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Crypto Currency – Analysis of Bitcoin Performance

Munir Hassan[1]

[1] Business Administration and Public Leadership, Johnson C. Smith University, USA

Correspondence: Munir Hassan,Associate Professor of Finance, Business Administration and Public Leadership, Johnson C. Smith University, Charlotte's Premier Independent Urban University, 100 Beatties Ford Road, Charlotte, NC 28216, USA. Tel: 929-369-5391. E-mail: mhassan@jcsu.edu

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Abstract

In this paper Crypto Currency, history and different types are discussed. The main objective of the paper is to do a pilot study on Cryptocurrency with special emphasis on Bit Coin Analysis. The aspects covered in the paper are the history of Crypto currency, and Features and reasons for investment in this currency. A short Analysis is done to compare the performance of Bitcoins between the last quarters of 2023 and 2024. In addition it was shown that the Trade volume and Market Capitalization are high for Bitcoins as compared to other currencies.

Keywords: crypto currency, trade volume, market capitalization, Bitcoins

1. Introduction

The main objective of the paper is to do a pilot study on Cryptocurrency with special emphasis on Bit Coin Analysis. The paper is discussed in 4 sections. In the first section the history of the Crypto currency, features, and reasons for investment in Cryptocurrency are outlined whereas the focus on the second section is on different types of Crypto currency. The third section emphasis is on a brief Review of Literature related to the topic and the fourth section examines the performance of one type of Cryptocurrency, namely, Bitcoin. Conclusions are given at the end.

2. History and Features of Cryptocurrency

It is stated that Cryptocurrency is digital money which does not require a bank or financial institution to verify transactions. A blockchain (which is a digital public ledger) is used to record the transfer of transactions between peers. In order to secure transactions and control the creation of new units Crypto currencies use Cryptography. Computer systems are used for the process of mining in order to create Cryptocurrencies. Crypto currencies differ from traditional currencies for reasons of easy to create, not typically government controlled and Utilize technology. It is possible for anyone with enough knowledge to create their own cryptocurrency using already existing blockchain platforms.

Cryptocurrency history is just a recent phenomenon. The first usage was observed in the 1980's and other digital currencies like Digi Cash and E-gold by David Chaum and Douglas Jackson were created later. It is only in 2000 that the real decentralized digital currency came to use. In 2008 cryptocurrency was invented by Satoshi Nakamoto. Bitcoin was the first cryptocurrency launch in 2008 is due to a paper titled *Bitcoin: A Peer-to-Peer Electronic Cash System*. In this paper a decentralized digital currency payment without any involvement of any banks was discussed. The start of the Bitcoin block chain mining was known as the "genesis block". The ledgers for Bitcoin and Ethereum are considered public ledgers.

Features of Cryptocurrency

The popularity of the cryptocurrency is due to its various features that make it different from the regular flat currency and add more security

There are various features of Cryptocurrency that make cryptocurrency different from the regular fiat currency, adding more security to the money and hence increasing the popularity of the cryptocurrency.

- **Decentralization**: This feature ensures that Cryptocurrency is not regulated or controlled by any authorities or any bank. It shares networks, immutable and collectively retained control by all users and further completely works based on Blockchain Technology.

- **Accountable and Transparent**: Transparency is one of the main features of Cryptocurrency Fraud cannot occur because any transaction once done cannot be traced back or it is not reversible. Extreme care needs to be taken while doing any transaction.
- **Digitization**: Great security is possible, and theft cannot occur because Cryptocurrency exists only in digital form. No physical notes or coins exist. Further, the user also need not maintain physical space in order to store currency.
- **Global Transactions**: Cryptocurrencies are universal and can be transferred digitally to anyone and anywhere without any border restrictions. Because it is digitized, transactions could be done at a single click at the comfort of the user. Cryptocurrency transactions are used globally.
- **Volatile Price**: feature makes Cryptocurrencies very risky but highly priced within a short period of time. Many would invest in it due to high returns on investment within a very short period of time.
- **Security**: Investors exhibit interest in investing in Cryptocurrencies because they follow cryptographic algorithms, which make them more secure and makes hackers more difficult in manipulating them.

3. Types of Cryptocurrencies

According to Priti Goel, Cryptocurrency is a digital currency that operates on a decentralized ledger called a blockchain. Units of cryptocurrency are created through the mining process. It uses blockchain technology to record data and track transactions. This is independent of the government or banks, as transactions are peer-to-peer. It works where the access to this digital ledger is distributed to many authorized users. The users share information on an immediate basis, and information remains "immutable" (cannot be modified or tampered with). Data remains accessible only to the users of the network and is heavily secure. Using the mining process, miners solve certain mathematical puzzles over specially equipped computer systems, and they are rewarded with bitcoins in exchange. There are platforms available to buy and sell cryptocurrencies. Once bought, these are sold in digital wallets. These wallets are categorized as "hot" (connected to the internet, vulnerable to theft and fraud) or "cold" (safer but harder to transact). One can use smartphones to easily transfer cryptocurrencies like bitcoin from one digital wallet to another. There are several thousands of cryptocurrencies available today, with the major ones being Bitcoin, Altcoin, and crypto tokens. The next landmark in the development of Digital Currency is the Birth of **Cryptocurrencies. Bitcoin**: The Genesis of a Revolution (2008): Satoshi Nakamoto: introduced the world to a decentralized digital currency through the whitepaper titled "Bitcoin: A Peer-to-Peer Electronic Cash System." **Blockchain Technology**: This is Bitcoin's innovation because it introduced a trustless, decentralized ledger. Some of the other Pioneering Cryptocurrencies and Altcoins**: Litecoin** (2011): Silver to Bitcoin's Gold: Created by Charlie Lee This Litecoin introduced the concept of faster block generation times and a different hashing algorithm, aiming to complement Bitcoin. Ethereum (2015): Smart Contracts and DApps: Vitalik Buterin's Ethereum expanded the Vitalik Buterin's Ethereum expanded the capabilities of blockchain by introducing smart contracts, enabling programmable, decentralized applications. **Blockchain Technology Beyond Currency**: Blockchain in Supply Chain and Logistics: **Provenance and Transparency**: Utilizing blockchain for supply chain management enhances traceability and transparency, combating issues like counterfeiting. **Secure Patient Record**s: Blockchain ensures the integrity and security of electronic health records, allowing for seamless sharing among healthcare providers**. Blockchain in Voting Systems:** Enhanced Security and Transparency: Blockchain-based voting systems aim to revolutionize elections by ensuring immutable, verifiable records.

Different countries have adopted diverse stances on cryptocurrencies, ranging from acceptance and regulation to outright ban. **Central Bank Digital Currencies (CBDCs):** Many central banks are exploring or piloting CBDCs to enhance the efficiency of their monetary systems.

Table 1. Some digital currencies

Type	Year	Definition
Bitcoin (BTC)	2009	Block chain Technology was introduced.
Ethereum (ETH)	2015	This is a decentralized platform enabling smart contracts the popularity of the cryptocurrency.
Ripple (XRP)	2012	This is designed for fast, low-cost international money transfers and remittances.
Litecoin (LTC)	2011	This is known for its faster transaction confirmation.
Bitcoin Cash (BCH)	2017	The purpose is to improve scalability and transaction speed.
Cardano (ADA)	2017	Designed as a blockchain platform for the development of decentralized applications with a focus on security.

Polkadot (DOT)	2020	The purpose is to provide A multi-chain platform enabling interoperability between different blockchains.
Chainlink (LINK)	2017	The purpose is to provide real-world data to smart contracts.
Stellar (XLM)	2014	Designed as a platform for fast, low-cost cross-border transactions and token issuance.
Dogecoin (DOGE)	2013	Purpose was created as a meme, it has gained popularity as a digital currency with a strong community

Before investing in Cryptocurrency, one should be aware of the challenges and risks involved.

- **High Return of Investment**: This is one of the main reasons people have interest in investing due to the high returns. Since cryptocurrency is highly volatile, investment in it could give high returns within a short period of time. It could sometimes be risky.
- **Access to cutting edge technologies**: Investing in cryptocurrency would make one aware of the various available technologies.
- **Diversified portfolio. It** helps the investor to build a diversified portfolio apart from our regular stocks and investments. It helps the investor even during crisis.
- **Protection against inflation**: It is believed that Cryptocurrency would give the investor protection when the regular currency loses its value. It is observed that even during inflation, when prices go high, cryptocurrency remains unaffected.
- **Financial and technological innovation**: Investing in cryptocurrency promotes innovation in financial methods and would make the technological industry more innovative and may lead to further innovations and development.

The various advantages of Digital currency are:

Convenience, Accessibility; Security; Cost Effectiveness; Speed and Accuracy; Transparency; Fast Transfer and Transaction Times, No Physical Manufacturing Required, Monetary and Fiscal Policy Implementation; Cheaper Transaction Costs; Decentralized and Acceptable around the world.

The disadvantages are: Security risks, Technological Dependence; Privacy concerns; Limited Acceptance; Technical Complexity; Regulatory challenges; Storage and Infrastructure Issues; Hacking Potential; Volatile Value and Irreversibility

4. Review of Literature

Blavers and McDonald (2021) state in their abstract that “The notion of a global currency is a debate set aside in the past decade as the abstraction saw little potential for realization in a world with heterogeneous governments unwilling to sacrifice seigniorage for optimal design. The technical capability of creating digital currencies, independent of governments, resurrects the discussion and begs the questions of practical design and implementation. Given that price stability is a key feature of currency design, we consider theoretically the issue of pegging a continuously traded digital currency to a periodic measure of inflation. Empirically we identify factors a cryptocurrency might use to create a portfolio mimicking the ideal design. Their theoretical framework for a stable blockchain currency is that the currency they propose may be viewed as a callable negotiable index bond with continuous coupon payments that is collateralized and has an indefinite maturity date. The coupon payments are renegotiated periodically but bondholders may convert the bond at any time for the value of the underlying index asset. The value of the underlying asset at each time is equal to the prevailing price of purchasing a particular defined basket of goods. Their conclusion is that until recently, the notion of the global currency was an interesting abstraction that saw little chance of becoming a reality in a world where only governments, who are unlikely to give up the budgetary flexibility of seigniorage, can issue fiat money. With the recent evolution of distributed trust technologies, popularized by Bitcoin, essentially anyone can produce a currency.

Paul, Pascal, Mauricio Ulate, and Jing Cynthia Wu. (2024) attempt to develop a quantitative New Keynesian DSGE model to study the introduction of a central bank digital currency (CBDC): government-backed digital money available to retail consumers. At the heart of their model are monopolistic banks with market power in deposit and loan markets. When a CBDC is introduced, households benefit from an expansion of liquidity services and higher deposit rates as bank deposit market power is curtailed. However, deposits also flow out of the banking system and bank lending contracts. One can assess this welfare trade-off for a wide range of economies that differ in their level of interest rates. Also, one finds substantial welfare gains from introducing a

CBDC with an optimal interest rate that can be approximated by a simple rule of thumb: the maximum between 0% and the policy rate minus 1%.

These authors give a short description of the other studies and state that "Most existing studies base their analysis on the New Monetarist approach. For example, Keister and Sanches (2022) show that a CBDC causes bank disintermediation as it crowds out bank deposits, leading to a decline in investment. However, they find that CBDC introduction often raises welfare by improving payment efficiency. Williamson (2022b) develops a model of banking and payments in which firms are subject to collateral constraints and a CBDC is introduced through a narrow banking facility. He finds that CBDC can be welfare-improving as it promotes more efficient safe asset usage and helps mitigate capital over-accumulation problem. In contrast to these models with competitive banking, Andolfatto (2021) considered a model with monopolistic banks and finds that the introduction of a CBDC can increase a bank's deposit rate and thus increase deposit financing while not necessarily impacting bank lending. Chiu et al. (2023) use a micro-founded model of payments where banks engage in oligopolistic competition in the deposit market. In their model, the introduction of CBDC is in fact crowds in bank deposits as long as the CBDC rate is not set too high. This effect is due to the assumption of perfect substitutability between deposits and CBDC. Relative to these contributions, the authors consider a New Keynesian dynamic stochastic general equilibrium (DSGE) model with imperfect substitutability between bank deposits and CBDC, bank market power in deposits and loans, and where bank profitability matters for bank lending. Up to this point, relatively few papers have studied the macroeconomic effects of introducing CBDC in a DSGE model of the type that is commonly used by central banks. Barrdear and Kumhof (2022) find that CBDC issuance of 30% of GDP against government bonds could lower the real interest rate and thus increase GDP by 3%. Most closely related to their work is the paper by Burlon et al. (2023), who find that the introduction of CBDC can lead to substantial welfare gains. In comparison, their model features bank market power in deposit markets, which gives rise to the endogenous deposit spread that they emphasize, as well as nonbank lending through the bond market. As a result, their model allows for two realistic additional channels through which CBDC can lead to relatively higher welfare gains. The welfare gains of introducing CBDC may also be higher if the bank dis-intermediation effect is dampened, which may occur for two reasons. Using a banking industry equilibrium model, Whited et al. (2023) shows that banks largely replace lost deposits with wholesale funding, such that bank lending only contracts by a fourth of the deposits lost. Relatedly, Abad et al. (2023) find that banks mainly decrease their excess reserves when deposits leave, as opposed to contracting their lending. In our framework, banks are able to replace lost deposits with borrowing from the central bank or wholesale funding. However, unlike deposits, these alternative funding sources do not carry a spread that is favorable to banks. Therefore, bank profitability declines and bank lending contracts. However, the authors emphasize that what matters for welfare is not necessarily bank lending dis-intermediation per se but rather the change in overall lending. For example, if firms can easily substitute from bank to nonbank borrowing, bank disintermediation can be relatively large but the change in total lending, and hence output, can be comparatively muted. Several other papers study optimal monetary policy and CBDC design. Brunnermeier and Niepelt (2019) formulate conditions under which a swap of private money for CBDC is irrelevant to economic allocations. Davoodalhosseini (2021) explores optimal monetary policy in a model where agents use cash and CBDC as payment instruments. Agur et al. (2022) consider the optimal design of CBDC in the presence of network effects. Closely related to our work, Niepelt (2023) studies the optimal quantity of CBDC in a standard growth and business cycle model where banks are monopsonists in deposit markets. He finds that the welfare-maximizing share of CBDC in payments generally exceeds that of deposits. In comparison, our framework features nominal rigidities, bank market power in loan markets, nonbank lending, and a role for bank profitability to determine credit supply." Their conclusion is that many countries are currently considering the introduction of a central bank digital currency and debating what the effects on their economies might be. Since practical experience with CBDCs remains scarce, policymakers turn to analysis based on theoretical economic models for insights. The authors point out that their paper provides such guidance and delivers a practical message that can be applied to various economies around the world. They suggest a New Keynesian DSGE model to assess the introduction of CBDC. Three competing channels determine the welfare effects in their model. On the positive side, households benefit from the introduction of a CBDC in two ways. First, they value the expansion of liquidity services that the new saving instrument provides. Second, households receive higher deposit rates since CBDC competes with bank deposits, thus reducing banks' deposit market power. On the negative side, banks face deposit outflows and cut their lending, which in turn reduces aggregate investment and output. One assesses this welfare trade-off for a wide range of economies that differ in their level of interest rates. One finds substantial welfare improvements in introducing CBDC if countries follow a simple rule that determines the rate of interest on CBDC: it pays the maxi number between 0% and the policy rate minus 1%. The simplicity of this rule is appealing in that it can

easily be communicated to the public and avoids political-economy concerns related to paying negative rates on CBDC. Interestingly, the authors point out that the introduction of a CBDC is most beneficial for economies with high interest rates. In such environments, banks have substantial market power in deposit markets which is sharply curtailed once CBDC is introduced.

5. Analysis of Bitcoin

In this section the data and methodology are outlined, and the results are presented in two parts with data analysis in the first and methodology in the second.

5.1 Data Analysis

The main source of data for the study is https://www.cryptocurrencychart.com

From this data these were selected based on Prices more than 500$ and 100$.

From the Table it is observed that Bitcoin reveals the highest price as well has the maximum values for Trade Volume and Market capitalization. As for Trade Activity, Bitcoin exhibited low percentages.

Table 2. Price more than $500

	Name	Price	Supply	Trade volume	Trade activity	Market capitalization
1	Bitcoin (BTC)	$84,363.85	19,831,881	$1,309,754,300	1.26%	$1,674,603,783,829
2	Ethereum (ETH)	$2,103.38	120,587,727	$554,631,476	2.57%	$251,256,402,161
35	Maker (MKR)	$1,389.72	852,676	$4,428,558	9.96%	$1,196,024,723
5	Binance Coin (BNB)	$563.17	142,475,853	$15,956,775	0.21%	$80,269,718,363

Table 3. Price more than $100

#	Name	Price	Supply	Trade volume	Trade activity	Market capitalization
1	Bitcoin (BTC)	$84,363.85	19,831,881	$1,309,754,300	1.26%	$1,674,603,783,829
2	Ethereum (ETH)	$2,103.38	120,587,727	$554,631,476	2.57%	$251,256,402,161
35	Maker (MKR)	$1,389.72	852,676	$4,428,558	9.96%	$1,196,024,723
5	Binance Coin (BNB)	$563.17	142,475,853	$15,956,775	0.21%	$80,269,718,363
18	Bitcoin Cash (BCH)	$309.48	19,837,013	$13,322,673	2.12%	$6,204,248,764
21	Monero (XMR)	$215.18	18,446,744	$1,498,308	1.99%	$3,980,545,573
25	Aave (AAVE)	$174.48	15,083,486	$5,786,211	5.50%	$2,631,991,665
6	Solana (SOL)	$1 37.59	507,656,065	$257,880,231	6.11%	$70,295,015,782
14	Litecoin (LTC)	$104.74	75,558,468	$46,007,264	8.96%	$7,960,864,618

Table 3 exhibited the same characteristics for Bit coin performance as Table 1 data.

5.2 Growth Rate Analysis

A simple methodology is used by calculating the growth rates by using a linear model and a semi log model. In this study the linear growth mode**l** describes a situation where a quantity increases by a constant amount over equal intervals of time is used.

As stated in the literature the linear growth model is written: Yt = a + bt, *Y* is the dependent variable, and the subscript *t* refers to time, a series of consecutive integers. The regression constant or intercept (starting point) for the line is a. The parameter b is the slope or amount of growth each period; b is also called the X variable coefficient.

The exponential growth model or semi log is written ln (Yt) = a + bt. Logs convert exponential growth to linear growth so the standard linear regression functions can be used. The exponential growth model is the most useful in the early life cycle of a product and hence has been selected for this study.

Both these models are used in the analysis to assess the performance of Bitcoins, and the results are presented below.

Table 4. Bitcoin analysis

Year	Regression	Dependent Variable	Time	Growth Rate	R^2	Equation
2023	Y=a+bx	Market Cap	Date	4.001e+09	0.9182	Y=(5.272e+11)+(4.001e+09)x (From 91 Observations)
2023	Y=a+bx	Volume	Date	1.189e+08	0.1522	Y=(1.387e+10)+(1.189e+08)x (From 91 Observations)
2023	$Y=ab^x$	Market Cap	Date	0.005819	0.9016	$Y=(27.010135)(0.005819)^x$ (From 91 Observations)
2023	$Y=ab^x$	Volume	Date	0.007568	0.2223	$Y=(23.251401)(0.007568)^x$ (From 91 Observations)
2024	Y=a+bx	Market Cap	Date	1.039e+10	0.8432	Y=(1.177e+12)+(1.039e+10)x (From 91 Observations)
2024	Y=a+bx	Volume	Date	4.763e+08	0.1769	Y=(3.366e+10)+(4.763e+08)x (From 91 Observations)
2024	$Y=ab^x$	Market Cap	Date	0.006539	0.8473	$Y=(27.817364)(0.006539)^x$ (From 91 Observations)
2024	$Y=ab^x$	Volume	Date	0.01047	0.2504	$Y=(24.11562)(0.01047)^x$ (From 91 Observations)

The main objective is to compare the growth rates for the last quarters of 2023 and 2024 in the performance of Bitcoins in terms of their Market Capitalization and Trade Volumes. Market capitalization represents the total value of a crypto currency in circulation calculated by multiplying the total number of coins by the current market price. In the above Table the results obtained by fitting the simple and exponential growth models are presented for the Bitcoin data. Daily data for October, November and December for 2023 and 2024 are considered. The performance of Market Cap is good whereas the Volume coefficient was not significant.

6. Conclusion

The **future of cryptocurrency** in 2025 is expected to be shaped by several key developments

It is quite possible that there may be significant announcements by G7 or BRICS to establish a strategic cryptocurrency initiative. It is quite likely that initiative. A second factor that may influence the future of cryptocurrency is that there will be a continued push for global adoption of cryptocurrencies, with more businesses and individuals integrating them into their daily travel. Further regulatory changes could evolve that could Impact how cryptocurrencies are traded and used .Technological innovations and Market trends could influence the trade in cryptocurrencies. These insights suggest a dynamic and evolving landscape for cryptocurrencies in the near future.

Another opinion is that the future of Cryptocurrency cannot be that easily predicted by anyone. However, with proper guidance and proper knowledge, the adoption of cryptocurrency could be increased to the great extent. It is stated that Regulation through government or banks would make it more stable in the market and then many traders and investors may show interest in it. There might be many environmental concerns with the rapid usage of cryptocurrencies as well. There might be increased cybersecurity threats which need to be addressed with care. Since it is highly volatile, it may produce high returns, but it may also sometimes lead to risky investments.

The conclusion is that Cryptocurrency is one of the fastest-evolving technologies of the century so far, with two important aspects:

1) Integration with Emerging Technologies:

Blockchain and AI: The convergence of blockchain with artificial intelligence promises to unlock new levels of innovation in various industries.

2) Financial Inclusion and Access:

Banking the Unbanked: Digital currencies have the potential to provide financial services to the billions of people who currently lack access to traditional banking.

As has been aptly pointed out by one author “It is observed that the history of digital currencies is a testament to human ingenuity and the transformative potential of technology. From conceptual seeds planted in science fiction to the global impact of cryptocurrencies, the journey has been nothing short of revolutionary. As blockchain technology continues to evolve and governments grapple with regulatory frameworks, the future of

digital currencies promises to shape the way one transacts, invests, and interacts with the global economy."

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