MPRA

The impact of COVID-19 on health sector stock returns

Oncu, Erdem

University of Mediterranean Karpasia

2021

THE IMPACT OF COVID-19 ON HEALTH SECTOR STOCK RETURNS

Assist. Prof. Dr. Erdem ÖNCÜ

University of Mediterranean Karpasia, Lefkoşa, Turkish Republic of Northern Cyprus e-mail: erdem.oncu@akun.edu.tr,
Orcid No: 0000-0002-3506-5803

1. Introduction

The first case of the SARS virus, which was first seen in China and most of Asia and then effective in North America and Europe, was seen in 2002. It is reported that SARS causes more than 800 deaths with a general mortality rate approaching 10% in 8,500 cases, and has virulence characteristics as an important human pathogen with a mortality rate approaching 50% in people over 65 (Cameron et al., 2012). Brown ve Smith (2008) found that the tourism sectors of Australia, Canada and Asian countries are significantly affected by the spread of the SARS virus. Studies on Taiwan and Hong Kong revealed that both the stock market and the tourism industry are significantly affected by the SARS virus (Pine and Mckercher, 2004; Chien and Law, 2003; Yang et al., 2010).

Table 1: Recent History of Pandemics

Pandemic	Time Period	Death (Estimated)	Location
Asian flu (H2N2)	1957-1958	1.100.000	World
Hong Kong flu (H3N2)	1968	1.000.000	World
Avian flu (H1N1)	2009	151.700 - 575.400	World
Severe Acute Respiratory Syndrome (SARS)	2002-2003	775	Hong Kong, China, Canada, Taiwan
Middle East Respiratory Syndrome (MERS)	2012	%35 (Mortality Rate)	World

Source**:** Baldwin and Weder di Mauro, 2020: 5-7.

COVID-19 outbreak also has a global impact like other outbreaks (H2N2, H3N2, H1N1, SARS, MERS). The coronavirus, which first appeared in Wuhan, China, has spread almost all over the world. The COVID-19 virus has affected the whole world in less than 2 months. The World Health Organization has declared the corona virus as a pandemic as of March 11. Spreading more than the SARS virus that emerged in 2012, COVID-19 has a devastating economic and cultural impact. The Asian Development Bank (ADB) announced in its report titled "Asian Development Outlook 2020" that the cost of the COVID-19 epidemic to the world economy will reach the level of 2.0-4.1 trillion dollars according to the rate of spread in Europe, the USA and other countries with large economies (Dhar, 2021). He stated that the cost also means a 2.3% -4.8% shrinkage of the Gross Domestic Product at the global level (GDP). In Asian countries, the economy is expected to contract by 2.2% until the end of the year. If the virus loses its effect by the end of this year, Asian countries will grow by 6.2% in 2021. Central banks have quickly begun to take measures to address the devastating impact of the virus. Central banks of countries, especially the Federal Reserve (FED), took monetary expansion decisions, just like in 2008 (Betz, 2021). With the changes in interest rates and loan regulations, the FED injected 6 trillion dollars into the market. In the statement made in the first week of April, the World Bank stated that they approved emergency support to developing countries within the scope of combating COVID-19. In the statement made, it was also stated that it was prepared for a support of 160 billion dollars within 15 months in order to support the measures to be taken to combat the global epidemic. The situation is similar for Europe. The European economy is expected to contract by 8% -15% by the end of the year. The European Central Bank announced that it will purchase bonds at the level of 600 billion Euros within the scope of combating COVID-19.

Health and economics are part of an inseparable whole for social welfare maximization. The risks posed by the pandemic on financial markets, as well as the health and social impact, are one of the most popular agenda items today. In the past studies conducted with event analysis, abnormal returns have been detected in the markets for the SARS virus period. Researchers who have recently investigated the COVID-19 impact have also reached abnormal return results. In this study, unlike other studies, the returns of companies with drug or vaccine projects against COVID-19 will be examined.

2. Literature

In this article, we are interested in the impact of COVID-19 on the stocks of biotech companies. In the literature review, the effects of viruses,

disasters and other negative events on stocks were examined. The effect of the SARS virus, which emerged in 2003, has been investigated in academic studies. On the day of the SARS outbreak and beyond, Taiwanese hotel stocks showed a significantly cumulative average abnormal return, indicating that the SARS outbreak had a significant negative impact on hotel stock performance (Chen et al., 2007). Before the SARS virus, a significant positive cumulative abnormal return was seen in biotech stocks, while negative cumulative abnormal returns were seen in the post-virus days (Yang et al., 2010).

In another study, pharmaceutical firms showed different abnormal return results on a per day basis. The window period of 1 day before gives positive results, while the results after 6 days indicate the presence of negative cumulative abnormal returns (Wang et al., 2013). In addition, abnormal returns to the financial ratios of biotech companies are analyzed. The results show that a higher R&D spending rate for companies has a negative impact as a result of an infectious disease outbreak.

Natural or man-made disasters from the past to the present have caused financial movements. The nuclear accident at Three Mile Island in 1979 resulted in abnormal returns on the stocks of companies providing electricity services for 2 months (Hill and Schneeweis, 1983). It is observed that companies whose electricity generation depends on nuclear power are affected more than others in terms of abnormal returns. Natural disasters such as earthquakes, typhoons and large-scale fires create fluctuations in stocks. In this context, abnormal returns have been observed in studies on natural disasters (Lamb, 1995; Kleidt et al., 2009; Bolak and Sürer, 2008; Song et al., 2012).

Terrorist attacks are one of the events that quickly mobilize financial markets. Multiple studies have found that abnormal returns occur in the markets with terrorist attacks (Brounrn and Derwall, 2009; Ramiah et al., 2018). Terrorist attacks have a more devastating impact than earthquakes and disasters such as typhoons (Kleidt et al., 2009; Brounrn and Derwall, 2009; Cummins and Lewis, 2003).

In addition to the aforementioned issues, new information about the sector may also generate abnormal returns. Yang and He (2018) found that regulations published on financial markets between 2008 and 2015 generated positive abnormal returns. In another study, depending on the nature of the news, the effect can be positive or negative abnormal return (Gogstad et al., 2017). In this context, it is determined that newly released regulatory information causes negative abnormal returns in some companies and positive abnormal returns in others (Law et al., 2016).

New status information that arises is not necessarily regulatory information. Political elections also generate abnormal returns. After Trump was elected president of the United States in 2016, abnormal returns have been observed, depending on the sectors (Nandy and Susan, 2018; Pham et al., 2018).

The impact of the COVID-19 pandemic on financial markets has become one of today's popular research topics. COVID-19 pandemic has a negative impact on financial markets. In examining the impact of the number of cases, the weekly number of cases increases, the returns to be obtained from the financial markets decrease (Khan et al. 2020). Also, Harjoto et al., (2020) finds that COVID-19 power of influence on financial market is higher in developing countries than in developed countries. In another study on the subject clarify that emerging financial markets in Asia have encountered more destructive effects than those in Europe (Topcu & Gulal, 2020). In addition, large firms are affected less negatively than small firms (Yan, 2020). When examined on a sectoral basis, during this period, while losses are experienced in many sectors, abnormal positive returns are observed in information technologies and healthcare sectors (He et al., 2020; Thorbecke, 2020; Mazur et al., 2020; Huo and Qiu, 2020).

3. Firms Trying to Develop COVID-19 Drugs or Vaccines

Abbott Labs (NYSE: ABT) introduced the first diagnostic test for COVID-19 on March 18, after receiving emergency use authorization from the FDA. The test provides results in just 15 minutes without any instrumentation, using lateral flow technology proven in clinical study with a proven sensitivity of 97.1% and specificity of 98.5% (Abbott, 2020a). In addition, the company has developed the telephone application called BinaxNOW in order for individuals or organizations to reach test results quickly and reliably. In the company's statement for the phone application, it stated that it aims to reach 50 million test capacities per month in early October 2020 according to its plans (Abbott, 2020b).

The company Gilead Sciences (NASDAQ: GILD) owns Remdesivir, a nucleotide analog prodrug that inhibits viral RNA polymerases. This drug, used in the treatment of COVID-19, reduces the recovery time of patients (Beigel et al., 2020; Grein et al., 2020).

Novavax, Inc. (NASDAQ: NVAX) announced on February 26, 2020 that it has produced a large number of nanoparticle vaccine candidates to protect against the coronavirus disease COVID-19(Novavax, 2020). Vaccine candidates have been developed using recombinant protein nanoparticle technology.

Emergent Biosolutions Inc. (NYSE: EBS), the company founded in 1998, is engaged in the treatment of COVID-19 and vaccine development. To develop the vaccine, EBS has signed partnership agreements with Novavax and Johnson & Johnson. For the drug, it continues to work on human blood and horse blood (Banta, 2020).

Pfizer (PFE) announced on March 13, 2020 that they started to develop vaccine with Biontech company (Pfizer, 2020). Pfizer and Biontech were previously involved in vaccine development studies for influenza virus.

Moderna (MRNA) announced on January 13, 2020 that the vaccine coded m-rna 1273 was developed on the COVID-19 virus (Moderna, 2020). The permission to start the 1 phase studies of the vaccine was given by the FDA on March 4, 2020.

Johnson & Johnson (NYSE: JNJ) announced that the company, which has been working with healthcare institutions and companies since the first days of the epidemic, will invest $ 1 billion in the COVID-19 vaccine on March 30, 2020. In addition, the company does not only depend on its own investments, but also makes partnership agreements with other important companies in the sector (JNJ, 2020).

4. Methodology

First of all, in this study, it is examined whether the companies that work with COVID-19 counter medication or vaccines during the pandemic period have a different return than normal. Multiple factors should be considered in order to analyze the case studies in a sound manner. The Fama and French (1993) model, one of the capital asset assessment methods used in many case studies in the literature, was chosen for the study. In this model, 2 new factors have been added to the capital assets evaluation model. In the Fama and French (1993) model,

$$R_{it} = \beta_0 + \beta_M M_t + \beta_{SMB} SMB_t + \beta_{HML} HML_t + \varepsilon_t$$
(1)

Rit (Ri- Rf) represents the determined return for a firm, Mt (Rm- Rf) the return of the market portfolio, SMBt size premium, HMLt value premium, εt represents the excess return on day t.

Abnormal return is found by subtracting the expected return from the actual return.

$$AR_{it} = R_{it} - E(R_i)$$
(2)

A statistically significant difference in cumulative abnormal returns indicates that an abnormal return has occurred in the relevant stock.

$$C\ A\ R_i(t_1, t_2) = \sum_{t=t_1}^{t_2} A\ R_{it} \qquad (3)$$

AAR (average abnormal returns) is calculated if the effects of more than one firm, not one, are to be monitored.

$$A\ A\ R_t = \frac{1}{N} \sum_{i=1}^{N} A\ R_{it} \qquad (4)$$

Finally, CAAR (cumulative average abnormal returns) used to monitor the average effect over multiple days is given below.

Patell (1976) test suppose that returns are independent and test prevents large variance units effects on outcome. The BMP test developed over the Patel test includes both the information in the prediction period and the event period into the analysis. Cross-section correlations of abnormal returns in Patell and BMP tests significantly affect the output. In order to solve this problem, Kolari and Pynnonen (2010) arranged cross section correlations deriving from Patell (1976) test.

5. Data

Producer companies in the health sector are complex. Companies that work on vaccines or drugs against the COVID-19virus and share their information with the media were used for this study. According to the statement made on March 11, 2020, after the announcement that 118 thousand cases were encountered in 114 countries and 4 thousand 291 people died due to the Corona virus epidemic, the World Health Organization announced that COVID-19 was included in the pandemic diseases group (WHO, 2020). The data set of the study was determined according to the date of the pandemic, and the event periods were determined as (-1,1), (-2,2), (-3,3), (-5,5) and (-10,10).

Figure 1: Estimation Period
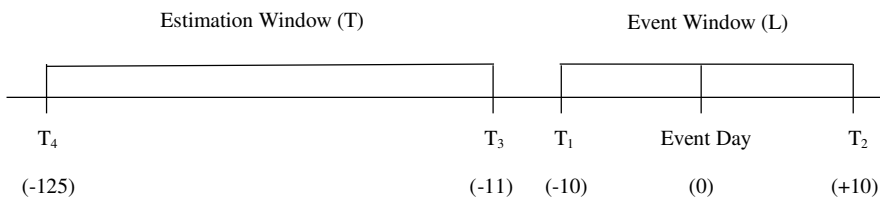
To test whether COVID-19 impact health sector stock performance, event study analysis is applied to examine the relationship between news of COVID-19 drug or vaccine and the performance of health sector stocks.

Table 2: 11 March 2020 Cumulative Average Abnormal Returns

SECURITY	CAAR [-1,1]	CAAR [-3,3]	CAAR [-5,5]	CAAR [-10,10]
ABT	0.0615*	0.1442*	0.2403*	0.1055*
	(3.900)	(3.984)	(4.075)	(3.024)
GILD	0.0108	0.0162	0.1469*	0.0649
	(0.351)	(0.380)	(2.784)	(1.041)
NVAX	-0,0677	-1,087*	-0,3361	0.3986
	(0.377)	(3.885)	(1.040)	(0.953)
EBS	0.2418*	0.2992*	0.3450*	0.201**
	(4.401)	(4.408)	(4.486)	(2.154)
JNS	-0,0095	0.0561**	0.1491*	-0,1106*
	(0.532)	(2.033)	(4.145)	(2.615)
MRNA	-0,101	-0,303**	-0,3417**	-0,3116
	(1.104)	(2.360)	(2.155)	(1.590)
PFE	-0,0523	0,0041	0,095*	0,0409
	(2.800)	(0.151)	(2.790)	(0.894)
CAAR Portfolio	0,0119	-0,1138	0,04***	0,06
	(0.582)	(0.691)	(1.875)	(0.698)

Note:*, **, and *** show significance at the 1%, 5%, and 10% levels, respectively.

In respect of Table 2, positive abnormal returns are seen in the event windows (-1, 1), (-5, 5) and (-10, 10) for the portfolio. However, statistically significant abnormal return is observed only in the (-5, 5) event window. EBS and ABT stocks have significant positive abnormal returns across all event windows. Significant negative abnormal returns are observed in JNS and MRNA stocks in the event window (-3, 3).

Table 3: 13 April 2020 Cumulative Average Abnormal Returns

SECURITY	CAAR [-1,1]	CAAR [-3,3]	CAAR [-5,5]	CAAR [-10,10]
ABT	0.026	0.0942*	0.1061*	0.1656*
	(1.250)	(3.011)	(2.690)	(3.094)
GILD	-0,0003	-0,0813	-0,0455	-0,0263
	(0.009)	(1.415)	(0.621)	(0.264)
NVAX	-0,0844	-0,0831	0.2513	0.0292
	(0.447)	(0.288)	(0.680)	(0.061)
EBS	-0,0211	-0,0452	0.0521	0.2088
	(0.384)	(0.540)	(0.492)	(1.527)
JNS	-0,0085	0.012	0.032	0.1387**
	(0.371)	(0.319)	(0.740)	(2.318)
MRNA	0,0707	0,1232	0,4426**	0,5315***
	(0.690)	(0.782)	(2.241)	(1.928)
PFE	0,0232	-0,0172	0,007	0,1314**
	(0.999)	(0.486)	(0.018)	(2.312)
CAAR Portfolio	0,0088	0,0022	0,12	0,1684**
	(0.605)	(0.251)	(1.388)	(2.452)

Note:*, **, and *** show significance at the 1%, 5%, and 10% levels, respectively.

According to Table 3, positive abnormal returns are observed in all event windows for the portfolio. Significant positive abnormal return is seen only in the (-10, 10) event window. While the significance in terms of stocks is mostly seen in ABT stocks, the most significant cumulative abnormal average returns are seen in the (-10, 10) event window.

Figure 2: Comparison of Cumulatiave Average Abnormal Returns

Comparing cumulative average abnormal returns in the event window (-10, 10), there is a positive change in most stocks and portfolio. Negative change is observed only in GILF stocks.

Conclusion

COVID-19 virus, which was first detected to appear in China in late 2019, became effective globally in a short time and affected large segments. Both its rapid spreading power and its global effectiveness caused the virus not only to health problems, but also to some economic problems. This epidemic, which emerged unexpectedly, differs from previous global economic crises due to the breadth of measures taken and its direct relevance to health.

Regardless of their reasons, crises disrupt macroeconomic balances and negatively affect capital markets. In particular, many studies have been conducted on the factors affecting stock prices. Having information about stock prices is of interest to both scientific researchers and investors.

Abnormal returns were analyzed using event analysis during the pandemic to investigate whether the impact of COVID-19 on biotech stocks had significant effects. The results show that stocks have positive returns based on cumulative and abnormal average return findings. The devastating effect of the COVID-19 epidemic on the financial sector is observed in the literature. While investors avoid investing in many industries, they still see the healthcare industry profitable. In parallel with this, it has been observed that firms in the health sector have positive abnormal returns in studies (He et al., 2020; Mazur et al., 2020; Huo & Qiu, 2020). In this context, the findings of this study are in line with the literature. Every crisis creates new opportunities, regardless of its negative aspects. For example, the Black Death of the middle ages affected social and economic life. The Black Death has changed the role of the working

class, leading to innovations and productivity, especially in the agricultural sector, due to the pandemic (Bell and Lewis, 2004). COVID-19 pandemic also reveals social and economic transformations such as Black Death. The COVID-19 pandemic has changed living and working conditions, causing income inequality and capital movements (Bonacini et al., 2021). Investors direct their investments towards the profitable sectors of the period. With this crisis, companies in the health sector increased their returns by taking advantage of the pandemic.

References

Bell, C. & Lewis, M. (2004). The economic implications of epidemics old and new. *World Econ*, 5(4), 137-174.

Benfield, T., Fätkenheuer, G., Kortepeter, M. G., Atmar, R. L., Creech, C. B., Lundgren, J., ... & Lane, H. C. (2020). Remdesivir for the treatment of COVID-19—Final report. *N. Engl. J. Med*, *10*.

Betz, F. (2021). In a Global Pandemic, Modeling the Central Bank Functions. *Modern Economy*, *12*(3), 623-658.

Bolak, M., & Süer, Ö. (2008). The effect of Marmara earthquake on financial institutions. *Journal of Doguş University*, 9(2), 135-145.

Bonacini, L., Gallo, G., & Scicchitano, S. (2021). Working from home and income inequality: risks of a 'new normal'with COVID-19. *Journal of population economics*, *34*(1), 303-360.

Cameron, M. J., Kelvin, A. A., Leon, A. J., Cameron, C. M., Ran, L., Xu, L., ... & Kelvin, D. J. (2012). Lack of innate interferon responses during SARS coronavirus infection in a vaccination and reinfection ferret model. *PLoS one*, *7*(9), e45842.

Chen, M. H., Jang, S. S., & Kim, W. G. (2007). The impact of the SARS outbreak on Taiwanese hotel stock performance: an event-study approach. *International Journal of Hospitality Management*, *26*(1), 200-212.

Chien, G.C.L., Law, R., 2003. The impact of the severe acute respiratory syndrome on hotels: a case study of Hong Kong. *International Journal of Hospitality Management*, 22, 327–332.

Dhar, U. (2021). Asian Development Bank (ADB), Asian Development Outlook 2020: What Drives Innovation in Asia?. *Journal of Asian Economic Integration*, *3*(1), 98-100.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of financial economics*, *33*(1), 3-56.

Ferstl, R., Utz, S., & Wimmer, M. (2012). The effect of the Japan 2011 disaster on nuclear and alternative energy stocks worldwide: An event study. *Business Research*, *5*(1), 25-41.

Gogstad, M., Kutan, A. M., & Muradoglu, Y. G. (2018). Do international institutions affect financial markets?: evidence from the Greek Sovereign Debt Crisis. *The European Journal of Finance*, *24*(7-8), 584-605.

Grein, J., Ohmagari, N., Shin, D., Diaz, G., Asperges, E., Castagna, A., ... & Flanigan, T. (2020). Compassionate use of remdesivir for patients with severe COVID-19. *New England Journal of Medicine*, *382*(24), 2327-2336.

Harjoto, M. A., Rossi, F., & Paglia, J. K. (2020). COVID-19: Stock market reactions to the shock and the stimulus. *Applied Economics Letters*, 1-7.

He, P., Sun, Y., Zhang, Y., & Li, T. (2020). COVID–19's impact on stock prices across different sectors—An event study based on the Chinese stock market. *Emerging Markets Finance and Trade*, *56*(10), 2198-2212.

Hill, J., & Schneeweis, T. (1983). The effect of Three Mile Island on electric utility stock prices: A note. *The Journal of Finance*, *38*(4), 1285-1292.

Huo, X., & Qiu, Z. (2020). How does China's stock market react to the announcement of the COVID-19pandemic lockdown?. *Economic and Political Studies*, *8*(4), 436-461.

Keogh-Brown, M. R., & Smith, R. D. (2008). The economic impact of SARS: how does the reality match the predictions?. *Health policy*, *88*(1), 110-120.

Khan, K., ZHAO, H., Zhang, H., Yang, H., Shah, M. H., & Jahanger, A. (2020). The impact of COVID-19pandemic on stock markets: An empirical analysis of world major stock indices. *The Journal of Asian Finance, Economics, and Business*, *7*(7), 463-474.

Kleidt, B., Schiereck, D., & Sigl-Grueb, C. (2009). Rationality at the eve of destruction: Insurance stocks and huge catastrophic events. *Journal of Business Valuation and Economic Loss Analysis*, *4*(2).

Kolari, J. W., & Pynnönen, S. (2010). Event study testing with cross-sectional correlation of abnormal returns. *The Review of financial studies*, *23*(11), 3996-4025.

Lamb, R. P. (1995). An exposure-based analysis of property-liability insurer stock values around Hurricane Andrew. *Journal of Risk and Insurance*, 111-123.

Law, C., Cornelsen, L., Adams, J., Penney, T., Rutter, H., White, M., & Smith, R. (2020). An analysis of the stock market reaction to the announcements of the UK Soft Drinks Industry Levy. *Economics & Human Biology*, *38*, 100834.

Mazur, M., Dang, M., & Vega, M. (2021). COVID-19and the march 2020 stock market crash. Evidence from S&P1500. *Finance Research Letters*, *38*, 101690.

Nandy, S., & Sussan, F. (2019). Did the US Presidential Election in 2016 have a Short-Term Effect on the Financial Returns of American Depository Receipts from Russia?. *Review of Integrative Business and Economics Research*, *8*(3), 78.

Patell, J. M. (1976). Corporate forecasts of earnings per share and stock price behavior: Empirical test. *Journal of Accounting Research*, 246-276.

Pham, H. N. A., Ramiah, V., Moosa, N., Huynh, T., & Pham, N. (2018). The financial effects of Trumpism. *Economic Modelling*, *74*, 264-274.

Pine, P., McKercher, B., 2004. The impact of SARS on Hong Kong's tourism industry. *International Journal of Contemporary Hospitality Management* ,16 (2), 139–143.

Song, L., Wang, J., Yao, S., & Chen, J. (2012). Market reactions and corporate philanthropy: A case study of the Wenchuan earthquake in China. *Journal of Contemporary China*, *21*(74), 299-315.

Thorbecke, W. (2020). The Impact of the COVID-19 Pandemic on the US Economy: Evidence from the Stock Market. *Journal of Risk and Financial Management*, *13*(10), 233.

Topcu, M., & Gulal, O. S. (2020). The impact of COVID-19 on emerging stock markets. *Finance Research Letters*, *36*, 101691.

Wang, Y. H., Yang, F. J., & Chen, L. J. (2013). An investor's perspective on infectious diseases and their influence on market behavior. *Journal of Business Economics and Management*, *14*(sup1), S112-S127.

Yang, F., Wang, Y., & Chen, L. (2010). Information value of the infectious diseases outbreak on biotechnology. *Journal of Medicinal Plants Research*, *4*(20), 2103-2107.

Yang, M., & He, Y. (2019). How does the stock market react to financial innovation regulations?. *Finance Research Letters*, *30*, 259-265.

Internet References

Abbot (2020a). Retrieved from https://abbott.mediaroom.com/2020-08-26-Abbotts-Fast-5-15-Minute-Easy-to-Use-COVID-19-Antigen-Test-Receives-FDA-Emergency-Use-Authorization-Mobile-App-Displays-Test-Results-to-Help-Our-Return-to-Daily-Life-Ramping-Production-to-50-Million-Tests-a-Month

Abbot (2020b). Retrieved from https://www.abbott.com/BinaxNOW-Test-NAVICA-App.html#/

Banta, M. (2020). A vaccine for COVID-19 is crucial for the economy. A company founded in Lansing is helping make one. Lansing State Journal. Retrieved from https://eu.lansingstatejournal.com/

JNJ(2020). Retrieved from https://www.jnj.com/coronavirus/

Moderna (2020). Retrieved from https://www.modernatx.com/

Novavax (2020). Retrieved from https://ir.novavax.com/news-releases/news-release-details/novavaxAdvances-development-novel-COVID-19-vaccine

Pfizer (2020). Retrieved from https://www.pfizer.com/news/press-release/press-release-detail/pfizer-outlines-five-point-plan-battle-COVID-19