

Bitcoin's Role as a Diversification Instrument for ASEAN Investors During COVID-19 Pandemic

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Abstract: Research Question: Should ASEAN-based conventional and Islamic equity investors invest in Bitcoin to gain portfolio diversification benefits during the Covid-19 pandemic? **Motivation:** Prior research on the diversification benefits of Bitcoin during the recent pandemic is not conclusive especially from the ASEAN perspective. Convergence of volatility among all stock index returns during the pandemic period may limit investor's portfolio diversification options due to higher financial integration of international markets. Thus, we propose the possible use of Bitcoin as a diversification tool. With ASEAN region playing a significant role in the world economy, our findings would help many investors understand the implications of including Bitcoin in their portfolios during troubled times. **Idea:** We examine the conditional volatilities and correlations of Bitcoin returns with conventional and Islamic stock indices during the Covid-19 pandemic era. Our observation period starts from day one after Covid-19 is declared a pandemic until June 2022. **Data:** We use daily prices of Bitcoin and index returns of six largest stock markets in the ASEAN region from March 13, 2020, to June 30, 2022. We have data for over 600 trading days. We retrieve all data from Thomson-Reuters DataStream and Yahoo Finance. **Method/Tools:** We use the multivariate GARCH DCC to examine time-varying volatilities and correlations amongst stock indices with Bitcoin. The stages involved include estimating univariate volatility parameters in the first stage and subsequently time varying correlation matrix are estimated in the second stage. **Findings:** Conditional volatilities are at high levels across all indices when Covid-19 was declared a pandemic and correlations with Bitcoin remains below 0.2. Bitcoin being the most volatile compared to the rest of the indices in the study period, exhibited low correlations with the returns of ASEAN stocks thus revealing potential portfolio diversification benefits. Our findings complement some prior research and contrast with others and bring some new insights on the diversification properties of Bitcoin. **Contributions:** We provide new evidence that Bitcoin provide diversification benefits to ASEAN-based investors especially Vietnamese-based conventional and Islamic equity investors during Covid-19 pandemic. Overall, Islamic indices

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despite recording higher volatilities, exhibit lower correlation with Bitcoin than conventional indices.

Keywords: ASEAN, pandemic, Bitcoin, Islamic index, diversification.

JEL Classification: G11, F3, G01

1. Introduction

In this paper, we determine the benefits of portfolio diversification by examining the correlation of returns between ASEAN stock market, Islamic equity, and Bitcoin for ASEAN-based investors during, and post-COVID-19 pandemic. Previous study revealed the potential of cryptocurrencies in providing diversification benefits pre- and during Covid-19 pandemic (Goodell and Goutte, 2021). Using similar beliefs, this study attempts to examine the portfolio diversification benefits in considering Bitcoin as a hedging tool for ASEAN stock market investors. Several other studies found that despite the increase in volatility of cryptocurrencies during the COVID-19 period, it still is a recommend hedging instrument for investors to reduce investment risk (Choi and Shin, 2022; Grobys, 2021; Chen *et al.*, 2020; Conlon and McGee, 2020; Huang *et al.*, 2021; Ozdemir and Ozdemir, 2021; Widarto *et al.*, 2022). Thus, leading to the consideration of Bitcoin to study if it presents similar portfolio diversification benefits for ASEAN-based investors during the COVID-19 pandemic.

This study also attempts to examine the portfolio diversification for ASEAN Islamic equity investors by hedging using Bitcoin. Existing literatures revealed that Islamic equity markets remain strong and can withstand, if not, resistant to crisis that should adversely affect the conventional stock markets such as global financial crisis in 2008, and the COVID-19 pandemic (Arif *et al.*, 2022; Ashraf *et al.*, 2022; Nomran and Haron., 2021; Masih *et al.*, 2018; Mirza *et al.*, 2022; Salisu and Shaik, 2022). The downside of being Shari'ah compliant, investors would have a smaller pool of assets. Shari'ah compliant indices would have to adhere to Islamic principles and thus, would filter out highly leveraged firms and financial institutions, while including smaller firms within concentrated sectors which have low level of debt financing. Generally speaking, Islamic equity investors would be exposed to higher volatility due to the less diversified portfolio and limited sectors (Abbes and Trichilli, 2015). In addition to understanding Bitcoin's diversification capabilities in ASEAN region, this paper seeks to provide a more comprehensive coverage by including and comparing Islamic and conventional ASEAN equity indices. The results can eventually be useful for ASEAN-based Islamic investors and conventional investors alike should they consider investing in Bitcoin as a form of diversification during global crisis such as the COVID-19 period.

Using the most recent datasets available, the empirical analysis will analyse major stock markets in the ASEAN region and Bitcoin. The study's findings have implications for portfolio diversification strategies, particularly for ASEAN-based investors seeking to minimise risk through Bitcoin. Using a time-varying volatility model suitable for the variables of interest (see Rudolf *et al.*, 2021), we find evidence in support of the hedging potential of Bitcoin for the ASEAN-based conventional and Islamic investors during the COVID-19 pandemic period. The results supporting this conclusion complements the growing importance of the ASEAN economy, cryptocurrencies and Islamic financial markets as an extension to the conventional market. The findings in this study contributes to the existing knowledge gap in portfolio diversification benefits of Bitcoin for ASEAN-based investors during the global crisis. The second contribution relates to the assessment of the hedging potential of Bitcoin (the largest cryptocurrency by market capitalisation) to

ASEAN-based Islamic equity investors during the COVID-19 pandemic era. Following our study, hedging potential during COVID-19 can be tested in other markets or includes a different cryptocurrency. The rest of the paper will further discuss on Section II: data and methodology, Section III: main findings, and Section IV: conclusion.

2. Literature Review

Modern portfolio theory, advocated by Markowitz, emphasizes that in diversified portfolios, the impact of a specific security on portfolio risk is determined by its covariance with other securities' returns rather than its individual variance (Bodie *et al.*, 2021). This underscores the significance of correlations among asset returns. Assuming the validity of the Capital Asset Pricing Model (CAPM) in investment markets, returns solely represent systematic risk, assuming investors maintain full diversification in their portfolios. With the introduction of Bitcoin, the largest cryptocurrency by market capitalisation, the non-inclusion of it would make a portfolio's return to be sub-optimal. Furthermore, Shari'ah compliant portfolios would have filtered out 'sin stocks' which makes the risk-return performances of portfolios even less desirable from the perspective of conventional investors.

There has been several studies that investigated diversification potential of Bitcoin and cryptocurrencies which concluded with mixed results. In some cases, cryptocurrencies were not useful in diversification strategies (Allen, 2022; Al-Nassar *et al.*, 2023) While in other cases, some researchers found positivity in Bitcoin as a useful diversifier (Chkili *et al.*, 2021; Tarchella *et al.*, 2024). Subsequently, growing interest in Islamic equities sparked studies that compared its performances against conventional equities such as by Kamil *et al.* (2012). Most recently, the focus has been towards the pandemic period whereby equity returns suffered due to economic standstill, yet Bitcoin prices surged to a new record high. While investors flock to find a safe haven, gold prices rose as well, prompting researchers to find if Bitcoin is an alternative safe haven to gold. Despite extensive research in this area, there remains a notable absence of empirical studies that explore the diversification potential of Bitcoin within the context of ASEAN equity markets, particularly in comparison between Islamic and conventional portfolios during the recent pandemic. This represents a gap in the existing literature, prompting the need for our current investigation.

To meet the objectives discussed above, we utilised dynamic conditional correlations as our chosen econometric method. While this technique has been applied across various fields, including political science, oil markets, futures markets, Islamic equities, and cryptocurrencies, there is a notable absence of its application within the specific geographical markets and time frame identified in our study. Consequently, our research presents novelty in two main aspects: firstly, by empirically examining the diversification potential of Bitcoin within ASEAN equity markets, and secondly, by discerning potential disparities in Bitcoin's diversification efficacy between Islamic and conventional portfolios within the ASEAN context.

3. Data and Methodology

Our data uses daily time series closing prices from March 13, 2020, to June 30, 2022, which we collect from Thomson-Reuters DataStream and Yahoo Finance. As the proxies for conventional and Islamic stock returns, we used the MSCI index and MSCI Islamic index returns dataset consists of the closing daily prices of six largest stock markets in the ASEAN region (Philippines, Vietnam, Thailand, Malaysia, Indonesia, Singapore) and Bitcoin. Majdoub and Mansour (2014) noted that the MSCI index has a stringent guideline for stocks to be included. The list of countries and its symbol is shown in Table 1.

Table 1: List of variables

| International indices | Symbol |
|-----------------------------------|--------|
| <i>Base index</i> | |
| Bitcoin | BTC |
| <i>Conventional stock indices</i> | |
| MSCI Philippines | PHP |
| MSCI Vietnam | VNM |
| MSCI Malaysia | MAS |
| MSCI Thailand | THD |
| MSCI Singapore | SGP |
| MSCI Indonesia | IDN |
| <i>Islamic stock indices</i> | |
| MSCI Philippines Islamic | PHLI |
| MSCI Vietnam Islamic | VNI |
| MSCI Malaysia Islamic | MAI |
| MSCI Thailand Islamic | THI |
| MSCI Singapore Islamic | SGI |
| MSCI Indonesia Islamic | IDI |

The study implements the multivariate GARCH DCC (MGARCH-DCC) proposed by Pesaran and Pesaran (2007) to study the time-varying volatilities and correlations amongst stock indices with Bitcoin. This method allows observation and analysis on the precise timings of shift in conditional correlations and volatilities replacing the traditional approach of using historical covariance mix. In first stage, univariate volatility parameters are estimated by using GARCH model. In stage two, the standardized residuals from first stage are used as inputs for estimating a time varying correlation matrix. The following equation is used this test:

$$V(r_{it}|\Omega_{t-1}) = \sigma_{i,t-1}^2 = \bar{\sigma}_i^2(1 - \lambda_{1i} - \lambda_{2i}) + \lambda_{1i}\sigma_{i,t-2}^2 + \lambda_{2i}r_{i,t-1}^2 \quad (1)$$

where $\bar{\sigma}_i^2$ is the unconditional variance of the i th asset return. $\lambda_{1i} + \lambda_{2i}$ are asset specific volatility parameters (individual asset return volatilities). We proceed to test whether the computed volatility is mean-reverting by estimating $(1 - \lambda_{1i} - \lambda_{2i})$. Some diagnostic tests were conducted to substantiate the validity of our models. A more comprehensive explanation on this model can in found in Pesaran and Pesaran (2007).

The DCC modelling allow identification of changes (when and how it occurs) in the interdependence between variables of a time series. Therefore, it allows identification of possible diversification benefits provided by Bitcoin in a dynamic environment such as during a global pandemic. MGARCH DCC model is known to be reliable estimators of portfolio estimators and have been used by Fantazzini (2009), Chevallier (2012) and Aas and Berg (2013) in investigating Value at Risk, time-varying correlations and multivariate dependence structures.

4. Main Findings

4.1 Should ASEAN-Based Conventional Equity Investors Invest in Bitcoin to Gain Portfolio Diversification Benefits?

In our first test, we examine potential diversification opportunities through Bitcoin alongside conventional stock indices from Philippines, Vietnam, Thailand, Malaysia, Indonesia and Singapore.

The Maximized Log-Likelihood value obtained by the t-DCC model (12,211.3) on conventional index returns is higher than that obtained by the Gaussian model (12,036.7). Besides, the estimated degree of freedom for the t-normal distribution is 5.2181, which is below 30. Therefore, this result implies that the fat-tailed nature of conventional index returns, and Bitcoin tends to be best captured by the t-distribution model. As t-DCC model is the most suitable model for the study of ASEAN conventional equity indices and Bitcoin, the following discussion is based on Table 2.

Table 2: Results of multivariate GARCH with underlying t-Distribution on the conventional index return series

| Parameter | Estimate | Standard Error | T-Ratio [Prob] |
|------------------------------------|----------|----------------|----------------|
| lambda1_PHP | 0.8474 | 0.0490 | 17.2902[.000] |
| lambda1_VNM | 0.5334 | 0.1347 | 3.9618[.000] |
| lambda1_MAS | 0.8335 | 0.0626 | 13.3245[.000] |
| lambda1_THD | 0.8738 | 0.0353 | 24.7483[.000] |
| lambda1_SGP | 0.8647 | 0.0348 | 24.8747[.000] |
| lambda1_IDN | 0.8346 | 0.0640 | 13.0442[.000] |
| lambda1_BTC | 0.9424 | 0.0153 | 61.4310[.000] |
| lambda2_PHP | 0.1160 | 0.0343 | 3.3821[.001] |
| lambda2_VNM | 0.2850 | 0.0701 | 4.0662[.000] |
| lambda2_MAS | 0.1217 | 0.0410 | 2.9708[.003] |
| lambda2_THD | 0.1071 | 0.0283 | 3.7886[.000] |
| lambda2_SGP | 0.1040 | 0.0250 | 4.1654[.000] |
| lambda2_IDN | 0.1402 | 0.0511 | 2.7426[.006] |
| lambda2_BTC | 0.0484 | 0.0112 | 4.3088[.000] |
| delta1 | 0.9892 | 0.0020 | 482.6907[.000] |
| delta2 | 0.0091 | 0.0015 | 5.9107[.000] |
| df | 5.2181 | 0.4255 | 12.2643[.000] |
| Maximized Log-Likelihood = 12211.3 | | | |

Notes: df is the degrees of freedom of the multivariate *t* distribution.

The volatility parameters observed under t-DCC model are highly significant, with the estimates of λ_{1i} , $i=1, 2, 3, 4, 5, 6, 7$ being close to one, implying a slow volatility decay. Furthermore, the sum of lambda1 and lambda2 for all conventional stock indices and Bitcoin (e.g. lambda1_PHP + lambda2_PHP = 0.9634) is equal to or less than 1. This indicates that after a shock in the market, the riskiness associated with the returns may slowly cancel out. Which means, the shock to the returns volatilities is only temporary.

Table 3: Unconditional volatilities of conventional indices alongside Bitcoin and unconditional correlations between conventional indices and Bitcoin

| Conventional index and Bitcoin | Unconditional volatility | Unconditional correlation |
|--------------------------------|--------------------------|---------------------------|
| Philippines (PHP) | 0.0171 | 0.0660 |
| Vietnam (VNM) | 0.0141 | 0.0472 |
| Malaysia (MAS) | 0.0104 | 0.0657 |
| Thailand (THD) | 0.0150 | 0.1770 |
| Singapore (SGP) | 0.0133 | 0.1982 |
| Indonesia (IDN) | 0.0185 | 0.0709 |
| Bitcoin (BTC) | 0.0487 | - |

The unconditional volatilities of Bitcoin and conventional index returns are shown in Table 3. A figure closer to zero under this column would mean the index is less volatile and closer to one implies higher volatility.

It is observed that conventional stock indices have much lower unconditional volatilities (ranging from 0.0104 to 0.0185) compared to Bitcoin (0.0487) throughout the Covid-19 outbreak. It is noteworthy to say that Bitcoin is characteristically different from equity index and is relatively more volatile.

The second row of Table 3 reveals the unconditional correlation between Bitcoin and conventional index returns of the top 6 ASEAN countries. It is noted that the unconditional correlations of Bitcoin with those equity markets are between +0.0472 and +0.1982. The high correlation between Bitcoin and Singapore index returns (+0.1982) is still comparably lower than correlations between equities (see Kılıç *et al.*, 2022). Prior studies have shown evidence of low correlations between Bitcoin and equity markets (see Pavković *et al.*, 2019). The lowest unconditional correlation is between Vietnam (VNM) and Bitcoin, at +0.0472, suggesting that conventional investors of Vietnam would achieve greater diversification benefits if they invested in Bitcoin during the Covid-19 outbreak period.

The dynamic conditional volatilities for each conventional stock index and Bitcoin return are shown in Figure 1. According to our findings, the conditional volatilities of the stock indices follow nearly the same path except for Bitcoin. The lowest conditional volatility is witnessed on the MSCI Malaysia stock index returns, whereas the highest volatilities are recorded by Bitcoin. Both findings are in compliance with the prior findings on unconditional volatilities in Table 3. Within the time interval of the study, the conditional volatilities started at its highest-level around mid-March 2020 when the Covid-19 was declared a pandemic by the World Health Organisation (WHO). Not surprisingly, the announcement caused the volatility to remain higher than the rest of the period of study. In studies such as by Kılıç *et al.* (2022) which shows convergence of volatility among all conventional stock index returns during the pandemic period which may limit investor's portfolio diversification options due to higher financial integration of international markets. Bitcoin recorded higher volatilities than the rest of the indices at most times due to many factors includes its uncertain legal status as a medium of exchange in different parts of the world and on-going government sanctions.

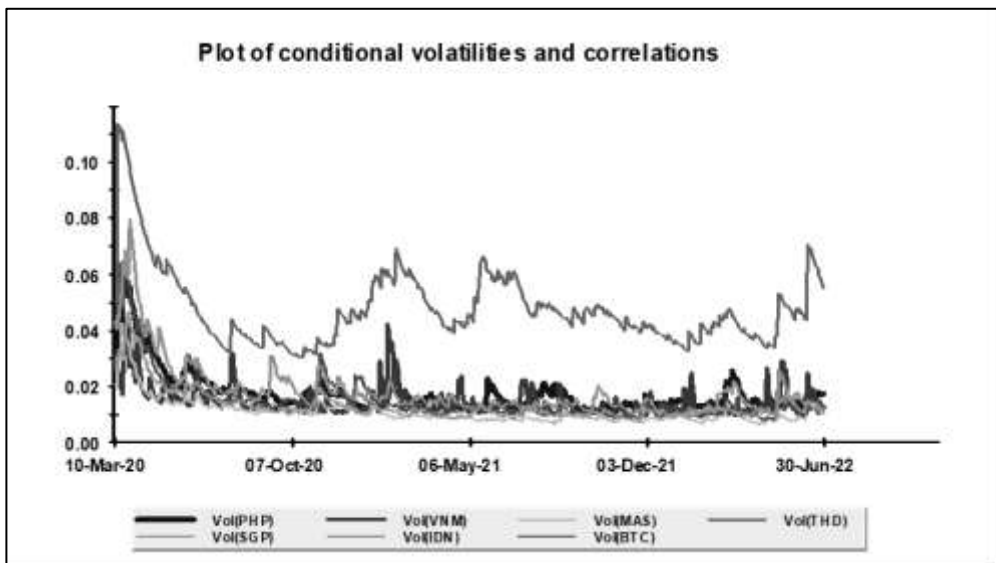


Figure 1: Conditional volatilities of conventional indices and Bitcoin

Finally, we plot the conditional correlations of Bitcoin returns with ASEAN top 6 conventional stock index returns in Figure 2. It is observed that the return correlations of Bitcoin with conventional stock indices are below +0.2 most of the time, with the exception for Singapore that went above +0.2 in early 2021 briefly and from the start of 2022. The Figure 2 confirms the results in Table 3 that Bitcoin's highest correlation is with Singapore conventional market returns and its average correlation was below +0.2 with all the conventional stock markets. Thus, Bitcoin investors would best exclude Singapore conventional stocks should they wish to optimize their diversification benefits in the ASEAN region while Singaporean-based investors may still benefit from the low correlation of Bitcoin, as international equity markets are known to move closely together especially during uncertain times. Generally, ASEAN-based conventional equity investors could include Bitcoin in their portfolio to enjoy its diversification benefits during the Covid-19 with Vietnam investors benefiting the most.

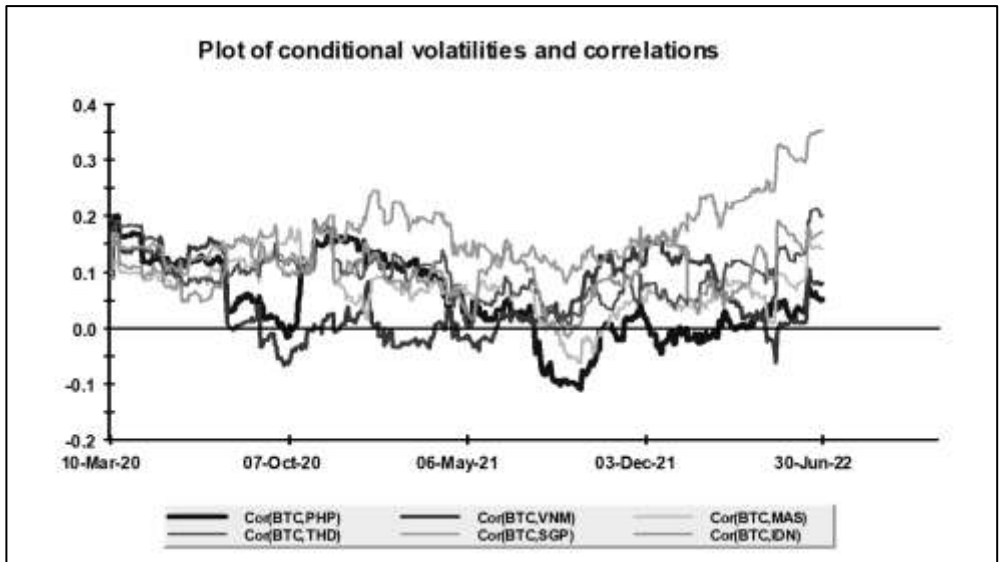


Figure 2: Conditional correlations of conventional indices and Bitcoin

4.2 Should ASEAN-Based Islamic Equity Investors Invest in Bitcoin to Gain Portfolio Diversification Benefits?

In our first test, we examine potential diversification opportunities through Bitcoin alongside Islamic stock indices from Philippines, Vietnam, Thailand, Malaysia, Indonesia and Singapore.

The Maximized Log-Likelihood value obtained by the t-DCC model (11,557.8) on Islamic index returns is higher than that obtained by the Gaussian model (11,364.7). Besides, the estimated degree of freedom for the t-normal distribution is 5.2319, which is below 30. Therefore, this result implies that the fat-tailed nature of conventional index returns, and Bitcoin tends to be best captured by the t-distribution model. As t-DCC model is the most suitable model for the study of Islamic indices and Bitcoin, the following discussion is based on Table 4.

The volatility parameters observed under t-DCC model are highly significant, with the estimates of λ_i , i_1 , 2, 3, 4, 5, 6, 7 being close to one, implying a slow volatility decay.

Furthermore, the sum of λ_1 and λ_2 for all conventional stock indices and Bitcoin (e.g. $\lambda_{1_PHLI} + \lambda_{2_PHLI} = 0.9672$) is equal to or less than 1. This indicates that after a shock in the market, the riskiness associated with the returns may slowly cancel out. Which also means, the shock to the returns volatilities is only temporary.

Table 4: Results of multivariate GARCH with underlying t-Distribution on the Islamic index return series

| Parameter | Estimate | Standard Error | T-Ratio [Prob] |
|---------------------|----------|----------------|----------------|
| λ_{1_PHLI} | 0.8526 | 0.0452 | 18.8787[.000] |
| λ_{1_VNI} | 0.5902 | 0.1065 | 5.5410[.000] |
| λ_{1_MAI} | 0.9301 | 0.0374 | 24.8451[.000] |
| λ_{1_THI} | 0.8844 | 0.0404 | 21.8864[.000] |
| λ_{1_SGI} | 0.8880 | 0.0539 | 16.4898[.000] |
| λ_{1_IDI} | 0.8805 | 0.0410 | 21.4687[.000] |
| λ_{1_BTC} | 0.9457 | 0.0152 | 62.1547[.000] |
| λ_{2_PHLI} | 0.1146 | 0.0324 | 3.5426[.000] |
| λ_{2_VNI} | 0.2657 | 0.0585 | 4.5431[.000] |
| λ_{2_MAI} | 0.0588 | 0.0285 | 2.0664[.039] |
| λ_{2_THI} | 0.1019 | 0.0337 | 3.0217[.003] |
| λ_{2_SGI} | 0.0779 | 0.0318 | 2.4521[.014] |
| λ_{2_IDI} | 0.1042 | 0.0331 | 3.1443[.002] |
| λ_{2_BTC} | 0.0470 | 0.0115 | 4.0992[.000] |
| δ_1 | 0.9926 | 0.0019 | 525.9040[.000] |
| δ_2 | 0.0070 | 0.0016 | 4.4544[.000] |
| df | 5.2319 | 0.3969 | 13.1823[.000] |

Maximized Log-Likelihood = 11557.8

Notes: df is the degrees of freedom of the multivariate t distribution.

The unconditional volatilities of Bitcoin and Islamic index returns are shown in Table 5. A figure closer to zero under this column would mean the index is less volatile and closer to one implies higher volatility.

Table 5: Unconditional volatilities of Islamic indices alongside Bitcoin and unconditional correlations between Islamic indices and Bitcoin

| Islamic index and Bitcoin | Unconditional volatility | Unconditional correlation |
|---------------------------|--------------------------|---------------------------|
| Philippines (PHLI) | 0.0197 | 0.1016 |
| Vietnam (VNI) | 0.0175 | 0.0152 |
| Malaysia (MAI) | 0.0121 | 0.0721 |
| Thailand (THI) | 0.0167 | 0.1448 |
| Singapore (SGI) | 0.0141 | 0.0667 |
| Indonesia (IDI) | 0.0188 | 0.0483 |
| Bitcoin (BTC) | 0.0487 | - |

It is observed that Islamic stock indices although slightly more volatile than conventional stocks, have significantly lower unconditional volatilities (ranging from 0.0121 to 0.0197) compared to Bitcoin (0.0487) throughout the Covid-19 outbreak. It is noteworthy to say that Bitcoin is characteristically different from Islamic equity index and is more volatile too.

The second row of Table 5 reveals the unconditional correlation between Bitcoin and Islamic index returns of the top 6 ASEAN countries. It is noted that the unconditional correlations of Bitcoin with those equity markets are between +0.0152 and +0.1448. The highest correlation between Bitcoin and Thailand Islamic index returns (+0.1448) reveals a

lower correlation than its conventional counterpart. Prior studies have shown evidence of low correlations between Bitcoin and Islamic equity markets (see Lim and Masih, 2017). The lowest unconditional correlation is between Vietnam (VNI) and Bitcoin, at +0.0152, suggesting that Islamic investors of Vietnam would achieve greater diversification benefits than conventional investors if they invest in Bitcoin during the Covid-19 outbreak period.

The dynamic conditional volatilities for each Islamic stock index and Bitcoin return are shown in Figure 3. According to our findings, the conditional volatilities of the Islamic stock indices follow nearly the same path except for Bitcoin. The lowest conditional volatility is witnessed on the MSCI Malaysia Islamic stock index returns, whereas the highest volatilities are recorded by Bitcoin. Both findings are in compliance with the prior findings on unconditional volatilities in Table 5. Within the time interval of the study, the conditional volatilities started at its highest-level around mid-March 2020 when the Covid-19 was declared a pandemic by the World Health Organisation (WHO). The announcement caused the volatility of index returns to remain higher than the rest of the period of study. Like the conventional stocks, convergence of volatility among all Islamic stock index returns during the pandemic period may limit Islamic investor's portfolio diversification options due to higher financial integration of international markets. Bitcoin recorded higher volatilities than the rest of the indices at most times due to several factors includes it's debatable Shari'ah compliance in the Islamic financial market ecosystem.

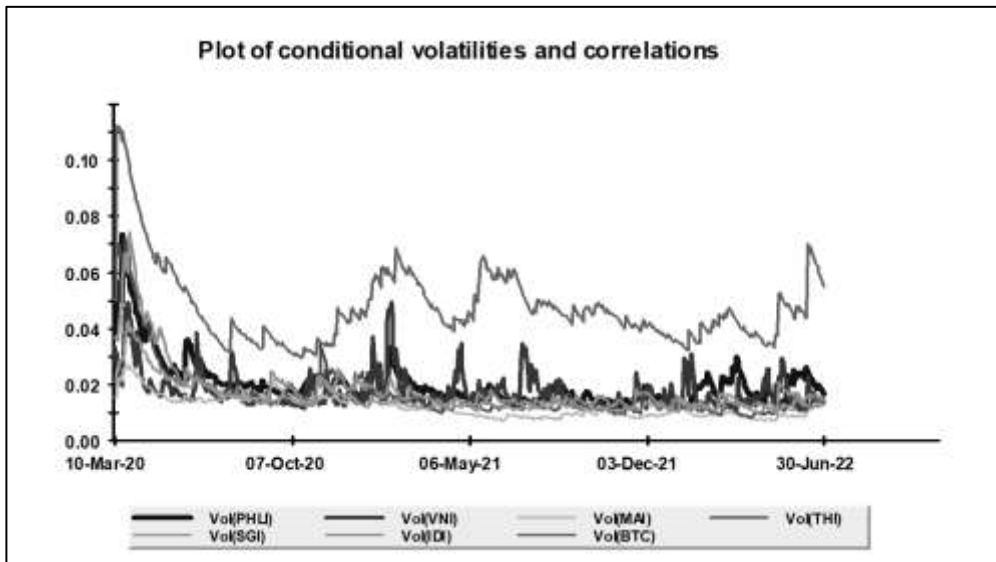


Figure 3: Conditional correlations of conventional indices and Bitcoin

Finally, we plot the conditional correlations of Bitcoin returns with ASEAN top 6 Islamic stock index returns in Figure 4. Unlike conventional stocks, the return correlations of Bitcoin with Islamic stock indices remained below +0.2 during the period of observation. Figure 4 further confirms the results in Table 5 that Bitcoin's highest correlation is with Thailand Islamic market returns even with a correlation below +0.2 alongside other Islamic stock markets. Thus, Islamic investors in the ASEAN region should include Bitcoin in their portfolio to gain diversification benefits during the Covid-19 pandemic period. While Vietnamese-based Islamic investors would benefit the greatest, even Thai-based Islamic investors would benefit despite recording the highest unconditional correlations. As diversification benefits of Bitcoin to ASEAN investors, conventional and Islamic alike,

seems to be much greater than that of the international equity markets (see Kılıç *et al.*, 2022).

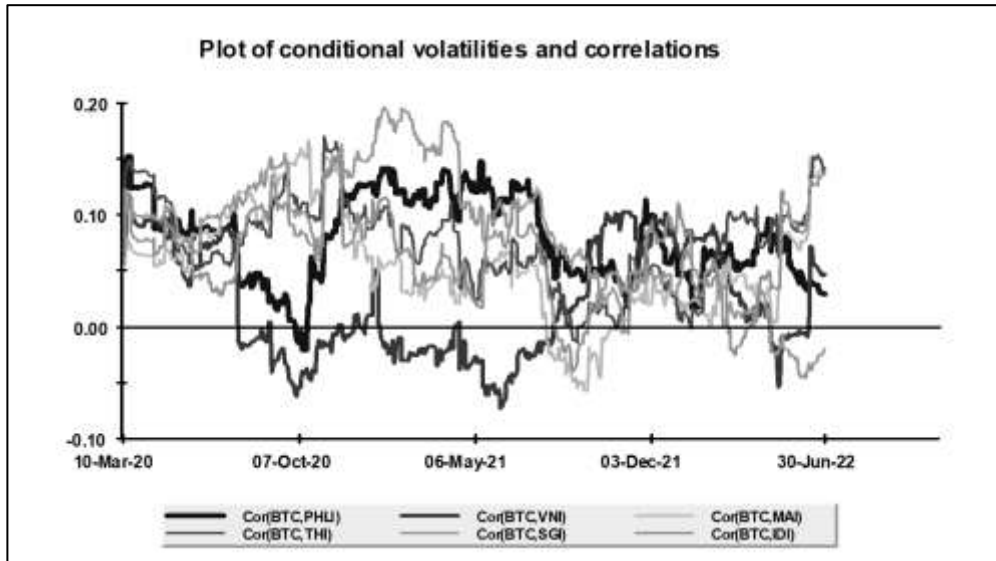


Figure 4: Conditional correlations of Islamic indices and Bitcoin

5. Conclusion

This research aims to help ASEAN-based equity investors identify potential portfolio diversification benefits by examining DCCs between Bitcoin returns and the returns of ASEAN stocks. Due to a significant increase in interest in Bitcoin and alternative cryptocurrencies during the recent pandemic which witnessed a record high followed by a slump, this study is expected to contribute to the existing literature in which researchers focused on the legal and technical perspective of Bitcoin. There has been few research looking into cryptocurrencies as a potential hedge for investors in conventional and Islamic markets, but not has looked into its diversification potentials during the pandemic from the perspective of ASEAN-based investors. The study is undertaken from two perspectives: ASEAN-based conventional equity investors and ASEAN-based Islamic equity investors. The multivariate GARCH-DCC is used to evaluate the time-varying links between Bitcoin and major ASEAN countries' stock index returns during the Covid-19 pandemic era. The analysis discovered that there was significant increase in conditional volatilities of Bitcoin and stock index returns right after WHO declared Covid-19 a pandemic in March 2020. The pandemic induced a high level of convergence among stock market returns, reducing diversification benefits of equity investors across international markets. Islamic indices recorded higher volatility compared to conventional ones, amongst the countries and time period in the scope of this study. This is despite Ho *et al.* (2014) revealing the outperformance of Islamic indices over conventional during crisis periods. Islamic indices however indicated lower correlation compared to conventional indices with Bitcoin. The time-varying conditional volatility parameters of conventional and Islamic stock indices showed that the lowest correlation exists between Vietnam and Bitcoin. This implies that Bitcoin provided more diversification benefits to Vietnam than to Philippines, Malaysia, Singapore, Thailand and Indonesia.

Despite the unexpected crash of cryptocurrency market in 2022 and recording higher volatility than stock indices, Bitcoin has low correlations with the MSCI conventional and Islamic stock indices in this study. Thus, ASEAN-based equity investors and fund managers might benefit to include Bitcoin as a potential diversification tool in addition to international equities and precious metals such as gold. The findings on market shocks caused by pandemic and the ASEAN market's interaction with major cryptocurrencies may provide beneficial insights into creating stabilization strategies to protect against contagion effect in international stock markets. Furthermore, the time-varying co-movements between equity markets and Bitcoin could provide useful information about the characteristics of cryptocurrencies that continues to be a controversial investment asset in this era.

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