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The impact of the COVID-19 lockdown on stock market performance: evidence from Vietnam

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Abstract

Purpose – This study explores the effects of the COVID-19 outbreak and its following lockdown on daily stock returns in Vietnam, a fast-growing emerging market that successfully revived after the pandemic lockdown.
Design/methodology/approach – This study uses panel-data regression models to evaluate the influence of the daily increase in the number of COVID-19 confirmed cases during pre-lockdown and lockdown on daily stock returns of 723 listed firms in Vietnam from 30 January to 30 May 2020.
Findings – The study confirms the adverse impact of the daily increasing number of COVID-19 cases on stock returns in Vietnam. The study also discloses that the Vietnam stock market before and during the nationwide lockdown performed in opposing ways. Though COVID-19 pre-lockdown had a significant, negative impact on Vietnam's stock returns, the lockdown period had a significant, positive influence on stock performance of the entire market and the different business sectors in Vietnam. The financial sector was hardest hit on the Vietnam stock market during the COVID-19 outbreak.
Research limitations/implications – The study indicates investors' confidence and trust in the Vietnam government's decisions to combat COVID-19 and favorable stocks prices were the main reasons that the Vietnam stock market rebounded during and after lockdown.
Originality/value – This is the first study to examine the impact of COVID-19 during the pre-lockdown and lockdown periods on stock performance in Vietnam, a rapidly developing economy that was successful in controlling the pandemic with a rejuvenated stock market after lockdown.

Keywords Lockdown, Pandemic, Stock performance, Vietnam
Paper type Research paper

1. Introduction

Vietnam is a rapidly developing emerging economy and stock market in the world (Nguyen *et al.*, 2017). The number of stocks listed on the Vietnam stock market increased from two in 2000 to 749 in 2018 (The World Bank, 2020). The Vietnam stock market consists of two main stock exchanges: the Ho Chi Minh Stock Exchange (HOSE), which lists large-size firms with a minimum charter capital of VND 120 billion; and the Hanoi Stock Exchange (HASTC), which trades smaller listed enterprises with a minimum charter capital of VND 30 billion.

Since 2014, the Vietnam government has focused on promoting the Vietnam stock market from a frontier market to an emerging market to attract greater overseas capital. Vietnam has continuously improved its legal framework, offered new securities products and improved the market environment to achieve the market-upgrade. As a result, the Vietnam stock

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market has developed significantly in the last five years. Market capitalization of the stock market at the end of 2019 was approximately USD 190 billion (79.2% of GDP), a nearly four times increase compared with USD 49 billion in 2014 (31.5% of GDP). The International Monetary Fund identified Vietnam as one of the fastest-growing economies in Asia in 2020, with the country's ability to avoid a possible recession that might affect many Asian nations (Giang and Yap, 2020).

The deadly infectious virus COVID-19, which emerged at the end of 2019, has resulted in a global social and economic crisis. To 31 July 2020, there were over 17 million confirmed cases, 650,000 deaths around the world (WHO, 2020), and one-third of the world's population experienced some form of lockdown (Hoof, 2020). Along with a big knockout of domestic trading and international business, COVID-19 has induced significant negative influences on the performance of different stock markets worldwide (Al-Awadhi *et al.*, 2020; Alfaro *et al.*, 2020; He *et al.*, 2020; Zhang *et al.*, 2020).

The global COVID-19 pandemic also enormously affected the Vietnam stock market like what happened during the 2008 global financial crisis that caused the Vietnam market index (VN-index) to fall sharply (Ginsberg, 2008). Prices of almost stocks on the Vietnam securities market plummeted in the first three months of 2020. At the trading session on 30 March 2020, the VN-Index had declined by 28% compared with 31 December 2019, resulting in a loss of USD 37.4 billion (over 15% of GDP in 2019) of the Vietnam stock market capitalization. From 1 April to 15 April 2020, Vietnam imposed a nationwide lockdown to curb community transmission of the virus (Viet Nam Government Portal, 2020). During the lockdown, the Vietnam stock market continued to operate.

After the nationwide lockdown, with zero deaths reported and no more cases of community transmission, the Vietnam government declared success over the disease outbreak. Since then, the Vietnam stock market started to show recovery signs. According to Bloomberg reports (Giang, 2020; Giang and Yap, 2020), Vietnam was the best performer in the global and the Asian stock markets in April and May 2020, respectively.

Several studies have investigated the impact of COVID-19 and its lockdown on stock markets (e.g. Al-Awadhi *et al.*, 2020; Alfaro *et al.*, 2020; Eleftheriou and Patsoulis, 2020; He *et al.*, 2020; Zhang *et al.*, 2020). These studies, however, focus on developed and emerging markets such as the US, China, France, Germany, Italy, Japan, South Korea and Spain. There is a lack of studies that explore the effects of COVID-19's pre-lockdown and lockdown periods on stock returns in fast-growing economies and stock markets, including Vietnam. No study has measured the influence of COVID-19 pre-lockdown and lockdown on the stock markets of countries that successfully controlled the pandemic by a lockdown.

This is the first study to examine the impact of COVID-19 on stock performance in Vietnam, a rapidly developing economy and a country that was successful in controlling the pandemic and revived the stock market after the nationwide lockdown. The particular effects of the pre-lockdown and lockdown periods on the Vietnam stock market's reactions are covered in this study. Accordingly, this study contributes to the knowledge of stock market reactions during COVID-19 pre-lockdown and lockdown, becoming a reference for academics, governments and investors in future unexpected events or pandemics.

2. Literature review

2.1 The impact of epidemics on stock markets

Previous studies have investigated the impact of different epidemics on stock performance in the 21st century. The researches assert that the fluctuations in the stock markets caused by investors' worries about and pessimism on future incomes because of epidemics have brought significant economic losses to markets (Jiang *et al.*, 2017; Liu *et al.*, 2020). For example, Nippani and Washer (2004) find negative impacts of the SARS outbreak on China's

and Vietnam's stock markets. Chen *et al.* (2007) and Chen *et al.* (2009) explored the influence of SARS epidemic on the Taiwan stock market and reveal a negative association between the disease outbreak and stock returns of hotel businesses, tourism, wholesalers and the retail sector. Conversely, biotechnology industries show a positive, significant relationship with stock returns in Taiwan during the epidemic. Jiang *et al.* (2017) assessed the relationship between the influenza virus H7N9 outbreak and China's stock performance. They find that the daily number of cases increased significantly and negatively impacted stock prices in the overall market index as well as relevant sectors, including Chinese traditional medicine, biological production and the biomedicine sectors in China. The Ebola virus outbreak also significantly affected relevant stocks in the US securities market (Ichev and Marinč, 2018). Ichev and Marinč (2018) show that the greatest impact of Ebola was associated with US firms whose operations were located in West Africa and the US and with the cases that occurred in West Africa and the US. Small firms' stock returns were more influenced by Ebola than bigger firms. Ichev and Marinč (2018) conclude that the biotechnology, food and beverage, healthcare supplies and pharmaceutical industries were positively connected to the epidemic; other industries were significantly oppositely related to the Ebola outbreak.

With the COVID-19 pandemic, the negative impacts of the disease outbreaks on stock markets worldwide have been documented in various studies. Al-Awadhi *et al.* (2020) show that both the daily increase in the number of confirmed cases and deaths due to COVID-19 adversely affected stock returns of all firms in China. Ashraf (2020) investigated the influence of the pandemic on stock market performance in 64 nations and finds reverse relationships between increasing numbers of confirmed cases and stock returns. Alfaro *et al.* (2020) show negative effects of COVID-19 on US stock returns. Zhang *et al.* (2020) confirm the negative consequences of COVID-19 on the stock markets of the ten countries that had the highest number of confirmed cases in March 2020 and on the Japan, Korea and Singapore stock markets. According to Zhang *et al.* (2020), China's stock market generated the greatest standard deviations in February but the smallest in March. The US stock market had the sharpest increase in standard deviation among the investigated nations during the study period. He *et al.* (2020) and Liu *et al.* (2020) evaluated the outcomes of COVID-19 on stock markets of multiple countries and find a negative impact of the pandemic on stock returns. He *et al.* (2020) also indicate a spreading effect among Asian, European and American nations from the pandemic. The severe impact of COVID-19 on stock markets has forced governments worldwide to impose bans and restrictions (such as short-sales bans) to reduce market crash risk, curtail volatility and protect the stability of markets (Kodres, 2020).

The effects of the COVID-19 pandemic on stocks, however, varied among different sectors and industries. Schoenfeld (2020) discovered the worst affected industries on stock markets because of COVID-19 included the gas and petroleum, garment, automobile, transport, machinery and hospitality industries. According to Goodell (2020), the financial sector (including banks and other financial institutions) was strongly influenced by COVID-19, because this sector experienced an increase in non-performing loans through borrowers' income losses and a substantial number of depositor withdrawals over a short time.

2.2 The impact of the COVID-19 lockdown on stock markets

The COVID-19 pandemic was an unprecedented event that compelled one-third of the world's population to experience some form of lockdown (Hoof, 2020). Several studies have paid attention to the impact of the COVID-19 lockdown on stock market performance. For example, Baig *et al.* (2020), when assessing the effects of COVID-19 and its lockdown on the US stock market, reveal that the lockdown contributed to a decline in the market's stability and liquidity. Eleftheriou and Patsoulis (2020) measured the effects of the COVID-19 lockdown and social isolation on the stock market indexes of 45 nations. The authors find a

negative relationship between the lockdown and the performance of international stock markets. However, Eleftheriou and Patsoulis (2020) did not clarify the impact of the lockdown on each specific country.

In general, the prior studies analyzed the effects of the COVID-19 pandemic and its lockdown on stock markets worldwide. However, no study estimates the influence of COVID-19 during pre-lockdown and lockdown in Vietnam, a rapidly developing emerging economy as well as a successful nation in controlling the pandemic and reviving the stock market. This gap in the literature and the potential development of the Vietnam stock market motivated this study.

3. Data and methodology

3.1 Data

This study examines the effects of the COVID-19 pandemic and the nationwide lockdown on daily stock returns of 723 listed firms on Vietnam's stock market; 385 firms on HOSE and 338 firms on HASTC. The daily stock data start from 30 January 2020, which was the first trading day of the Vietnam stock market after the Lunar New Year, and the first working day since the first confirmed COVID-19 case was announced for Vietnam. The end date of the daily stock data is 30 May 2020. The stock prices and firm-specific data are from Bloomberg. The daily number of confirmed cases in Vietnam is from the Vietnam Ministry of Health's website (https://ncov.vncdc.gov.vn/) for the COVID-19 update (see Table A1 for the study variables' definitions, periods and sources). In total, there are 62,901 observations in the study.

3.2 Methodology

Al-Awadhi *et al.* (2020) and Ashraf (2020), when investigating the impact of the COVID-19 pandemic on international stock market returns, explain that the pandemic peak was not the start date; the disease outbreak lasted for a longer period (several months) than any specific point in time. Following Al-Awadhi *et al.* (2020) and Ashraf (2020), this study adopts the panel-data regression approach, which is more suitable than classical event-study methods in the empirical analysis. The panel-data regression method can identify time-variant associations between dependent and explanatory variables as well as minimizing the problems of estimation biases, multicollinearity and individual heterogeneity (Baltagi, 2008; Woolridge, 2010; Hsiao, 2014).

To test the impact of COVID-19 during pre-lockdown and lockdown on Vietnam's stock performance, this study follows the regression models of Al-Awadhi *et al.* (2020) and Ashraf (2020) to evaluate the influence of the daily increase in the number of confirmed COVID-19 cases on Vietnam's daily stock returns. The models' independent variables include daily market capitalization, market-to-book ratio, return on equity and industry factors that significantly affect stock returns in the studies by Ahsan (2012), Awadhi *et al.* (2020) and Ashraf (2020). This study generates two dummy variables: D_BFLOCK which is the period before lockdown (30 January to 31 March 2020) and D_LOCK, which is the lockdown period (1 April to 15 April 2020) for the regression analysis.

The panel-data regression models are:

(1) Models (1) and (2) examine the impact of COVID-19 pre-lockdown and lockdown on stock returns:

$$RE_{j,t} = \alpha_{01} + \alpha_{02}CASE_{t-1} + \alpha_{03}MRK_{j,t-1} + \alpha_{04}MTB_{j,t-1} + \alpha_{05}D\_BFLOCK_{j,t} + \alpha_{06}RE1_{j,t-1} + \alpha_{07}ROE_j + \varepsilon_{0j,t} \quad (1)$$

$$RE_{j,t} = \alpha_{11} + \alpha_{12}CASE_{t-1} + \alpha_{13}MRK_{j,t-1} + \alpha_{14}MTB_{j,t-1} + \alpha_{15}D\_LOCK_{j,t} + \alpha_{16}RE1_{j,t-1} + \alpha_{17}ROE_j + \varepsilon_{1j,t} \quad (2)$$

(2) Models (3), (4) and (5) examine the relationships between the different sectors and stock returns under the impact of COVID-19 pre-lockdown and lockdown:

$$RE_{j,t} = \beta_{01} + \beta_{02}CASE_{t-1} + \beta_{03}MRK_{j,t-1} + \beta_{04}MTB_{j,t-1} + \beta_{05}RE1_{j,t-1} + \beta_{06}ROE_j + \gamma_0 D\_SECTOR_j + \theta_{0j,t} \quad (3)$$

$$RE_{j,t} = \beta_{11} + \beta_{12}CASE_{t-1} + \beta_{13}MRK_{j,t-1} + \beta_{14}MTB_{j,t-1} + \beta_{15}RE1_{j,t-1} + \beta_{16}ROE_j + \gamma_1 D\_SECTOR_j{*}D\_BFLOCK + \theta_{1j,t} \quad (4)$$

$$RE_{j,t} = \beta_{21} + \beta_{22}CASE_{t-1} + \beta_{23}MRK_{j,t-1} + \beta_{24}MTB_{j,t-1} + \beta_{25}RE1_{j,t-1} + \beta_{26}ROE_j + \gamma_2 D\_SECTOR_j{*}D\_LOCK + \theta_{2j,t} \quad (5)$$

Where:

$RE_{j,t}$ is the return of stock j on day t, based on the formula: $RE_{j,t} = \ln(P_{j,t}/P_{j,t-1})$, where $P_{j,t}$ is the price of stock j at day t. $RE1_{j,t-1}$ is the return of stock j on day $t-1$.

$CASE_{t-1}$ is the increased number of COVID-19 confirmed cases in Vietnam on day $t-1$.

$MRK_{j,t-1}$ is the natural logarithm of daily market capitalization of firm j on day $t-1$.

$MTB_{j,t-1}$ is the market-to-book ratio of firm j on day $t-1$.

ROE_j is the return on equity firm j in 2019.

$D\_BFLOCK_{j,t}$ equals 1 if the day is before 1 April 2020; 0 otherwise.

$D\_LOCK_{j,t}$ equals 1 if the day is during the period from 1 April to 15 April 2020; 0 otherwise.

D_SECTOR_j is a vector of dummy variables representing a firm's sector. It includes the financial sector (D_FIN), consumer goods sector (D_CGOOD), energy sector (D_ENRG), industrial sector (D_IND) and utility sector (D_UTL). The dummy variable equals 1 if the firm belongs to the specific sector; 0 otherwise.

Like Al-Awadhi *et al.* (2020), this study adopts the random-effects estimation for panel-data regression models. According to Bell and Jones (2015), random-effects estimation is more advantageous than the fixed-effects model not only on Monte Carlo simulations results but also the random-effects estimation's ability to deal with time-invariant independent variables in the models.

4. Empirical results

4.1 The descriptive statistics

Table 1 presents the descriptive statistics of the firms listed on the Vietnam stock market from 30 January to 30 May 2020. The average returns of all stocks in the market were negative during the study period. The average number of new COVID-19 confirmed cases was three per day. The average market-to-book values of listed firms on HOSE and HASTC were 1.13 and 0.84, respectively. The average return on equity in 2019 of HOSE listed firms was 9.9%, and of HASTC listed firms was approximately 8%.

The correlation matrix in Table 2 shows the correlations between the variables in the regression models are lower than 0.5, indicating no strong correlation among variables.

4.2 The impact of COVID-19, pre-lockdown and during lockdown on the Vietnam stock market

Table 3 reports the random-effects panel-data regression results of models (1) and (2). It shows that the daily increase in number of COVID-19 confirmed cases in Vietnam (CASE) is significantly negatively associated with stock returns on HASTC and HOSE at different significance levels in models (1) and (2). This result confirms Al-Awadhi *et al.*'s (2020) conclusion that the COVID-19 pandemic significantly impaired stock market performance.

The dummy variable D_BFLOCK is negative and significant at 1% for both HOSE and HASTC, indicating an adverse impact of COVID-19 pre-lockdown on the stock returns of Vietnam's listed firms. This result is comparable with the chaos and plunge of the Vietnam stock market before lockdown because of investors' concerns about COVID-19's impacts (Giang, 2020).

Notably, the dummy variable D_LOCK is positive and significant at 1%, indicating a positive impact of the COVID-19 lockdown period on the stock performance of listed firms on both HOSE and HASTC. This result contradicts the findings of Baig *et al.* (2020) and Eleftheriou and Patsoulis (2020) that indicate a negative impact of lockdown on US and international stock markets, respectively. According to the Bloomberg (Giang, 2020), the underlying reason for the outstanding performance of the Vietnam stock market during lockdown was the confidence and trust of investors in the Vietnamese government's actions to combat the spread of the virus. Additionally, investors decided to return to the Vietnam

	All market		HOSE		HASTC	
Variable	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
RE	−0.0008	0.0361	−0.00069	0.0323	−0.00093	0.04007
CASE	2.95402	5.47708	2.95402	5.47711	2.95402	5.47713
MRK	12.80572	1.8874	13.68145	1.77416	11.79686	1.46246
MTB	0.99531	1.65498	1.13139	1.05719	0.83909	2.13418
D_BFLOCK	0.51724	0.49971	0.51724	0.49971	0.51724	0.49971
D_LOCK	0.12644	0.33234	0.12644	0.33235	0.12644	0.33235
ROE	8.9951	15.87009	9.90141	16.53846	7.96975	15.01271
D_FIN	0.15491	0.36182	0.19221	0.39404	0.11243	0.3159
D_ENRG	0.04288	0.20258	0.02857	0.1666	0.05917	0.23595
D_CGOOD	0.27663	0.44733	0.28571	0.45176	0.26627	0.44202
D_IND	0.34163	0.47426	0.3039	0.45995	0.38462	0.48651
D_UTL	0.04149	0.19943	0.05714	0.23212	0.02367	0.15202

Table 1. The descriptive statistics of firms listed on the Vietnam stock market, Ho Chi Minh (HOSE) and Hanoi (HASTC) stock exchanges

Variable	RE	CASE	MRK	MTB	D_BFLOCK	D_LOCK	ROE
RE	1						
CASE	−0.014	1					
MRK	−0.006	−0.013	1				
MTB	−0.018	−0.025	0.490	1			
D_BFLOCK	−0.100	0.082	0.019	0.026	1		
D_LOCK	0.069	0.129	−0.015	−0.027	−0.392	1	
ROE	0.017	0.000	0.292	0.297	0.001	0.000	1

Table 2. A correlation matrix of the models' variables

Table 3.
The regression results of models (1) and (2) for Ho Chi Minh (HOSE) and Hanoi (HASTC) stock exchanges

Variable	Model (1)		Model (2)	
RE	HOSE	HASTC	HOSE	HASTC
CASE	0.00002 (0.00003)	−0.00009** (0.00004)	−0.00011*** (0.00003)	−0.00017*** (0.00004)
MRK	−0.00012 (0.00012)	−0.00001 (0.00019)	−0.00011 (0.00012)	−0.00004 (0.00019)
MTB	−0.00056*** (0.00020)	−0.00154*** (0.00036)	−0.00058*** (0.00020)	−0.00160*** (0.00036)
D_BFLOCK	−0.00879*** (0.00036)	−0.00483*** (0.00048)		
D_LOCK			0.00949*** (0.00054)	0.00505*** (0.00072)
ROE	0.00004*** (0.00001)	0.00008*** (0.00002)	0.00004*** (0.00001)	0.00008*** (0.00002)
RE1	0.06524*** (0.00555)	−0.06424*** (0.00593)	0.07145*** (0.00557)	−0.06298*** (0.00594)
CONS	0.00561*** (0.00152)	0.00269 (0.00208)	0.00028 (0.00152)	0.00012 (0.00207)

Note(s): **, *** signify 5% and 1% level of significance, respectively. The numbers in parentheses are standard errors

stock market because of the attractiveness of reasonable values for investors' favorable stocks then.

Regarding the firm characteristics, market-to-book ratio (MTB) is negative and significantly related to stock returns at 1% for both Vietnam stock exchanges during COVID-19. Return on equity (ROE) has a significant positive effect at 1% on Vietnam's stock performance during the pandemic. These results indicate that HOSE's and HASTC's listed firms with overvalued stock prices and poor financial performance tended to attain lower stock returns during the COVID-19 period in Vietnam.

4.3 The relationships between different sectors of the economy and stock returns during COVID-19 pre-lockdown and lockdown

Table 4 presents the random-effects regression results of models (3), (4) and (5). The results for model (3) indicate that the selected business sectors (financial, consumer goods, energy, industrial and utility sectors) had different associations with stock returns during COVID-19 in Vietnam. On HOSE, the financial sector was worst affected by COVID-19, followed by the industrial and consumer goods sectors. This result is consistent with Goodell's (2020) study that the financial sector is vulnerable during a pandemic and economic recession because of the possible occurrence of excessive bad loans and massive deposit withdrawals in a short time. Another possible explanation for this result is the Vietnamese government's incentives and bailout packages that targeted non-financial business sectors, such as the agriculture, apparel, automotive, aviation, food processing and tourism sectors (Medina, 2020). Following the incentives and bailout packages, the pandemic affected non-financial business stocks less than financial firms' stocks. There was no significant relationship between sector and stock returns on HASTC from 30 January to 30 May 2020.

Model (4)'s regression results demonstrate that Vietnam's different sectors' stock returns were negatively affected during the COVID-19 pre-lockdown period. On HOSE, the financial sector was most impacted whereas, on HASTC, the utility sector was hardest hit by the pandemic before the nationwide lockdown.

In model (5), all the selected sectors' stock performance was positively influenced by the lockdown. This result confirms that the improved trust of investors in the Vietnam government's actions to fight COVID-19 during lockdown (Giang, 2020) achieved positive outcomes for all sectors in the stock market. The financial and utility sectors on HOSE and HASTC, respectively, benefited most during the lockdown.

The impact of the daily increase in number of COVID-19 confirmed cases (CASE), market-to-book ratio (MTB) and profitability ratio (ROE) on Vietnam stock returns in models (3), (4) and (5) are consistent with the findings from models (1) and (2). Therefore, Vietnam's stock returns were most affected on days with a highly increased number of confirmed cases, affirming the considerable impact of COVID-19 on Vietnam's stock market. The stock performance of Vietnam's listed firms with high MTB and low ROE was also affected the most during COVID-19 pandemic.

4.4 Further tests

Following Al-Awadhi *et al.* (2020) and Ashraf (2020), the study re-examined the models with fixed-effects estimation and produces comparable results to the random-effects models (the results are available on request). The study also includes the Capital Asset Pricing Model's beta (Fama and French, 1996) as a risk factor for the investigated firms in the models (Drew, 2003) and gets similar results as from previous regression models without the risk factor (see Tables A2 and A3).

The study also examined models for the entire Vietnam stock market (see Table 5), which aggregates data from the two separate exchanges (HOSE and HASTC). The results are

Table 4.
The regression results of models (3), (4) and (5) for Ho Chi Minh (HOSE) and Hanoi (HASTC) stock exchanges

Variable	Model (3)		Model (4)		Model (5)	
RE	HOSE	HASTC	HOSE	HASTC	HOSE	HASTC
CASE	−0.00003 (0.00003)	−0.00013*** (0.00004)	0.00001 (0.00003)	−0.00010** (0.00004)	−0.00010*** (0.00003)	−0.00016*** (0.00004)
MRK	−0.00009 (0.00013)	−0.00012 (0.00021)	−0.00002 (0.00012)	0.00007 (0.00019)	−0.00015 (0.00012)	−0.00013 (0.00019)
MTB	−0.00069*** (0.00020)	−0.00157*** (0.00038)	−0.00056*** (0.00020)	−0.00150*** (0.00037)	−0.00059*** (0.00020)	−0.00157*** (0.00037)
ROE	0.00005*** (0.00001)	0.00008*** (0.00002)	0.00005*** (0.00001)	0.00008*** (0.00002)	0.00004*** (0.00001)	0.00008*** (0.00002)
RE1	0.08456*** (0.00555)	−0.06099*** (0.00594)	0.06852*** (0.00555)	−0.06346*** (0.00594)	0.07294*** (0.00557)	−0.06313*** (0.00594)
D_FIN	−0.00145** (0.00066)	0.00111 (0.00099)				
D_ENRG	−0.00067 (0.00116)	−0.00048 (0.00116)				
D_CGOOD	−0.00107* (0.00060)	0.00045 (0.00078)				
D_IND	−0.00118** (0.00059)	−0.00008 (0.00072)				
D_UTL	−0.00135 (0.00089)	−0.00168 (0.00167)				
D_FIN*D_BFLOCK			−0.00902*** (0.00063)	−0.00387*** (0.00106)		
D_ENRG*D_BFLOCK			−0.00751*** (0.00146)	−0.00480*** (0.00138)		
D_CGOOD*D_BFLOCK			−0.00806*** (0.00052)	−0.00408*** (0.00073)		
D_IND*D_BFLOCK			−0.00739*** (0.00051)	−0.00394*** (0.00063)		
D_UTL*D_BFLOCK			−0.00723*** (0.00105)	−0.00703*** (0.00215)		
D_FIN*D_LOCK					0.01082*** (0.00118)	0.01007*** (0.00199)
D_ENRG*D_LOCK					0.01035*** (0.00293)	0.00403 (0.00271)
D_CGOOD*D_LOCK					0.01049*** (0.00095)	0.00470*** (0.00132)
D_IND*D_LOCK					0.00761*** (0.00092)	0.00408*** (0.00111)
D_UTL*D_LOCK					0.00887*** (0.00207)	0.01134*** (0.00428)
CONS	0.00198 (0.00164)	0.00151 (0.00227)	0.00332** (0.00156)	0.00108 (0.00216)	0.00098 (0.00153)	0.00130 (0.00209)

Note(s): *, **, *** signify 10%, 5% and 1% level of significance, respectively. The numbers in parentheses are standard errors

consistent with the findings previously discussed. The results confirm that the daily increase in the number of COVID-19 cases in Vietnam negatively impacted stock returns. Tests on the entire Vietnam market also indicate that though COVID-19 pre-lockdown had a significant, negative impact on Vietnam's stock returns, the lockdown period had a significant, positive effect on the stock performance of the entire market as well as the different Vietnam business sectors. Among the different sectors, the financial sector was most affected during the pre-lockdown and lockdown periods.

5. Concluding remarks

5.1 Conclusions

This study examines the influence of COVID-19 during pre-lockdown and lockdown on daily stock returns of 723 listed firms on Vietnam's stock market from 30 January to 30 May 2020. Using panel-data regression models, this study confirms that the daily increase in the number of confirmed COVID-19 cases negatively impacted stock returns. COVID-19 pre-lockdown also had a significant, negative association with Vietnam's stock returns. In other words, the COVID-19 pandemic unsurprisingly affected Vietnam's stock markets negatively.

In contrast with the adverse impact in the pre-lockdown period on stock returns in Vietnam and the negative effects of lockdown on the stock markets of other countries (Baig *et al.*, 2020; Eleftheriou and Patsoulis, 2020), the COVID-19 lockdown in Vietnam had a significant, positive influence on Vietnam's stock performance. The underlying reasons for this finding are improved confidence of investors in the Vietnam government's reactions to COVID-19 and the under-valued prices of stocks that attracted capital inflow and revived the Vietnam stock market during lockdown.

RE	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
CASE	−0.00016***	−0.00005*	−0.00010***	−0.00006**	−0.00015***
MRK	−0.00001	−0.000001	−0.00001	0.00011	−0.00008
MTB	−0.00093***	−0.00090***	−0.00100***	−0.00090***	−0.00092***
D_BFLOCK		−0.00721***			
D_LOCK	0.00780***				
ROE	0.00005***	0.00005***	0.00006***	0.00006***	0.00005***
RE1	−0.00534	−0.00850**	0.00113	−0.00668	−0.00491
D_FIN			−0.00057		
D_ENRG			−0.00078		
D_CGOOD			−0.00046		
D_IND			−0.00071		
D_UTL			−0.00131		
D_FIN*D_BFLOCK				−0.00743***	
D_ENRG*D_BFLOCK				−0.00614***	
D_CGOOD*D_BFLOCK				−0.00655***	
D_IND*D_BFLOCK				−0.00588***	
D_UTL*D_BFLOCK				−0.00716***	
D_FIN*D_LOCK					0.01102***
D_ENRG*D_LOCK					0.0066***
D_CGOOD*D_LOCK					0.00835***
D_IND*D_LOCK					0.00607***
D_UTL*D_LOCK					0.00982***
CONS	−0.00066	0.00349***	0.00067	0.00128	0.00024

Note(s): *, **, *** signify 10%, 5% and 1% level of significance, respectively

Table 5. The regression results for Vietnam's stock market

Different business sectors were affected distinctively during COVID-19 pre-lockdown and lockdown in Vietnam. The hardest-hit sector on Vietnam's stock markets during the COVID-19 pandemic was the financial sector, which was characterized as a vulnerable sector during economic downturns with the possibility of an increase in bad loans and unusual withdrawals of deposits (Goodell, 2020).

5.2 Implications

Following the empirical results on the Vietnam stock market, this study presents several implications for governments and investors. First, the indisputable adverse effects of the COVID-19 pandemic and the daily increase in the number of confirmed cases on stock returns suggest that, in later epidemics and pandemics, early containment measures and proactive reactions are prerequisite conditions for governments and nations to protect stock markets from severe deterioration.

The positive relationship between lockdown and stock returns in Vietnam not only resulted from the lockdown itself but also from investors' confidence and trust in the government's reaction to the pandemic. If the investors continue to be worried and are afraid of the future, lockdown would make stock performance worsen (as in the studies by Baig *et al.*, 2020; and Eleftheriou and Patsoulis, 2020). Therefore, to help stock markets overcome a crisis and recover sustainably, governments should be proactive in curbing outbreak of viruses to enhance investor confidence.

Lastly, our empirical results support Goodell's (2020) study that highlights the negative effects of COVID-19 on the financial sector. Because of a high risk of increasing bad debts and abnormal large-scale withdrawals that may cause corporate crises or even bankruptcy, financial firms' stocks are among the most seriously affected securities on stock markets during a pandemic. Investors, therefore, should choose the stocks of financial firms that demonstrate a long-term good corporate governance and performance, as well as diversifying investment portfolios across both financial and non-financial sectors to avoid the significant impacts of a COVID-19 like outbreak and future unexpected events on their financial assets.

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Appendix

Table A1.
A definition list of the regression models' variables

Variable	Definition	Period	Source
Dependent variables			
$RE_{j,t}$	The return of stock j on day t, based on the formula: $RE_{j,t} = \ln(P_{j,t}/P_{j,t-1})$, where $P_{j,t}$ is the price of stock j at day t	30/01/2020–30/05/2020	Bloomberg
Explanatory variables			
$CASE_{t-1}$	The increased number of COVID-19 confirmed cases in Vietnam on day $t-1$	30/01/2020–30/05/2020	Vietnam Ministry of Health's website for COVID-19: (https://ncov.vncdc.gov.vn/)
$MRK_{j,\,t-1}$	The natural logarithm of daily market capitalization of firm j on day $t-1$	30/01/2020–30/05/2020	Bloomberg
$MTB_{j,\,t-1}$	The market-to-book ratio of firm j on day $t-1$	30/01/2020–30/05/2020	Bloomberg
ROE_j	Return on equity firm j	2019	Bloomberg
$RE1_{j,t-1}$	The return of stock j on day $t-1$	30/01/2020–30/05/2020	Bloomberg
D_SECTOR_j	A vector of dummy variables representing sector of firm j. D_SECTOR_j includes the financial sector (D_FIN), consumer goods sector (D_CGOOD), energy sector (D_ENRG), industrial sector (D_IND) and utility sector (D_UTL)The dummy variable equals 1 if the firm belongs to the specific sector; 0 otherwise	2019	Bloomberg
$D\_BFLOCK_{j,\,t}$	Dummy variable, equal to 1 if the day is before 1 April 2020; 0 otherwise	30/01/2020–30/05/2020	Viet Nam Government Portal (2020)
$D\_LOCK_{j,\,t}$	Dummy variable, equals to 1 if the day is from 1 to 15 April 2020; 0 otherwise	30/01/2020–30/05/2020	Viet Nam Government Portal (2020)

	Model (1)		Model (2)	
	HOSE	HASTC	HOSE	HASTC
CASE	0.00002 (0.00003)	−0.0001** (0.00004)	−0.0001*** (0.00003)	−0.0002*** (0.00004)
MRK	−0.0001 (0.0001)	−0.00002 (0.0002)	−0.0001 (0.0001)	−0.00004 (0.0002)
MTB	−0.001*** (0.0002)	−0.002*** (0.0004)	−0.001*** (0.0002)	−0.002*** (0.0004)
D_BFLOCK	−0.009*** (0.0004)	−0.005*** (0.0005)		
D_LOCK			0.009*** (0.001)	0.005*** (0.001)
ROE	0.00004*** (0.00001)	0.00008*** (0.00002)	0.00004*** (0.00001)	0.00008*** (0.00002)
RE1	0.063*** (0.006)	−0.064*** (0.006)	0.071*** (0.006)	−0.063*** (0.006)
BETA	−0.0002 (0.0004)	0.00004 (0.0005)	−0.0002 (0.0004)	0.00002 (0.0005)
CONS	0.005*** (0.002)	0.003 (0.002)	0.00001 (0.002)	0.0001 (0.002)

Note(s): **, *** signify 5% and 1% level of significance, respectively. The numbers in parentheses are standard errors. BETA is the Capital Asset Pricing Model's beta

Table A2.
The regression results of models (1) and (2) for Ho Chi Minh (HOSE) and Hanoi (HASTC) stock exchanges (with risk factor)

Table A3.
The results of models (3), (4) and (5) for Ho Chi Minh (HOSE) and Hanoi (HASTC) stock exchanges (with the risk factor)

Variable	Model (3)		Model (4)		Model (5)	
	HOSE	HASTC	HOSE	HASTC	HOSE	HASTC
CASE	−0.00003 (0.00003)	−0.0001*** (0.00004)	0.00001 (0.00003)	−0.0001** (0.00004)	−0.00010*** (0.00003)	−0.0002*** (0.00004)
MRK	−0.0001 (0.0001)	−0.0001 (0.0002)	−0.000004 (0.0001)	0.0001 (0.0002)	−0.0001 (0.0001)	−0.0001 (0.0002)
MTB	−0.001*** (0.0002)	−0.002*** (0.0004)	−0.001*** (0.0002)	−0.001*** (0.0004)	−0.001*** (0.0002)	−0.002*** (0.0004)
ROE	0.00005*** (0.00001)	0.0001*** (0.00002)	0.00005*** (0.00001)	0.0001*** (0.00002)	0.00004*** (0.00001)	0.0001*** (0.00002)
RE1	0.085*** (0.006)	−0.061*** (0.006)	0.069*** (0.006)	−0.063*** (0.006)	0.073*** (0.006)	−0.063*** (0.006)
D_FIN	−0.001** (0.001)	0.001 (0.001)				
D_ENRG	−0.001 (0.001)	−0.0005 (0.001)				
D_CGOOD	−0.001* (0.001)	0.0005 (0.001)				
D_IND	−0.001** (0.001)	−0.0001 (0.001)				
D_UTL	−0.001 (0.001)	−0.002 (0.002)				
D_FIN*D_BFLOCK			−0.009*** (0.001)	−0.004*** (0.001)		
D_ENRG*D_BFLOCK			−0.008*** (0.001)	−0.005*** (0.001)		
D_CGOOD*D_BFLOCK			−0.008*** (0.001)	−0.004*** (0.001)		
D_IND*D_BFLOCK			−0.007*** (0.001)	−0.004*** (0.001)		
D_UTL*D_BFLOCK			−0.007*** (0.001)	−0.007*** (0.002)		
D_FIN*D_LOCK					0.011*** (0.001)	0.010*** (0.002)
D_ENRG*D_LOCK					0.010*** (0.003)	0.004 (0.002)
D_CGOOD*D_LOCK					0.011*** (0.001)	0.005*** (0.001)
D_IND*D_LOCK					0.008*** (0.001)	0.004*** (0.001)
D_UTL*D_LOCK					0.009*** (0.002)	0.011*** (0.004)
BETA	−0.0002 (0.0005)	−0.0001 (0.0005)	−0.0001 (0.0004)	0.0001 (0.0005)	−0.0003 (0.0004)	−0.00003 (0.005)
CONS	0.002 (0.002)	0.001 (0.002)	0.003* (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)

Note(s): *, **, *** signify 10%, 5% and 1% level of significance, respectively. The numbers in parentheses are standard errors. BETA is the Capital Asset Pricing Model's beta

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