From a Stock Market Perspective: Is Lockdown Policy the Best Long-term Solution to COVID? Evidence from China and the UK

Yi Wang[1,a,*]

[1]*High School Attached to Northeast Normal University, Changchun Jilin 130000, China*
a. lncs@springer.com
*corresponding author

Abstract: As one of the most frequently-taken measures to combat the COVID-19 viral spread, the lockdown policy had always been questioned with its impacts on the stock markets and accessibility in the long run. In this paper, I examine the respective stock closing prices of FTSE.GI and 0.000001SH in the UK and China, the countries that had announced lockdown policies several times to find out whether the lockdown restrictions and relaxations negatively affected the investors and their performance in the stock market. By analyzing the stock data with economic theories, it is found that although the markets did show positive returns in the final phases of declarations, they went through low liquidity, high volatility and negative returns for the majority time. Furthermore, the results also suggest that because of the presence of economic inertia and negative investor sentiment, further lockdown had adversely impacted the stock markets, indicating that the alternant lockdown announcements (restriction and relaxation) are not the best long-term solution to COVID from a stock market perspective.

Keywords: COVID-19, stock market, market return, lockdown policies, closing prices, investor sentiment, liquidity, volatility, economic inertia, long-term solution

1. Introduction

COVID-19 is classified as a global pandemic by World Health Organization (WHO) in 2020, and it has so far caused millions of death cases in the world [13]. In order to effectively control the further viral spread, almost every government around the world had announced the lockdown policies that required businesses and all public areas to close down for a period of time, ranging from weeks to months [5][33].

From an economic theory perspective, the lockdown policy not only plays an effective role in minimizing the infectious population but is also originally designed for calming down stockholders as it is found out that there is a proportional relationship between the confirmed cases and negative performance derived from the panicking sentiment [34][37]. However, many economists who empirically work on the stock market argue against the effectiveness of the policy and suggest that it is not the best solution to take in a long run to a large extent if there is a consistent lack of medical treatments for virus and its mutations. This is because the analyzers had found out that the policy had unexpectedly raised the negative investor sentiment (such as fear, concern, etc.) and uncertainty,

leading to extremely low liquidity but high volatility of the stock indexes. They also reckon that the commutative implementations of restrictions and relaxations would largely undermine the positive returns at the later stages because the negative return patterns that arise from the new announcements will replace the former sooner or later [7][26][38].

Based on the background above, this paper would mainly focus on how the lockdown had impacted the stock market in the UK and China (since they have announced the policy several times since the COVID outbreak) and to what extent the positive or negative effects outweigh their counterpart via stock data analysis. Furthermore, with the two main focuses as preconditions, the dissertation aims to examine the long-term capability of the lockdown policy from a stock market perspective. The research plays a role in helping investors to forecast the future stock market, as well as informing the long-term capability of government policies to stockholders so that they could come up with appropriate market strategies.

2. Literature Review

2.1. Overview

The Covid-19 outbreak, as a global pandemic that was declared by The World Organization (WHO) in March 2020, has made a huge difference individually, nationally and globally [2][13]. This viral spread had proved to be a big threat to the stock markets since it brought fears, panic and uncertainty to investors therefore investment confidence and rationality were undermined, leading to negative economic impacts in terms of "deep dive in the value" [2], low liquidity and high volatility as results [7][15][17][20][35].

In order to stop the further coronavirus spread[14] and mitigate its threats to stock markets, governments worldwide announced a series of national lockdowns (e.g. Italy, China, US, Japan, UK, etc.) after the official declaration of the pandemic in March 2020 [25], followed by many re-lockdowns in some of the countries (e.g. the UK and China) in 2021 and 2022 [3][6][16].

2.2. Lockdown and the Stock Market

Investment Sentiment. Investor sentiment generally refers to how investors tend to respond to current information the market provides [10], and the concept is particularly applied when news that could create anxiety and fear is available to the stockholders [12][19][24], especially in the time of COVID-19 pandemic when an irrational decision would cost folded times than normal period [9].

The relationship between lockdown and investor sentiment is critically examined by behavioural economists since it is difficult to determine whether it brings confidence or pessimism to investors. On the one hand, the lockdowns overall did protect the stock prices by reducing the confirmed cases (since there is "a negative relationship between stock prices and infected population"), as which stockholders are becoming more rational and confident while investing [28][30].

On the other hand, the majority of scholars tend to take the restrictive degree of lockdowns into account as Saito and Sakamoto suggested: "The rapid recovery of asset prices occurs only if the lockdown policies are insufficiently stringent to reduce the number of new periodic cases" [30]. To be specific, the stricter lockdown is the less precautionary saving for preserving either working hours or healthcare it is. The asset prices therefore declined. In addition, a restrictive lockdown announcement could also raise investors' concerns and create uncertainty, leading to irrational behaviour in the market [7][38]. However, there would be a risk of asset bubbles with the relaxation of lockdown at the same time [22].

Liquidity and Volatility. Baig et al. claimed that restrictive lockdowns adversely affected the liquidity and volatility of the stock market for individual investors [7]. The economic policy uncertainty (EPU) [9] created raised the volatility of stock markets [27][35] and lowered liquidity at the

same time [7] since the lockdowns largely spread the public fear, even though it is originally aimed to preserve economics activities [14].

Stock Market Returns. Because of the semi-efficiency tested by EMH at the initial phase of Covid [11][26][29][32], most stock markets experienced a negative return at first after the announcement of strict lockdown but later returned positively because "inefficiencies decreased" as time went by. A similar pattern also showed in the relaxation of lockdown [26].

Criticisms of Further Lockdowns. Although lockdowns did lead to a partial recovery in the stock market [26], lockdown is still not favoured by most economists since the drawbacks are harmful to the quality of the financial market [7][8]. To be specific, delayed positive returns of restrictions may drive investors to be more willing and confident while investing and increased "buying pressure and future positive returns" [24], but the closely-followed relaxations would drag the market back to negative returns [26], and the economic inertia would possibly allow the negative impacts to last long [5]. Ibid also suggests that "economic losses mounted as the lockdown extended for much longer than originally planned". Hence, from a stock market perspective, economists confront that lockdown is not the best long-term solution to COVID-19.

3. Methodology

To investigate how lockdowns have affected the stock market in different phases of COVID-19 and whether the policy would achieve both viral control and stock market preservation, this paper intends to analyze the close prices of indexes (FTSE.GI; 000001. SH) in the UK and China as samples. There are two main sources for data collection.

The close prices of 000001.SH is obtained from SHANGHAI STOCK EXCHANGE, which is compiled and updated daily by the institution (4 significant lockdown policies [1] announced from December 2019 to April 2022). The database of FTSE.GI is collected from INVESTING website where all historical data on a daily basis of different stock indexes are available for the public (3 significant lockdown policies announced from December 2019 to June 2021).

The reason why this paper limits the sample to the UK and China only is because they are the countries with the similar semi-efficiency level of the stock market [36] that previously applied several temporary restrictive lockdowns and relaxations so that the stock return patterns and changes in investor's behaviour aligning with lockdown dates would be shown in these cases. Therefore, to specifically focus on the pre-phases and post-phases of lockdowns, I select the different time periods for each according to the respective time-point announcements the countries had made about the restriction policies. For the UK stock market (FTSE.GI), I determined to analyze from December 2019 to June 2021, during which 3 national lockdowns were declared by the UK government. Whereas for the Chinese stock market (000001. SH), a much longer time period is chosen because China had imposed a number of national and regional lockdowns across the country consistently between December 2019 and April 2022.

As an independent variable, I use the dates when lockdown related policies (restrictions and relaxations) were officially acknowledged to the public; and apply the close prices as the dependent variable. By corresponding to the lockdown restrictions and relaxations in respective countries and analyzing the close prices recovery through comparisons (before and after the applications of lockdown policies to examine the efficiency of recovery), I can observe how abnormal the stock markets were in terms of close prices with the policy changes so that predictions of investor sentiment would be sensibly made. Thus, in this way, whether lockdown related policies are potentially capable of balancing the viral spread control and stabilizing the stock markets in a long run can be found out.

4. Data Analysis

In this section, only the close prices for FTSE.GI and 0.000001.SH indexes that corresponded to the significant announcements of lockdown (either restrictions or relaxations) will be analyzed.
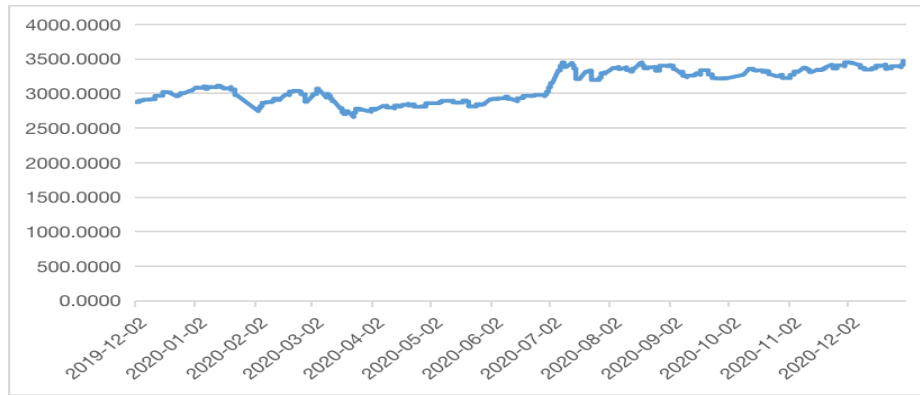
4.1. Stock Index: 000001SH (China)

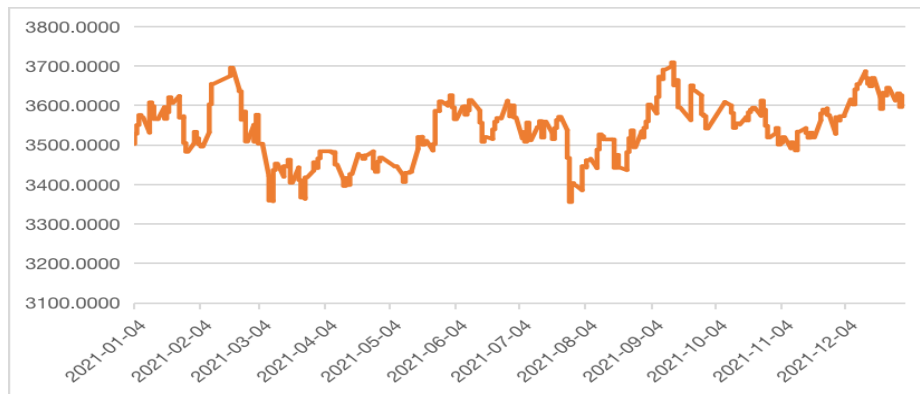Figure 1: Close prices of 000001.SH in 2020 (December 2019 included).
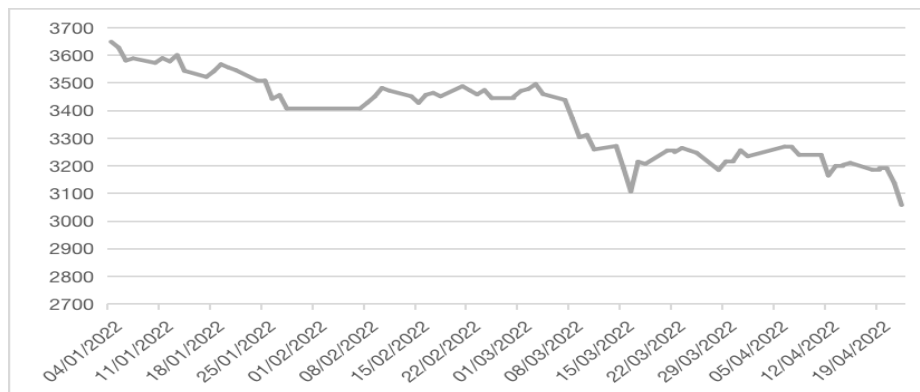

Figure 2: Close prices of 000001.SH in 2021.

Figure 3: Close prices of 000001.SH in 2022.

Fig. 1, 2, and 3 show varying patterns of close prices in the respective years of 2020 (December 2019 included), 2021 and 2022. It is transparent that the close prices went through a continuous

drop in 2022, whereas the overall trends in 2020 and 2021 both increased with a series of significant fluctuations in the latter year.

First lockdown in China (Parallel lockdowns included; January 23rd, 2020-April 8th, 2020). Being generally recognized as the origin of COVID [18][20][31], Wuhan imposed an extremely restrictive lockdown on January 23rd, 2020, which was later confirmed to last for 76 days [4]. This corresponds to a sudden drop after January 23rd and meets the trough on February 5th (2818.09), but then recovered a little bit. This indicates that delayed uncertainty had arisen from the announcement of restrictions, which led stockholders to be less interested and confident to invest. However, they were able to digest the information and soon became rational in the market, leading to a positive return shortly after the negative return.

However, a further lockdown restriction was declared in several other countries (e.g. Wenzhou, Huangshi, Qianjiang, etc.) from March, causing a second wave of drop-in close prices until the end of March according to Fig. 4. This may suggest that further lockdown restrictions across the country would hurt the stock market by raising severe uncertainty and negative investor sentiment. The market closing prices, nevertheless, managed to recover from the continuous decline in April.

First lockdown relaxation in China (April 8th, 2020). Wuhan eased the lockdown and restored all transportation for the public who had a "Green Code". The trend in closing prices was contradicted by Matshcke et al. the market did not experience a negative return immediately, but levelled off for a short period of time, which probably supported the theory of economic inertia [26].

Since there were no more national-degree lockdown restrictions being announced in 2020 (A few regional lockdowns are not taken into account in this analysis), the closing prices continuously rose because of the recovered investment confidence.

Second lockdown restriction period in China (January 11th, 2021). At the time of the Lunar New Year in 2021, China had reported a huge jump of confirmed cases (in Heilongjiang, Hebei, Beijing, etc.) after a 5-month successful control of COVID in 2020 due to the holiday travelling and international tourists. Therefore, the second wave of lockdown was imposed across the country. While traced in Figure 2, the closing prices fell with the psychological panic in the middle of January and dropped to the trough at the end of the month. Whereas it managed to recover as regular after a short while.

Third lockdown restriction in China (December 2021). Lockdowns again happened at the end of the year when people were travelling back to their hometowns for the new year celebration in China. The third lockdown restrictions were imposed in most provinces (Yunnan, Heilongjiang, etc.), resulting in a continuous drop in closing prices (Fig. 3). However, it is worth mentioning that the degree of decline was not as much as in the previous lockdowns, and the reason could be attributed to the fact that stockholders were better prepared for the repeated lockdowns. Nevertheless, the reduction in effect could not eliminate the negative impacts on the liquidity and volatility in the stock market overall.

Third lockdown relaxation in China (January 2022). The gradual relaxation of lockdown was announced in most cities (Xi'an, etc.). As Matshcke et al. suggested, the market had experienced a negative return either because of the mis-transmission of information or the continuous worry of virus control [26]. However, the market recovery as expected was interrupted by the fourth wave of national-level lockdowns later in the spring. Therefore, the closing prices did not manage to rise but levelled off in February, followed by a series of drops from the end of the month (Fig. 3).

Fourth lockdown restriction in China (March-April 2022). Starting from March of 2022, Jilin province had entered an emergent phase where nearly all major cities were required for lockdown. Closely followed by Shanghai, one of the most important cities for the Chinese economy was forced to lockdown because of the sudden rise of COVID confirmed cases. While corresponding to Fig. 3, the close prices went through one of the most significant drops even since the COVID outbreak,

with a trough at 3107.67 on March 16th, 2022. Despite the fact that the index closing prices did manage to recover in March, the lockdown restriction announced in Shanghai on April 3rd had hit led to a continuous drop in closing prices because of panic and uncertainty derived from the lockdown of the city which contributed to the most to the Chinese economy [21].

4.2. Stock Index: FTSE.GI (UK)

Figure 4: Close prices of FTSE.GI from December 2019 to June 2021.

According to Fig. 4, the general trend of close prices was shown to vibrate from 5000 to 7000 with a sudden drop at the end of March 2020 but slowly recovered after that.

First lockdown restriction (March 23rd, 2020-June 22nd, 2020). The PM announced that the residents in the UK were required to "stay at home". When trace correspondingly to the close prices (Fig. 4), it meets the trough in the market, implying that when restrictive lockdowns were imposed, stockholders acted irrational and pessimistic so that the close prices were negatively affected due to the loss of trust in the market. However, shortly after the declaration, the close prices rose with a series of fluctuations, inferring that people had been used to the lockdowns, reducing the level of uncertainty and irrationality since they gradually realized that lockdowns would control the spread of the virus. Hence, they performed more actively in this case.

First lockdown relaxation (June 23rd, 2020-August 17th, 2020). On June 23rd, 2020, the PM officially declared that UK's "national hibernation" had come to the end, in other words, the lockdown was gradually relaxed. It can be seen from Figure 4 that around June 2020, the close price had reached a relatively small peak, indicating that the good news had raised stockholders' confidence and became more willing to invest in the market. However, it is also worth mentioning that shortly after the peak reached, the close prices fell again as Matshcke et al. suggested [26]. The possible reason for this could be people awoke from the excitement of lockdown ease, and started to worry about the repeated spread of COVID or being trapped in the lockdown restrictions again. Therefore, they were cautious about investment.

Second lockdown restrictions (November 5th, 2020). On November 5th, 2020, a second national lockdown came into force in the UK, which corresponded to a second trough in Fig. 4. Although it again proved that the lockdown restriction was able to raise uncertainty and reduced close prices with low liquidity but high volatility, it is noticed that the magnitude of the drop was not as significant as the previous one. This suggests that people might psychologically be better prepared for the restrictive lockdown; however, the policy hit the market anyway.

Third lockdown restriction (January 6th, 2021). England entered a third national lockdown at the start of the new year on January 6th, 2021. Unlike the previous two lockdowns, people this time were responding far more rationally than ever before, according to a relatively level-off trend in Fig. 4. The reason was that the third lockdown was not as restrictive as the previous ones with the de-

cline in confirmed cases, therefore people were more confident with the stock market compared to the past.

   Third lockdown relaxation (March 9th, 2021-March 19th, 2021). The UK government offered a route back to a more normal life to people from the second week of March, and the relaxation announcement did raise the close prices a little bit since people were happy with the positive news. However, because of the economic inertia and the pattern brought up by Matshcke et al. the stock market did not recover immediately but remained in negative returns for a month until April [26].

5.   Discussion

Based on the data analysis in the previous section, I can infer information about a general trend of closing prices alongside the lockdown policy in both countries.

5.1.   Liquidity and Volatility

The outcome of the analysis again proved what Baig et al. had suggested that the lockdown restrictions were able to cause low liquidity and high volatility because the policy played a crucial role in raising public fear (investor sentiment) and concern, driving the stockholders to be largely pessimistic with the future of the stock market and therefore reduce their activeness in the market performance [7].

5.2.   Stock Market Return

The relationship between the continuously alternant restriction and relaxation of lockdown policy in both countries had largely undermined the efforts the stock markets made to recover and take the advantage of economic inertia, thus, I could infer that lockdown policy is not the best long-term solution for the stock market in the time of COVID-19 when the epidemic has been repeated ever since its outbreak in 2019.

   Lockdown restriction. In the UK and China, although because of different levels of efficiency, these two countries I studied had taken varying time for the stock market to react, both of their closing price patterns showed that the restrictive lockdown policy drove negative returns in the initial phase when stockholders were generally panicked with the official announcements made by the governments. Some may argue that according to the figures, the stock markets did recover shortly after the restriction declaration, however, it is worth noticing that the final closing prices the stock markets managed to reach after the recovery were still much lower than before, indicating that the hits which the restrictive policy provided for the stock market were unable to be corrected in a short term (Fig. 1, 2, 3, 4).

   Lockdown relaxations. Lockdown relaxations are able to reverse the positive returns when the market had already managed to recover from the lockdown restrictions across the countries [1]. According to the data of 0.000001SH and FTSE.GI, the closing prices had both, inevitably, fallen back into negative returns (regardless of the respective time taken for stock markets to react) after the relaxation announcements being made by the government.

5.3.   Limitations

Although this paper has done some work on stock data and given out conclusions with supportive evidence (in both theoretical and data-based ways), however, limitations are still involved in this research paper. Firstly, there is a lack of stock data apart from closing prices which can only tell limited information about the market. Hence, I suggest that the future paper should include swing

values and turnover ratios if they are accessible. In addition, there is quite a conflict between the goals of achieving good public health and maintaining the well-being of stock markets. Up until now, there is barely any way as effective as lockdown policies to control the viral spread in a long run; therefore the limited perspective of this paper may cause arguments on morality. However, I hope that a possible balancing solution could be thought out as soon as possible.

6.   Conclusion

In this paper, I examine the performance of investors and stock market returns in China and the UK by analyzing the closing prices of stock indexes 0.000001SH and FTSE.GI respectively in the corresponding time of lockdown policies implementations in each country. With the application of certain economic models such as investor sentiment, volatility, liquidity and economic inertia, I suggest the uncertainty, high volatility and low liquidity that both lockdown restrictions and relaxations brought outweigh their positive impacts on the stock markets to some extent.

In the meantime, this paper also responds to the question of whether lockdown is the best long-term policy to combat the COVID-19 pandemic from a stock market perspective. From the outcomes that have been concluded from the data, I reckon that the stock markets are largely hit by both restrictions and relaxations supported by two observations: first, the closing prices at the end of each policy implementation period were not able to recover to the level before (See Section 5: Discussion); meanwhile, the alternant policies (both cause negative returns at the initial phase and positive returns at the very end) unable the positive returns to be fully accessible to the market but being interrupted by the new announcement instead. Hence, I conclude that from a stock market point of view, a lockdown policy is not the best long-term solution to the pandemic.

References

[1]   Alfano, Vincenzo, & Ercolano, S. The efficiency of lockdown against COVID-19: A cross-country panel analysis. Applied Health Economics and Health Policy 18, 509-17 (2020).

[2]   Alfaro, L., Chari, A., Greenland, A. N., & Schott, P. K. Aggregate and firm-level stock return during pandemics, in real time. NBER Working Paper, 26950 (2020).

[3]   AlTakarli, N. S. China's response to the COVID-19 outbreak: A model for epidemic preparedness and management. Dubai Medical Journal, 3, pp.44-49 (2020).

[4]   AP News. Timeline: China's COVID-19 outbreak and lockdown of Wuhan(online).https://apnews.com/article/pandemics-wuhan-china-coronavirus-pandemic-e6147ec0ff88affb99c811149424239d (accessed on April 22nd, 2022) (2021).

[5]   Aviso, K. B., Santos, J. R., Tan, R. R., & Yu, K. D. S. The Economic impact of Lockdowns: A persistent inoperability input-output approach. Economies, 8, 8040109 (2020).

[6]   Baker, S. R., Bloom, N., Davis, S. J., Kost, K. J., Sammon, M. C., & Viratyosin, T. The unprecedented stock market impact of COVID-19. Technical Report, National Bureau of Economic Research (2020).

[7]   Baig, A. S., Butt, H. A., Haroon, O. & Rizvi, S. A. R. Deaths, panic, lockdowns, and US equity markets: The case of COVID-19 pandemic. Finance Research Letters, 38, 101-701 (2021).

[8]   Baig, S., Blau, B. M., & Sabah, N. Price clustering nad sentiment in bitcoin. Finance Research Letters, 29, pp.111-116 (2019).

[9]   Bao, Q., Lu, Z., & Sun, Y. P. Coronavirus (Covid-19) outbreak, investor sentiment, and medical portfolio: Evidence from China, Hong Kong, Korea, Japan, and U.S. Pacific-Basin Finance Journal, 65, 101-463 (2021).

[10]   Barberis, N., Shleifar, A., & Vishny, R. A model of investor sentiment. J. Financ. Econ. Finance, 76, pp.270-277 (1998).

[11]   Boubaker, S., Farag. H., & Nguyen, D. K.Short-term overreaction to specific events: Evidence from an emerging market. Res. Int. Bus. Finance, 35, pp.153-165 (2015).

[12]   Brogaard, J., & Detzel, A. The asset pricing implications of government. Econ. Pol. Manag. Sci, 61(1), pp.3-18 (2015).

[13]   Ciner, C. Stock return predictability in the time of COVID-19. Finance Research Letters, 38, 101-705 (2020).

[14]   Deng, T. J., Lee, Y. J., & Xu, T. Policy responses to COVID019 and stock market reactions-An international evidence. Journal of Economics and Business, 119, 106-043 (2022).

[15] *Donadelli, M., Kizys, R., & Ridel, M. Dangerous infectious diseases: bad news for main street, good news for wall street? J. Financ. Mark, 35, pp.84-103 (2017).*

[16] *Dyer, O. Covid-19: Lockdowns spread in China as omicron tests "zero covid" strategy. BMJ 2022; 376. https://doi.org/10.1136/bmj.o859 (2022).*

[17] *Erdem, O.Freedom and stock market performance during Covid-19 outbreak. Finance Research Letters, 36, 101-671 (2020).*

[18] *Frezza, M., Bianchi, S., & Pianese, A. Fractal analysis of market (in)efficiency during the COVID-19. Finance Research Letters, 38, 101-851 (2020).*

[19] *Gilchrist, S., Sim, J., & Zakrajsek, E. Uncertainty, financial frictions, and investment dynamics. SSRN Electron. J. https://doi.org/10.2139/ssrn.2503636. (2010).*

[20] *Harjoto, M. A., Rossi, F., Lee, R., & Sergi, B. S.How do equity markets react to COVID-19? Evidence from emerging and developed countries. Journal of Economics and Business, https://doi.org/10.1016/j.jeconbus.2020.105966 (2020).*

[21] *He, L. 3 reasons Shanghai's lockdown matters to the global economy (online). https://www.cnn.com/2022/04/13/business/shanghai-lockdown-global-economy-explainer-intl-hnk/index.html#:~:text=Shanghai%20accounts%20for%203.8%25%20of,world's%20busiest%20for%20container%20traffic.(accessed on May 3rd, 2022) (2022).*

[22] *Investopedia. How do asset bubbles cause recessions? (online). https://www.investopedia.com/articles/investing/082515/how-do-asset-bubbles-cause-recessions.asp(accessed on April 29th, 2022) (2020).*

[23] *Institute for Government Analysis Timeline of UK coronavirus lockdowns, March 2020 to March 2021. Available at https://www.instituteforgovernment.org.uk/sites/default/files/timeline-lockdown-webpdf(accessed on June 20th, 2021) (2020).*

[24] *Knutson, B., & Kuhnen, C. M. The influence of affect on beliefs, preferences and financial decisions. Journal of Financial and Quantitative Analysis, 46:3, pp.605-626 (2011).*

[25] *Liu, M., Choo, W.-C., & Lee, C.-C. The response of the stock market to the announcement of global pandemic. Emerging Markets Finance and Trade, 56(15), pp.3562-3577 (2020).*

[26] *Matschke, X., Rieger, M. O., & Scherf, M. Stock market reactions to COVID-19 lockdown: A global analysis. Finance Research Letters, 45, 102-245 (2022).*

[27] *Paster, L., & Veronesi, P. Uncertainty about government policy and stock prices. J. Financ. Quant. Anal, 45(2), pp.535-553 (2012).*

[28] *Phan, D. H. B., & Narayan, P. K.Country responses and reaction of the stock market to COVID-19a preliminary exposition. Emerge. Mark. Financ. Trade. https://doi.org/10.46557/001c/13745.(2020).*

[29] *Rahman, M. L., Amin, A., & Al Mamun, M. A. (2021). The COVID-19 outbreak and stock market reactions: Evidence from Australia. Finance Research Letters, 38, 101-832.*

[30] *Saito, Y., & Sakamoto, J. Asset pricing during pandemic lockdown. Research in International Business and Finance, 58, 101-449 (2021).*

[31] *Seven, U., & Yilmaz, F.World equity markets and COVID-19: Immediate response and recovery prospects. Research in International Business and Finance, 56, 101-349 (2020).*

[32] *Sewell, M. The Efficient Market Hypothesis: Empirical evidence. International Journal of Statistics and Probability, 1:2, pp.164-178 (2012).*

[33] *Ullah, Saif, & Muhammad Altaf Khan. Modelling the impact of non-pharmaceutical interventions on the dynamics of novel coronavirus with optimal control analysis with a case study. Chaos, Solitons & Fractals, 139, 110-075 (2020).*

[34] *Vasileiou, E., Samitas, A., Karagiannaki, M., & Dandu, J. Health risk and the efficient market hypothesis in the time of COVID-19. International Review of Applied Economics, 35:2, pp.210-223 (2020).*

[35] *Veronesi, P. (1999). Stock market overreactions to bad news in good times: a rational expectations equilibrium model. Rev. Financ. Stud, 12(5), pp.975-1007.*

[36] *Wang, Y. Whether the stock market in the UK is efficient: Analysis of EMH in the time of COVID-19 (unpublished) (2021).*

[37] *Xu, L. Stock return and the COVID-19 pandemic: evidence from Canada and the US. Finance Research Letters, 38, 101-872 (2020).*

[38] *Zaremba, A., Kizys, R., Aharon, D. Y., & Demir, E. Infected Markets: novel Coronavirus, government interventions, and stock return volatility around the globe. Finance Research Letters, 101-597 (2020).*