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A Study on Impact of Crypto Currencies on Select Global Currencies Volatility

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ABSTRACT - The present study has been emphasized on the impact of crypto currencies on select global currencies volatility from the period of 2013 to 2019. The study has considered the secondary data of six global currencies which are traded in US Dollar index. The relationship has been measured with the help of bi-variate correlation between the crypto currencies Bitcoin and Ethereum to the selected six global currencies and the result reveals that the stronger relation has been observed with all the six global currencies. The Robust least squares result indicated that the significant impact of Bitcoin and Ethereum is observed on selected global currencies. The Garch effect has been applied to know the crypto currencies volatility on select global currencies and the result stated that the selected global currencies are having the significant influence by the Bitcoin and Ethereum volatility. This paper is useful to the Academic researchers, Forex trader's and investors of crypto markets.

Keywords: Bitcoin, Canadian Dollar, Euro, Ethereum, Japanese Yen, Pound Sterling, Swedish Krona, Swiss Franc.

I. INTRODUCTION

A cryptographic money (or cryptographic money) is a moved resource wanted to function as a strategy for trade that utilizes cryptography to affirm its exchanges, to control the making of extra units, and to check the exchanging of focal points. A propelled money is hard to fake in context of this security highlight. A depicting highlight of cutting edge money, and clearly its most captivating interest, is its ordinary nature; it isn't issued by any focal master, rendering it speculatively resistant to government impedance or control. Cryptographic sorts of money are a sort of electronic cash related standards, elective budgetary structures and virtual monetary structures. Cryptographic kinds of money utilize decentralized control instead of united electronic cash and focal keeping money structures. The decentralized control of each electronic cash works through a blockchain, which is an open trade database, filling in as an appropriated record. The dark idea of mechanized cash exchanges makes them fitting for a generous get-together of accursed exercises, for example, cash washing and evaluation avoidance.

The basic cryptographic money to get the comprehensive network inventive limit was Bitcoin, which was activated in 2009 by an individual or get-together known under the nom de plume. As of September 2015, there were over 14.6 million bitcoins accessible for use with an inflexible market estimation of $3.4 billion. Bitcoin's flourishing has conveyed distinctive doing combating automated kinds of money, for example, Litecoin, Namecoin and PPCoin.

II. REVIEW OF LITERATURE

David LEE Kuo Chuen, Li Guo and Yu Wang (2018)[1]: The objective of paper is to help out the reader to comprehend the crypto currencies and evaluate their risk and return characteristics utilizing portfolio of crypto-currencies demonstrated by the crypto currency index. The consequences of the study depicts that the return correlations between crypto currencies and traditional assets are low.

Jaysing Bhosale, Sushil Mavale (2018)[2]: The paper determines that virtual currency and its fluctuation are increasing, crypto currencies various transaction are adopted worldwide-legal as well as illegal. The earned huge returns form crypto currency investments but simultaneously a question arises on their existences and creditability. Crypto currency is the currency that uses crypto-graphy for security purpose. The study highlights the comparison of 3 crypto currencies by comprehending their fluctuation and stability trends in present times.

ElBahrawy A, Alessandretti L, Kandler A, Pastor-Satorras R, Baronchelli A (2017)[3]: The paper focused on the attitude of some crypto currencies. The study considered entire market history and examined the attitude of crypto currencies. They revealed the increasing market capitalization of crypto currencies while new currencies are appearing and disappearing, they considered some stable years for several statistical properties of market. The consequences of study sheds light on the stuff of the crypto currency market and introduced a formal link between ecological modeling and the study of this growing system.

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Sha Wang, Jean-Philippe Vergne (2017)[4]: This paper recognized the elements connected with the difference in crypto currencies market values. Earlier there was an argument that the buzz encompassed crypto currencies in online media defined a difference in their prices. By contrast, we discover that the buzz encompassed crypto currencies are negatively connected with returns. Later controlling the variations in elements such as growth of supply and liquidity, eventually they discover that growth in supply is positively connected with weekly returns and crypto currencies not act as traditional currencies.

Ahmed Muzakkir Syed, Jamal Ahmed Moge, Mohammed Shandar Siddiqui (2016)[5]: The paper determines that currency system has continuously developing. In the time of information technology, the currency system is stepping into next level that is digital currency, crypto currencies are kind off open source algorithms that facilitates peer to peer networking without the need for arbitration and making it decentralized. This creates a system of tremendous economic potential.

Peter D. De Vries (2016)[6]: The paper determines that the crypto currency is an encrypted peer to peer network for digital transaction, intentions of crypto currencies are not replacing the traditional fiat currency but they could change the internet connection global markets and interact with each other. Crypto currencies may change digital trade market by innovating free flowing trading systems.

Eli Dourado and Jerry Brito (2014)[7]: The paper highlights that the fiat currency is a recently evolving and it is dominant form of money. Crypto currency is neither fiat money nor commodity. Crypto currency is a kind of experiments which may or may not succeed, but surely we can experience a mix of technical monetary features that enhance economic questions and other currency. The paper sheds on crypto currencies and comprehends its features and understands its problem to be solved. They begin with problems which trouble digital cash earlier and technical advancement that makes crypto currencies possible.

M Shoaib, M Ilyas, M sikandar Hayat Khiyal (2013)[8]: The paper talks about the medium of exchange in olden days was barter system and highlight that now paper currency is accepted as common medium of trade. The paper found some flaws they are first; they say that the currency holder is always at risk because of robbery and theft. Second, heavy cost is caused in printing and transferring pc. Third, says that counterfeit two currencies is a challenge for currency issuing authorities. Many organizations have initiated digital currency but hardly of them were governed by government. This paper established Official digital currency system which is issued and controlled by state or central banks.

RESEARCH GAP:

Crypto market is the emerging topic among the research literature. Based on the existing review of literature on this topic it is found that there is no research work has been attempted on impact of Crypto-currencies on global currencies. Hence the present study made an attempt to fill up the gap of research work with the help of "impact of crypto currencies on select global currencies volatility".

OBJECTIVES OF THE STUDY:

1. To study the Crypto-currency relationship with the select Global currencies.
2. To study the impact of Crypto-currencies prices on the select Global currencies.
3. To study the Crypto-currency Volatility influence on the select Global currencies.

HYPOTHESIS OF THE STUDY:

H0: There is no relationship between the Bitcoin & Ethereum with select Global Currencies.

H0: There is no impact of Bitcoin & Ethereum on select Global Currencies.

H0: There is no volatility influence on the select global currencies.

SCOPE OF THE STUDY:

The present study has considered on the historical Time series data (secondary). The period of the study has been considered form Aril, 2013 to February, 2019. The following are the variables were considered for the secondary analysis.

- **Crypto currencies:** Bitcoin, Ethereum.
- **US Dollar Index:** Euro, Japanese Yen, Pound sterling, Canadian Dollar, Swedish Krona, Swiss Franc.

III. RESEARCH METHODOLOGY:

The present study will consider secondary data from the year 2013 – 2019 January. The data is collected from various crypto trading sites.

The following statistical tools will be applied in this present study,

- ADF test, Bi-variant correlation, Robust Least Squares, GARCH test.

✓ **ADF Test** has been considered to identify the stationarity among the variables namely, Bitcoin, Ethereum, Canadian Dollar, Euro, Pound Sterling, Japanese Yen, Swiss Franc, Swedish Krona.

➢ **Bi-variant correlation:** It is used to measure the relationship between two variables. In this study the relationship between the Bitcoin and

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Ethereum with Global Currencies has been measured.

- **Robust Least squares:** Robust least squares are the form of regression which signifies the influence of independent on dependent variable.
- **Garch test:** GARCH test is used to find out the volatility between Bitcoin and Ethereum with select Global currencies.

Tabulation of Data Analysis

The study has considered the historical time series data from the period of 2013 to 2019 of various sectors. The Augmented Dicky Fuller test has been applied for the stationary to remove the seasonality of the data. The statistical methods were applied on the stationary data.

1st Objective: To study the Crypto Currency relationship with select global currencies.

Table – 1 The Correlation of Bitcoin with the Select Global Currencies

	DBTC_USD	DBTC_CAD	DBTC_EUR	DBTC_GBP	DBTC_JPY	DBTC_CHF	DBTC_SEK
DBTC_USD	1	-	-	-	-	-	-
DBTC_CAD	0.996716	1	-	-	-	-	-
DBTC_EUR	0.996548	0.99766	1	-	-	-	-
DBTC_GBP	0.996068	0.996818	0.99831	1	-	-	-
DBTC_JPY	0.996833	0.99654	0.997411	0.996373	1	-	-
DBTC_CHF	0.996769	0.997533	0.998894	0.997677	0.998331	1	-
DBTC_SEK	0.995016	0.996923	0.9981362	0.996614	0.99542	0.997457	1

Source: Compiled from E-views version 10 on secondary data

Table illustrates the relationship of Bitcoin with select Global Currencies. The result indicates that Bitcoin with Japanese Yen is strong i.e., 0.9968 (which is greater than standard value > 0.6), similarly, the relationship of Bitcoin with Canadian Dollar (0.9967), Euro (0.99654), Pound sterling (0.9960), Swiss Franc (0.99676) and Swedish Krona (0.9965) is observed to strong. Therefore, Null Hypothesis is rejected and Alternative Hypothesis is accepted.

Table – 2 The Correlation of Ethereum with the Select Global Currencies

	DETH_USD	DETH_CAD	DETH_EUR	DETH_GBP	DETH_JPY	DETH_CHF	DETH_SEK
DETH_USD	1	-	-	-	-	-	-
DETH_CAD	0.998141	1	-	-	-	-	-
DETH_EUR	0.997791	0.998074	1	-	-	-	-
DETH_GBP	0.997475	0.997723	0.998697	1	-	-	-
DETH_JPY	0.998157	0.996801	0.997499	0.996734	1	-	-
DETH_CHF	0.998099	0.997829	0.998923	0.998218	0.998392	1	-
DETH_SEK	0.996341	0.9975221	0.998605	0.997368	0.995727	0.997759	1

Source: Compiled from E-views version 10 on secondary data

Table illustrates the relationship of Ethereum with select Global Currencies. The result indicates that Ethereum with Japanese Yen is strong i.e., 0.99815 (which is greater than standard value > 0.6), similarly, the relationship of Ethereum with Canadian Dollar (0.9981), Euro (0.9977), Pound sterling (0.9974), Swiss Franc (0.99809) and Swedish Krona (0.9963) is observed to strong. Therefore, Null Hypothesis is rejected and Alternative Hypothesis is accepted.

2nd Objective: To study the impact of Crypto Currencies prices with select Global Currencies.

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Table – 3 Impact of Bitcoin on select Global Currencies

Independent Variable: DBTC_USD				
Method: Robust Least Squares				
Sample (adjusted): 2 2107				
Included observations: 2106 after adjustments				
Method: M-estimation				
M settings: weight=Bisquare, tuning=4.685, scale=MAD (median centered)				
Huber Type I Standard Errors & Covariance				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
DBTC_CAD	0.386678	0.003638	106.3021	0.0000
DBTC_EUR	0.159541	0.006364	25.06972	0.0000
DBTC_GBP	0.153882	0.003991	38.55531	0.0000
DBTC_JPY	0.260458	0.003933	66.22872	0.0000
DBTC_CHF	0.078937	0.006045	13.05917	0.0000
DBTC_SEK	-0.044222	0.003875	-11.41154	0.0000
Robust Statistics				
R-squared	0.541291	Adjusted R-squared		0.540199
Rw-squared	0.999694	Adjust Rw-squared		0.999694
Akaike info criterion	4737.868	Schwarz criterion		4775.865
Deviance	0.002164	Scale		0.000676
Rn-squared statistic	20096531	Prob(Rn-squared stat)		0.000000
Non-robust Statistics				
Mean dependent var	0.000460	S.D. dependent var		0.071612
S.E. of regression	0.004875	Sum squared resid		0.049916

Source: Compiled from E-views version 10 on secondary data

The Table depicts the Robust least squares influence of Bitcoin on select Global Currencies. The result indicates that Swedish Krona is observed to be having negative influence on Bitcoin (i.e. co-efficient value is -0.044). While the remaining Global currencies seemed to be having positive influence on Bitcoin in which Candian Dollar (0.38) has significantly high influence followed by Japanese Yen (0.26), Euro (0.159), Pound sterling (0.153). Whereas, Swiss Franc (0.07) influence on Bitcoin is significantly low. Hence, it is concluded that Bitcoin is having significant influence on Global Currencies.

Table – 4 Impact of Ethereum on select Global currencies

Independent Variable: DETH_USD				
Method: Robust Least Squares				
Sample (adjusted): 2 1277				
Included observations: 1276 after adjustments				
Method: M-estimation				
M settings: weight=Bisquare, tuning=4.685, scale=MAD (median centered)				
Huber Type I Standard Errors & Covariance				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
DETH_CAD	0.425183	0.002420	175.6802	0.0000
DETH_EUR	-0.021645	0.004125	-5.246950	0.0000
DETH_GBP	0.172258	0.002748	62.69180	0.0000
DETH_JPY	0.342772	0.002399	142.8950	0.0000
DETH_CHF	0.090781	0.003675	24.70080	0.0000
DETH_SEK	-0.007858	0.002677	-2.935300	0.0033
Robust Statistics				
R-squared	0.496901	Adjusted R-squared		0.494921
Rw-squared	0.999961	Adjust Rw-squared		0.999961
Akaike info criterion	3436.440	Schwarz criterion		3472.835
Deviance	0.000488	Scale		0.000377
Rn-squared statistic	58169007	Prob(Rn-squared stat.)		0.000000
Non-robust Statistics				
Mean dependent var	0.000300	S.D. dependent var		0.082559
S.E. of regression	0.003758	Sum squared resid		0.017934

Source: Compiled from E-views version 10 on secondary data

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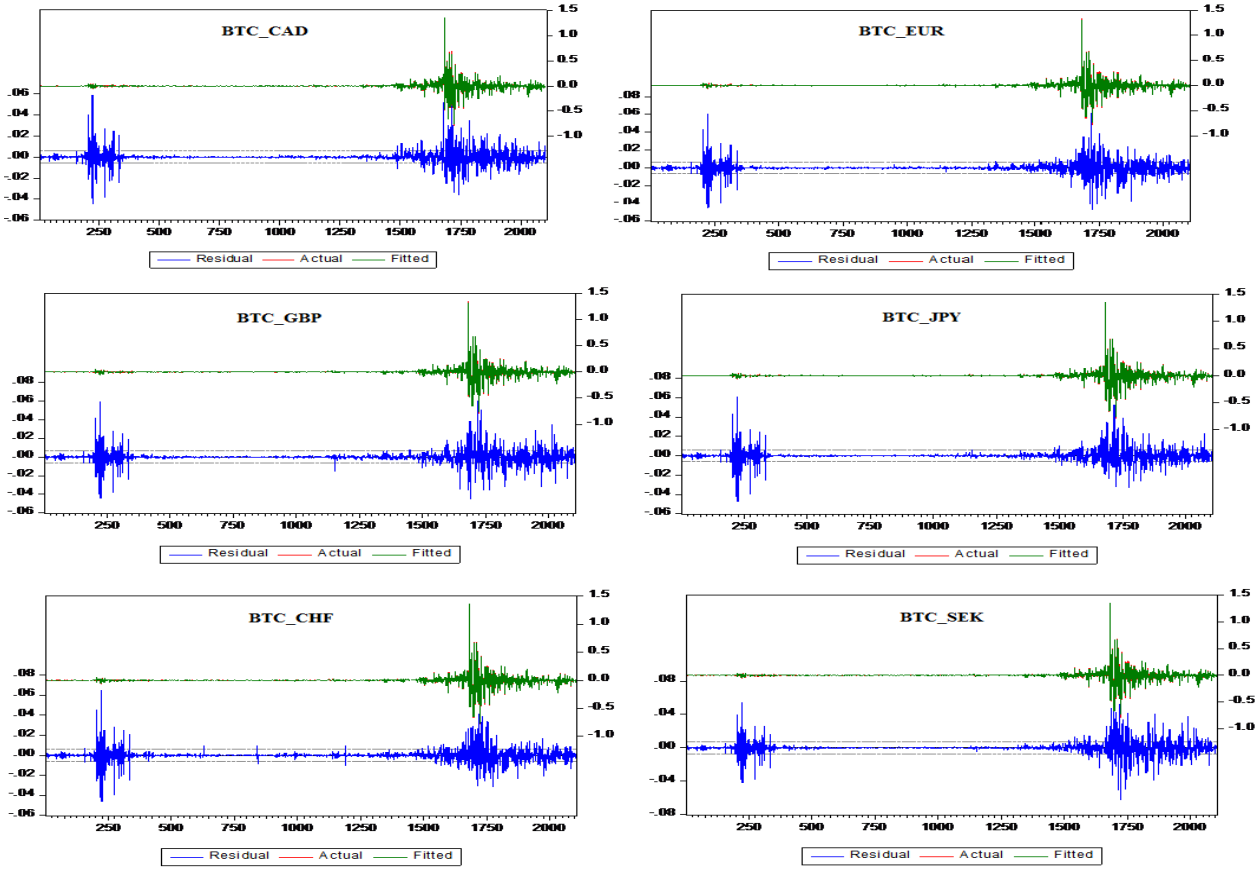
The Table depicts the Robust least squares influence of Ethereum on select Global Currencies. The result indicates that Swedish Krona and Euro is observed to be having negative influence on Ethereum (i.e. co-efficient value is -0.007, -0.021). while the remaining Global currencies seemed to be having positive influence on Ethereum in which Candaian Dollar (0.42) has significantly high influence followed by Japanese Yen (0.34), Pound sterling (0.172). Whereas, Swiss Franc (0.09) influence on Ethereum is significantly low. Hence, it is concluded that Ethereum is having significant influence on Global Currencies.

3rd Objective: To study the Crypto-currency Volatility influence on the select Global currencies.

Fig – 1 Residual graphs of Bitcoin volatility influence on select Global currencies.



Source: Compiled from E-views version 10 on secondary data

Residual graph reflect the movement of trend line between Bitcoin with select global currencies. The graph represent the bitcoin to USD dollar that bitcoin volatility has a significant influence on the USD return prices by observing the cluster formed during the study period I.e., (2013 - 2019).Similarly currency such as CAD, EUR, GBP, JPY, CHF and SEK had shown significant volatility that states that the GARCH volatility exist between Bitcoin prices on select currencies.

Table – 5: Bitcoin volatility influence on select Global currencies by GARCH test

Dependent Variable: DBTC_USD				
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
Sample (adjusted): 2 2107				
Included observations: 2106 after adjustments				
Coefficient covariance computed using outer product of gradients				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
DBTC_CAD	0.985773	0.001758	560.8155	0.0000
DBTC_EUR	0.965538	0.001312	735.8372	0.0000
DBTC_GBP	1.006011	0.001778	565.8285	0.0000
DBTC_JPY	0.966442	0.001723	560.9411	0.0000
DBTC_CHF	0.978877	0.001690	579.0880	0.0000
DBTC_SEK	0.981595	0.002006	489.3869	0.0000

Source: Compiled from E-views version 10 on secondary data

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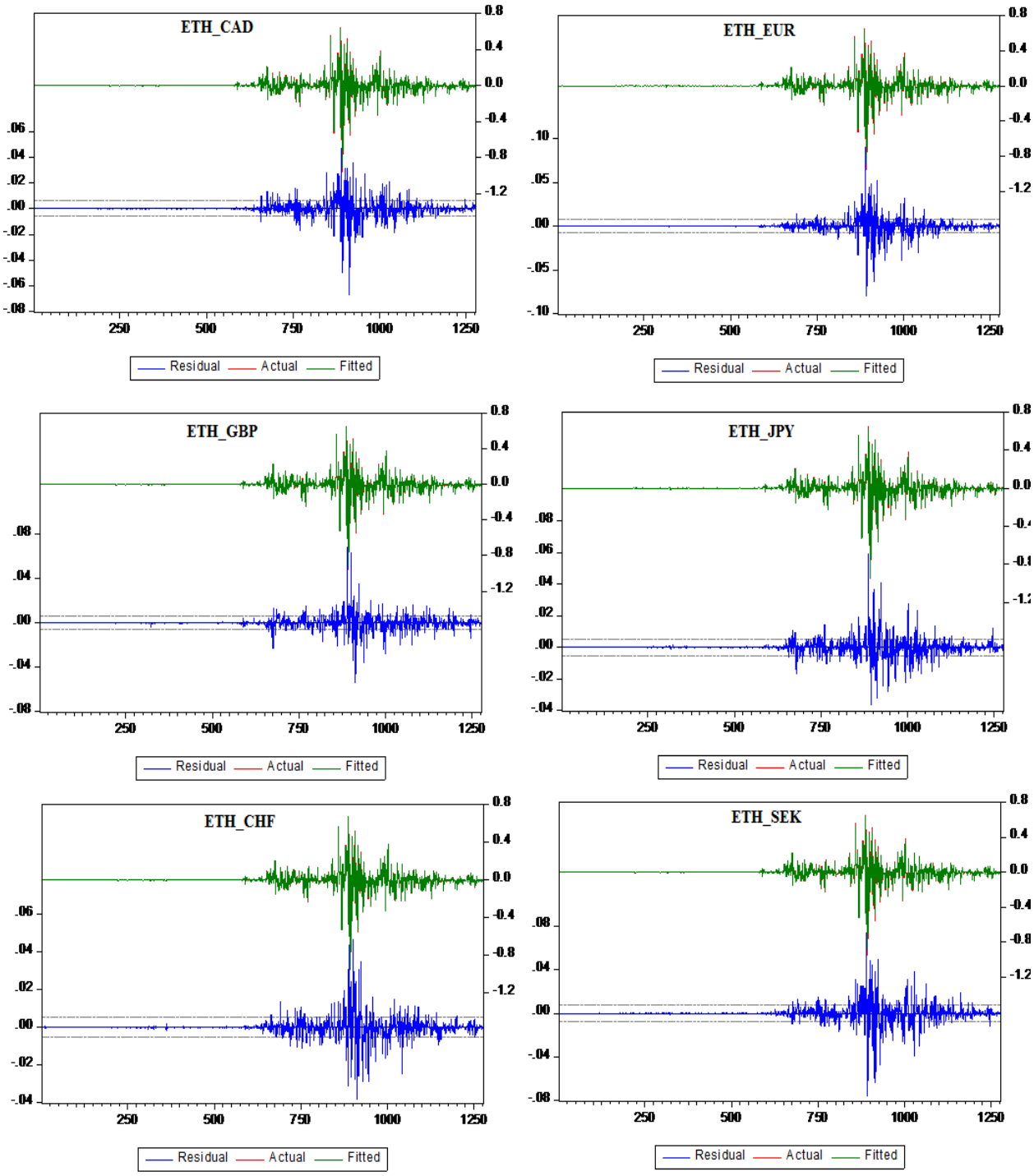
Table indicates the GARCH effect between the BITCOIN with select Global currencies. The Result indicates that GBP has highest significant volatility influence on BITCOIN with coefficient value of 1.006. similarly, the remaining selected currencies CAD, EUR JPY, CHF, SEK with coefficient values of 0.98, 0.965, 0.966, 0.978, 0.98 is also having the significant influence on BITCOIN. Thereby, confirming that all selected global currencies is having significant volatility with BITCOIN.

Fig – 2: Residual graphs of Ethereum volatility influence on select Global currencies Volatility.



Source: Compiled from E-views version 10 on secondary data

Residual graph reflect the movement of trend line between Ethereum with select global currencies. The graph represents the Ethereum to USD dollar that Ethereum volatility has a significant influence on the USD return prices by observing the cluster. Similarly currency such as CAD, EUR, GBP, JPY, CHF and SEK had shown significant volatility that states that the GARCH volatility exists between Ethereum prices on select currencies.

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Table – 6 Ethereum volatility influence on select Global currencies volatility with the GARCH test

Dependent Variable: DETH_USD				
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)				
Sample (adjusted): 2 1277				
Included observations: 1276 after adjustments				
Coefficient covariance computed using outer product of gradients				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
DETH_CAD	0.965195	0.000799	1207.533	0.0000
DETH_EUR	0.927503	0.001080	858.7969	0.0000
DETH_GBP	0.986699	0.000739	1333.026	0.0000
DETH_JPY	0.974875	0.000808	1207.024	0.0000
DETH_CHF	0.985659	0.001118	881.4922	0.0000
DETH_SEK	0.958936	0.001162	825.2622	0.0000

Source: Compiled from E-views version 10 on secondary data

Table indicates the GARCH effect between the ETHEREUM with select Global currencies. The Result indicates that GBP has highest significant volatility influence on ETHEREUM with coefficient value of 0.986. Similarly, the remaining selected currencies CAD, EUR JPY, CHF, SEK with coefficient values of 0.965, 0.927, 0.974, 0.985, 0.958 is also having the significant influence on ETHEREUM. Thereby, confirming that all selected global currencies is having significant volatility with ETHEREUM.

LIMITATIONS OF THE STUDY:

1. The study is limited to only two crypto currencies there were many crypto platforms are available but the present study is not considered all those crypto coins except Bitcoin and Ethereum.
2. The present study has considered the Ethereum data from 2015 onwards.
3. The present study is mainly focused on only six global currencies which are part of Dollar index.

IV. FINDINGS OF THE STUDY

1. The study found examined the relationship of Bitcoin with the selected global currencies with the help of Bi-variate correlation. The study result reveals that Bitcoin relation with all the selected currencies is having strongly correlation but the Japanese yen (0.996833) is having the stronger relation. The Swedish krona (995016) is slightly lower strong correlation with the Bitcoin.
2. The study result reveals that Ethereum relation with all the selected currencies is having strongly correlation but the Japanese yen (0.998157) is having the stronger relation. The relationship of Swedish Krona with the Ethereum is also found to be behaved similarly with the bitcoin.
3. The study found emphasized on the impact of Bitcoin on the select global currencies have been examined with the Robust least square method. The study result stated that the Canadian Dollar (0.386678) is observed to be having the higher positive influence by the Bitcoin and lowest influence has been observed on Swiss Franc (0.078937).
4. The study found emphasized on the impact of Ethereum on the select global currencies have been examined with the Robust least square method. The study result stated that the Canadian Dollar (0.425183) is observed to be having the higher positive influence by the Ethereum but Euro (-0.021645) and Swedish Krona (-0.00785) are having the negative influence by the Ethereum.
5. The Bitcoin and Ethereum Volatility influence has been examined with the Garch model and the result indicates that the selected currencies volatility got influenced. The coefficient value of British pound – GBP (1.006011) with Bitcoin is observed to be having higher influence. The Ethereum volatility coefficient (0.986699) is having the similar effect on volatility.

V. CONCLUSION OF THE STUDY

The present study has been focused on the impact of crypto currencies on the select global currencies with the help of secondary data. The study has considered the data from the period April, 2013 to February, 2019. The study has considered the six major global currencies which are based on the Dollar index. The Bi-variate correlation result indicated that the Bitcoin and Ethereum are having the stronger relationship with all the selected global currencies. The robust least square method indicated that the Bitcoin and Ethereum are significantly having the influence on the selected global currencies. The Garch model result indicated that the volatility of Bitcoin and Ethereum are having the influence on the selected volatility of the global currencies. Hence there is a need to do further research in

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this area by considering the global economic factors influence.

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