

# The Impact of U.S Monetary Policy and Macroeconomics Factors on Asia Emerging Islamic Stock Market During Covid-19

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## ABSTRACT

This study explores the volatility spillover in six Asia emerging Islamic stock markets (China, India, Indonesia, Malaysia, Taiwan, and Thailand) affected by the US monetary policy and macroeconomic factors during the COVID-19 pandemic period. It is found that most Islamic stock markets in Asia are more susceptible to VIX and US 10-month T-bill yield volatility than UCT and monetary policy (US 3-month T-bill rate). However, the Taiwan Islamic stock market provides diversification benefits because it is not affected by monetary policy and global stock market uncertainty. This study also explores a novel Asia Islamic stock market causality relationship. GARCH-BEKK is employed for variance analysis.

**Keywords:** *Islamic stock markets, monetary policy, macroeconomic.*

## 1 INTRODUCTION

Global Islamic fund assets, including the Islamic stock market, have rapidly developed from USD 22.6 billion in 2010 to USD 33.2 billion in 2017. This development is inseparable from the investor's confidence to invest in Islamic stocks, which have proven to be more resilient during the crisis (Rizvi 2015, Majid 2018) due to a low debt ratio compared to conventional stocks. According to Morgan Stanley Capital International (MSCI) screening criteria, Islamic stock market constituents are not allowed to have prohibited activities according to Islamic rules. Those activities involving *riba* (interest), *gharar* (uncertainty), *maysir* (gambling), and having more than 33% debt ratio of total assets. The different constituents between conventional and Islamic stock markets cause the two market indices not necessarily to have the same movements. This

difference then raises a decoupling hypothesis that Islamic stocks can be used as diversification assets in portfolios (Usman et al. 2019).

Asia is known as a region with the most developing countries and is the largest market for Islamic funds in the world. Asia Islamic fund capitalization fills 42.8% of the world's Islamic fund assets and has a Compounded Annual Growth Rate (CAGR) of 6% (Malaysia International Islamic Financial Center 2018). This large proportion results in integration between the Asia Islamic stock market and the world stock market, as reflected by the US Islamic stock market index (Caporale et al. 2019). As a developed country, the US has a strong influence on the world economy, including the Asia Islamic stock market. US monetary policy can be transmitted to the Asia Islamic stock market through exchange rate (Erdogan et al. 2020) and interest rate / Federal Fund Rate (FFR)

channel (Majid 2018). FFR influence can be reflected by the US 3-month T-bill rate (Yang & Hamori 2014). Several studies show that the Islamic stock market volatility increases during a crisis due to various macroeconomic factors, such as the instability of the US 10-year T-bond yield (Shahzad et al. 2020, Haddad et al. 2020), US Uncertainty Index (UCT) (Nazlioglu et al. 2015), and the fluctuation of the Chicago Board Options Exchange Volatility Index (CBOE VIX) (Raza et al. 2019).

Information related to macroeconomic factors' spillover effect is essential to determine appropriate diversification strategies. However, there has not been much literature discussing the effect of US monetary policy and macroeconomic factors in US 10-year T-bond yield, UCT, and CBOE VIX on the Asia Islamic stock market, particularly during the recent crisis (COVID-19 pandemic period). Monetary policy and each macroeconomic factor have a different effect during the crisis and normal times, like the Islamic stock markets causality relationship (Abbes & Trichilli 2015). This study fills the existing gap by exploring the volatility spillover in six Asia emerging Islamic stock markets like China, India, Indonesia, Malaysia, Taiwan, and Thailand, originating from monetary policy and macroeconomic factors. This study also explores a novel Asia Islamic stock market causality relationship during the COVID-19 pandemic period. GARCH-BEKK method (Engle & Kroner 1995) is employed for volatility spillover and causality relationship analysis.

This study reveals that most Islamic stock markets in Asia are more susceptible to VIX and US 10-month T-bill yield volatility than UCT and monetary policy (US 3-month T-bill rate) during the COVID-19 pandemic. In addition, the Taiwan Islamic stock market provides diversification benefits because it is not affected by monetary policy and global stock market uncertainty. Previous studies show some US influence on the Asia Islamic stock market. Erdogan et al. (2020) prove the US Dollar exchange rate volatility toward Turkey's Islamic stock market. US Is-

lamic stock index volatility is known to cause a spillover effect on the ASEAN & Asia-Pacific Islamic stock markets (Sakti 2014, Haddad et al. 2020). A study by Kim and Nguyen (2009) highlights that US monetary policy in the form of FFR adjustment influences ASEAN stock market volatility. FFR is known to influence the US 3-month T-bill rate (Yang & Hamori 2014), reflecting investors' expectation of government's short-term policies, mainly to handle a financial crisis. T-bill rate as a proxy for FFR and short-term monetary policy is also known to have a spillover effect on Indonesia, Singapore, and Thailand stock market in the tranquil period (Yang & Hamori 2014).

During the COVID-19 pandemic, The FED adjusted its FFR to almost zero, just like the policy made during the Global Financial Crisis (GFC) 2008 when stock markets experienced a sharp decline. According to general economic theory, the interest rate has a negative or opposite relationship with stock prices. FFR decline will be followed by a bond yield so that investors prefer to buy a stock over a bond because the stock price is getting a cheap valuation. A massive stock purchased during a crisis will increase stock price volatility and cause a stock market bullish that accelerates economic recovery. Conversely, when the FED decides to raise the FFR, investors will buy bonds because of high yield and sell their equities, resulting in the declining stock market index. Based on this phenomenon, monetary policy in the form of FFR adjustment is essential in crisis to maintain financial market stability, especially the stock market. Nazlioglu et al. (2015) show that FFR adjustment affects Asia's stock market volatility during the GFC period.

Furthermore, several studies reveal that the Islamic stock market volatility increases in times of crisis due to various macroeconomic factors instability. The US 10-year T-bond yield has become a standard proxy for benchmark interest rate and long-term investor expectations in many studies. It was proved to influence world Islamic stock market volatility (using Dow Jones Islamic

Market index as a proxy) (Shahzad et al. 2017) and particularly in Asia-Pacific (Haddad et al. 2020). The US Uncertainty Index (UCT) factor is a daily stock market uncertainty index reflecting macroeconomic conditions and government policies. A recent study by Yarovaya et al. (2021) stipulates that US stock market volatility during the COVID-19 pandemic is inseparable from the UCT volatility. Another macroeconomic factor is the Chicago Board Options Exchange Volatility Index (CBOE VIX), an indicator of market volatility and investors' risk-aversion level. CBOE VIX is known to have a negative correlation and low spillover effect on the Asia-Pacific Islamic stock market (Raza et al. 2019).

Based on the Arbitrage Pricing Theory (APT), information related to macroeconomic factors plays an important role in predicting expected returns and determining asset diversification strategies. In another way, Capital Asset Pricing Model (CAPM) theory also shows the importance of the T-bill rate as one factor to calculate expected return so that the T-bill rate volatility will affect investors' expectations of asset return.

## 2 RESEARCH METHODS

This study used daily time-series data of US 3-month T-bill rate, US 10-year T-bond yield, CBOE VIX, US Uncertainty Index, and MSCI Islamic Index of 6 developing countries in Asia (China, India, Indonesia, Malaysia, Taiwan, Thailand) from 2 December 2019 – 26 February 2021. All data were obtained from the Thomson-Reuters and FRED Economic Data. Following previous studies, all index data were transformed into a natural logarithm (first log difference), VIX and Uncertainty Index data are in logarithmic form, US 10-year T-bond yield and US 3-month T-bill rate are in the form of first difference (difference in values at  $t$  and  $t-1$ ).

Multivariate GARCH (MGARCH) with Baba Engle Kroner Kraft (BEKK) (Engle 1995) was applied to produce a variant-

covariance matrix system with definite positive guarantees (Bauwens et al. 2006). In general, the GARCH model is defined as:

$$\begin{aligned} Y_t &= \alpha + \Gamma Y_{t-1} + \varepsilon_t \\ \varepsilon_t / I_{t-1} &= N(0, H_t) \end{aligned}$$

where  $Y$  is the vector of the daily return at time  $t$ ,  $\alpha$  represents the constant vector,  $\Gamma$  is the lagged return parameter matrix,  $\varepsilon_t$  shows the random error,  $I_{t-1}$  is the series information and  $H_t$  is the variance-covariance matrix. Furthermore, the BEKK model is defined as:

$$H_t = C C + A' \varepsilon_{t-1} \varepsilon'_{t-1} + B' H_{t-1} B$$

where  $C$  is a constant matrix,  $A$  is a matrix that shows past shock and  $B$  is a past volatility matrix on the conditional volatility in market  $i$ . The off-diagonal values in matrices  $A$  and  $B$  indicate the cross-market effect on shock and volatility spillover, respectively. Initial condition and final parameter estimate for the variance-covariance matrix are obtained by applying BFGS (Broyden-Fletcher-Goldfarb-Shanno) algorithm.

## 3 RESULTS AND DISCUSSIONS

This section discusses the US monetary policy and macroeconomic factors spillover effect results on six Asia emerging Islamic stock markets using the BEKK method. Table 1 shows the descriptive statistics for all variables. Compared to all sampled countries, Thailand has the most extensive range of daily return series with a minimum value of -0.01651 and a maximum value of 0.0995. Thailand also has the highest return volatility with a standard deviation of 0.0228, followed by Indonesia and China. This evidence shows that the Islamic stock market in these three countries is vulnerable to volatility due to various influences of issues, government policies and macroeconomic factors. The significance of the Augmented Dickey-Fuller (ADF) test shows that all return series have fulfilled no unit root assumption (stationary data).

Indonesia's Islamic stock market is more susceptible to the influence of domestic monetary policy than foreign monetary policy, one of which is because of the domination of domestic investors (50.44 %) compared to foreign investors (49.56%) (Indonesia Stock Exchange, 2020).

Table 1. Descriptive statistics

	China	India	Indonesia	Malaysia
Mean	0.0008	0.0007	-0.0003	-0.0001
Median	-0.0001	0.0016	-0.0003	0.0000
Maximum	0.0657	0.0923	0.1500	0.0582
Minimum	-0.0853	-0.1206	0.0700	-0.0520
Std. Dev	0.0188	0.0181	0.0209	0.0137
Skewness	-0.3753	-0.8067	1.0584	0.1324
Kurtosis	5.0982	13.9177	12.9534	5.0181
Jarque-Bera	63.5204	1558.024	1324.59	52.9907
Prob	0.0000	0.0000	0.0000	0.0000
ADF t-Stat	-18.6126	-20.3339	-17.4666	-16.5340
Prob	0.0000	0.0000	0.0000	0.0000
Observations	307	307	307	307

Cont.

Taiwan	Thailand	UCT	VIX	US10Y	US3M
0.0018	-0.0001	0.0014	0.0020	-0.0012	0.4007
0.0007	0.0000	-0.0263	-0.0107	0.0000	0.1060
0.0789	0.0995	2.4126	0.4802	0.2680	1.5870
-0.0629	-0.1651	-2.2741	-0.2662	-0.2260	-0.0460
0.0171	0.0228	0.7766	0.0915	0.0559	0.5790
0.3389	-1.5224	0.2524	1.6712	0.1893	1.4559
6.2430	16.6385	3.7286	8.6442	9.1730	3.1918
140.4082	2497.95	10.050	550.41	489.273	108.92
0.0000	0.0000	0.0066	0.0000	0.0000	0.0000
-16.9333	-5.9014	-4.2572	-1.9631	-14.017	-1.9949
0.0000	0.0000	0.0000	0.3032	0.0000	0.2891
307	307	307	307	307	307

Furthermore, the Taiwan Islamic stock market is also not exposed to 3-month T-bill rate volatility. The market consists of constituents engaged in technology and semiconductor manufacturing, which is not influenced by interest rates, unlike other Islamic stock markets with various business sectors. The recent 3-month T-bill rate effect on China, India, Malaysia, and Thailand Islamic stock market during the COVID-19 pandemic is contrary to Yang & Hamori (2014). This study stipulates that the 3-month T-bill rate provides a spillover effect on the VIX

cross-market volatility's significance supports Shahzad et al. (2017), which prove that VIX volatility affects the US Islamic stock market volatility during the GFC 2008 and then causes a spillover effect on the Asia Islamic stock market volatility (Haddad et al. 2020). The strong volatility spillover of the US 10-month T-bill yield on the Asia Islamic stock market also found during the COVID-19 pandemic, supporting a previous study by Haddad et al. (2020) during the GFC 2008. On the other hand, UCT volatility affects all markets except for Taiwan.

Table 2. BEKK Past Volatility Matrix (Matrix B)

		UCT	VIX	US3M	US10Y
China	Coeff	-0.0066	-0.0780	0.1174	0.0770
	Prob	0.0000	0.0000	0.0000	0.0000
India	Coeff	0.0035	0.0365	-0.1083	0.0248
	Prob	0.0000	0.0000	0.0000	0.0001
Indonesia	Coeff	3.0187	-0.0445	-0.0169	0.0720
	Prob	0.0025	0.0000	0.2835	0.0000
Malaysia	Coeff	0.0079	-0.0485	-0.0604	-0.0204
	Prob	0.0000	0.0000	0.0000	0.0100
Taiwan	Coeff	0.0007	0.0133	-0.0134	0.0562
	Prob	0.3724	0.0718	0.3330	0.0000
Thailand	Coeff	0.0069	-0.0441	-0.0995	-0.0478
	Prob	0.0000	0.0000	0.0000	0.0000

Based on this information, it can be concluded that the Islamic stock market in Taiwan does not receive the spillover effect from the US and UCT monetary policy to provide benefits for asset diversification. The results of this study also support previous research conducted by Saiti et al. (2014) in which the Taiwan Islamic stock market has better hedging capabilities than China's.

The causality relationship discussion between six Asia emerging Islamic stock markets is presented in Table 3. In general, almost all Islamic stock markets in Asia have a bidirectional relationship in which volatility spillover occurs to each other. This finding supports the results of Wu (2020), which reveal that Asia has regional stock market integration that continues to develop after the Asia Financial Crisis (1998). A bidirec-

tional relationship between Indonesia and Malaysia can occur because these two countries are among the leading countries in general Islamic finance development (Asian Development Bank 2021), including the stock market. The geographical proximity and trade relations between China-India make the two markets to have a bidirectional relationship and a similar price movement (Uludag & Khurshid 2018). The spillover effect from India on the entire Islamic stock markets proves that the Indian Islamic stock market has high regional integration, complementing the study by G. C. et al. (2020), which shows its global integration.

Furthermore, volatility spillover from China's Islamic stock market to other countries' markets (Indonesia, Malaysia, Thailand) is inseparable from China's close trade relations with ASEAN according to ACFTA (ASEAN-China Free Trade Agreements) implementation in 2010. The unidirectional relationship between China and Taiwan comes from the political turmoil between both countries and the China government intervention to reclaim Taiwan as part of the China Mainland. Then China-Indonesia unidirectional relationship can occur because Indonesia's Islamic stock market has a smaller capitalization than China's Islamic stock market. Shocks that occur in the Indonesia Islamic stock market have no impact on China's Islamic stock market. This result is contrary to the study of Silvia et al. (2019), where Indonesia's Islamic stock market's volatility affects China in the 2011-2017 period. The result also supports a previous study by Abbas & Trichilli (2015), which proves that the Islamic stock market causality relationship could change over time.

Table 3. Cross-market causality relationship

No Spillover	Unidirectional	Bidirectional	
Indonesia- China	China- Indonesia	China-India	India- Malaysia
Taiwan- Thailand	Thailand- Taiwan	China-Malaysia Indonesia-	India-Taiwan India-
Taiwan-China	China-Taiwan	Thailand China-Thailand	Thailand Malaysia- Taiwan

*CONT*

India-Indonesia	Malaysia- Thailand
Indonesia- Malaysia	Taiwan- Indonesia

No spillover relationship was found in Taiwan-Thailand. It is contradictory to The Board of Investment of Thailand (BOI) 2018 data, where Taiwan is the third-largest investor (after the US and Japan) conducting various investments in Thailand. However, this relationship can occur when the Taiwan-Thailand cooperation does not include Islamic stock market constituents in both countries, so that the volatility of the Taiwan Islamic stock market does not affect Thailand. Based on the information above, investors and fund managers can consider diversifying their investment assets in the Islamic stock market that receives no spillover effect from other markets. The shock that occurs in one market does not significantly affect other markets so that the asset value does not decrease simultaneously during the bearish period, but there is still an opportunity to optimize profit in each market.

4. CONCLUSION

This study examines the volatility spillover in China, India, Indonesia, Malaysia, Taiwan, and Thailand's Islamic stock market originating from monetary policy and macroeconomic factors and a novel Asia Islamic stock market causality relationship during the COVID-19 pandemic period. The results show that the Asia Islamic stock market is more susceptible to volatility on macroeconomic factors such as VIX and US 10-month T-bill yield than UCT and monetary policy (US 3-month T-bill rate) during the COVID-19 pandemic. Then bidirectional relationship information provides diversification benefits in a bullish period because the stock indices simultaneously have positive movements. China, India, Indonesia, and Malaysia Islamic stock market indexes are essential indicators because of their strong spillover effect on almost all Islamic stock markets in Asia.

Investors and managers can set the best strategy in fund allocation and diversification to minimize risk and optimizing profits. Simultaneously, policymakers should be aware of making the best decisions that maintain international financial stability. We would like to thank Indonesia Endowment Fund for Education Scholarship (Beasiswa Lembaga Pengelola Dana Pendidikan/LPDP) for funding this research.

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