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IS BITCOIN A HEDGE FOR CURRENCIES IN ASEAN-5?

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ABSTRACT

Bitcoin is a new asset class in the global financial system where it is known as cryptocurrency or digital currency. Bitcoin has begun to gain the world's attention as the price of Bitcoin has been rising since 2009 as its usage increases day by day. The popularity of bitcoin has made some investors see it as a safe place. But is this true for the ASEAN-5 currencies? Therefore, this research paper aims to identify whether Bitcoin can act as a hedge for currencies in the ASEAN-5 countries namely Malaysia, Thailand, Indonesia, Singapore and the Philippines. This study uses daily data from December 1, 2014 until December 30, 2022. Empirical results of the study based on the GARCH (1,1) model show that Bitcoin can serve as a weak hedge for the ASEAN-5 currencies except for Singapore where there is evidence of a strong hedge in the Lion City. This is particularly due to a unique Singapore's monetary policy tools which are based on their exchange rate unlike with other countries that mainly use interest rate as their tool.

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***Keywords**: Bitcoin; currencies; ASEAN-5; hedge; GARCH.*

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1. INTRODUCTION

Bitcoin is a new asset class in the global financial system where it is recognised as a cryptocurrency or digital currency. Bitcoin has begun to receive attention from the world community when the price of Bitcoin has been increasing since 2009 as its usage increases every day. According to data from Yahoo Finance shows that as of 5 November 2022, Bitcoin's market capital was 408.61 billion US dollars which makes it the largest digital currency among other cryptocurrencies. The role of Bitcoin asset existence is considered important in the financial world as this innovation has transformed payments that are not only based on conventional currencies.

According to Nakamoto (2008), bitcoin is a decentralised system of electronic payments that are sent directly from one party to another without going through a third party. Bitcoin differs from most other financial assets such as conventional currencies in that it is not tied to any financial institution and has no physical form. Therefore,

the value of the Bitcoin price does not rely on any control of the central bank of the country and other commodities instead the formation of the Bitcoin price is determined by the power of the demand and supply markets as well as the specific factors of digital currencies (Ciaian et al., 2016). Bitcoin can be a potential medium of exchange for money where this cryptocurrency system has the advantage of low payment costs and can be used in all countries freely without government control.

The currency collapse in ASEAN countries is worsening and needs to be given special attention. However, the issue of currency collapse is not something new in fact the crisis of currency collapse has been going on for a long time when the Asian financial crisis in 1997 has shown a tremendous collapse in the value of currencies that challenged the regional economic market even in the economic crisis in 2008, the currency market was once again severely affected with a long term effect and until today it can be seen that the trend of ASEAN currency value is getting weaker. In addition, the impact of the COVID-19 crisis has resulted in the problem of rising inflation rates globally which caused each central bank to implement monetary policy by raising the Overnight Base Rate to stem this inflationary crisis.

According to the report of the International Fund Monetary, IMF said that the United States, U.S. has reached one of the highest inflation rates in history since 40 years with 8.3% by August 2022 in addition to the aggressive tightening of monetary conditions by the U.S. has led to a strong increase in the U.S. dollar so that the value of other currencies fell suddenly including ASEAN countries. Therefore, the low currency value experienced by ASEAN countries has affected the economic market and affected the living cost of the local residents. In addition, the U.S. is one of the biggest trading partners with ASEAN countries where any shock experienced by the U.S. dollar which is considered as the backing currency to ASEAN countries may impact the currency exchange rate in each ASEAN country.

Weak currency values in ASEAN countries are seen as a problem for investors and the global population. Most investors in ASEAN countries seek alternatives by holding assets in portfolios such as the gold and stock markets to protect their savings from losses due to the impact of falling currency values in the event of any economic shocks and disruptions. Thus, Bitcoin has been considered a new alternative investment asset class to hedge currency value. Therefore, this paper aims to identify Bitcoin assets that act as a hedge for the falling currency value of five out of ten countries in the ASEAN region, namely Malaysia, Thailand, Indonesia, Singapore and the Philippines (ASEAN-5). ASEAN-5 is given a focus because it has a large amount of economic trade value between other ASEAN countries and plays a major role in regional economic activities. Therefore, all trade and investment activities will be affected by instability in the ASEAN-5 market especially in the currency exchange rate (Kogid, 2015). In addition, this research paper can contribute to the relationship of crypto class assets of Bitcoin and the value of other currencies in a detailed and in-depth, especially the first time for ASEAN-5 currencies compared to previous studies.

The structure of this study paper is as follows. The second part discusses related literature review. Then the third part explains the sources of data obtained as well as the methodology of the study used. Part four discusses the findings of the study. Finally, the fifth part concludes the study.

2. LITERATURE REVIEW

Bitcoin is said to be digital gold when it provides an alternative to conventional currencies during times of weak economic conditions, such as during the global financial crisis in 2008 (Rogojanu and Badea, 2014). Additionally, a study by Glaser et al. (2014) found that the majority of users consider their Bitcoin investments as speculative assets rather than a means of payment. Therefore, Bitcoin may be mostly useful as an asset rather than a currency. In addition, according to Dyhrberg's (2015a) study analysis in assessing Bitcoin's volatility using the GARCH model shows Bitcoin has many similarities with both gold and the dollar. The overall conclusion of the study suggests that Bitcoin sits somewhere in between currencies and commodities due to its decentralised nature and limited market size. Hence, through these studies it shows that Bitcoin as an investment asset class to link profits versus its original purpose of being a payment medium.

Dyhrberg's (2015b) study shows that Bitcoin can act as a hedge against the US dollar and the UK stock market i.e. share similar hedging capabilities with gold. According to Urquhart and Zhang's (2019) study through the analysis of Dynamic Conditional Correlation (DCC) and Asymmetric Dynamic Conditional Correlation (ADCC) shows Bitcoin acts as a daily hedge and safe asset for certain currencies namely Swiss Franc, Euro and British Pound. Kliber et al. (2019) found similar evidence that Bitcoin can act as a safe haven asset. The study focused on cases for Venezuela and investments in Bolivars from 2014 to 2017. The researchers diversified their research by selecting the countries Estonia, Venezuela, Japan, China, Sweden to analyse with different aspects in terms of stock market, currency and economic conditions. However, the study found that only the extreme economic conditions in Venezuela point to Bitcoin as a safe asset. Corbet et al. (2018) said that Bitcoin has a role in investors' portfolios, although Bitcoin may contain its own idiosyncratic risks that are difficult to hedge, while Shahzad et al. (2019) showed that Bitcoin can be a safe asset, even though it is in different times and different markets. Guesmi et al. (2017) showed that the short positions in the Bitcoin market justify risk investment hedging against all different financial assets. The study states that Bitcoin assets also offer diversity and hedging benefits to investors. In addition, from another aspect through the results of Bouri et al. (2017a) showed that Bitcoin is a solid hedge and safe haven asset against movements in both commodity indices namely commodity and energy commodities. Other than that, the study of Yang et al. (2022) used a time-variance domain approach to find that Bitcoin has the ability to hedge against the currency market in the long run. Additionally, a recent study by Mariana et al. (2021) argues that Bitcoin and Ethereum are suitable short-term safe assets and this is supported by the study of Huang et al. (2021) showing that Bitcoin can be considered a safe haven asset in the financial markets during severe recession, such as the COVID-19 pandemic crisis.

However, through the same analytical approach Olde (2021) shows Bitcoin can indeed serve as a safe asset at a weak level for any currency. Nonetheless, Bitcoin's performance is the best to act as a safe asset over cryptocurrencies Ethereum, Litecoin and Ripple as well as gold which is a traditional safe asset. Investors, traders and residents of a country can use Bitcoin as a safe asset in the coming period of economic crisis. Some researchers such as in Smales (2018) study concluded Bitcoin is not yet suitable for hedging or being a safe asset. Bouri et al (2017b) used a DCC model and showed only limited evidence on Bitcoin's hedging and safe asset properties, although

it could still be an effective hedge. Additionally, according to Pengfei et al (2019) in general, cryptocurrencies are safe assets but not hedges for most international indices where in their study observations used 973 types of cryptocurrencies and 30 international indices from a dynamic perspective. In the study of Pal and Mitra (2019) showed among the underlying assets, gold was found to provide a better hedge against Bitcoin.

Studies conducted by Baur and Lucey (2010) and Baur and McDermott (2010) have elaborated and discussed the concept of hedging and safe assets thoroughly. An asset is characterised as a hedge when it is uncorrelated or has a negative correlation value relative to other assets on average over time. This is because hedging does not have the specific property of reducing losses during market stresses or emergencies as the asset can show a positive correlation in that period and a negative correlation in ordinary times with a negative correlation on average. The feature of a safe asset is also when the asset is uncorrelated or has a negative correlation value compared to other assets during a certain period of economic recession. A special feature of a safe asset is that it is not positively correlated with other assets in an economic downturn. This property does not force the correlation to be positive or negative on average but only to be zero or negative in a certain period. However, when examines into Bitcoin's dynamics, a significant positive relationship between Bitcoin and other currencies indicates that Bitcoin can serve as a strong hedge. Conversely, an insignificant relationship suggests that Bitcoin merely acts as a weak hedge for that specific currency. In addition, through the study of Urquhart and Zhang (2019) who used the exchange data of the currency value per U.S. Dollar in the Dynamic Conditional Correlation (DCC) method, the results of positive correlation results indicate that the currency value is in a weak state when the Bitcoin value is in a strong state which indicates the ability of the Bitcoin hedging feature and vice versa if the correlation is negative which is not a Bitcoin hedging feature.

3. DATA AND METHODOLOGY

The past research papers mentioned above such as Olde (2021), Dyhrberg (2015b), Bouri et al (2017b), Urquhart and Zhang (2019), Baur and Lucey (2010), Baur and McDermott (2010) and Smales (2018) on hedging for any asset use a similar form of analysis. It consists of applying the GARCH modelling technique and using a more in-depth GARCH model. In this paper, the data source and sample period are defined. Then, the most suitable research design is selected according to a parallel research methodology, taking into account these data sets and specific applications. The GARCH(1,1) model approach is used in this study. Finally, diagnostic tests were added to validate and confirm the main analyses.

3.1 Data and data sources

The five ASEAN-5 currency used in this analysis are Malaysian Ringgit (MYR) for Malaysia, Indonesian Rupiah (IDR) for Indonesia, Thai Baht (THB) for Thailand, Singapore Dollar (SDG) for Singapore and Philippine Peso (PHP) for the Philippines. The data for these five ASEAN-5 currencies as well as Bitcoin are benchmarked to the currency value of the US Dollar (USD) and collected from the same source for consistency. These high-frequency data are extracted on a daily basis from Yahoo Finance's filing page at https://finance.yahoo.com. The data sample is taken with daily closing prices from 1 December 2014 to 30 December 2022. This data sample starts

in 2014 due to the availability of Bitcoin price data starting in 2014 from the Yahoo Finance filing site. The currency value market for ASEAN-5 is traded only on weekdays i.e. Monday to Friday. Therefore, the daily Bitcoin data will be filtered to weekdays because the Bitcoin market is traded 24 hours a day and 7 days a week to avoid unequal and inconsistency data.

3.2 Continuous compound returns

The price of a currency's value is often not stationary at the original level. Therefore, the application of continuous compound returns to prices is more accurate than prices at their original level. Thus, descriptive statistics for simple returns will be analysed against prices. Below is the formula for continuous compound returns:

$$r_t = \log(P_t) - \log(P_{t-1}) \tag{3.1}$$

Where,
r_t = continuous compound returns for the price at the current period
P_t = closing price in the current period
P_{t-1} = closing price in a previous period
log = natural logarithm

3.3 Hedging

This study uses the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) modelling technique to study Bitcoin's hedging potential against the value of the ASEAN-5 currencies.

The GARCH model method was introduced by Bollerslev (1986) to simplify or parsimonious the ARCH model from Engle (1982) by including the lag conditional variance. GARCH specification is as below:

$$\sigma_t^2 = \omega + \sum_{i=1}^{q} \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^{p} \beta_j \sigma_{t-j}^2 \tag{3.11}$$

A simple GARCH model is GARCH(1,1) with the following specifications:

$$\sigma_t^2 = \omega + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 \sigma_{t-j}^2 \tag{3.12}$$

This conditional variance model, σ_t^2 allows it to be like an ARMA process where σ_t^2 depends on one previous period (σ_{t-1}^2) and disturbance on one previous period (ε_{t-1}^2). The parameter α_1 measures the news about the volatility one period before and the parameter β_1 measures the persistency one period before as well. However, most researchers conclude that the addition of parameters α_1 and β_1 ($\alpha_1 + \beta_1$) also measures persistency. If $\alpha_1 + \beta_1 < 1$, volatility is said to be mean reverting while if $\alpha_1 + \beta_1 > 1$, volatility is said to be explosive. In other word, the conditional variance is said to be stationary if $\alpha_1 + \beta_1 < 1$ and vice versa.

$$r_{btc,t} = \mu + \varphi r_{btc,t-1} + \beta_1 d\_btc + \beta_2 r_{currency,t} + \varepsilon_t \tag{3.13}$$

where $r_{btc,t}$ is the return of Bitcoin at time t and $r_{currency,t}$ is the return of currency at time t. Dummy variable (*d_btc*) is include in mean equation where value 1 is used to account a sharp decline of Bitcoin return on March 12, 2020 and 0 on other days. The mean equation can describe the characteristics of the hedge with the sign and significance of the coefficient β_2. If the value of β_2 has a significant negative correlation then it means that Bitcoin does not act as a hedge against the value of the currency while if the value of β_2 has a significant positive coefficient then it means that Bitcoin acts as a strong hedge against the value of the currency. However, if the value of β_2 is insignificant then it means that Bitcoin acts as a weak hedge.

4. RESULTS

4.1 Descriptive Statistics

Table 1 shows the average return value of ASEAN-5 currency and Bitcoin is between 0.03% and 0.18% where it indicates that the investors get a positive return during the study period. The highest return was recorded by Bitcoin which was 0.18% while the lowest return was recorded by Singapore Dollar with a value of 0.00131%. Meanwhile, the standard deviation measures the dispersion of returns from the average return which is also used as a proxy for risk. Additionally, according to risk and portfolio theory, high returns are accompanied by high risk. Thus, the highest risk is recorded by Bitcoin which is 4.52% while Singapore Dollar has the lowest risk which is 0.31%.

Table 1: Descriptive statistics for Bitcoin returns and ASEAN-5 currency values

	RBTC	RIDR	RMYR	RPHP	RSDG	RTHB
Mean	0.001792	0.000118	0.000121	0.000103	1.31E-05	3.24E-05
Median	0.001989	0.000000	0.000118	8.66E-05	-4.36E-05	-2.97E-05
Maximum	0.225119	0.045780	0.033848	0.123748	0.014245	0.025388
Minimum	-0.464730	-0.038641	-0.032345	-0.115179	-0.016292	-0.029023
Standard deviation	0.045171	0.006556	0.004619	0.005555	0.003117	0.004404
Skewness	-0.749400	0.118727	-0.030624	0.916876	-0.114325	0.023986
Kurtosis	12.23206	9.189522	10.68849	207.9891	4.651082	11.33105
Jarque-Bera	7687.07*	3371.46*	5194.87*	369285*	244.15*	6099.29*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

* represents significance at the 1% level, respectively.

Moreover, the most maximum and minimum return values among all are recorded by Bitcoin which are 22.51% (December 7, 2017) and -46.47% (March 12, 2020). This maximum return was driven by the high demand for the Bitcoin. On December 7, 2017 Bitcoin's dramatic price movements were driven by a combination of rapid trading fluctuations, heightened investor and institutional interest ahead of major exchanges launching Bitcoin futures. Meanwhile, Bitcoin recorded a big drop to almost halve of its value in March 12, 2020 because of the worldwide fear caused by the COVID-19 pandemic.

Furthermore, the skewness values for Bitcoin, Malaysian Ringgit, and Singapore Dollar returns show negative values. It can be said that most of the return data is below the mean value or simply there is a frequent fall in the return compared to the increase. However, the return value for Indonesian Rupiah, the Philippine Peso and Thai Baht shows the opposite result, which is that there is a frequent increase in the return compared to its fall. In addition, the clustering value above 3 for all ASEAN-5 countries as well as Bitcoin shows that the return data is very clustered around the mean, resulting in thick tails and excess peaks which indicate that the returns are not normally distributed. This is confirmed by the Jarque-Bera, p-value which is less than the 1% significance level.

4.2 Price trend analysis

The price trend for each variable in this study is plotted to see the up and down pattern of the variable throughout the study period.

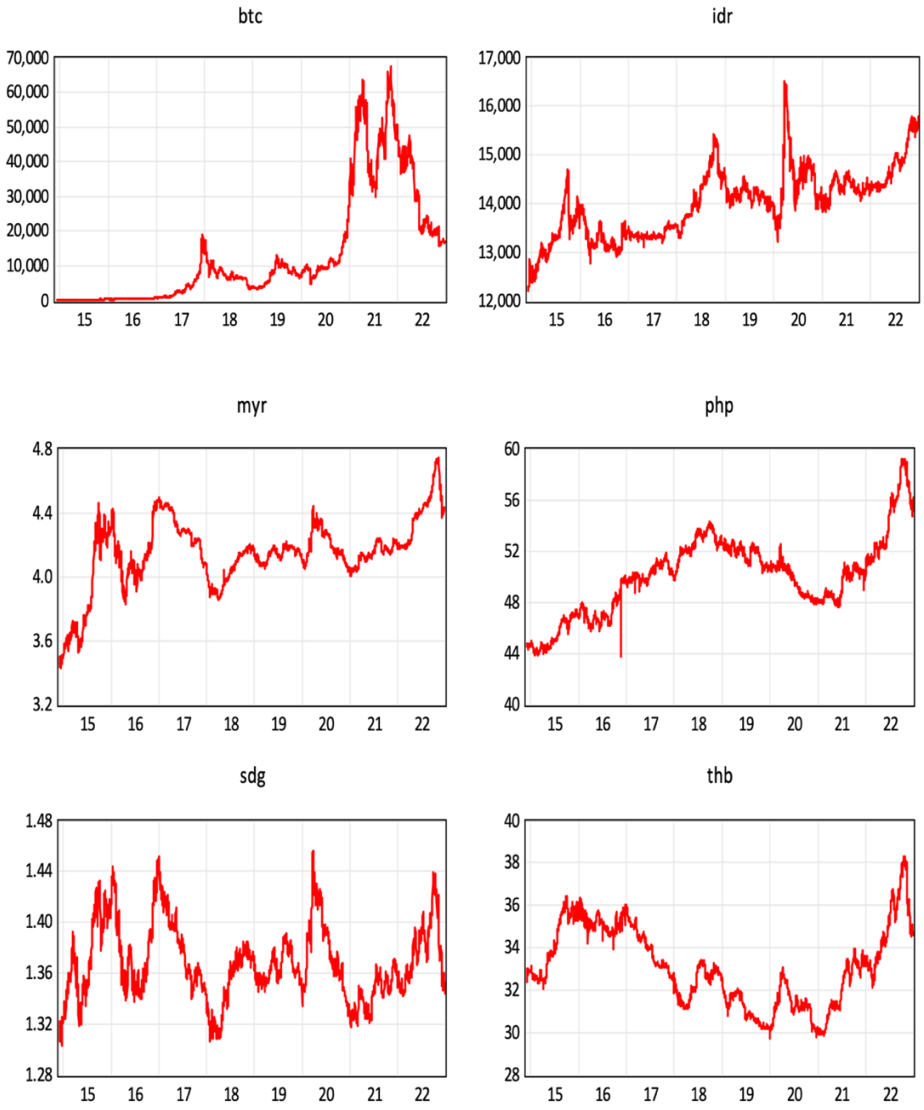

Figure 1: Bitcoin price market and ASEAN-5 currency value

Figure 1 shows that the overall Bitcoin price and all ASEAN-5 currency values except Singapore Dollar show an increasing trend from time to time while Singapore Dollar shows a stable up and down trend. The stability of Singapore Dollar due to their monetary policy framework that using exchange rate as their monetary policy tools. The Monetary Authority of Singapore (MAS) carefully manages the SGD's nominal effective exchange rate (NEER) within a policy band, allowing it to fluctuate in response to economic conditions while ensuring it remains relatively stable (Tee, 2013). Even so, for the increase in this trend shows that the strength of the value of the currency for the countries of Malaysia, Thailand, Indonesia and the Philippines experienced a fall in value. This fall in depreciation is seen significantly when the COVID-19 crisis from 2020 to 2021 where the sluggish economic sector is driven by less export and import activity. Therefore, the value of the currency is traded weakly.

4.3 Analysis of return plots

The return value for each variable is plotted to see the fluctuating behaviour of returns throughout the study period. Figure 2 shows the return value of Bitcoin and ASEAN-5 currencies.

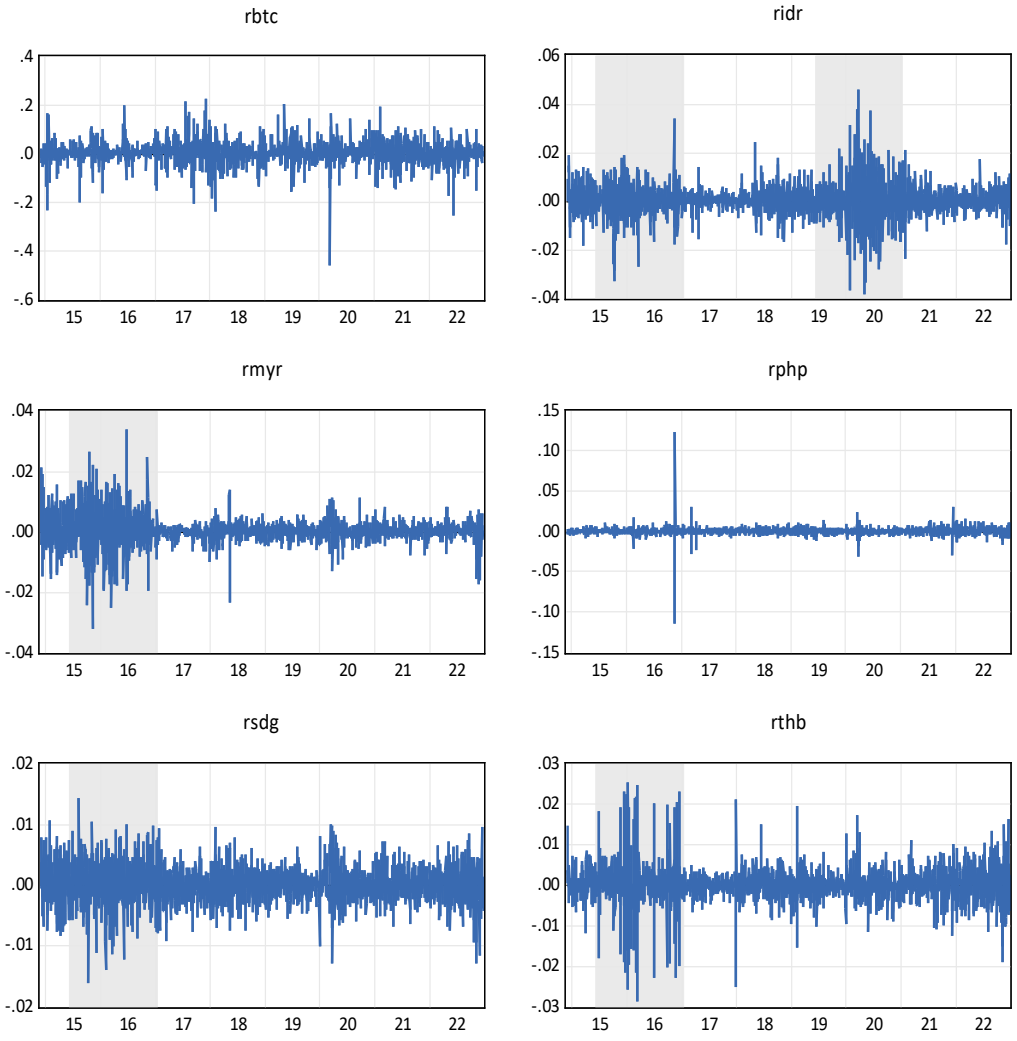

Figure 2: Return value of Bitcoin and ASEAN-5 currencies

Figure 2 shows the return plot for the countries of Singapore, Malaysia, Indonesia and Thailand shows a very significant fluctuating activity during the years 2015 to 2016. According to the 2015 annual report of Bank Negara Malaysia states that the global financial market experienced high volatility and volatility throughout most of in 2015 due to a combination of factors. This was driven by interest rate changes in the United States (US) which strengthened the value of USD points and the slow global growth momentum and government debt in the Euro area. Furthermore, the continued decline in crude oil and global commodity prices also affected sentiment in global financial markets, especially in commodity exporting economies. In fact, the volatility is exacerbated by the taking of speculative positions that lead to uncertain capital flows. In addition, the fluctuation movement of return value for Indonesia is seen to be very extreme in 2019 and 2020 when this return value is greatly affected by the impact of uncertainty regarding the Indonesian presidential election. However, in the second half of 2019, the rupiah strengthened when the Federal Reserve lowered interest rates and the Indonesian government implemented measures to stabilize the currency, such as raising interest rates, increasing foreign exchange reserves and implementing fiscal policies.

4.4 Unit Root Test

Before applying GARCH analysis to examine the relationship between the Bitcoin market and ASEAN-5 currency values, the stationarity level of a time series should be taken into account. This is to avoid specification problems, especially the presence of non-stationary variables in the mean equation. Table 2 shows the unit root test on returns of Bitcoin and ASEAN-5 currencies. Two types of unit root test, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) will be used to identify the degree of integration for each series. Both of these tests have the same null hypothesis that the series contains a unit root

Table 2: Unit root test results

	Unit root test	
	PP	**ADF**
Series	**I+T**	**I+T**
BTC	-46.1569***	-46.1026***
IDR	-59.0251***	-38.6572***
MYR	-46.9018***	-46.8547***
PHP	-71.2534***	-44.1221***
SDG	-46.2312***	-46.2247***
THB	-53.6019***	-19.0097***

Notes: ***, ** and * represent significance at the 1% 5% and 10% levels, respectively. I refer to intercept and T refers to trend.

Based on table 2, the results of the unit root test on the return series using the both PP and ADF test show that all return series were found to be stationary when the null hypothesis was successfully rejected at the 1% significance level.

4.5 Hedging

A Generalized Autoregressive Conditional Heteroskedasticity (GARCH) analysis was used to examine whether Bitcoin is a hedge against the value of the ASEAN-5 currencies. Starting with the mean equation, the constants which represented by μ demonstrated a positive significant relationship at 10% significant level across all these currencies. This shows a positive average return for Bitcoin during the period 2014 until 2022 which is similar as reported in Table 1. Moreover, lagged return which denoted as ϕ, shows a significant coefficient across all currencies implying that a return on the previous day would likely have an information on the subsequent day for Bitcoin. Following Efficient Market Hypothesis (EMH), Bitcoin is consider not efficient since the weak form of the EMH states that current market prices are depicted by the available information at the present time only (Elton et al., 2014)

Table 3: GARCH estimation of Bitcoin returns and ASEAN-5 currencies

Coefficient	RBTC (i=1)	RBTC (i=2)	RBTC (i=3)	RBTC (i=4)	RBTC (i=5)
			Mean equation		
μ	0.0017*	0.0017*	0.0017*	0.0017*	0.0017*
∅	0.0450*	0.0425*	0.0452*	0.0475*	-0.0441*
d_btc	-0.4841***	-0.4832***	-0.4840***	-0.4838***	-0.4843***
Currency(i)	0.1312	0.2396	0.0898	0.5187**	0.0351
			Variance equation		
ω	0.0001***	0.0001***	0.0001***	0.0001***	0.0001***
α	0.1038***	0.1045***	0.1038***	0.1046***	0.1041***
β	0.8454***	0.8446***	0.8457***	0.8453***	0.8452***
$\alpha + \beta$	0.9492	0.9491	0.9495	0.9499	0.9493
			Diagnostic Tests		
Q(5)	0.410	0.368	0.418	0.391	0.417
Q^2(5)	0.975	0.974	0.974	0.973	0.974

Notes: ***, ** and * represent significance at the 1% 5% and 10% levels, respectively Q represent Ljung-Box Q test for autocorrelation while Q^2 represent Ljung-Box Q^2 test for heteroscedasticity. i equal to 1 for Indonesia, 2 (Malaysia), 3 (The Philippines), 4 (Singapore) and 5 (Thailand)

Besides, Bitcoin dummy which denoted as d_btc shows a consistently negative coefficient for all the equation. The coefficient is similar from what has been reported in Table 1 which show Bitcoin recorded a big drop to almost halve of its value in March 12, 2020 because of the worldwide fear caused by the COVID-19 pandemic. Come to the main finding of this paper, there is a positive relationship between currency and bitcoin across all ASEAN-5 currency. This means that a fall or depreciation in currency is associated with higher bitcoin returns suggesting hedging behavior. However, among the ASEAN-5 currencies only the Singapore Dollar has a significant impact. Thus, bitcoin might act as a weak hedge for the ASEAN-5 currencies except for Singapore where bitcoin can serve as a strong hedge. The unique

finding for Singapore Dollar may attribute to their monetary policy framework whereby the exchange rate is the main mechanism. The stability of Singapore Dollar might not offer the same potential for rapid appreciation like any other currencies. For those looking for potential high returns (albeit at higher risk), Bitcoin can act as a counterbalance to the stable SGD.

Moving to variance equation, the ω which refer to constant term in the conditional variance equation shows that the conditional variance is depending on its long-run variance. Significant of the ARCH term (α) and GARCH term (β) across all model indicates the conditional variance depends on past news about volatility and past volatility at one period before. Besides, the sign of α and β should be positive where it is defined in the empirical results. Furthermore, the summation of ARCH term and GARCH term (α + β) measure the persistency of the volatility either it is an explosive process or mean reverting process. For GARCH (1,1), the summation of both term is nearly one indicating the volatility of the Bitcoin are quite persistent. Lastly, our diagnostic tests, shows non-rejecting of homoscedastic variance and no autocorrelation at 10% significant level indicating the model is adequate.

Overall, empirical results show that Bitcoin act as a weak hedge against Indonesia Rupiah (IDR), Malaysia Ringgit (MYR), Philippine Peso (PHP) and Thailand Baht (THB) while Bitcoin is strong hedge against the Singapore Dollar (SDG). Therefore, this study is in line with Urquhart and Zhang (2019) showing that Bitcoin acts as a daily hedge only for certain currencies and is different for each country. This is because fluctuations in the value of each country's currency are affected by different economic factors and each country has its own monetary policy to evaluate the currency. In addition, the findings of this study are also supported by the study by Guesmi et al. (2017) when saying that Bitcoin is able to offer hedging benefits to investors.

5.0 CONCLUSIONS AND POLICY IMPLICATIONS

This study examines the hedging properties of Bitcoin towards the currencies of ASEAN-5 region namely Indonesian Rupiah (IDR), Malaysian Ringgit (MYR), Philippines Peso (PHP), Singapore Dollar (SDG) and Thailand Bath (THB) during a period from December 1, 2014 until December 30, 2022. Empirical evidence from the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model reveals that Bitcoin acts as a strong hedge against the Singapore Dollar (SDG) but serve as a weak hedge against the currencies of Indonesia, Malaysia, the Philippines and Thailand.

The results of this study are expected to be important for traders and investors for the ASEAN-5 countries that are experiencing the problem of continuous currency depreciation as well as for policy makers to enact better policies for the future. Residents of countries with high currency devaluations can use alternative currencies such as Bitcoin to provide continued access to capital and business while maintaining a trading position in international markets. This can avoid losses due to the fall in the value of the currency and impact on economic activity. However, Bitcoin assets are still new in the world of financial markets and have very high volatility. This is where the direction of Bitcoin's movement is still unclear to consider Bitcoin as a sustainable investment. Furthermore, there is still a lack of research and a lack of evidence on the relationship between the financial market value of ASEAN-5 currencies and Bitcoin.

Finally, for the improvement of the study that Bitcoin assets have a relationship with other financial assets. Therefore, future research should study more deeply by using other models and improve the understanding in modelling the correlation between Bitcoin and other financial assets.

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