of unit root test for variables.

Table 2: Unit Root Test Results

| | Level Form | | First Difference | |
|---|---|---|---|---|
| **Variable (RRNSE30)** | **Intercept & Trend** | **Intercept** | **Intercept & Trend** | **Intercept** |
| **ADF** | -26.7893*** | -26.7976*** | -17.6459*** | -17.6404*** |
| **PP** | -26.5464*** | -26.5549*** | -368.2699*** | -367.6810*** |
| **KPSS** | 0.0974 | 0.0948 | 0.5000** | 0.5000** |
| | **Level Form** | | **First Difference** | |
| **Variable (RRBTC)** | **Intercept & Trend** | **Intercept** | **Intercept & Trend** | **Intercept** |
| **ADF** | -39.7639*** | -39.7727*** | -17.8369*** | -17.8426*** |
| **PP** | -40.5328*** | -40.5443*** | -346.8587*** | -346.6256*** |
| **KPSS** | 0.1040 | 0.1031 | 0.0657 | 0.1283 |

**(*) Significant at the 10%, (**) Significant at the 5%, (***) Significant at the 1% and (no) Not Significant**

Table 2 shows the unit root test results for both dependent and independent variables. For RRNSE30 (ADF, PP, KPSS) tests confirmed that our variable is stationary by rejecting the null hypothesis at level form, which means that our variable is integrated in order zero I (0).

In the case of RRBTC (ADF, PP, KPSS), our variable is integrated in order zero I (0) by rejecting the null hypothesis at level form. The tests confirm that our variable is integrated in order zero I (0).

We assume that both of our variables RRBTC and RRNSE30 are integrated order zero I (0) based on the majority of the tests results, since there were at least two tests for each variable proving the integration order of our variables.

## 5.4 Quantile Regression Results

The advantage of QR is that it can offer information on tail dependency both upper and lower tails beside the median, which may be thought of as capturing the dependent variable's normal phase. The QR method has the drawback of not being able to capture total dependence. While the QR approach will estimate the heterogeneous relationship between Nigerian stock exchange returns and bitcoin returns at different points of the conditional distribution, also it ignores the possibility that the nature of uncertainty could also influence how Bitcoin returns are related to Nigerian stock exchange returns in both large or small nature.

Quantile regression (QR), which examines the impact of Bitcoin returns on the distribution of Nigerian stock returns, provides more information than OLS regression.

Table 3: Quantile regression

| | (Intercept) | B |
|---|---|---|
| **tau= 0.05** | -0.015573 | 0.015093 |
| **tau= 0.10** | -0.011231 | 0.013541 |
| **tau= 0.15** | -0.008221 | 0.00685 |
| **tau= 0.20** | -0.006572 | 0.006726 |
| **tau= 0.25** | -0.005043 | 0.005039 |
| **tau= 0.30** | -0.003761 | 0.006917 |
| **tau= 0.35** | -0.002604 | 0.007506 |
| **tau= 0.40** | -0.00165 | 0.008048 |
| **tau= 0.45** | -0.000846 | 0.009094 |
| **tau= 0.50** | -0.000112 | 0.002799 |
| **tau= 0.55** | 0.0001534 | 0.003983 |
| **tau= 0.60** | 0.000919 | 0.00695 |
| **tau= 0.65** | 0.0021796 | 0.003548 |
| **tau= 0.70** | 0.0031302 | 0.002066 |
| **tau= 0.75** | 0.0045068 | 0.003184 |
| **tau= 0.80** | 0.0060868 | 0.0032 |
| **tau= 0.85** | 0.0077808 | 0.007631 |
| **tau= 0.90** | 0.0108092 | 0.003872 |
| **tau= 0.95** | 0.0165172 | 0.00134 |

Table 3 provides a results of quantile regression estimation, where the number of quantiles is 19 for tails (0.05, 0.10....0.95).

In lower quantiles (0.05-0.35) and in medium quantiles (0.40-0.50), the impact of bitcoin returns on stock market returns is negative meaning that bitcoin is performing in a bad way, this dramatic pullback in bitcoin comes as a flurry of negative headlines and catalysts, it can also be related to its supply and the market's demand for it.

In upper quantiles (0.50-0.95) the impact is positive, higher quantiles mean bitcoin is performing well and it has a positive impact on stock market, this can be due to the change in prices, it may be related to the rivalry with the other cryptocurrencies and exchange rate.

## 5.5 Quantile on Quantile Regression

The quantile-on-quantile regression methodology (QQR) was used to analyze the dependency between Nigerian stock exchange returns and Bitcoin returns under different distributions of each other to study possible heterogeneities and asymmetry. The QQR methodology is based on a nonparametric method created for detecting nonlinear and asymmetric dependency, and it provides a fuller view of the reliance relationship than traditional econometric approaches like the OLS and quantile regression. Moreover, to acquire a better understanding of the findings, we utilize QQR regressions to examine if different levels of Bitcoin returns influence the conditional distribution behavior of Nigerian stock exchange returns and their different frequencies.

Table 4: Quantile on Quantile Regression Results

| Q/T | 0.05 | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 | 0.35 | 0.40 | 0.45 | 0.50 | 0.55 | 0.60 | 0.65 | 0.70 | 0.75 | 0.80 | 0.85 | 0.90 | 0.95 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0.05** | 0.070 | 0.111 | 0.111 | 0.111 | 0.014 | 0.014 | 0.043 | 0.011 | 0.018 | 0.094 | 0.094 | 0.094 | 0.147 | -0.023 | 0.004 | 0.004 | 0.073 | 0.219 | 0.219 |
| **0.10** | -0.005 | 0.070 | 0.037 | 0.014 | 0.014 | 0.023 | 0.043 | 0.024 | 0.023 | 0.056 | 0.066 | 0.089 | 0.044 | 0.044 | 0.022 | 0.024 | 0.073 | 0.138 | 0.138 |
| **0.15** | -0.013 | -0.013 | 0.032 | 0.034 | 0.030 | 0.034 | 0.043 | 0.039 | 0.037 | 0.040 | 0.046 | -0.003 | 0.007 | 0.022 | 0.028 | 0.024 | -0.005 | -0.006 | 0.138 |
| **0.20** | 0.043 | 0.005 | 0.020 | 0.020 | 0.030 | 0.034 | 0.028 | 0.036 | 0.013 | -0.002 | -0.007 | -0.004 | -0.004 | 0.001 | -0.010 | -0.011 | -0.033 | -0.006 | -0.060 |
| **0.25** | -0.018 | -0.005 | 0.000 | 0.000 | 0.004 | 0.004 | 0.008 | -0.010 | -0.007 | -0.009 | -0.012 | -0.013 | -0.014 | -0.026 | -0.016 | -0.011 | -0.034 | -0.001 | -0.007 |
| **0.30** | -0.023 | -0.028 | -0.024 | -0.013 | -0.009 | -0.007 | -0.014 | -0.011 | -0.012 | -0.004 | -0.010 | -0.013 | -0.011 | -0.014 | -0.022 | -0.011 | -0.009 | -0.005 | 0.000 |
| **0.35** | 0.001 | -0.002 | -0.017 | -0.013 | -0.009 | -0.002 | -0.007 | -0.010 | -0.012 | -0.003 | -0.002 | -0.008 | -0.010 | -0.007 | -0.017 | -0.013 | -0.009 | -0.023 | 0.000 |
| **0.40** | 0.056 | 0.023 | 0.009 | -0.009 | -0.007 | -0.002 | -0.006 | -0.005 | -0.004 | -0.002 | 0.000 | -0.006 | -0.009 | -0.003 | -0.007 | -0.010 | -0.009 | -0.023 | -0.008 |
| **0.45** | 0.041 | 0.027 | 0.015 | 0.003 | -0.007 | -0.003 | -0.003 | -0.002 | 0.008 | 0.002 | 0.000 | 0.004 | 0.000 | 0.002 | 0.002 | 0.001 | 0.000 | -0.008 | -0.020 |
| **0.50** | 0.030 | 0.019 | 0.015 | 0.010 | -0.003 | -0.003 | 0.001 | 0.010 | 0.012 | 0.006 | 0.005 | 0.013 | 0.008 | 0.010 | 0.010 | 0.015 | 0.021 | 0.006 | -0.023 |
| **0.55** | 0.037 | 0.013 | 0.014 | 0.019 | 0.014 | 0.008 | 0.018 | 0.018 | 0.013 | 0.008 | 0.015 | 0.017 | 0.008 | 0.013 | 0.011 | 0.019 | 0.023 | 0.010 | -0.022 |
| **0.60** | 0.041 | 0.033 | 0.033 | 0.026 | 0.028 | 0.025 | 0.021 | 0.021 | 0.014 | 0.012 | 0.016 | 0.013 | 0.006 | 0.013 | 0.019 | 0.020 | 0.023 | 0.033 | 0.004 |
| **0.65** | 0.028 | 0.034 | 0.038 | 0.028 | 0.030 | 0.025 | 0.021 | 0.021 | 0.020 | 0.014 | 0.021 | 0.014 | 0.008 | 0.034 | 0.028 | 0.027 | 0.041 | 0.044 | 0.059 |
| **0.70** | -0.055 | -0.064 | 0.019 | 0.015 | 0.006 | -0.007 | 0.000 | 0.006 | 0.019 | 0.014 | 0.026 | 0.052 | 0.039 | 0.039 | 0.050 | 0.066 | 0.084 | 0.099 | 0.031 |
| **0.75** | -0.227 | -0.270 | -0.177 | 0.007 | -0.002 | -0.013 | -0.021 | -0.007 | -0.017 | -0.002 | -0.005 | 0.051 | 0.026 | 0.032 | 0.060 | 0.046 | 0.096 | 0.126 | -0.024 |
| **0.80** | -0.237 | -0.285 | 0.057 | 0.024 | 0.019 | 0.002 | 0.017 | 0.000 | -0.017 | -0.035 | -0.046 | 0.004 | 0.059 | 0.084 | 0.067 | 0.036 | 0.019 | -0.061 | -0.061 |
| **0.85** | 0.293 | 0.293 | 0.055 | 0.055 | 0.055 | 0.047 | 0.085 | 0.085 | 0.085 | 0.088 | 0.156 | 0.143 | 0.103 | 0.103 | 0.084 | 0.036 | -0.057 | -0.083 | -0.083 |
| **0.90** | 0.293 | 0.055 | 0.055 | 0.047 | 0.047 | 0.047 | 0.047 | 0.047 | 0.012 | -0.149 | -0.149 | -0.255 | -0.255 | -0.255 | -0.255 | -0.255 | -0.255 | -0.255 | -0.255 |
| **0.95** | 0.055 | 0.047 | 0.047 | 0.047 | -0.149 | -0.255 | -0.255 | -0.255 | -0.255 | -0.255 | -0.255 | -0.255 | -0.255 | -0.255 | -0.255 | -0.255 | -0.255 | -0.255 | -0.255 |
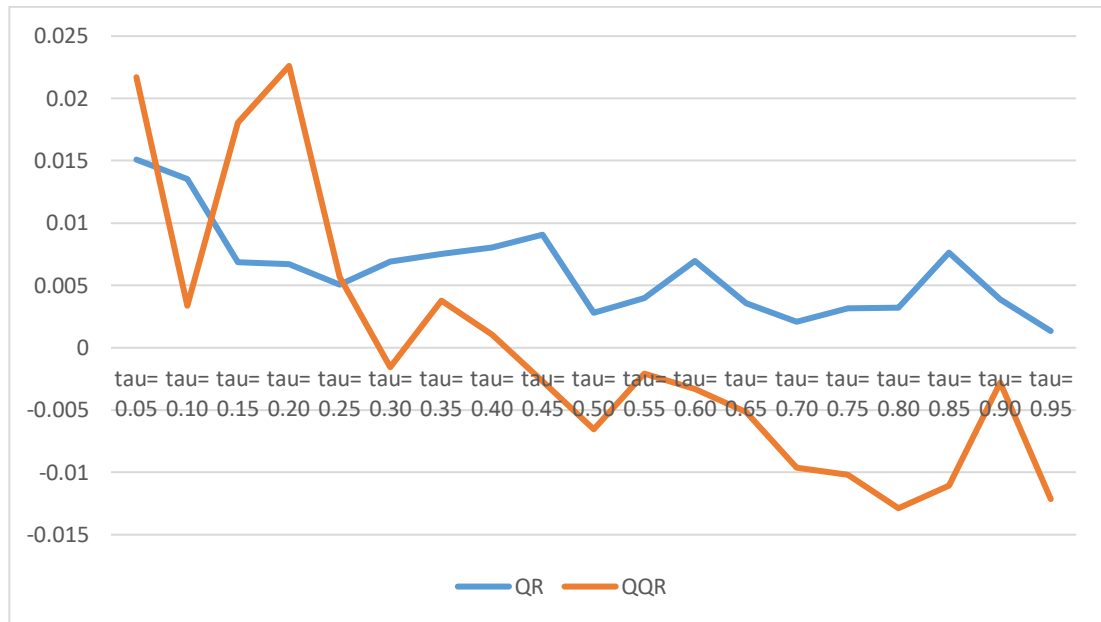
Figure 2: Quantile Regression and Quantile-on-Quantile Regression Estimâtes Comparaison.

The estimates of the quantile regression parameters, indicated by QR (dashed blue line), and the averaged QQR parameters, represented by QQR (dashed orange line), are displayed in the graph for different quantiles of Bitcoin and stock market returns in Nigeria. When the QQR estimates are compared to the quantile regression in Fig.2, the following findings are obtained for both Nigerian stock exchange returns and Bitcoin returns.

The results of QQR estimates are very similar to those of standard quantile regression. However, the QR estimate shows that Bitcoin returns have a negative impact on Nigerian stock exchange returns only in the upper quantiles (0.90 & 0.95) but the QQR estimate shows a negative impact in both the lower (0.10, 0.30 to 0.50) and upper (0.90, 0.70 & 0.95) quantiles.
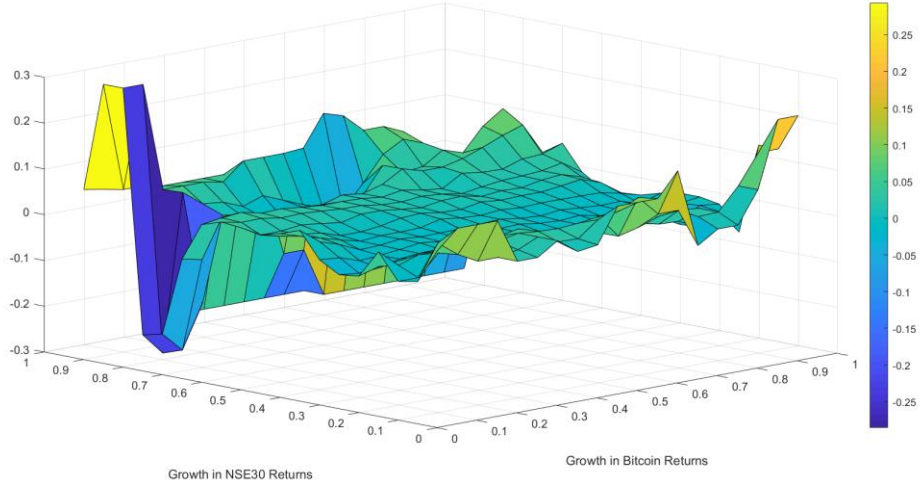
Figure 3: Three-dimensional graph of Growth in NSE30 returns and Growth in Bitcoin returns.

Figure 3 illustrates the QQR relationship and estimates the slope coefficient β1(θ, τ), which captures the effect of Bitcoin τth quantile return on the θth quantile return of Nigerian stock exchange at different values of τ and θ. In other words, the QQR method was set up in order to provide a more comprehensive view of dependency. It is accomplished by choosing a number of quantiles of Bitcoin returns indexed by tails and calculating the local influence of the tail-quantile of Bitcoin returns on the $\theta$-quantile of the Nigerian stock return.

The general structure of Bitcoin returns may be described as follows: Because these parameters are functions of quantiles and tails, they can change across different beta-quantiles of the Nigerian stock return and tails-quantiles of Bitcoin returns, revealing how the two factors are related at their respective distributions.

Looking first at the relationship between Nigerian stock returns and Bitcoin returns, as indicated by the intercept term of the Nigerian stock returns, using the QQR method.

Because is indexed by tails, it can fluctuate with various tails-quantiles of Bitcoin returns, unlike the QR approach's intercept term, which is not affected by tails.

As a conclusion from Figure 3, when the unconditional volatility of the relationship between stock market and bitcoin returns is close to 1, the asset contains a high volatility, meaning a high risk. That is to be said when this volatility is negative as they are below zero (<0) it can be a sign of using bitcoin in the portfolios to hedge the risk in order to take measures against bitcoin's market risk as it can serve as a hedge against volatility.

The relationship between the stock market and bitcoin returns in high quantiles is positive when the market is bullish regardless of bitcoin performance. Also, when bitcoin performs well and stock market is bearish there is a positive relationship between them. Bitcoin cannot be a hedge tool, because it's far too volatile compared to gold for example, which has a long history as well as being trustworthy and physical, contrary to bitcoin which is completely unregulated and lacks transparency, any hedging can't avoid the regulatory concerns that bitcoin will always face when prices reach such extremes.

However, there is no evidence that a negative Bitcoin return can generate such positive reactions when the market is performing poorly. The Nigerian stock return, for example, responds relatively weakly to variations in tails at its median (= 0.5). If the median Nigerian stock return indicates a market that is neither bearish nor bullish, Bitcoin returns should have less impact on Nigerian stocks during non-extreme market activity. As a result, our findings show that the relationship between Bitcoin return and

Nigerian stock return may be influenced by both the type of Bitcoin return and the performance of the Nigerian stock market.

Finally, regardless of whatever $\theta$ -quantiles of the Nigerian stock return that are being analyzed, even though we can have as significant negative bitcoin return (tail 0.2) it still may have a positive impact on the Nigerian stock market, in case of the well - functioning of the Nigerian stock market, a good Bitcoin return appears to be meaningless.

# Chapter 6

# CONCLUSION

This study examines the dynamic relationship and impact of Bitcoin as a cryptocurrency on the performance of stock exchange of Nigeria, including a daily data (weekdays only) from May 6, 2013 to May 6, 2019. However, many tests were conducted beginning with unit root test under (ADF, PP, KPSS) tests which confirms that our variables RRNSE30 and RRBTC are stationary by rejecting the null hypothesis at level form which affirms that our variables are integrated order zero I (0), since there were at least two tests for each variable proving the integration order of our variables. Regarding the plot trend of both variables, it shows a high fluctuation since the beginning of the period and affirm that the mean is not constant over time. According to the findings of quantile regression, lower quantiles (0.05-0.35) and in medium quantiles (0.40-0.50), the impact of bitcoin returns on stock market returns is negative meaning that bitcoin is performing in a bad way, this pullback it can be related to its supply and the market's demand for it. In upper quantiles (0.50-0.95) the impact is positive, higher quantiles mean bitcoin is performing well and it has a positive impact on stock market, due to the change in prices or even to the rivalry with the other cryptocurrencies and exchange rate. While the quantile-on-quantile regression it suggests that when this volatility is negative as the relationship between stock market and bitcoin returns are below zero (<0) it can be a sign of using bitcoin in the portfolios to hedge the risk and serve as a hedge against volatility. When the market is bullish the relationship between bitcoin and stock market returns is positive regardless of

bitcoin performance, on the other hand when the stock market is bearish the bitcoin has to perform well so that we get a positive relationship between the two. Bitcoin cannot be used as hedge tool due to it high volatility compared to gold. As a result, our findings show that the relationship between Bitcoin return and Nigerian stock return may be influenced by both the type of Bitcoin return and the performance of the Nigerian stock market.

Cryptocurrencies have the potential to facilitate global social and economic growth by offering access to finance and financial services. For example, adopting Bitcoin as the principal currency in third-world countries provides them with a currency that is unaffected by changes in their economy. Bitcoin is solely vulnerable to global economic changes since it works on a worldwide platform, and localized changes have little to no influence on the currency's total value.

By overcoming a lack of social trust and expanding access to financial services, cryptocurrency has the potential to help individuals overcome poverty. They may help poor nations flourish by boosting financial inclusion, enhancing fund traceability, and aiding individuals in getting out of poverty. As well as Bitcoin, the most popular cryptocurrency, which has already enabled many people and businesses to grow and prosper.

Bitcoin has risen to prominence as a new alternative investment option for investors, attracting both media and investor interest. Cryptocurrencies can be a useful way for investors to diversify their portfolios; some perceive Bitcoin as being akin to holding gold and acting as a safe haven when the value of other currencies falls. Some investors

see it as a currency or commodity, while others see it as a new asset class that is unrelated to stocks.

The return and risk of the asset grew as more bitcoin was added to the portfolio. If people exclusively invest in bitcoin, they will be exposed to a high level of risk in comparison to the potential reward. As a result, it is possible to infer that bitcoin has the potential to improve portfolio effectiveness. Investors should be warned, however, that this is an unregulated and new asset class. It's not a good idea to put more money into their account than they perceive to be their play money. Despite the increasing confidence in these assets, investors should be mentally prepared to lose their whole investment. If people can't accept this before investing, it's advisable to stay away from it because an intangible asset can't be compared to a physical metal. Both assets have advantages and disadvantages.

Based on history and a fundamental grasp of economics, adding an asset to the portfolio that is not controlled by the acts of a single government agency is the appropriate decision. The proportion of cryptocurrency in an investor's portfolio is one of the most often asked questions. To be honest, no one can provide a definitive answer. In any case, it's critical to grow this asset consistently in order to reap the benefits of cost averaging.

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