

Cryptocurrency And NSE Stock Market: A Comparative Data Analysis

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Abstract - In this research paper, we have analysed Top 25 Cryptocurrency and NSE stock market data set. This can help the investors to analyse the behaviour of these options, to determine which stocks are trending and which are not, so that people can decide in which stocks or cryptocurrency they should invest. Many people are not literate about stock marketing, so to make them understand and give a general idea, we chose this topic. To be more beneficial for people to invest, we decided to co-relate Cryptocurrency and NSE stock by plotting graphs of their various factors like volatility, market cap and prices over different time ranges. This graph can show which stocks are beneficial for long term and short term. By volatility we get to know the growth or decline of the particular stocks and even if stocks of a company are declining day by day so, it can aware people from investing money in it. People who are new to stock market can get benefited by our research paper. Due to COVID-19, stock prices of many companies went down and caused losses. But there were many companies which were not affected by it as we have shown in our graphs.

Key Words: Crypto currency, bitcoin, stock market, stock exchange, data analysis.

1. INTRODUCTION

From start of the first ever human transaction cryptocurrency is the one and only payment method done online which is not accountable to any authority such as bank for verification of transactions. It can be in any corner of the world by anyone for payments. Transaction done through cryptocurrency is done with the help of blockchain technology in which it is stored. Cryptocurrency is stored/saved in digital wallets. The most famous as well as first cryptocurrency created by Satoshi Nakamoto is Bitcoin. Since its inception it has marked around 20 years but still remain the most popular among all. Main reason for trading of cryptocurrencies is for profitability, very high prices being driven at times by speculators. Blockchain also can be called a distributed public ledger which helps to run cryptocurrency which hold record for all the transactions.

A place where is the group of exchanges mainly selling, buying, and publicly held companies does their issuance of shares is known as stock market. A set of rules or guideline is made for such financial transaction and activities and conducted through offline/online mode. The meaning of the stock exchange and stock market is the same, the 'stock exchange' generally subgroup or more precisely subset of

stock market. A given nation may have one, two, three or more number of stock exchanges. The BOMDAY STOCK EXCHANGE (BSE) and the NATIONAL STOCK EXCHANGE (NSE) are the top stock exchanges of India. These topmost national exchanges, also several other exchange functioning in the nation these all together results in the formation of the INDIAN stock market. Stock market acts as a measuring instrument for understanding the condition for the overall economy. A fair price in stock market is assured as number is of participants is huge in the stock market.

2. LITERATURE REVIEW

2.1 Basic Definitions and Behaviour of Cryptocurrency and Stock Market

Cryptocurrency trading can be defined as buying and selling of cryptocurrencies with the intention of making a profit is known as cryptocurrency trading

Stock trading can be defined as a place secured by government institutions where trading is done in a proper and systematic way. As per government guidelines securities buying and selling is done here. Here securities can be described as debenture and issued shares by public company which is listed on stock exchange.

Behaviour of stock market and cryptocurrency:

A) Behaviour of stock market: In normal days, the behaviour of market is like game at casino, Different players play here and the probability of outcome can be guessed which is largely dependent on the investment decisions of them. When the market is in stress. It gets take over by herding behaviour (more like a poker game). The game now totally depends on the players who play the gamble to the mindset of other investors and their reaction to the situation.

B) Behaviour of cryptocurrency: Some of its former investors have already declared is as the future of online transactions or as the technology that will disrupt the entire market. The hard price determination puzzle of cryptocurrency is solved by this paper.

People's fear to invest in stocks and cryptocurrency:

1. In India, gambling is always used as the alternate name of investing or trading in stock market or cryptocurrency. Many people fear investing due to some old social dilemma and

also mindset which has been created over generation. That's the reason Indians have a less percent of their income invested in equity market or cryptocurrency comparing to other nations. Hence, prefer mainly prefer real estate, gold or FD an old tradition carried till date

2. Financial literacy: One of the major factors that keeps Indian people away from investing in stock markets and cryptocurrency is the lack of knowledge and awareness about it. A lot of people have the assumption that stock market and cryptocurrency is something that is hard to understand. That thought could be rooted from the fact that nobody has ever tried to make them understand what the stock market and cryptocurrency is and how investing in it works in a simple way.

3. Conservative attitude: In the middle of the Covid-19 pandemic last year, most Indians decided to invest their money in fixed deposits with more than 6 lakh crore new fixed deposits accounts opened in quarter 1 of 2020; according to a report from The Times of India This indicates the money attitude of Indians – they like to save, not invest. They think - why should I invest in stock markets when banks give me steady and fixed returns without any risk?

4. Lack of capital: This is another by-product of lack of knowledge about the stock market and crypto. Most people hear success stories about the giants of Indian stock market and cryptocurrency and think that they need a huge amount of money to start investing in stock markets. But this is totally wrong. You can just start with an amount as low as Rs. 500. Creating awareness about the working of stock market investments is the key to rectifying most of the above problems.

5. Cash flow, firms or assets do not back cryptocurrency. The one thing that moves crypto prices is sentiment. As sentiment goes up and down, prices goes up and down; and sometimes immensely. Thus we can conclude that the cryptocurrency trading is based on the theory of "greater fool theory of investing" which is driven on possibility that in future someone will buy it for more price.

Pros of investment in cryptocurrency:

- Possibility of hedge against fiat currency: For all the traders, one of the most important advantages of cryptocurrency is its decentralized form. Cryptocurrency is neither controlled by any central banking system nor any governments; which tends to prints money and try to create inflation in fiat currencies such as U.S. dollars or euros. Cryptocurrency is nowadays called "digital gold of today's era" by traders who buy and hold them. This is because they think it's price will increase over time and hence, shall protect them against inflation.

- Potential for outsized gains: Buying cryptocurrencies creates the potential for larger gains on your investment. Several cryptocurrencies such as bitcoin have seen their prices skyrocket since first being introduced. These gains are the main reason as to why people are attracted to crypto, but this potential for price appreciation comes with significant risk.

- Growing number of crypto coins: Earlier, there were just a few coins of cryptocurrency available for investment; but the speculative interest of people has changed that too. Now, new crypto coins are introduced frequently in the world and there are now thousands of options to choose from.

- Growing interest in digital currencies: There seems to be a growing interest in cryptocurrency from investors/traders, companies as well as governments. Tesla had even held Bitcoin on its balance sheet and briefly accepted the cryptocurrency as payment before reversing the course. El Salvador also had adopted Bitcoin as a legal tender in 2021; though, against this, the International Monetary Fund has requested the country to change its decision. Increasing acceptance and popularity of cryptocurrency could be a positive sign for traders.

Cons of investment in cryptocurrency:

- High volatility: Cryptocurrencies were extremely volatile so far in their overall lifetime. They are not backed by anything solid, so the price at which they are traded is determined by guesses of the traders. Fortune/money can be made or lost in a short span and there is no guarantee when or where the crypto coin might be traded next.
- Cyber risks: Even though, the cryptocurrency enthusiasts flaunt the security benefits of crypto, some frauds were found involving some cryptocurrency. Most of the time it is difficult to recover the stolen commodity.

- No intrinsic value: Cryptocurrency does not have real physical value, which means that they are not backed by underlying assets, organisations, firms or some sort of earnings in the way that stocks are. Stocks are valued because they have the future earning power and hence, they will return for their owners. In contrast to stocks, cryptocurrencies can offer nothing to support the speculations.

Pros of investment in stocks:

- Previous history of solid and guaranteed returns: The stocks have a long history to produce solid returns on investments, with the S and P 500 returning around 10% over the long-term ones. Even though, the stocks can be volatile for short-term period, they are generally safe (for most times) to hold over long span of time.

- Intrinsic value: A stock of a firm represents the ownership in a company and its value depends on the success,

expansion and profits of the underlying company over the time. Companies own or generate assets that produce earnings for investors, thus creating what is known as intrinsic value of the stock.

- **Accessibility:** It has now become easier nowadays to invest in stocks because of many online brokers cutting trading and transaction fees to almost zero. You have the option to invest in stocks of individual company or choose to purchase a diversified portfolio of stocks (different companies) through help of index fund. Index funds help to keep costs lower and allows you to build a diversified portfolio even if you don't have enough money at start.

- **Strong regulations and rules:** Brokers, stock exchanges and firms are all heavily regulated under various public and government agencies. Firms must provide required information to investors through the Securities and Exchange Commission. Even if no regulatory body is perfect, but stocks have been around for long time and in addition to that, there are many protections for investors in place.

Cons of investment in stocks:

- **Volatility/fluctuations:** When you hold a broad portfolio (variety) of stocks through the index fund, stocks are less likely to be volatile as compared to cryptocurrency. Stocks can tend to be more volatile, but typically less when compared against cryptocurrency. Due to this more fluctuating nature, stocks are mostly used for long-term investment. This gives chance to you, so that you can have time to recover from any losses occurred in short term.

- **Low chances for extreme gains:** Stock indexes like S and P 500 are less likely to attain higher profits, that are sometimes found in cryptocurrency. Stocks can have positive returns (profit) about 10% for longer time period. On other hand, it is common for cryptocurrency to change 10% in a single day.

2.2 Limitations of Current Literature

The proposed papers and analysis generally lack, a global perspective of factors that influence cryptocurrency market. Most of the publications are also missing a factual validation in this field. To tackle this, we proposed the method by which we can correlate cryptocurrency and NSE (National Stock Exchange) with the help of volatility of the stocks. In many of the research papers they have not mentioned which stocks are preferable, so we mentioned it whether cryptocurrency is better or NSE by their graphs, even we can decide in which stocks we should invest /buy and which is good for long term or short-term investment.

3. DIFFERENCE BETWEEN CRYPTOCURRENCY AND STOCK MARKETS

Before starting the analysis of cryptocurrency and NSE stocks dynamics, let's see difference in crypto market and stock market characteristics. This will help the traders to understand the need behind this study.

1. Stocks are available for trading in the countries in which they are introduced. On other hand, cryptocurrency is universally available for trading, which attracts many investors throughout the world.

2. The share market (like NSE & BSE) are backed by bank systems and government entities. Cryptocurrency markets have decentralized system and there is no government influence; there are no restrictions and regulations (or very limited) in crypto markets. Blockchain is the technology that undertakes the roles entitled by this centralization. It is a fact that it is not centralized, and this sometimes leads as a source of concern for investors. This situation results for contribution to more fluctuations in prices, since traders don't take crypto market safe when compared to share market, which has to follow strict rules set by the governments, public bodies and banks.

3. Share market has more resistance to manipulations of market as compared to crypto market, as it is regulated. For traders who guess the prices periodically with the phenomenon of FUD (Fear, Uncertainty, Doubt), crypto markets would be a good trading place for them.

4. In the share market, traders are forced to spend some part of their investment to charges such as: broker charge, taxes, transaction charges, and transaction fees, etc. While, in crypto market, these additional costs do not exist or are very small. These things might appeal more to the traders, and hence they transact more on cryptocurrency, which then results in more fluctuations in the market.

5. Key difference in share market and crypto market is the differences in the profit making and loss occurring margin. Traders have to be patient in order to make profit with shares/stocks. Usually, the process is slow, which can range for months to even years. On other hand, traders aiming for profits in short span may choose for trading in crypto. This situation occurs due to volatile nature of crypto market.

4. DATA ANALYSIS AND VISUALIZATION

For the data analysis, we have taken into account, the data of 25 most popular cryptocurrencies and NSE stocks. The data and datasets have been taken from Kaggle.com. The data has been taken up to year 2021. The included cryptocurrencies and stocks are of varying range from being very affordable to very costly and from oldest to latest. This wide variety will help us to get a better and broad understanding of overall

market conditions. For data analysis, we have taken data from data sets which are available on 'Kaggle' website.

Comparative Data Analysis:

The aim of this paper is to give insights regarding stability, volatility, short-term and long-term returns, etc. of Cryptocurrencies and NSE stocks to Indian investors which will give them a better understanding of conditions in both markets and hence, help them in taking proper decisions while investing. To achieve this, we will compare various aspects of both the markets, analyse and visualize data and then, based on these, derive conclusions.

1) Market Cap: Market-cap (also known as market capitalization) means the total price/cost of all of a company's shares and stocks. It can be calculated by first multiplying the price of a single stock with number of company's outstanding shares.

For a crypto currency, market capitalization is the overall total price of all the crypto-coins together that have been mined up to the date. It is the product of total number of coins in circulation and the current market price of a single crypto-coin.

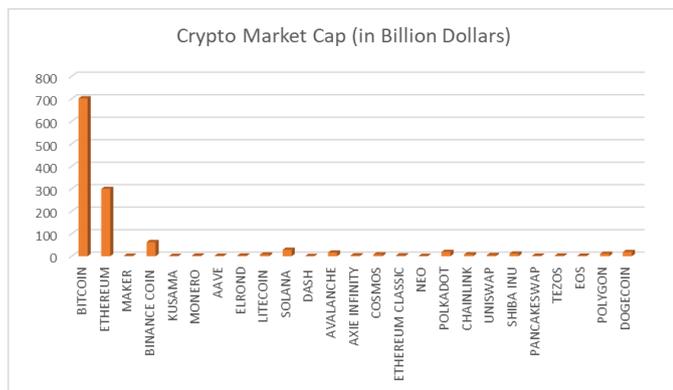


Fig -1: Cryptocurrency market cap

The top 3 Cryptocurrency in 'Market cap' are:

1. Bitcoin (\$701.49 B)
2. Ethereum (\$298.87 B)
3. Binance coin (\$62.31 B)

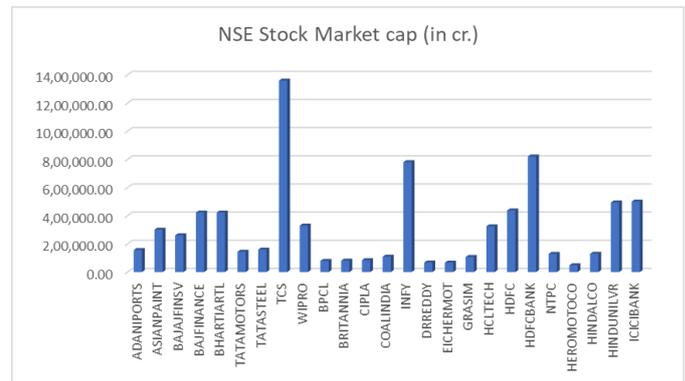


Fig -2: NSE stocks market cap

Top 3 Stocks in Market cap are:

1. TCS (13,59,475.36 Cr.)
2. HDFC BANK (8,20,747.17 Cr.)
3. INFOSYS (7,80,097.61 Cr.)

2) Per commodity price:



Fig -3: Cryptocurrency prices

Top 3 costliest cryptocurrency are:

1. Bitcoin (36,983\$)
2. Ethereum(2,510\$)
3. Maker(1,989\$)

Top 3 most affordable cryptocurrency are:

1. SHIBA INU (0.00002\$)
2. DOGECOIN (0.14\$)
3. POLYGON (1.54\$)

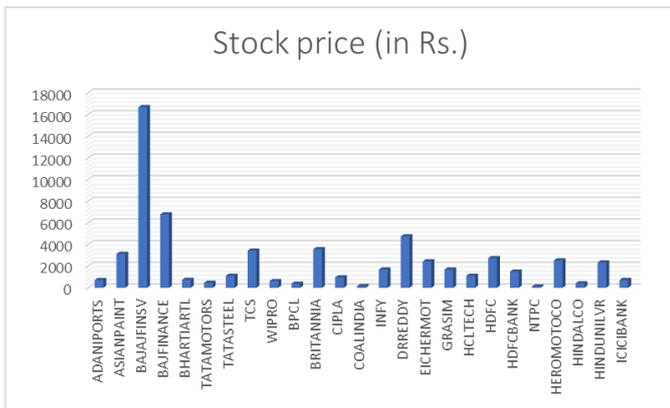


Fig -4: Stock prices

Top 3 costliest stocks are:

1. BAJAJFINSV (16,684.00 Rs.)
2. BAJFINANCE (6,780.00 Rs.)
3. DRREDDY (4,750.00 Rs.)

Top 3 most affordable stocks are:

1. NTPC (128.65 Rs.)
2. COALINDIA (155.9 Rs.)
3. BPCL (377.4 Rs.)

The above figures are enough to break the myths that:

- A lot of money is required initially to invest: People can buy a stock for around 150 Rs. And cryptocurrency for as less as around 1 \$.
- Cryptocurrencies are always costlier: Some cryptocurrencies like Shiba Inu and Dogecoin can be bought for less than a dollar.

3) % change in prices: Percent change is a simple metric that compares a stock price at one point in time to its price at a different time. Percent change help investors quickly identify how significant the stock movement is. If percent change is positive, it indicates there was profit of that much percent between buying and selling of that stock. If percent change is negative, it indicates there was loss of that much percent between buying and selling of that stock.

Percent gain or loss can be calculated by following steps:

- Subtract 'Purchase/Initial/Original price' from 'Selling price'. This will give us amount gained or lost.
- Divide this amount by 'Purchase price' and then multiply by 100.

Percent change helps investors to determine various factors like:

- Short-term, mid-term and long-term returns.
- Volatility and Stability of the commodity.

By studying and understanding these factors, investors can decide:

- Duration of investment/trading: If investor is doing Intra-day trading or looking for short-term returns, then Volatile markets having higher % change over short time would be favourable. If investor has to invest for a longer period or looking for long-term returns as they don't have much time for trading, then stable markets would be favourable.
- Long-term and Short-term returns: If investors would to try for high return over short time, them volatile market would be the choice for investment. But it must be noted that volatile markets also have very high risk of losing money as well. If investors want fixed positive returns, then they must try for stable markets over long term.

% change for 30 days

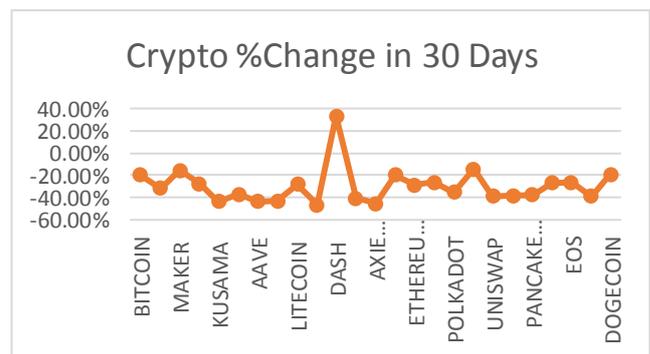


Fig -5: Percent change in cryptocurrency prices (30 days)

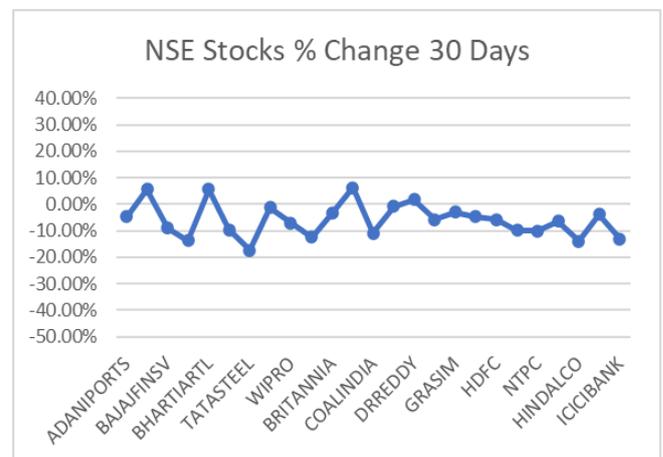


Fig -6: Percent change in stock prices (30 days)

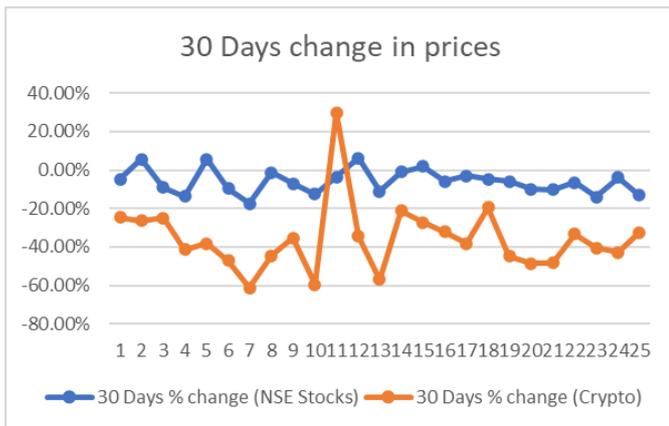


Fig -7: Comparison of percent change in prices (30 days)

The % change in 30 days for cryptocurrencies is between -50% to 40%, while for NSE stocks is -20% to 10 %. This shows that volatility of cryptocurrency over short-term (30 days) is slightly higher than stocks. The graphs show that for most stocks and cryptocurrencies, for same month, the returns were negative, which indicates there was % loss.

% change for 1 year:

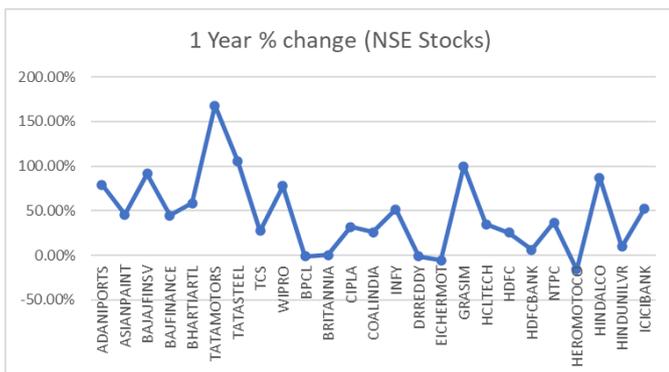


Fig -8: Percent change in stock prices (1 year)

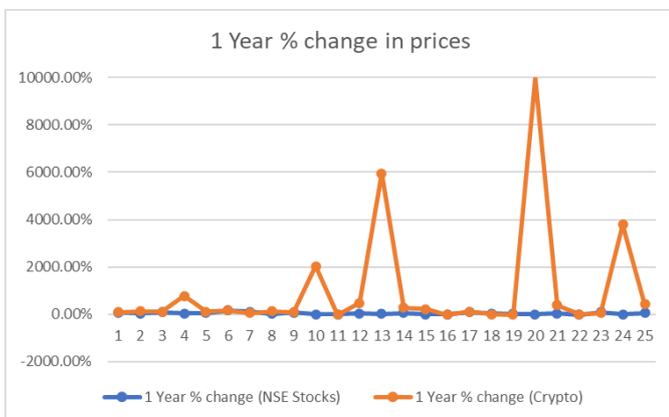


Fig -9: Comparison of percent change in prices (1 year)

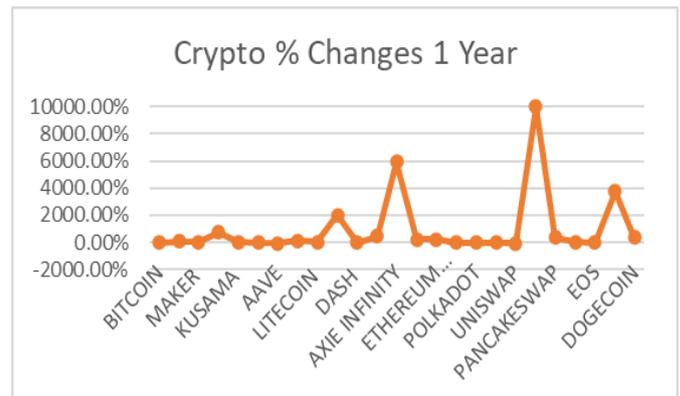


Fig -10: Percent change in cryptocurrency (1 year)

There is a significant % change in prices of both, stocks and cryptocurrencies. The % changes for cryptocurrencies are between -54% to astounding 10,000%. As for NSE stocks, % changes are between -16% to almost 170%.

This gives us the following results:

Top gainers in cryptocurrency:

1. SHIBA INU (9999.99% gain)
2. AXIE INFINITY (5924.29% gain)
3. POLYGON (3787.96% gain)

Top gainers in NSE Stocks:

1. TATAMOTORS (167.95% gain)
2. TATASTEEL (105.13% gain)
3. GRASIM (99.95% gain)

Top losers in cryptocurrency:

1. AAVE (54.25% loss)
2. UNISWAP (46.31% loss)
3. CHAINLINK (28.65% loss)

Top losers in NSE stocks:

1. HEROMOTOCO (16.02% loss)
2. EICHERMOT (5.95% loss)
3. BPL (1.22% loss)

The above graphs show that:

- Over long term, most of the stocks and cryptocurrencies

The above graphs show that:

- Over long term, most of the stocks and cryptocurrencies give positive % change, i.e. profit.
- For longer time span, cryptocurrency is very much volatile as compared to NSE stocks. This means stock prices are more stable during long term.
- Over long term, cryptocurrencies gave higher returns than stocks.
- Over long term, % loss in NSE stocks is very less as compared to loss in Cryptocurrencies.

CONCLUSIONS

[1] It is affordable for Indian investors to invest in both, stocks and cryptocurrency.

[2] The % return does not depend on price of stock or cryptocurrency. A cryptocurrency of very less price can also give very high percentage returns.

[3] Before investment, the investor must decide the period of investment and risk he is willing to take. For short-term/swing trading, volatile markets with greater risks are preferred. For long-term investments, stable markets like Stocks are preferred. But analysis has shown that, for long term cryptocurrency can give exponential or very high percentage of returns

[4] It would be better to have a diversified portfolio, including both, cryptocurrencies and stocks, which may ensure high returns and also mitigate the risk of losing a lot of money.

FUTURE SCOPE

[1] Data analysis of top 200-300 cryptocurrencies and NSE stocks

[2] Comparison of trading in Cryptocurrency, International stocks and NSE stocks.

[3] Data analysis of trending NFT's (Non fungible tokens).

[4] Conversion of prices of all commodities to a single currency (e.g. Rs.) for better understanding of investor.

[5] Analysis ranging for wide range of time spans (1 day; 7 and 15 days; 1, 3 and 6 months; 1, 2, 5 years, etc.)

[6] Analysis of effects of certain crises like 'COVID-19' and 'Ukraine-Russia war' on trading market

REFERENCES

[1] Al-Yahyaee, K. H., Mensi (2018). Efficiency, multifractality, and long-memory property of the bitcoin: A comparative analysis with stock, national currency, and gold markets. *Finance Research Letters*, 27, 228–234.

[2] Bacry, E., Bompain, M., Gaiffas, S., & Poulsen, S. (2017). Python library for statistical learning, with particular focus on time-dependent modeling. arXiv e-prints.

[3] Bartolucci, S., Ortu, M., Uras, N., Marchesi, M., & Tonelli, R. (2020). The butterfly "effect": Impact of development practices on cryptocurrency. *EPJ Data Science*, 9(1), 21.

[4] Websites:

<https://www.kaggle.com/>

<https://en.wikipedia.org/wiki/Cryptocurrency/>

<https://www.moneycontrol.com/>

<https://www.nseindia.com/>

<https://www.bseindia.com/>

<https://www.investopedia.com/terms/s/stockmarket.asp>

<https://www.marketwatch.com/>