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# Bitcoin as digital money: Its growth and future sustainability

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**Abstract.** *This paper examines the comprehensive idea about the growth and future sustainability of bitcoin as a cryptocurrency. The transaction volume of bitcoin is used as the growth of the bitcoin and the bitcoin log return is used for testing the volatility which is helpful for the future sustainability of bitcoin. The study period says that the growth of bitcoin's transaction volume is an increasing trend as more day to day transaction is minting with the exchange of Bitcoin. The study also uses ARCH & GARCH methodology to know the volatility of this emerging digital currency, and the GARCH result shows that it is a highly volatile currency. As a result, most of the governments have not given their legal status for the use of bitcoin in their country. But if bitcoin will be stable in the future, then it is easily accepted through worldwide and in the long run, people will have more faith in the cryptocurrency technology and its usability.*

**Keywords:** digital money, bitcoin, cryptocurrency, volatility.

**JEL Classification:** G12, G18, G32.

## 1. Introduction

Money is nothing but a technological solution to solve the problem that the society faces on Barter. So it changes its form from traditional Barter to Digital money. One of the greatest innovations in the modern era that money's destiny is to become digital. A large number of digital currencies are there, but bitcoin is most important due to its highest market capitalization, as of 10th August 2017 the market capitalization of bitcoin has crossed 48 percent among all cryptocurrency which is around 55 billion US dollar (coinmarketcap.com). Here the main focus is on "bitcoin." It is a decentralized digital money is an online payment system invented by an anonymous person(1) using the pseudonym "Satoshi Nakamoto" in 2009. The first unit was issued through open-source software. bitcoins are not printed like fiat money, but instead, are "mined" using computing power cryptography technology. Recently bitcoin has attracted much attention. Its use in the form of payment system for goods and services has grown, and merchants have an incentive to accept it due to its lower transaction fee, i.e., less than 2-3% typically imposed by credit card processors (Chakravorti et al., 2007), and instant transfer from one account to other. Despite a big increase in the number of merchants accepting bitcoin, the virtual currency doesn't have much momentum in retail transactions. The main aim of the currency is trading goods and services, especially in the virtual market (where bitcoins are accepted). In this paper, the study tries to find out the growth and future sustainability of bitcoin. Here the present study uses the ARCH and GARCH methodology for measuring the volatility nature of bitcoin and provides various information regarding its use in various economy.

The rest of the paper is organized as follows. Section 2 explores some past studies regarding bitcoin. Section 3 describes the data sources and methodology for measuring the Volatility of bitcoin. Empirical analysis of results is examined in section 4. In Section 5 the study highlights some issues regarding the future sustainability of bitcoin. Finally, Section 6 gives some concluding remarks.

## 2. Review of literature

Nakamoto (2008) explore bitcoin as a peer-to-peer version electronic cash that allows online payments to be sent directly from one party to another without going to a financial institution. Mark (2011) argue that the digital currency is something different from government issued currency as it is issued by the private parties and circulate only through the internet. Murali (2013) in his study, state that bitcoin is a currency of the new generation emerged when people's confidence loose on the fiat currency. Christen (2013) tries to point out the illegal activities of bitcoin, and found that silk road an online marketplace for the illegal trading of drugs and other goods and services receive payment only on bitcoin. Dwyer (2014) establishes that current digital currencies such as bitcoin is helpful for double-spending problem and create finality of transactions. Where the average monthly volatility of returns on bitcoin is higher than for gold or a set of foreign currencies in dollars, but the lowest monthly volatilities for bitcoin are less than the highest monthly volatilities for gold and the foreign currencies**.** Flitter (2014) examines

the illegal activities of bitcoin that US marshals services suspended the trading through bitcoin in 2013 and seized worth of $3.6 million to $27 million of bitcoin within 6 months from the silk road (unlawful activities doing with the exchange of BTC). Yermack (2014) tries to know the volatility of bitcoin and found that bitcoin's exchange rate volatility in 2013 was 142% than other currencies which fall between 7% and 12%. Bouoiyour et al. (2014) confirm the extremely speculative nature of bitcoin without neglecting its usefulness in case of trade transactions. Cheah and Fry (2015) examine the speculative bubbles in bitcoin market by taking log-return series and BDS test and shows that by comparing other asset class the fundamental value of BTC is zero and it exhibits high volatility so, there are more chances of speculative bubbles. From BDS test they highlight that it is significant for the dependency in the log-return. Dyhrberg (2016a) attempts to measure the volatility of bitcoin against gold and dollar, again Dyhrberg (2016b) says that bitcoin has hedging capabilities against FTSE (financial times stock exchange index) and US dollar by applying the asymmetric GARCH methodology. The result shows that bitcoin can be clearly used as a hedge against stocks in the FTSE. Bouri et al. (2017) argue that bitcoin is an effective diversifier against all asset.

From the above literature, the study observed that most of the studies have focused on defining bitcoin, its volatility and how it works? But none of the studies discuss the future sustainability of bitcoin. As a result, the present study differs from the previous literature in particular on the ground of specific focus on the comprehensive account of its growth and volatility nature and how various countries are accepting it as a digital currency for its usability regarding future sustainability.

## 3. Data and methodology

The study is based on weekly secondary time series data starting from 17$^{th}$August 2010 to 29$^{th}$ August 2017. The variables like price and transaction volume of bitcoin are used for the empirical analysis. The database is sourced from core financial data, blockchain.info. The closing price of bitcoin is converted into log series, and the transaction volume is converted to change in natural logarithm value of transaction volume. The bitcoin price is converted to returns using the first differences of the natural logarithm of bitcoin prices.

### 3.1. Methodology

This study makes use of some well-known time series tests such as Augmented Dickey-Fuller test and Phillips-Perron tests to know the stationarity of the data. Further, Autoregressive conditional heteroscedasticity (ARCH), Generalized autoregressive conditional heteroscedasticity (GARCH), models are estimated to measure the magnitude of the volatility of bitcoin.

#### 3.1.1. The ARCH Test

Engle (1982) developed a Lagrange multiplier test to find the presence of ARCH effects in the time series process generating variables. This test is a fast step test to move ahead of GARCH and other test in the ARCH family. This model allows time-varying volatility in the process. The ARCH (p) model can be specified as

$\mu_t = \xi_t \sigma_t, \xi_t iid\ N(0,1)$

$\sigma_t^2 = \psi + \psi_1 \mu_{t-1}^2 + \psi_2 \mu_{t-2}^2 + \cdots \ldots \ldots \ldots + \psi_p \mu_{t-p}^2$

Where $\psi > 0, \psi_i \geq 0, i > 0$.

Here the null hypothesis is that $\psi_i$=0 for all *i*, means there is absence of ARCH effects in the bitcoin value. Alternative hypothesis is that at least one coefficient of $\psi$ should be statistically significant.

### 3.1.2. The GARCH Model

The GARCH model was a generalization of the ARCH model. It was developed by Bollerslev (1986) and Taylor (1986). A GARCH (1, 1) model can be expressed in the equation as follows

$\sigma_t^2 = \alpha_0 + \alpha_1 u_{t-1}^2 + \beta \sigma_{t-1}^2$

Here, $\sigma_t^2$ is the conditional variance of bitcoin, because its value at time *t* depends upon the past information. These information are $u_{t-1}^2$ indicating the ARCH effect and $\beta_{t-1}^2$ as the GARCH effect. Interestingly, the variance of $\sigma_t^2$ is heteroscedasticity while retaining the assumption of homoscedasticity for error variance. The coefficient $a_1$ measures the change in the conditional variance ($\sigma_t^2$) given the volatility of previous period. Similarly, the coefficient β measures the response of conditional variance due to change in the fitted variance of previous period. The coefficient α+β show the degrees of persistency in the volatility. The higher value of joint coefficient, say 0.90 indicates the higher degrees of lagged influence on the conditional variance of the bitcoin value. In other words, large shock in the past is going to affect its current conditional variance largely. This phenomenon is termed as "volatility clustering" in the financial economics. The GARCH model is more effective compared to ARCH model because there is more possibility of violating non-negativity condition in the later model. This model can be extended to higher order lag to get a better forecast of conditional variance. Extending the model to p and q period, the GARCH (p, q) can be specified as

$$\sigma_t^2 = a_0 + \sum_{j=1}^{p} \alpha_j u_{t-p}^2 + \sum_{i=1}^{q} \beta_i \sigma_{t-q}^2$$

## 4. Empirical results

### 4.1. Volatility of bitcoin

To test the volatility some preliminary unit root test has been done to check the time series properties of the variables. It is known that the data needs to be stationary to run the ARCH and GARCH model for testing the volatility of bitcoin. For the stationarity of data, the study has used the well-known Augmented Dicky Fuller (ADF) and Phillips-Perron test (PP). The result of both the tests has been shown in the below Table 1.

**Table 1.** *Unit Root Test*

| Variables | ADF | PP |
|---|---|---|
| **Lnvalue (At Level)** | 2.812<br>(0.056) | 2.286<br>(0.176) |
| **∆lnvalue (1st Difference)** | 12.860***<br>(0.000) | 13.263***<br>(0.000) |
| **Lntransaction (At Level)** | 2.662<br>(0.080) | 2.523<br>(0.110) |
| **∆lntransaction (1st Difference)** | 23.822***<br>(0.000) | 24.330***<br>(0.000) |

**Source:** Author's own calculation, Note: *** denote statistical significance at 1% level. The values in parentheses shows P-value.

**ADF test.** In Table 1, the ADF test shows that the lnvalue series is nonstationary at the level. The test statistics (2.812) is less than the critical value at 1% and 5% level of significance. Thus the model is unable to reject the null hypothesis. However, the first difference of the lnvalue series is stationary at 1% level of significance as the test statistics (12.860) is greater than the critical value. Similarly, ADF test for lntransaction series shows that the data is non-stationary at the level as the test statistics (2.662) is less than the critical value. But the lntransaction variable is stationary at first difference. The test statistics value (23.822) is higher than the critical value at 1% level of significance, which reveals that lntransaction series is stationary at first difference.

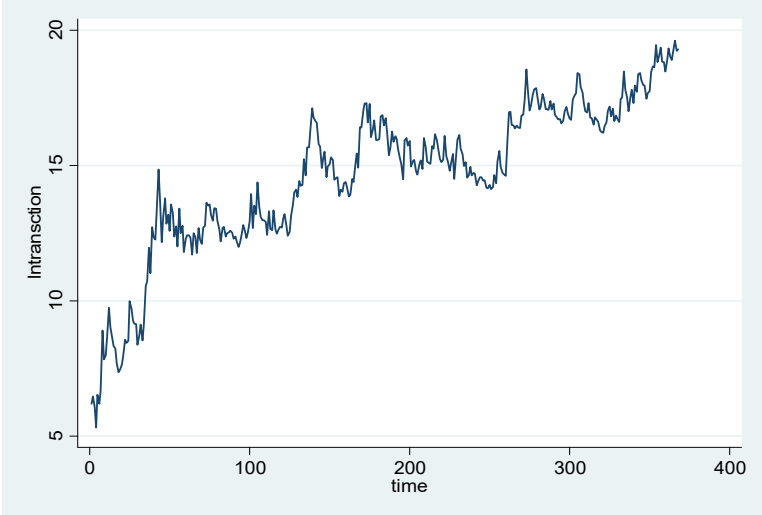
**PP-test.** The result of PP-test is also present in Table 1, which states that the lnvalue and lntransaction are non-stationary. After taking the first difference of this two variable the test statistic values at first difference is 13.263 and 24.330 respectively for lnvalue and lntransaction. These values strongly suggest that the two variables are stationary at the first difference.

The result of PP test also supports the result of ADF test that the data become stationary at 1st difference. The result of ADF and PP tests for the study period was non-stationary at their initial levels, but become stationary after the first difference, it means both the data series being characterized of order I(1).

### 4.1.1. Growth and volatility of bitcoin

Here growth of bitcoin is measured regarding transaction of bitcoin on a weekly basis and the volatility of bitcoin is measured through its weekly fluctuating price volume. Volatility is a measure of risk and uncertainty involved in the process of price development. Thus, high volatile instruments have lesser exposure to be held by the public. In the meantime, it increases the interest of business holder to hold that instrument since speculation is involved in the pricing process. The logic is simple; the high volatile assets takes the future path which is unexpected and unpredictable.

**Figure 1.** *Weekly Transaction(ln) volume*

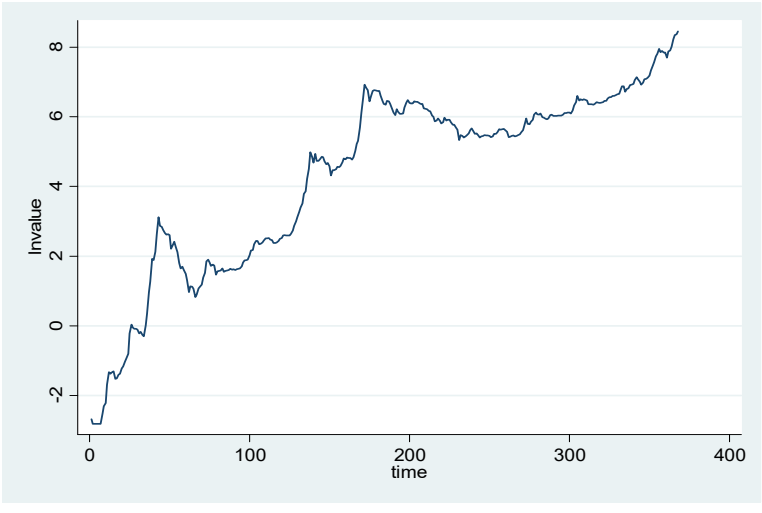



**Source:** Author's own calculation.

The value changes so frequently that it creates disincentive among the public to keep that asset. This measure is more popular in the financial debt and equity markets (Predeshu and Stancu, 2011) although, macroeconomic variables such as inflation, interest rate, etc. We use this measure to know the uncertainty associated with their movement. In the recent time, there has been a lot of interest in the concept of 'bitcoin,' and highly debated. There has been unprecedented growth in the use of bitcoin as it is evident from the Figure 1.

The total volume of weekly transactions has increased at an increasing trend over time. As a result, we can say that the growth of bitcoin transaction volume is an increasing trend as more day to day transaction is minting with the exchange of bitcoin.

**Figure 2.** *Weekly Bitcoin Price Value(ln)*




**Source:** Author's own calculation.

From Figure 2. It is clearly, measures the rising trend in the bitcoin transaction volume over the time. This increasing trend necessitates the measure of the volatility of the bitcoin. The volatility of bitcoin is measured as the change in the log price of bitcoin. The price of bitcoin is measured through the demand of and supply for the bitcoin. Measuring volatility of bitcoin will not only help to know the uncertainty and risk associated with the movement of bitcoin price, but it also helps to see the incentive for the people to use it in their day to day transactions. The consensus is that higher the volatility of bitcoin price lowers the incentive for the public to use in the transactions. The sudden fall in the bitcoin price creates a loss for the user regarding the declining worth of the bitcoin currency and vice-versa. This type of price behavior of bitcoin might create declining confidence among user to use as a currency in the payment. The volatility of bitcoin price is measured through a simple statistical calculation of 'standard deviation' of a particular series. Further, persistence in the volatility is measured through the time series model such as ARCH and another test in the GARCH family(2).

**Table 2.** *Descriptive statistics of Bitcoin over the full sample period, as well as two subsample periods*

| Sample period | N | Mean | SD | Max | Min | Kurt | Skew |
|---|---|---|---|---|---|---|---|
| 17/8/10 to 29/8/17 | 368 | 4.291 | 2.655 | 8.451 | -2.813 | -0.159 | -0.859 |
| 17/8/10 to 29/10/13 | 168 | 1.889 | 2.063 | 5.314 | -2.813 | -0.208 | -0.477 |
| 5/11/13 to 29/8/17 | 200 | 6.309 | 0.684 | 8.451 | 5.330 | 0.848 | 0.986 |

Table 2 reports the descriptive statistics of bitcoin. We divide the whole sample according to the hike of the graphical representation. The full sample period suggests that the mean return of bitcoin is positive with high standard deviation, low kurtosis, and negative skewness value. From the second subsample, the mean return is higher, and standard deviation of bitcoin returns are lower compared to the first subsample, where the kurtosis and positive skewness are much greater in the second subsample period. The low standard deviation in the second subsample period indicates that the volatility is reducing in the recent period than before. As a result, it is easily acceptable by the investors and users. However, the recent role of volatility and volume of transaction goes against the general consensus of the researcher. This creates debate in the researcher sphere regarding the sources of recent development in the bitcoin price. There could be several possible sources that drive the price and transaction volume. One of the reasons might be the speculation in the bitcoin prices. The high volatility could be a major source for the investor to gain from it. As a result, there is an increase in the transaction volume which in turn increases the price of bitcoin. This new currency has served more often as a financial asset rather than a currency. This is due to its limited supply (Nakamoto, 2009) and wide fluctuations in the value.

The ARCH test is necessary before running a GARCH model. The test result shows that there is evidence of ARCH effects indicating that there is presence of persistence in the return volatility of bitcoin. Table 3 represents the result of ARCH test which shows that the lagged volatility coefficient is significant at 1% level of significance. The current return volatility of bitcoin is significantly influenced by its previous two weeks' return volatility.

**Table 3.** *ARCH test of bitcoin return*

| Lags(p) | Null hypothesis | Chi square | Prob. |
|---|---|---|---|
| 2 | No ARCH effects | 54.309*** | 0.000 |

**Note:** *** denotes 1% level of significance.

However, it is suggested that the GARCH test gives more robust result in assessing the volatility of a return series. Here the GARCH (1, 1) model best describes the volatility of the weekly bitcoin returns. Table 4 illustrates the result of variance equation that shows both the α and β coefficient is significant at 1% level of significance. It means the conditional variance of bitcoin return dependents positively on the square error terms in the previous period and its conditional variance in the previous period. In other words, the current volatility in the bitcoin return can be explained by the previous volatility.

**Table 4.** *Volatility in bitcoin return*

| | Coefficient | Standard Error | Z-statistics | Probability |
|---|---|---|---|---|
| **Mean Equation** | | | | |
| **Lnvalue** | 0.154 | 0.004 | 3.46 | 0.001 |
| **Variance Equation** | | | | |
| **ARCH(1) (α)** | 0.279 | 0.043 | 6.47*** | 0.000 |
| **GARCH(1) (β)** | 0.702 | 0.259 | 27.04*** | 0.000 |
| **Total Observation=367** | | | | |

**Note:** ***denote 1% level of significance.

The coefficient value of α+β is 0.98 which indicates that there is the presence of high persistence in the volatility. Furthermore, the coefficient value of α (0.27) in the GARCH model shows that the volatility reacts 27 percent to the market movements. Again, there is no evidence of a spike in the volatility of bitcoin return as the value of α coefficient (0.27) is relatively lower than the coefficient β (0.70). The coefficient value of β indicates that the past variance can be helpful to explain the current variance of bitcoin by 70 percent. Interestingly, the long run average volatility of bitcoin return is 0.004 which is too low compared to financial instruments. This time dependency in the conditional variance is mainly due to an increase in the volume of transactions and fluctuations in the prices of bitcoin due to new news into the market. Unlike conventional money, it has attracted an investor to use for their investment purpose. This speculative behavior has led to a further rise in the volatility of bitcoin price. Like debt instrument, the bitcoin has paid some return to the investor whenever the price goes high. However, it is not to be confused between fixed income debt instrument and bitcoin in respect of return promises in future dates. Moreover, this new currency has similar functional quality as the gold has in the gold market. However, it departs in one point from the gold metal by being a medium of payment.

## 5. Bitcoin and its future sustainability

### 5.1 Fall of Mt.Gox (Dark side of bitcoin)

Mt.Gox (Magic: **T**he **G**athering, **Online** e**X**change) it was initially started by Jed Mccaleb in 2009 and started bitcoin trading from July 2010 by exchanging bitcoin with real money. Initially, in November 2010, bitcoins exchange rate was USD 0.5= 1BTC, but in February 2011 it par with US Dollar at $1=BTC. But in March 2011 Mccalab sold Mt.Gox to Mark Karpeles after that he became CEO of the exchange. It was world's No.1 Tokyo based online spot to buy and sell bitcoins trading exchanges[3] (Anders, 2014). But due to the loss of more than $450 million BTC belonging to both costumes and company as the hackers leaked the usernames and passwords. As a result, more than thousands of bitcoin trading account were inaccessible, and Mt.Gox suspended all trading's and closed its exchange services.

### 5.2. Silk road (marketplace)

Silk Road was an online black market knowing for illegal trading activities, it is also known as bitcoin-dollar online drug bazaar, and this website was specially designed for unlawful transaction activities. In 2011 most of the illegal trading (drugs, malicious software, child pornography, weapons,) activities on Silk Road were done through the digital currency known as bitcoin, because due to the easiest transaction process without knowing the parties. Ross William Ulbricht was the creator of the Silk Road, and due to this illegal activities Ulbricht was arrested, and Silk Road was shut down on October 2013 by Federal Bureau of Investigation (FBI). The bureau initially ceased 26000 bitcoins valued $3.5 million and then 144000 bitcoin worth $28.5 million of that time. And from Ulbricht's computer FBI again ceased 144342 bitcoins. A total valued of $87 million bitcoin was ceased during that time(4). So, in May 2015, William was sentenced to life imprisonment without any possibility of escape due to the illegal money laundering activities. (Christin 2012), mentioned the proportion of bitcoin activities in major exchanges and Silk Road during the period from mid-2011 to end of 2012 and stated that 1.35 million BTC were exchanged on the dark market. Comparing that to other exchanges total bitcoin trading was 29.6 million over the same period. It shows that over total trading percentage Silk Road transaction captured 4.5% of all traded bitcoin. But when Christin takes some external factor into account the bitcoin transaction activities could double from 4.5% to 9% in Silk Road. He also found that 24400 items were sold through bitcoin during six months of that period among which 13000 items includes illegal drugs. Due to this fraudulent scheme the users' faith on bitcoin declines, they think that this kind of illegal activities might continue in the future and tries to restrict them on investing bitcoin.

### 5.3. Role of government

Bitcoin spread its way whole over the world, but still many countries are in a dilemma of their official decision to give it legal permission or not. At the same time some countries mark positive sign for the use of bitcoin (USA, UK etc.) and some did not give the legal permission to use it in their territory (Bangladesh, India, Bolivia, Ecuador, Russia etc.), (Pagliery, 2014).

**Bangladesh**
The central bank of Bangladesh from September 2014 strictly banned the use of bitcoin and any other virtual currency in the country, as it is not a legal tender of any country and there is risk involved in using the bitcoin. The authority also said that if anybody caught by using the virtual currency, he/she could be punished under the countries anti-money laundering controlling act 2012.

**Bolivia (Central South America)**
Bolivia's central bank **El Banco Central de Bolivia** announced that it is illegal to use any type of virtual currencies if it is not issued by any central authority or regulated by any central bank of that country.

**China**
Bitcoins are not totally banned in China, as Chines government neither support nor oppose bitcoin. On 5th of December 2013, People's Bank of China prohibited the

financial institution and its employees who are engaged in the bitcoin activities, but there is no restriction for common individual's on bitcoin trading and mining (ECB 2012). After that now China is the world's largest bitcoin trading market as many of the chines bitcoin exchange platform still working and trading bitcoins (OKCoin, BTCC, Huobi). If it is safely operated in the future, then the Chinese government may support the legality of bitcoin in the country.

**Ecuador**
The National Assembly of Ecuador strictly banned the use of bitcoin and any kind of decentralized digital currencies. As the country is building a national electronic cash system so, they have to protect their home currency.

**Iceland**
Iceland has not banned all cryptocurrencies. In May 2014 it only banned Foreign exchange trading with bitcoin, but still, the people of Iceland are using the Cryptocurrency, i.e. Auroracoin. As a result, the Central Bank of Iceland issued a legal status of digital currency to protect the Icelandic currency.

**India**
The first bitcoin exchange in India was BTCX India, but it did not survive any longer due to loss of its banking partner. On 28 December 2013, the Deputy Governor of RBI said that in recent India is not planning to legalize bitcoin. But the Governor of RBI Raghuram Rajan recently (on December 2014) in an interview to ND TV spoke out that sooner or later India might test the flavor of digital currency like bitcoin, but it will take time because now most of the revenue of India comes from seigniorage activities.(5) So in case of India bitcoin is not fully banned, only officially the use of bitcoin is not allowed, but individuals can buy and sell bitcoin in India. Recently on May 2015, Zebpay started bitcoin mobile wallet in the country for its users to buy, sell and transact on bitcoin and every week the company experiencing that at least 500 users are opening their bitcoin wallet through Zebpay app.

**Russia**
The finance minister of Russia banned the digital currency, i.e., Bitcoin but not the blockchain as he knew that blockchain technology is very important for the development of various internet services and said that Ruble is the only official currency. The main goal is to protect their citizens from fraud and prevent money laundering and tax evasion activities by providing a red signal to cryptocurrency.

**Vietnam**
The government of Vietnam announced that bitcoin is not a legitimate payment method. So, the Government made it illegal for both its people and the financial institution by stating that the use of cryptocurrencies might help in increasing the money laundering activities.

### Countries accepting BTC

**America**
In 2013, the US Treasury classified bitcoin as a decentralized convertible virtual currency. The US district court also classified bitcoin as a currency, and the government also imposes a tax on bitcoin business. The major countries in America accepting BTCs are US, Brazil, Mexico, Canada, etc.

**Australia**

In 2013, governor of the reserve bank of Australia (RBA) said that there is no law against the legality of bitcoin, and no one would stop the people of this country for doing transaction with bitcoin (Hazelman, 2013). And the tax office of Australia considered bitcoin as property. As a result, the Government imposes a tax on the usage of bitcoin. Australian tax office decides bitcoin is an asset, for capital gain tax purpose not as currency.

**European Union**

In the Europe, 61% of the population is using the internet. As a result, we can say that the European Union is a fertile land for the usability of bitcoin. But the European Union has not issued any official regulation regarding the legality of bitcoin. A few nations (UK, Germany, Finland, Italy, Spain, etc.) are allowing bitcoin as a cryptocurrency, where other nations (Iceland, Denmark) are not taken any decision regarding the legality of bitcoin (Pagliery, 2014).

## 6. Conclusion

From the above discussion of the study, it is interesting that the transaction growth of bitcoin is an increasing trend, as some people are more excited about bitcoin due to its underlying technology, and others are excited about its commercial possibilities. The study convinced that technologically bitcoin is deep, novel, interesting, and based on sound principles, but the high volatility GARCH result shows that it is a highly speculative currency. As a result, most of the governments are not giving their legal status for the use of bitcoin in their country due to its illegal nature and hacking of trading exchanges (Anders, 2014). But if bitcoin will be stable in the future, then it is easily accepted through worldwide and the security issue problem can be easily resolved, as we know more stability currency dominants other currencies. We believe that in the long run people will more faith in the cryptocurrency technology, but doing the mastery of technology is more important work for the investors and the users.

## Notes

(1) No one knows who Satoshi is? May be a group of software developer or a single person. Still the Identity is unknown.

(2) The persistency is defined as the lagged effects in a particular series, particularly, when current period volatility of an instrument is influenced by its past volatility significantly.

(3) https://anders.io/the-troublesome-history-of-the-bitcoin-exchange-mtgox/

(4) Silk road activities: https://en.wikipedia.org/wiki/Silk_Road_(marketplace)

(5) http://www.coindesk.com/indias-central-bank-one-day-use-digital-currency-chief-says/

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