



VIRTUAL CURRENCY AND ECONOMIC GROWTH IN NIGERIA

Hussein Olamilekan AJIBOLA¹ & Oludare Olakunle FASINA²

¹ & ²Department of Accountancy, Federal Polytechnic Ilaro, Ogun State, Nigeria

Corresponding E-mail: jblhussein@gmail.com

Phone Number: +2348133298690

Abstract

Despite the recent rise in the value of several cryptocurrencies, the rate at which they are traded is still very volatile. Prices of the virtual currency are determined by supply and demand. As a result, it is vital to analyze their capitalization, which is determined by their pricing, in connection with economic performance. This study therefore looked at how virtual currency affects economic growth in Nigeria. Ex-post facto research design was used in the study. The data was collected during a ten-year period, from 2014 to 2023, using secondary sources. However, the Coinmarketcap website provided the statistics on virtual currencies, and the CBN Statistical Bulletin provided the measures of Nigeria's economic growth (real gross domestic product). The gathered data was analyzed using regression analysis, correlation, line charts, and descriptive statistics. The results showed that the real gross domestic product of Nigeria was not significantly affected by Bitcoin and Ethereum coin. The study came to the conclusion that the price of virtual currencies like Bitcoin and Ethereum coin cannot be used to forecast Nigeria's GDP. The study recommended that Nigerian government should consider enacting regulations that would protect against the excessive volatility of virtual currencies and their vulnerability to illegal operations in Nigeria.

Keywords: Bitcoin, Economic Growth, Ethereum coin, Gross Domestic Product and Virtual Currency.

1. Introduction

Virtual currency has continued to be a contentious topic in many countries around the world. While the 21st century undoubtedly brought about many advancements and changes, particularly in the financial technology sector, the block chain that gave rise to cryptocurrencies has remained the most contentious issue (Sakiz & Gencer, 2019). Virtual currency, according to Utomo (2018), is a form of money that uses cryptography for security and is designed to facilitate the exchange of digital data through a sequence of steps that employ the concept of crypto currency. To put it simply, crypto currency is a digital currency that is developed using block chain technology. Because of the system's high level of security, virtual currencies are hard to counterfeit because they are based on block chain technology. These currencies serve the same purposes as money and may be used as assets, stores of value, and means of trade. However, unlike money, cryptocurrency has no tangible proof because it is only stored in data (Sakiz & Gencer, 2019).

Bitcoin and Ethereum, global stablecoins like Libra and US Dollar Tether (USDT), and central bank-digital currency by central bank, CBDC, are the three categories Tong and Jiayou (2021) specifically used to group virtual currencies. Both Ethereum and Bitcoin are extremely decentralized and have erratic prices. They are mostly utilized for speculation, whereas stablecoins are supported by an algorithmic framework and are comparatively centralized.

There have been many concerns about the theoretical relationship between virtual money and economic growth, and there are answers available. Specifically, concerns regarding the effectiveness of digital currency distribution, its coexistence with fiat money, and its stability must be raised (Fernández-Villaverde & Sanches, 2018). Theoretically, price stability is achievable under this setup, but wise monetary regulation and effective allocation are still more pressing concerns. Recent increase in the prices of some cryptocurrencies, like Bitcoin, Ethereum, Lite coin, and Binance token, have further increased the importance of electronic money and, more importantly, block chain technology in countries all over the world (Salisu et al. 2023). For instance, Obisesan et al. (2024) tha that the price of bitcoin has increased recently, rising from 26600 USD in June 2022 to around 42265 USD as of December 2023. However, because virtual currency lacks tangible proof, the balance of bitcoin, Litecoin and Ethereum coin could be lost on the device used to store basic information about a particular coin, particularly if there is no backup copy of the information. This is because the cryptocurrencies prices are determined by supply and demand, and the rate at which the digital currency is exchanged is still highly volatile (Stancel, 2020). Their capitalization, which is determined by their pricing, is therefore necessary to be examined in relation to economic performance.

Virtual money is a discernible causative element for economic growth, notwithstanding the paucity of research on the subject in developing nations like Nigeria. Obisesan et al. (2024), Idisi, Adeagbo, Idiegbe, Isah, Simpa & Atteh (2024), Ademosu & Ayodele (2023), Yunusa (2021), and Ahannaya, Oshinowo, Sanni, Arogundade & Ogunwole (2021) are a few of these investigations. The majority of these studies was observed to have used descriptive analysis and content analysis, including frequency counts and percentages. The fundamental flaw in descriptive and content analysis, including frequency counts and percentages, is that they typically produce results that are not generalizable, which reduces the confidence level of potential users in the estimation. This assumption served as the foundation for this study, which looked at how virtual currency affects Nigerian economic growth, thereby providing answers to the underlisted questions:

- i. To what extent does bitcoin affect Nigerian real gross domestic product?
- ii. How does Ethereum coin affect Nigerian real gross domestic product?

2. Literature Review

2.1 Conceptual Review

Economic Growth

Appah, Tebepah and Newstyle (2023) described economic growth as a rise in the value of a nation's products and services over time, which may be used to gauge a nation's size. It is the steady rise in net national product or per capita national production over a long period of time. It suggests that the pace of increase in total production must be greater than the rate of population growth in order to raise the people' quality of living. But according to Jhingan (2022), economic growth is apparent when an economy's productive potential rises and is then utilized to generate more products and services. Because Nigeria's economy is so dependent on the commercial production of crude oil, it is a mono-product economy. That means crude oil contributes more than 80 percent of our nation's overall revenue, making it a significant source of both foreign exchange and government revenue (Jhingan, 2022).

Gross Domestic Product (GDP)

Regardless of the nationality of the individuals who generated the products and services, Appah and Zibaghafa (2018) make it clear that the gross domestic product is the entire amount of output that has occurred in the economy. The GDP is the entire amount of output made in Nigeria by both Nigerians and foreigners who reside there. The salaries and property gains of Nigerians living overseas are not included in the GDP. Similarly, it does not exclude foreign revenues and foreign property in Nigeria (Appah & Zibaghafa, 2018). According to Ironkwe and Agu (2019), the gross domestic product, or

GDP, is the sum of the dollar values of all products and services generated within a certain time period; it may be thought of as the size of the economy. The most common way to express GDP is in relation to the prior quarter or year. For instance, the GDP increased by 3% in the third quarter of 2017, which is considered to indicate that the economy grew by 3% at that time. Although quarterly growth rates are a regular indicator of the state of the economy, yearly GDP estimates are frequently used as a standard for gauging the size of the economy.

Virtual Currency

Virtual currency was defined by Mandeng (2018) as a private, de-nationalized, unreserved, floating, and convertible forms of currency. According to Idisi et al. (2024), virtual currencies share many traits with fiat money, including being easy to standardize, widely accepted, divisible, portable, and resistant to deterioration. These qualities also apply to cryptocurrencies: they are very safe, easy to transport, and hard to counterfeit. Due to their exchangeability with major currencies like the Naira or the Dollar, they are liquid, limited in supply, and can be exchanged for local currencies regardless of the physical entity, location, or time.

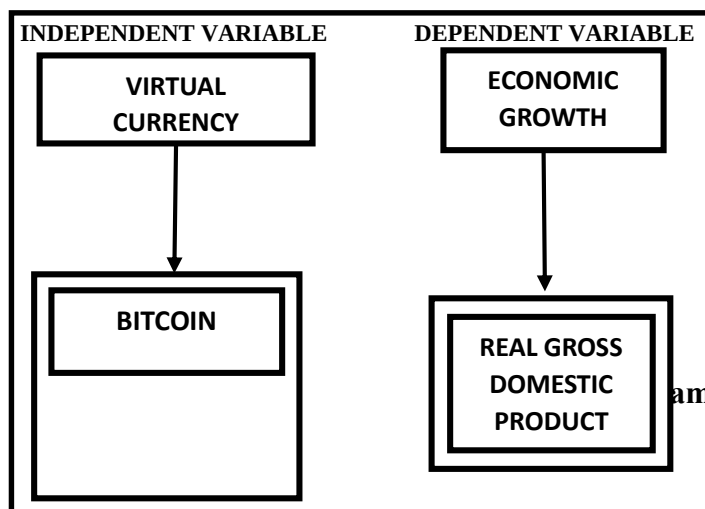
Bitcoin

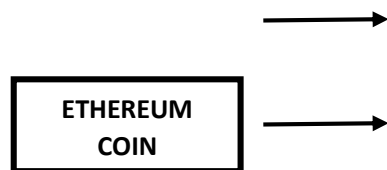
Rivera-Batiz (2019) claim that bitcoin was the first digital currency to be created in 2009. It is a standards-based, open-source technology that records and verifies transactions over the internet using cryptographic protocols to guarantee the security and safety of online transactions. In order to exchange bitcoin, users generate and save private keys in digital wallets along with their matching public keys, or bitcoin addresses (Jimoh & Oluwasegun, 2020). Bitcoin is a peer-to-peer digital currency that enables electronic payments between individuals or entities without going through any financial institutions (Eucharia, Francisca & Martins, 2023). The bitcoin transaction log is stored on a computer network and offers a method of rewarding trustworthy people who figure out a puzzle. To find out how to solve this riddle, you need to spend more time on the internet, which increases the quantity of cyberspace needed to support and administer this new industry.

Ethereum (ETH)

Blockchain technology powers the decentralized global software platform Ethereum. Investors are most familiar with it because of its native cryptocurrency, ether (ETH), while developers are more familiar with it because of its application development in blockchain and decentralized finance (Hameed & Farooq, 2016). Ethereum functions as both a blockchain platform and a cryptocurrency. In contrast to Bitcoin, Ethereum has non-fungible tokens (NFTs) and a smart contract application that takes action automatically when specific criteria are satisfied. From a value of around \$11 in April 2016 to over \$2,700 in May 2022, Ethereum has likewise seen incredible growth, rising by almost 25,000% (Olorundare et al., 2023). A distributed ledger called a blockchain is used by Ethereum. Blocks are used to store information, and each block contains both the new information and encoded data from the block before it. This results in an unchangeable chain of encoded information. The blockchain is disseminated in an identical copy across the blockchain network (Mandeng, 2018).

Figure 1 Conceptual Model





Source: Researchers' Design, 2025

The study's variable proxies are shown in schematic in Figure 1 above. As the graphic shows, the dependent variable is economic growth, which was assessed by real gross domestic product. The independent variable is virtual currency, which was measured by Bitcoin and Ethereum coin.

2.2 Theoretical Framework

The Innovation-Growth Theory

In 1994, Paul Romer created the innovation-growth theory. According to the theory, economic pressures have an impact on businesses' (including researchers' and entrepreneurs') propensity to innovate and generate new ideas (Romer, 1994). When economic conditions are favorable, businesses, researchers, and entrepreneurs will create innovations that boost economic activity and boost production (Rivera-Batiz, 2019). Put differently, the theory posits that innovation arises from the endeavors of scholars and entrepreneurs who react to financial incentives, and their inventive concepts result in technical advancements that favorably impact societal economic progress. This idea implies that economic development and innovation are closely related (Ebelogu, Oriakhi, Ojo, & Agu, 2019).

Since the requirement to maintain a desirable rate of economic growth may incentivize inventors to create new digital inventions like the bitcoin, Ethereum coin, and Litecoin that aid in achieving a desired rate of economic growth, this theory encourages the development of virtual currencies. The creation of virtual currency is therefore encouraged by the theory as it is a promising invention that may boost economic growth by making it easier for money to move efficiently to trade, investment, production, and consuming activities.

2.3 Empirical Review

Jimoh and Oluwasegun (2020) examined the connection between economic and financial factors and the two biggest traded cryptocurrencies in Nigeria: Bitcoin and Ethereum. For the study, monthly data from August 2015 to December 2019 was used. The analytic methods used were Granger causality, exponential general autoregressive conditional heteroscedasticity, and generalized autoregressive conditional heteroscedasticity. The findings connect the volatility of Ethereum and Bitcoin values to stock market pricing rather than Nigerian exchange rates. Additionally, the results showed that there was unidirectional correlation between Ethereum and Bitcoin and the whole share index.

Chris, Ebere, Onyeledo and Augusta (2021) conducted a study to assess the impact of cryptocurrencies on the Nigerian economy. Online transactions were greatly improving, and bitcoin and other digital currencies were gaining traction in the nation, according to the study, which used primary data sources. Nowadays, people all around the world believe that using it is safe, legal, and cost-effective, and that it is helping the economy flourish.

The Nigerian economy and cryptocurrency are evaluated by Yunusa (2021). Both primary and secondary data gathering approaches were employed. Surveys were used to gather pertinent information from company and financial institution management, both public and private. Tables and percentages were utilized to examine the data; the Z-test was used to test the hypothesis, and the correlation was used to assess the link between the variables. The study found, among other things, that using cryptocurrency has both advantages and disadvantages and will boost economic growth.

The relationship between digital currency, monetary policy, and economic development in Nigeria was examined by Aminu, Hayewa, Mohammed, and Abubakar (2022) between the first quarter of 2013 and the fourth quarter of 2020. To confirm that the model was properly specified, preliminary statistics were conducted as part of the structural vector autoregressive technique of analysis. Digital money has a little effect on Nigeria's economic growth, according to the analysis's findings, whereas monetary policy proxies have minimal effect on growth. In particular, the variance decomposition revealed that the money supply contributes 41% to economic development, in contrast to digital currency, which might theoretically add up to 0%.

Ademosu and Ayodele (2023) studied the Nigerian economy and digital currencies from the fourth quarter of 2010 to the third quarter of 2022, concentrating on Bitcoin, Ethereum, and Litecoin. The ARDL model and the Granger causality test were used to examine the collected data. According to the results of the trend analysis, the country's exchange rate fluctuates in tandem with the activities of digital currencies, but it also has some bearing on the rate of economic growth in Nigeria. The growth rate is accelerated by lower returns for Bitcoin and Litecoin, whereas Ethereum's return instead moves in tandem with the growth rate. Additionally, the study discovered that low market volatility will increase the economy's growth rate (particularly for Ethereum), with causal implications extending from the returns and volatility of these currencies to growth and exchange rates.

Obisesan et al. (2024) investigated the impact of cryptocurrencies on economic growth in African countries. The study collected secondary panel data from 2016 to 2021 for five African nations spread throughout the continent. The data was assessed using pooled OLS estimation, fixed and random effect analysis, correlation analysis, and descriptive statistics. According to the study's findings, Bitcoin significantly impedes the economic development of developing African countries, Ethereum significantly and favorably influences the economic development of developing African countries, and Binance coin significantly impedes the economic development of Africa, as indicated by the GDP growth rate.

According to the findings of the previously examined research, there is a lack of consensus about virtual currency and economic growth in Nigeria. For this reason, this study aims to contribute to the body of knowledge by evaluating the following null hypotheses:

H₀₁: Bitcoin has no significant effect on Nigerian real gross domestic product

H₀₂: Binance coin does not affect Nigerian real gross domestic product

3. Methodology

The study used an ex-post facto research strategy because it sought to collect crucial information on the status of a particular phenomenon after a period of naturally occurring therapy without changing the situation. The Coinmarketcap portal was used to collect secondary data on virtual currencies (BTC and ETH), while the CBN Statistical Bulletin was used to derive measures of Nigeria's economic development (real gross domestic product) between 2014 and 2023. Furthermore, a model was employed to calculate the cumulative impact of virtual currency proxies on the economic growth of Nigeria. Virtual money, as measured by Bitcoin, and Ethereum coin, is used to estimate economic growth. The actual gross domestic product, however, was used to gauge economic growth. The association was estimated using ordinary least square (OLS) regression, which looks like this:

$$RGDP = f(BTC, ETH) \dots\dots\dots i$$

The model was formulated to suit the study as follows:

$$RGDP = \alpha + \beta_{1BTC} + \beta_{2ETH} + e \dots\dots\dots ii$$

Where:

RGDP = Real Gross Domestic Product (Dependent Variable)

BTC = Bitcoin (Independent Variable)

ETH = Ethereum Coin (Independent Variable)

β_1, β_2 = Coefficient of Regression

e = error term

4. Results and Discussion

This section presents the findings of the study on virtual currency and economic growth in Nigeria. In addition to performing trend, descriptive, correlation, and regression analysis on the gathered data, the research also performed a number of robustness tests to increase the validity of the results.

4.1 Presentation of Results

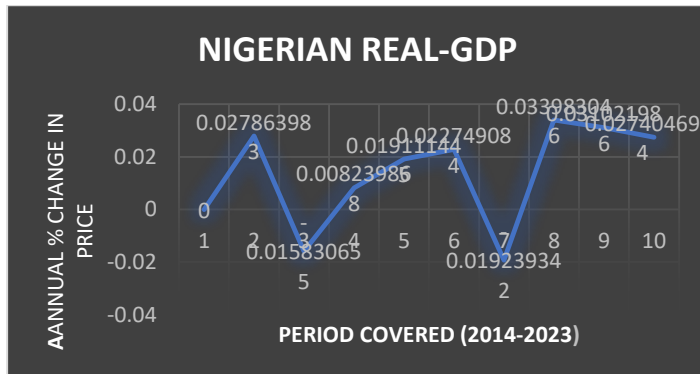


Figure 2: Trend analysis and variation of Nigerian Real-GDP from 2014-2023

Source: 2016 Microsoft Excel, 2025

The actual gross domestic product of Nigeria from 2014 to 2023 is shown in Figure 2 above, along with a trend and variance analysis. As the above figure illustrates, there were positive fluctuations in Nigeria's RGDP in 2015, 2017, 2018, 2019, and 2021, with corresponding yearly percentage changes of 2.79%, 0.82%, 1.91%, 2.27%, and 3.40%. The Nigerian RGDP did, however, show a notable and notable improvement in 2021 compared to the previous years in the analysis. In contrast, there was a negative fluctuation in the Nigerian RGDP in 2016 and 2020, with yearly percentage changes of -1.58% and -1.92%, respectively.

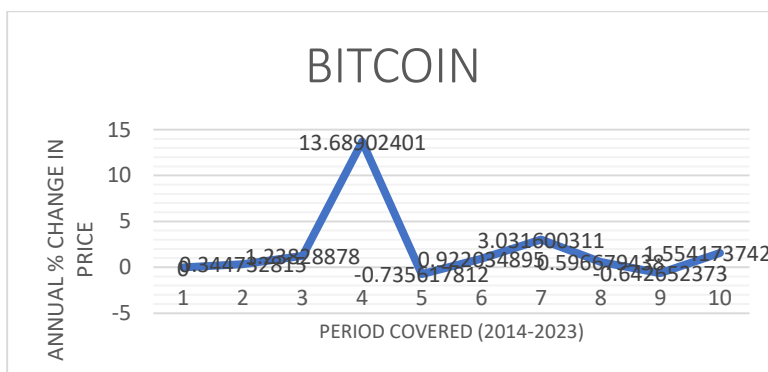


Figure 3: Trend analysis and variation of average annual price of BTC from 2014-2023

Source: 2016 Microsoft Excel, 2025

Figure 3 above illustrates the examination of trends and variations in the average annual price of Bitcoin between 2014 and 2023. The graphic showed that the average annual price of Bitcoin changed positively and sharply in 2016, 2017, 2020, and 2023, with an annual percentage change of 123.83%, correspondingly 1368.90%, 303.16%, and 155.42%. However, compared to the previous years in the analysis, the average annual price of Bitcoin changed by a very noticeable, positive, and considerable amount in 2017 (1368.90%). between contrast, the average annual value of Bitcoin showed a negative

fluctuation between 2018 and 2022, with annual percentage changes of -73.56% and -64.27%, respectively.

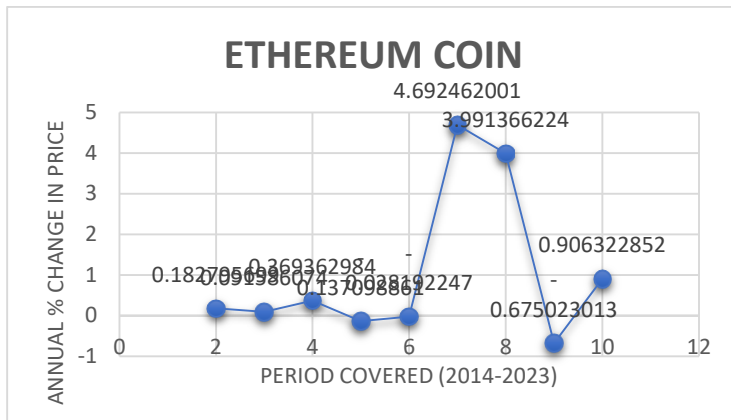


Figure 4: Trend analysis and variation of average annual price of Ethereum coin (2014-2023)
Source: 2016 Microsoft Excel, 2025

The trend and variance study of the Ethereum (ETH) coin's average annual price from 2014 to 2023 is displayed in Figure 4 above. In 2017, 2020, 2021, and 2023, the average annual price of ETH showed significant and favorable improvements, with annual percentage changes of 36.94%, 469.25%, 399.14%, and 90.63%, respectively, according to the chart. Among the other years the study examined, 2020 saw a particularly notable, positive, and rapid shift in the average annual price of ETH (469.25%). However, the average yearly price of ETH in 2018 and 2022 showed opposite variations, with percentage price changes of -13.71% and -67.50%, respectively.

Table 1 Descriptive Results

	RGDP	BTC	ETH
Mean	4.849381	3.767728	2.530582
Median	4.844521	4.003950	2.157078
Maximum	4.884710	4.665641	3.566158
Minimum	4.827064	2.505408	1.941611
Std. Dev.	0.018474	0.810659	0.620779
Skewness	0.708290	-0.465461	0.611701
Kurtosis	2.401153	1.731846	1.693086
Jarque-Bera	0.985549	1.031180	1.335306
Probability	0.610929	0.597148	0.512911
Sum	48.49381	37.67728	25.30582
Sum Sq. Dev.	0.003072	5.914510	3.468301
Observations	10	10	10

Source: E-view 12 Results, 2025

The descriptive findings are displayed in the above table together with the parameters' minimum, maximum, average, standard deviation, and Jarque-Bera. RGDP, BTC and ETH had average values of 4.849381, 3.767728 and 2.530582, respectively, according to the findings. It was clear from the average value that, among the independent variables, Bitcoin is a good predictor of the dependent variable (RGDP) since its greatest average value is 3.767728, whereas ETH's is 2.530582. Also, 4.884710, 4.665641, and 3.566158 were the variables' maximum values, respectively. The variables' minimum values, however, are 4.827064, 2.505408, and 1.941611, in that order. Due to the fact that the Jarque-Bera probability values (0.610929, 0.597148 and 0.512911) are larger than the 0.05 significant threshold, the analysis also found that the data obtained for all the variables are normally distributed.

Additionally displayed were the standard deviation numbers, which were 0.018474, 0.810659 and 0.620779, respectively.

Table 2 **Correlation Analysis**

	RGDP	BTC	ETH
RGDP	1.000000	0.719702	0.807654
BTC	0.719702	1.000000	0.824728
ETH	0.807654	0.824728	1.000000

Source: E-view 12 Results, 2025

The correlation results between RGDP, BTC, and ETH—the adopted variables—are shown in Table 2 above. With correlation values of 0.719702 and 0.807654, respectively, the data demonstrated that BTC, and ETH all had favorable relationships with RGDP.

Table 5 **Regression Analysis**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BTC	0.048479	0.028385	1.707875	0.1484
ETH	-0.026260	0.030202	-0.869474	0.4244
C	4.753592	0.042982	110.5953	0.0000
R-squared	0.795972	Mean dependent var		4.849381
Adjusted R-squared	0.632750	S.D. dependent var		0.018474
S.E. of regression	0.011196	Akaike info criterion		-5.839750
Sum squared resid	0.000627	Schwarz criterion		-5.688458
Log likelihood	34.19875	Hannan-Quinn criter.		-6.005718
F-statistic	4.876618	Durbin-Watson stat		2.013075
Prob(F-statistic)	0.056219			

Source: E-view 12 Results, 2025

The regression model's coefficient that was previously specified is included in the table above, as shown below:

$$\text{RGDP} = \alpha + \beta_1 \text{BTC} + \beta_2 \text{ETH} + e$$

It has been described as follows:

$$\text{RGDP} = 4.753592 + 0.048479\text{BTC} - 0.026260\text{ETH} + \mu$$

Using coefficient value of -0.026260, respectively, the preceding equation demonstrates that ETH have a negative impact on RGDP, but BTC has a positive impact with a coefficient value of 0.048479. This implies that Nigeria's RGDP will decrease by 0.026260, respectively, if each ETH increases by one unit, whereas a one-unit increase in BTC would cause the RGDP to rise by 0.048479. Additionally, the regression's R-squared percentage was 0.795972, indicating that Bitcoin and ETH can account for 79.60% of the overall changes in the Nigerian RGDP, with additional characteristics not included in this study accounting for the remaining 20.40%. With a p-value of 0.056219 and an F-statistic of 4.876618, the study's model can be regarded as statistically insignificant because the p-value is less than the 0.05 threshold. However, because the value is greater than 1.5, the Durbin-Watson statistic result was 2.013075, indicating the absence of auto-correlation. This implies even more that the indicators are doing well. It is possible to classify the p-values of the predictors (BTC and ETH) as

statistically insignificant because they are above the 0.05 significant threshold. The t-calculated values of the predictors (BTC and ETH) were also displayed—1.707875, and -0.869474—each of which is less than the t-tab of 2. Additionally, their matching probability values, 0.1484 and 0.4244, respectively.

Test of Hypotheses

H₀₁: Bitcoin has no significant effect on Nigerian real gross domestic product

According to the regression table, the BTC t-cal value was 1.707875, and the corresponding p-value was 0.1484, which was considered statistically insignificant because it was higher than the 0.05 cutoff. The aforementioned null hypothesis, according to which bitcoin has no discernible impact on Nigeria's real gross domestic product, is confirmed by the study.

H₀₂: Ethereum coin does not significantly affect Nigerian real gross domestic product

With a t-cal value of -0.869474 and a corresponding p-value of 0.4244, the Ethereum (ETH) study accepted the null hypothesis mentioned above and concluded that Ethereum coin does not significantly affects Nigerian GDP.

4.3 Discussion of Results

The study looked at the impact of virtual money on Nigeria's economic growth. The average yearly price of Bitcoin, Litecoin, and Ethereum were specifically used as virtual currency proxies, while real gross domestic product was used to gauge economic development. However, some of the results of the previously examined studies were found to be in disagreement with the current investigation, while other results were found to be connected to the results of this study, as will be stated below:

According to the study, virtual currency, as measured by bitcoin, has no discernible impact on Nigeria's real gross domestic product at the 5% level of statistical significance. This outcome is not related to the findings of Chris, Ebere, Onyeledo, and Augusta (2021), but it is related to the research conducted by Jimoh and Oluwasegun (2020) and Yunusa (2021). It was discovered that the Nigerian gross domestic product is not significantly affected by Ethereum coin. The results of the study conducted by Ademosu and Ayodele (2023) are connected to this outcome; however, the findings of Olorundare et al. (2023) does not relate with the findings of this study.

5. Conclusion and Recommendations

Bitcoin (BTC) has a matching p-value of 0.1484, which is over the 0.05 significant threshold and was considered statistically insignificant, according to the study's findings. Thus, the research concludes that the price of Bitcoin, a virtual currency, cannot be used to forecast Nigeria's real GDP. In addition, the Ethereum coin's p-value from the regression table was revealed as 0.4244, which was considered statistically insignificant because it was greater than the 0.05 significant level. The study suggests that the value of Ethereum, a measure of virtual money, cannot be used to predict Nigerian Real-GDP with any degree of accuracy.

The underlisted recommendations were offered in accordance with the results and conclusion of the study:

When regulating Bitcoin, the Nigerian government should take steps to shield its users from the currency's extreme volatility and susceptibility to illegal activity in the country. This will prevent an unanticipated decline in investor wealth, which would be detrimental to the Nigerian economy.

The use of Ethereum coin as virtual currency should also be restricted by the Nigerian government, working with national regulatory agencies, as it has not shown to be a sustainable instrument for the country's long-term development. Nigeria and Nigerians may be able to take advantage of this fascinating shift in the monetary paradigm by creating the necessary regulatory and monetary frameworks or apparatuses around the new financial technology known as virtual currency.

The government of Nigeria, through its parastatals, should consistently warn against and prohibit people and companies from using virtual currencies, particularly alternative coins that have not been used frequently and thus expose users to high risk. This would lower investor risk and free up funds for more productive uses that would promote economic growth.

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