



AN ANALYTICAL STUDY OF VOLATILITY AND RETURN OF TWO MOST TRADED CRYPTO CURRENCIES: BITCOIN AND RIPPLE

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Abstract

Many virtual currencies (Crypto Currencies or Digital Currencies), such as Bitcoin have emerged over the last 10 years. Many people were attracted by these currencies as an investment option and many are interested to know more about these currencies. However, certain difficulties are restricting people from having exposure on it, such as Safety features, Regulations, Decentralized structure and Amount of risk involved. The main aim of this research paper is to discuss about the risk involved, return, financial implications, Future Scope, Limitation, Feasibility & Regulation of Bitcoin and Ripple.

Keywords: Block chain, crypto currency, Virtual Money, Disruption, economic paradigms.

Introduction

In 2012, the European Central Bank defined crypto currency as "a type of unregulated, digital money, which is issued and usually controlled by its developers, and used and accepted among the members of a specific virtual community".

Virtual currencies are digital currency or electronic money. Crypto currencies are digital currency in which encryption techniques are used to regulate the generation of units of currency and verify the transfer of funds, operating independently of a central bank. Although they can be used as a form of payment if another person is willing to accept them, they are not legal tender. The value of virtual currency can fluctuate significantly, they may not be accepted in many places and they are not guaranteed by any bank or government. They do not physically exist as coins or notes.

Literature Review:

(Glaser, 2014) This paper aims at giving empirical insights on whether users' interest regarding digital currencies is driven by its appeal as an asset or as a currency. The paper provides strong indications that especially uninformed users approaching digital currencies are not primarily interested in an alternative transaction system but seek to participate in an alternative investment vehicle. **(Bollen, 2013)** This paper shows that regulation of virtual currencies is at a very early stage. Most regulatory systems are not well designed to cater for this type of payment system. **(DeVries, 2016)** In this research paper a SWOT analysis of Bitcoin is presented, which illuminates some of the recent events and movements that could influence whether Bitcoin contributes to a shift in economic paradigms.

(Chohan, 2017) This paper emphasizes that Crypto currencies are an area of heightened pecuniary, numismatic, technological, and investment interest, and yet a comprehensive understanding of their theories and foundations is still left wanting among many practitioners and stakeholders. This discussion paper synthesizes and summarizes the salient literature on crypto currencies with a view to advancing a more general understanding of their order and purpose. **(Ametrano, 2016)** This paper highlights that Bitcoin has enabled competition between digital crypto currencies and traditional legal tender fiat currencies. Despite rapidly increasing acceptance, so far the affirmation of crypto currency as better money has been thwarted by dramatic deflationary price instability. **(Mitsuru, 2014)** This paper discusses the potential and limitations of Bitcoin as a digital currency. Bitcoin as a digital asset has been broadly discussed from the standpoints of engineering and security design. Bitcoin was designed as a payment vehicle and as a store of value. Despite recent enthusiasm for Bitcoin, it seems very unlikely that currencies provided by central banks are at risk of being replaced, primarily because of the market price instability of Bitcoin (i.e. the exchange rate against the major currencies).



(Luther, 2015) This paper shows that bitcoin has gone from a relatively obscure piece of code to an internationally recognized form of payment. Yet, opinions about bitcoin's future are mixed. After considering the major factors affecting bitcoin's future use, the paper offers some modest predictions namely: the share of electronic transactions will continue to increase; block chain technology will be widely adopted to process these digital payments; bitcoin and other crypto currencies, to the extent that they survive at all, will likely function exclusively as niche monies;. (Chuen, 2017) This paper sets out to help the readers to understand crypto currencies, and to explore the risk and return characteristics using a portfolio of crypto currency represented by the CRIX Index. Substantial discussions are centred on bitcoin and its close variants. Some questions are raised about the potential of crypto currencies as an investment class. Results show that the correlations between the crypto currencies and traditional assets are low, and incorporation of CRIX index will improve the performance of the portfolio that consists mainly of mainstream assets. Sentiment analysis also indicates the CRIX index has a relatively high Sharpe ratio. (Hayes, 2016) This paper aims to identify the likely source(s) of value that crypto currencies exhibit in the marketplace using cross sectional empirical data examining 66 of the most used such 'coins'. A regression model was estimated that points to three main drivers of crypto currency value: the difficulty in 'mining' for coins; the rate of unit production; and the cryptologic algorithm employed. Bitcoin-denominated relative prices were used, avoiding much of the price volatility associated with the dollar exchange rate. The resulting model can be used to better understand the drivers of relative value observed in the emergent area of crypto currencies.

Research Methodology

This research paper is based on secondary data collected from various newspaper, journals, different publications and websites. Different research papers have been studied, news from different newspapers as well the publications of the RBI, World Bank and different research committees have been studied to gather secondary data.

Type of research: Descriptive Research

Period Considered: Out of all the crypto currencies; Bitcoin, Ripple, Litecoin and Ethereum are the most traded crypto currencies based on Market Capitalization as per the report published on investing.com on 5.12.18. My research study is on Bitcoin and Ripple for three calendar years, starting from 1.1.16 – 5.12.18

Data Representation: Table and Graphs

Tools used: Statistical tools like Standard Deviation and Coefficient of Variation

Objective of the study

- To study the acceptance, legality and limitations of Bitcoin and Ripple
- To study the risk involved or volatility and returns of Bitcoin and Ripple
- To study Bitcoin and Ripple as an investment option

Introduction of crypto currencies: Bitcoin, and Ripple

Bitcoin

Bitcoin (BTC) is a cryptocurrency and worldwide payment system. It is the first decentralized virtual currency, as the system works without a central bank or single administrator. The network is peer-to-peer and transactions take place between users directly, without any intermediary. These transactions are verified by network nodes through the use of cryptography and recorded in a public distributed ledger called a block chain. Bitcoin was invented by an unidentified person or group of people under the name Satoshi Nakamoto and released as open-source software in 2009. Bitcoin is a decentralized digital currency that uses peer-to-peer technology, which enables all functions such as currency issuance, transaction processing and verification to be carried out collectively by the network. While this decentralization renders Bitcoin free from government manipulation, the flipside is that there is no central authority to ensure that things run smoothly or to back the value of a Bitcoin. Bitcoins are created digitally through a "mining" process that requires powerful computers to solve complex algorithms and crunch numbers.



Ripple

Ripple (XRP) is a real-time gross settlement system (RTGS), currency exchange and remittance network created by the Ripple company. Also called the Ripple Transaction Protocol (RTXP) or Ripple protocol, it is built upon a distributed open source internet protocol, consensus ledger and native crypto currency abbreviated as XRP (ripples). It supports tokens representing fiat currency, crypto currency, commodity or any other unit of value such as frequent flier miles or mobile minutes. Ripple was launched by Open Coin, a company founded by technology entrepreneur Chris Larsen in 2012. Like Bitcoin, Ripple is both a currency and a payment system. The currency component is XRP, which has a mathematical foundation like Bitcoin. The payment mechanism enables the transfer of funds in any currency to another user on the Ripple network within seconds, in contrast to Bitcoin transactions, which can take as long as 10 minutes to confirm. The goal of Ripple is to be a global settlement network, a platform to allow anyone to transfer money in any currency to any currency in a matter of seconds. This is an ambitious goal meant to eliminate the use of older systems like Western Union or SWIFT. The Ripple network has been accepted by several banks as a legitimate money transfer system, and the currency (XRP) offers a range of useful features. It's a bit more complicated than most crypto currencies, though.

The Risk of Investing in Bitcoin and Ripple

In general all crypto currencies faces the following risks

- Digital currency coins are encrypted to keep them secure but there is drawback there. This coding identifies the currency, but not its owner. Whoever holds the coin's encryption code *becomes* its owner, and there's nothing in the coins coding that says it belongs to a particular person. This built-in anonymity feature means when a coin is stolen, it's *gone*—and the investor has little to no recourse in getting it back.
- Hacking a payment gateway-risk of total loss due to exchange account getting hacked. Therefore it is recommended to invest in off line cold storage, instead of keeping crypto on the exchange house network.
- Volatility as part of the trading is also a major risk as crypto currencies are based on high risk/high return phenomenon.
- Fear of regulation is another thing (the mainstream bankers are already lobbying for regulation against it as we are seeing more and more funds moving from banks to the crypto world).

Future Scope of Bitcoin and Ripple

Investing in cryptocurrencies is highly speculative and the market is largely unregulated. Anyone considering it should be prepared to lose their entire investment. Bitcoin is the most battle-hardened network in existence. Bitcoin has survived the test of time and multiple attacks by well-resourced adversaries. It is a crypto currency which can be trusted upon, and with the Lightning Network in infancy stages great things are coming. Ripple is not a truly decentralized but lightning fast, Ripple has the power to improve on legacy banking systems and help streamline international money transfers.

Regulation and legal status of Bitcoin and Ripple in India:

Fiat currency issuance is a highly centralized activity supervised by a Nation's Central Bank. While the bank regulates the amount of currency issued in accordance with its monetary policy objectives, there is theoretically no upper limit to the amount of such currency issuance. In addition, local currency deposits are generally insured against bank failures by a government body. Bitcoin, on the other hand, has no such support mechanisms. The value of a Bitcoin is wholly dependent on what investors are willing to pay for it at a point in time. As well, if a Bitcoin exchange folds up, clients with Bitcoin balances have no recourse to get them back.

Virtual currencies (VCs) including Bitcoins do not have any underlying assets and their price is entirely speculative, which can expose the investors to heightened risk. Now, as no legal status is granted to virtual currencies in India, there are no set rules and guidelines available to the judiciary for resolving disputes related to



investments in crypto currencies. So, in case of any fraud/dispute, an investor can't seek legal help and has to bear the brunt of losses solely.

Limitation of Bitcoin and Ripple

Some of the limitations that Bitcoin and Ripple currently face are the fact that one's digital fortune can be erased by a computer crash, or that an online vault may be robbed by a hacker – may be overcome in time through technological advances. What will be harder to overcome is the basic paradox on which crypto currencies stand – the more popular they become, the more regulation and government scrutiny they are likely to attract, which grind down the fundamental premise for their existence.

Acceptance of Bitcoin and Ripple

The number of merchants who accept Bitcoin and Ripple has steadily increased but they are still very much in the minority. For Bitcoin and Ripple to become more widely used, they have to first gain widespread acceptance among consumers. However, Bitcoin and Ripple relative complexity compared to conventional currencies will likely deter most people, except for the technologically adept.

Bitcoin and Ripple need to satisfy divergent criteria to become part of the mainstream financial system. Both need to be mathematically complex (to avoid fraud and hacker attacks) but easy for consumers to understand; decentralized but with adequate consumer safeguards and protection; and preserve user anonymity, money laundering and other nefarious activities.

Data Analysis and Interpretation

For the purpose of calculating the volatility/risk involved, the data for three calendar years were collected starting from 1.1.16 – 5.12.18. The closing price of each day was taken into consideration to calculate the average price. And using the same data minimum value, maximum value of the crypto currencies under consideration was also determined. Also, Standard deviation and coefficient of variation for both bitcoin and ripple was calculated to study the risk involved if an investment is done in these currencies.

The table below shows the Average price, Standard Deviation, Coefficient of variation, Minimum and Maximum value of both the crypto currencies under consideration:

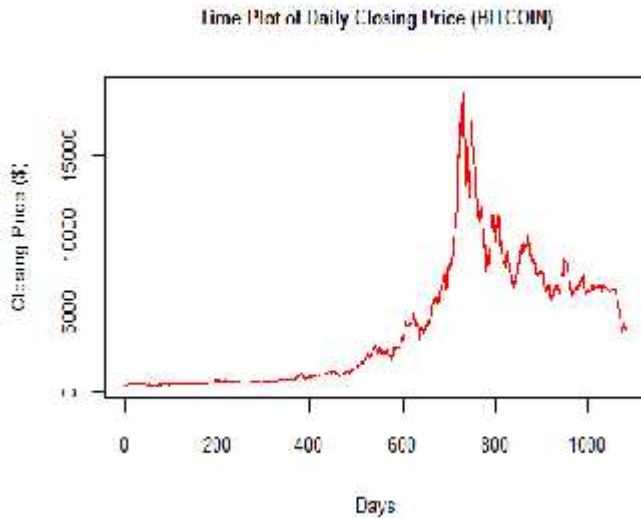
Particulars	Bitcoin	Ripple
Average Price (Mean)	\$3,985.21	\$0.28
Standard Deviation	3951.87	0.390977
Co-efficient of variation	99.16%	142.04%
Minimum Value	\$358.90	\$0.00
Maximum Value	\$19,187.00	\$2.77

Interpretation

- From the Minimum value, Maximum value and Average value, it is clear that prices of bitcoins are way too higher than prices of Ripple.
- If we look at Standard Deviation and Coefficient of variation it is very high for both the virtual currencies. It means both are highly volatile or highly risky. However, Variation is more in Ripple prices as compared to Bitcoin Prices as coefficient of variation of ripple is more as compared to bitcoin.



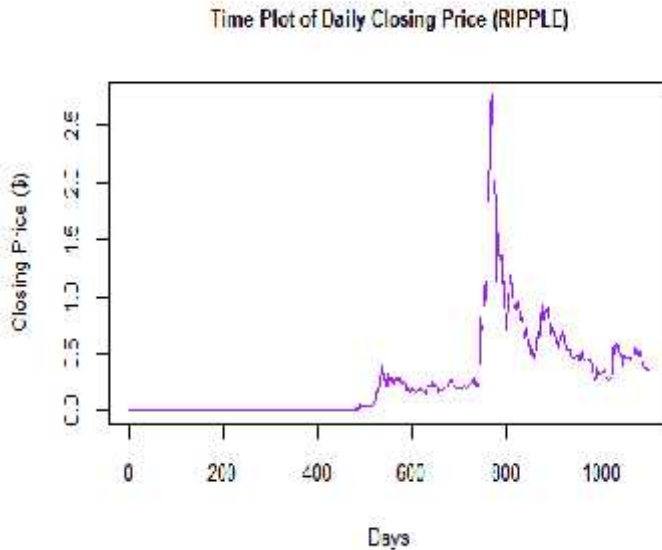
Time plot of Daily Closing Price of Bitcoin starting from 1.1.18 – 5.12.18



Interpretation:

- From the graph it can be noticed that from 2016 – 2017, the prices of bitcoins were stable or increasing.
- From the graph it can be seen that bitcoin reached its highest value in the month of Dec 2017.
- Looking at the graph it is also clear that after 2017 the prices of Bitcoin started falling.

Time plot of Daily Closing Price of Ripple starting from 1.1.18 – 5.12.18

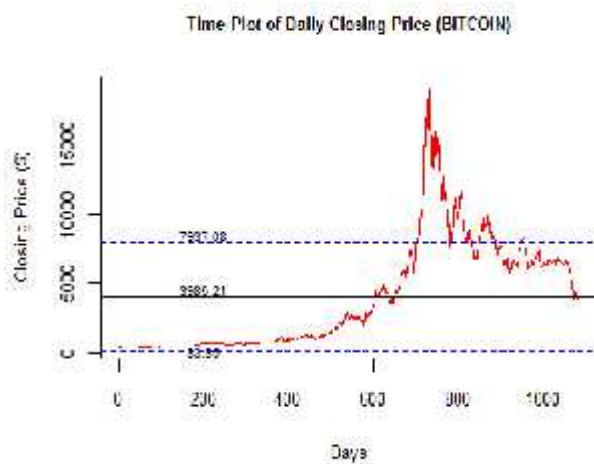


Interpretation:

- From the graph it can be noticed that from 2016 – 2017, the prices of Ripple were stable or increasing.
- From the graph it can be seen that ripple reached its highest value in the month of Dec 2017.
- From the graph it can be seen that the prices of Ripple started falling from 2018



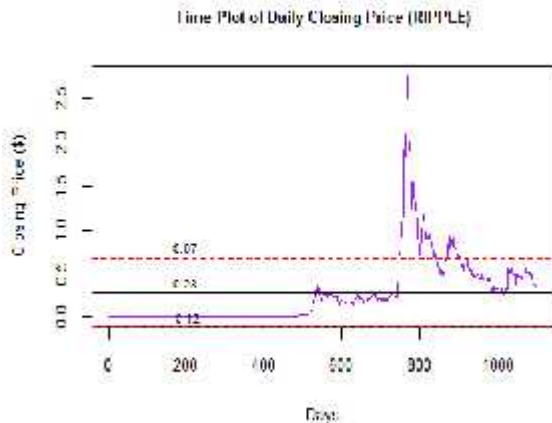
Graph Showing Deviation from Mean Price of Bitcoin



Interpretation:

- The graph shows the deviation of Bitcoin prices from its average prices.
- The graph also shows that maximum of the variation of the prices of bitcoin lies between the range \$33.35 – \$7937.08

Graph Showing Deviation from Mean Price of Ripple



Interpretation:

- The graph shows the deviation of Ripple prices from its average prices.
- The graph also shows that maximum of the variation of the prices of Ripple lies between the range \$0.67 – \$0.12

Table showing percentage change in return of Bitcoin and Ripple from 2016 - 2018 by taking 30th November closing price as reference value

Crypto Currency	Value on 30.11.16	Value on 30.11.17	Value on 30.11.18	Percentage change in 2017	Percentage change in 2018
Bitcoin	739.00\$	9907.00\$	4038.30\$	1240%	-59.24%
Ripple	0.00679\$	0.2372\$	0.36606\$	3393.37%	54.33%

Interpretation

- Against bitcoin's 1240% return, ripple offered as much 3393.37% return in 2017
- Against bitcoin's -59.24% return, ripple offered as much 54.33% return in 2018
- Though the market share and popularity of Bitcoin is higher as compared to ripple but returns offered by ripple are better than bitcoins.



Findings

- Investment in both Bitcoin and Ripple are highly speculative investment as market prices are highly volatile.
- Both Bitcoin and Ripple have been both good and bad investments. They have been good investments for those who purchased them early on before their big run up, and sold them near their all-time highs. But they have been bad investments for those who purchased them near the all-time highs, and either sold them in 2018 when prices dropped, or continue to hold on to them with heavy losses.
- A crypto currency has no intrinsic value apart from what a buyer is willing to pay for it at a point in time. This makes it highly susceptible to huge price swings, which in turn increases the risk of loss for an investor.
- Bitcoin prices have jumped in 2017 on some relevant triggers and also on the preponderance of investors' interest.
- Bitcoin prices rose in December 2017 because of the bitcoin's inclusion in the futures trading platforms that include CME Group and CBOE (Chicago Board options Exchange).
- The reason for fall in bitcoin price in 2018 was that this currency was overvalued and correction was obvious because of overhype, it became a balloon which may burst anytime and the same happened in 2018. Moreover, since there is no regulation on this currency that also became a reason for falling prices of bitcoin.
- Ripple's price (in the last week of 2017) surged past \$2.3 since there was news that the South Korean and Japanese banks were testing the viability of crypto currency's usage in cross border payments.
- Though the market share and popularity of Bitcoin is higher as compared to ripple but returns offered by ripple are better than bitcoins but at the same time volatility of Ripple is higher as compared to Bitcoin.

Suggestions

- Bitcoin and Ripple are vulnerable to market fluctuations as any other commodity or stock. It does not mean not to invest in Bitcoin and Ripple but to take a longer big picture view of investment, as opposed to letting a momentary drop in value that leads to panic.
- Those who purchased during all-time highs, it is better for them to sell depending on their risk appetite as the market is highly volatile for both the currencies.
- Any investment in Bitcoin or Ripple, may be best treated as investment in any other highly speculative venture. In other words, recognize that the risk of losing most of the investment, if not all of it. If an investor cannot stomach that kind of volatility, look elsewhere for investments.
- Looking at the last three years risk and return figures of Bitcoin and Ripple, it is advisable to sell the current holding even if there is a loss and if an investor plans to purchase then wait for the prices to get stable a little. Also, the investor needs to do some speculation on the chances of these currencies getting legal status.

Conclusion

The emergence of Bitcoin has sparked a debate about its future and that of other crypto currencies. Despite Bitcoin's recent issues, its success since its 2009 launch has inspired the creation of alternative crypto currencies. A crypto currency that aspires to become part of the mainstream financial system would have to satisfy very divergent criteria. While that possibility looks remote, there is little doubt that both the Crypto currencies, Bitcoin and Ripple are technological innovations rather than get rich quick schemes. Investment in Bitcoin or Ripple is not a get-rich-quick scheme, it's a technological revolution with the potential to disrupt the fundamental tenets of global financial systems. The acceptance, legality, regulation and feasibility is still a question mark and in such a situation investment in Bitcoin and Ripple becomes highly risky. Moreover, the volatility is also very high so it is



advisable not to invest hard earned money in Bitcoin or Ripple. Once the Digital Currencies prices attain some stability and the currencies are legalized then trading is advisable.

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