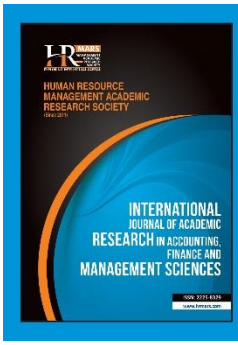


INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN ACCOUNTING, FINANCE AND MANAGEMENT SCIENCES

HRMARS MANAGEMENT ACADEMIC RESEARCH SOCIETY
EXPLORING INTELLECTUAL CAPITAL

www.hrmars.com
ISSN: 2225-8329

Does Chinese Exchanges Affect Bitcoin Price?

Alice Huong Yong Zheng, Amy Huong Yong Jing, Rossazana Ab-Rahim

To Link this Article: http://dx.doi.org/10.6007/IJARAFMS/v12-i2/12880 DOI:10.6007/IJARAFMS /v12-i2/12880

Received: 05 April 2022, ***Revised:*** *07* May 2022, ***Accepted:*** *25* May 2022

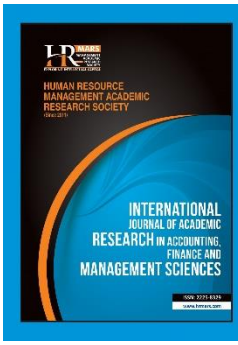
Published Online: *11* June 2022

In-Text Citation: (Zheng et al., 2022)

To Cite this Article: Zheng, A. H. Y., Jing, A. H. Y., & Ab-Rahim, R. (2022). Does Chinese Exchanges Affect Bitcoin Price? *International Journal of Academic Research in Accounting Finance and Management Sciences. 12(2),* 471 – 482.

Vol. 12, No. 2, 2022, Pg. 471 - 482

http://hrmars.com/index.php/pages/detail/IJARAFMS | **JOURNAL HOMEPAGE**


INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN ACCOUNTING, FINANCE AND MANAGEMENT SCIENCES
HRMARS MANAGEMENT ACADEMIC RESEARCH SOCIETY
EXPLORING INTELLECTUAL CAPITAL
www.hrmars.com
ISSN: 2225-8329

Does Chinese Exchanges Affect Bitcoin Price?

Alice Huong Yong Zheng, Amy Huong Yong Jing, Rossazana Ab-Rahim
Faculty of Economics and Business, University Malaysia Sarawak, Kota Samarahan, Kuching, Malaysia
Corresponding Author Email: amyhuong94@gmail.com

Abstract
China was one of the first nations to implement cryptocurrencies back in 2013. The highest trade volumes have previously been reported on the Chinese exchanges in cryptocurrencies. However, after four years, the China government shut down cryptocurrency exchanges and initial coins offering websites. The problem arises as to whether the Chinese exchange affects the price of Bitcoin in case of prohibition. Therefore, the aim of this research is to analyse the causal link between the Chinese exchange and the Bitcoin prices. The causality between the Bitcoin price and Chinese stock market are examined through the vector autoregressive model (VAR). There is short run causality from Shanghai Composite Index and Shenzhen Composite Index to Bitcoin price. This study found that Bitcoin could be a potential hedge against the Shenzhen Composite Index while the Shanghai Composite Index is merely a factor that affects Bitcoin price in the short run. In contrast to existing studies, this study considers the causality between the Bitcoin price and the Chinese exchanges.
Keywords: Bitcoin Price, Chinese Stock Market, Vector Autoregressive Model, Impulse Response Function, Variance Decomposition.

Introduction

Bitcoin, a digital currency, appeared just after the 2008 financial crisis. Looking back on the past, Bitcoin's white paper was published in 2008 followed by the first Bitcoin mined in 2019. It is the concept put forth by the alias Satoshi Nakamoto, and it remains the mystery of the exact author until today.

In general, Bitcoin is a virtual currency and different from a fiat currency. It is connected to a decentralized ledger network called blockchain, which controls all the transactions and is not sponsored by any authority or government. The world's first Bitcoin transaction was made in 2010 with a Florida programmer using 10,000 Bitcoins to buy $25 worth of pizza. Afterward, in July 2010, the first major price rise happened when Bitcoin's value went from $0.0008 to $0.08. This continues to grow, and the Bitcoin Foundation was launched in 2012. Most notably, there's around $1 million of bitcoin traded per month. However, rates fell dramatically after 2014 due to Mt Gox's bankruptcy. In 2016, the price went up from $360 to $767. The price hit almost $20,000 in December 2017. After, the road fell in 2018. Bitcoin experienced a sustained market revival in price and value, rising to $10,000 by June, and

dropping again at the end of the year, though history continues to repeat itself. In 2020, the price of Bitcoin is rising gently.

As the first cryptocurrency achieved mainstream success, Bitcoin successfully influenced several other blockchain ventures and became popular. It is now the world's largest cryptocurrency in the market. The main reason for bitcoin production is its ability to act as an alternative to domestic fiat and traditional resources like gold. Today, the United States of America, Russia, the United Kingdom, Venezuela and China are among the top five nations most traded in Bitcoin. However, Asia traded the most in Bitcoin at $2.07 billion as reported by Coin Dance (Mcguire, 2018). Moreover, not all countries have legalized bitcoin, though. Rather, it was commonly regarded as a commodity. The definition of bitcoin as currency or commodity is still ambiguous.

In Asia, the cryptocurrency ecosystem has played a leading role in China in the past. In 2013 to 2017, Bitcoin's trade rates reached 90% of the nation in Yuan China and USD. In October 2017, however, the Chinese government closed Bitcoin's trading to prevent loss and monitor the financial stability of foreign exchange (Fang et al., 2018). After then, the price of Bitcoin dropped. Nonetheless, the Over-the-Counter (OTC) Bitcoin transaction is permitted and lawful in China. In May 2019, the Government announced the 2017 trade ban and initial coin offerings did not impact on Bitcoin's legal status as a peer-to-peer channel (Nomayo, 2019). Many China prosperous mining activities closed or turned to other cryptocurrencies without access to home bitcoins. Bitcoin's global supply has undergone a drastic change and its ultimate effect on monetary prices is uncertain.

In addition, it is undeniably that Chinese were highly interested in bitcoin transactions. According to a new analysis conducted by the Alternative Finance Center (CCAF) of the University of Cambridge (2019), China's Bitcoin hash rate in April 2020 was 65.08 per cent. This shows that China is the dominant global player in Bitcoin mining. United Stated and Russia subsequently show a large gap in hash rate with China at 7.24 percent and 6.0 respectively. It is interesting to note that the Chinese miner still dominates Bitcoin even after the ban was announced in 2017. China is one of the major players in Bitcoin mining and development even though Bitcoin is not formally recognized.

Furthermore, according to Zhu et al (2017), Bitcoin price in exchange of Chinese Yuan and the US Dollar appeared with similar patterns. Further research on the relation between Bitcoin prices and the Chinese market is therefore needed to have a better understanding on Bitcoin (Zhu et al., 2017). There are a variety of studies examining the factors that drive the Bitcoin price based on past literature in terms of market dynamics, technical features, investors' appeals, and global economic conditions. The focus of past papers was on the impact of the American stock exchange, such as Dow Jones Industrial on Bitcoin price. However, minimal paper explores the connection between Bitcoin and the Chinese stock market. The objectives of this study are as below:

- To investigate whether the Bitcoin price is affected by the Chinese stock market.
- To examine the Granger causality relationship between Bitcoin price and the Chinese stock market.

The remainder of this study is arranged accordingly: The previous work on factors influencing the Bitcoin price is described in Section II. The data and methodology for study causality of Bitcoin and Chinese exchange is included in Section III. The results of all of the studies are summarized in Section IV and Section V also provides our final conclusions and recommendations for further analysis.

Literature Review

Digital currency can be known as money where it acts as medium of exchange and the unit of account (Ali et al., 2014). However, in this study, without committing to any definite theory of money, the general of the constitution of money being discussed which include commodity theory, fiat theory and credit theory (Bjerg, 2015). Smith (2010) figured about the advancement of simple barter to money economy as refer to commodity theory of money. The value of a commodity means to a person who possesses and does not consume himself but to exchange for another commodity. It is a kind of exchangeable value of all commodities such as gold and silver. In the fiat theory of money, Knapp (1926) stated that money is the creation of the state of sovereign identity where the usage of it is regulated by legal laws. Bitcoin shares some kinds of idea of fiat theory. It has value as it generally accepted by money community which being claimed upon society. Community users willing to exchange the commodity through Bitcoin whereby Bitcoin does not have intrinsic value (Simmel, 1978). Credit theory of money by Innes (1914) claimed that sales and purchases involved the commodity credit exchanged. It does not depend on the value of any metals but on the payment acquired by the creditor. Creation of money by commercial banks usually take place. Upon comparison of Bitcoin with these theories, Bjerg (2015) concluded that Bitcoin incorporates several attributes of money in which it is a commodity money without gold, fiat money without a state, and credit money short of debt.

There are lots of studies discussed about Bitcoin from different points of view. According to Zhu et al (2017), the authors studied the factors that affect Bitcoin by using Vector Error Correction models. Authors used Gold as reference to choose the factors that influence the price of Bitcoin. The variables chosen include Consumer Price Index, Dow Jones Industrial Average, US dollar Index, Federal Effective Funds Rate and London Gold Price Fixing. Their result suggested that there is a short run relationship between the gold price, consumer price index and US dollar with Bitcoin price while consumer price index, Dow Jones Industrial Average, Federal Effective Funds Rate and US dollar Index have a long-run relationship with Bitcoin price. Also, they concluded that Bitcoin can be hedged against the dollar and that Bitcoin is an asset instead of a currency because the global economic climate is likely to affect the Bitcoin price.

According to Wang et al (2016), the authors also examined the impact factor of Bitcoin prices using the vector error correction model. The authors focused on the supply and demand factors for Bitcoin by selecting the variables such as stock exchange indexes such as Dow Jones Industrial Average, crude oil price and the amount of trade. Their result showed a stable long-term relationship of Bitcoin price with the stock price index, oil price and daily bitcoin market volume. Changes in oil price and the regular volume of trading have little impact on bitcoin prices, though adjustment in the stock price index also has a major influence on bitcoin.

According to Ciaian et al (2015), a vector autoregressive model is used to examine the factors that affect Bitcoin price. Their result implied that Bitcoin price formation can be explained by the conventional economic model. Market fundamentals such as supply, and demand have a significant influence on Bitcoin price. However, there is no significant relationship between the macro-financial indicators such as Dow Jones Industrial Average and Bitcoin price.

According to Gozcek and Skliarov (2019), the vector error correction model is employed for analysis of factors leading to the price of Bitcoin. The authors included various variables from different terms such as supply and demand, investor attractiveness, global economic climate and commodity market and stock market. Their findings showed that the supply and demand

factors do not affect the Bitcoin price. Also, the global economic climate does not have an influence on Bitcoin price and fails to hedge other investments. Stock market has a positive but not robust impact on the Bitcoin price.

According to Bouri et al (2018), the authors used a distributed lag model and quantile model of autoregressive controls to investigate the factors influencing Bitcoin's price. Overall, the findings suggested that the price movement of Bitcoin based on market data from the aggregate commodity index and gold prices can be expected.

Moreover, Dyhrberg (2016) studied Bitcoin's ability to hedge through the GARCH model. Their finding showed that Bitcoin has the same hedging ability as gold. For risk-averse investors, Bitcoin is suitable for handling uncertainties and for anticipating negative market disorders.

Furthermore, Shahzad et al (2019) determined whether Bitcoin is a safe haven through a cross-quantilographic bivariate method. It focused on several stock market indices, including those from the United States, China, and others. In most cases, their findings showed that any Bitcoin, gold, and commodity index can in certain cases be considered a weak asset for hedging. Overall, there are limited paper discussions on the relationship between the Chinese stock market and Bitcoin price.

Methodology

As no theory addresses the potential combination between the variables considered is seen in the literature review in this analysis, VAR is used to evaluate the endogeneity among the variables. Vector autoregression (VAR) is a non-linear model used in multi-time series capturing linear interconnections. By permitting more than one evolving component, VAR model extends the univariate autoregressive model (AR model). Also, the VAR framework is empirically based and does not have a theoretical background (Zivengwa et al., 2013).

Thus, this study employs the use of vector autoregressive model (VAR) to track the causality of the Bitcoin price and the Chinese stock market. The following definitions refer to the VAR model;

$$y_t = \delta + \sum_{i=1}^{p} \Phi_i y_{t-i} + \varepsilon_t \quad (1)$$

where y_t refers to vector variables, δ refers to k-vector of constant, p refers to the order, Φ_i refers to matrix parameter, ε_t refers to k-vector of error term.

In this study, the proposed model is shown below;

$$LB_t = \sigma + \sum_{i=1}^{k} \beta_i LB_{t-i} + \sum_{j=1}^{k} \Phi_j LSH_{t-j} + \sum_{m=1}^{k} \varphi_m LSZ_{t-m} + u_{1t} \quad (2)$$

Table 1 shows the description of the variables. In this study, both the composite Shanghai Index and the Composite Shenzhen Index are chosen as they are the two largest exchanges in China. The data was obtained in general from Investing.com on a monthly basis from January 2016 through March 2020.

Table 1
Variables Description

Variables	Description	Period	Source
LB	Logarithm of Bitcoin price in US dollar	Monthly data from Jan 2016 until March 2020	Investing.com
LSH	Logarithm of Shanghai Composite Index		Investing.com
LSZ	Logarithm of Shenzhen Composite Index		Investing.com

Results and Analysis

Augmented Dickey Fuller and Phillips and Perron tests

To check the variables in standard form, preliminary tests such as Dickey and Fuller (1981, ADF) and Phillips and Perron (1988, PP) are required. The null hypothesis of this test indicates that the series has no constant means and variance. In the Table 2 test result, all variables do not reject the null hypothesis that shows that the variables at the level do not remain stationary. However, further tests show that the variables in the first order are stationary. These variables are therefore measured at the first order differential to reduce data fluctuation.

Table 2
ADF and PP tests

Variables	LB		LSH		LSZ	
	ADF	PP	ADF	PP	ADF	PP
Level	0.376	0.389	0.484	0.428	0.459	0.364
	4	8	4	6	9	3
First-order difference	0.000	0.000	0.000	0.000	0.000	0.000
	0***	0***	0***	0***	0***	0***

Note: *denotes significant at levels 10%; ** denotes significant at levels 5%; *** denotes significant at level 1%.

Final prediction error (FPE), Akaike's information criterion (AIC), Schwarz's, Bayesian information criterion (SBIC) and the Hannan and Quinn information criterion (HQIC)

Later, the optimal lag selection will be determined based on the final prediction error (FP), Akaike's information criterion (AIC), Schwarz's, SBIC and Hannan and Quinn (HQIC). An optimal lag is required to avoid misspecification and reduce the problem of serial correlation. From the result in Table 3, all four selection criteria agree that lag one should be selected.

Table 3
FPE, AIC, SBIC and HQIC tests

Lag	FPE	AIC	SBIC	HQIC
1	7.0e-08*	-7.96211*	-7.78013*	-7.46563*
2	8.7e-08	-7.75282	-7.43436	-6.88399
3	8.2e-08	-7.83239	-7.37744	-6.59119
4	1.0e-07	-7.62494	-7.03351	-6.01139

Notes: *denotes the selection

Johansen Tests for Cointegration

Afterward, the Johansen cointegration test is subsequently conducted to determine if there is a long-term cointegration between the variables. The null hypothesis at zero maximum rank indicates that cointegration is not possible. The findings in Table 4 fail to reject the null hypothesis as both the trace and max statistics are smaller than 5% critical value. Therefore, the model does not have a long-term relationship. Thus, in this case, the VAR model is acceptable.

Table 4
Johansen tests

Maximum rank	Trace statistics	5% critical value	Max statistics	5% critical value
0	24.6349	29.68	13.140	20.97
1	11.4939	15.41	8.2833	14.07
2	3.2106	3.76	3.2106	3.76

Vector Autoregressive Model Analysis

From Table 5, the first panel states that the VAR model is considered fit with Log-like characteristics greater than zero and R-square greater than 0.5. All the equation variables have a significant p-value of 1%. Next, the second panel denotes that all the independent variables have a significant short-term relation to the dependent variables. LSH has a short run causality to LB at 1% significant level while LSZ has a short run causality to LB at 10% significance level.

Table 5
VAR Model

Log-likelihood	193.985		
Equation	**R-square**		**P>Chi Square**
LB	0.9559		0.000*
LSH	0.7634		0.000*
LSZ	0.7942		0.000*
Dependent variable: LB	**Coefficient**	**SE**	**P>|z|**
LB	0.94	0.03	0.00***
LSH	2.29	0.86	0.01***
LSZ	-0.95	0.58	0.10*

Note: *denotes significant at levels 10%; ** denotes significant at levels 5%; *** denotes significant at level 1%.

Granger Causality

To further conclude the causality between both LSH and LSZ with the LB, granger causality test is carried out. The null hypothesis of granger causality shows that there is no causal relationship between the variables. From the result in Table 6, LSH is found to granger cause LB at 1% significance level while LSZ is granger cause LB at 10% significance level. The joint effect of both LSH and LSZ granger cause LB at 1% significance level.

Table 6
Granger Causality test

Equation	Excluded	Chi-square	df	Prob>Chi-square
LB	LSH	7.06	1	0.01***
LB	LSZ	2.66	1	0.10*
LB	ALL	9.69	2	0.01***

Note: *denotes significant at levels 10%; ** denotes significant at levels 5%; *** denotes significant at level 1%.

Lagrange-multiplier Test

Of course, a robust model must be free from autocorrelation problems. To detect the autocorrelation in the respective lag order, the Lagrange-multiplier test is performed. The null hypothesis indicates that there is no autocorrelation in lag one. From the result in Table 7, it fails to reject the null hypothesis and concludes that the VAR model is free from autocorrelation in lag one.

Table 7
Lagrange-multiplier test

Lag	Chi-square	df	Prob>chi2
1	7.82	9	0.55

Jarque-Bera test

Furthermore, the Jarque-Bera tests whether the VAR model associates with normality. The null hypothesis indicates that the residual of variables is normally distributed. From the result in Table 8, the tests fail to reject the null hypothesis. Thus, concluded that the residual of variables is normally distributed.

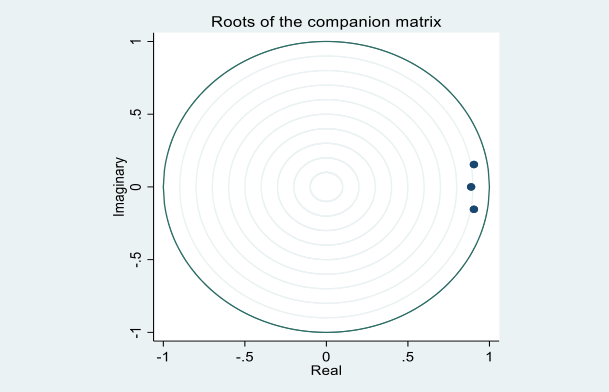
Table 8
Jarque-Bera test

Equation	Chi-square	df	Prob>Chi-square
LB	0.79	2	0.67
LS	0.61	2	0.74
LSZ	1.58	2	0.45
ALL	2.98	6	0.81

Eigenvalue Stability Condition

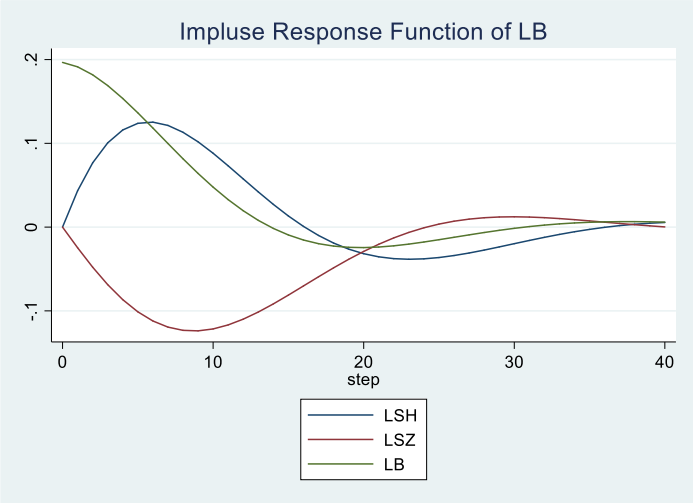
The stability of the self-value of the VAR model is determined. One important fact is that stability requires stationarity. It is therefore necessary to measure stability to guarantee that a stable and stationary model operation. Based on Figure 1, the result shows that all values lie inside the unit circle satisfy the stability condition.

Figure 1. Eigenvalue Stability Condition



Impulse Response Function

Figure 2. Impulse Response of LB

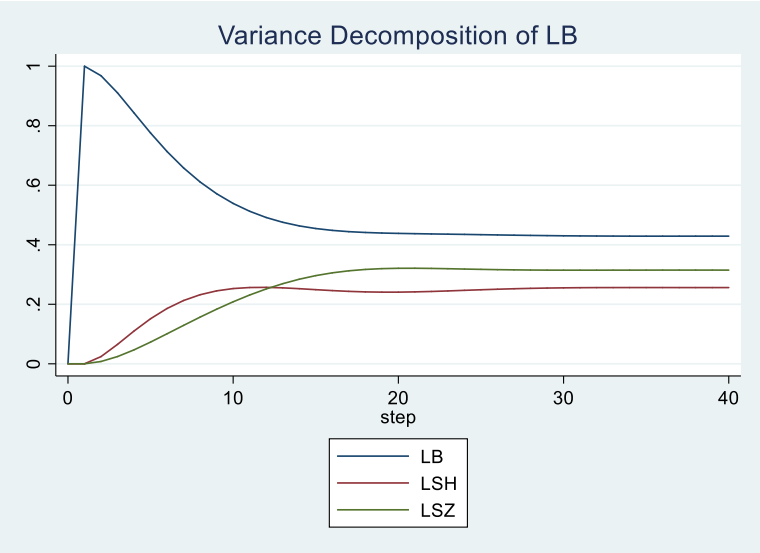


The impulse response function (IRFs) in general used to track the response of the variables to shock pulses. Figure 2 shows that LB's reaction to the LSH and LSZ shock is significant. LB takes about 20 months to stabilize after receiving the shock from both LSH and LSZ. Interestingly, the shocks in LSH and LSZ contribute to different impacts on LB. The positive shock in LSH leads to a short-term rise in LB while the positive shock in LSZ triggers a short-term decrease in LB. Over the long run, both effects on LB remain stable.

Variance Decomposition

The decomposition of the variance implies the decomposition in contribution of each variable of the mean square error. The random shock tells us of the relative value, by showing that each endogenous variable has a predicted error variance. The variance breakdown of LB due to the LSH and LSZ fluctuations is reported in Figure 3. The variation in LB explained by itself shows a decline trend in the short run while LSH and LSZ shows a gentle increase in their contribution to the LB in the short run and the effect remains stable after the 15th period. In the 15th period, 43.82% of variance decomposition is from LB, 24.08% of variation is explained by LSH and 32.1% of the variation explained by LSZ. It shows that LB itself contributes the most variation while LSH exerts a smaller role than LSZ. LSZ play a more significant role in explaining the long run LB.

Figure 3. Variance Decomposition



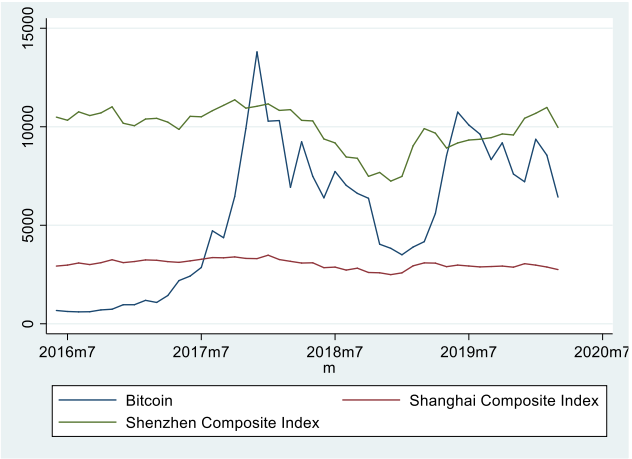
Analysis on Each Chinese Exchanges on Bitcoin Price

Previous findings show that both the Shanghai Composite Index and the Shenzhen Composite Index have short-term causality to the bitcoin price. This section includes individual analysis of the Shanghai composite index and the Shenzhen composite index on the basis of previous findings.

From Figure 4, Bitcoin price shows an extremely fluctuated trend. It shows a significant decline trend in the end of 2017. Within this period, China announced the closure of the Bitcoin trading platform to avoid losses and control of financial stability in foreign-exchange markets. Consequently, the Bitcoin price drops dramatically. As a result, investors lost their trust in Bitcoin. In the end of 2019, Bitcoin price will show a sharp decline due to the presence of Covid-19. Therefore, random events will shift Bitcoin price drastically in short-term.

Moreover, the price of Bitcoin and both indexes show a downward trend in 2018 due to the emergence of China-United States trade wars and the macro-economic slowdown in the country. President Donald Trump imposed tariffs and other trade barriers on China in the year 2018 with the aim of forcing China to make modifications on business practices in terms of increasing trade deficits, intellectual property robbery and forced American technology transfer. With both the Shenzhen Composite Index and Shanghai Composite Index slumps, the willingness of people to invest in other financial assets has weakened, and the price of Bitcoin has fallen substantially. Thus, the Shenzhen Composite Index's and Shanghai Composite Index and random event may cause Bitcoin price to change dramatically over a short period of time.

Figure 4. Line graph of Bitcoin, Shenzhen Composite Index's and Shanghai Composite Index's



Conclusions

In this study, the causality of Chinese stock exchange on Bitcoin price is determined through a VAR model. The chosen Chinese exchanges are two of China's biggest exchanges, Shanghai composite Index and Shenzhen composite Index. Empirical result show that Bitcoin's price is caused by both Shanghai and Shenzhen exchanges in the short run. Moreover, the shock impulses caused by the Shanghai Composite Index cause a rise in Bitcoin price in the short run while those by the Shenzhen Composite Index cause a decline in Bitcoin price in the short run. The different response of Bitcoin to the shock may be due to the fact that there exist other factors that disrupt the response. The Bitcoin price remains stable in the long run-in response to both the shock from Shenzhen Composite Index and Shanghai Composite Index. Apart from that, the Shenzhen Composite Index explained a greater variation than that of the Shanghai Composite Index in the forecast error variance decomposition of Bitcoin price in the long run while vice versa in the short run.

Findings show that both the Shenzhen Composite Index and Shanghai Composite Index's random event may cause Bitcoin price to change dramatically over a short period of time. However, Bitcoin can, to a certain extent, be a potential hedge against the Shenzhen Composite Index while the Shanghai Composite Index is merely a factor that affects Bitcoin price in the short run. Apart from that, since both the stock exchanges affect the Bitcoin price, this study shows that Bitcoin cannot be a potential currency. However, further investigations into whether Bitcoin is a true currency or merely a commodity is encouraged by including more variables from different terms. Furthermore, investigation on the mechanism of how the Shenzhen Composite Index and Shanghai Composite Index influences the Bitcoin price should be carried out.

Acknowledgement

Acknowledgement: This work was supported by Universiti Malaysia Sarawak [grant numbers F01/SpMYRA/1676/2018].

References

Ali, R., Barrdear, J., Clews, R., & Southgate, J. (2014). The Economics of digital Currencies. *Bank of England Quarterly Bulletin*, *Q3*, 276-286.

Bjerg, O. (2014). *Making Money: The Philosophy of Crisis Capitalism*. Retrieved from http://libsearch.cbs.dk/primo_library/libweb/action/dlDisplay.do?docId=CBS01000669860&vid=CBS&afterPDS=true

Bouri, E., Gupta, R., Lahiani, A., & Shahbaz, M. (2018). Testing for asymmetric nonlinear short and long-run relationships between bitcoin, aggregate commodity and gold prices. *Resources Policy*, *57*(C), 224-235.

Cambridge Centre for Alternative Finance. (2019). *Bitcoin Mining Map*. Retrieved from https://cbeci.org/mining_map

Ciaian, P., Rajcaniova, M., & Kancs, D. (2015). The Economics of Bitcoin Price Formation. *Applied Economics*, *48*(19), 1799-1815.

Dickey, D. A., & Fuller, W. A. (1981). *Econometrica*, Inform Global.

Fang, W., Tian, S., & Wang, J. (2018). Multiscale fluctuations and complexity synchronization of Bitcoin in China and US markets. *Physica A*, *512*(2018), 109-120.

Goczek, L., & Skliarov, I. (2019). What drives the Bitcoin price? A factor augmented error correlation mechanism investigation. *Applied Economics*, *51*(59), 1-18.

Innes, A. M. (1914). The Credit Theory of Money. *The Banking Law Journal*, *31,* 151-168.

Knapp, G. F. (1926). The State Theory of Money. *Journal of Political Economy, 34*(3), 404-406.

Mcguire, A. (2018). *Which Country Trades the Most Bitcoin*. Retrieved from https://irishtechnews.ie/which-country-trades-the-most-bitcoin/

Nomayo, O. A. (2019). *Alipay Denounces Bitcoin OTC Trading: Regulatory 'Gray Area' in China.* Retrieved from https://cointelegraph.com/news/alipay-denounces-bitcoin-otc-trading-regulatory-gray-area-in-china

Phillips, P. C., & Perron, P. (1986). Testing for a unit root in time series regression. *Biometrika*, 335-346.

Shahzad, J. H. S., Bourib, E., Roubaude, D., Kristoufekd, L., & Lucey, B. (2019). Is Bitcoin a better safe-haven investment than gold and commodities. *International Review of Financial Analysis*, *63*(C), 322-330.

Simmel, G. (1978). *The Philosophy of Money*. London: Routledge.

Smith, A. (2010). *The Wealth of Nations: An inquiry into the nature and causes of the Wealth of Nations*. Chichester: Capstone.

Wang J., Xue, Y., & Liu, M. (2016). An Analysis of Bitcoin Price Based on VEC Model. Proceedings of *International Conference on Economics and Management Innovations 20 16* (pp.146-152). Atlantis Press.

Zhu, Y., Dickinson, D., & Li, J. (2017). Analysis on the influence factors of Bitcoin's price based on VEC model. *Financial* Innovation, *3*(3), 1-13.

Zivengwa, T., Hazvina, F., Ndedzu, & Mavesere, I. M. (2013). Investigating the Causal Relationship between Education and Economic Growth in Zimbabwe. *Asian Journal of Humanities and Social Science*, *1*(5), 2321-2799.