An Evaluation of the Rationale of the Impact of Crypto Currency on Market Performance

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Abstract

This paper is an outcome of the belief that, crypto currency in India is neither illegal nor legal. Simultaneously, government initiatives have taken to trade the crypto currency (Bitcoin) under security exchange board of India, similar to gold sold digitally. In present era of technological advancement currency too should be digitalized. This paper is an attempt to identify the rationale of crypto currency and the impact of crypto currency on market performance. The volatility has been measured of both, market performance (through BSE Sensex movement) and price of crypto currency (Bitcoin). An effort has made to bring both the elements i.e. market performance and crypto currency (Bitcoin) on common platform and thereby measure their individual as well as collective resultant. The study reveals that the traded volume in bitcoin is less than 2% of the total investors in Indian Sub-continent. And it becomes too early to derive the impact of Bit coins over market performance.

Keywords *Crypto Currency; Market Performance; Unit Root Test*

Introduction

Crypto currency, as the name itself reveals, is a virtual currency that uses cryptography for secure transactions. It is a digital asset, designed to work as a medium of exchange. As opposed to centralized banking system crypto currency uses decentralized control through a blockchain which is a public transaction database. Crypto currencies make it easier to transfer funds between two parties in a transaction; these transfers are facilitated through the use of public and private keys for security purposes. These fund transfers are done with minimal processing fees, allowing users to avoid the steep fees charged by most banks and financial institutions for wire transfers. Satoshi Nakamoto is arguably the biggest pioneer of crypto currency.

Market performance refers to the behavior of a security or asset in a market place. In the present article market performance is resembled through BSE daily closing prices. Established in 1875, BSE (formerly known as Bombay Stock Exchange Ltd.), is Asia's first & the Fastest Stock Exchange in world with the speed of 6 micro seconds and one of India's leading exchange groups. BSE has facilitated the growth of

the Indian corporate sector by providing it an efficient capital-raising platform. Today BSE provides an efficient and transparent market for trading in equity, currencies, debt instruments, derivatives, mutual funds. (source: bseindia.com)

Review of Literature

(Agarwal, 2018) revealed that crypto currency is a digital currency created and stored electronically. Unlike monetary currency, the supply of crypto currency is not determined by any central bank or authority and the network is completely decentralised. India plays a relatively small role in the global crypto currency market, only about 2% of the global crypto currency market cap. The RBI has warned about the potential financial, legal, customer protection and security-related risks in crypto currency. Emphasizing over possibilities of crypto currency he stated that some of the biggest companies in the world have announced that either they already are/will soon be dealing in bitcoin including Ernst & Young (EY) Switzerland, Deloitte, KPMG, CME Group, PwC and Nasdaq! This increases the chances of a secure and hopeful future for Bitcoins.

(UK, 2017) has discussed the working of bitcoin in detail along with the method of bitcoin transaction on a network and the process of bitcoin mining. The paper also discusses the effect of bitcoin and its advantages on developing countries, centered on its effect over Indian economy and its future in the country and presenting the views of different groups of people over this new currency. The paper also provides a wide view of security issues in bitcoin with a discussion on 51% attack and presents a feasible solution to defend the attack. Bitcoin is an innovative concept of a decentralised, peer-to-peer virtual currency. Its functions are autonomous from any centralised influence. Bitcoin is a potential way to improve the basic financial services and the quality of life of the people in developing nations, which is a promising antipoverty technique. Thus, Bitcoin provides an emergency exit for the people in countries whose currencies are devalued.

(Menon & Das, 2016) The price of bitcoins on Zebpay, which claims to have over 1.3 lakh users, surged from Rs 51,600 to Rs 69,500 (per bitcoin) in a mere 18 days after the demonetisation speech of November 8. The real adopters of bitcoins in India are people who use the cryptocurrency as an investment vehicle. The exchanges abound with speculators punting on volatile bitcoin prices.

(Chan, Chu, Nadarajah, & Osterriede, 2017) analyzed statistical properties of the largest cryptocurrencies (determined by market capitalization), of which Bitcoin is the most prominent example. We characterize their exchange rates versus the U.S. Dollar by fitting parametric distributions to them. It is shown that returns are clearly non-normal, however, no single distribution fits well jointly to all the cryptocurrencies analysed. We find that for the most popular currencies, such as Bitcoin and Litecoin, the generalized hyperbolic distribution gives the best fit, while for the smaller cryptocurrencies the normal inverse Gaussian distribution, generalized t distribution, and Laplace distribution give good fits. The results are important for investment and risk management purposes.

(Seetharaman, Saravanan, Patwa, & Mehta, 2017) determined multiple factors which are translating Bitcoin (BTC) that is gaining momentum in various fields of global finance and how disruptive it can be, including replacing main fiat currencies in the financial system impacting mainly USD. The key variables studied are Regulation or lack of it around Bitcoin, Bitcoin Technology, Bitcoin Economy and the usage of Bitcoin as a Currency. The research used the latest statistical tool to analyze the data collected by building a partial least squares structural equation model (PLS-SEM).

(Singhal & Rafiuddin, 2014) discussed the issues on both sides of bitcoin particularly in interest of financial institutions and economists with a prospective transformation, with an application of advance technology, and revolution with a digital currency. Bitcoin has potential to replace traditional money. In order to do that, it must first evolve into a more secure form of money. It is concluded that changes

brought in the society are adapted gradually and rapid progress can be possible only through the efforts of showing all the stake holders the benefits of the possibility of a single currency.

Research Objective

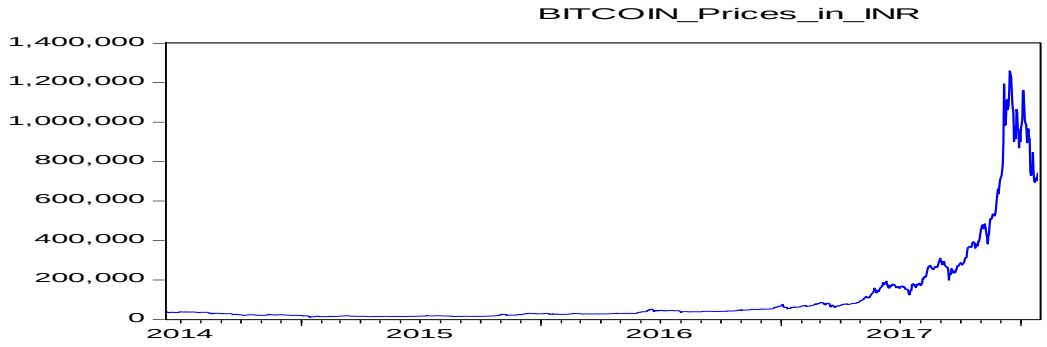
- To understand the essentials of crypto currency.
- To evaluate the rationale of crypto currency in Indian sub-continent.
- To identify the relationship between crypto currency and market performance.

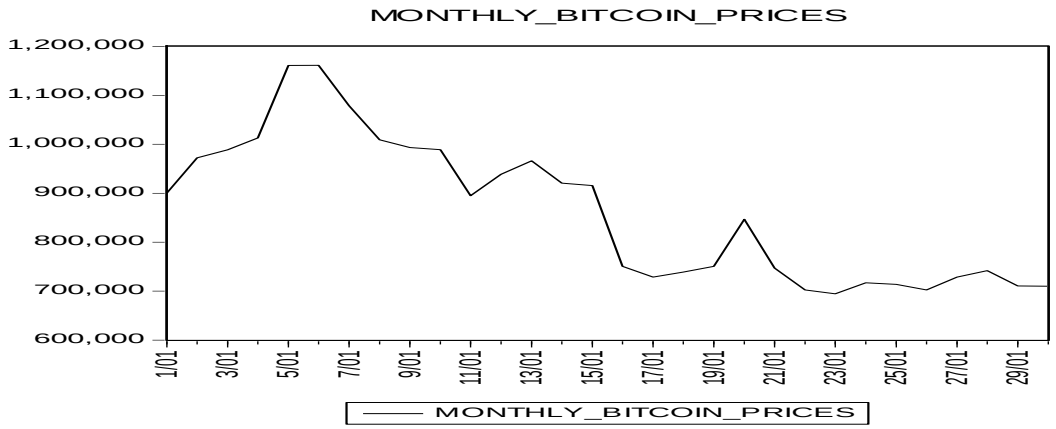
Data Analysis

Descriptive Analysis

Statistical Measures	*Bitcoin Price in INR*	*BSE_Sensex Price*
Mean	110775.0685	34943.77362
Standard Error	5725.447023	189.0058417
Median	35297.37377	34771.05078
Standard Deviation	208959.2077	866.1335763
Sample Variance	43663950495	750187.372
Kurtosis	11.20412269	-1.379779946
Skewness	3.324916027	0.258479677
Range	1249135.307	2489.871094
Minimum	10806.8809	33793.37891
Maximum	1259942.188	36283.25
Sum	147552391.3	733819.2461

Graphical Presentation




MONTHLY_BITCOIN_PRICES
1,200,000
1,100,000
1,000,000
900,000
800,000
700,000
600,000
1/01
3/01
5/01
7/01
9/01
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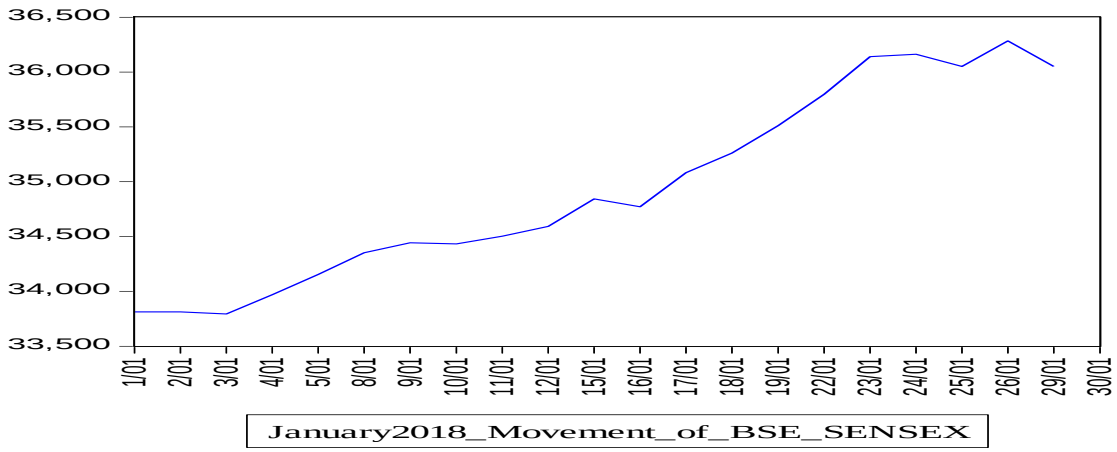
MONTHLY_BITCOIN_PRICES


36,500
36,000
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34,500
34,000
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1/01
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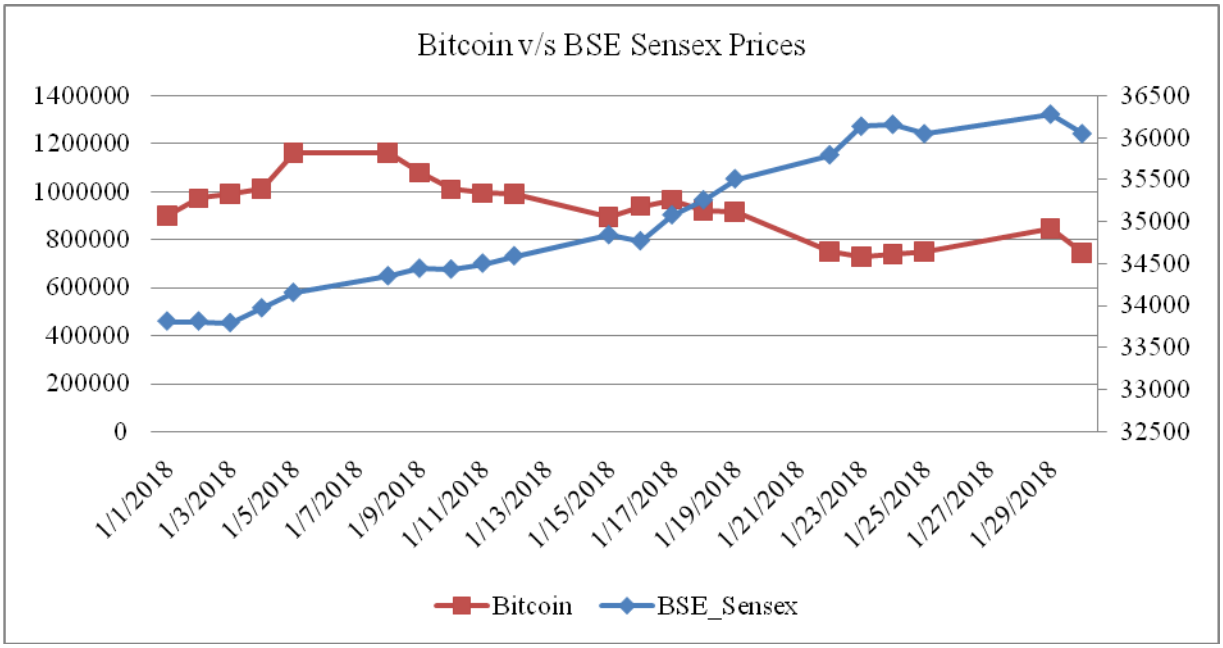
January2018_Movement_of_BSE_SENSEX


Bitcoin v/s BSE Sensex Prices
1400000
1200000
1000000
800000
600000
400000
200000
0
36500
36000
35500
35000
34500
34000
33500
33000
32500
1/1/2018
1/3/2018
1/5/2018
1/7/2018
1/9/2018
1/11/2018
1/13/2018
1/15/2018
1/17/2018
1/19/2018
1/21/2018
1/23/2018
1/25/2018
1/27/2018
1/29/2018
Bitcoin
BSE_Sensex

Null Hypothesis: BITCOIN has a unit root

Exogenous: Constant
Lag Length: 22 (Automatic based on SIC, MAXLAG=22)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.403305	0.5820
Test critical values:	1% level	-3.435134	
	5% level	-2.863540	
	10% level	-2.567884	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(BITCOIN)
Method: Least Squares

Sample (adjusted): 2/07/2014 30/01/2018
Included observations: 1309 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BITCOIN(-1)	-0.003174	0.002262	-1.403305	0.1608
D(BITCOIN(-1))	0.042150	0.027641	1.524914	0.1275
D(BITCOIN(-2))	-0.167472	0.027676	-6.051177	0.0000
D(BITCOIN(-3))	0.016695	0.027883	0.598740	0.5495
D(BITCOIN(-4))	-0.035254	0.027746	-1.270607	0.2041
D(BITCOIN(-5))	0.198521	0.027716	7.162681	0.0000
D(BITCOIN(-6))	-0.047976	0.028347	-1.692433	0.0908
D(BITCOIN(-7))	0.112855	0.028308	3.986692	0.0001
D(BITCOIN(-8))	0.109593	0.028415	3.856935	0.0001
D(BITCOIN(-9))	0.085797	0.028221	3.040249	0.0024
D(BITCOIN(-10))	0.183765	0.028284	6.497061	0.0000
D(BITCOIN(-11))	-0.009667	0.028789	-0.335770	0.7371
D(BITCOIN(-12))	-0.094174	0.029170	-3.228475	0.0013
D(BITCOIN(-13))	-0.072327	0.028697	-2.520345	0.0118
D(BITCOIN(-14))	-0.139947	0.028582	-4.896424	0.0000
D(BITCOIN(-15))	-0.094517	0.028827	-3.278743	0.0011
D(BITCOIN(-16))	-0.093922	0.030139	-3.116362	0.0019
D(BITCOIN(-17))	-0.022771	0.030143	-0.755428	0.4501
D(BITCOIN(-18))	-0.038621	0.030126	-1.281960	0.2001
D(BITCOIN(-19))	0.143493	0.030175	4.755401	0.0000
D(BITCOIN(-20))	0.186070	0.030506	6.099542	0.0000
D(BITCOIN(-21))	-0.006572	0.030742	-0.213790	0.8307
D(BITCOIN(-22))	0.165590	0.030830	5.371113	0.0000
C	595.9790	479.0592	1.244061	0.2137

R-squared	0.219786	Mean dependent var	510.5502
Adjusted R-squared	0.205821	S.D. dependent var	17121.69
S.E. of regression	15258.28	Akaike info criterion	22.12180
Sum squared resid	2.99E+11	Schwarz criterion	22.21672

Log likelihood	-14454.72	Hannan-Quinn criter.	22.15740
F-statistic	15.73847	Durbin-Watson stat	1.981235
Prob(F-statistic)	0.000000		

Interpretation

The above descriptive analysis is an outcome of the data collected of Bitcoin prices in INR and BSE Sensex of last 1 year daily fluctuations. The Bitcoin prices in INR and BSE Sensex reveals that, standard deviation of bitcoin prices are much higher than BSE Sensex, with which we can conclude the higher amount of volatility exists in the movement of bitcoin prices. Further in order to test the hypothesis, unit root test has applied. Assuming the hypothesis that Bitcoin has a unit root i.e. the data is non stationary; as it is reflected through the graphical presentation as well as the variance derived from descriptive analysis too states the same.

With the application of statistical tool EViews, the ADF statistic value is -1.4033 and the associated one-sided *p-value* (for a test with 1309 observations) is 0.5820. In addition, EViews reports the critical values at the 1%, 5% and 10% levels. Notice here that the statistic t_α value is greater than the critical values so that we do not reject the null at conventional test sizes.

The second part of the output shows the intermediate test equation that EViews used to calculate the ADF statistic. Here the dependent variable, is the difference of bitcoin prices including 1309 observations. Test critical values of Augmented Dickey-Fuller test statistic at 1%,5% and 10% level reflects significant relationship. R-squared value of 0.219786 reveals that 21% of the variables influencing the volatility are significantly related while; the remaining 79% of the elements are still untouched. These are the exogenous factors which impacts indirectly the volatility of bitcoin prices.

Conclusion

Crypto currency is a digital asset, designed to work as a medium of exchange. Bitcoin is an innovative concept of a decentralised, peer-to-peer virtual currency. Its functions are autonomous from any centralised influence. Bitcoin is a potential way to improve the basic financial services and the quality of life of the people in developing nations, which is a promising antipoverty technique. The data thus analysed through the application of Unit root test and graphical analysis, reveal that Bitcoin prices have unit root and thus the data of the last 4 years are non stationary. The higher degree of standard deviation and a lesser amount of R- Square thus supports the greater volatility in the prices. The descriptive analysis between Bitcoin prices in INR and BSE Sensex, are independent to each other. It becomes difficult to predict any substantial relationship between the two. As far as Indian sub- continent is concerned, the traded volume in bitcoin is less than 2% of the total investors; whereas BSE Sensex has witnessed generous amount of trading in the stock market. Hence we can conclude that, in present globalised world India is yet unharmed from the use of Bitcoin. And it becomes too early to derive the impact of Bit coins over market performance. This could be due to the fact that crypto currency in India is neither illegal nor legal. Further it is suggested, in order to encourage the employment of bitcoin, to confiscate structural impediment, such as lack of digitalization at every corner of the state as well as government policy should be flexible enough to promote such transformation.

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