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Volatility Spillover between Stock Returns and Oil Prices during the Covid-19 Pandemic in ASEAN

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ABSTRACT

This study points to increase global monetary integration as a result of rising volatility spillovers. As a result, analyzing volatility spillovers for international areas that expand and improve through the usage of inventory returns and oil prices is critical. The EGARCH model is used to explore the Volatility Spillovers of oil agencies in five ASEAN international areas during the Covid-19 Pandemic. To assess the interrelationships of the ASEAN stock index as well as the path of volatility, data were acquired from five global sites with very large volatility spillovers, namely Indonesia, Malaysia, Singapore, Thailand, and Vietnam. The findings show that this search is critical for ASEAN traders as well as Filipinos. Furthermore, because accurate forecasting of volatility spillover in global equity markets is required to reduce portfolio risk, this search has a substantial and viable significance.

Keywords: Stock Return, Oil Price, Volatility Spillovers, EGARCH Model, Covid-19
JEL Classifications: E44, G11, Q4, Q47

1. INTRODUCTION

In the long run, a strong and environmentally friendly stock market refers to an anomaly that calls into question the correctness of the environmentally friendly market theory. In practice, a variety of market abnormalities, such as grazing behavior, weaken their accuracy, resulting in inefficiency. When investors follow in the footsteps of others, they form a herd. This behavior occurs when rational traders interact in a widespread manner, preventing them from searching for market-critical data that is influenced by volatility spillovers (Gontijo et al., 2020). The bigger the spread, according to (Abidah et al., 2020), the greater the data asymmetry between market participants. Furthermore, the more favored the capital market rivalry is, the lower the advertising cost and the higher the buy price, resulting in narrower margins. Over the last 30 years, international financial integration has accelerated considerably, allowing for higher-quality cross-border capital mobility as well as more volatile spillovers (Darinda and Permana, 2019). Growing international financial integration, according to (Dean et al., 2010), has resulted in a strengthening of the relationship between stock market returns and global market volatility. As the giving market matures, however, the most influential search tends to focus on the changing financial circumstances. The volatility of the Sharia Spillovers Index for the Covid-19 Pandemic's journey through ASEAN appears to be under-explored in recent research.

In the Covid-19 pandemic, finance became the foundation for capital market investor behavior (Sugianto et al., 2020; Suripto, 2021). One of the most important tactics for survival is the role of the global economic system in overcoming the monetary crisis at some point during the epidemic (Arfah et al., 2020). However, at some point during this time, the number of inventory indices in the housing quarter multiplied, indicating that several finance possibilities had been devised for the duration of the epidemic (Abdelsalam et al., 2016) pointed out that, independent of the epidemic, there are shares with large cash flows that can be utilized as financial preferences. As a result, at some point during the

Covid-19 Pandemic, this search aspires to decide the Spillover Volatility between Stock Returns and Oil Prices in ASEAN. This is the first find out about to appear at the effect of spillover volatility between inventory returns and oil expenses in the course of the Covid-19 Pandemic, as hostile to preceding research that solely regarded the results of spillover volatility in growing countries.

Various literary studies have focused on offering a better understanding of the stock market's volatility since it highlights the risk and uncertainty of financial products (Gunarto et al., 2020). Spillover volatility is defined as an uneven movement in one market that has a delayed impact on the volatility of other markets (Milunovich and Thorp, 2006; Aggarwal et al., 1999). They adhere to risk management and, as a result, are crucial in determining the causes of volatility in global financial markets. Market volatility and fairness, in general, are adverse to the economic engine's characteristics (Nikmanesh and Mohd Nor, 2016).

For the time of the Covid-19 Pandemic in ASEAN, this search explores the Volatility Spillover between Stock Returns and Oil Prices. It additionally bills for structural harm in the inventory returns sequence and concentrates on the effect of the US market on ASEAN markets. At some point during the Covid-19 Pandemic, the EGARCH technique was used to collect daily frequency statistics from 2 March 2020 to 2 March 2021.

Some factors have an impact on this search. The first is to look into the Covid-19 Pandemic's volatility spillover in rising markets. Because of its young, the market is more susceptible to even little changes than developed markets. Furthermore, some areas of the literature that had no relevance on the volatility spillover during the outbreak influenced our search. According to (Carrieri et al., 2007), it is critical to consider the volatility spillover from a broad perspective because previous research has revealed that financial and macroeconomic characteristics, as well as monetary liberalization policies, all, play a role in integrating emerging countries.

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(Fay et al., 1967) In an influential study, he introduced explicit metrics of returns and volatility spillovers. This search overview reveals evidence of inconsistent behavior in the dynamics of returns and volatility spillovers. The spillover of stock returns, in particular, suggests a slow-developing mode rather than a boom, although there is no evident boom in the volatility spillover.

This research adds to the field by evaluating the effects of shocks originating in developed world countries on the establishment of the ASEAN inventory market. This search has progressed to the point that it currently includes research on volatility spillovers in a variety of domains. For starters, it concentrates on the ASEAN supply market, which is mostly untapped. Second, this is one of the first studies to examine the volatility spillover outcomes using the ICSS algorithm, which has previously been utilized to identify extraordinary breakthroughs in the ASEAN inventory market (Sharma, 2021).

This research offers a lot of practical implications and policy implications, which will appeal to policymakers and investors. The next step is to assess the global spillover volatility for funding and diversification. For monetary watchdogs to avoid the domestic fairness market from overreacting, they must have a thorough understanding of the global spillover of volatility.

2. LITERATURE REVIEW

2.1. Volatility Spillovers

Volatility Spillover is the ability for volatility in one market or asset to change as a result of changes in volatility in other markets. It depicts the rapid movement of papers across a variety of markets as a result of a series of small volatility swings. The volatility marketing is spot on, as it is entirely based on spillover volatility. Spillover volatility, he argues, is concerned about the possibility of a shock impact of volatility in one market on volatility in all other markets over a short period. Meanwhile, PR volatility or beta volatility can be used to entice long-term relationships. This type focuses more on spillovers caused by common interconnectedness across big economies from a wide range of countries. The shock that is communicated between global areas as a result of the actuality of the unique hyperlink and the hyperlink economy is the possibility of interdependence here. Of course, there is a transmission mechanism in the shift of information in the spillover analysis, and each record is exceptional and dreadful. Of course, the understanding that is surpassed from one market to the subsequent is valuable. According to (Nikmanesh and Mohd Nor, 2016), facts despatched from one market to a spate of different markets will have an impact on the whole market at an equal time, which, of course, expands the impact to records that can also be decided between markets.

2.2. Model Development

Review of the literature related to the capital market, with a focus on capital market integration and spillover. This search used to be done between capital markets within a location as well as between regions. When a condition exists that causes volatility, spillover effects look up and become interesting.

Investor behavior in the capital market provides the framework for investing at some point during the Covid epidemic (Sugianto et al., 2020). One of the most important criteria for survival is the role of the economic gadget in overcoming financial devastation at some time throughout the epidemic (Arfah et al., 2020). Although it was once discovered at some point during the epidemic that some stock indices in the housing zone had extended (Sumer and Ozorhon, 2020). This ensures that a variety of funding options will be available throughout the pandemic. Despite the pandemic, there are still stocks with large cash flows that can be utilized as funding options (Mahata et al., 2020).

In rising economies such as Hong Kong, Sri Langka, China, Pakistan, and India, there is a lot of unequal volatility. In the Sri Langka and Indian stock markets, there is additionally a lot of bidirectional volatility. Before the 2007 monetary crisis, there used to be a lot of volatility between India, Pakistan, and Hong Kong, and there was once also a lot of volatility between the inventory markets of Sri Langka and Pakistan after the tragedy (John Wei et al., 1995). There was a unidirectional volatility spillover effect between inventory expenditure and shopping for and boosting levels before the economic crisis, and a bidirectional volatility spillover effect following the 2008 global economic disaster in Turkey (Sumer and Ozorhon, 2020).

3. METHODOLOGY AND DATA

The scale of the Covid-19 outbreak is expected to close between 2020 and 2021, according to this empirical study, which looks at the sharia index of six worldwide online sites in ASEAN. Between March 2, 2020, and March 2, 2021, the data necessary to analyze the international monetary disaster was accumulated. During the Covid-19 Pandemic, the Volatility Spillover Index was evaluated in six ASEAN countries: Malaysia (FBMKCI), Singapore (STI), Thailand (SET), Vietnam (VN INDEX), and Indonesia (Jakarta Islamic), the Philippines (FTWIPHLL),. Bloomberg's database was used to compile the statistics.

3.1. Using Stationary Data to Test

Aside from creating time-series graphs, statistical tests such as the Augmented Once upon a time, the Dicky Fuller investigation was taken out to look into stationary data (ADF test). Because there is no regular fee level, sometime-series data, such as charge, are non-stationary. Because it is a stochastic way of inflicting troubles in time sequence modeling, this kind of sequence is referred to as a unit-root non-stationary time sequence (Dickey, 2005). In the subsequent paragraphs, the ADF test method is described as x1, x2,…, xn are time-series statistics, and xt follows the AR (p) model proposed. Equation introduces the mannequin's mathematical expression (1).

$$Xt\left(\mu+\varphi 1Xt-1\right)=\sum_{i=1}^{p-1}\varphi 1\Delta Xt-1+\varepsilon t \tag{1}$$

Where xt denotes the distinction sequence, εt is white noise with imply zero and the variance σ2 (εt ~ WN (0, σ2)). The ADF take a look at as a unit-root take a look at used to be carried out through calculating the statistical price τ as follows:

Ho: ϕ 1 = 1 (non-stationary data).
Ho: ϕ 1 < 1 (stationary data). Statistics.

Statistical take a look at (ADF test):

$$\tau=\frac{\varphi 1}{Se\varphi 1} \tag{2}$$

For the level of significance (α = 0.05), Ho is rejected if τ <−2.57 or if P < 0.05 (Emang et al., 2010)

3.2. Checking for White Noise

Bernard Law is a New York City lawyer. According to Bernard Law Montgomery et al., white noise is a time sequence that consists of uncorrelated observations (data) with constant variance (2008). Gaussian white noise is a term used occasionally to describe a time sequence that is widely spread. When a time collection is referred to as white noise, the pattern autocorrelation coefficient distribution in a giant pattern is the same as the everyday distribution, with a suggestion of zero and a variance of 1 / T, the place T is the vary of observations (Dickey, 2005). The expression is introduced by equation (3).

$$r\sim N(0,\tfrac{1}{T} \tag{3}$$

It is possible to check the autocorrelation lag using Equation (3). Ho: ok = zero in the direction of Ha: okay zero in the use of check statistics, as shown in Equation (4).

$$Z=\frac{rk}{\sqrt{1/T}}=rk\sqrt{T} \tag{4}$$

If |Z|>Z/2 is the pinnacle / two percent of the well-known or if P 0.05, Ho is rejected. The statistic that can be used to assess ACF and PACF is shown in Equation (4) (Wei, 2006). The time collection is also described as non-stationary when the ACF decays often. The method outlined above is applied one test at a time, with the autocorrelation being assigned a degree of importance and each test being evaluated independently. When the time series is subjected to white noise, it learns about the desire to think about a collection of autocorrelations at the same time. As a result, as shown in Equation, this problem can be solved using a statistical equation provided by the Box-Pierce statistic (Dickey, 2005). (5).

$$Q_{BP}=T\sum_{k=1}^{K} r^{2}\text{k} \tag{5}$$

The time sequence is distributed as chi-squared with levels of freedom K under the null hypothesis that it is white noise (Dickey, 2005). If Q BP>X (a, K)2, Ho is rejected, and the time collection is no longer white noise. If P 0.05, it is also possible to reject Housing the p-value.

Records differentiation and transformation strategies are used when the facts are no longer stationary.

3.3. Testing the ARCH Effect

Estimating and evaluating parameters, diagnosing and checking residuals, and selecting a decent model based on the AIC or SC requirements with the lowest price is all part of this stage. The ARCH effect is determined by evaluating the residuals obtained from the large ARMA model using the LM check. The information has imitated the use of the ARCH or GARCH technique due to the existence of an ARCH effect. Charting the rectangle of the PACF residuals can be used to mount the ARCH or GARCH model's sequence.

3.4. ARCH Model

The ARCH/GARCH model is entirely predicated on the idea that variance has increased with time. This assumption is known as heteroscedasticity, according to (Robiyanto, 2018). It has to do with the least-squares model, which states that the predicted values of all squared errors will be the same at some point. Heteroscedasticity is a variable that the ARCH and GARCH patterns are eager to model (Robiyanto, 2018) used a delayed disturbance mannequin and an autoregressive conditional heteroscedasticity (ARCH) mannequin to assemble a conditional time-variance mannequin. ARCH (Abbady et al., 2019) is an autoregression function, in accordance to (Robiyanto, 2018), which potential that variance is no longer normal throughout time and is influenced by using previous data. This mannequin's goal is to decide the hyperlink between contemporary and preceding random variables.

3.5. Generalized ARCH (GARCH) Model

A typical ARCH version that avoids superfluous sequences is Multiple GARCH (Generalized Autoregressive Conditional Heteroscedastic). The GARCH model encompasses more than just the connection between two residuals; it also considers previous residuals (Miyakoshi, 2003) assisted in the delivery of GARCH, and the mannequin with tiers p and q are characterized as follows.

$$X_t \left| F_{t-1} \right| \sim N(0, \sigma^2{}_t) \qquad (6)$$

The model allows conditional variants based on the previous lag, as shown in Equation (7).

$$\sigma^2{}_t = \omega + \sum\nolimits_{i=1}^{q} \lambda_{i\varepsilon^2_{t-i}} + \sum\nolimits_{j=1}^{p} \beta_{j\sigma^2_{t-j}} \qquad (7)$$

Where the present-day cost of the conditional variance is parameterized incomplete with the assist of lag q residual rectangle and p lag is represented as GARCH(p,q). As a result, the conditional variance of the GARCH mannequin is heteroscedastic with autoregression and MA (Chen et al., 2005). The GARCH model is represented via equation (8).

$$X_t = \delta + \sum\nolimits_{i=1}^{p} \varnothing_1 X_{t-i} - \sum\nolimits_{i=1}^{q} \theta_1 \varepsilon_{t-i} + \varepsilon_t \qquad (8)$$

$$\varepsilon_t \sim N(0, \sigma^2)$$

$$\sigma^2{}_t = \omega + \sum\nolimits_{i=1}^{q} \lambda_{i\varepsilon^2_{t-i}} + \sum\nolimits_{j=1}^{p} \beta_{j\sigma^2_{t-j}}$$

x_t is the equation of conditional mean (Bollinger and Pagliari, 2019).

3.6. EGARCH Model

The EGARCH model, also recognized as the GARCH-BEKK model, was created with the GARCH-BEKK mannequin in the idea to affect the achievable structural breakdowns in the volatility series (Vo and Ellis, 2018). It (Tran et al., 2020) Iterative Cumulative Sum of Squares technique (ICSS) to determine quite a number lag dates in the Volatility Spillovers of Index in ASEAN all through the Covid-19 Pandemic, as properly as to take a look at the Pandemic's outcomes on precise ASEAN inventory markets. The original ICSS method used to be previously broadly used in the search for and assessment of volatility spillovers. According to EGARCH, however, just a few lookups employed this method to swap structural damage. Over a size separated with the useful resource of a positioned breakpoint, the ICSS method promotes the assumption of normal unconditional variance. This is also used to figure out how inventory market volatility affects returns. According to multiple research, including (Kim and Rhee, 1997), (Singh and Shukla, 2020), (Nelson, 1991) EGARCH mannequin is the super specification for modeling stock index (Teniwut et al., 2019). This was also looked at in some subsequent experiments, such as a web search (Krause and Tse, 2013). This seems up estimates the EGARCH model, which gives alternate elements for each collection of ASEAN stock returns, after recognizing all alternate elements in the volatility sequence. All alternate elements are created with a set of dummy variables that have a rate of 1 for every alternate invariance attribute and a rate of 0 otherwise.

The reason for using the EGARCH (1,1) model instead of the GARCH (1,1) model is to loosen the variance equation coefficient's non-negative limitations. For AR (1) -EGARCH, the sequence of returns for each u. s. a. in the information pattern has been carefully created (1,1). The advice and variance equations are expressed as follows in general:

$$Rit = \alpha 0i + \alpha 1iRi, t-1+\varepsilon it, \varepsilon it \sim N\ (0, hit); \qquad (9)$$

$$hit = \beta 0i + \sum \delta ji\ Breakji + \beta 1ihi, t-1+\gamma\ \varepsilon 2 \qquad (10)$$

where

Rit: The United States of America has returned. On day t, I

Hit: The variation in inventory returns in the United States On day t, I

Break: A dummy variable that represents the length between the breaking factor (j-1) and the breakpoint j and zeroes elsewhere for the duration of the length between the breaking factor (j-1) and the breakpoint j.

Except for structural injury dummies, the AR (1) -EGARCH (1,1) mannequin is estimated to provide resilience. The ASEAN inventory market volatility, on the other hand, is factored into the variance equation.

$$Rit = \alpha 0i + \alpha 1iRi, t-1+\varepsilon it, \varepsilon it \sim N\ (0, hit);$$
$$hit = \beta 0i + \theta iUSVolatility + \beta 1ihi, t-1+\gamma\ \varepsilon 2 \qquad (11)$$

the location the variation of ASEAN inventory returns is called volatility spillovers, and it denotes the influence of inventory return variance on a US economy.

4. RESULTS

4.1. Data Analysis

Table 1 displays inventory market returns descriptive data for all indices with fine recommended returns values. With a likelihood level of 0.677, the inventory market in Singapore has the best chance.

The pattern's daily average return on the stock market is 3.735, with a famous deviation of 0.036. Furthermore, stock markets in some developing countries, such as Thailand, are placed second behind Singapore, with a high probability of 0.258 and a standard deviation of 0.018. Meanwhile, the other four countries have a probability level of 0.000, which is lower than Singapore and Thailand.

Table 2 shows the results of the stationarity test, which used the ADF and Phillip-Perron assessments to determine stationarity. Every evaluation once rejected the null hypothesis of non-stationary charges for all countries' stock returns, leading to the common conclusion that all stock returns are I (0).

Then there was once white noise, which is a statistical take a look at of the estimation of the speculation that there is no autocorrelation from the sequence to a given interval that is substantially special from zero. In any of the logs, there are no documents on the series. The white noise speculation was once strongly many times ordinary (P> 0.0001) when autocorrelation used to be examined in six groups, as proven in Table 3.

Heteroscedasticity of the Sharia Index at some point during the Covid-19 Pandemic in ASEAN, as shown in Table 4, using the ARCH heteroscedasticity test.

Because the P-value Obs * R-squared = zero in the heteroscedasticity test with ARCH, heteroscedasticity, and modeling may be endured using EGARCH to develop forecasting models. Table four suggests an EGARCH mannequin.

The EGARCH model (1,1) was estimated with and without dummy variables to test the overflow after using white noise to pick up surprising fluctuations in the volatility of the sequence of returns on Islamic stock indexes in ASEAN. In any EGARCH mannequin, the size of the Break dummy variable allows for monitoring changes in associated volatility as well as assessing the abundance of volatility throughout ASEAN international locations (Figure 1).

Table 5 shows that the EGARCH Model forecasts risk of R = zero for Indonesia, Malaysia, Singapore, Thailand, and Brunei Darussalam, meaning that H0 is rejected and spillover volatility exists. On the other hand, the impacts of the EGARCH evaluation should be re-evaluated using a variety of tests, such as serial correlation, ARCH effect, and normality. Finally, regardless of whether or not the data were normally distributed, the EGARCH mannequin had no autocorrelation or ARCH influence.

Using data from 364 days of observation, Granger causality is utilized to assess whether the volatility spillover variable, the stock return index variable, and oil prices have a unidirectional, bidirectional, or no causal link. Table 6 depicts Granger's causal effect on the stock return index and oil prices of 6 ASEAN international sites, as measured by return volatility spillover.

As evidenced by the use of the EGARCH approach, this impact reveals that there has been an increase in spillover volatility in financial integration international from inventory return and oil rate indices from 6 global locations in ASEAN. In addition, the Granger sufferer examination was once used to determine the spillover volatility path, which was once as soon as determined to have no relationship in the provide markets of Indonesia,

Table 1: Descriptive Statistics (in percentage)

Variable	Probability	Std. Dev.	Min	Max
R_Indonesia	0.000	0.068	2.350	2.927
R_Philippines	0.000	0.054	–0.146	0.239
R_Malaysia	0.000	0.032	0.652	0.832
R_Singapore	0.677	0.036	2.378	3.735
R_Thailand	0.258	0.018	2.032	2.158
R_Brunei Darussalam	0.000	0.063	2.783	3.958

Table 2: Unit root test ADF

Variable	Missing Point	Test statistics	Phillip Perron
R_Indonesia	8	–12,857***	0.000 ***
R_Philippine	5	–12,941***	0.000***
R_Malaysia	6	–4,813***	0.000***
R_Singapore	7	–2,087***	0.264***
R_Thailand	4	–2,432***	0.121***
R_Brunei Darussalam	9	–13,811***	0.000***

***, **, *Respectively indicating a significance level of 1%, 5%, and 10%

Table 3: White noise test

To Lag	P-value	AC	Pac	Q-Stat	Prob
1	<0.0001	0.2083333	0.16041667	17.904	0.000
2	<0.0001	0.1625	0.11041667	28.838	0.000
3	<0.0001	0.3131944	0.27013889	70.041	0.000
4	<0.0001	0.2027778	0.07083333	87.336	0.000
5	<0.0001	0.1798611	0.07638889	100.96	0.000
6	<0.0001	0.16875	–0.019	113.01.00	0.000
7	<0.0001	0.1173611	–0.052	118.80	0.000
8	<0.0001	0.1319444	0.007	126.19.00	0.000
9	<0.0001	0.078	–0.118	127.41.00	0.000
10	<0.0001	0.0819444	0.035	130.23.00	0.000
11	<0.0001	0.1222222	0.084	136.69	0.000
12	<0.0001	0.0902778	0.07083333	140.17.00	0.000
13	<0.0001	0.038	–0.066	140.46.00	0.000
14	<0.0001	0.055	–0.059	141.07.00	0.000
15	<0.0001	0.1631944	0.13402778	152.78	0.000
16	<0.0001	0.1090278	0.086	158.04.00	0.000
17	<0.0001	0.036	–0.049	158.31.00	0.000
18	<0.0001	0.1673611	0.08402778	170.90	0.000
19	<0.0001	0.0847222	–0.071	174.10.00	0.000
20	<0.0001	0.048	–0.060	174.57.00	0.000
21	<0.0001	0.1173611	0.005	180.86	0.000
22	<0.0001	0.0902778	0.021	184.55.00	0.000
23	<0.0001	0.0847222	0.050	187.83	0.000
24	<0.0001	–0.010	–0.148	187.85	0.000
25	<0.0001	0.007	–0.032	187.86	0.000
26	<0.0001	0.080	–0.048	189.25.00	0.000
27	<0.0001	0.053	0.073	189.86	0.000
28	<0.0001	–0.031	–0.017	190.06.00	0.000
29	<0.0001	0.049	0.084	190.58.00	0.000
30	<0.0001	0.008	–0.055	190.58.00	0.000
31	<0.0001	–0.022	–0.035	190.68	0.000
32	<0.0001	0.065	0.07638889	191.62	0.000
33	<0.0001	0.032	–0.076	191.84	0.000
34	<0.0001	0.060	0.061	192.67	0.000
35	<0.0001	0.009	–0.019	192.68	0.000
36	<0.0001	–0.002	–0.027	192.68	0.000

Table 4: Heteroscedasticity test

Heteroskedasticity Test: ARCH			
F-statistic	172.2844	Prob. F (1,196)	0.0000
Obs*R-squared	91.19451	Prob. Chi-square (1)	0.0000

Table 5: Results of the EGARC H model without considering structural damage

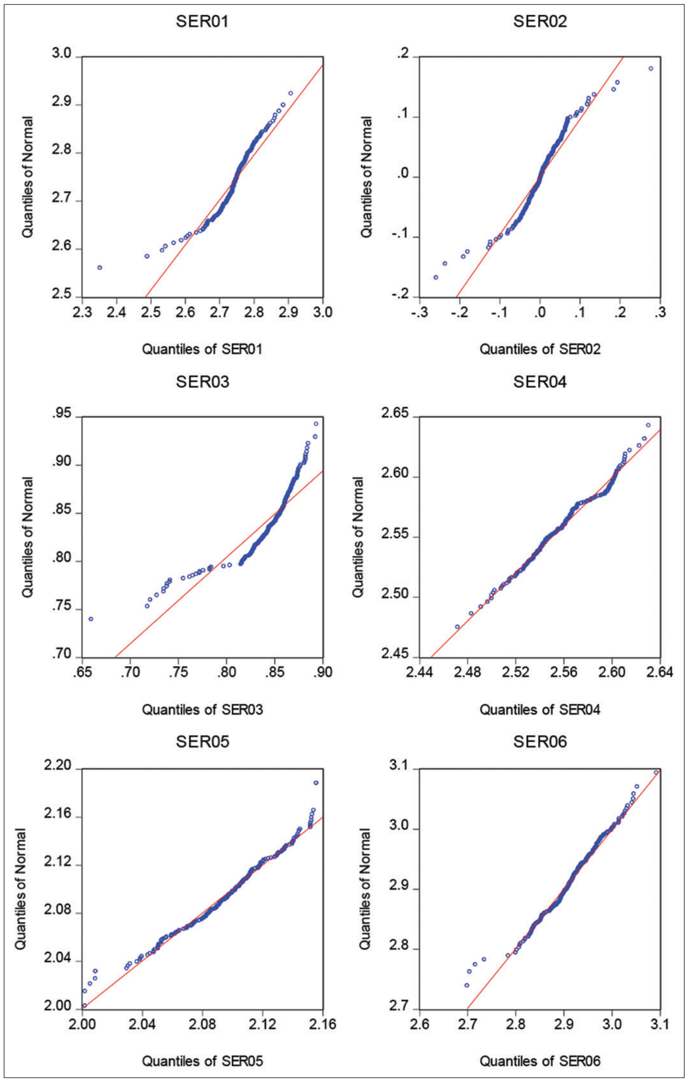
LOG (GARCH)=C (7)+C (8)*RESID(-1)/@SQRT (GARCH(-1)) + C (9) *LOG (GARCH(-1))				
Variable	**Coefficient**	**Std. Error**	**z-Statistic**	**Prob.**
Indonesia	0.045530	0.005690	8.028257	0.0000
Philippines	–0.002433	0.006692	–0.361605	0.7080
Malaysia	–0.057891	0.014101	–4.135380	0.0000
Singapore	0.199766	0.018266	10.94840	0.0000
Thailand	0.161570	0.023105	6.998664	0.0000
Brunei Darussalam	0.027535	0.010538	2.616069	0.0091
Variance Equation				
C (7)	–0.517913	0.210508	–2.460318	0.0141
C (8)	–0.080757	0.028916	–2.792964	0.0054
C (9)	0.949580	0.022104	42.96545	0.0000
Mean dependent var	1.000000	S.D. dependent var		0.000000
S.E. of regression	0.012758	Akaike info criterion		–6.479686
Sum squared resid	0.031423	Schwarz criterion		–6.330742
Log-likelihood	653.7287	Hannan-Quinn criteria.		–6.419404
Durbin-Watson stat	0.124913			

Table 6: Granger causality test results

Pairwise Granger Causality Tests Lags: 2			
Null Hypothesis	**Obs**	**F-Statistic**	**Prob.**
The Philippines Does Not Granger Cause Indonesia	197	0.96975	0.3810
Indonesia Does Not Granger Cause Philippines		2.30871	0.1021
Malaysia Does Not Granger Cause Indonesia	197	2.81186	0.0626
Indonesia Does Not Granger Cause Malaysia		1.19861	0.3039
Singapore Does Not Granger Cause Indonesia	197	4.12609	0.0176
Indonesia Does Not Granger Cause Singapore		0.50001	0.6073
Thailand Does Not Granger Cause Indonesia	197	1.68209	0.1887
Indonesia Does Not Granger Cause Thailand		1.49094	0.2278
B.Darussalam Does Not Granger Cause Indonesia	197	2.57696	0.0786
Indonesia Does Not Granger Cause B.Darussalam		0.33952	0.7125
Malaysia Does Not Granger Cause Philippines	201	6.14871	0.0026
The Philippines Does Not Granger Cause Malaysia		20.0764	1.E-08
Singapura Does Not Granger Cause Philippines	201	1.58846	0.2069
The Philippines Does Not Granger Cause Singapura		7.50724	0.0007
Thailand Does Not Granger Cause Philippines	201	3.65236	0.0277
The Philippines Does Not Granger Cause Thailand		3.84320	0.0231
B.Darussalam Does Not Granger Cause Philippines	201	4.52835	0.0120
The Philippines Does Not Granger Cause B.Darussalam		0.55620	0.5743
Singapore Does Not Granger Cause Malaysia	202	0.81665	0.4434
Malaysia Does Not Granger Cause Singapore		0.14946	0.8613
Thailand Does Not Granger Cause Malaysia	205	0.19914	0.8196
Malaysia Does Not Granger Cause Thailand		3.02540	0.0508
B.Darussalam Does Not Granger Cause Malaysia	205	3.54464	0.0307
Malaysia Does Not Granger Cause B.Darussalam		8.58959	0.0003
Thailand Does Not Granger Cause Singapore	202	2.40613	0.0928
Singapore Does Not Granger Cause Thailand		0.21592	0.8060
B.Darussalam Does Not Granger Cause Singapore	202	3.66561	0.0273
Singapore Does Not Granger Cause B.Darussalam		2.68597	0.0707
B.Darussalam Does Not Granger Cause Thailand	213	4.69750	0.0101
Thailand Does Not Granger Cause B.Darussalam		0.76150	0.4683

Malaysia, Singapore, Thailand, and Brunei Darussalam, besides for the Philippines and the Sharia Index, which was once as soon as discovered to have no relationship in the Covid-19 Pandemic in ASEAN, besides for the Philippines and the Sharia Index, which was once as soon as located to have no relationship in the grant markets of Indonesia, Malaysia, Singapore, Thailand, and Brunei Darussalam, barring for the Philippines and the Sharia As a result, stock market shocks in Indonesia, Malaysia, Singapore, Thailand, and Brunei Darussalam at some factor all through the Covid-19 outbreak can't now account for shocks in the ASEAN stock return

Figure 1: Decrease of volatility spillovers in returns Index stocks in ASEAN (Joshi, 2011)



index and oil prices, and vice versa. Cash travels more easily across borders as a result of globalization and economic freedom. This strategy also encourages volatility to spill over from mature markets to emerging economies. Consumers in portfolio financing and risk management will benefit greatly from these results. This also applies to policymakers who must put in place a system to display and regulate average volatility spillovers.

5. CONCLUSION

For a variety of reasons, emerging markets are an excellent place to learn about stock market volatility. Rising markets are widely considered to be riskier than the majority of trustworthy fairness markets. The fact that the majority of stocks markets are small and are heavily influenced by small changes in developed markets adds to the uncertainty. As a result, this study examines the Volatility Spillover between Stock Returns and Oil Prices in ASEAN during the Covid-19 Pandemic. During the Covid-19 Pandemic in ASEAN, data on the Volatility of Spillovers of stock returns and oil fees were collected from 2 March 2020 to 2 March 2021.

Administrative comments or hints from the investigation are linked to factors that have a significant influence. The components that can affect the charge of return on offers should be considered by financial experts and potential monetary experts. Since stock returns are used by economists to contribute to businesses in the capital market, they are used as a measure of business execution. Proposals for this lookup may additionally be developed through mixing internal variables like return on investment, organization estimate, and open possession with outdoor factors like the board of executives, intrigued rates, money supply, and swelling. To get higher investigation results, greater analysts have to be in a position to lengthen the investigation time and use a few one-of-a-kind industrial divisions.

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