

Revisiting the Impact of the COVID-19 Pandemic on Stock Price Volatility: Evidence from Malaysian Glove Companies

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Abstract: *Glove companies are thriving despite the challenges most sectors have encountered during the COVID-19 pandemic. Hence, this study investigated the impact of the pandemic on individual glove stock volatility via the Exponential GARCH (EGARCH) model. The empirical results demonstrated that the number of COVID-19 positive cases reported daily negatively influences the volatility of glove companies. In addition, the presence of a leverage effect was found in the volatility of Top Glove Corporation. The empirical results improve understanding of the dynamics of glove companies during an unprecedented event, which would benefit individual and institutional investors. Furthermore, the result will aid investors in mitigating risks, formulating trading strategies, and managing investment portfolios during a pandemic.*

Keywords: COVID-19, Glove Stock, Volatility, Asymmetric, EGARCH

1. Introduction

The first Corona Virus Disease 2019 (COVID-19) case was reported in December 2019 at the province of Wuhan China, and rapid transmission of this virus led to the start of the global pandemic. Due to the rapid spread and the lack of a vaccine, governments around the world implemented strict regulations to restrict its citizens' movements. The Malaysian government implemented a Movement Control Order (MCO) that restricted people from leaving their homes except for those employed in essential services (Shah et al., 2020; Keh and Tan, 2021). These strict regulations disrupted stock markets globally and the FTSE Bursa Malaysia fell by 25.1% from 1612.6 (January 2020) to 1207.80 (March 2020). This downfall was attributed to panicked investors who constantly sold their stock holdings and avoided the markets as the world navigated to the uncharted and unprecedented event (Eachempati et al., 2021).

But not all bloom is gloom, as there are opportunities for every problem that arises. This is consistent with the fundamental concept of behavioral finance, where the contrarian distinguishes value during unprecedented event where others perceive difficulties. Contrarian individual and institutional investors are usually able to identify opportunities to invest in companies that have benefited from this global pandemic (Pagano et al., 2021). For example, Jiang et al. (2017) reported a positive effect of the reported number of daily cases on the China stock market during the influenza A outbreak, while Donadelli et al. (2017) reported that disease-related news during influenza A, severe acute respiratory syndrome (SARS), Ebola, and polio outbreaks significantly and positively influenced pharmaceutical stock returns in the United States. Consequently, while normal investors are staying away from the market, both

contrarian individual and institutional investors may redirect their investments toward the sectors that are likely to benefit during the global pandemic of COVID-19.

FTSE Bursa Malaysia does not currently list any pharmaceutical company, but it does feature several healthcare-related companies that excel in their respective areas of expertise. This can be seen when healthcare authorities instruct the mandatory use of full protection kits, including surgical gloves to the healthcare workers who provide medical treatment to people diagnosed with or suspected of having COVID-19 (Anedda et al., 2020). This approach allowed glove manufacturers to expand their production lines and, in turn, attract new opportunities in the challenging global market for individual and institutional investors to invest in their companies. As a result, Malaysian glove companies with years of industrial experience have benefitted significantly from the COVID-19 pandemic. Table 1 shows that all six glove companies listed in FTSE Bursa Malaysia experienced a super bull run, with Careplus Group (+2351%) leading the way, followed by Hextar Group (+1425%), Supermax Corporation (+1309%), Top Glove Corporation (+421%), Kossan Rubber Industries (+301%), and Hartalega Holdings (+250%). All of these companies have recorded historically high stock prices; nevertheless, no rally lasts forever.

Table 1: Malaysian Glove Companies

Glove Companies	Date Listed in FTSE Bursa Malaysia	Pre COVID-19 (MYR)	Highest in 2020 (MYR/%)	Post-COVID-19 (MYR/%)
Careplus Group	16 November 2010	0.235	5.76 / +2341%	0.775 / -86.89%
Hartalega Holdings	28 March 2008	6.03	21.16 / +250%	5.08 / -75.99%
Hextar Global	19 August 2009	0.20	3.05 / +1425%	0.63 / -79.34%
Kossan Rubber Industries	8 March 1996	2.375	9.54 / +301%	2.05 / -78.51%
Supermax Corporation	30 June 2000	0.76	10.71 / +1309%	1.27 / -88.14%
Top Glove Corporation	16 February 2001	1.84	9.60 / +421%	2.05 / -78.65%

Source: Authors' collection.

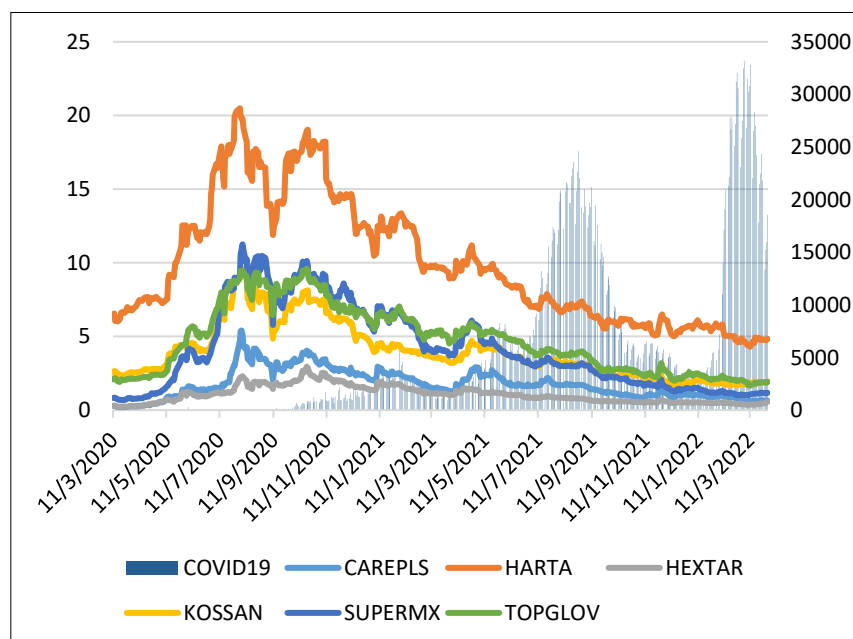


Figure 1: Stock Prices of Glove Companies and New Case of COVID-19 Reported

Source: Bloomberg Terminal and Ministry of Health Malaysia.

Despite Malaysia only initiating the vaccine rollover campaign in February 2021 and transitioning to the endemic phase on April 1, 2022, Figure 1 illustrates the decline in the stock prices of glove companies in the third quarter of 2020. Moreover, the stock prices of Hartalega Holdings and Kossan Rubber Industries are trading lower compared to their pre-pandemic prices. Furthermore, the stock prices of these companies exhibited an upward trend towards their peak, a period marked by a relatively low number of positive cases, before experiencing a downward trend as the number of positive cases continued to rapidly increase. This development has raised questions regarding the relationship and impact of COVID-19 on Malaysian glove companies. It is clear that this global pandemic has substantially impacted the financial markets, and the outbreak has had a particularly detrimental effect on the investment portfolios of individual and institutional investors. But whether the pandemic has an impact on the volatility of the glove companies was uncertain. Hence, the motivation for this study derived from seeking to understand how the volatility of the Malaysian glove companies was shaped during the COVID-19 periods.

Therefore, the primary objective of this study is to empirically examine the impact of the global pandemic on the volatility of individual glove companies listed on FTSE Bursa Malaysia. Moreover, this study will further investigate the presence of an asymmetric effect of positive or negative innovations on the volatility by incorporating a real number of COVID-19 reported cases instead of a dummy variable. The inclusion of this variable will yield an accurate representation of the impact of COVID-19 on the volatility of glove companies. To achieve this objective, the Exponential Generalized Autoregressive Conditional Heteroscedasticity (EGARCH) model is employed to capture asymmetry in volatility clustering. Effectiveness of EGARCH is capturing asymmetric effects in the volatility by differentiating positive and negative shocks will contribute our understanding of these dynamic market during unprecedented events.

This empirical examination is notable as few researchers have documented this unprecedented event, specifically glove companies, and whether their volatility benefitted from the pandemic or vice versa. Addressing this issue is expected to contribute to existing literature and practitioners. The outcome from this study will facilitate a deeper understanding of the volatility of the glove companies and provide more comprehensive information on the financial markets' response to an unprecedented event. Additionally, the results could potentially assist individual and institutional investors in effectively managing risk, developing trading strategies, and managing their investment portfolios, which is crucial before making investment decisions in glove companies or any other market. This study is unfolded as follows. The first part is an introduction, the second part is a literature review, the third part discusses the data and the method, fourth part provides a detailed analysis and discussion of the results, and the fifth part is conclusion with recommendations.

2. Literature Review

COVID-19 is not the first global pandemic that has significantly impacted the world and led to a substantial loss of life. The World Health Organisation (WHO) has declared several previous global pandemics, including SARS in 2002 and Ebola in 2014. Consequently, several researchers undertook a study examining the effects of the pandemic on the stock market. Keogh-Brown and Smith (2008) conducted an investigation involving 33 countries impacted by the SARS, revealing that the magnitude of SARS had severe repercussions on the global economy where various sectors in both countries experienced the greatest losses due to SARS. Meanwhile Beutels et al. (2009) focused on Beijing, China, and reported that SARS

significantly affected tourism-related activities in May 2003. The tourism industry experienced irreparable losses of approximately USD1.4 billion, which was 300 times higher than the SARS treatment costs in Beijing.

Other than SARS, Joo et al. (2019) examined the economic effects of the Middle East respiratory syndrome (MERS) outbreak in South Korea. The researchers concluded that 2.1 million non-citizen tourists shortened their trips due to the outbreak, which affected USD2.6 billion in South Korean tourism revenue and hundreds of millions of US dollars in other sectors. Hence, global pandemic has demonstrably inflicted economic damage on sectors closely associated with physical-related activities especially tourism, services, accommodation, and transportation.

In addition to analysing economic sectors, previous researchers have attempted to examine the global consequences of the pandemic on the stock market, as it serves as a significant indicator of prevailing sentiment. For instance, Ali et al. (2010) conducted a study focus on the short-term effects of multiple events in Malaysia and reported that the 2003 SARS outbreak presented substantial evidence of stock overreaction behavior in Bursa Malaysia. Meanwhile Jiang et al. (2017) examined the relationship between influenza A (H7N9) cases reported daily and stock price indices in China. The results revealed that the Avian Influenza Sector Index decreased as the H7N9 cases increased, particularly when there were fewer than five cases. The H7N9 case number reported daily also strongly correlated with the Avian Influenza Sector Index closing price.

Meanwhile Donedelli et al. (2017) investigated investor moods on pharmaceutical companies listed on the US stock market due to the WHO alert and international media coverage during the SARS (2003) and influenza A H1N1 (2009) outbreaks. The researchers concluded that the current and lagged effects revealed clear and incontrovertible evidence that disease news positively and significantly affected US pharmaceutical stock returns. The researchers also determined relatively stronger effects for a small-stocks portfolio.

Past studies demonstrate that every pandemic has a devastating impact on various sectors in each affected country. However, in contrast to previous pandemics, COVID-19 has sparked extensive research due to its unparalleled scale and widespread impact across all countries. Almost every country has implemented restrictions on movement (Piccoli et al., 2021), and the closure of borders has led investors to steer clear of physical sectors such as tourism, services, accommodation, and transportation. As the world navigates uncharted territory, investors are attempting to learn from past pandemics and gather all available information to restructure their investment portfolios. This is in line with the theory of rational expectations, where investors make investment decisions based on rationality, available information, past experience, and current policies.

Thus, during this unprecedented event, it is only natural for investors to experience concern and fear. However, it is crucial for them to evaluate rationally the effect of these pandemic on their investment portfolio. Consequently, investors may leverage all accessible information to make informed decisions regarding potential beneficiaries of this pandemic, as Stein (1996) emphasizes that sentiment toward investment is a systematic deviation of investors' expectations of the future. Investors have identified the absence of a COVID-19 vaccine as a significant factor contributing to the global repercussions of this virus. Hence, when Chinese scientists disseminated information about COVID-19 (Han, 2020), pharmaceutical companies promptly tasked their researchers to develop a COVID-19 vaccine (Patel et. al., 2021; Thorn

et. al., 2022). Consequently, investors gather all available information and recognise this opportunity to redirect their investments towards pharmaceutical companies.

Numerous researchers examined the performance of pharmaceutical companies during this global pandemic. For instance, Ambelal and Sebastian (2021) studied the performance of pharmaceutical companies on various stock exchanges and reported that COVID-19 did not notably affect individual pharmaceutical stock returns. Nonetheless, pandemics generally increased volatility for most pharmaceutical stocks. Davidescu et al. (2021) focused on Sanofi, AbbVie Inc., Pfizer, and Bristol Myers Squibb using DCC-GARCH analysis. The results revealed investors' preference for Pfizer during the COVID-19 pandemic, which was driven by its COVID-19 vaccine development. The researchers also determined that market fluctuations influenced stock returns before and during the pandemic, which emphasized the effects of volatility. This result highlighted investors' substantial support for innovative biopharmaceutical firms amid the pandemic, which rewarded their contributions to fighting disease and aiding global recovery. Both aforementioned studies reported similar results and concluded that COVID-19 did not significantly affect individual pharmaceutical stock returns but increased volatility across the sector.

Other than return and volatility, few researchers focused on the presence of asymmetric in the volatility during the COVID-19 pandemic. Ozdurak et al. (2020) and Baek et al. (2020) were among the first researchers to document the asymmetric effect on the stock market. Ozdurak et al. (2020) examined Gilead Sciences, ChiNext, Bristol Myers Squibb, AbbVie Inc., Dynavax Technologies, and Pfizer, and their empirical results demonstrated that pharmaceutical companies benefited significantly from pandemics. For example, Gilead Science developed remdesivir, the Ebola vaccine, and Dynavax Technologies collaborates on vaccine development. The analysis also demonstrated that the market reacted positively to the positive news and these companies experienced asymmetric effects. This result suggested that the market valued these companies expecting them to play an important role in discovering treatments or addressing critical parts of the pandemic. Contrasting with other multinational pharmaceutical companies, Gilead Science and Dynavax Technologies demonstrated more pronounced responses to positive news due to their greater engagement in outbreak control.

Baek et al. (2020) examined the response of 14 US stock market-listed industries to COVID-19 reporting daily and identified significantly increased total risk across all US stock market industries. Furthermore, the researchers determined that volatility was more responsive to COVID-19 news than economic gauges. Moreover, negative data on the deaths reported had double the effects compared to positive news regarding recoveries. The researchers concluded that the market response to COVID-19 news exerted an asymmetrical effect of positivity and negativity. Meanwhile Wang et al. (2023) examined US and Chinese pharmaceutical companies using the exponential GARCH (EGARCH) model. They determined that both countries experienced asymmetric effects. Positive news in China exerted a greater influence on pharmaceutical companies, which resulted in higher investment levels during market optimism. Contrastingly, negative news had a more significant influence on US pharmaceutical stocks. The researchers concluded that US pharmaceutical companies benefited from market volatility as they initially gained popularity as a top investment option during the pandemic due to the anticipated advancements in medicine and vaccine development. Surprisingly, it is also a safe haven asset during a pandemic.

These prior studies show how pharmaceutical companies benefitted during the global pandemic of COVID-19. However, there is a gap between the first reported case and the development

and public availability of the vaccine. Therefore, the unknown virus and months of ongoing development of vaccines present an opportunity for investors to invest in healthcare-related companies, particularly in light of the anticipated surge in demand for surgical gloves. In accordance to the authors' understanding, the impact of the COVID-19 pandemic on the volatility of Malaysian glove stocks appears to be limited. Rosli et al. (2023) focus on the stock market forecasting via ARIMA found that Top Glove Corporation Berhad emerged as the most successful stock, characterised by impressive average daily returns paired with a comparatively lower risk profile. In contrast, Air Asia Berhad was the worst performing stock, marked by a high standard deviation and the lowest average daily returns across the board, exhibiting negative average daily returns throughout the entirety of 2020. Meanwhile Mok (2021) conducting a SWOT analysis and Porter Five Forces on a glove company and concluded that Malaysia gloves industry has its potential to grow due to continuously demand from domestic and international markets.

Awareness of the performance and effects of glove companies, especially during investors' dire concerns, is needed as the results of this study could present a fresh perspective on all glove companies. Thus, the effects of the pandemic on Malaysian glove companies should be examined and documented. This study expands the scope of previous studies by including the real number of positive cases reported as the subject of interest instead of a dummy variable. Whether the number of cases reported drives the volatility of glove companies will be discovered in this study. Moreover, this study employed the EGARCH model, attempting to capture the asymmetric effect in the volatility of Malaysian glove companies. The outcome will determine whether this global pandemic has a positive or negative impact on the glove companies. The empirical results contribute new insights and discussion to the existing literature, risk management, trading strategies, and portfolio management for individual and institutional investors.

3. Data and Methodologies

This study used daily data from March 11 2020 to March 31 2022, which consisted of the closing prices of individual stocks of FTSE Bursa Malaysia-listed glove companies. We selected March 11 2020 because there were new cases reported continuously on that day, and March 31 2022 marked the end of the pandemic in Malaysia before transitioning to the endemic phase the following day. These data were converted to the returns form using the formula $R_t = P_t/P_{t-1}$, where R_t denotes the individual glove stock return and P_t and P_{t-1} denote t and $t - 1$, respectively. All stock prices of glove companies extracted from the Bloomberg Terminal and the positive COVID-19 case numbers reported daily was obtained from the Ministry of Health Malaysia.

EGARCH is one of the extension versions of Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model developed by Bollerslev (1986). The problem with the model is it does not capture the asymmetric nature caused by the inverse correlation between volatility and returns (Ezzat, 2012). Thus, Nelson (1991) introduced EGARCH to capture the leverage effect and the model is given by:

$$\text{Log}(\sigma_t^2) = w + \sum_{j=1}^q \beta_j (\sigma_{t-j}^2) + \sum_{i=1}^p a_i \left| \frac{\varepsilon_{t-i}}{\sigma_{t-i}} \right| + \sum_{k=1}^r \gamma_k \frac{\varepsilon_{t-k}}{\sigma_{t-k}} \quad (1)$$

where Equation (1) is the conditional variance of EGARCH consist of ARCH term (a_i), GARCH term (β_j), and the asymmetric effect (γ_k). γ_k is the coefficient that captures the

asymmetric effects in volatility. The null hypothesis states that the model is symmetrical ($H_0: \gamma_k = 0$) and the alternative hypothesis is ($H_a: \gamma_k \neq 0$). Specifically, the alternative hypothesis of γ_k involves $y > 0$ (asymmetric effect) and $y < 0$ (leverage effect). Compared to the other version of GARCH, EGARCH has an advantage where positivity of the parameters is guaranteed since this model works with the log of the variance. Moreover, there are no restrictions on the parameters of a , β , and γ , although β must be positive and less than 1 to maintain its stationarity (Epaphra, 2016; Xu and Lien, 2022). To address the objective of this study, the specific model based on Equation (1) is as follows:

$$\text{Log}(\sigma_t^2) = w + \sum_{j=1}^q \beta_j (\sigma_{t-j}^2) + \sum_{i=1}^p a_i \left| \frac{\varepsilon_{t-i}}{\sigma_{t-i}} \right| + \sum_{k=1}^r \gamma_k \frac{\varepsilon_{t-k}}{\sigma_{t-k}} + \varphi_i \text{Case}_t \quad (2)$$

The possible impact of the number of COVID-19 positive cases on the volatility of individual glove stock incorporated in Equation (2) denotes by Case_t as exogenous variable. The null hypothesis is the number of COVID-19 positive case did not drive volatility on the glove companies ($h_0: \varphi_i = 0$) and the alternative hypothesis is the number of COVID-19 reported case drive and induce volatility on the glove companies ($h_0: \varphi_i \neq 0$).

This study also attempted to examine the presence of asymmetric in the volatility of glove companies. Thus, the null hypothesis is no asymmetric effect found in the volatility of glove companies ($H_0: \gamma_k = 0$) and the alternative hypothesis is ($H_a: \gamma_k \neq 0$). If asymmetric found in the volatility, the coefficient of γ_k indicates whether there is a positive shock ($y > 0$) or negative shock ($y < 0$) in the volatility of the glove companies. Furthermore, this study will determine number of days for the volatility to decay after a shock or sudden increase in volatility based on Half-Life [$HL = \text{Log}(0.5)/\text{Log}(\beta)$] (Ahmed et al., 2018). This will provide insights into the persistence of volatility and understanding the speed of adjustment to its equilibrium point. Lastly, the presence of heteroscedasticity and persistence of serial correlation in the series, or vice versa, were examined using the autoregressive conditional heteroscedasticity Lagrange multiplier (ARCH-LM) and Ljung-Box-based Q-statistics squared residual.

4. Empirical Results and Discussion

The empirical results begin with descriptive statistics on the general overview of individual glove stock returns, followed by the primary result, which examines the impact of the pandemic on the volatility of individual glove stocks. Lastly, the outcomes of the diagnostic tests are reported.

Table 2: Descriptive Statistics

Variable/Test	Mean	SD	Skewness	Kurtosis	JB
RCAREPLS	1.0041	0.0735	1.9053	10.733	1560.82 ^a
RHARTA	1.0000	0.0355	0.5557	7.1802	392.888 ^a
RHEXTAR	1.0031	0.0603	1.7775	9.8356	1246.63 ^a
RKOSSAN	1.0002	0.0378	0.4450	6.9708	347.747 ^a
RSUPERMX	1.0021	0.0533	1.0408	6.4189	336.451 ^a
RTOPGLOV	1.0006	0.0406	1.0073	7.2763	469.256 ^a

Notes: There were 504 observations. SD = standard deviation; JB = Jarque-Bera statistic test. ^a denotes 1% significance level.

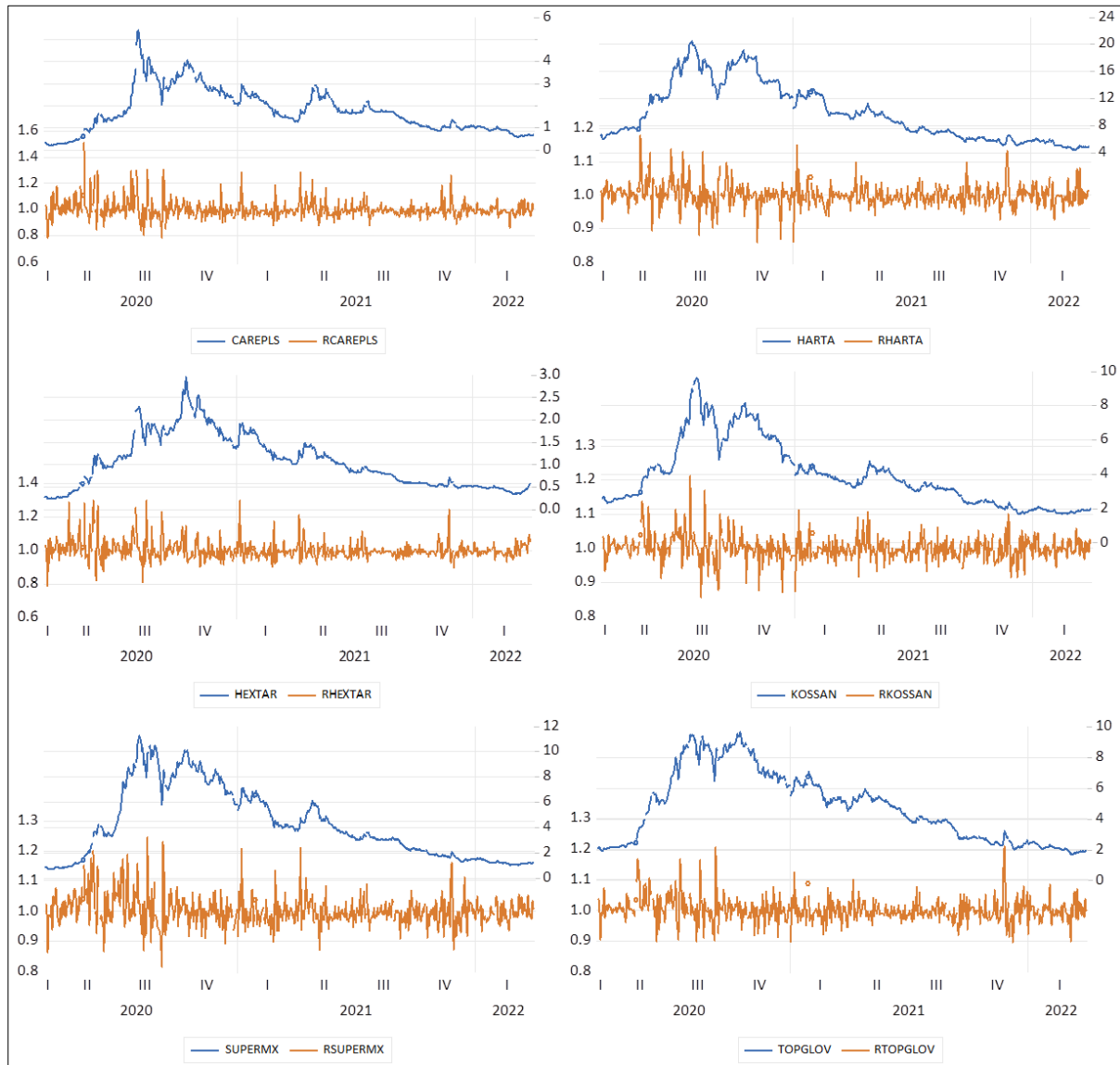


Figure 2: Glove company stock prices and returns

Source: Bloomberg Terminal (stock price) and authors' collection (return)

Table 2 summarizes four moments and the normality test in descriptive statistics. The first moment demonstrated that RCAREPLS recorded the highest mean (1.0041), followed by RHEXTAR (1.0031), RSUPERMX (1.0021), RTOPGLOV (1.0006), RKOSSAN (1.0002), and the lowest mean recorded by RHARTA (-0.001315). In the second moment, RCAREPLS recorded the highest standard deviation (0.0735), followed by RHEXTAR (0.0603), RSUPERMX (0.0533), RTOPGLOV (0.0406), RKOSSAN (0.0378) while RHARTA recorded the lowest (0.0355). The third moment demonstrated that all variables recorded a positive skewness, which indicated that all variables had a longer tail on the right side. For the fourth moment, all variables demonstrated leptokurtic distribution as the kurtosis value was > 3 . Lastly, the Jarque-Bera test statistic recorded a 1% significance level for all variables, which implied that the distribution departed from normality. In addition, general observations in Figure 2 demonstrated several volatility clusters in the return series. Thus, the non-normality and volatility clustering indicated the presence of the ARCH effect in the series. As a result, this study proceeds to stationarity and heteroscedasticity tests.

Table 3: Stationarity and ARCH Effect Tests

Variable/Test	ADF	PP	ARCH-LM (12)	Q ² (12)
RCAREPLS	-21.484 ^a	-21.634 ^a	32.752 ^b	40.844 ^a
RHARTA	-19.962 ^a	-19.967 ^a	21.533 ^b	26.626 ^a
RHEXTAR	-4.1972 ^a	-21.773 ^a	64.476 ^a	72.389 ^a
RKOSSAN	-7.5496 ^a	-20.561 ^a	33.469 ^a	32.028 ^a
RSUPERMX	-7.9864 ^a	-20.828 ^a	49.932 ^a	67.351 ^a
RTOPGLOV	-20.405 ^a	-20.377 ^a	55.157 ^a	55.971 ^a

Notes: ADF = Augmented Dickey-Fuller test; PP = Phillips-Perron test; ARCH-LM = autoregressive Lagrange multiplier; Q² = Ljung-Box test for squared residuals; (12) = number of lags. ^a and ^b denote 1% and 5% significance levels, respectively.

This study utilised the augmented Dickey-Fuller test (ADF) developed by Dickey and Fuller (1979) and the Phillips-Perron test (PP) developed by Phillips and Perron (1988) for stationarity analysis (Table 3). The results demonstrated that all models were stationary at level, which suggested the models did not exhibit a unit root. The heteroscedasticity results based on the ARCH-LM and Ljung Box Q² statistics demonstrated that all models exhibited an ARCH effect, which aligned with Figure 2 depicting that all stock demonstrated volatility clusters. Thus, the volatility of the individual stock price return was investigated via EGARCH (1,1).

Table 5: Conditional Variance

$$\text{Log}(\sigma_t^2) = w + \sum_{j=1}^q \beta_j(\sigma_{t-j}^2) + \sum_{i=1}^p a_i \left| \frac{\varepsilon_{t-i}}{\sigma_{t-i}} \right| + \sum_{k=1}^r \gamma_k \frac{\varepsilon_{t-k}}{\sigma_{t-k}} + \varphi_i \text{Case}_t$$

	RCAREPLS	RHARTA	RHEXTAR	RKOSSAN	RSUPERMX	RTOPGLOV
α_i	0.5872 ^a	0.2079 ^a	0.5910 ^a	0.1527 ^a	0.2395 ^a	0.3768 ^a
β_j	0.0880	0.6044 ^a	0.8230 ^a	0.9465 ^a	0.8816 ^a	0.8503 ^a
γ_k	-0.0082	0.0273	0.0143	0.0238	-0.0036	-0.057 ^c
φ_i	-0.0000596 ^a	-0.000014 ^b	-0.000016 ^a	-0.0000037 ^a	-0.00000819 ^a	-0.00000581 ^b
HL	0.29 days	1.38 days	3.56 days	12.61 days	5.5 days	4.27 days
AIC	-2.561133	-3.876334	-3.078019	-3.812201	-3.218508	-3.697257
SIC	-2.502397	-3.817598	-3.019283	-3.753465	-3.159772	-3.638521
HQ	-2.538091	-3.853292	-3.054977	-3.789159	-3.195466	-3.674215
ARCH LM(12)	16.6234	10.1407	21.1275 ^b	12.1539	4.2901	9.2469
Q ² (12)	19.319	11.354	23.431 ^b	10.689	4.1086	8.4208

Notes: HL = Half Life; AIC = Akaike Information Criterion; SC = Schwarz Criterion; HQ = Hannan Quinn; ARCH-LM = autoregressive Lagrange multiplier; Q² = Ljung-Box test for squared residuals; (12) = number of lags. ^a, ^b, and ^c denote 1%, 5%, and 10% significance levels, respectively.

Table 5 presents the output of EGARCH(1,1) model for all glove stocks. All models are significant (except RCAREPLS) as ARCH (α_t) and GARCH (β_t) terms were significant at the 1% level. Furthermore, RKOSSAN recorded highest persistence of volatility (0.9465) since the coefficient of β_t is greater than 0.85, followed by RSUPERMX (0.8816), and RTOPGLOVE (0.8503). In addition, coefficient of φ_i in all models are statistically significant with a negative sign. This result suggests that the daily reported number of COVID-19 positive cases significantly influences and negatively impacts the volatility of all Malaysian glove companies. This finding sits in contrast to previous studies by Jiang et al. (2017) and Donedelli et al. (2017), which indicated that the effects of COVID-19 diverge from the effects associated with SARS and Influenza A.

Surprisingly, the outcome obtained from γ_t which represents the asymmetric parameter in the model demonstrated that only RTOPGLOV is statistically significant. Coefficient of γ_t in RTOPGLOV is negative (-0.057) which reveals the presence of leverage effect in the volatility of Top Glove Corporation. This result also indicates that the negative shocks innovations exerted a greater influence compared to positive shocks in the conditional variance of Top Glove Corporation. Thus, the results of Top Glove Corporation during COVID-19 did not exhibit a similar effect with the pharmaceutical companies (Ozdurak et al., 2020; Baek et al. 2020), and contradicting with study conducted by Rosli et al. (2023) who found that Top Glove Corporation has impressive daily average returns and lower risk profile.

This study also employs a half-life to measure the duration of glove companies' volatilities. The effect of volatility continued for approximately 12.61 days for RKOSSAN, followed by RSUPERMX (5.5 days), RTOPGLOV (4.27 days), RHEXTAR (3.56 days), RHARTA (1.38 days), and lastly RCAREPLS (0.29 days). The ARCH-LM and Ljung Box statistic (Q^2) tests confirmed the fitness of the model with no further ARCH effect, except for RHEXTAR. This result was reasonable as this study was conducted during global market turbulence.

4. Empirical Results and Discussion

This study aimed to distinguish and document the impact of new cases of COVID-19 reported during this global pandemic on the volatility of Malaysian individual glove stocks by employing the EGARCH model. The empirical result shows that the daily reported number of COVID-19 positive cases significantly influences and negatively impacts the volatility of all Malaysian glove companies. This finding sits in contrast to previous studies by Jiang et al. (2017) and Donedelli et al. (2017), which indicated that the effects of COVID-19 diverge from the effects associated with SARS and Influenza A. Additionally, this study did not find any evidence of a leverage effect in the volatility of any Malaysian glove stocks, with the exception of Top Glove Corporation. This result indicates that the negative shocks in the volatility of Top Glove are more pronounced compared to positive shocks during this pandemic.

This result is somewhat surprising given the exceptional performance of all these glove companies during the early stages of the pandemic. However, the basic market cycle might explain the market trend experience of all these glove companies. Despite the varying volatility changes experienced by these stocks and the reported number of positive cases, the performance of each glove stock appeared to align with the stock market cycle, which includes the accumulation, markup, distribution, and markdown phases.

Therefore, it is crucial for individual and institutional investors to consider this cycle. Given the high demand for surgical gloves, rational investors gather all available information and begin to invest and accumulate in Malaysian glove companies. More and more investors, both rational and irrational, are joining the fray, leading to a higher price and a superbull experience for glove companies. As the stock price of glove companies reached a historical high with at least triple digit percentage increases, investors began to sell their positions, either due to profit-taking, a lack of confidence in the market's direction, or a lack of fear due to the rising prices. Furthermore, flights of funds are possible, where individuals and institutional investors move their funds from glove producers to vaccine developers. Ozdurak et al. (2020), Baek et al. (2020), and Davidescu et al. (2021) reported that the stock returns of vaccine developers benefitted during the COVID-19 pandemic, and Wang et al. (2023) even reported that pharmaceutical companies can be a safe haven asset during a pandemic crisis.

Thus, this experience has made a significant contribution to the existing literature, particularly rational expectation theory related to the context of market cycles, and it could potentially serve as a valuable reference in the event of another global pandemic. This study further recommends that future research should divide the series specific to the stock market cycle for each company affected by this pandemic. This will allow us to see the clear impact and determine whether there are positive or negative shocks in the volatility.

In addition, there are several opportunities to investigate how investors reacted when vaccines became widely accessible and every country initiated its vaccination campaign. One of the primary obstacles encountered by numerous researchers is the lack of available data. The inclusion of speculation activities measured by buying and selling volume would significantly enhance such research. Lastly, widening the research scope by involving publicly listed healthcare companies rather than focusing on individual glove stocks would be advantageous. This expanded approach would provide more profound insights into healthcare stock performance during healthcare crises and result in a deeper understanding of their dynamics during such challenges. Examining fund outflow could be intriguing given the absence of a vaccine developer in Malaysia. It would also be interesting to analyze the trend of foreign funds buying and selling Malaysian glove stocks and reallocating their funds to vaccine developers.

In addition to expanding the existing body of knowledge, this study seeks to enhance the oversight features of the authority. Adequate surveillance by regulatory bodies (Bursa Malaysia and the Securities Commission) is crucial, particularly during crises. Numerous market uncertainties can lead to an influx of excessive speculative activities, which can result in retail investors becoming trapped during the markup phase and experiencing financial losses. Furthermore, the COVID-19 pandemic presents an unprecedented threat and has caused investors to react with intensified anticipation and anxiety. Nevertheless, even with this increased anxiety, rational expectations should clarify the stock return fluctuations in the market overall and in individual stocks.

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Conflict of Interest Statement

The authors declare that there is no conflict of interest regarding the publication of this study.

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