The Impacts of the COVID-19 Pandemic on the U.S. Capital Markets

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Abstract. Amid the COVID-19 pandemic and the ongoing Ukraine conflict, an unprecedented amount of uncertainty appear in the financial market. This essay aspires to provide a picture of how those events have affected the stock market, energy market and initial public offering market in the US and give some investment strategies based on the findings. The paper gathered relevant data over the period and summarised the research method employed by other sources to lead to conclusions. The conclusion is that COVID-19 and Ukraine war has, in general, adversely impacted the stock market in terms of its return, volatility and efficiency, but with High tech sector is growing rapidly. The energy market also experienced significant fluctuations, and empirical results suggest that ETFs are safer investments than futures. Lastly, the initial public offering during the first year of the pandemic suffered significant underpricing and volatility in their returns, contrary to the anecdotal that the initial public offering market has performed well during the pandemic.

Keywords: Stock market; energy market; IPO; COVID-19 pandemic.

1. Introduction

The COVID-19 pandemic and the Ukraine conflict have led to significant economic losses worldwide. Most economies have witnessed a deep economic depression with a large fall in their gross domestic products. The financial market also suffered; For instance, on 27 February 2020, the first week of the COVID-19 outbreak, the Dow Jones stock index in the US experienced the sharpest fall since the financial crisis of 2008. Confronting new coronavirus cases and government restrictions, investors faced considerable uncertainty and failed to find a haven for their investments. The following Ukraine conflicts have extended this period of information uncertainty; with the sanction placed on Russian imports by the US, the oil price began to surge and translated into worse business conditions worldwide. In order to manage risk, it is essential to explore how those events have impacted the financial market and know the implications. Therefore, this essay provides insight into how COVID-19 and Ukraine wars have impacted the financial market; It will focus on the financial market in the US, namely the stock market, energy markets and the markets for initial public offerings. The reason for choosing US financial market is that it is generally considered to be the largest and most efficient, thus might provide convincing results regard to how financial markets would respond to similar events in the future. This paper also provides some suggestions on the investment option from the findings. The essay will first consider how the pandemic and Ukraine war affected the US stock market, using stock indexes as a proxy of the market performance, which gives investors an overview of the market conditions. Then an industry-level analysis will be conducted to find out which industry has had superior performance over the pandemic period, which might inform where the opportunities are for the investors. Next, it will investigate the overall stock market's volatility and efficiency, which are essential for risk management. Then, a very closely related market, the energy market, will be examined with the main focus on the crude oil stock index, futures and exchange-traded funds (ETF). Comparing those three types of energy-related securities would offer a summary of the risk and return of each. The connectedness between oil prices and the stock market will also be reviewed. Lastly, the essay will explore how the initial public offering (IPO) market is influenced by the pandemic, which is said to have had a record high number of IPOs and rapid growth since the start of the COVID-19 pandemic. This essay will examine the driving force behinds why a large number of firms choose to go public during the pandemic period and which sectors those firms

belong to, and then turn into comparing the performance of post-covid IPOs with pre-covid IPOs. The comparison will be made on their initial pricing and the volatility of their stocks.

2. Stock Market

COVID-19 hit the stock market unprecedentedly; the circuit breaker in the US stock market set off four times in March 2020 [1]. Therefore, it might be crucial to investigate how the stock market responded to the pandemic. This paragraph will explore the connectedness between the pandemic and the S&P 500 and Dow Jones stock index in the US, which represented the performance of the largest companies listed on the US stock exchange and used as a proxy of the US stock market. In order to find the relationships between coronavirus cases and the stock's performance. Chowdhury and Abedin (2020) constructed a correlation matrix using the data from 1 January 2020 to 30 April 2020, demonstrating the correlation between coronavirus cases, death and major stock index in the US, as Table 1 shown [2].

Table 1. Correlation matrix for covid measures and stocks indexes performance [2]

	DJ	S&P500	VIX	VOL_{DJ}	$VOL_{S\&P500}$	CC	DC
DJ	1						
S&P500	0.988	1					
VIX	-0.662	-0.692	1				
VOL_{DJ}	-0.083	-0.084	0.156	1			
$VOL_{S\&P500}$	-0.085	-0.079	0.121	0.876	1		
CC	-0.024	-0.018	0.044	0.653	0.753	1	
DC	-0.00092	0.006	0.009	0.637	0.743	0.967	1

As Table 1 shown, a negative correlation exists between confirmed cases (CC) and indexes (DJ and S&P500). The observed data shows how the economic uncertainty related to the coronavirus cases has caused the US stock market to tumble. Nevertheless, even though the US stock market's overall performance was poor during the COVID-19, not all sectors were affected equally by the COVID-19. According to a report from McKinsey, the weighted average shareholder return declined sharply for all sectors in February 2020 [3]. With the help of the government stimulus plan, sectors such as Pharmaceuticals have fully recovered their losses within six months since February. However, sectors such as aerospace, air and travel and insurance remain significant losses from the pandemic. Although the vaccination in October helped those markets partially recover from the crisis, the dispersion between those sectors recovered quickly, and the rest kept widening. More importantly, different to those companies that just managed to thrive, 25 companies have witnessed an enormous market capitalization gain during the first year of the crisis.

As can be seen from Figure 1, most of those fast-growing companies are in the sector of north American technology and Asia technology, many of which are digital entertainment and e-commerce that benefited from pandemic-related demand. The growing trend of those sectors existed before the pandemic, but the crisis has intensified the speed. In addition, the pandemic has not only widened the difference in performance across different sectors, but the performance dispersion within the sector is also growing. For instance, although the restaurant industry has suffered the most significant hit from the pandemic, Domino's pizza managed 26% of total returns to shareholders for adapting their business to fast-growing delivery services. This demonstrated that companies that are asset-light and adapt tech quickly could gain an edge over their sector peers. Thus, it might be worth considering how the trend above will continue after the pandemic and how different sectors will be affected by those fast-growing high-tech companies.

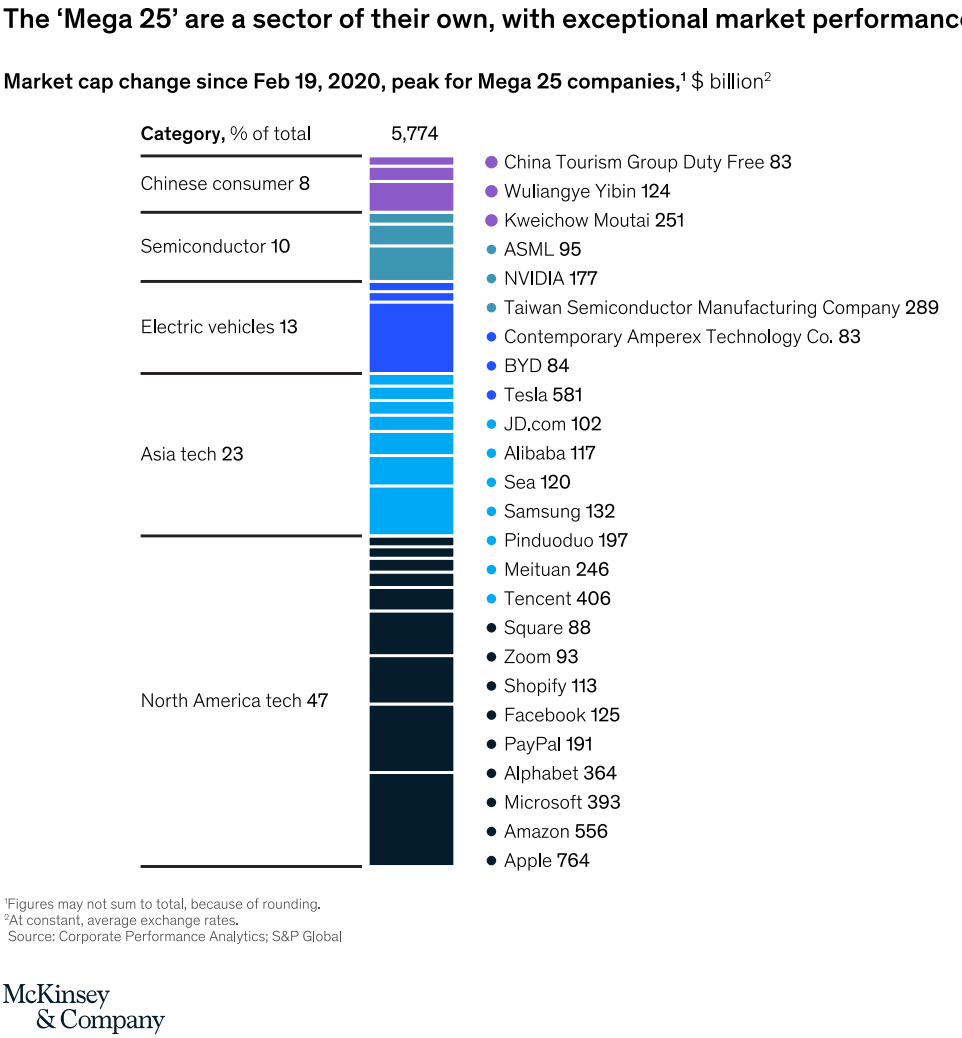


Fig. 1 25 companies with exceptional growth in the first year of COVID-19 [3]

A further study has investigated the linkage between the oil and stock markets in the United States. Investors need to understand the interdependence between those markets to avoid risk, particularly in the pandemic period where a demand shock hit the oil market due to the global quarantine. The study from Managi and Yousfi et al. (2022) uses the daily data on the implied volatility of the oil market (OVX) and the S&P 500 from January 2018 to December 2020, trying to find how co-movement between oil and the stock market evolved [4]. In the paper, Pearson correlation and coefficient with a p-value between those data are calculated; As can be seen in Table 2, the results show that oil price is positively correlated with the stock market index (S&P 500), and a negative correlation can be found between the implied volatility of oil price and the stock market. An ADS index, which measures the business condition in the US, is also negatively related to the volatility in the oil price.

Table 2. Pearson correlation between volatility of oil price and stock market index [4]

	OIL	OVX	SP	ADS
OIL	1			
OVX	-0.5553	1		
SP	0.2810	-0.3728	1	
ADS	0.11141	-0.0462	0.0075	1

Managi and Yousfi et al.'s paper also used the continuous wavelet transformation and coherence approach, confirming that dependence between oil prices and the stock market has been enforced during the pandemic [4]. At least in the case of demand-side shocks, When the oil price reaches the

lowest, the US stock market and business conditions also suffer. These results reveal the damaging effects of the sensitivity of the stock market to economic growth, for oil demand shocks probably already indicate a poor business environment, and a reaction in the stock market would aggravate this further. Thus, it is sensible for the government to use a set of policies about the COVID-19 to make the stock market more resilient.

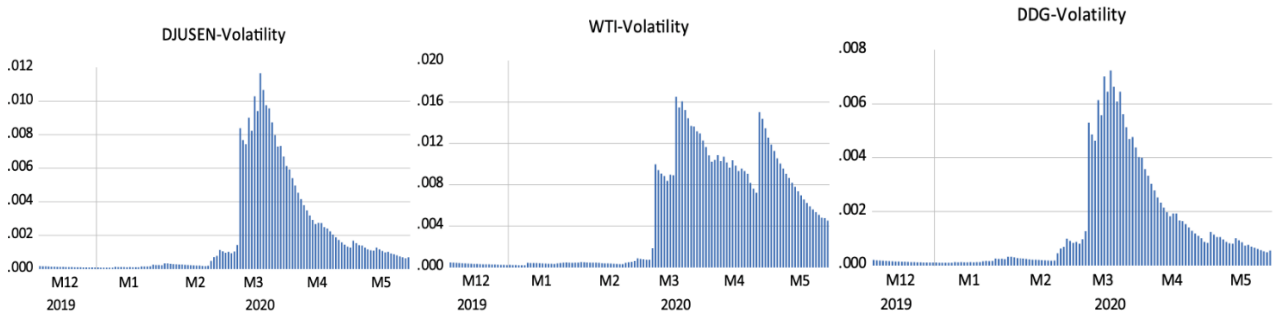
Another fact that can be identified from table 1 is that confirmed cases are positively correlated with volatility and trading volume. Thus, the volatility of the market will be explored next. Albulescu's paper (2021) investigated how US stock market volatility responds to the announcement of new cases [5]. Using the realized volatility (RV) of the S&P 500 as a proxy for the financial market volatility and empirical results indicates that new cases reported, especially at the global level, have a considerable positive impact on the US financial market volatility. The study of Chowdhury, Dhar, and Stasi (2022) also found negative cumulative abnormal returns on the S&P 500 during the events of coronavirus cases reported [6]. This strong relation is probably attributed to the highly efficient US stock market, where investors' uncertainty is reflected instantaneously after the news. In addition, considering the impact of government policy, economic policy uncertainty (EPU) has a persistent positive impact on stock market volatility. However, investors' responses towards fiscal measures were quite optimistic, as the $2 trillion stimulus package practically alleviated the inequalities caused by the pandemic lockdowns. The analysis of the volatility of the US stock market can be extended to the Russia-Ukraine conflict period when the invasion took place on 24 February 2020; it sent a shock to volatility in global stock markets, including the US. Recent research examines the mean stock market price difference in two stages. Stage one is when the army starts to build up around the Ukraine borders, and the second stage is when the full-scale invasion happens [7]. The outcomes show that in stage 1, no significant impact on the volatility of the US stock market has been found; on the contrary, the actual invasion has largely influenced the volatility level of the US stock market. With the p-level standing at 0.01168, Insufficient to reject the correlation between invasion and change in volatility. The US stock market has shown to be less influenced than the EU and UK markets. This reveals that the US stock market is more resilient to war events than markets in other countries; thus, it is good for the risk-averse investor to invest in the US. Investors might also use these results to diversify their investments across different stock markets to achieve a balanced portfolio.

As shown in the previous paragraph, capital market volatility has significantly increased. Thus, it could be helpful to inspect the efficiency of the market and consider whether predictabilities exist. Dias, Teixeira et al.'s study (2020) tested the weak form of an efficient capital market, using the data on daily returns of the Dow Jones indices in the US from December 2019 to May 2020 [8]. This paper applied the rank variance test and shows that the returns are not normally distributed, thus rejecting the random walk hypothesis. This result shows that the US market tends to overreact to the information, which then self-corrects in the following days, regardless of bad or good news. The high sensitivity of stock prices to information is probably attributed to the uncertainty experienced by investors during the pandemic. Further, the results reveal that extraordinary returns might be earned if the rates of return can be correctly forecasted to some extent and arbitrage opportunities might exist. This counter the random walk in the efficient capital market, and information efficiency does not exist.

3. Energy Market

The lockdown and restriction on travel also affected the energy market substantially; for instance, the global crude oil price declined more than 50% in the first quarter of 2020. As mentioned in the previous section, the stock market is sensitive to changes in oil prices; this suggests the effects of COVID-19 pandemic on the energy market warrant a closer look. Thus, energy-related securities such as energy stock indexes, futures and ETFs can be investigated. Firstly, it can be helpful to examine how prices fluctuated over the period. Shaikh's research constructed a time series market volatility for the US Dow Jones oil & gas index, ETF and futures [9]. It models the conditional

volatility using the GJR-GARCH model, and the result is shown below in Figures 2, 3 and 4. As can be seen from the figures, the energy indexes' volatility began to surge from February to March. This rise in volatility is more noticeable for the crude oil futures, where WTI suffered two waves of increase in volatility rather than one.



(a) (b) (c)

Fig. 2 Time series plot of the energy markets' volatility during the pandemic period [9]

Shaikh also reveals that the excess market returns slope is positive and greater than 1 for West Texas Intermediate (WTI), a US light oil market benchmark, indicating that energy markets are very responsive to market shock and overreact to systematic risk [9]. However, the DDG exchange-traded fund, which provides inverse exposure to US oil and gas stocks, is less responsive to market risk. In addition, the experiment proves that DDG also does not react to the news of new coronavirus cases. During March 2020, when the pandemic grew exponentially across Europe, most of the energy market suffered an adverse decline, but DDG remained resilient. Those characteristics of DDG suggest that DDG is an excellent investment for risk management. It can be concluded that for the risk-averse investor, ETFs such as DDG are a better option than crude oil futures such as WTI.

The ongoing Russia-Ukraine conflicts also significantly impacted US oil prices; following the sanctions the US placed on Russian crude oil imports, there has been a significant swing in crude oil prices. To further explore the war's impact on US oil prices, Appiah-Otoo's paper used the quantiles regression model to examine the relationship between the war and the oil price [10]. This approach has the advantage of capturing the distribution of oil prices; the results reveal that the Russia-Ukraine war's impact on oil prices. Except for the first quantile, the values in all other quantiles are statistically significant to show the positive effects of the war on oil prices. This is contrary to the adverse demand shocks caused by COVID-19; the war increased oil prices.

4. IPO

The last part of the essay will explore how COVID-19 has impacted the IPO market. The number of IPOs in the US in 2020 is at an all-time high and witnessed more than 100% growth from the previous year. Further, more than 150 billion of capital was raised in 2020. Thus the evidence indicates that the initial public offering (IPO) market has performed exceptionally well. However, a closer analysis found that IPOs are more subject to information uncertainty related to the pandemic and government policy. IPOS were generally more likely to be underpriced and have greater return volatility than in the pre-covid period, which is attributed to government restrictions [11]. Baig and Chen's paper first compared the main statistics of the 143 firms that went public after the pandemic and 278 IPOs before the pandemic. The first key finding is the contrast in underpricing between the two groups; the underpricing is the return generated from the offer price to the close price on the first trading day. Moreover, on average, IPOs during the COVID-19 are more underpriced by 23% compared to the latter group. Further, the first 30 daily returns standard deviation (volatility) is higher for the IPOs during the COVID-19.

Similarly, the difference between the natural log of the highest daily recorded price and the lowest price is higher for IPOs during the COVID-19. All three measures above are used as proxies for the

information uncertainty experienced by the IPOs during the COVID-19. The statistics suggest that IPO firms during the COVID-19 experience more volatile prices and suffer from underpricing. The paper further conducted an industry-level analysis to explore how different sectors experience different degrees of information uncertainty. It divides IPOs into consumer, manufacturing, High tech, health and others. The results not only found that more than half of the total IPOs (157) are from the healthcare industry (84), and the highest number of High-technology IPO firms was recorded in 2020. A closer comparison of information uncertainty measures between IPOs within the five industries shows that high-technology sector firms endure more underpricing and have greater post-IPO volatility. This, combined with the higher initial return received by the Healthcare industry, suggests that information uncertainty might be primarily driven by the high-tech and healthcare industry.

5. Conclusion

In summary, the COVID-19 pandemic and Ukraine conflicts have substantially impacted the US financial markets. As for the stock markets, although the initial fall in the performance of stocks is significant due to fear of the COVID-19 outbreak, the subsequent recovery of most stocks is quick after the vaccination. However, the pandemic has enlarged the dispersion between different firms. The highest growth and return can be observed in high-tech and e-commerce companies, and any firms that adopted the new technology also benefited from the trends. The stock market has become more volatile worldwide, not only due to the news and economic policy uncertainty but also because of the co-movement of stock prices with the oil prices. When adverse demand shocks hit the oil market, the stock markets also seem to underperform. Thus, it might be worthwhile for the government to design economic policies to prevent this market risk from spreading to causing further downturns during an economic recession. Nevertheless, the US stock market has lower volatility than the EU market and, therefore, is more resilient to the Ukraine war than the EU market. It might suggest a suitable investment strategy is for risk-averse investors to invest in the US stock market when events like war happen again in the future, which would provide a portfolio that fluctuates less. During this pandemic period, the efficiency of the capital market was challenged. Even though the US stock market is generally considered to be more efficient than other markets, it fails to withstand the weak form efficiency test. It has been shown to overreact to new information, which creates predictabilities and arbitrage opportunities for investors. For the oil market, the overall volatility for the oil stock index, futures and ETF have risen in the first few months of the COVID-19 outbreak. Then the empirical results suggest that ETFs become more stable than the futures, such as WTI, with no further swings in volatility and thus might be a safer option than investing in futures. Finally, a careful study of the IPO market found that considerably more firms went public in 2020, and considerable funds was raised in the period. The main contributor was the high number of healthcare and high-tech companies' IPOs in the latter half of 2020. Nevertheless, the study did not suggest that the IPOs market was performing well. Instead, significant underpricing for their stocks in the initial offering exists compared to pre-covid period IPOs. In addition, their stock prices seem more volatile, and it might be expected that those firms underperform with their peers even in the long run.

References

[1] Zhang, W. and Hamori, S. Crude oil market and stock markets during the COVID-19 pandemic: Evidence from the US, Japan, and Germany. International Review of Financial Analysis, 2021, 74: 101702.

[2] Chowdhury, E. K., & Abedin, M. Z. COVID-19 Effects on the US Stock Index Returns: An Event Study Approach. SSRN Electronic Journal, 2020.

[3] The impact of COVID-19 on capital markets, one year in. https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/the-impact-of-covid-19-on-capital-markets-one-year-in. Last accessed 2022/11/20.

[4] Managi, S., Yousfi, M., Zaied, Y.B., Mabrouk, N.B. and Lahouel, B.B. Oil price, US stock market and the US business conditions in the era of COVID-19 pandemic outbreak. Economic Analysis and Policy, 2022, 73: 129-139.

[5] Albulescu, C.T. COVID-19 and the United States financial markets' volatility. Finance research letters, 2021, 38: 101699.

[6] Chowdhury, E.K., Dhar, B.K. and Stasi, A. Volatility of the US stock market and business strategy during COVID-19. Business Strategy & Development, 2022.

[7] Ngwakwe, C., 2022. Stock Market Volatility during Rumours of War and Actual War: Case of Russia-Ukraine Conflict. Acta Universitatis Danubius. Œconomica, 18(3): 55-70.

[8] Dias, R., Teixeira, N., Machova, V., Pardal, P., Horak, J. and Vochozka, M., 2020. Random walks and market efficiency tests: evidence on US, Chinese and European capital markets within the context of the global Covid-19 pandemic. Oeconomia Copernicana, 2020, 11(4): 585-608.

[9] Shaikh, I. Impact of COVID-19 pandemic on the energy markets. Economic Change and Restructuring, 2022, 55(1): 433-484.

[10] Appiah-Otoo, I. 2022. Russia–Ukraine War and US Oil Prices. Energy Research Letters, 2022.

[11] Baig, A.S. and Chen, M. Did the COVID-19 pandemic (really) positively impact the IPO Market? An Analysis of information uncertainty. Finance Research Letters, 2022, 46: 102372.