

# *Research on the Impact of COVID-19 on Futures Market*

Yichi Zhang<sup>1,a,\*</sup>

<sup>1</sup>Dalian American International School, Dalian, Liaoning Province, China, 116600

a. zyc20051207@163.com

\*corresponding author

**Abstract:** This paper focuses on the specific impacts of COVID-19 on the performance and trading conditions of various global futures markets. The major impact of COVID-19 on the economy includes the raised concern of market stress, city lockdowns and travel restrictions. These factors can negatively affect the performance of future markets in different ways and to different degrees. This paper will explore the topics of the interconnectedness of several commodity futures' performances, the volatility and return of major commodity futures, the relationship between various contemporary financial indicators and the performance of crude oil future, as well as the general performance of innovative future types. The study has found that the interconnected linkages between several commodity futures appeared under COVID pandemics. Furthermore, the study shows that COVID-19 has a considerable influence on both the short-term and long-term volatilities of industry-related and consumer staple-related futures to different degrees. Lastly, the coronavirus crisis has an overwhelmingly negative impact on the prices of innovative forms of the future, including the carbon future and Bitcoin future.

**Keywords:** COVID, volatility, commodity future, interconnectedness, crude oil

## 1. Introduction

Since the first outbreak of the coronavirus pandemic from Wuhan, China in December 2019, there have been approximately 0.6 billion reported COVID cases worldwide until August 8, 2022, which has contributed to over six million deaths by the time of writing [1]. The COVID-19 crisis has a fundamental impact on global economic activity reshaping the supply and demand sides in every affected nation.

In the financial markets, the coronavirus crisis has caused a considerable decline in global stock markets. According to the Daily FT (2020) [2], the Dow Jones and S&P both show that the standard performance of the US stock market dropped by over 20 percent. Moreover, the economic policy uncertainty (EPU) regarding the recovery of COVID-19, which has become a hot topic recently has increased the volatility of oil futures markets combined with the factor of the drop in global oil prices. The high volatility of oil futures has caused a reduction in interest in global oil futures exchanges recently.

This paper focuses specifically on the impact of COVID-19 on global futures exchanges. The study aims to discover the current environment and situation of global future trades under COVID-19. The interconnected impact of COVID-19 on different categories of futures, and the volatilities of future products across different categories. This study is significant, because, firstly, it provides up-to-date

insights to traders of global futures for different purposes. Secondly, it indicates the future performance of futures markets worldwide. Thirdly, it gives suggestions to the governments nationally and internationally on future decisions and policies. Lastly, it recommends further research areas expected to be filled.

## **2. Interconnected Impact of COVID on Commodity Futures**

According to Jiang Wang, the oil future has a close correlation with various other agricultural futures. Through employing the method of multifractal detrended fluctuation analysis (MF-DFA) and its extension version of MF-DCCA, the study found that the volatilities of agricultural futures are closely impacted by the volatilities of oil futures in the long run. This is because sugar is a major ingredient for ethanol as a type of fuel within the same category as fuel. As an alternative to crude oil, the supply and demand of oil as well as its price have a strong impact on the supply and demand side of sugar. The graphing analysis of the data in the study suggests that the COVID-19 has strengthened the correlations between crude oil and sugar [3].

Furthermore, according to Mostafa Kamal's research, the interconnectedness between commodity futures is extremely strong only during the first period of the study (from January 21, 2020 to May 31, 2020). The interconnectedness started to loosen up after that period. This is due to the lockdown policies and travel restrictions in many countries. For instance, as the global manufacturing force, China had its lockdown policies at the start of the pandemic causing its reduction of manufacturing activities and production captivity. This reduction in supply has disrupted the global commodity futures market leading to the increasing interconnectedness of commodity futures [4].

There is a conflict between the two studies. The first study carried out by Jiang Wang suggested that the multifractality of commodity futures under the pandemic is stronger than that of the period before COVID-19. On the other hand, through data comparison from subdivided periods after the emergence of COVID-19, Mostafa Kamal's research shows that the interconnectedness of commodity futures should reach its maximum in the time between January 2020 to May 2020 and then start to loosen. Nevertheless, because of the deblocking of cities around the globe and economic recoveries with increased global production captivity, it can be indicated that supply and demand for commodities will return to the pre-pandemic situation. This suggests that the pandemic itself will be less likely to intensify the interconnectedness of global commodity futures.

## **3. Volatility and Return of Major Commodity Futures**

The volatilities and returns of different commodity futures vary distinctively according to their categories. According to research done by Xi'an Jiao Tong-Liverpool University, commodity futures in Chinese markets such as soybean, corn, and iron ore had a positive return. The futures of petroleum asphalt and PTA showed signs of depreciation. The study also reveals that the volatility of eggs and petroleum asphalt ascended drastically [5]. On the other hand, the volatility of corn, hot rolled coil, coke, and screw steel descended considerably in the post-pandemic period [5]. The high volatility and current return of corn is due to the boosting demand for food supply caused by the lock-down against the pandemic. It is expected that the return of corn futures will decrease after the kurtosis since the recovery from the pandemic.

In addition, research done by Yongmin Zhang investigating the volatilities of four major commodity futures (copper, soybean, oil and gold) has shown that the long-term volatility of four commodity futures will still increase due to the pandemic in the descending order of copper, soybean, oil and gold [6]. The study further finds that the instantaneous infection rate of COVID-19 has a bigger impact on increasing the short-term volatility of copper and gold futures, and the long-term volatilities of oil and soybean futures are more stable under the pandemic.

Combining the two investigations, it can be concluded that COVID-19 has a strong impact on the volatilities of both industry-related and consumer food-related commodity futures. The two studies also show that COVID-19 causes a steady change in volatility in consumer food futures such as soybean and corn futures, as well as vital industrial fuels such as oil futures. On the other hand, commodity futures less vital to the manufacturing and food supply industries such as copper, gold, and hot rolled coil are influenced more by short-term instantaneous volatility under the background of the pandemic.

#### **4. Varies Factors Influencing the Oil Future under Pandemic**

Crude oil is a natural resource as a form of fuel vital to the manufacturing and transportation industries. It is the primary source of energy production [7]. It is commonly known that the COVID-19 had a significant impact on the global oil price by increasing the volatility of crude oil futures, and this section continues to analyze several factors that influence the crude oil futures under the circumstances of COVID.

According to an analysis led by Zibo Niu, there are several financial indicators of the volatilities of crude oil futures. Through the use of several models such as the HAR, the study shows that under the general impact of COVID-19, the major influences on crude oil futures volatilities derive from the crude oil volatility, volatility implied by the Chicago Board Options Exchange (CBOE), and the volatility index [8]. In comparison, the economic policy uncertainty has less impact in this case. Furthermore, crude oil volatility has the most constant impact on crude oil volatility, while the volatility index has the strongest influence under the conditions of the pandemic, and the Chicago Board Options Exchange implied volatility was the most effective indicator before the pandemic [8].

Another research carried out by Zhejiang University of Finance and Economics focuses on the impact of investors' sentiment on the crude oil future price. The study uses the crude oil volatility indicated by the CBOE (OVX) to represent the sentiment of crude oil futures investors. From the graph provided by the investigation showing the data relationship between the OVX and WTI crude oil future price, after the breakout of COVID-19, the OVX started to increase dramatically as the WTI crude oil future price dropped less drastically. "When investor sentiment increases by 1%, the crude oil futures price falls by 0.678%" [9]. As a result, it can be concluded that the crude oil futures price has a clear relationship with investor sentiment.

#### **5. Innovative Research and Volatilities of New Forms of Commodity Futures**

As a new form of future, carbon future has gained considerable popularity over recent years. The carbon future is a type of future whose underlying asset is carbon emissions. Several countries signed the Kyoto Protocol in 1997 to reduce carbon emissions. In response, countries involved started to impose restrictions on domestic industries. In some cases, there are companies with carbon emissions quantity remaining, while others face the need for more carbon emissions. Thus, the carbon future was created for exchanging specific amounts of carbon emissions.

According to the research done by Yue Dou investigating the relationship between economic policy uncertainty (EPU) and the volatility of carbon futures, EPU is influencing the prices of carbon futures during the period of COVID-19. Data analysis and observations have proved that "the causality from EPU shocks to carbon futures price returns becomes significant around the middle of the carbon return distribution" during the pandemic. The study also suggested that under most market conditions, the EPU has an undermining impact on the carbon future returns [10].

The bitcoin future is another unique financial future product differentiated from the traditional commodity futures. The price of bitcoin and its legal controversy have become popular topics

especially during the period of COVID-19 when the scarcity of production forces led to the increase in the price of computer hardware.

Beum-JoPark carried out a study analyzing the relationship between the COVID-19 and the performance of Bitcoin futures. The (SC)-VAR-MGARCH was introduced. The result of the investigation suggests that the belief dispersion from the market stress because of concerns about COVID-19 had a negative impact on the prices of Bitcoin futures. Nevertheless, this belief dispersion increased the volatility and trade volume considerably during the period of COVID-19[11].

## 6. Conclusion

In general, COVID-19 has numerous significant and insignificant impacts on global future markets, including both traditional commodity futures and futures with innovative underlying assets. Firstly, the interconnectedness between commodities such as sugar and oil were strengthened by the growing infection rate of COVID-19. However, the interconnected relationship between commodity futures peaked during the first few months of the pandemic and started to loosen after the primary breakout. Secondly, the COVID-19 has a strong impact on the volatilities of industry-related and consumer staple-related futures. While the volatilities of vital production resources and food supplies such as oil and soybeans are mainly impacted by COVID for the long term; less vital commodity futures such as copper, gold, and hot rolled coil are more heavily influenced by instantaneous volatility under the background of COVID-19. Thirdly, the volatilities of crude oil futures under the circumstances of the COVID are the most effectively related to the indicator of crude oil volatility implied by the Chicago Board Options Exchange. Finally, the EPU especially against the pandemic has a negative impact on the performance of carbon futures, and the market stress of COVID-19 also negatively impacts the price of Bitcoin futures while boosting its volatility.

Currently, most studies about the relationship between COVID-19 and future market performances are mainly conducted by statistical and mathematical models with brief casualties explained. Therefore, more specific, and convincing reasoning from real-world events is still expected to be added to prove the applicability and effectiveness of the model employed. Another prospect for future investigation is that researchers should be more aware of the specific period and geographic locations which they are studying due to the different levels of infection rate and different degrees of anti-pandemic regimes in various regions and times.

## References

- [1] *worldometer*, (2022), *COVID-19 Coronavirus Pandemic*, <https://www.worldometers.info/coronavirus/>.
- [2] *ft.lk*, (2022), *COVID-19: The economic impact simplified*, <https://www.ft.lk/Columnists/COVID-19-The-economic-impact-simplified/4-697725>.
- [3] *Jiang Wang, South Korea*, (2020), *Analysis of the impact of COVID - 19 on the correlations between crude oil and agricultural futures*, [https://www.sciencedirect.com/science/article/pii/S0960077920302964?ref=pdf\\_download&fr=RR-2&rr=741c1f747ea72542](https://www.sciencedirect.com/science/article/pii/S0960077920302964?ref=pdf_download&fr=RR-2&rr=741c1f747ea72542).
- [4] *Md. Mostafa Kamal, China*, (2021), *Interconnectedness of the Global Commodities Futures Markets: COVID -19 Pandemic vs. the Global Financial Crisis*, [https://acfr.aut.ac.nz/\\_data/assets/pdf\\_file/0003/530778/Manuscript\\_Interconnectedness-of-the-Global-Commodities-Futures-Markets.pdf](https://acfr.aut.ac.nz/_data/assets/pdf_file/0003/530778/Manuscript_Interconnectedness-of-the-Global-Commodities-Futures-Markets.pdf).
- [5] *Ahmet Goncu, China*, (2021), *Effects of Covid-19 Pandemic on Chinese Commodity Futures Markets*, <https://arxiv.org/ftp/arxiv/papers/2106/2106.09250.pdf>.
- [6] *Yongmin Zhang, China*, (2021), *COVID-19 impact on commodity futures volatilities*, [https://www.sciencedirect.com/science/article/pii/S1544612321005614?ref=pdf\\_download&fr=RR-2&rr=741c1f747ea92542](https://www.sciencedirect.com/science/article/pii/S1544612321005614?ref=pdf_download&fr=RR-2&rr=741c1f747ea92542).
- [7] *James Chen*, (2022), *Crude Oil*, <https://www.investopedia.com/terms/c/crude-oil.asp>.
- [8] *Zibo Niu, China*, (2022), *The role of uncertainty measures in volatility forecasting of the crude oil futures market before and during the COVID-19 pandemic*, [https://www.sciencedirect.com/science/article/pii/S0140988322002791?ref=pdf\\_download&fr=RR-2&rr=741bc02afa679815](https://www.sciencedirect.com/science/article/pii/S0140988322002791?ref=pdf_download&fr=RR-2&rr=741bc02afa679815).

- [9] Wenli Huang, China (2020), *COVID-19: Structural Changes in the Relationship Between Investor Sentiment and Crude Oil Futures Price*, <https://erl.scholasticahq.com/article/13685-covid-19-structural-changes-in-the-relationship-between-investor-sentiment-and-crude-oil-futures-price>.
- [10] Yue Dou, China, (2021), *Dynamic linkages between economic policy uncertainty and the carbon futures market: Does Covid-19 pandemic matter?*, [https://www.sciencedirect.com/science/article/pii/S0301420721004633?ref=pdf\\_download&fr=RR-2&rr=741bde5f787b96f0](https://www.sciencedirect.com/science/article/pii/S0301420721004633?ref=pdf_download&fr=RR-2&rr=741bde5f787b96f0).
- [11] Beum-Jo Park, South Korea, (2021), *The COVID-19 pandemic, volatility, and trading behavior in the bitcoin futures market*, [https://www.sciencedirect.com/science/article/pii/S0275531921001409?ref=pdf\\_download&fr=RR-2&rr=741c1f77088a2542](https://www.sciencedirect.com/science/article/pii/S0275531921001409?ref=pdf_download&fr=RR-2&rr=741c1f77088a2542).