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Cryptocurrencies as Fintech-Driven Investment Opportunities: Volatility Analysis and Implications for Global Financial Systems

Shilpa Ekka [1], Prof. G. L. Puntambekar [2]

[1]Research scholar, Department of Commerce, Dr. Harisingh Gour Central University, Sagar, Madhya Pradesh, India, 470003. Shilpaekka18@gmail.com

[2]Professor, Department of Commerce. Dr. Harisingh Gour Central University, Sagar, Madhya Pradesh, India, 470003.

Abstract:

The economic history witnessed several reforms and innovative products in financial sector and also caused crisis like World Economic Crisis-2008. The obsession of faster growth with huge profits and innovative financial products has opened up several new opportunities of investment but at the same time these new and innovative products especially the products based on technology has created very high risk even to damage the traditional financial system. Crypto currency is one of the most volatile, driven by a complex technology and also a serious threat to an authorized monetary system of the world. This new type of currency has become an investment script which is generating manifold profit as compare to other financial products with the facility of hiding the transaction trail. The recent development regarding operation of crypto- exchanges, its recognition by the Governments, efforts to regulating crypto currency operations, tracking and taxing the crypto- transactions and most importantly the popularity of these digital Crypto-currency platforms are also related to FinTech companies and therefore I have selected the topic of Cryptocurrencies as Fintech-Driven Investment Opportunities: Volatility Analysis and Implications for Global Financial Systems. For this purpose, I have taken the daily market price data of four cryptocurrencies namely, Bitcoin (BTC), Ethereum (ETH), Ripple (XRP), and Litecoin (LTC) for analysis and tried to examine the trends of investment in selected crypto-currencies.

Keywords: *Cryptocurrency, Fintech, time series analysis, and volatility*

1. Introduction:

Economic history has witnessed several reforms and innovation in the past. These have met with both success like online payment system for time saving purpose and disaster like the global recession in 2008. Augmented interest in E-commerce is the main reason in the invention of digital currency. Obsession with faster growth with huge profits has opened up several new opportunities of investment, but at the same time these new innovative products, especially the technology driven products, which is highly volatile and poses a serious threat to the existing monetary system

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of the world. Cryptocurrencies are not yet pegged to any country's currency or any real-world currency. Supply and demand in the market determine the exchange rate of these cryptocurrencies. This new type of currency has become quite attractive to young investors since it can conceal the transaction trail from the government and has yield manifold profit as compared to other financial products. The recent developments regarding operation of crypto-exchange its recognition by the government, efforts to regulate crypto currency operations, tracking and taxing the crypto-transactions and most importantly the popularity of theses crypto-currency platforms are also related to Fin Tech companies and therefore I have selected the topic of Cryptocurrencies as Fintech-Driven Investment Opportunities: Volatility Analysis and Implications for Global Financial Systems.

Crypto-currency exchanges all over the world are facing scrutiny from both investors and government agencies, fair example was the increase in Repo Rates by the numerous monetary authorities to curb inflation resulting increase in loan rates for general public. So as the people who invested in cryptocurrency took the money out from crypto market back to banks to suffice the interest rates. Which made downfall in the value of cryptocurrencies. Where bitcoin dropped 11.71% to $1.81 trillion in the month of April 2022.

2. Review of Literature:

The advent of cryptocurrencies has significantly transformed the discourse on financial systems, challenging traditional monetary frameworks and fostering a robust body of academic literature. This literature review synthesizes key studies on cryptocurrencies, tracing their theoretical foundations, evolution, market dynamics, and associated challenges. Rooted in monetary theories and spurred by technological advancements, cryptocurrencies have emerged as a disruptive force in global finance, prompting scholars to examine their implications for economic systems, regulatory frameworks, and investment landscapes. The review is organized thematically, covering foundational theories, the impact of the 2008 financial crisis, technological innovations, market dynamics, legal characteristics, advantages and risks, and their role as investment assets.

The theoretical underpinnings of cryptocurrencies can be traced to Hayek's (1976) monetary theory, which challenged the notion of government monopoly over currency issuance. Hayek argued that private entities, such as banks, should issue currencies under registered trademarks, allowing market competition to determine their value and exchange rates. This

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decentralized vision laid the intellectual groundwork for cryptocurrencies, which operate without centralized control, embodying Hayek's principles of competition and market-driven valuation. His theory provides a lens through which to understand the ideological motivations behind cryptocurrencies, positioning them as alternatives to state-controlled fiat systems.

The 2008 global financial crisis served as a pivotal catalyst for the rise of cryptocurrencies, as highlighted by White (2008). The crisis exposed the vulnerabilities of centralized financial intermediaries, whose interdependence and lack of transparency led to severe economic repercussions. Public distrust in traditional banking systems, perceived as having failed society, fueled interest in decentralized alternatives. Cryptocurrencies, with their promise of bypassing intermediaries, emerged as a response to this crisis, aiming to restore financial autonomy to individuals. White's analysis underscores the socio-economic context that shaped the early adoption of cryptocurrencies, framing them as a reaction to systemic failures in global finance.

Satoshi Nakamoto's (2008) white paper on Bitcoin marked a technological milestone, introducing a peer-to-peer electronic cash system that eliminated the need for financial intermediaries. Bitcoin's blockchain technology enabled direct transactions between parties, secured by cryptographic protocols, fundamentally altering the paradigm of money transfer. Unlike traditional systems, which rely on multiple intermediaries, Nakamoto's model prioritized decentralization, aligning with Hayek's vision while leveraging technological innovation. This seminal work not only birthed Bitcoin but also established the foundational architecture for subsequent cryptocurrencies, emphasizing trustless and intermediary-free transactions as the core ethos of the cryptocurrency movement.

Ivanov (2014) draws parallels between cryptocurrencies and stock markets, highlighting their role in financial markets as innovative mechanisms for accumulating and distributing funds. By eliminating intermediaries, cryptocurrencies significantly reduce transaction costs, including commissions and spreads, making them attractive to investors. Ivanov notes that these cost efficiencies have enhanced liquidity and spurred investment activity, akin to the dynamics observed in electronic stock exchanges. This comparison underscores the transformative potential of cryptocurrencies in reshaping financial markets, positioning them as viable platforms for investment and wealth creation.

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Khidzev (2014) examines the legal characteristics of cryptocurrencies, identifying three key features: decentralization, anonymity, and lack of guarantees. Unlike fiat currencies, which are often backed by government mandates as legal tender, cryptocurrencies operate without centralized control, making them immune to traditional monetary policies. Their anonymity allows users to conceal their identities in transactions, raising concerns about illicit activities. Additionally, the absence of guarantees—unlike fiat money, which may be backed by government credibility—poses risks for users. Khidzev's analysis highlights the legal and regulatory challenges of integrating cryptocurrencies into existing financial systems, emphasizing their distinct nature compared to traditional currencies.

The European Central Bank (ECB) (2015) provides a balanced perspective on the advantages and disadvantages of cryptocurrencies. On one hand, they offer innovative payment solutions with lower costs, global reach, payer anonymity, and rapid settlement times, making them appealing for cross-border transactions. On the other hand, their lack of transparency, high volatility, and dependence on IT infrastructure pose significant risks. The ECB notes that anonymity facilitates potential illegal activities, such as money laundering and tax evasion, while volatility undermines their reliability as a store of value. The absence of technical solutions to mitigate these risks has led to regulatory scrutiny in many jurisdictions, highlighting the need for robust oversight to balance innovation with consumer protection.

Dyhrberg (2016a) expands the discourse by framing cryptocurrencies not only as digital currencies but also as investment assets with characteristics akin to commodities. Their decentralized nature and limited market size position them between classical commodities and digital currencies, offering opportunities for active investment management. Dyhrberg emphasizes their potential as risk-averse assets, capable of diversifying investment portfolios due to their low correlation with traditional financial instruments. This dual role as both a currency and an investment vehicle underscores the versatility of cryptocurrencies, attracting a diverse range of stakeholders from retail investors to institutional players.

The Financial Stability Board (FSB) (2017a, b) situates cryptocurrencies within the broader context of fintech innovations, which encompass payments, lending, insurance, and asset management. The FSB identifies key drivers of fintech growth, including shifting consumer preferences, evolving financial regulations, and rapid technological advancements.

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Cryptocurrencies, as part of this ecosystem, reflect the convergence of these factors, offering innovative solutions while posing challenges to financial stability. The FSB's reports highlight the need for adaptive regulatory frameworks to accommodate the rapid evolution of fintech, including cryptocurrencies, while ensuring systemic stability.

Despite the wealth of research, significant gaps remain in the literature. First, there is a notable absence of robust economic models to assess the long-term viability and macroeconomic implications of cryptocurrencies. While technological and legal aspects are well-explored, the economic assumptions underpinning their sustainability—such as their impact on monetary policy, inflation, and economic stability—remain under-examined. Second, the literature lacks depth in localized contexts, particularly in India, where only one thesis on the legal aspects of cryptocurrencies has been noted. This gap limits the understanding of cryptocurrency adoption and regulation in emerging economies. Third, the continuous emergence of new cryptocurrencies with innovative features complicates efforts to standardize and regulate the sector, as governments struggle to keep pace with technological advancements. Finally, while risks such as volatility, fraud, and anonymity-related issues are acknowledged, there is insufficient exploration of technical or policy solutions to mitigate these challenges effectively.

3. Research Gap:

While going through existing literature review, it shows the new designs that the government of various countries are working on to bring in a practical and logical cryptocurrency. But it is not happening as there are new cryptocurrency emerging with passage of time with innovative features. As it is a very deep and rich segment. The knowledge in this field of finance has considerably grown but there is still lacking in understanding. There are many international research papers which is as good as any thesis and there is only one Indian thesis on the field of law. But the literature does not provide economic assumptions yet.

4. Methodology:

The study is descriptive in nature based on secondary data collected from marketcap.com with historical time series data of Four top and leading cryptocurrencies with highest market capitalization as on September 16th, 2022 and lengthier data span. Bitcoin (BTC), Ethereum

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(ETH), Ripple (XRP) and Litecoin (LTC) are examined in this study. From 1st January 2016 to 6th August 2022 daily cryptocurrency dataset is observed. The dataset is taken from the platform coinmarketcap.com/coins/ which averages prices of cryptocurrencies across several exchanges. Time series analysis is used for analyzing the different cryptocurrencies to provide estimation based on daily closing values of a particular cryptocurrency. Durbin-Watson test an Auto correlation Function (ACF): ARIMA Model to assess trends in a stock's value over time and use that data to predict its future value. Generalized Autoregressive Conditional Heteroskedasticity (GARCH) Process given by Robert F. Engle to estimate volatility in financial market of cryptocurrencies.

5. The objective of the Study:

a) An attempt to offer basic facts about major cryptocurrency movements and their potential linkage among them.
b) Perform the prediction on time series data from CoinMarketCap, a cryptocurrency exchange by using ARIMA Model.
c) To observe that the return variations were affected by the news going globally.
d) To explain the volatility dynamics of cryptocurrency's daily returns

6. Introduction on Cryptocurrency as a Fintech:

Paying something with your phone, transferred money using an App or checked bank statements online it is all because of a Multi-billion Dollar industry called Fintech which is changing economies around the world. Fintech includes a huge range of products, technologies and business models which are changing the financial industry. It refers to everything from cashless payments, to crowdfunding, to virtual currencies. Its aim is to help in smooth running of banking and financial industries by changing the way public pay and borrow money. Global investment in the Fintech sector has added up to $100 billion since 2010. In 2017 alone, fintech investment surged 18%. Startups focusing on payments and lending technologies received the majority of those funds. Not only startups are in Fintech also the world's biggest companies like, Apple with Apple Pay, Google with GPay and Alibaba with Alipay are catering their service in online transactions.

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7. Adaption of Fintech and Ease in Cryptocurrency Trading

Crypto currency is 21st century's financial instrument. One out of every three people across 20 developed economies report using more than two fintech services. China and India half of the consumer base who are using these services according to a assessment report by NMCC under Federation of Indian Chambers of Commerce and Industry. Financial Technology have given service to people who don't have access to traditional banking services. Nearly 2.5 billion people worldwide are without bank accounts as on 2022.

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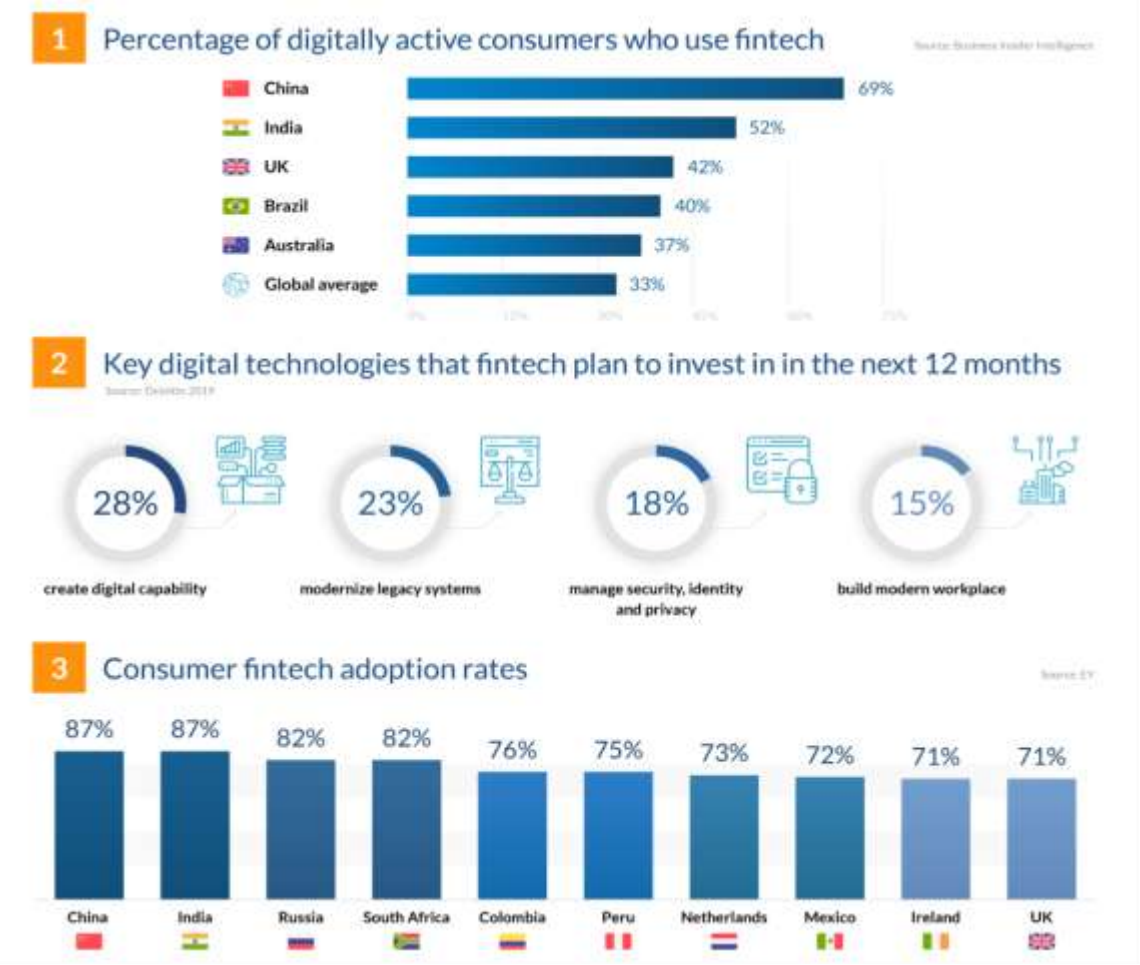

Source: Coinbase

Cryptocurrency Exchange is a peer-to-peer lending platform where individuals lend and borrow without going through a bank. Data privacy is also a major concern while dealing with traditional banks. It is traded in its own specific market that is Cryptocurrency Exchange. It differs from the traditional markets, like Foreign Exchange and Equity. Indulging in Cryptocurrency Exchange one needs to have a portal to reach this exchange just like one should have a DEMAT account to trade in Stock exchange similarly to trade in crypto market one should have account in one of these Crypto exchanges like Binance, Coinbase, CoinMarketCap etc. and some Indian Crypto Exchanges like WazirX, Zebpay, Unocoin etc. which act as catalyst to interact or trade in the Crypto Market.

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Chart 1: Latest update in investors portfolio

Source: CNBC 2022

8. Exponential growth in Market Capital of Cryptocurrency with increase in Fintech Companies:

CoinMarketCap ranks and scores exchanges based on traffic, liquidity, trading volumes, and confidence in the legitimacy of trading volumes reported. Fast growing Crypto Trading and Exchanges it is becoming a trend to add some percentage of investment in cryptocurrency to make the portfolio versatile. To attract more customers crypto exchange are offering cashback on TDS paid where the Exchange will bear the TDS burden and Referral discount are on some of the marketing scheme, A Recent survey by KuCoin found that 54% of Indian crypto investors believe Cryptocurrency to be the future of Finance.

9. Crypto Leverage Effect:

The presence of volatility is a process to understand unexpected shocks, which is a vital feature of the Time Series of Financial Market. The Leverage Effect which is a financial mechanism that enables the shareholders to increase their profit. The leverage effect only works with the presence of debt because you can't generate surplus without debts. So if the shareholder wants to increase the leverage effect one have to increase your leverage. It will only work if the productivity is in a good pace or high. In case of low productivity, the leverage effect will be negative.

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(I) Analysis and interpretation:

I. To fulfill the first objective of the study i.e., ***"to study the basic facts about major cryptocurrency movements and their potential linkage among them."*** Comparison among four cryptocurrencies is carried out and certain conclusions has been drawn through it which are as follows:

In this paper the daily market price data of four major cryptocurrencies. Bitcoin (BTC), Ripple (XRP), Ethereum (ETH), and Litecoin (LTC) are observed. For the analysis, I selected to use daily market data taken from 1 January 2016 to 6th June 2022. The start date is chosen to observe the deviations due to COVID-19 and its after-effects with inflation rising in every part of the globe.

Table 1. Market Capital and price of BTC, ETH, XRP and LTC

No	Names	Market Cap`	Price	Circulating Supply
1.	**Bitcoin**	$381,958,676,936	$19,957.51	19,142,856
2.	**Ethereum**	$203,235,120,982	$1,662.06	122,259,900
3.	**Ripple**	$16,618,646,243	$0.33	99,989,318,921
4.	**Litecoin**	$4,263,918,090	$59.98	84,000,000

Table 2 contains summary statistics of daily returns of four cryptocurrency taken for this study. It is observed that they are similarly distributed. Mainly positive returns are seen and some negative returns mainly in the recent year. The presence of observations that are extreme in reference to Minimum and Maximum. Exchange rate stability in case of Bitcoin is better than Ethereum. Ethereum standard deviation shows better stability to exchange rate compared to the two i.e. Litecoin and Ripple. All the four shows positive skewness which indicated that they have leptokurtic feather. Positive skewness represents that median is more than mean. According to (Chen et al., 2001) the general financial theory the rational investor go towards positive asymmetry where occurrence of big losses are less.

Table 2. Summary Statistics between cryptocurrencies:

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Statistics	BTC	ETH	LTC	XRP
N	2348	2348	2348	2348
Mean	14729.24879	803.821399	80.4800680	0.404953
Median	*7965.04500*	247.644371	58.5855940	0.294667
Mode	418.42000	11.290000	2.9657000	1.090000
Sum	34584276.15000	1887372.644000	188967.1995000	950.830500
Maximum	67549.73000	4810.071300	387.8692000	3.360000
Minimum	365.07000	0.933700	2.9625000	0.005100
Range	67184.66000	4809.071300	384.9035000	3.354900
First	430.72000	0.933700	0.0060000	3.479500
Last	29836.29000	1802.923500	0.3923000	63.780800
Std. Deviation	17245.17599	1154.702416	69.7344269	0.392005
Variance	*297396094.90000*	1333337.670000	4862.8900000	0.153000
Skewness	1.38700	1.691000	1.1270000	1.967000
Std Error of Skewness	-0*.05100*	0.051000	0.0510000	0.057000
Kurtosis	0.57800	1.633000	1.2060000	1.075000
Std Error of Kurtosis	0.10100	0.101000	0.1010000	0.101000
Probability	000	000	000	000
Percentile				
10				
20				
25	623.774000	11.123000	3.845085	0.0065750
30	1225.154000	49.730000	10.293730	0.0332020
40	3248.560000	127.666477	32.819209	0.1876500
50	4000.323000	150.520441	42.498207	0.2035900
60	6497.124000	199.704298	49.219426	0.2502400
70	7965.045000	247.644371	58.585594	0.2946670
75	9349.589000	351.207816	74.609960	0.3394200
80	11350.196000	554.985816	105.825209	0.4723730
90	15881.050000	780.679016	122.291100	0.5723500
	32826.187000	1675.962158	137.930378	0.6771000
	45592.854000	2918.879981	180.987067	0.9263300

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The following Table 2 shows how Bitcoin (BTC), Ethereum (ETH) And Litecoin (LTC) and Ripple (XRP) are highly correlated with each other. The correlation coefficient of ETH, LTC, XRP and BTC here are 0.904, 0.877, 0.789 and 0.895 that gives us a couple of things:

1. There is positive correlation coefficient which means that there is a positive correlation between BTC, LTC, XRP and ETH. That as any of the crypto's increases the remaining other also increase as well.

2. Regarding the strength of the relationship. This relationship is relatively strong correlation because its higher than 0.3 which is an arbitrary boundary of the weak and somewhat strong relationship.

3. There is direct relationship between the four cryptocurrencies and the correlation of these major cryptocurrencies makes them homogeneous in terms of the level of covariance within the investment portfolio. Where bitcoin has a dynamic rate of return.

Table 3. Spearman's Linear Correlation Matrix between cryptocurrencies

	Bitcoin (BTC)	**Ripple (XRP)**	**Litecoin (LTC)**	**Ethereum (ETH)**
Bitcoin (BTC)	1.000	0.789	0.877	0.904
Ripple (XRP)	0.787	1.000	0.895	0.854
Litecoin (LTC)	0.877	0.895	1.000	0.903
Ethereum (ETH)	0.904	0.854	0.903	1.000

**Correlation is significant at the 0.01 level (2 tailed)

- **Time Series Analysis:**

Time series analysis will help us understand the underlying reason and cause of systematic pattern that is a trend over the time. Providing extra source of information such as Dependencies, track and set of orders.

- **Regression Analysis:** Linear Regression have various models. Some of the classical models are auto regressive model, Moving Average Model (MA), Auto Regressive Moving average model (ARMA) and lastly Auto regressive integrated moving average model (ARIMA). It is found that ARIMA model had a good fitness for the forecasting of time series such as sales of retail products in one step and multiple steps model (PR15). Dealing with non linear historic

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time series data just like the everyday closing values of cryptocurrencies will require a hybrid ARIMA Model for better accuracy in forecasting as suggested by Xu et al. For the current study I have used ARIMA (310) to curb the non-stationarity.

II. **ARIMA Modeling**:

To fulfill the Second objective i.e., **"*Perform the prediction on time series data from CoinMarketCap, a cryptocurrency exchange by using ARIMA Model.*"**

For the following study I have taken closing values of currencies on the 1st day of the month from January 2016 to September 2022. Following Figure shows the value each month.

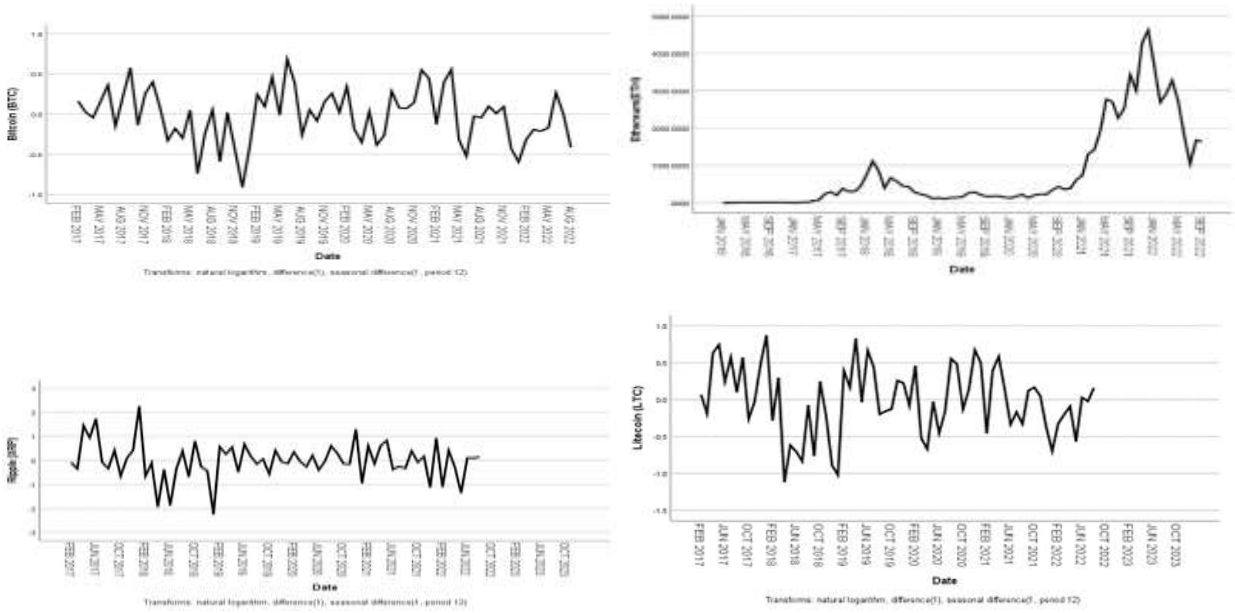

Figure1. Non-Stationary Data

Here we can see on the ARIMA Modelling that the data has no single pattern or seasonally adjusted. In statistical terms the data doesn't seem stationary. Stationarity is the first thing to check. It can be observed, there is no tendency to fluctuate around the definite mean i.e., its tendency to wander up and down again and again doesn't appear to be stationary. This is also seen at the ACF and PACF charts (Auto correlation and Partial Auto correlation). ACF shows correlation value one period back to two period back and so on. Here the significant correlation is going above 16 of the respective cryptocurrencies. To make the data stationery the correlation should fall quickly

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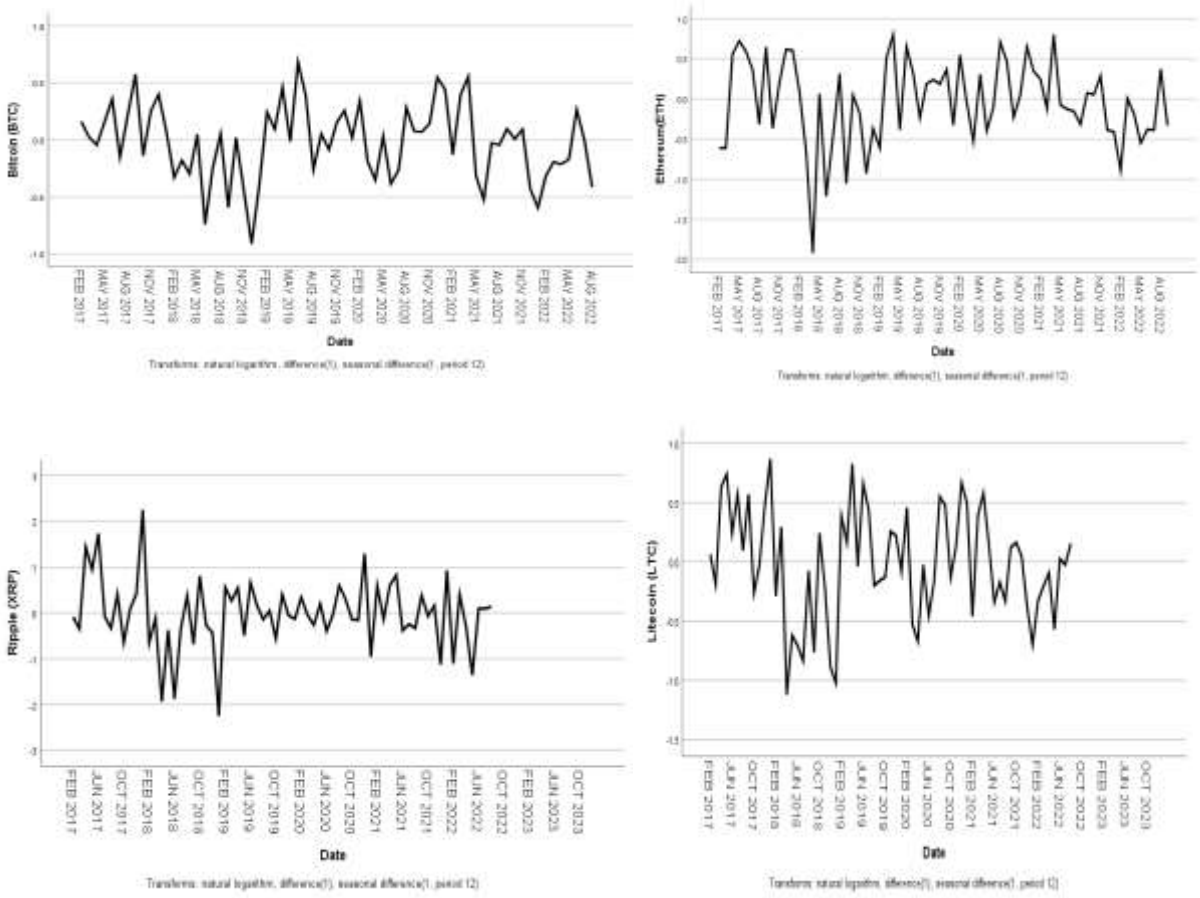
to zero. So, to remove the non-stationarity of the trend typically by taking the first difference, which is simply the change from one period to the next.

$$First\ Difference = \Delta Y_t = Y_t - Y_{t-1}$$

Figure 2. Data after the white noise is removed, making the data stationary



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ARIMA Model Parameter:

- **Bitcoin (BTC):**

		ESTIMATE	S. E	T-TEST	SIGNIFICANCE
	Constant	292.091	540.803	0.540	0.591
AR	Lag1.	0.287	0.118	2.437	0.017
	Lag2.	-0.262	0.118	-2.437	0.029
	Lag3.	0.019	0.119	0.155	0.877
	Difference	1			

- **Ethereum (ETH):**

		ESTIMATE	S. E	T-TEST	SIGNIFICANCE
	Constant	-21.395	238.863	-0.090	0.929
AR	Lag1.	-1.186	0.083	-14.330	0.000
	Lag2.	-1.075	0.105	-10.240	0.000
	Lag3.	-0.724	0.084	-8.576	0.000
	Difference	1			

- **Ripple (XRP):**

		ESTIMATE	S. E	T-TEST	SIGNIFICANCE
	Constant	0.005	0.017	0.293	0.770
AR	Lag1.	-0.429	0.111	-3.856	0.000
	Lag2.	-0.296	-0.117	-2.527	0.014
	Lag3.	-0.259	0.112	-2.321	0.023
	Difference	1			

- **Litecoin (LTC):**

		ESTIMATE	S. E	T-TEST	SIGNIFICANCE
	Constant	0.783	2.879	0.272	0.786
AR	Lag1.	-0.079	0.113	-0.697	0.488
	Lag2.	0.048	0.114	0.424	0.673
	Lag3.	-0.186	0.114	-1.627	0.108
	Difference	1			

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Bitcoin (BTC):

$$(Y_t - Y_{t-1}) = 0.287(Y_{t-1} - Y_{t-2}) - 0.262(Y_{t-2} - Y_{t-3}) + 0.019(Y_{t-3} - Y_{t-4})$$

(2.437)	*(-2.232)*	*(0.155)*	*t-stat*
0.96	*0.11*	*0.359*	*p-value*

Ethereum (ETC):

$$(Y_t - Y_{t-1}) = 0.194(Y_{t-1} - Y_{t-2}) - 0.303(Y_{t-2} - Y_{t-3}) + 0.114(Y_{t-3} - Y_{t-4})$$

(1.686)	*(-2.619)*	*(0.923)*	*t-stat*
0.96	*0.11*	*0.359*	*p-value*

Ripple (XRP):

$$(Y_t - Y_{t-1}) = -0.429(Y_{t-1} - Y_{t-2}) - 0.296(Y_{t-2} - Y_{t-3}) - 0.259(Y_{t-3} - Y_{t-4})$$

(-3.856)	*(-2.529)*	*(-2.321)*	*t-stat*
0.000	*0.014*	*0.023*	*p-value*

Litecoin (LTC):

$$(Y_t - Y_{t-1}) = -0.079(Y_{t-1} - Y_{t-2}) - 0.048(Y_{t-2} - Y_{t-3}) - 0.186(Y_{t-3} - Y_{t-4})$$

(-0.697)	*(0.424)*	*(-1.627)*	*t-stat*
0.488	*0.673*	*0.108*	*p-value*

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Figure 3. Residual ACF and Residual PACF

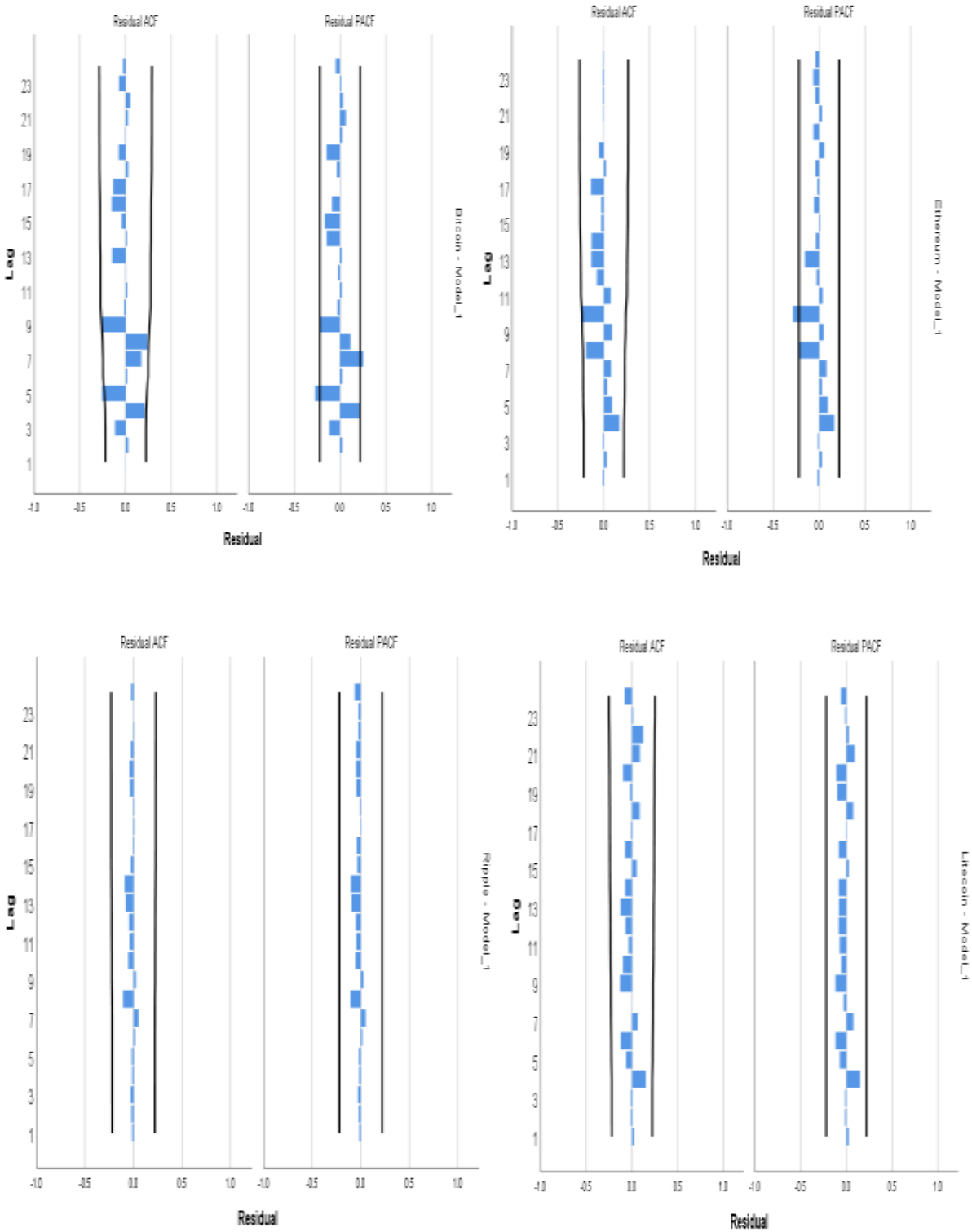

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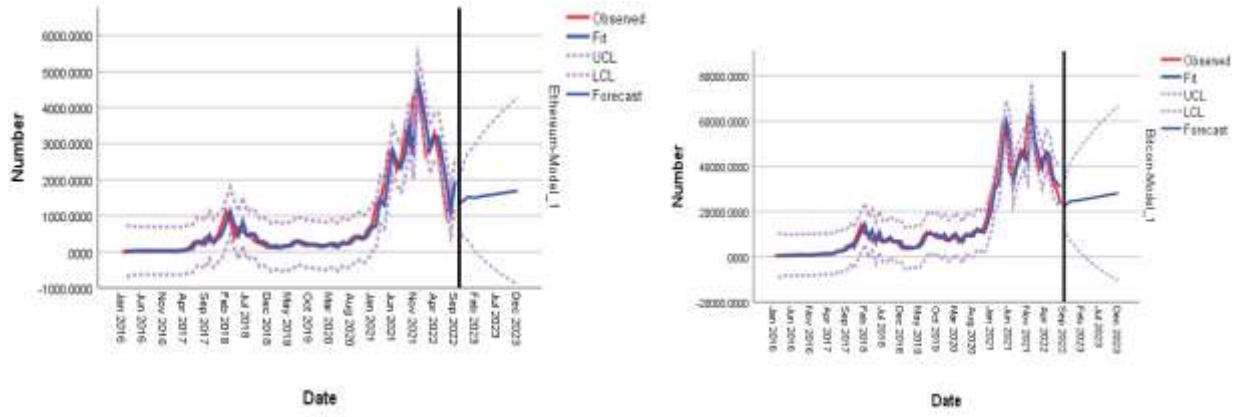
Table No 4: Forecasted cryptocurrencies values each month for the year 2023

	Years	Bitcoin (BTC)	Ethereum (ETH)	Ripple (XRP)	Litecoin (LTC)
April	2022	45554.1600	3282.5762	0.8147	123.7317
May	2022	37713.2700	2729.9941	0.5871	96.1679
June	2022	31792.5500	1823.5700	0.4219	68.4170
July	2022	29799.0800	1039.7700	0.3137	51.1200
August	2022	23314.2000	1681.5100	0.3800	59.9100
September	2022	22145.5659	1634.2000	0.4365	64.4941
October	2022	23754.6630	1360.2480	0.4308	68.7263
November	2022	24784.7618	1411.7347	0.4094	67.9305
December	2022	24784.7393	1517.4125	0.4157	68.2973
January	2023	24879.7985	1508.7135	0.4309	68.3947
February	2023	25176.8804	1498.6075	0.4381	69.5049
March	2023	25518.6469	1529.0345	0.4390	70.3058
April	2023	25820.0163	1554.7251	0.4426	71.2301
May	2023	26101.8275	1567.0597	0.4490	71.9414
June	2023	26389.4520	1582.8570	0.4551	72.7330
July	2023	26683.1307	1602.8297	0.4597	73.4850
August	2023	26976.6596	1621.0425	0.4644	74.2837
September	2023	27268.5543	1638.0440	0.4695	75.0618
October	2023	27560.3826	1655.8192	0.4748	75.8512
November	2023	27852.4162	1673.9107	0.4799	76.6300
December	2023	28144.5871	1691.6913	0.4849	77.4139

Figure 4: Forecasted cryptocurrencies values each month for the year 2023



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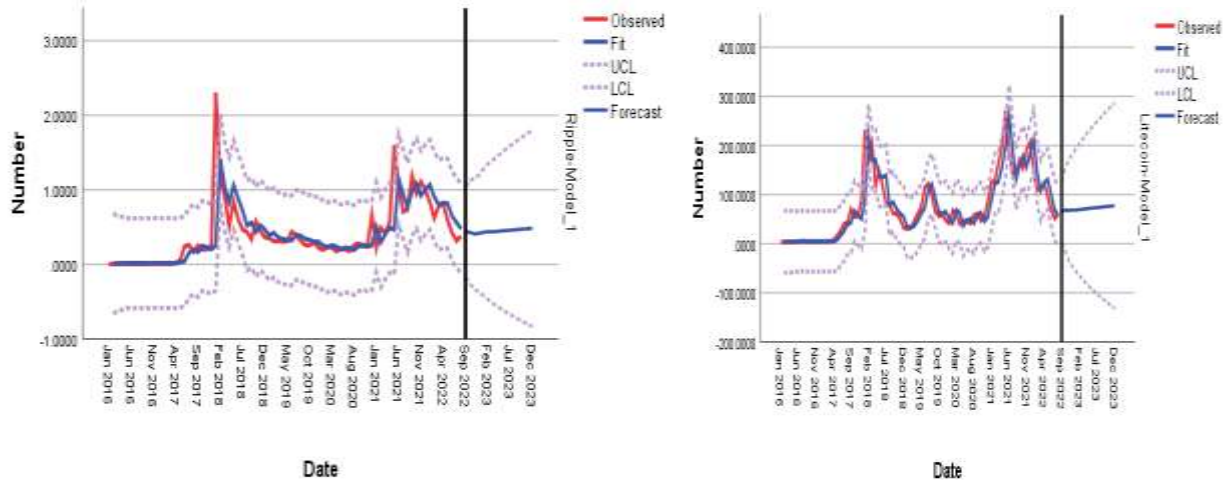

Source- IBM SPSS Output

The above table 4 and graph 4 show the forecast amount of the four cryptocurrencies taken for the study (Bitcoin BTC, Ethereum ETH, Ripple XRP and Litecoin LTC) by the end of 2023. The forecast includes the closing values of the four cryptocurrencies. Though the data of cryptocurrencies is available on daily basis and is updated everyday because of blockchain technology therefore forecasting includes the duration from 1st October 2022 to 1st December 2023. The forecast clearly shows that there is growth in cryptocurrency market as all the four cryptocurrencies are positively correlated. The values will rise a little bit, Bitcoin will rise to $28144.5871/BTC, Ethereum will rise to $1691.6913/ETH, Ripple to $0.4849/XRP and Litecoin to $77.4139/LTC. but not as much as it was in April i.e., post change in increased Repo Rates of various Countries in the world to curb Inflation. The cryptocurrency market has shown great potential to earn profit if there will investment literacy and support from government.

- **Volatility in Cryptocurrency Market:**

Cryptocurrency has experienced extreme fluctuations specially the most popular Bitcoin which is most extensively traded resulting being the highest in value among all the cryptocurrency in the market has experienced fluctuations extremely since it's been introduced in 2009. Then the market crash in December 2013 and price unprecedentedly rose in the late 2017. Then in the recent past in 2019 making Bitcoin and other cryptos the safe haven like gold.

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The summary statistics in Table 1. of daily closing returns in US Dollars of four cryptocurrency which are top cryptocurrency in the cryptocurrency trading market according to CoinMarketCap (https://coinmarketcap.com/currencies/). The taken cryptocurrencies are representation of cryptocurrencies basically in terms of market capitalization, volume and underlining technology in making these cryptos namely Bitcoin, Ripple, Ethereum and Litecoin.

Returns are computed as follows:

$$R_i = \left(\frac{Close_i}{Close_{i-1}} - 1\right) \times 100\%$$

Where,

R_i – Return on the i^{th}day in %,

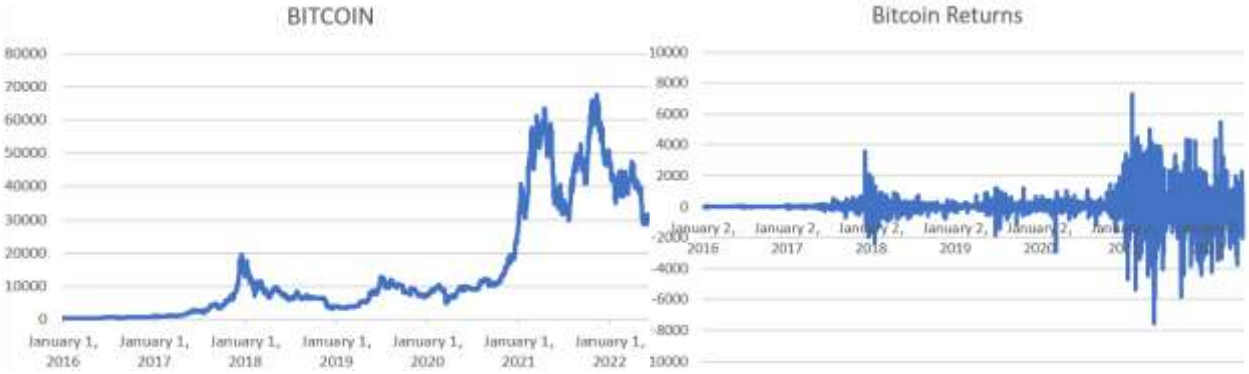
$Close_i$ – Closing price on the i^{th} day;

$Close_{i-1}$ – Closing price on the $(i-1)^{th}$ day

Cryptocurrency markets are open 24 hours a day and seven days a week, the closing price is taken on midnight.

This phenomenon is called Volatility process in Asymmetry. (Figure 5)

Figure 5: Daily Closing prices and Returns of Top Four Cryptocurrencies in US Dollars. Data covers the period from 1st January 2016 to 31st December 2022.



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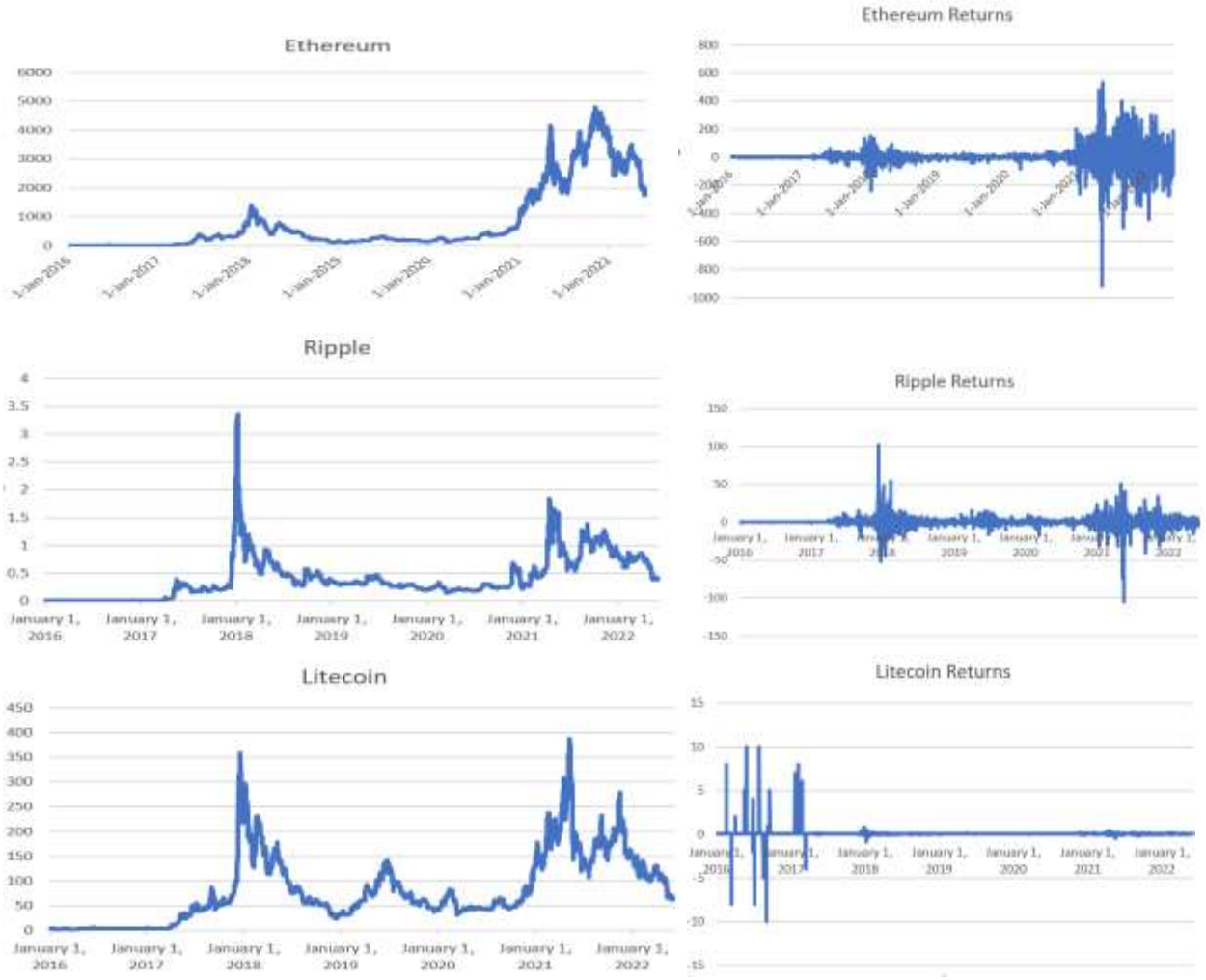

III. To fulfill the third and fourth objective of the study i.e., "***to observe that the return variations were affected by the news going globally and to explain the volatility dynamics of cryptocurrency's daily returns***".

Test of Heteroskedasticity is tested generally by observing by multiple regression and then testing it using a visualization approach by looking at scatter-plot or by looking at residual histogram which are informative but they don't tell us the Heteroskedasticity statistically.

GARCH Volatility analysis Model is used to forecast the cryptocurrency data return volatility. GARCH is Generalized Auto-regressive Conditional Heteroskedasticity Volatility Processes. The GARCH Model is logically slightly different from the ARCH model as it allows

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for more persistent volatility processes. The dynamic and high in volatility GARCH type model is applied.

GARCH (1,1) MODEL= $X_t = e_t$

$$\sigma_t^2 = \omega + \alpha_1 X_{t-1}^2 + \cdots + \alpha_1 X_{t-p}^2 + \beta_1 \alpha_{t-1}^2 + \cdots + \beta_q \alpha_{t-q}^2$$

Where., σ is obtained by $X_0 - X_{t-1}$

Table 5: Parameter estimates

Parameters	GARCH (1.1)
σ_t	0.00007 (0.0010)
α_1	0.0080* (0.0045)
β_1	-0.1326** (0.0380)

**Significance at 1%level
*Significance atc10%level

All the Four cryptocurrency show high volatility measured by minimum and maximum range and standard deviation. Bitcoin being the dominant crypto showed the most volatility so far. While working with the data it was observed that a global issue will affect the values of the cryptocurrencies. Such as Central Banks rate changes, COVID19 period observed that public all over the world encountered cryptocurrency as Safe-haven in other words in time of financial distress investors can hedge their finance with cryptocurrency market.

10. Conclusion:

Wealth manager advisors compared to Automated financial advisor services with high-tech algorithms, Fintech services are available 24/7 also more affordable than traditional asset managers. That's why the Fintech industry is booming. With cryptocurrency on board and its profitability it also has risks and regulators have struggled with fast pace of innovation. Crypto

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Bill is still in the making which gives innovators time to play with blockchain technology as to one's use. As Cryptocurrency will show positive inducement in employment generation,

Trust played a big roll after the 2008 crisis; this was not the first time this world is facing this crisis it happens in every era that is seen in the history. Just like the financial distress after World War II (1940) and in 1650 when the Dutch currency lost its value due to over printing. Public now know their power and an innovative instrument is made which has all the Leadership quality, which has changed the rules of law, Changing the order of the world by reallocating Resources and is Open for global thinking.

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Authors:

Shilpa Ekka- Research scholar, Department of Commerce, Dr. Harisingh Gour Central University, Sagar, Madhya Pradesh, India, 470003.

Shilpaekka18@gmail.com

Prof. G. L. Puntambekar- Professor, Financial Advisor, Department of Commerce. Dr. Harisingh Gour Central University, Sagar, Madhya Pradesh, India, 470003.