Crypto-currencies and Stock Market Performance: Evidence from the Nigerian Stock Exchange Market

*Ariyibi Mayowa. E

**Yinusa, Olumuyiwa. G

***Obadeyi, James. A

Submitted: *17.08.2024* ***Accepted:*** *14.12.2024* ***Published:*** *13.06.2025*

Abstract

The COVID-19 era ushered in new investment options and payment systems within the global financial system, this investment option operates independently of the economic stock market. Studies have remained inconclusive if the virtual asset is a substitute or complement that can improve the overall performance of the stock market. Due to this lacuna, this study examines the quantile and conditional mean impact of crypto currencies on stock market performance in Nigeria. The secondary data was monthly data for (60) months from 31st January 2019 to 31st December 2023. The study was anchored on the financial innovation theory of Schumpeter. The VECM (Vector error correction model) and the Quantile regression technique were the econometric techniques used to draw inferences from the outcome and explanatory variables. The VECM findings revealed that 77.5% of the variance in all share index are explained by their shocks, while BIT (Bitcoin), BNB (Binance smart index), ETH (Ethereum), and LIT (Litecoin) jointly explain positive variation in the all share index performance. Specifically BIT (Bitcoin), contributed 5.58%, BNB (Binance smart index) contributed 7.43%, ETH (Ethereum) contributed 3.64% and Litecoin contributed 5.86%. The Quantile regression technique revealed that cryptocurrencies (Bitcoin, Binance smart index, and Ethereum) have positive and negative significant effects on all share indexes at the upper, middle, and lower bound periods. The study recommended that investors and corporate organization pay attention to the new normal in finance since this asset have also ushered in the Fintech innovation in the financial system.

Keywords: *Crypto currencies; Stock market performance; Vector error correction model; Quantile regression technique*

JEL Classification: C52; G11; G45

1.1 Introduction

*Corresponding Author, Department of Banking and Finance, Faculty of Administration and Management Sciences, e-mail:ariyibimayowa@gmail.com, ORCID: 0000-0002-4514-1275

**Department of Banking and Finance, Faculty of Administration and Management Sciences, e-mail: yiusa2016@gmail.com, ORCID: 0000-0003-1005-2341

***Department of Banking and Finance, Faculty of Administration and Management Sciences, e-mail: obadeyi.james@oouagoiwoye.edu.ng, ORCID: 0009-0009-7525-9061

The Nigerian Capital Market is one of the most viable and largest capital markets in the continent having a market capitalization of twenty-eight billion naira and hosting different kinds of investors and financial assets on the market floor daily interacting to improve their return on investment (Sami and Abdallah, 2020). The functions of the capital market in an economic and financial system include mobilization of buyers and sellers, financing of business operations, project expansion, and intermediation of long-term funds. The capital market is the financial vehicle that aids in the transference of funds from the surplus economic unit to the deficit economic unit for investment into productive use (Abina and Maria, 2019; Sami and Abdallah, 2020).

From a consumer perspective and investor view, the surplus sector of the capital market is the investors who have a speculative reason for having funds or capital. This speculative motive is what will make them respond to favorable risk-return securities available on the market, based on their respective risk appetite (Baig, 2022). However, since the occurrence of COVID-19 in the year 2021, the financial architecture of the payment system and investment diversification has shifted to the cryptocurrency investment platform that has an un-regulated asset component which financing and investment decisions could be taken upon (Pineault, 2022). Cryptocurrencies are attractive digital currencies that could give reasonable return characteristics. Bitcoin and Ethereum are the two most traded crypto-currencies traded on blockchain technology.

However, examining the peculiarity of the virtual asset that is attributed to the decentralized operating system and non-regulatory back-up for investor intermediation in the technological market (Kumah & Odeis, Mensah, 2021). The traditional stock market is propelled or influenced by some factors like market anomalies, fundamental factors/ technical factors, and behavioral factors that are intrinsic to the type of investors in the market. The crypto-currencies have become the new normal in the financial system (Vardar and Aydogon, 2019; Salisu et al., 2019) which has made experts in dilemma towards the asset to either be seen as a substitute to market stocks or complementary asset that could help in the attainment of building a mean-variance portfolio (Jeribi et al, 2021; Caferra et al, 2021).

Cryptocurrencies have evolved to become a financial asset for investors and a means of payment. These two functions that this new normal is taking, will contend with the responsibilities of the players of the traditional capital market (Ozyesil, 2019). Because investment would give a return on investment and return on investment would improve the financial prowess of investors either

individual or corporate while being a means of payment would sup the transaction and intermediation benefit the market and institutions derive from granting that particular responsibility to the players in the financial web (Caferra and Vidal-Tomás, 2021). Cryptocurrencies let participants make payments in a Blockchain-decentralized environment that does not involve any third party such as banks or financial institutions. Apart from the ability to absorb investment and enhance payment/ transaction, this investment asset have also helped to improve the level of investment and saving culture of the populace in the economy. Another lacuna why the investigation of crypto-currencies with other financial tenets should be examined is to understand the challenges they pose and embrace the opportunities that are within the operation, is the unregulated nature of the operation of this digital currency (Jimoh and Benjamin 2020). Unlike the capital market which is been controlled by the Central Bank and other regulatory bodies, the technology relies on the blockchain which is an open-source software algorithm that verifies decentralized transactions (Jimoh and Benjamin 2020).

Theoretically, investors may suffer a negative pact of the asset and overall value of the market, if the value or price of a crypto-currency asset increases in rapid succession compared to the stock market. However, a positive pact would occur for investors if the virtual asset could improve the overall return of their investment short or long (Sami and Abdallah, 2020; Jeris et al, 2022; Gil-Alana et al, 2020). Studies like Sami & Abdallah (2020), and Jeris et al (2020) have been able to test the volatility and technique-based relationship between the micro and macro constructs of the crypto-currency market and stock market performance. However distorting findings due to the peculiarity of measurement and variable capturing may affect the position of validating the negative or positive position of the crypto-currencies market (Bouriet et al, 2017; Shahzad et al, 2020).

Based on the notable features of crypto-currencies and fewness of literature in Nigeria. This study examines into the individual and financial attributes of various selected crypto-currencies on stock market performance in Nigeria. This due to the peculiarity of each of the virtual asset characteristics in the block-chain technology, knowing fully well that financial asset have idiosyncratic risk and return that could either be beneficial or problematic to the overall performance of the traditional financial market in the economy.

The research inquiry is structure into five main sections. The introduction section provides a holistic and concise view into the topic under investigation. The second section captures the literature review and framework while the third section outlines the methodology used in the inquiry. The fourth section details the research findings and the final section address the conclusions and recommendations based on the objective of the study.

2.0 Literature Review

Financial Innovation Theory

The Schumpeter financial innovation theory is the main foundation for this research. The theory was proposed in 1934. According to Schumpeter, technological creative destruction creates new profit channels which as a result improve investment for financial institutions and markets. (Peteraf and Bergen, 2003). The theory posits that technological innovation tends to create financial instruments and payment models continually that will improve the return on investment of operators of the new innovative models. The financial system is an architecture that aids companies in managing risks. The financial products and contracts available in the financial system is the tool that would give companies and households to hedge and take on exposures in close alignment with the risk preference and tolerance of the companies (Sekhar and Gudimetla, 2013). Digital currencies are a product of financial innovation and technology that have been able to contend with the traditional payment system and also serve as an opportunity to diversify the investment portfolio of investors and companies. The operation of these digital currencies is improving investment nature but also affecting the financial stability of the system globally and locally.

Empirical Review

Ahmed, Sarkodie, and Leirvik, (2023) in their study investigated the combined and directional relationship between the top-five crypto-currencies and S&P 500 from January 2018 to December 2021. The subject matter of this inquiry is to examine the response effect of crypto-currencies on the stock market. The study employed the General-to-specific Vector Auto-regressive test and cumulative impulse response between the S&P 500 and the return/price of five selected crypto-currencies. The study revealed that there exist positive short and long-run effects of historical S&P 500 and five selected coins.

Jeris, Chowdhury, Akter, Frances, and Roy (2022) examine the relationship between cryptocurrency and the stock market. The methodologies include bibliometric and content analysis covering 151 journals from November 2008 to 2021. The content analysis covered prominent institutions, authors, countries, and journals and also discussed the key findings of four research streams. The findings have several implications for the present state of the literature on cryptocurrency and the stock market, including study gaps and potential future research initiatives.

Pineault (2022) examines the influence of modeling and adding crypto-currency to a portfolio. The study investigated the objective attributes of the digital currency by examining the backgrounds of Ethereum and Bitcoin, how both coins came about, their functional differences, investors' choice among the two coins, and finally the combined impact of the coins in an optimally diversified investment portfolio. The secondary data was thirty diversified stocks from 2016 to 2021. The results revealed that adjusted closing prices determine the optimal portfolio for a distinctive portfolio. The combination of the coins will aid in determining the expected return from the constructed investor's portfolio. This will allow for the understanding of what the best crypto-currency would be to add to an investment portfolio and the hypothetical stocks to include in an optimized portfolio.

Baig (2022) investigated into impacts of cryptocurrency (Bitcoin) on selected companies' stock prices listed on the Turkish Capital Market. The twenty-four biggest companies selected from the airlines, retail, and manufacturing companies were used and the BIST 30 National Index for four years also was employed. The multiple linear regression between the stock market prices of the companies and the main return ratios and financial leverage was used for the first regression while the standardization of companies' stock prices and correlation with the Bitcoin prices for the second regression was used. The findings revealed that financial statements had little impact on the stock market price of the companies analyzed with a weak correlation between the independent variables and outcome variables.

Heikal, Saragih, Ilham, Khaddafi, and Rusydi (2022) examine the effect of world Oil Prices on Cryptocurrency return. The quantitative descriptive research design was employed. The multiple linear regression model was used to determine the inference of the inquiry where world oil prices are the independent variable and the return on cryptocurrency is the dependent variable. The findings revealed that the world oil price explains the return on digital currency at 27.9% at a

significant level. The global market's swings in oil prices have an impact on cryptocurrency return. According to this study, changes in the price of oil on the global market have a favorable effect on cryptocurrency return. In other words, the rise of cryptocurrencies is encouraged by the rise in oil prices. The study advises paying closer attention to global oil prices before other commodity prices because of how much of an impact they have on global commodity prices. So, for instance, a drop in global oil prices could have an impact on cryptocurrency return.

Caferra and Vidal-Tomás (2021) examine the crypto-currencies and stock markets during the COVID-19 period. The Wavelet coherence and Markov switching auto-regressive model was adopted to determine the behavior between the outcome variable and the explanatory variable. Bitcoin and Ethereum are the currencies while the SP500 and Euro Stoxx 50 are the stock indices used for the inquiry. The results revealed that financial contagion occurred in March for both cryptocurrency and stock prices. This has allowed investors to hedge their finances toward cryptocurrency investments.

Kumah and Jones (2021) in their inquiry examine the benefit and cause/effect of crypto-currencies and the African Stock Market. The subject matter was to determine if the crypto-currencies market could be integrated into the African stock market. To determine if cryptocurrency assets could help in effective portfolio management and building of local and international investors. To also determine the relevance between the cryptocurrency market and country-specific financial market/macroeconomic variables. The study was able to model three crypto-based currencies and eight African stock Indices and determine the level of integration. The study adopted the multi-scale approach analysis and continuous market wavelet technique. The variable for the crypto-currencies bitcoin, Ethereum, litecoin, and eight African stocks (Nigeria, Egypt, South Africa, Kenya etc). The findings reveal that low degrees of integration between the market at higher frequencies, which grow stronger at medium frequencies and perfectly integrated at lower frequencies.

Jimoh and Benjamin (2020) examine the relationship between exchange rates, stock market prices, and the two most traded cryptocurrencies in Nigeria. The study is themed on the disruption in payment systems around the world that have affected and influenced various traditional business cycles in the global market and local market. The study used the time series monthly data between August 2015 and December 2019. The Generalized Autoregressive Conditional Heteroscedasticity

(EGARCH 1.1), Exponential Autoregressive Conditional Heteroscedasticity (EGARCH 1,1), and Granger causality technique to determine the nature of volatility between the variables and directional impact. The outcome analysis demonstrates that the volatility of Bitcoin and Ethereum prices has a greater impact on the stock market price than Nigeria's exchange rate. Additionally, there is proof that Bitcoin and Ethereum have a one-way causal relationship with the all-share index. These results suggest that there is a need that Nigerian stock market participants to pay close attention to the movement of pricing of cryptocurrencies.

Sami and Abdallah, (2020) in this study the relationship between the crypto-currencies market and the Stock market is examined. The study intends to examine the positive and negative influence of the crypto-currencies market on the stock exchange market in Golf countries. The secondary data was sourced between 2014 and 2019 from the crypto-currencies database and international data in Gulf countries. The study employed the IV-GMM estimation. The findings revealed that crypto-currencies and the stock market have a negative relationship.

Corelli (2018) examines the relationship between cryptocurrencies and fiat currencies to determine or establish any pattern or relationship among the series. Due to their close connection to the Blockchain system from which they derive, cryptocurrencies are a hot topic in finance and are typically seen as a component of the current, global financial revolution. The unique inquiry examines the interconnectedness of real money and digital currencies in the economy. The findings revealed that there exists some level of relationship between cryptocurrencies and fiat currencies in the economic and financial system. The outcome is a clear and possibly explainable relationship between cryptocurrencies and Asian markets while envisioning some kind of Asian effect.

Appraisal of Literature

Most of the studies examine how cryptocurrencies interact with stock markets, such as Ahmed et al. (2023) and Jeris et al. (2022). In the context of whether focusing on the S&P 500 or regional stock indices, these studies explore correlations, volatility, and potential for portfolio diversification involving cryptocurrencies. Multiple studies employ regression models and time series analysis to investigate these relationships. For example, Ahmed et al. (2023) used a Vector Auto-regressive model, while Jimoh and Benjamin (2020) employed Generalized Autoregressive Conditional Heteroscedasticity (EGARCH). These techniques are popular for exploring financial

relationships. The research highlights global implications. Whether analyzing the effect of world oil prices on cryptocurrencies (Heikal et al., 2022) or the interconnectedness of cryptocurrencies and fiat currencies (Corelli, 2018), these studies demonstrate that cryptocurrency trends are influenced by global market variables. Some studies focus on specific regions. For example, Baig (2022) examined the Turkish capital market, while Kumah and Jones (2021) focused on the African stock markets. Others, like Sami and Abdallah (2020), emphasize Gulf countries, revealing varying regional cryptocurrency impacts on local markets. The studies differ in the cryptocurrencies they examine. For instance, Ahmed et al. (2023) analyzed five major cryptocurrencies, while Baig (2022) focused only on Bitcoin. Similarly, Kumah and Jones (2021) considered multiple cryptocurrencies, including Bitcoin, Ethereum, and Litecoin. The research varies in the time periods and market contexts they explore. While Ahmed et al. (2023) focused on the period between 2018 and 2021, Pineault (2022) used data from 2016 to 2021. In contrast, studies like Jeris et al. (2022) provide a broad bibliometric review covering literature from 2008 to 2021. While some studies like Ahmed et al. (2023) reveal positive correlations between cryptocurrencies and stock markets, others such as Sami and Abdallah (2020) report negative relationships. The diversity in findings highlights the complexity and context-dependence of cryptocurrency-stock market interactions.

1.2 Methodology

This study employed the ex-post facto research design in determining the relationship and effect of crypto-currencies and stock market performance: evidence from Nigeria's stock exchange market. The explanatory variables include Bitcoin, Ethereum, BNB (Binance Smart chain network), and Litecoin, The asset price at the end of each month was used because the monthly price tends to show the fair and average value of a security at the end of the year. The outcome variable is the all-share index (ASI), which is the holistic value of equity and debt component instruments traded on the Nigeria Stock Exchange (Jimoh and Benjamin, 2020; Kumah and Jones, 2021). The secondary data was employed which was monthly data of the crypto-currency prices and all share index volume that was sourced from the crypto-currency platform (infor. ng) and central bank statistical bulletin. The data would be secondary data from the period of 31st January 2021 to 31st December 2023. The study would help to capture the holistic position of various virtual financial asset effects on the Nigeria stock exchange (Heikal et al, 2022).

Model Specification

To achieve this objective of the effect of crypto-currencies and stock market performance: evidence from the Nigeria stock exchange market the Vector Error Correction Mechanism (VECM) model was employed to determine the effect between the dependent variable and independent variable. The impact model was adopted from the study of Agama and Akanegbu (2022)

$$\Delta lnASI_t = \sigma + \sum_{i=1}^{k-1} \beta_i \, \Delta lnASI_{t-i} + \sum_{j=1}^{k-1} \phi_j \, \Delta lnBIT_{t-j} + \sum_{m=1}^{k-1} \varphi_m \, \Delta InBNB_{t-m} + \sum_{n=1}^{k-1} \psi_n \, \Delta lnETH_{t-n} + \sum_{n=1}^{k-1} \psi_n \, \Delta lnLIT_{t-n} + \lambda_1 ECT_{t-1} + \mu_{1t}$$

Where;

$k-1$ is the lag length is reduced by 1; β_j, ϕ_j, φ_m and ψ_n are short-run dynamic coefficients of the model's adjustment long-run equilibrium; λ_i is the speed of adjustment parameter with a negative sig; ECT_{t-1} is the error term; μ_{it} is the residuals. The outcome variables ASI; All share index at the time t while the independent variables includes; BIT: Bitcoin price at time t; BNB: Binance smart chain at time t; ETH: Ethereum at time t; LIT: Litecoin at time t

1.4 Results and Discussion

Table1: Descriptive Analysis

	ASI	BIT	BNB	ETH	LIT
Mean	4.557259	4.989107	3.049071	4.073889	3.962839
Median	4.027684	4.618259	2.334978	3.306438	3.081447
Maximum	9.635967	8.960728	8.506640	9.588047	9.808015
Minimum	0.550285	2.606349	0.173186	1.029789	1.485906
Std. Dev.	2.570432	1.600163	2.290136	2.096824	2.400895
Skewness	0.473872	0.938745	0.805484	0.828046	0.736483
Kurtosis	2.153643	3.140511	2.597836	2.514806	2.362093
Jarque-Bera	4.036349	8.861777	6.892381	7.445130	6.441392

Probability	0.132898	0.011904	0.031867	0.024172	0.039927
Sum	273.4356	299.3464	182.9443	244.4333	237.7703
Sum Sq. Dev.	389.8200	151.0708	309.4386	259.4036	340.0934
Observations	60	60	60	60	60

Source: Author's Compilation (2024)

Descriptive statistics is a pre-estimation test that helps to show the nature of the variables deployed for the inquiry. The ASI (Share index) has a mean value of 4.55%, a median value of 4.02%, and a standard deviation has a variation of 2.57. BIT (Bitcoin) has a mean value of 4.98%, a median value of 4.16%, and a standard deviation of a variation of 1.60. BNB (Binance smart chain) has a mean value of 3.04%, a median value of 2.33%, and a standard deviation variation of 2.29. ETH (Ethereum) has a mean value of 4.07%, a median value of 3.30%, and a standard deviation has a variation of 2.09. LIT (Litecoin) has a mean value of 3.96%, a median value of 3.08%, and a standard deviation has a variation of 2.40. ASI (All share index) is platykutic at 2.15, since (2.15<3), BIT (Bitcoin) is mesokutic, since (3.14 equals 3), BNB (Binance smart chain) is platykutic at 2.59, since (2.59<3), ETH (Ethereum) is platykutic at 2.51, since (2.51<3), LIT (Litecoin) is platykutic at 2.36, since (2.36<3). The Jarque-Bera Statistics helps to show if the variables are evenly distributed. ASI (All share index) is 4.036 at 0.132, BIT (Bitcoin) is 8.861 at 0.011, BNB (Binance smart chain) is 6.892 at 0.031, ETH (Ethereum) is 7.44 at 0.024, and LIT (Litecoin) is 6.44 at 0.039. It shows that ASI (All share index) is the only variable that is normally distributed.

Table 2: Correlation Matrix

	ASI	**BIT**	**BNB**	**ETH**	**LIT**
ASI	1				
BIT	0.5448	1			
BNB	0.3935	0.5141	1		
ETH	0.7407	0.5069	0.7973	1	
LIT	0.3286	0.8257	0.5997	0.6880	1

Source: Author's Compilation (2024)

The test above helps to check the presence of multi-collinearity among the outcome and explanatory variables. This table shows no presence of multi-collinearity.

Table 3: Augmented Dickey-Fuller Test

Variable	Level T-Stat	Critical Value @ 5%	First Difference T-stat	Critical Value @ 5%	Prob	Order of Integration
ASI	-1.7283	-2.9126	-5.8000	-2.5482	0.0000	I(I)
BIT	-1.6359	-2.9117	-6.3751	-2.9126	0.0000	I(I)
BNB	-0.3577	-2.9117	-7.1920	-2.9126	0.0000	I(1)
ETH	-2.2679	-2.9117	-6.4868	-2.9126	0.0000	I(I)
LIT	-1.3119	-2.9145	-3.5566	-2.9145	0.0000	I(I)

Source: Author's Compilation (2024)

The table above is also a pre-estimation test that aids in giving direction to the econometric modeling and analysis that would be suitable for drawing inferences in an inquiry. The table above revealed ASI (All share index), BIT (Bitcoin), BNB (Binance smart chain), ETH (Ethereum), and LIT (Litecoin) are stationary at first difference. It implies that the Vector Error Correction Mechanism (VECM) model would be the suitable econometric technique to draw inferences between the outcome variable and explanatory variables adopted in this study. Knowing fully well, that VECM allows the estimation of the long-term effects and to analyze the short-run adjustments process within the model.

Table 4: Johansen Co-integration Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.545251	150.5410	69.81889	0.0000
At most 1 *	0.505236	104.8364	47.85613	0.0000
At most 2 *	0.361500	64.02327	29.79707	0.0000
At most 3 *	0.320607	38.00252	15.49471	0.0000

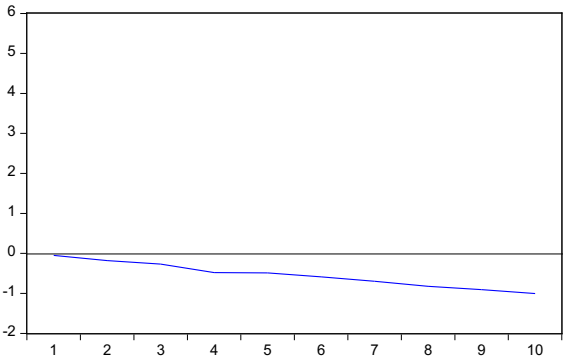
At most 4 *	0.235597	15.58232	3.841466	0.0001
Trace test indicates 5 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.545251	45.70460	33.87687	0.0013
At most 1 *	0.505236	40.81314	27.58434	0.0006
At most 2 *	0.361500	26.02075	21.13162	0.0094
At most 3 *	0.320607	22.42021	14.26460	0.0021
At most 4 *	0.235597	15.58232	3.841466	0.0001
Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Author's Compilation (2024)

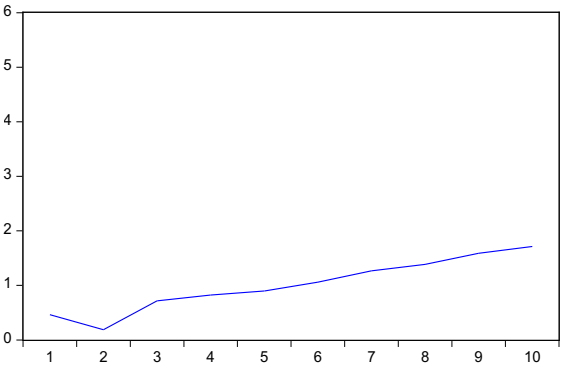
Johansen's co-integration test was employed to test whether the linear combinations of the variables could result in a long-run relationship among the variables. The co-integration result presented shows that the null hypothesis of the co-integrating vector is accepted at "at most 2" and "at most 1" co-integrating vector at 5% significance level for Trace and Maximum Eigen test respectively denoting two and one co-integrating vectors. Our cointegration test implies that explanatory variables converge to all share indexes which is the stock market performance in the long run.

Figure 1: Impulse Response Functions

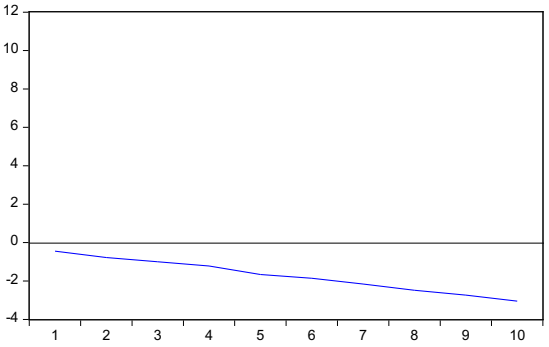
Accumulated Response of BIT to ASI



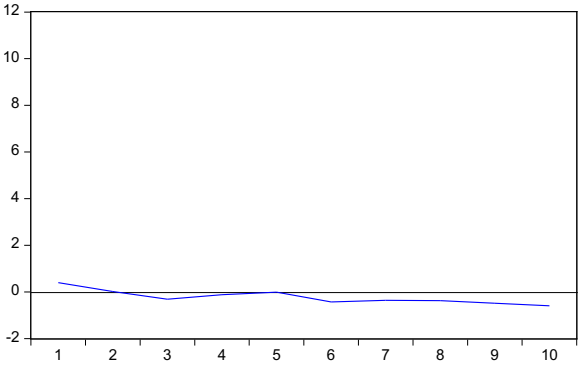
Accumulated Response of BNB to ASI



Accumulated Response of ETH to ASI



Accumulated Response of LIT to ASI



The Table above displays the impulse response functions corresponding to the VECM model.

Table 5: Variance Decomposition Analysis

Table 5: Variance Decomposition Analysis

Period	SE	ASI	BIT	BNB	ETH	LIT
1	2.784547	100.0000	0.000000	0.000000	0.000000	0.000000
2	3.372642	82.52034	5.225152	4.790064	2.949184	4.515256
3	3.589368	73.92685	6.140030	8.859805	3.482881	7.590439
4	4.018634	76.35316	6.113341	8.181757	3.266031	6.085710
5	4.373247	77.56590	5.487377	7.436842	3.641551	5.868333
6	4.555480	76.65760	5.531888	7.346887	3.646811	6.816813
7	4.797309	75.76483	6.015218	7.762469	4.068372	6.389107
8	5.056919	75.53435	5.986388	8.355471	3.912198	6.211592
9	5.280967	75.47796	6.027741	8.146158	4.065896	6.282249
10	5.471202	75.34516	6.027880	8.134832	4.237509	6.254615

Source: Author's Compilation (2024)

The variance decomposition for 1-year to 10 years helps to show the extent to which variables are dependent on each other in the model, it helps to provide information about the importance of each random innovation affecting the variables in the model during the forecast horizon. The variance decomposition indicates the degree to which each variable contributed to the other variables in the autoregression.

The variance decomposition table above reveals that in the first period, none of the crypto-currencies explain (0%) variation in the all share index that was 100%. But in the 5 periods, 77.5% of the variance in all share index are explained by their shocks, while BIT (Bitcoin), BNB (Binance smart index), ETH (Ethereum), and LIT (Litecoin) jointly explain positive variation in the all share index performance. Specifically BIT (Bitcoin), contributed 5.58%, BNB (Binance smart index) contributed 7.43%, ETH (Ethereum) contributed 3.64% and Litecoin contributed 5.86%. At 10 period, 75.3% of the variance in all share index are explained by their shocks, while BIT (Bitcoin), BNB (Binance smart index), ETH (Ethereum), and LIT (Litecoin) jointly explain positive variation

in all share index performance. Specifically BIT (Bitcoin), contributed 6.02%, BNB (Binance smart index) contributed 8.13%, ETH (Ethereum) contributed 4.23% and Litecoin contributed 6.25%.

Table 6: Quantile Regression Analysis

According to Koenker and Basset (1978), the model is an alternative method from the popular ordinary least square regression that captures the conditional mean analysis. This model aids in measuring the quantiles of the outcome variables given a set of explanatory variables. The model helps to show the conditional distribution of the outcome variable over a given period on the selected explanatory variables. Quantile regression helps to determine the upper bound, middle bound, and lower bound percentile of the dependent variable as affected by the explanatory variables. This study adopts this model in determining the upper bound, middle bound, and lower bound relationship between the crypto-currencies and stock market performance in Nigeria from 31st January 2017 to 31st December 2021.

This model was adopted and adjusted from the studies of Noam (2019) and Mallick (2021)

$$ASI = \alpha + \beta_1 BIT + \beta_2 BNB + \beta_3 ETH + \beta_4 LIT + \mu$$

Lower Bound (0.1 percentile)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
BIT	0.169839	0.162638	1.044274	0.0008
BNB	0.205010	0.256999	0.797705	0.0284
ETH	-0.068696	0.266023	-0.258233	0.7972
LIT	0.003821	0.208538	0.018325	0.9854
Middle Bound (0.5 percentile)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
BIT	0.806448	0.251262	3.209591	0.0022
BNB	-0.303406	0.288578	-1.051385	0.2976
ETH	0.043238	0.264279	0.163606	0.8706
LIT	0.221591	0.248117	0.893089	0.0056
Higher Bound (0.9 percentile)				

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BIT	1.163270	0.418816	2.777520	0.0074
BNB	-0.592607	0.301365	-1.966411	0.0542
ETH	0.789723	0.479818	1.645880	0.0054
LIT	0.329485	0.375553	0.877333	0.3841

Source: Author's Compilation (2024)

The table above shows the position impact of crypto-currencies on stock market performance for (60) months. The lower bound shows that BIT (Bitcoin) and BNB (Binance smart chain) has a positive significant effect on all share index at a 5% level of significance. The middle bound shows that BIT (Bitcoin) and LIT (Litecoin) has a positive significant effect on all share index at a 5% level of significance. The higher bound shows that BIT (Bitcoin), BNB (Binance smart chain), and ETH (Ethereum) has a positive and negative significant effect on all share index at a 5% level of significance. The findings above reveal that virtual assets are investment options that could be used as a complement in building a mean-variance portfolio along with other traditional stock market financial investments in the economy.

1.5 Conclusion and Recommendation

From the micro perspective of investment decision and financing decisions the ability of the finance manager and finance department in any organization to be able to find viable project opportunities and develop a negatively correlated portfolio that would help the continuity prospect of such an individual organization is becoming challenging due to the new innovative technology of the crypto-currencies, that is either understood to be a beneficial financial asset to the financial market or a menace that is disrupting the availability of new mode of holding money.

However, based on the findings above from the VAR (variance decomposition) indicate that there is a strong statistical response of the crypto-currencies towards the stock market performance in Nigeria within a (60) sixty-month bracket from 31st January 2017 to 31st December 2021. These findings depict that virtual asset trading and price influence the overall performance of the stock market in Nigeria. Inclusively, from the estimated Quantile regression technique, results show that BIT (Bitcoin) and BNB (Binance smart chain) have a positive significant effect on all share indexes at the lower bound. Also, BIT (Bitcoin) and LIT (Litecoin) has a positive significant effect on all share index at the middle bound while BIT (Bitcoin), BNB (Binance smart chain), and ETH

(Ethereum) has a positive and negative significant effect on all share index. This depicts that crypto-currencies in their various forms have a positive and slightly negative effect on all share indexes in the Nigerian stock market. It shows that the financial asset could be another come-to-stay asset that can help in investment and financing decision prospects of investors in the market.

Inclusively, the findings of this inquiry agree with the study of Ahmed, Sarkodie, and Leirvik (2023) which also captures various crypto-currencies assets to examine how each virtual asset affects the S&P 500, which revealed a positive short and long-run effect, giving a concise position that those financial instruments are a complement to the performance of the market in Nigeria. Jeris et al (2022) using the bibliometric research method on 151 journals found in more than average of the papers reviewed that crypto-currencies have a positive relationship with the stock market. Pineault (2022) study pushed further and peculiar to this present study by examining which among Ethereum and Bitcoin jointly and separately influence the portfolio combination of an investor. The study revealed that Bitcoin gives a higher positive return in an investor's optimal portfolio compared to Ethereum. The study of Biag (2022) disagrees with the above studies and findings of this inquiry, by revealing that Bitcoin price has a negative weak correlation with stock market price and performance. Cafferra and Vidal-Tomas (2022) showed dual results that crypto-currencies could serve as a financial hedge instrument for some time and even have a positive contagion effect on the stock market, but this positive contagion effect only has a short-run impact and not a long-run impact. Theoretically, the findings validate the position of financial innovation theory (Schumpeter, 1934) that crypto-currencies are technological creative destruction that has and would be a profit channel that would improve the overall dexterity and investment option for the markets.

Based on the dual findings, it, therefore, recommended that investors and corporate organization pay attention to the new normal in finance since this asset have also ushered in the fintech innovation in the financial system. The corporate bodies should ensure knowledge about this financial innovation is understood, before putting the scarce resources to ensure it becomes a complement to other financial decisions that have been taken by the organisation.

References

Abina, A. P., and Maria, L. G. (2019). Capital market and performance of Nigeria economy. *International journal of innovative finance and economics research*, *7*(2), 51-66.

Ahmed, M. Y., Sarkodie, S. A., & Leirvik, T. (2023). Mutual coupling between stock market and cryptocurrencies. *Heliyon*, *9*(5).

Baig, M. (2022). The Impact of Cryptocurrency over the Turkish Capital Market: A Case Study of Bitcoin (BTC). *Global Research Review in Business and Economics [GRRBE] ISSN (Online)*, 2454-3217.

Caferra, R., & Vidal-Tomás, D. (2021). Who raised from the abyss? A comparison between cryptocurrency and stock market dynamics during the COVID-19 pandemic. *Finance Research Letters*, *43*, 101954.

Caferra, R., and Vidal-Tomás, D. (2021). Who raised from the abyss? A comparison between cryptocurrency and stock market dynamics during the COVID-19 pandemic. *Finance Research Letters*, *43*, 101954.

Charles, A., and Darné, O. (2019). Volatility estimation for Bitcoin: Replication and robustness. *International Economics*, *157*, 23-32.

Corelli, A. (2018). Cryptocurrencies and exchange rates: A relationship and causality analysis. *Risks*, *6*(4), 111.

Corelli, A. (2018). Cryptocurrencies and exchange rates: A relationship and causality analysis. *Risks*, *6*(4), 111.

Frankovic, J., Liu, B., & Suardi, S. (2022). On spillover effects between cryptocurrency-linked stocks and the cryptocurrency market: evidence from Australia. *Global Finance Journal*, *54*, 100642.

Frankovic, J., Liu, B., and Suardi, S. (2021). On spillover effects between cryptocurrency-linked stocks and the cryptocurrency market: evidence from Australia. *Global Finance Journal*, 100642.

Heikal, M., Saragih, M. M. S., Ilham, R. N., Khaddafi, M., & Rusydi, R. (2022). Effect of World Oil Prices on Cryptocurrency Return. *Journal of Accounting Research, Utility Finance and Digital Assets*, *1*(1), 61-68.

Heikal, M., Saragih, M. M. S., Ilham, R. N., Khaddafi, M., and Rusydi, R. (2022). Effect of World Oil Prices on Cryptocurrency Return. *Journal of Accounting Research, Utility Finance and Digital Assets*, *1*(1), 61-68.

Jeribi, A., Jena, S. K., & Lahiani, A. (2021). Are crypto-currencies a backstop for the stock market in a COVID-19-led financial crisis? Evidence from the NARDL approach. *International Journal of Financial Studies*, *9*(3), 33.

Jeris, S. S., Chowdhury, A. N. U. R., Akter, M. T., Frances, S., and Roy, M. H. (2022). Cryptocurrency and stock market: bibliometric and content analysis. *Heliyon*, e10514.

Jeris, Saeed Sazzad, ASM Nayeem Ur Rahman Chowdhury, Mst Taskia Akter, Shahriar Frances, and Monish Harendra Roy (2022). "Cryptocurrency and stock market: bibliometric and content analysis." *Heliyon*.

Jimoh, S. O., and Benjamin, O. O. (2020). The effect of cryptocurrency returns volatility on stock prices and exchange rate returns volatility in Nigeria. *Acta Universitatis Danubius. Œconomica*, *16*(3).

Kumah, S. P., & Odei-Mensah, J. (2021). Are Crypto-currencies and African stock markets integrated?. *The Quarterly Review of Economics and Finance*, *81*, 330-341.

Kumar Mallick, S., & Arvind Mallick, D.M. (2021). A study on the relationship between Crypto-currencies and official Indian foreign exchange rate. Materials Today: Proceedings Advance online publication: https://doi.org/10.1016/j.matpr.2021.07.383.

Noam. E.M. (2019). The Macro-Economies of crypto-currencies: Balancing Entrepreneurialism and Monetary Policy: SIPA's Entrepreneurship & Policy Initiative Working Paper Series. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3493333.

Ozyesil, M. (2019). A Research on İnteraction Between Bitcoin and Foreign Exchange Rates. *Journal of Economics Finance and Accounting*, *6*(1), 55-62.

Peteraf, M. A., and Bergen, M. E. (2003). Scanning dynamic competitive landscapes: a market-based and resource-based framework. *Strategic management journal*, *24*(10), 1027-1041.

Pineault, A. (2022). Modeling the Impact of Adding Cryptocurrency in a Portfolio.

Sami, M., & Abdallah, W. (2020). Cryptocurrency and stock markets: complements or substitutes? Evidence from gulf countries. *Sami M., & Abdallah W.(2020). Cryptocurrency and Stock Market: Complements or Substitutes*, 25-35.

Sami, M., and Abdallah, W. (2020). Cryptocurrency and Stock Markets: Complements or Substitutes? Evidence from Gulf countries. *Sami M., & Abdallah W.(2020). Cryptocurrency and Stock Market: Complements or Substitutes*, 25-35.

Sekhar, S., and Gudimetla, V. (2013). Theorems and theories of financial innovation: models and mechanism perspective. *Financial and Quantitative Analysis, FQA*, *1*(2), 26-29.

Uzonwanne, G. (2021). Volatility and return spillovers between stock markets and crypto-currencies. *The Quarterly Review of Economics and Finance*, *82*, 30-36.