



# “How COVID-19 impacts Vietnam’s banking stocks: An event study method”

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# HOW COVID-19 IMPACTS VIETNAM'S BANKING STOCKS: AN EVENT STUDY METHOD

## Abstract

The banking industry is one of the major industries in the Vietnamese stock market, so understanding how the industry index reacts to unusual events such as COVID-19's impact is very important for the development of the Vietnamese stock market. This study examines the response of the banking sector index to three lockdown/blockage announcements to prevent the COVID-19 epidemic in Vietnam in 2020. Three times of lockdown/blockage: On February 13, 2020, blockade of Son Loi commune, Vinh Phuc province; on March 30, 2020, Vietnam announced the nationwide epidemic of COVID-19 and then nationwide lockdown, and on July 28, 2020, blockade in Da Nang. In the first case, the abnormal returns changed the sign around the notification date indicating that the stock price deviated from its fair value, but accumulating abnormal returns  $CAR(0;3]$  and  $CAR(0;2]$  are both positive and statistically significant, which means that investors are more secure when the epidemic area is tightly controlled. The nationwide lockdown was the event that had the strongest impact on the stock price when both AR and CAR were negative and statistically significant before and after the date of the event's announcement. Nationwide lockdown was the event that had the strongest impact on stock prices as both AR and CAR were negative in the days before and days after the event. This result supports the theory of imperfect substitution. Only AR [2] was positive and statistically significant, showing that the blockade event in Da Nang had a slight impact on the banking sector's stock price.

## Keywords

abnormal return, banking industry, blockage, lockdown, stock market

## JEL Classification

G01, G14, G21, G40

## INTRODUCTION

The outbreak of the COVID-19 epidemic was a shock of unprecedented scale and nature. The main solution taken so far mainly to curb the spread of COVID-19 remains to lockdown, block and distance society on a global scale, which has led to the stagnation of economies. In 2020, Vietnam is one of the few countries in the world that still maintains positive growth momentum (World Bank, 2020) and soon controls COVID-19. Having this achievement, in addition to the synchronous solutions from the regulators, is a significant contribution to the Vietnamese banking industry.

Until now the banking industry is still playing an important role in the Vietnamese economy. Research by World Bank (2019) has shown that GDP growth per capita and credit growth in Vietnam have a close relationship with each other. By the end of 2019, the total outstanding loans of listed banks accounted for 64.3% of the total outstanding loans of the banking system (FiinPro, 2020c), the market capitalization ratio of the finance-banking industry is 29.08%, the highest among the industry groups on the listed stock market in Vietnam. In which, there are eight bank stocks in the group of 30 stocks with the largest market capitalization on the Ho Chi Minh City Stock Exchange (HSX, 2019).

Although WHO announced the first case of COVID-19 in China on December 31, 2019 (WHO, 2020) and Vietnam found the first positive case on January 23, 2020 – coinciding with the Tet holidays in Vietnam (MHO, 2020a), so the paper considers three days of lockdown/blockage<sup>1</sup> announcement as event dates, including (1) February 13, 2020 in Son Loi commune – Vinh Phuc, (2) on March 30, 2020, Vietnam announced the nationwide epidemic of COVID-19 and implemented a nationwide lockdown, and (3) July 28, 2020 in Da Nang. These three days were chosen because it showed that the number of COVID-19 cases increased rapidly and there was infectiousness in the community. If the epidemic of COVID-19 is not controlled soon, it will pose a serious threat to public health and the worse consequences.

This study examines the impact of COVID-19 on Vietnam's banking industry by considering the banking sector's stock index on three lockdown times in Vietnam in 2020. Research results have found that investors' reactions to each event are very different. The market has foreseen the negative impact of a national lockdown by reacting before and after the date of the event, which also supports Shleifer's imperfect substitution theory (1986). The banking sector index responded positively to the third lockdown in Da Nang, an interesting finding of the study.

This study contributes to the earlier literature on the impact of the epidemic on banking stocks. It has taken into account the full impact of all three events related to the course of the COVID-19 epidemic in 2020 in Vietnam on the banking sector – a key sector of the Vietnamese economy. It also sheds light on the timely responses and decisions of Vietnamese leaders to achieve the dual goal of both combating the COVID-19 epidemic and assisting individuals (bank customers) and institutions (banks) to recover from a pandemic soon.

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## 1. LITERATURE REVIEW

### 1.1. The impact of the COVID-19 pandemic on the performance of the stock market

The COVID-19 pandemic had a strong impact on global stock markets. Using the event study method, scholars have shown that the COVID-19 pandemic not only had a negative impact on the countries with the highest number of infections and deaths (Liu et al., 2020), countries that are considered successful in this pandemic (Straitstimes, 2021; Pandey & Kumari, 2021), it also affects countries with different levels of development (Singh et al., 2020; Pandey & Kumari, 2021). Singh et al. (2020) showed that the outliers (AR) were negative and significant for both developed and developing countries. In particular, Asian stock markets were the most affected (Pandey & Kumari, 2021).

The lockdown, blockage and movement restrictions to prevent COVID-19 caused economic activity to stagnate. A wide range of industries has

been affected by the COVID-19 epidemic in varying degrees. The world airline industry is heavily affected by this epidemic (Maneenop & Kotcharin, 2020). The return on 52 countries' listed airlines has dropped significantly more than the overall market return. In the markets, Western investors react more quickly to recent news than in the rest of the world (Maneenop & Kotcharin, 2020).

He et al. (2020) pointed out that the COVID-19 pandemic severely affected traditional Chinese industries (transportation, mining, electricity and heating and the environment) but it creates opportunities for high-tech sectors to flourish, such as manufacturing industries, information technology, education and healthcare. Alam et al. (2020) showed that on February 27, 2020, announcing the COVID-19 outbreak in Australia, the food, pharmaceutical and healthcare industries showed abnormal returns, impressively positive. However, after the 10-day event window announcement, the transport sector was poor, while the telecommunications, pharmaceutical and healthcare industries performed well (Alam et al., 2020).

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<sup>1</sup> The word "lockdown" may be used instead of "blockage" later in this article.

## 1.2. An overview of the impact of the COVID-19 epidemic

Since the discovery of the first two cases of COVID-19-positive disease on January 23, 2020 (MOH, 2020), Vietnam had three major lockdowns to prevent the spread of the disease in the community. This section will summarize the major developments of the COVID-19 epidemic in Vietnam in 2020 and its negative impact on the Vietnamese banking industry.

**The first lockdown:** After discovering 11 more patients with the COVID-19 infection in the community, originating from three Vietnamese workers returning from China, on February 13, 2020, it was decided to blockade the Son Loi commune – Vinh Phuc with 10,600 people (Zing news, 2020). On February 25, 2020, all 16 patients infected with COVID-19 were Vietnamese and recovered.

**The second lockdown:** After detecting the first COVID-19 patient in Hanoi, patient No. 17 returned from Europe on March 6, 2020; Vietnam's measures to prevent the COVID-19 epidemic have been quickly deployed with the coordination of many ministries, from central to local levels and to each citizen. Residents are required to wear masks in public places; businesses and entertainment services (bars, movie theaters, massages) have been shut down, the issuance of visas for foreign visitors was suspended for 30 days; they required all foreigners entering Vietnam to undergo a 14-day quarantine, closed the border with all foreigners (only accepting citizens Vietnam), introduced mandatory medical clearance for all domestic passengers (aircraft, train, bus), prohibited gathering of more than 20 people. After recognizing the 200th patient infected with COVID-19 on March 30, 2020, Vietnam announced the epidemic nationwide and the day after the country was lockdown (ODV, 2020; World Bank, 2020).

When the COVID-19 epidemic occurred in the first quarter of 2020, blockage measures and travel restriction caused normal business activities to stall, many businesses faced difficulties and had to reduce production, the credit needs of businesses and households were both reduced. This makes the Business Climate Index (BCI) of Vietnam in the first quarter of 2020 drop to its lowest level since

2010. BCI decreased from 77% (quarter 4/2019) to 26% (quarter 1/2020). The psychological drop from positive (> 50%) to its lowest level in 10 years is a direct result of the impact of COVID-19. More than 90% of business leaders said that COVID-19 had a negative impact on their business, nearly 80% said their business incurred higher costs from the measures taken to lockdown (EuroCham, 2020a). The ratios related to the Vietnamese banking system and the business results of listed banks have been very low in recent years. Total means of payment, capital mobilization of credit institutions and credit growth as of March 20, 2020 increased by 1.55%, respectively; 0.51% and 0.68% compared to the end of 2019 (GSO, 2020a), but only equivalent to 34.1% (1.55/4.54); 29.6% (0.51/1.72) and 35.8% (0.68/1.9) in the same period last year. The three main negative effects of the COVID-19 epidemic on Vietnam's banking industry are declining interest income and services, deteriorating asset quality (Tam et al., 2020). Interest income decreased due to lower deposit rates. Asset quality deteriorated due to a slowdown in the client's business. Service income decreased due to increased customer support for service fees. These negative effects have been clearly reflected in the business results of listed banks in the first quarter of 2020. The profit of 18 banks in the first quarter of 2020 decreased the most since the second quarter of 2018, increasing only by 11.5% compared to the fourth quarter of 2019. The Net Interest Margin (NIM) change rate of this banking group decreased by 1.1 bps compared to the fourth quarter of 2019 to 0.87%. Interest income quality shows signs of slowing down as interest and accruals on net interest rates increase from 157.9% in Q4 2019 to 168.1% in Q1 2020 (FiinPro, 2020a). Facing this fact, some securities companies have made conservative judgments about the business results forecast of Vietnam's banking stocks in 2020 (Agrisecco, 2020; PHS, 2020).

Facing the negative impact of COVID-19 on the economy in the early months of 2020, the State Bank of Vietnam (SBV) has issued many credit support policies for customers affected by COVID-19 such as: Circular No. 01/2020/TT-NHNN dated March 13, 2020, providing for credit institutions, foreign banks' branches to restructure repayment terms, exemption and reduction of interests, maintaining debt groups; Circular No.

04/2020/TT-NHNN dated March 31, 2020, adjusting 50% reduction of interbank payment fees via the Interbank electronic payment system, applicable from April 1 to the end of 2020. Decisions to adjust the operating interest rates, issued on March 16, 2020 and March 17, 2020, include: reducing refinancing rate, rediscounting interest rate, other operating interest rate from 0.5%-1% per year, reducing ceiling interest rate for term deposits from 0.25-0.3%; reducing 0.5% of short-term lending interest rate for priority sectors (currently at 5.5% per year) (MPI, 2020).

After a strict lockdown period to prevent COVID-19 from the end of March 2020, from April 16, 2020, the lockdown measure has been loosened more than before; however, the prohibition on gathering over 20 people, wearing a mask in public places, schools remain closed and flights were suspended. From May 4, 2020 to May 11, 2020, schools at all levels started to reopen (ODV, 2020).

After the government's efforts to fight the COVID-19 epidemic, Vietnam was able to return to normal business much sooner than other countries. In addition, the very practical measures of the State Bank of Vietnam to support businesses affected by COVID-19 introduced in mid-March 2020 have made business leaders' confidence increase again. As a result, by the second quarter of 2020, BCI has recorded an increase of 7.7 percentage points compared to the first quarter of 2020 to reach 34.4 percentage points. In which, more than 50% of executives predict that Vietnam's macroeconomic situation will "stabilize and improve" in the next quarter. That was a significant increase compared to the first quarter (only 10% predict this) (EuroCham, 2020b). The listed bank's business results have shown signs of recovery. In the second quarter of 2020, the after-tax profit of 19 listed banks increased by 16.2% compared to the first quarter of 2020. If calculated in the first six months of 2020, total profit after tax increased by 12.8% over the same period. At the end of Q2 2020, customer loans of 19 listed banks increased only by 3.4%, much lower than the same period of the two previous years (9.2% in 2018, 8.2% in 2019) but still much higher than the growth of 1% to the end of Q1 2020 (FiinPro, 2020b). In general, the business performance indicators of Vietnam's listed banks in the second quarter of 2020 were still

much lower than the previous years, but improved compared to the first quarter of 2020 and had better results than the judgment of securities companies (Agrisecco, 2020; PHS, 2020) previously. It shows positive signals from businesses and banks as Vietnam soon took control of COVID-19 in the context of this complicated pandemic happening globally.

The third lockdown: After 99 days of no infection in the community, on July 25, 2020, Vietnam recorded patient No. 416 infected with COVID-19, in Da Nang. Since July 28, 2020, Da Nang has returned to a state of blockage, and non-essential activities have been suspended (Danang, 2020). On September 11, 2020, Da Nang returned to a new normal life, removing quarantine after 14 days without new cases (ODV, 2020).

From the lockdown in Da Nang to the end of 2020, Vietnam also discovered a number of new COVID-19 infections but quickly traced and quarantined the patients so there was no other lockdown.

## 2. METHOD

It can be seen that the COVID-19 pandemic had a great impact on the world stock markets, and many industries were affected by this pandemic. However, the understanding of the impact of the COVID-19 epidemic on the banking sector is not commensurate with its role in other countries. Moreover, the banking industry is playing an important role in the economy and the development of the stock market in Vietnam (World Bank, 2019; HSX, 2019). These reasons indicate the need for serious consideration and discussion on this topic. Therefore, this paper uses an event study method to examine the impact of the COVID-19 pandemic on Vietnam's banking stock price based on three lockdowns in 2020.

An event is defined as an event or action of a publicly disclosed organization. There are two types of events that are often considered: random events that happen only once or rarely (mergers, natural disasters, large-scale epidemics ...) or regular events (dividends, gender product introduction...). Theories that explain the market's reaction to rare



events (e.g. the COVID-19 pandemic) include: The theory of the efficient market and the theory of the imperfect substitute. The semi-strong form efficient market theory in Malkiel and Fama (1970) states that stock prices reflect all published information and implicitly assumes that buying and selling large amounts of stocks will not affect the share price. The theory of imperfect substitution of Shleifer (1986) states that stocks do not change perfectly for each other, so buying and selling a large number of stocks will shift the demand curve to a new equilibrium state. At this price level, there will be no expectation of reversal as the new price reflects the new equilibrium allocation of the equity holder (Shleifer, 1986; D'Amico & King, 2013).

This paper uses the event study method proposed by Fama et al. (1969) as the main methodology to consider the reaction of Vietnam's banking stock price index in 2020 for three-time lockdown because of COVID-19. So this paper will design the study in accordance with the sequence and standards of the event research methodology. In the method of the event study, to analyze the impact of an event, analysts carry out the following four basic steps:

- 1) identify the event;
- 2) calculate abnormal return (Abnormal return\_AR);
- 3) calculate cumulative abnormal return (CAR); and
- 4) analyze and test the impact of the event.

*Research events:* The paper focuses on three main events relating to three lockdowns in Vietnam by COVID-19 in 2020. On February 13, 2020, there was a blockage in Son Loi commune, Vinh Phuc province (Zing news, 2020); on March 30, 2020, Vietnam announced the nationwide epidemic of COVID-19 and implemented a nationwide lockdown (ODV, 2020; World Bank, 2020); on July 28, 2020, a lockdown was announced in six districts of Da Nang city (Danang, 2020).

*Event window:* Since information related to the COVID-19 epidemic is gradually reflected in

stock prices, this study chooses an event window [-7; 7] to measure the response of the bank's share price. The date the event was signed is currently 0, 7 days before the event, and 7 days after the event so the event timeframe used in this study is 15 days. Brown and Warner (1980, 1985) suggested that a long event window can reduce the power of statistics.

*Measure and test price response:* The paper examines the response of Vietnam's banking sector's stock price to three events through the measurement and testing of extraordinary returns on days surrounding each event. This method has been performed similarly to previous studies (Maneenop & Kotcharin, 2020; Lamy & Thompson, 1986).

The price change of the banking sector index in this study is calculated using the method used by Kiyamaz and Berument (2003):

$$r_t = \ln(P_t / P_{t-1}). \quad (1)$$

According to Mackinlay (1997), the expected return  $E(r_{it}|X_i)$  of stock  $i$  is related to the market return ( $R_{m,t}$ ) calculated by the following formula:

$$E(r_{it} | X_i) = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t}. \quad (2)$$

Next step, to eliminate the effect of other factors on the price change of stocks, the extraordinary profit is determined as follows:

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{m,t} = R_{it} - E(r_{it} | X_i), \quad (3)$$

where  $\hat{\alpha}_i$  and  $\hat{\beta}_i$  are the estimated coefficients of stock  $i$  from equation (2).  $AR_{it}$  recognizes the impact of the event when information on the three events mentioned above is released to the market. If the other  $AR_{it}$  is not statistically significant, it shows that the stock's market value deviates from its fair value, or it demonstrates a violation of the semi-strong form efficiency theory.

Cumulative abnormal return (CAR) between  $t_1$  and  $t_2$  is calculated using the formula:

$$CAR(t_1, t_2) = \sum_{(t=t_1)}^{t_2} AR_{it}. \quad (4)$$

Accumulated extraordinary returns represent the sum of outliers at a given point in time, showing

the effect of the event over time. This paper investigates whether the market price deviates from fair value by checking if  $CAR(t_1, t_2)$  significantly differs from zero. If the market cannot predict the event, or the share price does not respond to new information, the extraordinary returns accumulated up to the date of the event will approximately be zero. If the CAR tends to increase gradually (or decrease) in the days before the event and the positive (or negative) effect is maintained until the days after the event, then the market is expected to foresee this event.

To conclude whether an event related to the COVID-19 epidemic in Vietnam really affects the stock price of the Vietnamese banking industry or not, the t-statistic test method will be used in this study.

The paper uses the banking industry index set and calculated by Fiinpro. This index is calculated by Fiinpro based on the weighted average of each listed bank share (FiinPro, 2018). Banking industry index data 250 trade days before each event is used to estimate expected return.

### 3. RESULTS

The regression results according to formula (1) serve as a basis for calculating abnormal profits

according to formula (2), and the results of the significance level t-test are shown in Table 1. To do the research, first of all, the paper calculates the extraordinary profit (AR) and the cumulative extraordinary profit (CAR) at the event windows for each event. The next step is to test the t-significance level of both AR and CAR. The next step is to t-test the significance of both AR and CAR. Table 1 presents the results of abnormal profit and t-test results for three different event days associated with the COVID-19 progress in Vietnam in 2020. Table 2 presents the results and the t-test of cumulative abnormal returns over time  $[-t; 0)$  and  $(0; t]$  around the events related to the evolution of COVID-19 in Vietnam in 2020.

#### The first event: February 13, 2020

Table 1 shows that the banking sector's share price decreased before the time of the Vinh Phuc province blockade. Abnormal returns on  $AR[-4] = -1.4\%$  and  $AR[-3] = -1\%$  and have statistical significance of 5% and 1%, respectively. On the event date,  $AR[0] = -0.2\%$  is negative but not statistically significant. Tables 1 and 2 show that a few days before and after the event of anomalous return and cumulative abnormal return are both greater than zero and statistically significant. Specifically, in Table 1,  $AR[-2] = AR[2] = 1.1\%$ ; in Table 2,  $CAR(0; 2] = 1.4\% < CAR(0; 3] = 2.4\%$ . The banking sector stock index's extraordinary return is negative

**Table 1.** Abnormal profit (AR) and t-test results for three lockdown times due to COVID-19 in Vietnam

Source: Author's calculations.

t	February 13, 2020		March 30, 2020		July 28, 2020	
	AR	t-test	AR	t-test	AR	t-test
-7	0.020	3.379***	-0.001	-0.156	0.005	0.729
-6	-0.002	-0.269	0.005	0.758	0.002	0.364
-5	0.001	0.176	0.008	1.245	0.000	-0.007
-4	-0.014	-2.377**	0.020	3.197***	0.001	0.095
-3	-0.010	-1.710*	-0.006	-0.998	-0.006	-0.809
-2	0.011	1.949*	-0.019	-3.131***	0.002	0.320
-1	0.002	0.348	-0.007	-1.067	0.001	0.085
0	-0.002	-0.422	0.000	-0.031	-0.005	-0.717
1	0.004	0.640	-0.007	-1.116	0.012	1.737*
2	0.011	1.815*	0.009	1.430	-0.008	-1.226
3	0.009	1.629	-0.012	-2.041***	-0.009	-1.283
4	-0.006	-1.013	-0.006	-0.983	0.000	0.043
5	-0.011	-1.951*	-0.012	-2.032**	0.004	0.608
6	-0.010	-1.662*	-0.007	-1.120	0.001	0.092
7	-0.008	-1.409	-0.002	-0.343	-0.009	-1.317

Note: \*, \*\* and \*\*\* have statistical significance of 10%, 5% and 1%, respectively.

**Table 2.** Cumulative abnormal returns (CAR) and t-test results for three lockdowns due to COVID-19 in Vietnam

Source: Author's calculations.

[-t;0]	February 13, 2020		March 30, 2020		July 28, 2020	
	CAR	t-test	CAR	t-test	CAR	t-test
-7	0.009	0.566	-0.001	-0.058	0.005	0.294
-6	-0.011	-0.771	0.000	0.001	0.000	0.019
-5	-0.009	-0.724	-0.005	-0.338	-0.002	-0.142
-4	-0.010	-0.897	-0.012	-1.002	-0.002	-0.155
-3	0.003	0.339	-0.032	-3.007***	-0.003	-0.234
-2	0.013	1.627	-0.026	-2.975***	0.003	0.287
(0;t]	0.000	0.000	CAR	t-test	CAR	t-test
2	0.014	1.740*	0.002	0.222	0.003	0.362
3	0.024	2.363**	-0.011	-1.000	-0.005	-0.447
4	0.018	1.539	-0.017	-1.358	-0.005	-0.366
5	0.007	0.502	-0.029	-2.125**	-0.001	-0.054
6	-0.003	-0.222	-0.036	-2.398**	0.000	-0.012
7	-0.011	-0.739	-0.038	-2.350**	-0.009	-0.510

Note: \*, \*\* and \*\*\* have statistical significance of 10%, 5% and 1%, respectively.

from date  $t = 4$  to date  $t = 7$  but only  $AR[5] = -1.1\%$  and  $AR[6] = -1\%$  are statistically significant at 10%.

#### The second event: March 30, 2020

Tables 1 and 2 show that before Vietnam announced the outbreak of COVID-19 nationwide on March 30, 2020, abnormal profit (abnormal) of the banking industry's stock price still has a positive signal when  $AR[-4] = 2\%$  and is statistically significant at 1%. Then, except for day  $t = 0$  and  $t = 2$ , which are  $AR$  greater than zero and not statistically significant, the remaining days in the event window have  $AR$  and  $CAR$  less than zero. In which, the abnormal profit  $AR[-2] = -1.9\%$ ;  $AR[3] = AR[5] = -1.2\%$  with statistical significance of 1%, 1% and 5%, respectively; accumulated abnormal return are statistically significant at 1%, including  $CAR[-3; 0] = -3.2\%$ ;  $CAR[-2; 0] = -2.6\%$ ;  $CAR(0; 5] = -2.9\% > CAR(0; 6] = -3.6\% > CAR(0; 7] = -3.8\%$ ; for the remaining days,  $AR$  and  $CAR$  were both negative but not statistically significant.

#### The third event: July 28, 2020

Similar to the previous two events, the t-test results from Tables 1 and 2 show that the bank-

ing sector's stock price did not react on the day of the announcement. The abnormal return on Vietnamese banking stocks is only statistically significant at 10% on day  $t = 1$  with  $AR[1] = 1.2\%$

## 4. DISCUSSION

#### The first event: February 13, 2020

The results from Table 1 show that investor concerns based on the number of COVID-19-positive patients recorded prior to February 13, 2020 were reflected in the banking sector's stock index leading to  $AR[-4]$  and  $AR[-3]$  were both less than zero. However, investors' worries quickly passed away, replaced by more peace of mind when the National Steering Committee for COVID-19 Prevention requested the construction of two double field hospitals in Vinh Phuc province and rapidly zoning to avoid spreading in the community (Zing news, 2020). As a result, both abnormal returns and cumulative abnormal returns several days before and after the event date were greater than zero ( $AR[-2]$ ;  $AR[2]$ ;  $CAR(0; 2]$ ; and  $CAR(0; 3]$ ). However, information about 10,600 people in the Vinh Phuc province restricted movement; events that had



never happened before were mentioned more by the media and reminded people to raise awareness about prevention of COVID-19 the following days. It had a negative impact on banking sector's share price. The abnormal return of the banking sector stock index was negative on day  $t = 5, 6$ . To summarize, it can be seen that banking indices have stronger negative reactions 3 to 4 days before the event, positive reactions 2 days before and after the event, negative reactions after the event from 5 to 6 days. This result proves that the investor's sentiment is quite sensitive to news and events that have never happened before.

### **The second event: March 30, 2020**

The results in Table 1 show that the closer to the event date, the abnormal returns and accumulated abnormal returns of bank shares turned negative.  $AR[-2]$ ,  $CAR[-3; 0]$  and  $CAR[-2; 0]$  are all less than zero, indicating that investors have anticipated the negative impact of COVID-19 based on the public information before March 30, 2020. In fact, after detecting citizens with COVID-19 returning from the UK, from March 17, 2020 to March 29, 2020, Vietnam quickly introduced a series of measures to limit the intrusion of COVID-19 from foreign countries, as well as restrictions on infection in the community were issued (ODV, 2020). In addition, a series of solutions were introduced by the State Bank of Vietnam in the early months of 2020 to support clients in the COVID-19 pandemic, and the negative effects from this disease were issued (MPI, 2020), also affecting business results of the banking industry. In the first quarter of 2020, business results of listed banks in Vietnam plummeted compared to the last three years. In the first quarter of 2020, the after-tax profit of 18 listed banks decreased by 11.5% compared to quarter 4/2019; this is the largest decrease since Q2 2018. Customer loans grew by only 1%, which is much lower than the same period in 2018 by 4.2% and 2019 by 3.4%, also lower than the overall growth of the industry in this quarter of 1.3% (FiinPro, 2020a). During these days, abnormal returns  $AR[3]$  and  $AR[5]$  were both less than zero with a statistical significance of 1% and 5%, respectively (Table 1). Accumulated abnormal returns are

negative, and the absolute value of  $CAR$  is higher over a longer period of time.  $CAR(0; 5) = -2.9\% > CAR(0; 6) = -3.6\% > CAR(0; 7) = -3.8\%$  and both are statistically significant at 5% (Table 2). This result supports Shleifer's imperfect substitution hypothesis (1986).

### **The third event: July 28, 2020**

On July 28, 2020, Da Nang city announced the blockade of six districts within 15 days (Hao & Binh, 2020) after patient No. 416 was found to have COVID-19 in the community on July 25, 2020 (Thai Binh, 2020), but bank stocks only reacted on day  $t = 1$  with  $AR[1] > 0$ . This interesting result can be explained by four reasons. Firstly, the negative impact of COVID-19 was envisaged for cities that were formerly popular tourist destinations for international visitors. Danang is known as one of the famous tourist cities in Vietnam and in the world (Walsh, 2018; Wilson, 2018). The spread of COVID-19 has had a negative impact on the tourism industry around the world (Fernandes, 2020; Hoque et al., 2020), and Da Nang is no exception. These negative effects have been received by investors through the media from the COVID-19 epidemic in Vietnam in March, so when Da Nang announced its blockage at the end of July that was not too surprising for investors. Secondly, the business results of listed banks in the second quarter of 2020 were more positive than previously predicted by experts (Agriseo, 2020; PHS, 2020). According to estimates of the State Bank of Vietnam, by the end of June 2020, credit growth of the whole banking industry was at 3.26% (GSO, 2020b). In the second quarter of 2020, the provision for credit losses of 19/19 listed banks decreased by 19.4%, contributing to the increase of profit after tax to 16.2% compared to the first quarter of 2020. In the first six months of 2020, total profit after tax increased by 12.8% over the same period (FiinPro, 2020b). This is a positive result during the COVID-19 period compared to previous forecasts of securities companies (Agriseo, 2020; PHS, 2020). Thirdly, the scope of the blockage from July 28, 2020, focusing only on six districts of Da Nang, is much smaller than the national lockdown on March 20, 2020. Fourthly, investors are more experienced and calmer about blockage information in Da Nang than before.

## CONCLUSION

Using the t-test method, this paper proved that investors reacted differently, via listed banking stock prices, to the three COVID-19 events in Vietnam in 2020. Investors are sensitive to information about unexpected events that have never happened before. Therefore, the abnormal return before and after February 13, 2020, when it was announced that Vinh Phuc-Vietnam province was blocked, continuously changed the signals. The abnormal returns of the banking stock index  $AR[-4]$  and  $AR[-3]$  are both negative;  $AR$  increases when the event dates ( $AR[-2]$  and  $AR[2]$ ) are both positive, then  $AR$  decreases again when ( $AR[5]$  and  $AR[6]$ ) are both negative. As for the event on March 30, 2020, Vietnam announced the nationwide epidemic of COVID-19, and immediately after implementing the lockdown, investors seemed to have anticipated the negative impact of this event. Abnormal returns are negative from day  $t = -2$ , and cumulative abnormal returns (CAR) are negative from day  $t = -3$ . The negative impact on the second event persisted to the 7th day after the event date when  $CAR(0; 7)$  was less than zero. Interestingly, investors reacted positively to the fact that Da Nang implemented a lockdown of six districts in the city since July 28, 2020 when  $AR[1] = 1.2\%$ , statistically significant 10%. It is possible that the investor thinks that the results of the profit of listed banks in the first six months of 2020 are more positive than expected, and the lockdown in Da Nang is much smaller than the lockdown event of the whole Vietnam at the end of March 2020. The reasons for the date have explained the rise in banking stock prices when the third lockdown on COVID-19 was announced. This result also shows that investors have calmed down and more carefully assessed information when making decisions, their maturity when dealing with COVID-19 related information.

Based on the three typical events related to the COVID-19 epidemic in Vietnam in 2020, it is clear that investors need to update information, especially information potentially having a strong influence on the economy and the stock market (such as the evolution of the COVID-19 pandemic) so as to analyze and have a strategy to promptly respond. They need to pay close attention to quickly check the official information and its development. For example, business results of the Vietnamese banking industry in the second quarter of 2020 recovered faster than the previous forecast of experts. It is essential to keep up with current events along with the correct handling of information in the market. This will help investors grasp investment opportunities to gain profits or minimize losses.

## AUTHOR CONTRIBUTIONS

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