MJBE Malaysian Journal of Business and Economics

DOES THE IMPLEMENTATION OF A MORATORIUM BRING POSITIVE SHOCK TO THE BANK STOCK PRICE AMIDST THE GLOBAL PANDEMIC?

Azmi Majid, Rozilee Asid
Thien Sang Lim, Zaiton Osman
Faculty of Business, Economics and Accountancy,
Universiti Malaysia Sabah, Kota Kinabalu, Sabah.

***Corresponding author's email:**
azmi.am@ums.edu.my

Date Received: 2 October 2024

Date Reviewed: 25 November 2024

Date Accepted: 28 November 2024

Date Published: 31 December 2024

DOI: https://doi.org/10.51200/mjbe.v11i2.5784

Keywords: *Pandemic, moratorium, banks, stock price, EGARCH.*

ABSTRACT

Malaysia was the only nation that provided moratorium on loan repayment in a blanket basis during the global pandemic. Thus, this study examines the whether moratorium has a contractionary or an expansionary impact from the perspective of loan repayment towards the volatility of banking stock prices listed in Bursa Malaysia. The Exponential GARCH (EGARCH) was employed with daily data from 2 January 2019 to 31 December 2021. The empirical findings showed that the loan-repayment moratorium induced a positive shock to the volatility of Hong Leong Bank, Public Bank, RHB Bank, and Alliance Bank. However, all these banks exhibit a leverage effect, and negative shocks were more pronounced towards their stock price volatility during the moratorium implementation. The findings were crucial for investors and authorities to understand the impact of a moratorium on the banks towards the stock price.

INTRODUCTION

The banking industry has experienced numerous challenges during the global pandemic caused by the coronavirus disease 2019 (COVID-19). The unforeseen impact of this global pandemic has caused significant damage to the global economy and financial markets (Ciotti *et al.*, 2020), especially when there was no medical solution to protect against it during the initial outbreak. As

the virus propagated globally, the world population has incurred a significant toll in terms of human lives lost during this pandemic. It forces governments worldwide to take drastic measures by implementing emergency ordinances and restricting people's movement to curb the spread of the virus. In Malaysia, the Movement Control Order (MCO) was enforced on 18 March 2020, restricting households from leaving their homes except for essential purposes.

Since economic activities were almost at a standstill, Malaysia's central bank (Bank Negara Malaysia, B.N.M.) perceived this event as a catastrophe. B.N.M. projected that households and businesses would struggle to service their loan repayment which could create an adverse effect for the banks. Navigating the uncharted territory, B.N.M. initiated implementing a six-month automatic full blanket loan-repayment moratorium to assist households and businesses. It also served as a precaution to preserve the banks' ability to sustain operations by mitigating the rise in non-performing loans and bankruptcy.

B.N.M. requested banks to offer an automatic six-month full blanket moratorium on loan repayment (except credit card) to debtors. In other words, all borrowers were granted the temporary option to postpone the repayment obligation of their current loans without being subject to any conditions. This made Malaysia unique compared to other countries (e.g. Australia, New Zealand, India, Pakistan, Bangladesh, and Brunei), where borrowers must meet specific criteria to qualify for this financial repayment relief (Sah and Wong, 2021; Rosli et al., 2023).

The moratorium loan repayment was an intervention by the central bank to mitigate the income loss suffered by households and businesses during the pandemic (Shah et al., 2020). With the moratorium, cash meant for loan-repayment could be rechanneled for other spendings, which supports the economy during an unprecedented crisis. Notably, the moratorium in Malaysia covered not just the banks but also licensed credit houses and corporations. B.N.M.'s primary goal was to expand the accessibility of short-term financial assistance to individuals and businesses experiencing adverse circumstances caused by the crisis.

Table 1: Bank Stock Price

Banks/Stock price	Index Listed	Moratorium Starts 1 April 2020 (M.Y.R.)	Moratorium Ends 30 September 2020 (M.Y.R.)	Changes (%)
AMMB Holdings Berhad	KLCI and Finance	2.94	3.00	+0.02%
CIMB Group Holdings Berhad	KLCI and Finance	3.53	3.08	-0.13%
Hong Leong Bank Berhad	KLCI and Finance	13.22	15.04	+0.14%
Malayan Banking Berhad	KLCI and Finance	7.33	7.22	-0.02%
Public Bank Berhad	KLCI and Finance	3.14	3.14	-
RHB Bank Berhad	KLCI and Finance	4.55	4.57	+0.004%
Alliance Bank Malaysia Berhad	Finance	1.44	1.40	-0.02%
Affin Bank Berhad	Finance	1.86	2.19	+0.18%
Bank Islam Berhad	Finance	2.43	2.62	+0.08%
Malaysia Building Society Berhad	Finance	0.56	0.51	-0.09%

Source: Bloomberg Terminal as of 31 December 2023

Due to the consequences of the global pandemic and the moratorium implementation, banks were anticipated to face challenging times due to lower incomes. Surprisingly, however, Table 1 shows that the banks stock prices in Malaysia experienced an increase at the end of the moratorium. Four banks experienced slightly lower stock prices: CIMB Group Holdings Berhad, Malayan Banking Berhad, Alliance Bank Malaysia Berhad, and Malaysia Building Society Berhad. Thus, the question arises as to whether implementing an automatic full blanket loan-repayment moratorium positively impacts the bank's stock price. While most of the bank's stock prices worldwide plummeted (Ellul *et al*., 2020; Acharya *et al*., 2021), Malaysia's bank stock prices seemed to go in a different direction. Although the moratorium relieves most households and businesses, there was a question about its impact on bank stock prices, prompting questions about whether it brings a positive shock which eventually made Malaysia bank's stock price volatile.

Addressing this issue was crucial to current and prospective investors since an incline in bank stock price lead to a decline in the bank's debt-to-equity ratio. Consequently, investors who bore the cost of the additional risks regard the future cash flow of the bank as comparatively riskier (Brooks and Williams, 2022). Thus, there was a need to emphasize the risk since investors consider risk measurement while making investment decisions. Even though volatility in stock prices or any financial assets has been a natural phenomenon due to positive or negative information at the domestic or international level (Setiawan *et al*., 2021), market volatility is an illustration of investors' lack of confidence, and it reflects the risks that investors experience.

Furthermore, increased volatility generated a fear of losses among investors. Such uncertainty can prompt investors to divest their funds by selling their stock holdings, leading to a further decline in stock prices (Adenomon *et al*., 2022). It was also crucial for authorities to gain a deeper understanding of the impact of a moratorium on the bank's stock price since changes in monetary policies can send positive and negative shocks to the stock market (Hu *et al*., 2018; Liu *et al*., 2022). By comprehending the potential positive or negative consequences of implementing a moratorium, B.N.M. can proactively prepare and strategize for future uncertainties or crises. The empirical results of this study could contribute new insights and discussions to the existing body of knowledge. This was because many studies have primarily examined the effects of the global pandemic on stock indices. At the same time, only Malaysia uniquely implemented a full 6-month blanket moratorium on loan repayment during this period.

RESEARCH OBJECTIVE

The specific objective of this study was to examine the asymmetric effect and shocks of the moratorium on the volatility of individual stock prices of publicly listed banks in Bursa Malaysia during the unprecedented event of the COVID-19 global pandemic.

LITERATURE REVIEW

Numerous studies focused on the stock market's volatility and asymmetric effect. However, there have been few studies on moratoriums since only Malaysia implemented a full blanket moratorium during the global pandemic. Sah and Wong (2021) were did the sole research that specifically examined the effects of a moratorium on the Malaysian banking sector. They investigated the impact of this financial relief on the banking sector by employing cumulative abnormal returns. They found that a full blanket moratorium has led to a drop in the cumulative abnormal return for three major local banks: Malayan Banking Berhad, CIMB Groups Holdings Berhad, and Public Bank Berhad. Hence, this study concluded that banks' stock price was

negatively affected by the implementation of the moratorium.

Putri (2020) examined the stock price differences in the top ten stocks of Indonesian banking companies prior to, during, and after the global pandemic. A paired Sample T-test was employed, and it was found that the stock price in Indonesia's banking sector fell sharply during the global pandemic, and there was a significant difference in stock prices before and after the pandemic. Meanwhile, Bhuvaneshwari and Radhika (2021) employed Granger causality and impulse response function to examine COVID-19's impact on Nifty Bank, Financial Services, Private Banks, and P.S.U. Banks. This study demonstrated a short-term causal relationship between the Nifty 50 and several sectoral indices. Furthermore, this study also found that a change in the Nifty 50 index pre-COVID-19 and during COVID-19 significantly affected the index values of Nifty Bank and Nifty Private Banks.

It cannot be denied that a limited number of studies concentrated on the impact of loan-repayment moratorium, but several studies examined the relationship of bank loans on the stock market. This was relatable since a full blanket moratorium is a form of financial relief from the bank loan. For example, the relationship between bank loans and stock prices was investigated by Ibrahim (2004) using a generalized impulse response function and a value at risk (V.A.R.) model. It found that bank loans positively impacted stock prices, but this effect was insignificant. The study concluded that bank loans do not substantially transfer the effects to the stock market. Ibrahim and Shah (2012) examined the interrelations between bank lending, the stock market, and financial uncertainty in an emerging economy, finding evidence that market volatility tends to depress bank loans. Apart from its adverse effect on bank loans, heightened market uncertainty depressed stock prices. Thus, market volatility impacts both bank loans and stock prices.

Similarly, Samsi *et al*. (2018) explored the impact of the global financial crisis on both the stock market and bank loans. Their findings indicated that the crisis significantly affected both the stock market and bank loans. Three of the five ASEAN nations studies demonstrated that the global financial crisis had a more pronounced impact on banks. In addition, this study also suggested that the global financial downturn set the stage for the subsequent credit crisis, leading to higher risk premiums being imposed on bank loans.

Far from Malaysia, Almutair (2015) examined the relationship between bank loans and Saudi Arabia's stock market index (SSPI). The researcher found a direct relationship between SSPI and bank loans, which aligns with the economic theory that asserts when stock prices rise, demand and supply for bank loans subsequently increases. In addition to examining the relationship between banks and stocks, it is essential to view the circumstances from the perspective of risks, given that the uncertainty in the market may have contributed to a drop in the stock price due to the rise in investment risk.

While there was currently no specific research on the effects of a moratorium on bank stock price volatility, a substantial amount of research has been undertaken to investigate the impact of COVID-19 on the volatility of bank stock prices or indexes. Bhatia and Gupta (2020) examined the volatility of specific banking sector indices in India compared to the general banking index during the first wave of the COVID-19 pandemic. The selection process consisted of selecting Nifty Bank, Public Sector Undertaking Bank, and Private Sector Bank, and the EGARCH model was employed. The results revealed that only leverage has a significant impact on PSUBI. Furthermore, the study found that a significant leverage effect which indicated negative news regarding COVID-19 had a more significant impact than any positive news during the study period.

Ahadiat and Kesumah (2021) utilized the GARCH model and value at risk to analyze the possible investment losses associated with investing in an Indonesian state-owned bank. The empirical findings of this study revealed that all banks exhibit a negative sign, suggesting the most potential loss investors may experience by holding their stocks during the COVID-19 pandemic. This study further discovered that the leverage effects were more pronounced than the asymmetry effect and recommends that investors reevaluate their investment in an Indonesian state-owned bank. This study aligns with the results obtained by Batten *et al*. (2022), which examined the transmission of volatility between European Global Systemically Important Banks and the persistence of volatility in the stock market. Battern et al. (2022) demonstrated the leverage effect of V.I.X. and the negative impact on the European Global Systemically Bank's performance amid the COVID-19 pandemic.

Nikhil *et al*. (2023) seeked to examine the volatility of the returns of the Indian Bank Nifty by employing a range of GARCH models. Using the Nifty Bank Index as data from June 2005 to May 2022, it discovered that positive shocks had a more significant impact on the volatility of Bank Nifty returns than adverse shocks. This study added that positive shocks in the Indian banking industry led to an increase in volatility in the following period, compared to negative shocks of the same size. This phenomenon was referred to as the anti-leverage effect. Therefore, the leverage coefficient's outcome confirmed that the disturbance in volatility caused by positive shocks was greater than that caused by negative shocks. However, the impact was not continuous across the Indian Banking series.

Close to Malaysia, Setiawan *et al*. (2021) examined the influence of COVID-19 on Indonesia's stock indexes using the GARCH model. Their findings indicate that the Indonesia stock index was affected by COVID-19, leading to significant disruptions in Indonesian financial markets. Similarly, Nurdany *et al*. (2021) examined the impact of asymmetry on the Indonesia Sharia Stock Index (ISSI) and discovered a noteworthy and statistically significant asymmetric effect on the ISSI. They added that positive shocks significantly influenced volatility more than negative shocks. Furthermore, both Setiawan et al. (2021) and Nurdany et al. (2021) recommend that the government persist in curbing the virus's spread and implementing its economic recovery strategy.

Alzyadat *et al*. (2021) and Eledum and Sayed (2021) examined the persistence of volatility and asymmetrical effects on the stock market in Saudi Arabia. Alzyadat et al. (2021) utilized a non-linear GARCH model to analyze the performance of the Saudi Arabia single stock index during the COVID-19 pandemic. The findings indicated an inverse asymmetrical effect before the COVID-19 pandemic, and a significant negative impact was observed after the health crisis occurred. Eledum and Sayed (2021) conducted a study by selecting 21 industrial sectors listed in the Saudi stock market instead of focusing on a single stock index. The EGARCH model was utilized, and empirical results showed a leverage effect. Specifically, negative shocks accounted for 25% of the observed changes, while positive shocks accounted for 14%. This study also specifically concluded that there is a leverage effect in the banking sector, which implies that a negative shock has a greater impact on volatility than a positive shock of the same magnitude.

On the other hand, Fakhfekh *et al*. (2021) used the ARCH family model to study Tunisian sectoral stock market indices' volatility persistence and asymmetric effect during COVID-19. They found that Tunisian listed banks had a strong positive and significant asymmetric effect during COVID-19. Close to Tunisia, Bonga *et al*. (2022) examined Zimbabwean stock market volatility between January 2020 and January 2022. This study

employed GARCH family models to quantify volatility analysis on all Zimbabwe Stock Exchange stock indices. The asymmetry coefficient of EGARCH (1,1) was positive and statistically significant, indicating that positive and negative shocks of the same magnitude affect the stock market differently. In particular, positive volatility shocks were more pronounced than negative shocks in the Zimbabwe stock market.

In the United States, Ozdemir *et al*. (2021) investigated the impact of COVID-19 on stock indices in the US, Germany, France, and the U.K. by employing the EGARCH model. This research's empirical findings revealed a significant increase in volatility in the major stock markets during the first wave of COVID-19. This volatility was characterized by short persistence and was influenced by leverage in returns. Furthermore, it has been discovered that positive shocks during the pandemic have a more significant impact on the volatility of stock index returns compared to negative shocks. Subsequently, Khan *et al*. (2023) examined the asymmetric effects of COVID-19 on cryptocurrency, commodities, and S&P500 by employing the EGARCH model, and this study discovered that the S&P500 exhibited a notable asymmetry effect during the COVID-19 pandemic.

Prior research conducted in Malaysia has primarily focused on the relationship between bank loans and stock prices but relied on stock indices rather than the specific prices of individual bank stocks price. The essence of this distinction lies in the fact that the Kuala Lumpur Composite Index encompasses numerous sectors, with banks being only one component among them, and it would be beneficial to narrow down the individual prices of individual bank stocks. Thus, this study took a similar route to Bhatia and Gupta (2020), Sah and Wong (2021), Ahadiat and Kesumah (2021), Batten *et al*. (2022), and Nikhil *et al*. (2023), which employed individual bank stock prices. This study further expanded the scope of previous studies by adding moratorium as the subject of interest and examining its impact on the volatility of individual Malaysian bank stock prices. The empirical findings of this study could contribute new insights and discussions to the existing body of knowledge, especially when Malaysia is the only country granted an automatic six-month full blanket moratorium during the COVID-19 global pandemic.

METHODOLOGY

The data used in this study focused on the individual stock prices of publicly listed banks in Bursa Malaysia, consisting of daily closing prices spanning from 2 January 2019 until 31 December 2021. These data were retrieved from Bloomberg Terminal, represented in natural logarithms, and converted to a return model by using the formula where is the return of individual stocks, and is the price of individual stocks on day and respectively. Individual banks' stock prices listed on Bursa Malaysia are presented in Table 2. Kuala Lumpur Composite Index (KLCI) was included in the study as a benchmark for the study, although six banks were part of the KLCI. Moreover, the overnight policy rate (O.P.R.) was also a controlled variable since interest rate changes potentially impact every bank's stock price. Noted that B.N.M. offers several loan repayment relief offers, but the automatic full blanket moratorium was only given for six months. Thus, this study included moratorium () as dummy variables with the value 1 from 1 April 2020 until 30 September 2020, while the rest takes 0.

Table 2: List of Variables

Name of Bank	Variable in return
Kuala Lumpur Composite Index	RKLCI
AMMB Holdings Berhad	RAMBANK
CIMB Group Holdings Berhad	RCIMB
Hong Leong Bank Berhad	RHLB
Malayan Banking Berhad	RMAYBANK
Public Bank Berhad	RPBB
RHB Bank Berhad	RRHB
Alliance Bank Malaysia Berhad	RALLIANCE
Affin Bank Berhad	RAFFIN
Bank Islam Berhad	RBIMB
Malaysia Building Society Berhad	RMBSB

Source: Bloomberg Terminal as of 31 December 2023

Engle (1982) developed the Autoregressive Conditional Heteroskedasticity (ARCH) model to understand better the dynamic properties of financial time series and forecast variations in heteroskedasticity over time. This model was extended by Bollerslev (1986) by allowing the conditional variance to be dependent upon previous own lags, known as the Generalized ARCH (GARCH) model. Since its development, the GARCH model has seen numerous proposed expansions and modifications. However, the fundamental constraint of the GARCH model is the requirement for a symmetrical response of volatility to both positive and negative shocks. This occurs since the conditional variance depends on the magnitudes of the lagged residuals rather than their signs. There is a contention that negative shocks in financial time series are more likely to result in a significant rise in volatility than positive shocks of the same magnitude (Black, 1976). Thus, Nelson (1991) proposed the Exponential GARCH (EGARCH) model, which allows the modelling of positive (asymmetric) or negative (leverage) effects. Furthermore, this model can capture the asymmetric nature or skewness caused by the inverse correlation between volatility and returns, and its parameters are guaranteed to be positive since it is working with the log of the variance, and this solving process is more straightforward and more flexible (Lahmiri, 2017). The specification conditional variance (of EGARCH(1,1) model as follows:

$$h_i = a_i + \varphi_i \left(\left| \frac{e_{t-1}^2}{h_{t-1}} \right| \right) + \gamma_i \frac{e_{t-1}^2}{h_{t-1}} + \beta_i h_i \qquad (1.1)$$

where is a constant, is an ARCH term, and is a GARCH term. Volatility persistence in Equation (1.1) governs by , compared to GARCH where volatility persistence measured by the sum of coefficient and (Oseni and Nwosa, 2011). Meanwhile is the coefficient that captures the asymmetric effects in volatility and the null hypothesis is the model is symmetry (: = 0) and alternative hypothesis is (: Specifically, alternative hypothesis of are and which implies asymmetric effect and leverage effect respectively. Furthermore, the positive shocks () can be seen if the sum of coefficient is greater than the negative shocks (), or positive shocks have a stronger impact on conditional volatility than past positive shocks (Lin, 2017). O.P.R. added in the model as controlled variable while moratorium as dummy variable and the specification EGARCH(1,1) model as follows:

$$h_i = a_i + \varphi_i \left(\left| \frac{e_{t-1}^2}{h_{t-1}} \right| \right) + \gamma_i \frac{e_{t-1}^2}{h_{t-1}} + \beta_i h_i + \delta_{1,i} OPR + \delta_{2,i} Moratorium \qquad (1.2)$$

introduced as dummy variable in Equation (1.2) in line with the objective of this study in investigating the impact of the moratorium implemented during the global pandemic and is the coefficient to be determine for moratorium. The optimal EGARCH(1,1) models for each bank's returns were selected based on the lowest values of the Akaike Information Criterion, Schwarz Information Criterion, and Hannan-Quinn Criterion. Subsequently, this study performed diagnostic tests on EGARCH models and assessed the significance of the model parameters that satisfied the specified criteria. Following that, this study addresses the objective of this study by utilizing the EGARCH(1,1) model to

examine the shocks in volatility of the bank's stock price. Selection on the error distribution is based on the kurtosis from the descriptive statistics. This study will utilize Gaussian normal distribution if the model is playkurtic and student's distribution if leptokurtic (Dana, 2016; Ozdemir et al., 2021). Moreover, Half-Life () measure based on Engle and Patton (2001) used in this study in order to estimate on the number of days of volatility persists and it can be estimated by . Autoregressive Conditional Heteroscedasticity Lagrange Multipler (ARCH-LM) and correlogram statistic or Q-Statistics based on Ljung-Box were also conducted to examine the presence of heteroscedasticity and model's residual.

FINDINGS

This section is organized into three distinct subsections. The first subsection presents an overview of the descriptive data for all the banks, consisting of 737 observations. All variables were transformed into their respective return forms and natural logarithms to get a more accurate approximation of a normal distribution, and the results are provided in Table 3. The second subsection presents the outcomes of the EGARCH model without a dummy variable, while the third subsection presents the primary findings, including a moratorium.

Table 3: Descriptive statistics

Banks	Mean	SD	Skewness	Kurtosis	JB
RKLCI					
RAMBANK	-0.000417	0.016941	-0.781331	12.539740	2869.647***
RCIMB	-0.000049	0.017755	-0.317565	24.216750	13835.76***
RHLB	-0.000117	0.013523	0.753899	25.160550	15150.36***
RMAYBANK	-0.000167	0.011416	-1.202899	30.141860	22799.97***
RPBB	-0.000231	0.016235	2.373783	30.774380	24381.06***
RRHB	0.000013	0.015378	1.189809	29.888870	22376.36***
RALLIANCE	-0.000482	0.017182	-1.245054	22.287440	11614.08***
RAFFIN	-0.000326	0.012832	0.459782	11.838650	2424.955***
RBIMB	0.000192	0.016148	-0.566537	17.018580	6074.244***
RMBSB	-0.000728	0.019812	-0.271472	18.160220	7066.822***

Notes: Total observation is 737. S.D. is standard deviation and J.B. is Jarque-Bera test statistic. All variables are expressed in return form and natural logarithm. *** denotes 1 percent level of significance.

For the first moment, only two banks recorded a positive mean: RBIMB (0.000192) and RRHB (0.000013). Other banks recorded a negative mean, with RMBSB being the lowest (-0.000728). For the second moment, RMBSB recorded the highest standard deviation value (0.019812) and the lowest value recorded by RMAYBANK (0.011416). On the third moment, RHLBANK, RPUBLIC, RRHB, and RAFFIN recorded a positive skewness value, indicating a longer-tailed on the right side. Meanwhile, RAMBANK, RCIMB, RMAYBANK, RALLIANCE, RBIMB, and RMBSB exhibit an asymmetric distribution as it recorded negative skewness values. For the fourth moment, the kurtosis value for all variables is greater than 3, indicated a heavy-tailed or leptokurtic distribution. Lastly, Jarque-Bera test statistic recorded 1 percent level of significant which implies that the distribution of all variables departed from normality. This non-normality also indicated the presence of GARCH effect in all series. Moreover, the presence of volatility clustering can be seen in the Figure 1. Consequently, the aforementioned descriptive statistics result on the skewness justified using the EGARCH model. Moreover, based on the excess of kurtosis, non-normality of Jarque-Bera test

statistic, and clusters of volatility shown in Figure 1, the student's conditional distribution for errors was applied in the EGARCH model and the estimation was carefully executed to achieve convergence.

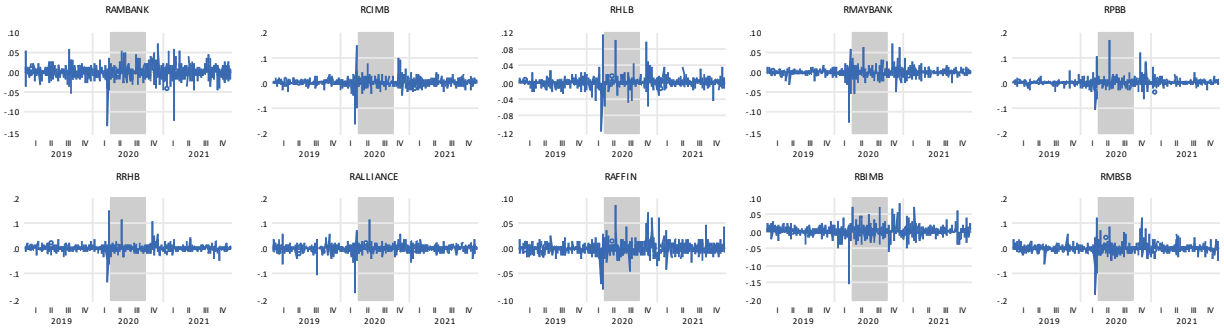

Figure 1: Bank's Daily Return and Implementation of Moratorium

The shaded area represents the duration through which the automatic full blanket moratorium was implemented, spanning from 1 April 2020 to 30th 2020.

Table 4: Result of Unit Root Test and ARCH Effect

Banks/Tests	ADF	PP	ARCH-LM (1)	(12)	(12)
RKLCI					
RAMBANK	-30.7044***	-30.6352***	1.280763	10.484	8.0305
RCIMB	-10.8156***	-29.6076***	30.97521***	42.338***	225.01***
RHLBANK	-12.6086***	-26.1916***	0.636655	19.676**	89.089***
RMAYBANK	-11.4764***	-29.7106***	1.239458	29.273***	41.543***
RPUBLIC	-12.2946***	-25.7347***	0.256972	30.004***	42.356***
RRHB	-12.669***	-30.4682***	13.99373***	35.786***	136.77***
RALLIANCE	-11.183***	-27.6307***	5.585090**	18.999*	41.239***
RAFFIN	-17.3172***	-26.9395***	4.881093**	16.025	58.454***
RBIMB	-18.0239***	-27.1053***	0.0336**	16.471	18.816*
RMBSB	-10.9424***	-28.6138***	22.19880***	38.631***	182.73***

Notes: A.D.F. is Augmented Dickey Fuller and P.P. is Phillip Perron. ARCH-LM is Autoregressive Conditional Heteroscedasticity Lagrange-Multiplier. is Correlogram Q-statistic represents Ljung-Box for normalized residuals and is Ljung-Box for squared residuals. ( ) represent number of lags. *** and ** denotes 1% and 5% level of significance respectively. All variables are expressed in return form and natural logarithm.

Augmented Dickey Fuller (A.D.F.) developed by Dickey and Fuller (1979) and Phillips Perron (P.P.) developed by Phillips and Perron (1988) were employed in this study for stationarity analysis. Result showed that all models were stationary at level, indicating that the model did not have unit root. This study proceeded to determine the heteroscedasticity (ARCH-LM) and autocorrelation (Ljung-Box). Result showed that all models exhibited an ARCH effect and/or correlation except for RAMBANK. Thus, RAMBANK was excluded from further investigation. Overall, pre-condition of descriptive statistic, unit root, and ARCH effect of using EGARCH models have been satisfied (Ahmed et. al., 2018).

Table 5: Result of EGARCH(1,1) model without Moratorium

$$h_i = a_i + \varphi_i \left(\left| \frac{e_{t-1}^2}{h_{t-1}} \right| \right) + \gamma_i \frac{e_{t-1}^2}{h_{t-1}} + \beta_i h_i$$

Variable	φ_i	γ_i	β_i	$e_{t-1}^2 > 0$ $\varphi_i + \gamma_i$	$e_{t-1}^2 < 0$ $\varphi_i - \gamma_i$	HL
RKCLI						
RCIMB	0.29341***	-0.00981	0.95021***	-	-	13.57
RHLB	0.06450***	-0.02597***	0.98798***	0.03853	0.09047	57.31
RMAYBANK	0.21031***	0.01084	0.99161***	-	-	82.27
RPBB	0.10145***	-0.08016***	0.9946***	0.02129	0.18161	127.94
RRHB	0.18264***	-0.06933***	0.98916***	0.11331	0.25197	63.55
RALLIANCE	0.30664***	-0.04314**	0.93248***	0.2635	0.34978	9.9
RAFFIN	0.33122***	0.02883**	0.92561***	-	-	8.97
RBIMB	0.29271***	0.00736	0.73097***	-	-	2.21
RMBSB	0.34906***	0.02528***	0.93452***	-	-	10.23

Notes: is half-life. *** and ** denotes 1% and 5% level of significance. All variables are expressed in return form and natural logarithm.

This study employed the EGARCH model to validated the volatility for all samples further and investigated the impact of moratorium on the bank's stock price. Output result of conditional variance of EGARCH presented in Table 5. On the return volatility, all models characterized by a very high persistence since the coefficient of is closed to 1, except RBIMB (. Thus, almost all stock price of bank's returns was characterized by a long memory effect during the global pandemic of COVID-19. The Result also shows that all variables' coefficients were statistically significant, except for RCIMB, RMAYBANK, and RBIMB. On the asymmetric effect, conditional volatility model of RAFFIN, and RMBSB experienced an asymmetric effect () while RHLB, RPBB, RRHB, and RALLIANCE exhibit a leverage effect (). Thus, the presence of leverage effect from these banks were corroborated with PSUBI in India (Bhatia and Gupta, 2020), Indonesia state-owned bank (Ahadiat and Kesumah, 2021), Global Systemically Important Banks (Batten *et al.,* 2022), and banking sector in Saudi Arabia (Eledum and Sayed, 2021).

In the EGARCH model, the impact of positive shock on the volatility was calculated by while negative shock is calculated by (Lin, 2017; Ozdemir *et al*., 2021). Results show that positive shocks affect RHLB by 0.0385% and negative shocks by 0.09%. Volatility persistence was examined, and the effect continue for approximately 57.31 days. On the other hand, RPBB was affected more by negative shocks (0.1816%) than positive shocks (0.02129%). In addition, RPBB recorded the highest volatility effect compared to others, as it continued for approximately 127.94 days. Meanwhile negative shocks of RRHB (0.252%) were more pronounced than positive shocks (0.1133%). The effect of volatility was approximately 63.55 days. Similar with other banks, positive shocks of RALLIANCE was affected as much as 0.2635% while negative shocks affected as much as 0.35%. However, RALLIANCE recorded the lowest impact of volatility by 9.9 days, and it suggested that the impact of volatility shocks was short-lived and quickly dissipated compared to RHLB, RPBB, and RRHB. Hence, these negative shocks experience by these banks during the COVID-19 global pandemic align with the empirical result by Ozdemir *et al*., (2021).

Table 6: Result of EGARCH(1,1) model with moratorium

$$h_i = a_i + \varphi_i\left(\left|\frac{e_{t-1}^2}{h_{t-1}}\right|\right) + \gamma_i\frac{e_{t-1}^2}{h_{t-1}} + \beta_i h_i + \delta_i Moratorium$$

Variable	φ_i	γ_i	β_i	δ_i	$e_{t-1}^2 > 0$ $\varphi_i + \gamma_i$	$e_{t-1}^2 < 0$ $\varphi_i - \gamma_i$	HL
RKLCI							
RCIMB	0.29299***	-0.00996	0.95079***	-0.00392			13.74
RHLB	0.05973***	-0.03683***	0.98595***	0.02075***	0.0229	0.09656	48.97
RMAYBANK	0.21099***	0.01146	0.99114***	0.7965			77.86
RPBB	0.10373***	-0.07425***	0.99133***	0.01516***	0.02948	0.17798	79.64
RRHB	0.23974***	-0.06255***	0.96582***	0.03644***	0.17719	0.30229	19.93
RALLIANCE	0.33180***	-0.05590***	0.9211***	0.06007***	0.2759	0.3877	8.43
RAFFIN	0.35578***	0.01358	0.89925***	0.08416***			6.53
RBIMB	0.29972***	0.00078	0.74434***	0.10065***			2.3
RMBSB	0.35411***	0.02762*	0.92779***	0.03015			9.24

Notes: is half-life. *** and ** denotes 1% and 5% level of significance. All variables are expressed in return form and natural logarithm.

Moratorium introduced in the EGARCH model as the dummy variable in line with the objective of this study and the impact of moratorium presented in Table 5. All banks recorded a positive and statistically significant coefficient for except for RCIMB, RMAYBANK, and RMBSB. This indicated that implementation of moratorium did not affect the volatility in CIMB Group Holdings Berhad, Malayan Banking Berhad, and Malaysia Buliding Society Berhad. RAFFIN and RBIMB also exhibited a statistically significant coefficient of but failed to reject null hypothesis (. Thus, moratorium did affect the volatility of RAFFIN and RBIMB but no asymmetric nor leverage effect was found in the volatility.

Similar with the result in Table 5, among all the banks, only RHLB, RPBB, RRHB, and RALLIANCE exhibited a statistically significant coefficients at 1 percent level in the models. Furthermore, these models exhibited a positive and statistically significant . This indicated that moratorium induced a positive volatility to RHLB, RPBB, RRHB, and RALLIANCE by 0.0208%, 0.0152%, 0.1772%, and 0.2759% respectively. But coefficient of in the model was negative, which indicated that all banks exhibit a leverage effect (, with and without the moratorium.

A negative sign coefficient of indicated that there was a leverage effect in the model. Meanwhile positive and statistically significant indicated that moratorium induced a positive volatility to RHLB, RPBB, RRHB, and RALLIANCE. Similarly, the negative shock to the volatility of RHLB, RPBB, RRHB, and RALLIANCE was more pronounce than positive shocks. Moreover, there was an increase in negative shocks when the moratorium was included in the model where RRHB recorded the highest increase of 0.00503%, followed by RALLIANCE (+0.0038%), and lastly RHLB (+0.0058%). Only RPBB recorded a reduction of negative shock when moratorium included in the model by 0.0036%. Empirical result of this study was in line with the conclusion made by Sah and Wong (2021) as the implementation of moratorium caused a negative shock towards volatility of the bank stock price. On the other hand, this study also found that moratorium in the model shorter all volatility decay of all the banks based on Half-Life, except for RCIMB (+0.17 day). Thus, implementing the moratorium did cause negative shocks to the banks, but it shortened the duration of the volatility.

Diagnostic tests were re-conducted to examine the appearance of heteroscedasticity and autocorrelation problem. The accuracy of the model specification was indicated by the

statistically insignificant ARCH-LM (1). This result indicated that the ARCH effect in the return model disappeared. Furthermore, the value of Q-stat and Q^2-stat for the lag of 12 was statistically insignificant, indicating that the model was unaffected by autocorrelation (except RCIMB and RMBSB).

Table 7: Diagnostic tests

Model	WITHOUT MORATORIUM			WITH MORATORIUM		
Variable/Test	**ARCH-LM (1)**	**(12)**	**(12)**	**ARCH-LM (1)**	**(12)**	**(12)**
RKLCI						
RCIMB	0.075646	13.696	19.282**	0.144736	14.513	21.464**
RHLB	0.236809	6.1497	1.2946	0.17275	6.0976	1.0613
RMBB	0.143514	11.311	3.6414	0.158987	11.843	3.7126
RPBB	0.259423	8.5366	3.2283	0.384794	8.6011	4.0588
RRHB	0.138276	8.5741	2.6205	0.168522	8.754	3.4199
RALLIANCE	0.07156	12.694	3.122	0.071136	12.681	3.1002
RAFFIN	0.160543	15.556	10.315	0.265389	15.757	9.839
RBIMB	0.316335	13.78	9.0004	0.244058	14.822	10.247
RMBSB	0.209411	15.938	25.459**	0.271426	13.733	23.999**

Notes: ARCH-LM is Autoregressive Conditional Heteroscedasticity Lagrange-Multiplier. is Correlogram Q-statistic represents Ljung-Box for normalized residuals and is Ljung-Box for squared residuals. ( ) represent number of lags. ** denotes 5% level of significance. All variables are expressed in return form and natural logarithm.

CONCLUSION

This study examines the impact of the loan repayment moratorium on the volatility of banking stocks in Bursa Malaysia. Empirical result showed that automatic six-months full blanket moratorium did induce a positive shock to the volatility of the stock price of all public listed banks except for CIMB Group Holdings Berhad, Malayan Banking Berhad, and Malaysia Building Society Berhad. However, Hong Leong Bank Berhad, Public Bank Berhad, RHB Bank Berhad, and Alliance Bank Berhad experience a leverage effect and on top of that, a negative shock was more pronounce compared to the positive shock to the volatility of their stock prices. Thus, it can be concluded that the magnitude of the moratorium's positive shock was rather smaller compared to the negative shock experience by the stock price of these banks. Overall, the implementation of a moratorium has a negative impact on the volatility of the bank's stock price. However, it does shorten the duration of the volatility.

Findings from this study might be advantageous to current and prospective investors. Banks such as Malayan Banking Berhad, Affin Bank Berhad, Bank Islam Berhad, and Malaysia Building Society Berhad have a neutral volatility impact, making them attractive investments for those who desire lesser risk. Moreover, prospect investors would have better guidance on investment options in a new crisis, particularly if B.N.M. contemplates imposing a full blanket moratorium again.

In addition to benefiting investors, this research also provided advantageous results for B.N.M. Although implementing a full blanket moratorium during an unprecedented event could be advantageous for households or businesses, it may harm banks' stock price. Hence, B.N.M. must meticulously assess financial assistance measures to guarantee an equilibrium among the concerns of households, businesses, and shareholders. Policy actions have the potential to significantly impact stock prices. Nevertheless, B.N.M. has expanded its scope by offering a strategic plan for future crises, including those of comparable

magnitude to the COVID-19 global pandemic.

The COVID-19 pandemic has had a significant and far-reaching effect on the global economy and financial markets. Hence, the findings of this study have the potential to inspire further research. Therefore, this study solely emphasizes the full blanket moratorium, despite B.N.M. has implemented other measures to provide relief for loan repayments. Hence, there is a potential for varying responses from investors prior to and following the moratorium concerning the stock price of banks. One can further examine the variations in implementing full, partial, and post-moratorium to the volatility of stock prices.

Furthermore, these publicly listed banks demonstrated distinct market capitalization levels, with certain banks listed on the Kuala Lumpur Composite Index. Therefore, these banks may experience a different level of risk exposure and resilience during times of crisis. In addition to moratorium and shocks in volatility, this study also incorporated Half-life in determining the duration or persistence of the volatility. Interestingly, the volatility of all KLCI banks took a more extended day to decay, while non-KLCI banks took less than ten days to decay. This merits deeper investigation as it might benefit the prospective investor or fund manager. Thus, this study defers this subject to be addressed in future research.

REFERENCES

[1]Statement extracted from The Edge news by the previous Finance Minister of Malaysia on the 31 December 2023. Statement: https://theedgemalaysia.com/article/zafrul-rm64b-estimated-losses-banks-during-moratorium-period.

[2]Statement extracted from the press statement by The Association of Banks in Malaysia (A.B.M.) on the 31 December 2023. Statement: https://www.abm.org.my/press-releases/media-statement-by-the-association-of-banks-in-malaysia/.

Acharya, V.V., Engle, R.F., & Steffen, S. (2021). Why did bank stocks crash during COVID-19? National Bureau of Economic Research.

Adenomon, M.O., Maijamaa, B., & John, D.O. (2022). The effect of COVID-19 outbreaks on the Nigerian stock exchange performance: Evidence from GARCH model. *Journal of Statistical Modeling and Analytics, 4*(1).

Ahadiat, A. & KESUMAH, F.S.D., (2021). Risk Measurement and Stock Prices during the COVID-19 Pandemic: An Empirical Study of State-Owned Banks in Indonesia. *The Journal of Asian Finance, Economics and Business*, *8*(6), 819-828.

Ahmed, R.R., Vveinhardt, J., Streimikiene, D., & Channar, Z.A. (2018). Mean reversion in international markets: Evidence from GARCH and half-life volatility models. *Economic Research-Ekonomska istrazivanja, 31*(1), 1198-1217.

Almutair, S. (2015). Dynamics of the relationship between bank loans and stock prices in Saudi Arabia. *International Business and Economics Research Journal (IBER)*, *14*(3): 439-452.

Alzyadat, J.A., Abuhommous, A.A.A. & Alqaralleh, H., (2021). Testing the conditional volatility of saudi arabia stock market: Symmetric and asymmetric autoregressive conditional heteroskedasticity (GARCH) approach. *Academy of Accounting and Financial Studies Journal*, *25*(2), 1-9.

Batten, J.A., Choudhury, T., Kinateder, H. & Wagner, N.F., (2023). Volatility impacts on the European banking sector: G.F.C. and COVID-19. *Annals of Operations Research*, *330*(1), 335-360.

Bhatia, P. & Gupta, P., (2020). Sub-prime crisis or COVID-19: A comparative analysis of volatility in Indian banking sectoral indices. *FIIB Business Review*, *9*(4), 286-299.

Bhuvaneshwari, D. & Radhika, K.P. (2021). Impact of COVID-19 on the financial sector indices. *International Research Journal of Business Studies, 14*(2), 137-145.

Black, F. (1976). The pricing of commodity contracts. *Journal of Financial Economics, 3*(1-2), 167-179.

Bollerslev, T. (1986) Generalized autoregressive conditional heteroscedasticity. *Journal of Econometrics, 31*(3), 307-327.

Bonga, W.G., Chimwai, L., Siyakiya, P. & Choga, I., (2022). Stock Market Volatility in Zimbabwe Stock Exchange during Pandemic Period. *Eurasian Journal of Economics and Finance*, *10*(2), 68-82.

Brooks, C. & Williams, L. (2022). When it comes to the crunch: Retail investor decision-making during periods of market volatility. *International Review of Financial Analysis*, *80*, 102038.

Ciotti, M., Ciccozzi, M., Terrinoni, A., Jiang, W.C., Wang, C.B., & Bernardini, S. (2020). The COVID-19 pandemic. *Critical Reviews in Clinical Laboratory Sciences, 57*(6), 365-388.

Dana, A.N. (2016). Modelling and estimation of volatility using ARCH/GARCH models in Jordan's stock market. *Asian Journal of Finance and Accounting, 8*(1), 152-167.

Dickey, D.A. and Fuller, W.A. (1979) Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association,* 74(366a), 427-431.

Eledum, H. & Sayed, O.A., (2021). Asymmetric Modelling of COVID-19 related news persistence impact on Saudi Arabia stock market volatility. *International Journal of Ecology & Development*, 58-72.

Ellul, A., Erel, I., & Rajan, U. (2020). The COVID-19 pandemic crisis and corporate finance. *The Review of Corporate Finance Studies, 9*(3), 421-429.

Engle, R.F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. *Econometrica: Journal of The Econometric Society,* 987-1007.

Engle, R.F. & Patton, A.J. (2001). What good is volatility model? *Quantitative Finance, 1*(2), 237.

Fakhfekh, M., Jeribi, A. & Ben Salem, M., (2023). Volatility dynamics of the Tunisian stock market before and during the COVID-19 outbreak: Evidence from the GARCH family models. *International Journal of Finance & Economics*, *28*(2), 1653-1666.

Hu, L., Han, J., & Zhang, Q. (2018). The impact of monetary and fiscal policy shocks on stock markets: Evidence from China. *Emerging Markets Finance and Trade, 54*(8), 1856-1871.

Ibrahim, M.H. (2006). Stock prices and bank loan dynamics in a developing country: The case of Malaysia. *Journal of Applied Economics, 9*(1), 71-89.

Ibrahim, M.H. & Shah, M.E. (2012). Bank lending, macroeconomic conditions and financial uncertainty: Evidence from Malaysia. *Review of Development Finance*, *2*(3-4), 156-164.

Khan, M., Kayani, U.N., Khan, M., Mughal, K.S. & Haseeb, M. (2023). COVID-19 Pandemic & Financial Market Volatility; Evidence from GARCH Models. *Journal of Risk and Financial Management*, *16*(1), 50.

Lahmiri, S. (2017). A study on chaos in crude oil markets before and after 2008 international financial crisis. *Physica A: Statistical Mechanics and its Application, 466*, 389-395.

Lin, Z. (2018). Modeling and forecasting the stock market volatility of S.S.E. Composite Index using GARCH models. *Future Generation Computer Systems, 79*, 960-972.

Liu, F., Kong, D., Xiao, Z., Zhang, X., Zhou, A., & Qi, J. (2022). Effect of economic policies on the stock and bond market under the impact of COVID-10. *Journal of Safety Science and Resilience, 3*(1), 24-38.

Nelson, D.B. (1991). Conditional heteroscedasticity in asset returns: A new approach. *Econometrica: Journal of the Econometric Society,* 347-370.

Nikhil, M.N., Suman, C., Lithin, B.M., Sanket, S., & Satyakam. (2023). Modeling Indian bank Nifty volatility using univariate GARCH models. *Banks and Bank Systems, 18*(1), 127-138.

Nurdany, A., Ibrahim, M.H. & Romadoni, M.F., (2021). The asymmetric volatility of the Islamic capital market during the COVID-19 pandemic. *Journal of Islamic Monetary Economics and Finance*, *7*, 185-202.

Oseni, I.O. & Nwosa, P.I. (2011). Stock market volatility and macroeconomic variable volatility in Nigeria: An exponential GARCH approach. *Journal of Economics and Sustainable Development, 2*(10), 28-42.

Ozdemir, L., Ercan, O.Z.E.N., Grima, S., & Romanova, I. (2021). Determining the return volatility of major stock markets before and during the COVID-19 pandemic by applying the EGARCH model. *Scientific Annals of Economics and Business,* 68(4), 405-419.

Phillips, P.C., and Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika, 75*(2), 335-346.

Putri, H.T. (2020). COVID-19 dan harga saham perbankan di Indonesia. *Eksis: Jurnal Ilmiah Ekonomi dan Bisnis, 11*(1), 6-9.

Rosli, N., Pitchay, A.A., Azman, N.H.N., & Abd Jalil, M.I. (2023). Does bank's moratorium alleviate the burden of borrowers? Case of the pandemic COVID-19. *Malaysia Journal of Business and Economics, 10*(1), 43-57.

Sah, N.I.M & Wong, W.Y. (2021). The impact of MCO on the stock market and moratorium on Banking sector's performance in Malaysia: The case of COVID-19. *Labuan Bulletin of International Business and Finance, 19*, 13-25.

Samsi, S.M., Yusof, Z. & Cheong, K.C. (2018). The effect of global financial crisis on ASEAN growth: Evidence from stock market analysis. *DLSU Business and Economics Review*, *28*(1), 1-33.

Setiawan, B., Ben Abdallah, M., Fekete-Farkas, M., Nathan, R.J. & Zeman, Z. (2021). GARCH (1, 1) models and analysis of stock market turmoil during COVID-19 outbreak in an emerging and developed economy. *Journal of Risk and Financial Management*, *14*(12), 1-19.

Shah, A.U.M., Safri, S.N.A., Thevadas, R., Noordin, N.K., Abd Rahman, A., Sekawi, Z., Ideris, A., & Sultan, M.T.H. 2020. COVID-19 outbreak in Malaysia: Action taken by the Malaysian government. *International Journal of Infectious Diseases, 97*, 108-116.