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Government intervention and stock price returns during covid-19 pandemic: evidence from an emerging market

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ABSTRACT

As the impact of the COVID-19 pandemic on the stock market returns has received much attention from researchers and practitioners, the evidence on the government intervention on stock market returns in frontier markets in the Asia-Pacific is very scanty. This study first revisits the relationship between COVID-19 and stock market returns using large data from 23/01/2020 to 28/05/2021. Second, this study examines how the Vietnamese stock market reacts to government actions during the COVID-19 outbreaks. Using the fixed effects model, the findings show stock market returns are negatively affected by the COVID-19 pandemic. Although most sectors face a sharp decline in returns, positive returns are found in some sectors such as Energy, Healthcare, and Utilities, which is the opportunities for investors amid the pandemic. When observing the effect of government intervention, the stock market reacts to it negatively. The same is true for the announcements of social distancing and economic support measures. However, the stock market responds to containment and health measures with positive returns. More importantly, social distancing policy measures further enlarge the negative impact of COVID-19 on stock market returns – thus the government should take these measures with caution. The results also emphasize that economic support policy measures benefit indirectly via the channel of decreasing new infections. As a whole, the study offers some suggestions for the best and most proactive policy actions that governments, market participants, and investors in other emerging markets with similar financial institutions to Vietnam's should use in the event of exogenous shocks like the COVID-19.

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1. Introduction

The nature, magnitude, and speed of the COVID-19 pandemic, an uncommon external shock, have presented a threat to the global economy in contrast to the Global Financial Crisis (GFC) of 2008 (Mehmood & De Luca, 2023; Song et al., 2021; Wen & Liao, 2022; Zaremba et al., 2021). Its outbreak was a health shock of seismic proportions that devastated lives and instilled extreme anxiety in society. By mid-August 2020, there had been over 850,000 COVID-19 deaths and 30 million confirmed cases (Bouri et al., 2022), and reached over 4 million deaths and over 184 million confirmed cases by the end of the first half of 2021¹. Apart from the catastrophic consequences it has on human life, COVID-19 has also become a systemic risk that influences global economic operations across a range of industries (S. R. Baker et al., 2020), which leads to a global rout of financial markets (i.e. increase of non-performing loans) (Rizvi et al., 2020), causes employments reductions and business closures (Bouri et al., 2022), and declines in demand for goods and services worldwide. Due to its wide impacts, stock markets are not exceptional; and as a result of COVID-19, the level of uncertainty has increased and equities prices have decreased.

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For example, Wagner (2020) and Alam et al. (2021) further emphasizes that the complicated and spreading conditions on the impact of an infectious COVID-19 pandemic can be reflected by the fluctuations in stock markets as stock markets include a comprehensive view of different participants and their expected outcomes. The main reasons are in addition to a low interest rate environment that ultimately squeezed corporate profit margins and earnings and, consequently, the stock prices of financial firms, many individuals and corporations struggled to obtain funds and pay debt services. This has already reduced the confidence of investors in stock markets (Anusakumar et al., 2017; Liu et al., 2020). Therefore, several studies that attempt to examine the impact of COVID-19 on stock markets generally showed a negative relationship between them (Harjoto et al., 2021; He et al., 2020; Lee et al., 2021; Subramaniam & Chakraborty, 2021; Wang et al., 2021; Wu et al., 2021; Xu, 2021) even though each country experiences the pandemic to a different degree. However, other studies assert that the impact of the COVID-19 pandemic on stock markets differ among industry sectors (Kanno, 2021) or depend on the pre-COVID firm's characteristics (Ding et al., 2021), or different stages of the pandemic (Ashraf, 2020b).

The majority of governments worldwide were unready for a pandemic like this. Nonetheless, in response to the negative impact of the COVID-19 pandemic and slowing down its spread, the governments in most countries have implemented different and flexible degrees of policy measures, including social distancing, lockdowns, travel restrictions, public testing (both early case-detection and extensive testing), contact-tracing strategies, and economic support packages and stimulus (i.e. income support and tax relief), which experienced a variety of new challenges (direct and indirect financial costs) in various economic activities (Koutoupis et al., 2021). The mix of measures and policies are regularly tightened or loosened in accordance with the virus's rate of sweep or containment and the severity and nature across countries and regions, but they might have two side-effect effects. Initially, these measures could provide the authorities a better control of the virus COVID-19 spread, and thus mitigate economic losses (Hunjra et al., 2021). If these measures are implemented in a longer period, this however makes the production process stagnant and interrupts the global supply chains by slowing down overall demand and supply, production, trading, savings, investments, and other economic actions in every sector of most countries (Ho et al., 2023; Xie et al., 2022). This ultimately increases the unemployment rate and poverty and reduces people's income – thus affecting the economy negatively (Ashraf, 2020a).

Hence, the body of literature addressing COVID-19 and governmental policies has grown. It does, however, primarily concentrate on how well contamination remedies work to lower the number of COVID-19 cases and fatalities (Carraro et al., 2020; Dergiades et al., 2022), the pandemic's price response and equity funds performance (Mirza et al., 2020; Mirza et al., 2020; Yarovaya et al., 2021), considering the differences in national government responses (Greer et al., 2020). In recent years, the effect of government intervention on stock markets during the COVID-19 pandemic has started receiving much attention from researchers, industry participants, and the authorities, but the literature shows confounding findings. Several studies show that stock markets react to government policy responses (M.-H. Chen et al., 2020; Hu et al., 2021) or social distancing measures (Ashraf, 2020a) negatively. However, others show opposite results (Ashraf, 2020a; Chang et al., 2021; Harjoto et al., 2021), or there is no significant impact of government intervention in health on the stock market (Chang et al., 2021). Indeed, Hunjra et al. (2021) argue that the impact of different policies measures on the stock markets largely depends on the country settings. Second, the literature on the impact of government intervention on stock markets during the COVID-19 pandemic is dominated by studies in developed markets (e.g. the US, Japan, Europe) and the global financial market as a whole, with much less discussion on frontier markets in the Asia-Pacific regions (only the study of Alam et al. (2021) and Bouri et al. (2022) are the exception, but it is also about a developed market – Australia and New Zealand, respectively. Not to mention that the two countries had controlled the epidemic very well because its independence in the Pacific Ocean, which couldn't be applied in the emerging markets with sharing the same borders with many countries like Vietnam). Given the increasing contribution of some of the frontier markets like Vietnam to the world economy, this issue in Vietnam has not been explored yet although several studies attempt to examine the impact of COVID-19 on the Vietnamese stock markets (Anh & Gan, 2021; Dang et al., 2021).

Therefore, this study contributes to the scholarly literature on multiple levels. First and foremost, regarding the above discussions and the paucity of relevant empirical research in Vietnam, our study adds to the current literature a new evidence in this emerging country by looking at how government intervention in

reaction to COVID-19 affected overall and industry stock returns in Vietnam. To achieve this purpose, we use a broad measure of government responses to examine its impact on Vietnamese stock market returns. We further decompose the overall government responses into different policy measures including the stringent index (social distancing measures), the containment and health index (containment and healthcare policy measures), and the economic support index (economic stimulus packages). As suggested by Kanno (2021), we investigate whether the impact of government responses on the Vietnamese stock market during COVID-19 differs among industries by using daily data from 23/01/2020 to 28/05/2021, capturing the period between phase 1 and phase 3 of the pandemic. Second, our results indicate that the COVID-19 pandemic, on average, has a negative impact on stock market returns, but the impact varies depending on the sector. Similarly, the results also highlight the negative reaction of stock market returns to the overall government responses. When breaking down, these responses' effects varies depending on the kind of policy and the nature of industry. More precisely, stock market returns are negatively impacted by government pronouncements of strict social distancing policies and measures for economic support programmes, but positively impacted by announcements of testing policies and healthcare investments. These results expands publications on the factors influencing stock market returns and stability under pressure (Balli et al., 2020; Bhargava et al., 2012; Bouri et al., 2022; El Hedi Arouri et al., 2011).

The rest of this study is organized as follows. In Section 2, we reviews the relevant research on government responses and stock price returns during the COVID-19 pandemic to consequently propose the research hypotheses. Next, Section 3 explains the methodology and the details of the data used in this study. Finally, whilst Section 4 reports the empirical results and discussions, Section 5 offers a summary of our findings and concluding remarks.

2. Literature review

This section will focus more on (1) the impact of COVID-19 pandemic on the aggregate stock market index as well as the sector level and (2) how different measures of government interventions affect stock markets during the COVID-19 pandemic.

2.1. Stock price returns and COVID-19 pandemic

The literature mostly documents the adverse impact of COVID-19 on the stock markets as the whole (Anh & Gan, 2021; Ashraf, 2020a; Bouri & Harb, 2022; Ding et al., 2021; He et al., 2020). For instance, from global perspectives, Abuzayed et al. (2021) looks at the possible systemic risk spillover between the individual stock market indices of 14 nations that were heavily impacted by the Covid-19 pandemic and the global stock market index. They indicate that the COVID-19 pandemic exacerbated systemic risk contagion in both of them, according to empirical assessments. Developed stock markets in North America and Europe, as opposed to Asian stock markets, notably transmitted and received more marginal severe risk to and from the global market index during this stressful era. Similarly, Bouri et al. (2021) demonstrate that, up to early 2020, the dynamic total connectedness across the five assets (including gold, crude oil, world equities, currencies, and bonds) was moderate and largely steady. Following that, the network of connectedness's structure changes and the overall connectivity surges, both of which are consistent with the COVID-19 epidemic. Prior to the COVID-19 outbreak, the bond index becomes the main source of shocks, whilst the stock and USD indices serve as the key sources of shocks during the pandemic. More interestingly, Phan and Narayan (2020) demonstrate that stock market returns in 25 countries first reacted negatively to the COVID-19 outbreak but eventually turned largely positive, indicating a market overreaction and correction. In terms of specific countries, the Indian market's stock returns are adversely correlated with the daily increase rate of COVID-19 cases and deaths (Dharani et al., 2023). In the same vein, the Saudi stock market saw a little decline following the official disclosure of the first COVID-19 case in China. Nevertheless, the declaration of the first verified case in Saudi Arabia had an adverse and noteworthy impact within the initial nine-day event window (Sayed & Eledum, 2023).

When breaking down to the sector level, the literature all confirms the heterogeneous effects of the COVID-19 based on how businesses and industries are impacted by the restraint and control measures. For instance, they include the production capacity of the firm, its degree of integration in regional and

global production networks, and the type of market they serve) (Bouri et al., 2021; Shahzad et al., 2021). These factors allowed businesses and industries to more quickly adjust to the uncertainties and challenges brought on by COVID-19 and reduce the negative impact of the pandemic on their operations. Consequently, Dharani et al. (2023) suggest that during the entire period of the crisis, the food and beverage, technology, and chemical sectors have better returns. On the other hand, the returns from the banking and finance, automobile, services, and cement and building industries are lower. It's interesting to note that during the lockdown, every industry group in this study experiences a profit. Of which, the food and beverage, automobile, technology, chemical, and mining industries offer higher rewards. Furthermore, according to Sayed and Eledum (2023) and Alam et al. (2021), while telecommunication services and food & beverage were positively impacted, the industry categories most severely impacted were banks, consumer services, capital goods, transportation, and commercial services. Fasanya (2023) also investigate South Africa stock market and claim that the various sector returns (industrials, financials, health care, telecoms, materials, consumer services, consumer goods and technology) are all negatively and statistically significantly impacted by pandemic uncertainty, suggesting that sector stock returns decrease as the pandemic outbreak intensifies. Similarly, the NZ50 index (New Zealand's main equity index), generally fell nearly 30% between 24 February and 23 March 2020. Equity indexes showed losses when broken down, particularly those related to banking, manufacturing, airline, and travel stocks. Bouri et al. (2022) explain that travel restrictions have resulted in huge losses for service businesses like transportation, tourism, and hospitality. Thereby, they can be very harmful to the oil industry which mostly relies on transportation and economic activities. In contrast, some industries and sectors – like health-care, online entertainment, information technology, and telecommunication services – have seen an increase in demand for their goods and services, or at least stability in it. This is due in part to these industries' no-cyclicality endurance to business cycle variations, as well as the growth and innovation prospects that the COVID-19 pandemic brought to these.

From other perspectives, Maneenop and Kotcharin (2023) are interested in transportation sector only. By using a dataset of 727 listed companies from 63 countries, they reveal that the introduction of the vaccination has a favorable impact on transportation stocks, but the pandemic proclamation even has a negative impact. Further, compared to freight markets, passenger markets were more impacted. Also, Railway firms' equities were unscathed by the pandemic, but airline stocks took the brunt of it. Shahzad et al. (2023) study the default risk transmission of travel and leisure industry in US. They find that since the pandemic, default risk transmission has increased over all time horizons, which is indicative of the decline in T&L enterprises' credit quality throughout the pandemic. This bad result may come from the travel ban and lockdown measures have significantly reduced spending, which hurts this industry's performance (Bouri et al., 2022; Sobieralski, 2020). Or in the study of Mirza et al. (2023), they illustrate how company solvency declines during the pandemic, especially for those companies that are operating in manufacturing, mining, and retail sectors with a fall in both sales revenues and market capitalization.

2.2. Government intervention, stock price returns, and COVID-19 pandemic

The main focus of this section is to answer how different measures of government interventions affect stock markets during the COVID-19 pandemic which has caused a surge in the degree of uncertainty around the world economy (Baker et al., 2020).

To be specific, it is argued that social distancing measures would increase society costs as economic activity is stagnant. When the negative valuation impact is generally perceived by investors, stricter social distancing measures are expected to decrease stock market returns (Ashraf, 2020a). However, social distancing measures are obvious to be successful tools to prevent the virus from spreading and, consequently, reduce the number of deaths (Mazey & Richardson, 2020; Phan & Narayan, 2020; Thunström et al., 2020) and the number of new infectious cases (Hussain, 2020), and thus could have a positive economic impact. Studies by Anh and Gan (2021) and Bouri et al. (2022) shows that stock market performance is positively associated with the lock-down period, implying that it can increase investors' trust in the stock market as a whole.

When observing the effect of the containment and healthcare policy measures, this could result in a positive market reaction by promoting investors' confidence and trust in the authorities to control the

COVID-19 pandemic. These measures first increase the awareness of people about the benefits of restricted going out, washing hands more regularly, and keep common places sanitized. Along with this, public testing and contact tracing for detecting infected cases are attributing to the success of controlling the COVID-19 pandemic in the early phase. Vietnam, Japan, and South Korea are good examples. Ashraf (2020a) indicates that stock market returns are positively associated with containment and health policy measures. In contrast, an adverse effect of these measures on stock market performance is documented by Hu et al. (2021) and Hunjra et al. (2021). Even, Chang et al. (2021) emphasize the stock market is seemingly not affected by health policy measures.

When considering the effect of economic stimulus packages, stock markets react to this announcement differently. Several studies show a positive stock market reaction (Ashraf, 2020a; Harjoto et al., 2021). It is because that income support program helps households to purchase necessary goods while staying at home due to lock-down. Also, enterprise support programs are designed to reduce the certain level of burden in selected industries. Others however found that the stock prices are negatively related to the announcement of economic support programs (Hu et al., 2021).

Taken the above arguments, the first hypothesis is formed as

H₁: The government intervention has no impact on stock market return.

Given that the negative impact of COVID-19 on the stock markets as emphasized by several studies such as Al-Awadhi et al. (2020) and Ashraf (2020b), if government intervention could provide a positive economic impact by controlling the number of death cases and newly infected cases, the government intervention can mitigate the adverse effect of COVID-19 on stock market returns. Therefore, the following hypothesis is postulated as:

H₂: Government intervention is likely to mitigate on stock market's negative reaction to the COVID-19 pandemic.

3. Methodology

We utilizing daily data from 23/01/2020 to 28/05/2021 where the first confirmed case was announced to the early stage of the 4th wave of the COVID-19 pandemic in Vietnam to examine how different Vietnamese stock market reacted to the government's crisis response. Our research specifically focuses on the earlier phase of the COVID-19 pandemic in Vietnam, which encompasses the first three waves: the first wave (23/1-24/7/2020), the second wave (25/7/2020-27/1/2021), and the third wave (28/1-26/04/2021). It is noted that there is evidence that the impacts of COVID-19 on the stock markets was stronger in those phases (Ashraf, 2020; He et al., 2020; Tan et al., 2022) but the impacts decreased over time.

Our dataset was gathered from three main sources. First, the data on stock price was obtained from Refinitiv Eikon. Daily stock returns were calculated using adjusted closing prices. Second, data on daily COVID-19 confirmed cases and death cases was collected from the John Hopkins University, Coronavirus Resource Centre database. Thereafter, the data on the government response index and its components was gathered from the Oxford COVID-19 Government Response Tracker dataset (OxCGRT) as constructed by Hale et al. (2021) rather than using dummy variables. As many other governments worldwide, the government of Vietnam implemented a variety of measures to handle the COVID-19 situation. These policies can be classified into (1) social distancing measures or stringency index (i.e. lockdowns, limitations on domestic travel, border closures, travel restrictions, etc.), (2) containment and healthcare policy measure or containment and health index (i.e. public testing (both early case-detection and extensive testing), contact-tracing strategies, suspected people isolation, etc.), and (3) economic stimulus package or economic support index (i.e. restructuring the debt repayment period, income support, free-interest loans, and tax relief, etc.). After matching three datasets, this arrived at 200,432 observations from a sample of 799 non-financial firms from 23/01/2020 to 28/05/2021. Note that observations were dropped with missing data on daily stock prices, COVID-19 cases, and government intervention datasets. All financial data is winsorized at the 1% and 99% levels.

Our model is used as follows:

$$RE_{i,t} = \alpha_0 + \beta_1 LNCVD_{t-1} + \beta_2 \Delta GOV_t + \tau_i + \varepsilon_{i,t} \quad (1)$$

where $RE_{i,t}$ represents the daily stock return of firm i in day t and is calculated by $\frac{stock\ price_{i,t} - stock\ price_{i,t-1}}{stock\ price_{i,t-1}}$. Following Ashraf (2020a) and Ashraf (2020b) who demonstrated that stock market returns are significantly affected by COVID-19 cases rather than by the death cases, $LNCVD_t$ as measured the natural logarithm of daily growth of confirmed COVID-19 cases is used. We also use the natural logarithm of daily growth of death COVID-19 cases and the natural logarithm of accumulative death cases for robustness checks (although these are not reported due to the space restriction, they are available upon request). GOV_t is the daily change in the overall government response index from the OXCGRT database. We further decompose the overall government responses into three components, including stringency index ($STRINGENT_t$), containment and health index ($CONTAIN_t$), and economic support index ($ECONOMIC_t$). τ_i , firm fixed-effects, is included to control for time-invariant differences across firms. Robust standard errors are clustered at the firm level while $\varepsilon_{i,t}$ is an error term. Following Ashraf (2020a), Equation (1) is modified to examine whether government intervention could mitigate the adverse impact of COVID-19 on stock price returns in the Vietnamese market:

$$RE_{i,t} = \alpha_0 + \beta_1 LNCVD_{t-1} + \beta_2 \Delta GOV_t + \beta_3 LNCVD_{t-1} * \Delta GOV_t + \tau_i + \varepsilon_{i,t} \quad (2)$$

Following Gulen and Ion (2015) and Phan et al. (2019), time-fixed effects are excluded from our model due to collinearity issues since COVID-19 and government intervention and their interaction terms are analogous to all the firms at a given day. We also use interaction terms for each of the three government reaction indexes with the growth of COVID-19 cases. Following the suggestion of Kanno (2021), this study further examines the impact of COVID-19, government responses, and their joint effect on stock price returns differ among ten industrial sectors in Vietnam.

4. Empirical results and discussions

Table 1 provides descriptive statistics on variables used in this study. The average value of stock price returns is 0.2% with a standard deviation of 0.035. The 0.031 mean value of the growth in confirmed cases shows that on average COVID-19 cases observed a 3.1 percent daily increase. The minimum and maximum values of government action indexes imply that the Vietnamese government may respond to the COVID-19 with mild to moderate significant changes in policy measures.

Table 2 reports the main empirical findings. Negative coefficients on CVD imply that stock price returns react to the growth of COVID-19 confirmed cases negatively – thus hypothesis 1 is rejected. This is comparable with the early findings of Salman and Ali (2021), Al-Awadhi et al. Al-Awadhi et al., (2020), and Anh and Gan (2021) who found that the COVID-19 pandemic has a significantly negative impact on stock markets. Negative coefficients on GOV suggest that stock markets react to the overall government response negatively. The same result still holds for the case of $CVD * GOV$ and thereby rejecting hypothesis 2. This finding demonstrates that the overall government responses do not weaken the adverse effect of the COVID-19 pandemic on the Vietnamese stock market. This somewhat supports the early findings of Hu et al. (2021) who found that government intervention affects stock prices of energy firms

Table 1. Summary statistics.

Variable	Obs	Mean	STD	Min	Max
RE	202,402	0.002	0.035	-0.100	0.111
CVD	201,744	0.031	0.181	-1.000	3.000
GOV	200,432	0.005	0.049	-1.000	0.605
STRING	200,432	0.004	0.059	-1.000	0.733
CONTAIN	200,432	0.005	0.050	-1.000	0.605
ECONOMIC	200,432	0.002	0.068	-1.000	1.000

Notes: RE is measured by the daily stock return of a firm. CVD is measured by the daily growth in COVID-19 confirmed cases. GOV expresses the overall government response index. $STRING$ represents the introduction of social distancing policy measures such as workplace and school closures, public closures, and restrictions on domestic and international travel. $CONTAIN$ represents the introduction of containment and health measures such as public awareness campaigns, testing policy and contract tracing, and investments in healthcare. $ECONOMIC$ represents income support and debt relief.

Table 2. The results of baseline models.

RE	Model 1	Model 2	Mode 3	Model 4
LNCVD	-0.008*** (0.001)	-0.007*** (0.001)	-0.017*** (0.004)	-0.012*** (0.004)
GOV	-0.015*** (0.001)	-0.012*** (0.002)		
LNCVD*GOV		-0.011*** (0.007)		
STRING			-0.034*** (0.005)	-0.025*** (0.005)
LNCVD*STRING				-0.637** (0.259)
CONTAIN			0.022*** (0.006)	0.024*** (0.007)
LNCVD*CONTAIN				0.263 (0.332)
ECONOMIC			-0.001 (0.001)	-0.008*** (0.002)
LNCVD*ECONOMIC				0.413*** (0.103)
Const	0.002 (0.000)	0.002 (0.000)	0.002 (0.000)	0.004 (0.000)
No. Obs	200,432	200,432	168,323	168,323
R square	0.015	0.015	0.014	0.014
Fixed effects	Yes	Yes	Yes	Yes
Time effect	No	No	No	No

Notes: Robust standard errors in parentheses are clustered at the firm level. *, **, and *** denote results significant at the 10, 5, and 1 percent levels, respectively. *RE* is measured by the daily stock return of a firm. *CVD* is measured by the daily growth in COVID-19 confirmed cases. *GOV* expresses the overall government response index. *STRING* represents the introduction of social distancing policy measures such as workplace and school closures, public closures, and restrictions on domestic and international travel. *CONTAIN* represents the introduction of containment and health measures such as public awareness campaigns, testing policy and contract tracing, and investments in healthcare. *ECONOMIC* represents income support and debt relief.

negatively, and Khan and Batteau (2011) who suggest that direct government intervention does not generate benefits for the stock market during a crisis. This further emphasizes that the Vietnamese government should have different initiatives to reduce the impact of COVID-19 outbreaks. Nonetheless, this finding validates our further analysis.

When observing the components of government responses, the coefficient of *STRING* is negative and significant, emphasizing that the stringent government social distancing measures (e.g. workplace closing, close public transport, stay at home requirements, restrictions on internal movement, and so on) may lead to a reduction in stock prices. Although these measures may help to control the number of cases, this may increase the unemployment rate and affect the production process and supply chain management. A negative coefficient on *CVD * STRINGENT* demonstrates that continuing the stringent social distancing measures may further exaggerate the negative impact of the COVID-19 outbreak on the Vietnamese stock market. When social distancing measures are continuing against to COVID-19 pandemic, there appears lack of labour in many industrial zones, thus lead to a reduction in economic outputs. Nonetheless, this supports the early findings of Zaremba et al. (2021) who suggest the stock market liquidity is detrimental to workplace closures, and of Alexakis et al. (2021) who demonstrate that stock market returns are negatively associated with the intensity of lockdown. Nevertheless, these results are contrary to the findings in advanced markets (Canada, France, Japan, the UK, the US, and New Zealand), or the stock returns have improved with each day of lockdown by increasing investors' confidence in the markets (Bouri et al., 2022; Narayan et al., 2021).

On the other hand, Containment and health index (*CONTAIN*) shows positive signs, indicating that the Vietnamese stock market responds to these policy measures with positive returns. This is in line with the findings of Ashraf (2020a), showing that in Vietnam, when vaccines firstly announced amid the pandemic, this initiative increase investors' confidence in the Vietnamese economy or is symbolized as the road to recovery from this crisis. However, the coefficient of *CVD * CONTAIN* is positive but not statistically significant.

When observing the effect of economic support measures (*ECONOMIC*), the stock market return is negatively affected by economic support programs. This is partly comparable with the suggestions of Hu

et al. (2021). Again, the result is different from those of advanced economies like France, Germany, Japan, Italy, and New Zealand. In more detail, Narayan et al. (2021) and Bouri et al. (2022) claim that stimulus packages have no impact on these markets' stock returns. Even though they are dissimilar, both of them can be interpreted that the economic supports might have been prolonged, but as long as there are restrictions on international travel, it is unlikely that the tourism and aviation sectors will resume their pre-COVID-19 level of operation. For this reason, uncertainty will persist once the extension term ends. Investors get uneasy due to the direct and indirect effects of government initiatives to combat COVID-19. The coefficient on $CVD * ECONOMIC$ however becomes positive and significant, emphasizing that the effect of government responses associated with income support and debt relief is channelled via a decrease in confirmed cases. Together, these results highlight that the economic support policy measures are the most effective mechanism to alleviate the negative impact of COVID-19 on the Vietnamese market while public awareness and containment and health measures are less so.

Next, the impact of COVID-19 on stock price returns in ten different sectors is further analysed to capture a more in-depth understanding of how governmental intervention impacts each sector. Looking back at the GFC, compared to other businesses, the financial and household sectors alone lost around USD 13 trillion worldwide (McDonnell & Burgess, 2013). In the same vein, the effects of COVID-19 and government remedies to contain the pandemic are expected to be unevenly distributed among industries because economic recessions affect nations and industries differently. Due to the length restrictions, we only report the results of sectors that our main variables show significant signs, and the rest is available upon request. Regarding the overall government responses, the data in Tables 3 and 4 shows stock price returns of most sectors that are negatively impacted by the COVID-19 pandemic include Consumer discretionary, Industrials, Materials, Real estate, and Information technology². If further investigating each governmental response in each sector, the results are even more complex, which will be explained in combinations.

First, Consumer discretionary are goods that people typically don't require in their daily lives can survive without them (i.e. cars, household appliances, speciality items, luxury goods, and leisure). Therefore, compared to the demand for consumer staples (items that people must have), the demand for consumer discretionary goods is far more susceptible to fluctuations in the economy (Bouri et al., 2022; Sayed & Eledum, 2023). Besides, the negative coefficients of GOV and $LNCVD * GOV$ indicates that the overall

Table 3. The results of the impact of COVID-19 on different sectors in Vietnam.

RE	Information Technology			Materials		Real Estate		Utilities		
LNCVD	-0.022*** (0.011)	-0.021*** (0.011)	-0.011 (0.026)	-0.007** (0.003)	-0.010*** (0.003)	-0.016*** (0.005)	-0.016*** (0.004)	-0.016*** (0.005)	0.032** (0.014)	0.020 (0.023)
GOV	-0.005 (0.013)	0.016 (0.028)		-0.017*** (0.004)	0.008 (0.007)	-0.024*** (0.004)				
LNCVD*GOV		-0.066 (0.149)			-0.069 (0.050)	-0.159** (0.078)				
STRING			0.038 (0.072)				-0.061*** (0.011)	0.038** (0.019)	-0.053*** (0.015)	0.032 (0.026)
LNCVD*STRING			-0.122 (2.345)					-1.295** (0.637)	-1.985*** (0.655)	
CONTAIN			-0.023 (0.087)				0.057*** (0.012)	-0.033 (0.026)	0.094** (0.020)	-0.051 (0.040)
LNCVD*CONTAIN			0.702 (2.955)					1.884** (0.729)		2.390** (1.150)
ECONOMIC			-0.003 (0.008)				-0.001 (0.002)	-0.005* (0.002)	-0.002 (0.003)	-0.001 (0.004)
LNCVD*ECONOMIC			4.661* (2.467)					0.645 (0.871)		-1.889 (1.254)
Const	0.002 (0.000)	0.002 (0.000)	0.002 (0.000)	0.002 (0.000)	0.002 (0.000)	0.002 (0.000)	0.002 (0.000)	0.002 (0.000)	0.001 (0.000)	0.001 (0.000)
R square	0.116	0.219	0.031	0.226	0.171	0.019	0.002	0.012	0.033	0.029
No. Obs	5,187	5,187	4,354	42,538	42,538	19,134	16,194	16,194	9,834	9,834
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effect	No	No	No	No	No	No	No	No	No	No

Notes: Robust standard errors in parentheses are clustered at the firm level. *, **, and *** denote results significant at the 10, 5, and 1 percent levels, respectively. RE is measured by the daily stock return of a firm. CVD is measured by the daily growth in COVID-19 confirmed cases. GOV expresses the overall government response index. $STRING$ represents the introduction of social distancing policy measures such as workplace and school closures, public closures, and restrictions on domestic and international travel. $CONTAIN$ represents the introduction of containment and health measures such as public awareness campaigns, testing policy and contract tracing, and investments in healthcare. $ECONOMIC$ represents income support and debt relief.

Table 4. The results of the impact of COVID-19 on different sectors in Vietnam (Cont'd).

RE	Consumer Discretionary		Energy		Health Care	Industrials			
LNCVD	-0.011** (0.005)	-0.011** (0.005)	0.679*** (0.026)	0.125** (0.049)	0.028*** (0.008)	-0.008*** (0.002)	-0.010*** (0.002)	-0.008*** (0.002)	-0.010*** (0.002)
GOV	-0.015*** (0.005)	0.011 (0.008)				-0.014*** (0.002)	0.001 (0.004)		
LNCVD*GOV		-0.146*** (0.068)					-0.052 (0.034)		
STRING			-0.073** (0.028)	0.455 (0.058)	-0.034 (0.022)			-0.045*** (0.009)	0.011 (0.017)
LNCVD*STRING				-3.979*** (1.302)					-1.096** (0.488)
CONTAIN			0.062 (0.032)	-0.115 (0.078)	0.043 (0.028)			0.030*** (0.011)	-0.021 (0.023)
LNCVD*CONTAIN				5.373** (1.871)					1.429** (0.677)
ECONOMIC			-0.016 (0.009)	-0.019* (0.010)	0.008 (0.006)			-0.001 (0.002)	-0.001 (0.002)
LNCVD*ECONOMIC				0.332 (2.176)					-0.455 (0.722)
Const	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)	0.002 (0.000)	0.002 (0.000)	0.002 (0.000)	0.002 (0.000)
R-square	0.1984	0.221	0.371	0.085	0.106	0.006	0.005	0.001	0.001
No. Obs	16,759	16,759	3,662	3,662	4,962	74,188	74,188	62,183	62,183
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effect	No	No	No	No	No	No	No	No	No

Notes: Robust standard errors in parentheses are clustered at the firm level. *, **, and *** denote results significant at the 10, 5, and 1 percent levels, respectively. *RE* is measured by the daily stock return of a firm. *CVD* is measured by the daily growth in COVID-19 confirmed cases. *GOV* expresses the overall government response index. *STRING* represents the introduction of social distancing policy measures such as workplace and school closures, public closures, and restrictions on domestic and international travel. *CONTAIN* represents the introduction of containment and health measures such as public awareness campaigns, testing policy and contract tracing, and investments in healthcare. *ECONOMIC* represents income support and debt relief.

governmental responses exacerbate the detrimental effects of the COVID-19 pandemic on stock returns since the objects of these responses are not consumer discretionary.

Second, the Industrials and Materials sector's sharp increase in layoffs indicates that it is highly sensitive to the COVID-19 quarantine restrictions and, consequently, its returns have a decline. This result is also consistent with the study of Bouri et al. (2022), Fasanya (2023), and Mirza et al. (2023) when they claim that the most susceptible to bankruptcy industries are manufacturing, mining, and retails during the COVID-19 pandemic. Also, Industrials are one of the most negatively impacted sectors by the lockdown policies, while the opposite is true for containment and health policies.

Third, with regards to Real estate, many people are paying off their mortgages by renting out their homes as accommodations, but because of travel limitations (by lock down policies) and job losses, this kind of household income has vanished, making the mortgage payments on time more difficult (Bouri et al., 2022). Therefore, it is understandable that the coefficients of *STRING* and *LNCVD*STRING* are statistically negative. Moreover, the market for residential and commercial constructions would be significantly impacted by potential salary reductions during the pandemic, and people will strive to hang onto their cash in order to meet their everyday requirements, which will squeeze demand for real estate. Lastly, the movement of laborers involved in building projects and the inability to obtain supplies while the lockdown is in place will cause delays in housing projects. Property companies will find it more difficult to obtain capital if fresh equity investment slows down (Alam et al., 2021).

Fourth, in terms of Information technology sector, it is widely recognized that the sector will be a crucial factor in the *road to recovery* from the current economic crisis. It is also predicted that this sector will grow in the upcoming years as a results of chances for remote work and a work-from-home culture (Ramelli & Wagner, 2020). Nonetheless, our findings are opposite but in line with the studies of Bouri et al. (2022), Dharani et al. (2023), and Fasanya (2023) showing that because most IT firms in our dataset are mainly producing and exporting electronic components and devices rather than providing IT solutions for businesses, they are severely affected by the lockdown policies and shipment delays (Alam et al., 2021). Also, a long period of isolation would make it challenging for many businesses in the sector to survive due to expenses associated with hiring staff and wasting fixed assets (Wang et al., 2020). Another explanation is that since the dot-com boom in the 1990s, investors have shifted their money

away from the IT sector and move to others, and currently, tech companies with ties to China are likely to increase investor apprehension (Anderson et al., 2010; Baker & Wurgler, 2006; Chen et al., 2013).

On the other hand, stock price returns of Utilities and Energy and Healthcare are positive during the impact of COVID-19, suggesting that investors may see some huge opportunities for the rapid growth of these sectors during the COVID-19. First, with respect to the Energy sector, our findings are similar to the findings of Surahman et al. (2022). Their study intends to look into how much energy households in urban residential structures in Indonesia's largest cities used during the COVID-19 outbreak when the lockdown policy (movement control order) takes effect. They claim that the average yearly energy consumption of all samples during the pandemic was roughly 23.5 GJ, which was 3.0 GJ more than it was prior to the pandemic. The main reasons for the difference were the use of cooking and air conditioning. The statistical research made it abundantly evident that rising household income (from affordable to expensive homes) will result in larger homes and more equipment, including air conditioning, and higher overall energy consumption in households. Particularly, in Vietnam, a survey in Dang et al. (2021) found that 'Compared to Danang in 2019, the presence of air conditioner in Son Tra is 35% higher. This result may be due to the COVID epidemic in 2020 - 2021: the time spent at home in summer has impacted people to buy more air conditioners: the time spent at home in summer has impacted people to buy more air conditioners.' Further, the study also indicates that the three main needs for the people during the pandemic are cooling (i.e. fan and air conditioner), entertainment (i.e. mobile phone and TV), and cooking (i.e. refrigerator and electric rice cooker) (Le et al., 2023). It is also note that in the North of Vietnam, the winter months require more heaters.

Next, COVID-19 raises a significant demand for drugs and healthcare produces, increasing profits for these businesses as well as their stock returns (Al-Awadhi et al., 2020; Alam et al., 2021). For example, since the growth of risk of COVID-19 infection caused by air pollution, demand for masks and alcohol-based standard sterilizers has risen at an unprecedented rate (Paital, 2020), which has led to massive increases in sales of both products. Further, the formidable obstacles impeding the advancement of novel vaccinations possess the capacity to operate as monopolies. The research of vaccines is far more sophisticated and technologically advanced than the manufacturing of pharmaceuticals, hence a universal vaccination cannot be created, and thus, increasing its demand. These results are similar to those in previous pandemic diseases such as SAR (Chen et al., 2009; Hinman et al., 2006).

With reference to the utilities sector, there are the same explanation. During the spread of COVID-19, people spend more on utilities as they are required at home due to the lock-down and workplace closures (i.e. electricity, water, gas, trash, etc.). This somewhat supports the early suggestion of Rakshit and Basistha (2020) that some firms show positive returns because people have to increase their consumption of necessary products.

Furthermore, we do not find enough evidence that stock prices of Consumer services, Consumer staples are affected by the COVID-19 pandemic. These results is somehow contrary to the findings of Bouri et al. (2022) and Alam et al. (2021), which mentions that they were more resilient to the pandemic when favourable purchasing upticks for several survival products. To be specific, the food industry is handling the COVID-19 problems rather successfully. The supply chains for food products from the fields of production to the retail outlets and customers are disrupted by the closure of numerous eateries (Deák & Karali, 2014). Instead, supermarkets and grocery stores fared rather well in terms of volume of revenue and profits due to the panic buy (Nicola et al., 2020). The results of government responses still hold, and thereby our main findings as above are robust.

5. Conclusion

This study investigated the effect of the Vietnamese government intervention on the stock price returns during the COVID-19 pandemic. The findings show that on average, the COVID-19 pandemic affects stock market returns negatively. However, this impact differs among sectors. For example, while most of sectors as Information Technology, Materials, Real Estate, Consumer Discretionary, and Industrial show a negative relationship with stock price returns, the opposite is true for Utilities, Energy, and Health Care sectors. Furthermore, the findings also emphasize that stock market returns react to the overall

government responses negatively. More specifically, the announcement of stringent social distancing and economic support program measures mostly lead to negative stock market returns while government announcements of testing policy and investments in healthcare result in positive returns.

Our findings have important implications for both policymakers, regulators, portfolio managers, and investors. First, in the light of the systematic market vulnerability and the seismic health shock, our study helps local policymakers understand how the three enacted responses have affected industry- and overall-level stock market performance heterogeneously in Vietnam, thereby determining the best course of action for the targeted stock markets (at the aggregate and the industry level) to take in the case of a catastrophic incident like COVID-19. For example, the continuing social distancing measures should be taken very cautiously because these measures magnify the adverse effect of COVID-19 on stock market returns. On the other hand, the findings also demonstrate that economic support program measures have an indirectly beneficial impact via the channel of reduction in the spread of COVID-19 outbreaks. This is important to the case of Vietnam as an emerging market. On the whole, the study some recommendations for optimal and anticipatory policy measures that could be implemented in other emerging markets which have financial structures comparable with that in Vietnam during exogenous shocks like the COVID-19. Consequently, they can sustain both the health of these stock markets and financial stability.

Besides, because that investors and portfolio managers often swap between several industry stock indexes, this study also enables them to make more sophisticated decisions (i.e. investing and trading strategies) about risk management and portfolio diversification by uncovering factors (i.e. governmental responses, industry factor risks) that shape stock market return in crisis periods. Therefore, they maximize their profits, limit risk, and implement a switching strategy among industry stock indexes for the advantages of risk management, diversification, and hedging. Finally, they can regain their confidence in the financial markets.

As other studies, our research has some limitations, which implies for the future research agenda. First, future research should assess the effects of governmental responses to COVID-19 for the whole period of the pandemic. Second, other studies can take into account the same effects while considering an international sample or all-emerging-countries sample. Third, some can compare the performance of the aggregate stock market or the industry stock market in three distinct periods: pre-COVID-19, in the COVID-19, and post the pandemic.

Notes

1. Retrieved from <https://www.worldometers.info/coronavirus>, accessed on 22nd Feb, 2024.
2. Note that most listed firms in Information technology (IT) are mainly producing and exporting electronic components and devices while few of them are providing IT solutions for businesses.

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Data availability statement

The data that support the findings of this study are available from the corresponding author, THH, upon reasonable request.

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