When Economies Jitter, Bitcoin Flutters: Evidence from the Impact of Macroeconomic Factors on Bitcoin Returns

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Abstract

The study attempts to explore the growth rate of Bitcoin for the sample countries followed by investigation of significant macro-level variables on returns of Bitcoin by considering a panel of different countries from 2013-2016. For this purpose, the paper tries to assess the impact of economic development and financial development of the economy on the returns of Bitcoin.

Key Words: Bitcoin returns, macroeconomic variables, economic development, financial development, cryptocurrency

Introduction

The crypto-currencies nowadays are making waves globally, emerging as a curious alternative to the fiat currencies. One such crypto-currency which is at the helm of making waves and claims 85-95% trade by volume is Bitcoin. Bitcoin since its launch in the year 2009 by itsarchitect Satoshi Nakamoto, surfaced as the most prosperous cryptocurrency ever. It captured the attention of the world leaders and market players, evolving as a global phenomenon. It stroked the imagination of entrepreneurs, technology leaders and financial investors. In the cryptocurrency market with the networth of over USD 570 billion, Bitcoin's market cap exceeds USD 190 Billion as of February, 2018. The market is flooded with more than 1000 types of cryptocurrencies that have seen their own share of growth but standing no comparison with the massive increase in value exhibited by Bitcoin. Bitcoin since its conception had experienced exponential growth in its value rapidly rising from around USD 0.01 in 2009 to nearly USD 20,000 in December 2017 before depreciating in early 2018 (Higgins, 2009).

The meteoric rise of cryptocurrencies' presence and influence had intrigued regulators, investors, businesses and academics into deciphering the new technology and its impact on the financial and non-financial conduct of the world. Consequently, this paper was drafted to

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investigate into some of related enquiries. What is Bitcoin and how does cryptocurrencies work exactly? What are the economic and financial factors which influences its adoption and growth? Does bitcoin enjoys different growth rate in different countries?

Beginning with understanding Bitcoin, it is an invention of 2008 (post-crisis period) floated by Satoshi Nakamoto as a medium of innovative electronic payment systems worldwide. The most striking feature of this virtual currency is that it operates outside the purview of the regulation of any centralized authority. Bitcoin is created and exchanged on a peer-to-peer (P2P) network independent of any intermediary, a transition from an era of e-finance into P2P (peer-to-peer) finance[1].

Bitcoin is a digital currency that is encrypted and hence is also called cryptocurrency. The balances of Bitcoins are kept on a public ledger, called blockchain. This mechanism ensures the authenticity of each transaction, prevents double-counting which has been a major limitation of most of the digital currencies, and also contains other frauds. The immense computing power required to falsify a block reduces the chances of fraud.

The Bitcoin ecosystem consists of 1.) exchanges that permit trading between Bitcoin and traditional currencies, 2.) the transaction service providers that help individuals to keep, send, receive and manage Bitcoins without running the Bitcoin client on their computers, 3.) theBitcoin miners and 4.) escrow providers. Bitcoins can be purchased over the exchange where its price floats against world currencies or may be purchased from an individual or at a Bitcoin ATM. The two most appealing characteristics of Bitcoins viz., its anonymity of transactions and being neither controlled nor mediated, makes it amenable to discussions by various critiques. These characteristics also make it vulnerable to abuse by criminals, money launderers, and speculators. Nonetheless, these very features have made Bitcoin a *revolutionary* digital currency whose market capitalization is the highest among all digital currencies.

Correspondingly, the specific objectives of the paper are:

1. To find out the growth rate of Bitcoin industry for 20 countries.
2. To check whether the growth rate differs between different countries.
3. To analyze the impact of various macro-level variables on the returns of Bitcoin industry for 10 different countries.

To achieve above stated objectives, study employed Panel data Regression Model encompassing the pooled data, fixed effect and random effect analysis followed by Hausman Test to select the appropriate model for drawing conclusions. Subsequently, Stability

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[1]P2P finance is the provision of financial services between the end-users relying on digital, network-based and communication technologies.

Diagnostic Test using Cusum Test was also employed to examine the trend of the variables over the period of analysis. To attain above specified objectives, following hypotheses were tested:

H_1: There is no growth in Bitcoin industry for 20 countries.

H_2: There is no significant difference in the growth rate of different countries.

H_3: Different macro-level variables do not have an impact on the returns of Bitcoin industry.

In succinct, the entire study is organized as follows, Section 2 presents the review of literature. Section3 deals with estimation of growth rate of Bitcoin market. Section 4 presents data and methodology followed by Section 5 discussing the rationale. Section 6 contains empirical results and Section 7 concludes the study.

Review of Literature

This section deals with relevant literature related to growth of Bitcoin industry worldwide. Growth can be seen in terms of both popularity and use of Bitcoin. Despite its growth, there exists a relative dearth of empirical analysis in academia about this new phenomenon.

Baek and Elbeck (2015) have used Bitcoin and S&P 500 Index daily return data to examine relative volatility using detrended ratios. They also investigated the effect of select macro-economic variables on Bitcoin market returns. Their results reported that volatility in Bitcoin market is internally driven which means that this market is highly speculative at present and at the introductory life cycle stage. All external economic factors do not have any significant bearing on Bitcoin market returns.

Moore and Christin (2013) were of the view that Bitcoin has enjoyed wider adoption than any other crypto currency. They empirically investigated the risk prevalent in Bitcoin exchanges. They conducted a survival analysis on 40 Bitcoin exchanges and found that out of 40 exchanges, 18 have since closed over the past three years, with customer account balances often wiped out. They also found that average transaction volume of an exchange is negatively correlated with the probability it will close prematurely but positively correlated with experiencing a breach. Further, logistic regression results showed that popular exchanges are more likely to suffer a security breach.

Kroeger (n.d) analyzed whether purchasing power parity holds in Bitcoin markets for dollars, euros and British pounds. He found that Bitcoin prices exhibit relative purchasing power parity but there is persistent deviation from absolute purchasing power parity. The mean of real exchange rates persistently differ from each other. Thus, there must be some inter country factors which must be present to explain such a phenomenon.

Badev and Chen (2014) have empirically seen the general patterns of Bitcoin usage, and examined the use of Bitcoin for investment and payment purposes. They reported that while the number of daily users may have doubled every eight months but the transaction volume is negligible compared to the domestic volume of USA payment systems. They also testified that Bitcoin is still barely used medium of payment for goods and services.

Raskin and Yermack (2016) stated that the blockchain technology behind digital currencies has the potential to improve central banks' payment and clearing operations, and possibly to serve as a platform from which central banks of different countries might launch their own regulated digital currencies. Launching of digital currency could have insightful implications for the banking system, narrowing the relationship between citizens and banking system as it removes the need for public to keep deposits in commercial banks.

Polasik et al. (2015) have discovered that Bitcoin returns are driven primarily by its popularity. They also examined how country, customer and company specific characteristics interact with the proportion of sales attributed to Bitcoin. They found that company structures, use of payment methods, customers' knowledge about Bitcoin, and size of economy had a significant bearing on Bitcoin returns.

Luther and White (2014) have considered Bitcoin a hypothetical instrument, limited to pay for goods and services. Shian et al. (2015) studied the impact of Bitcoin networks in international trade and suggest the mechanisms through which effects come into place. They also studied whether the efficiency of Bitcoin payment system would induce its users to trade more internationally. Their results reported that international trade is significantly positively affected by Bitcoin networks.

Glaser et al. (2014)debated a question on intentions of users when changing their domestic currency into a digital currency. Based on their evaluation, they find strong indications that especially uninformed users approaching digital currencies are not interested in alternative system of balancing transactions but seek to participate in an alternative investment vehicle only.

The above review of literature reveals that studies on Bitcoin have been essentially descriptive in nature. Few studies have attempted to look at Bitcoins empirically. With the increasing volatility in its prices, its popularity, and varied usage in countries worldwide, this paper attempts to do a panel study of different countries globally and identify the macroeconomic factors that have significant impact on returns of Bitcoins.

Results of Growth Model

The growth rate of Bitcoin industry in 20 different countries is estimated in this section of the paper. For this purpose, we have estimated following equation in respect of all the countries.

$$Ln\,(BC) = b_0 + b_1 T$$

Where, Ln (BC) = Natural log of Bitcoin values of ith country
b_0 = Constant/Intercept of Bitcoin industry in i^{th} country
b_1 = Growth rate of Bitcoin industry in i^{th} country
T = Time period (1 for April 2013, 2 for May 2013......45 for December 2016)
i covers different countries viz. Australia, India, UK, USA, etc.

Table 1: Parameters of Growth Model

Country	Intercept	P-Value	Growth Rate (%)	P-Value
Australia	5.353***	0.000	3.175***	0.000
Brazil	6.042***	0.000	3.905***	0.000
Canada	5.360***	0.000	3.030***	0.000
Denmark	7.532***	0.000	1.814***	0.004
India	9.390***	0.000	2.702***	0.000
Hong Kong	7.434***	0.000	2.164***	0.002
UK	4.808***	0.000	2.879***	0.000
Europe	4.998***	0.000	3.014***	0.000
Czech Republic	8.354***	0.000	2.852***	0.000
China	7.074***	0.000	2.686***	0.000
Mexico	7.773***	0.000	3.634***	0.000
New Zealand	5.459***	0.000	3.097***	0.000
South Africa	7.754***	0.000	3.286***	0.000
USA	5.359***	0.000	2.598***	0.000
Thailand	8.639***	0.000	2.982***	0.000
Singapore	5.643***	0.000	2.413***	0.000
Sweden	7.219***	0.000	3.097***	0.000
Russia	8.727***	0.000	4.480***	0.000
Poland	6.641***	0.000	2.466***	0.000
Norway	7.055***	0.000	3.469***	0.000

***Significant at 1% level

Subsequently owing to the substantial volatility in returns as observed in the data, we did not estimated any equation for returns. However, as we have to make comparative analysis of returns of Bitcoin industry in all the countries so one way ANOVA was employed. In applying ANOVA, we compare the returns of Bitcoin industry among all the countries. If Bitcoin industry of any country behaves significantly different in terms of returns then it may be logically concluded that that country has a distinctive comparative advantage.

Table 2: ANOVA Table

Source	Sum of Squares	Degrees of Freedom	Mean of Squares	F	Prob> F
Regression	0.073724977	19	0.003880262	0.01	1.000
Residual	518.054891	780	0.664172937		
Total	518.128616	799	0.648471359		

The analysis of the growth model in Table 1 show the intercept and growth rates of Bitcoin industry in 20 different countries using log-linear model. Intercept of India (i.e. 9.390) is highest among all other nations. This indicates that growth of Bitcoin industry in India is adequately captured by time period under study. In respect of p-values of all the intercepts are concerned, all are significant which implies that there are some other factors besides the time-period which have significant effect on Bitcoin prices.

Growth rate for Bitcoin industry in Russia is 4.48% per month followed by Brazil (i.e. 3.90% per month) which is higher than the growth rates in other countries. However, growth rate in India is 2.70% per month which is lagging far behind the growth rate of Bitcoin in other economies. The reason for this may be argued that perhaps the higher stability and future growth prospects of Indian economy currently enjoying has essentially deterred investors to adopt Bitcoin as enthusiastically as in other economies experiencing economic instability. Interestingly, when we look at the different growth rates, we find that all growth rates are coming out to be significant since the P-value is less than 1% level of significance. This means that public at large i.e. consumers, companies, investors, speculators, etc. are nowadays discounting and internalizing the use of Bitcoin as a medium of payment or investment. After this, our next objective is to check whether there exists a significant difference between the growth rates of different countries. In order to check that we have applied ANOVA test and the results are shown in Table 2. Since the p-value is very high, it shows that there is no significant difference in the growth rates of Bitcoin prices of different

countries. The reason for this could be attributed to the absence of regulation on trading of Bitcoins in different economies. It also means that there is no cross section variation in the returns of Bitcoin prices. The significant intercept coefficient leaves us with the question of what is driving the growth in Bitcoin prices which witnessed an exploding growth globally, apart from time factor (witnessed in above analysis). This leads to the examination of the factors affecting the returns of Bitcoin across the world in subsequent section.

Data and Methodology

Sample Selection

The sample includes the top 10 countries where Bitcoin is accepted as a medium of payment. The data for the sample is taken from April 01, 2013 to December 31, 2016. We have selected the period since inception of Bitcoin industry in different countries. The period reflects significant changes in attitude of country towards Bitcoin. Data was collected from databases of Bitcoincharts.com, World Bank and Fed Reserve. The study is afflicted with the limitation of access to data on Bitcoin publicly. This resulted in the reduction of number of countries under investigation from 20 initially to 10 countries for relationship analysis employing OLS regression, Cusum Test and other tests.

Estimated Regression Equation

The paper makes use of panel data regression analysis based on 10 countries wherein we have applied Pooled Least Square, Random Effect and Fixed Effect Regression Models. First of all, Breusch-Pagan LM test was employed to determine the necessity of using Random Effect Model surpassing Pooled Regression. Hausman test has also been conducted to identify the preferred model out of Random and Fixed Effect Models. To achieve or first objective, we perform the following regression:

$$BTC\_RET_{it} = \beta_0 + \beta_1 LOG\_IIP_{it} + \beta_2 T\_BILL_{it} + \beta_3 LOG\_STMKT_{it} + \beta_4 EX\_RATE_{it} + \beta_5 UNEMP_{it} + \beta_6 SPREAD_{it} + \beta_6 SPREAD_{it} + \eta \text{ it.}$$

BTC_RET is the return of Bitcoin industry in different countries for our sample period. LOG_IIP_{it} represents Log of Index of Industrial Production for country i, time period t, T_BILL_{it} represents Treasury Bills representing interest rates of ith economy for time period t, LOG_STMKT_{it} represents stock market index, EX_RATE_{it} indicates exchange rate, $UNEMP_{it}$ represents Unemployment and $SPREAD_{it}$ indicates spread of Bitcoin prices.

IIP, Exchange Rate and Unemployment are economic development variables whereas T-Bill Rate and Stock market are financial development variables. These explanatory variables have been discussed in detail in Section 3. Additionally, spread of the Bitcoin has been taken as the control variable. It is taken as the natural logarithm of difference between highest Bitcoin value and lowest Bitcoin value. The past spread of Bitcoin returns is a significant

potential driver of the demand for Bitcoin in the market. Baek&Elbeck (2014) also found spread as the sole factor driving the Bitcoin market returns.

Stability Diagnostic Test – Cusum Test

To achieve our second objective, we plot the recursive estimates of OLS (Ordinary Least Squares) using Cusum Test for significant countries in terms of Bitcoin industry. This test is based on cumulative sum of the recursive residuals. The test checks stability/instability of parameters (beta values) by plotting the cumulative sum. If the cumulative sum goes outside the area between two critical lines, the parameters are said to be unstable. We have employed Cusum Test on Equation (1) to check whether the parameters of the model are stable or not over the period taken in study. The study employs Cusum test on growth model to capture the effect of stability in data.

Operational Definition of Variables

Table 3: Operational Definitions of variables

Factors	Variables	Definition	Source
Economics Development	Index of Industrial Production (IIP)	Measures real output for all facilities located in an economy; measures movement in production output and highlights structural development in economy	Fred Reserve Bank
	Exchange rate	Nominal exchange rate (USD)-monthly	International Financial Statistics, World Bank
	Unemployment	Share of labour force that is without work but available for and seeking empolyment (%)	World Bank
Financial Development	Stock market index	Local equity market index valued in Local Currency Unit, converted into USD	Global Economic Monitor, World Bank
	Interest rates	Secondary Market 3 month T-bills	Fred Reserve Bank
Control Variable	Spread	Lag of Log (Highest - Lowest Bitcoin Price)	Bitcoincharts.com

Macroeconomic Factors affecting the Returns of Bitcoin

The currency prices and their returns are governed by the inter-market relationships. It is the interaction between demand and supply forces on the market that dictates a currency's fluctuation. Currencies, generally perceived as standard economic goods, are driven by macroeconomic factors of its respective nation such as unemployment, GDP, inflation, trade, interest rates, etc. For instance, India when struggled with a sudden demonetization decision of the government exhibited a surge in Bitcoin trading (Singh &Vegha, 2016) and also exhibited attraction with the introduction of GST that influenced its economic dynamics. Further, though the fundamentals for the fiat currency is fixedand well researched, the same cannot be asserted for the virtual/ digital currency like Bitcoins. Present paper attempts to respond to the research gap that whether the Bitcoin is driven by macroeconomic development of a particular country. For this purpose, the paper tries to assess the impact of economic development and financial development of the economy on the returns of Bitcoin. Such bifurcation becomes important because it has been observed that all countries have not invariantly adopted Bitcoin. The legal status of Bitcoin varies from country to country. Some countries allow its usage, some restricts its usage and some have banned it.

Economic Development

We postulate that economic development of a country may have an impact on the returns of Bitcoin. We measure economic development by index of industrial production, exchange rate of currencies, and unemployment in the economy.

Index of Industrial Production (IIP)

Though GDP (or its growth) is an obvious choice in examining the determinants of Bitcoin but due to the availability of its official estimates on quarterly basis, IIP with the daily monthly estimates replaced GDP in the present study. Historically also, IIP has been established to display strong co-movements with GDP, making it an apparent replacement of GDP in numerous OECD studies and indicator developments (OECD, 2012). Further, it has been observed in the recent past that the economies experiencing financial instability and turmoil are steadfastly and enthusiastically investing in Bitcoin. For instance, Latin American region specifically Venezuela, Brazil, Argentina with their shrouded economic stability and essentially staring at depression had witnessed a sharp rise in Bitcoin demand in years 2015 and 2016. Similarly, wounded Chinese Stock Market leading to distress in the economy also saw an enthusiastic trading of Bitcoin in year 2015. Correspondingly, Latin

factors were found to influence the Bitcoin and these were one, global macroeconomic and financial development, two, attractiveness of bitcoin for investors, and three, supply-demand interaction of Bitcoin (Buchholz, et al., 2012, Kristoufek, 2013; van Wijk, 2013). All these factors are parameters of the financial development of an economy. Furthermore, the world is gradually becoming cashless including countries like Sweden, Denmark, France, Italy, Spain, India, UK, and US (for example, Spain has already banned cash transactions of more than 2,500 EUR; Italy has banned cash transactions of more than 1,000 EUR). The digitization and technology is swiftly gripping the world riding on the anchor of their financial development. We therefore postulate that the financial development of a country has an impact on the adoption of bitcoin and eventually bitcoin returns. The paper measures financial development of a country by stock market index and interest rates prevailing in the economy.

Stock Market Development

Stock market development serves as a perfect proxy for a nation's financial development. Wijk (2013) had found that stock market, amongst other factors influences Bitcoin movement. However, there is another study that offers an alternate perspective and asserts an insignificant influence of financial development of a nation on the price of Bitcoin (Ciaian, et al., 2014, Bartos, 2015). A report by Nautilus Investment Research found that stock market does have an influence on the Bitcoin that pushes its prices and thereby returns forward (O'Connell, 2017).

Interest Rates

Post-crisis, major economies of the world have opted for lower interest rates regime with a view to attract investment and boost their recession-hit economies. The benchmark interest rates were slashed to almost zero. Central Banks of Japan, Europe and other central banks in general have been practicing policies of negative interest rates on government securities. In essence, negative interest rates mean that people must pay banks to keep their money for parking their funds for security. Japan and Europe have reduced their interest rates to below 1 percent (World Bank Group, 2016). The low-interest rate environment has steered the investors and traders to shelter under the digital investment alternatives offering incentives similar to ones offered by safe haven assets such as government bonds. These alternatives essentially were digital currencies like Bitcoin which do not require investors/depositors to pay to park their funds (Bovaird, 2016). Parking funds in digital currency like bitcoin, wins the confidence of investors owing to its decentralized nature and greater security through

private key and encryption of transactions using SHA-256 algorithm, thereby eliminating the middlemen. Conversely, the moment the interest rates are increased by the Central Banks of respective nations, investors would immediately pull out their investments from bitcoins. Hence, a negative relationship apparently emerges between interest rates and Bitcoin prices (SGBTC, 2014).

Results

Table 4: Descriptive Statistics

	Mean	Standard Deviation	Minimum	Maximum
BTC_RET	1.256402	20.0405	-36.5865	218.309
LOG_IIP	24.1299	0.97284	20.7893	26.3799
T_BILL	3.728695	4.20887	-0.11	15.3218
LOG_STMKT	4.602343	0.38073	3.22404	5.18492
EX_RATE	11.30027	18.9715	0.58565	68.2211
UNEMP	9.053819	6.09378	3.56	26.9899
SPREAD	5.082208	1.23375	1.13018	10.7517

The descriptive statistics of all the variables for the observed period have been exhibited in Table 4. For the period under consideration, the volatility of Bitcoin returns was found to be highest amongst all the variable set. The volatility in exchange rate was not too different and in fact was in the vicinity of Bit coin return's volatility. The mean value was found to be highest for Industrial Production while the lowest emerged for the Bit coin returns.

Table 5: Diagnostic Test of Model

Fixed effects or Random effects: Hausman Test	$Chi^2 (6) = 85.11$	$Prob>chi^2 = 0.4823$
Mean VIF to check multicollinearity	2.35	
Likelihood Ratio Test - heteroskedasticity in Random effects	$Chi^2(9) = 86.09$	$Prob>chi^2 = 0.0000$
Wooldridge test for autocorrelation	$F(1,9) = 40.139$	$Prob>F = 0.0001$

Table 6: Results of Random Effect Panel Model

Dependant Variable: BTC_RET	Coefficients	Standard Error	P>z
LOG_IIP	-1.359324	0.6843029	0.047
T_BILL	-0.3663709	0.1637332	0.025
LOG_STMKT	-12.83477	1.312807	0.000
EX_RATE	0.1054182	0.0227797	0.000
UNEMP	0.0119804	0.1227794	0.922
SPREAD	4.151226	0.7022433	0.000
CONSTANT	72.27604	12.08332	0.000
R-squared	0.0712		
Adj. R-squared	0.0232		
Wald chi2(6)	751.16		
Prob> chi2	0.0000		

Some preliminary statistical tests were conducted on the model with the aim of correctly specifying the regression model (refer Table 5). Low Variance Inflation Factor (VIF) score of Multi collinearity at 2.35 successfully rejects the presence of multi collinearity amongst the regressors in the panel data. The null hypothesis of no auto correlation in idiosyncratic error terms is rejected at 1% significance level as revealed by Woold ridge test for auto correlation (Woold ridge, 2002). Similarly, null hypothesis of homo skedasticity of the idiosyncratic error variances is also rejected at 1% again as exhibited by Wald test for group-wise heteroskedasticity (Baum, 2001; Greene, 2000). The null hypothesis is rejected yet again in favor of presence of conditional he teroscedasticity when Likelihood Ratio Test was conducted.

The Random effects model robust to auto correlation and heteroskedasticity is revealed in Table 6. The paper has examined the relationship via all pooled, fixed effect model and random effect models but quotes the results of only the random effects model. Selection of Random Effects Model (REM) is based on the results of Hausman Test advocating the higher efficiency of REM over other models.

The result in Table 6 exhibits a significant impact of both the financial development and economic growth of the country on the returns generated by investing in Bitcoins, controlling for the ubiquitously affecting variable, "Spread". The results

are on the lines of the reports discussing the developments of Bitcoin globally and most importantly, priori established. However, in the absence of any empirical proof validating the underlying hypothesis, this paper is constructed. The analysis found IIP, Stock Market and T-Bills to be having a significantly inverse relationship with the returns of Bitcoin. The inverse relationship for IIP, a proxy for economic growth underlines the fact that popularity of Bitcoin and thereby the Bitcoin returns enjoys an ascending trend in response to rising instability in economies. The significant negative coefficient of Stock market validates that a substantial negative shock to the stock market increases the market risk appetite of the investors, thereby driving them to invest in alternative opportunities like Bitcoin. The result finds the support in the study of Dyhrberg (2016). Further, inverse relationship of Bitcoin with T-Bills endorses empirically that it is the prevailing low-interest rate environment in economies that is fuelling the rising interest of investors in the crypto currency and associated returns in Bit coins. The investors and traders are eagerly exploring digital investment alternatives such as Bit coins, which offers returns even during the period of low or negative interest rates in economies globally.

A significant exchange rate of local currency suggests that Bit coin returns are substantially sensitive to exchange rate fluctuations, also indicating at the presence of country specific effects in the results. The results find similarity with literature in indicating at the usefulness of Bit coin in hedging against the domestic currency fluctuations and specifically, USD (Tully & Lucey, 2007; Dyhrberg, 2016). In other words, this result underlines the risk management capabilities of Bit coin.

This illustrates and reinforces that depreciating currencies increases the popularity of Bit coins amongst investors leading to the appreciation in their returns. The depreciating currency coupled with capital control has always triggered capital flight to alternative instruments offering returns or safety without returns, as seen in the case of depreciating Yuan episode of 2015. Bit coin is one alternative that offers substantial returns, awaiting to be explored liberally. The trend of generous spread available to Bit coin investors has provided enough fodder to them and traders, leading them to increase their investments in Bit coin and raising its returns whenever the spread increases.

Finally, it is observed that the association between Bit coin returns and unemployment is weak and statistically insignificant. The explanatory power of the model is found to be low at 7.12% in the random effects model. Nevertheless, literature has consistently hold the view that it is not unusual for large panels to support low R^2 (Gujarati, 2011). Further, the table unveiled the results of Wald Chi-square Test that examined the joint influence of regressors

to be equal to zero in its Null Hypothesis (H_0). The model is successful in significantly rejecting the H_0 indicating the significant impact of at least one of the variable on the Bit coin returns. Following sub-section deals with examination of stability of data used in our regression equation.

Above figures (refer figure 1) represent the results of Cusum Test to check for structural stability in our data. From the above figures we can identify one break occurring simultaneously in case of all the countries taken together. The reason for this could be there is no difference in panels i.e. there is no heterogeneity. In other words, we can also say that behavior of Bitcoin is same in all the countries for all the sample years because of no intervention either by government or by monetary authority in Bitcoin industry worldwide, underlining the absence of heterogeneity. Subsequently, we have segregated our data into two parts on the basis of above results and similar results were obtained for both the periods.

Conclusion

Bitcoin, the most popular crypto-currency had rapidly emerged as a cost effective, fast, and attractive alternative to fiat and digital currency. In the wake of its increasing popularity amongst cryptocurrencies, the growth rate in returns of Bitcoin for sample countries was examined. The results found that each country in our sample had a significant growth rate in Bitcoin industry. This indicated that Bitcoin currency is increasingly becoming more acceptable medium. The analysis also revealed the absence of significant difference in the growth rates of different countries. Thus, it may be concluded that there was no heterogeneity present in our results. The reason for this could be the absence of regulation on trading of Bitcoins in different economies. Additionally, analysis also underlined the high volatile nature of Bitcoin.

Subsequently, significant drivers of Bitcoin returns were investigated by considering a panel of different countries. Investigation revealed that economic development of a country has an inverse relationship with Bitcoin returns. It may be interpreted that the declining economic growth rate and increasing exchange rate triggers a loss of faith in the economy which in turn steers the existing and prospective investors towards the virtual currency, Bitcoin. Thus, the results interestingly indicated that the turmoil in economies increased the attraction for virtual currencies as they offered better return, thereby causing increased investment in Bitcoin. Similarly financial development of an economy also reflected a negative association with Bitcoin returns. It indicated that a financial stress in the economy would trigger a heightened interest of investors in virtual currency, Bitcoin causing an upswing in its returns. Finally, *spread* also displayed a significant inverse relationship with Bitcoin returns, hinting to the emerging speculation in the Bitcoin market.

Though Bitcoin has not become that popular as a currency, it could be a foundation for future revolutions in the payment system which is faster, cheaper and secure. The implication of the study lies in its ability to assist the market players to estimate the prospect of future adoption and survival of Bitcoin. This essentially could be determined by the macroeconomic profile of the respective country as it was established that macroeconomic characteristics of a country substantially impact the Bitcoin returns. This is especially important for e-commerce traders exploring cost-effective and time-efficient payment methods for mainstream adoption. Conclusively, it may be said that eager-exploring attitude of investors and popularity of Bitcoin can be attributed to the investor's want to trying to escape the country's weak economic and financial conditions. Hence, it may not be further from the truth that Bitcoin returns luster when the economies are ailing.

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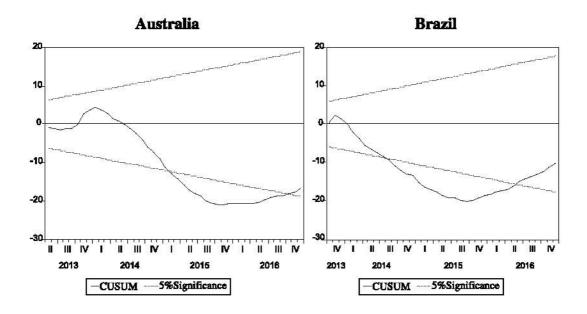
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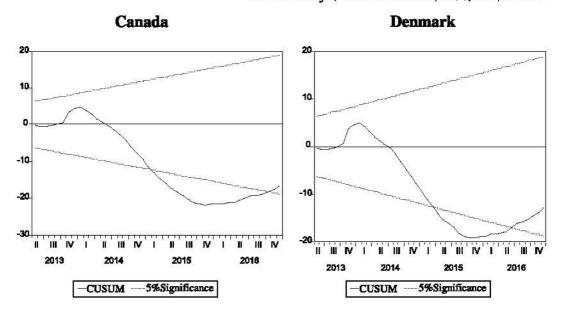
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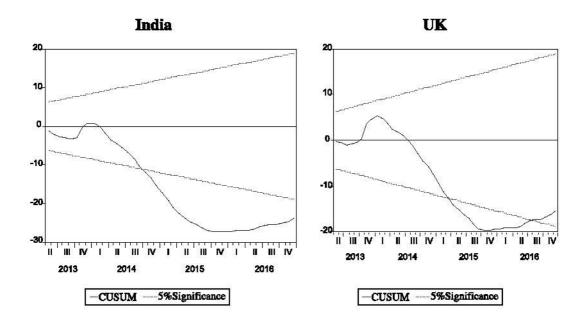
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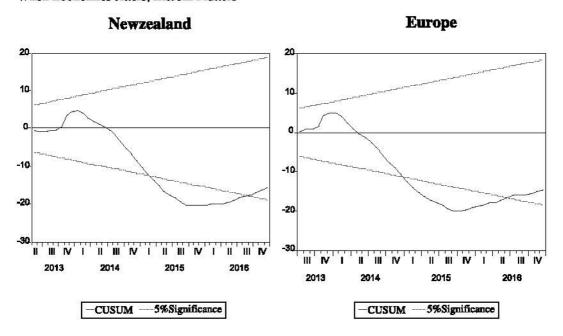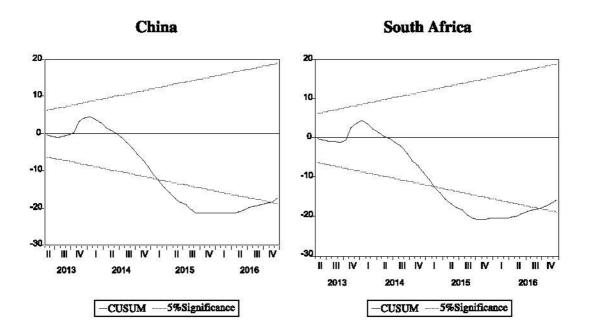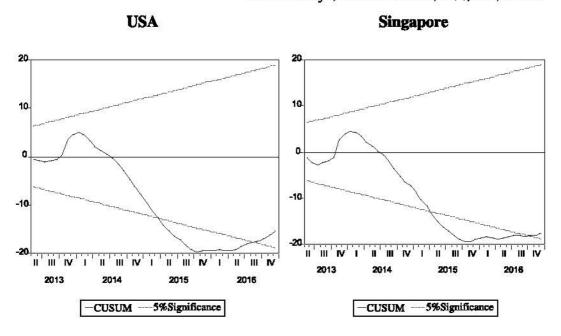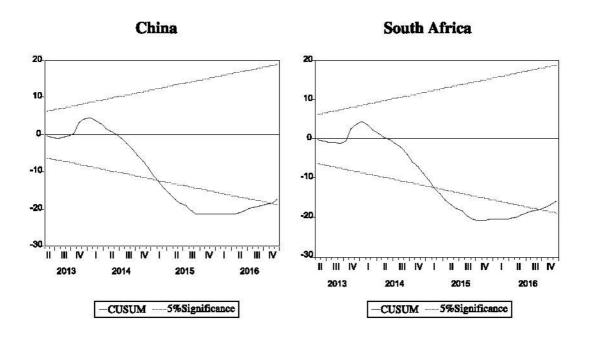
Figure 1: Stability Diagnostics Results

Australia

Brazil

Canada

Denmark

India

UK

When Economies Jitters, Bitcoin Flutters

Newzealand

Europe

China

South Africa

USA

Singapore

China

South Africa

Sweden

Russia