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Effect of Covid-19 On Oil Market

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Abstract: The purpose of this paper is to discuss the impact of COVID-19 on oil markets and mention the most important sectors that have been affected by the oil market in light of the impact of COVID-19. The authors use theoretical inductive approach to know what is the effect of COVID-19 on oil market, and What is the effect of changing oil prices on other industries after COVID-19. Lastly, how to face the risks of fluctuating oil prices? This study is important because on Monday 9 March 2020, Saudi Arabia announced a stunning discount in oil prices of $6 to $8 per barrel to its customers in Asia, the United States and Europe. After that Massive Discounts Oil prices and stock indexes were in freefall. Benchmark Brent crude oil futures dove 30%, the steepest drop since the Gulf War in 1991. A review of the literature shows that oil prices suffered an historic collapse. US oil prices crashed as much as 34% to a four-year low of $27.34 a barrel. Moreover, the impact of COVID-19 has extended to include Brent crude, Texas crude. Crude finished with a staggering loss of nearly 26% to settle at $31.13 a barrel. Brent crude, the global benchmark, plunged 24% to close at $33.36 a barrel. There is existence of a mutual effect between oil prices and some industries under the influence of COVID-19. For example, the aviation industry, and agricultural futures contracts. Also, it has been found that gold acts as a safe haven asset for international crude oil markets which can help investors to develop an effective portfolio strategy. Finally, the authors recommend future research to look into the precautionary processes that the markets should take to protect investor' money from any external factors that negatively affect it.

Keywords: Oil Market; Covid-19; COVID-19; Crude Oil.

تأثير فايروس كورونا على سوق النفط

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كلية الأعمال || جامعة جدة || المملكة العربية السعودية
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المستخلص: هدفت هذه الورقة إلى مناقشة تأثير COVID-19 على أسواق النفط وذكر أهم القطاعات التي تأثرت بسوق النفط في ضوء تأثير COVID-19. واستخدمت الباحثتان المنهج الاستقرائي النظري لمعرفة تأثير COVID-19 على سوق النفط، وتأثير تغير أسعار النفط على الصناعات الأخر. وكيف يمكن مواجهة مخاطر تذبذب أسعار النفط؟ تمت هذه الدراسة لأن المملكة العربية السعودية أعلنت يوم الاثنين 9 مارس 2020 عن خصم مذهل في أسعار النفط من 6 إلى 8 دولارات للبرميل لعملائها في آسيا والولايات المتحدة وأوروبا. وبعد هذه التخفيضات الهائلة، شهدت أسعار النفط ومؤشرات الأسهم تراجعاً حراً وانخفضت العقود الآجلة لخام برنت القياسي بنسبة 30%، وهو أكبر انخفاض منذ حرب الخليج في عام 1991. وتظهر استعراض الأدبيات أن أسعار النفط عانت من انهيار تاريخي فقد

انخفضت أسعار النفط الأمريكي بنسبة 34% وهو أدنى مستوى لها منذ أربع سنوات حيث وصل 27.34 دولارًا للبرميل. علاوة على ذلك، امتد تأثير COVID-19 ليشمل خام برنت وخام تكساس فقد أنهى النفط الخام بخسارة مذهلة بنسبة 26% ليستقر سعره عند 31.13 دولارًا للبرميل وانخفض خام برنت بنسبة 24% ليغلق عند 33.36 دولارًا للبرميل وهناك تأثير متبادل بين أسعار النفط وبعض الصناعات تحت تأثير COVID-19 على سبيل المثال، صناعة الطيران، والعقود الزراعية الآجلة. أيضًا فقد وجد أن الذهب يعمل كملاذ آمن لأسواق النفط الخام الدولية والتي يمكن أن تساعد المستثمرين على تطوير استراتيجية محفظة فعالة وأخيرًا، أوصت الباحثتان بإجراء بحث مستقبلي للنظر في العمليات الاحترازية الاضافية التي يجب أن تتخذها الأسواق لحماية أموال المستثمرين من أي عوامل خارجية تؤثر عليها سلبًا.

الكلمات المفتاحية: سوق النفط، كوفيد-19، الزيت الخام.

Introduction.

COVID– 19 pandemic is a "once-in-a century pathogen we've been worried about" (CNBC, 2020). The World Health Organization (WHO) first announced that COVID-19 was a world health emergency in January 2020; on March 11 it declared the viral outbreak is officially a pandemic, the highest level of health emergency. The virus was detected in over 200 countries and all U.S. states. After that, the emergency developed gradually into a global public health and economic crisis. COVID-19 spread between and across countries and influenced mostly every community. The $90 trillion global economy had been affected beyond anything experienced in nearly a century which explains the meaning of highly interconnected nature of the global economy (Jackson, Weiss, Schwarzenberg & Nelson, 2020, p1).

By early March 2020, the focal point of COVID-19 moved out from China to Europe, especially Italy, and by April, the focus had moved to the United States, where the number of infections was accelerating. In addition to causing death worldwide, COVID-19 has paralyzed the worldwide economic cycle. Since the onset of the pandemic, the world has been experiencing an economic disaster. Financial and commodity markets showed huge losses. Global financial markets had the worst disorder since 1930 and more pervasive than the global financial crisis (GFC) in terms of the number countries influenced. IMF projects global growth at −4.4% in 2020. To combat the pandemic, governments across the globe announced fiscal measures estimated at USD 11 trillion, resulting in a fiscal deficit of 14% of GDP in 2020, up 10% points from 2019 (IMF, 2020). Unavoidably, evidence show that recession is already in place and the outbreak make structural changes in the pricing dynamics in all markets.

The problem:

Panic and uncertainty from the COVID-19 outbreak in January-March 2020 has guided to a hugs sell-off in financial markets and a vast spike in market volatility levels. Notably, there has been a severe decline in the oil market which is often seen as a barometer of economic activity. Crude oil is a vital and strategic resource for the economy. It plays an essential role, in the whole economy and policy design not only in financial markets. Moreover, it is an important input for many goods and services, and the variations of oil prices can affect corporations' cash flows, which affects the stability of financial markets

(Dutta, Bouri, Uddin & Yahya, 2020, p26). Therefore, this paper aims to examine the impact of COVID-19 on oil market.

The problem questions:

1- What is the effect of COVID-19 on oil prices?
2- What is the relation between the oil market, and the stock market under the COVID-19?
3- What is the effect of changing oil prices on other industries after COVID-19?

The Objective:

The main objective of this paper is to further examine the impact of COVID-19 on oil market specifically oil price. Then mention the most important sectors that have been affected by the oil market in light of the impact of COVID-19.

The important:

1- It is important to paid attention in the oil price after the pandemic and study the effect of COVID-19 on it because of the below reasons:
   A. For the last three years, two reasons have been extremely influential in the oil markets. Firstly, has been the surge of shale oil production in the United States, that has changed the country from a large oil importer to an increasingly important exporter. Secondly, is the cooperation between Saudi Arabia and Russia, that recently have cooperated in trimming production in order to counter shale's impact. However, after pandemic that cooperation between two of the world's three largest oil producers, the third is the United States, seems to be at an end (Englund, 2020).
   B. On Monday 9 March 2020, Saudi Arabia announced a stunning discount in oil prices of $6 to $8 per barrel to its customers in Asia, the United States and Europe. After that Massive Discounts Oil prices and stock indexes were in freefall. Benchmark Brent crude oil futures dove 30%, the steepest drop since the Gulf War in 1991(Edition, 2020). Oil prices suffered an historic collapse after Saudi Arabia shocked the market by launching a price war against onetime ally Russia. US oil prices crashed as much as 34% to a four-year low of $27.34 (Egan, 2020).
2- Such a study draws the attention of investors to the necessity of considering the precautionary measures that the markets must take to protect their money from any external factors that negatively affect it, such as epidemics.

The methodology.

We used the theoretical inductive approach. It begins by collecting the relevant research literature on the topic. Then discuss the main issues that emerge from the literature. lastly, the paper concludes with a summation of the main points and issues it raises. Since COVID-19 is relatively a new topic, studies are

limited in this area to a period of time 2019-2020. Consequently, the authors will try to make up for the lack of prior studies by focusing on the existing literature.

The Previous of Study:

1- Study of (Qin, Zhang & Su 2020):

The purpose of this study is to explore the role of pandemics in the volatility of oil prices (OP). They used The residual-based bootstrap (RB)-based modified-likelihood ratio (LR) statistics to find the correlation between the pandemics index (PDI) and oil prices (OP). They choose the quarterly data from 1996: Q1 to 2020: Q13, During this time, there were a number of pandemic diseases around the world. The empirical findings suggest a negative relationship between PDI and OP. The fundamental reason is that pandemics may cause a significant drop in demand for oil and related items as the economy slows. Understanding the link between PDI and OP can teach investors valuable lessons. By factoring PDI, investors can predict the direction of OP, allowing them to mix their investments (change portfolios) and mitigate risk.

2- Study of (Albulescu, 2020):

This study Examine the impact of new COVID-19 infection cases on oil prices, while considering for the role of financial stress and volatility (VIX index), as well as US economic policy uncertainty (EPU). The study examines 49 observations from January 21, 2020 to March 9, 2020. COVID-19 data taken from WHO's daily status reports beginning January 21, 2020. They employed the ARDL model to estimate the link between oil prices, COVID-19, VIX, and EPU. The results of this study indicate that the new infection cases of COVID-19 have a limited negative effect on crude oil prices in the long run. But it was minor compared to the impact of financial instability and economic policy uncertainty on oil prices. The effect of COVID-19 on oil prices appears to be indirect, affecting first the volatility of financial markets.

3- Study of (Mhalla, 2020):

This study tried to evaluate the effect of COVID-19 on the oil and aviation industries by using a qualitative approach by analysing documents. It found that COVID-19 would have a significant impact on air travel and the aviation industry. As a result of the slowing demand, many airlines have reduced their flight schedules and implemented cost-cutting steps. This would have a huge effect on the global oil industry's production. This would have a huge effect on the global oil industry's production. Moreover, is the world's largest oil importer, the closure of a portion of its economy, which has ramifications for air and road transportation as well as industrial production, decreases the need for hydrocarbons. On other hand, since oil is one of the major costs for airlines, a decrease in oil prices can be beneficial to them.

4- Study of (Zhang & Hamori, 2021):

This study investigates the link between the COVID-19 pandemic, the crude oil market, and the stock market by looking at the return and volatility spillover between the crude oil market, the stock

market, and the COVID-19 pandemic in 2020 in the US, Japan, and Germany. Data set from 4 January, 2006 was employed to compare the effect of the 2008 global financial crisis with that of the 2020 COVID-19 on the US stock index, the Japanese stock market, and the German stock market. The study computes the return and volatility spillover in the time-domain approach and the method based on frequency dynamics. The results show that COVID-19 created an unparalleled level of risk, such as decline oil prices and triggering the US stock market circuit breaker four times, which caused investors to suffer serious losses in a short period.

5- Study of (Gharib, Mefteh-Wali & Jabeur, 2021):

This study examines the causal relationship between crude oil and gold spot prices to evaluate how the economic impact of COVID-19 has influenced them. The study examined the daily WTI and gold prices from January 4, 2010, to May 4, 2020. The nominal WTI price is given by the U.S. Energy Information Administration (EIA) and the gold price by www.gold.org. The results show that there are general bubbles in the WTI oil and gold markets in March 2020 and April 2020. The dates of the 2020 crash correspond to the global COVID-19 outbreak.

Literature Review:

The first months of the pandemic brought back memories of the great depression. Starting with (Jordà, Singh & Taylor, 2020) which study the medium to long-term effects of pandemics and how they differ from other economic disasters. Authors study major pandemics using the rates of return on assets stretching back to the 14th century. Significant macroeconomic after effects of pandemics persist for about decades, with real rates of return substantially depressed, in stark contrast to what happens after wars. The results show that capital is destroyed in wars, but not in pandemics; pandemics instead may induce relative labor scarcity and/or a shift to greater precautionary savings. although, (OECD, 2020) report that the COVID-19 pandemic in February intensely decreased world investments, including portfolio investments, and the negative consequence of the pandemic was twice greater than that of the 2008–2009 world economic crisis. Besides, the pandemic has had a huge negative effect on the manufacturing industry throughout the world. The drop in the world's gross output in 2020 will be the hugest in decades. Global GDP is likely to shrink by around 2%, with a larger contraction in developed economies than in emerging economies. (ECLAC, 2020, p7).

Some publications have provided information about how pandemic's influence on oil markets, different methods have been used. Some studies extended the study period to include a number of epidemics, such as (Qin, Zhang & Su 2020) which explore the impact of the pandemics index (PDI) in the fluctuations of oil prices (OP). The quarterly data from 1996: Q1 to 2020: Q13, were chosen to investigate the relationship between pandemics and the oil market since this is when many infectious diseases appeared around the world such as the bird flu (H5N1) in 1998, the SARS in 2003, the H1N1 from 2009

to 2010, the Middle East respiratory syndrome (MERS) from 2014 to 2016, and COVID-19 in 2020. The results show that there is a negative effect from pandemics index in oil price. The main reason is that the pandemics may slowdown the economy which lead to dramatically decrease the demand for oil and its related products. Conversely, high oil price may delay the decline in pandemics index, which indicates a positive effect. Understanding this interrelationship can help investors to diversify their investments (change portfolios) and reduce risks. Also (Bouri, Demirer, Gupta & Pierdzioch, 2020) examine the ability of a daily newspaper-based index of uncertainty associated with infectious diseases (EMVID) for diseases like COVID-19, MERS, SARS, Ebola, H5N1, and H1N1 can predict oil market volatility. Specifically changes in the Chicago Board Options Exchange's Volatility Index (VIX) from 3 January 2001—14 May 2020. The results show that There is a positive relationship between EMVID and realized oil volatility, and implying the EMVID index in a HAR-RV model significantly improves oil realized volatility forecasting efficiency. As a result, market uncertainty associated with infectious diseases provides useful information for predicting potential levels of oil market volatility, which can help enhance the design of crude oil-based portfolios (and risk management strategies). While (Dutta, Bouri, Uddin, & Yahya, 2020) explore the impact of COVID-19 on international crude oil prices, and whether this impact is consistent or inconsistent across various international crude oil benchmarks (WTI, Brent, Dubai), and the effects of the COVID-19 outbreak on the XLE index. By Using a standard event study method for three events related to COVID-19 on crude oil returns and energy ETF returns. the results indicate that the COVID-19 outbreak has a significant negative impact on international crude oil markets, with the impact being greatest when the novel coronavirus disease is declared a pandemic. The negative effect is the same for all three international crude oil prices used. The energy ETF also has a significant negative impact, although it is usually weaker. Moreover, (Albulescu, 2020) reports that the oil price reaction to COVID-19 was gradually accommodated until March 09, 2020, after 49 days of the release of the first COVID-19 monitoring report by the World Health Organization (WHO), international prices drop with more than 20% in one single day as consequence of that Saudi Arabia floods the market with oil. Therefore, this study examines the effect of COVID-19 case numbers on oil prices, while controlling for the effect of financial volatility and the United States (US) economic policy uncertainty. The study concludes that the COVID-19 daily reported cases of new infections have a marginal negative impact on the oil prices in the long run. However, COVID-19 also has an indirect effect on the recent dynamics of oil prices by amplifying the financial markets volatility. The study of (Tvalchrelidze & Silagadze, 2020) was more precise. It also investigates the oil prices during spread of COVID-19 world infection cases, but it concludes that coronavirus mortality rate drive Oil prices not just infection cases. At the beginning of the COVID-19 there was very strong negative correlation between infected cases and low oil prices so the oil market was crushed. Then it turns out coronavirus mortality rate drive the oil prices. This statement is proven by the statistical regression model of the interdependence between oil prices and COVID-19 coronavirus world mortality rate. A gradual stable

reduction in the world mortality rate that caused by COVID-19 generated an environment for the gradual restart of the world economy. So long as a new wave of COVID-19 does not dramatically rise mortality rates, the oil and maritime tanker trade market will regain the equilibrium it lost. The published prospects for the end of the year and 2021 are pessimistic which state that oil tanker rate face negative impact in late-2020 and into 2021. (Liang, 2020) shed the light on that tanker supply fundamentals can offer a positive counterbalance, however rates for oil tankers are expected to be negatively impacted later this year and into 2021.On the contrary, (Ahundjanov, Akhundjanov & Okhunjanov, 2021) conclude with that the impact of Google search activity related to COVID-19 on Brent and West Texas Intermediate crude oil prices has been estimated to be statistically insignificant. When they Investigate the effect of individuals' behavior in the state of uncertainty under a pandemic (COVID-19) on the oil and gasoline market. Empirical analysis was used using daily data between January 22, 2020 and July 2, 2020, in conjunction with a structural vector autoregressive (SVAR) model for three sets of variables: global COVID-19 reported cases, COVID-19 linked worldwide Google search queries, and oil and gasoline market prices (Brent crude oil price, West Texas Intermediate crude oil price, New York Harbor Conventional Gasoline Regular spot price, Dow Jones US Oil & Gas Total index). Although the impact of Google search activity related to COVID-19 on oil price is statistically insignificant, During the time of the pandemic has caused a rise in uncertainty, which in turn has made an unprecedented effect.

According to (Kelly &Stephanie, 2020) approximately 25% slump in oil prices caused panic selling and heavy losses on Wall Street's main stock indexes as the quick spread of coronavirus bigger fears of a global recession. several studies have explored the relation between oil market, and the stock market under the COVID-19. (Akhtaruzzaman, Boubaker, Chiah & Zhong, 2020) investigates the relationship between changes in oil price and financial and non-financial stock returns across regions around the world. The empirical results show that oil supply industries benefit from positive shocks to oil price risk in general, whereas oil user industries and financial industries react negatively to positive oil price shocks. The COVID−19 outbreak appears to moderate the oil price risk exposure of both financial and non-financial industries. This brings important implications in risk management of energy risk during the pandemic. Moreover (Zhang & Hamori, 2021) investigate the relation between the crude oil market, and the stock market under the COVID-19 pandemic in 2020 through the United States, Japan, and Germany. They analyze the return and volatility spillover using the data from 4 January, 2006 to 31 August, 2020 from the Infectious Disease Equity Market Volatility Tracker (IDEMVT), Crude Oil WTI Futures (WTI), S&P 500 Index (SP500), TOPIX Index (TOPIX), and DAX index (DAX) for America, Japan, and Germany. They use data from 4 January 2006 to compare the effect of the 2008 global financial crisis. The results show that the return spillover occurs primarily in the short term, while volatility spillover occurs primarily in the long term. Furthermore, COVID-19 has created unparalleled levels of risk, such as falling oil prices and four times triggering the US stock market circuit breaker, causing investors to lose a lot of money in a short

period of time. Moreover, COVID-19 had a greater influence on oil and stock market volatility than the global financial crisis of 2008, and it continues to have an impact. In the short and long term, the effect of the COVID-19 pandemic on financial markets is unclear.

In addition, there are a number of studies that have investigated the impact of COVID-19 on the oil market and its relationship to some other industries. For instance, (Wang, Shao & Kim, 2020) explore The effect of COVID-19 on cross-correlations between crude oil and agricultural futures markets. The daily closing prices of London Brent Oil and agricultural futures were chosen using a multifractal detrended cross-correlation analysis (MF-DCCA) approach for the period from 3 April 2017 to 3 April 2020. The results show that after the appearance of COVID-19, cross-correlations for most agricultural futures increased. and COVID-19 has a major effect on the cross-correlation of multifractal property between crude oil and most agricultural future markets in general. On the other hand, (Mhalla, 2020) attempted to assess the effect of covied-19 on the oil and aviation industries by using a qualitative approach by analysing documents. It found that covied-19 would have a significant impact on air travel and the aviation industry. As a result of the slowing demand, many airlines have reduced their flight schedules and implemented cost-cutting steps. This would have a huge effect on the global oil industry's production. This would have a huge effect on the global oil industry's production. Moreover, China is the world's largest oil importer, the closure of a portion of its economy, which has ramifications for air and road transportation as well as industrial production, decreases the need for hydrocarbons. on other hand, since oil is one of the major costs for airlines, a decrease in oil prices can be beneficial to them.

In the midst of the COVID-19 outbreak, dropping oil prices have increased the probability for adverse oil price movements in oil-derived assets. As a result, finding an alternative investment instrument to offset the risks of oil exposure is critical. To that end (Dutta, Das, Jana & Vo, 2020) empirically examines the time-varying correlations between gold and oil markets, to see whether gold is a safe haven asset for international crude oil markets. The safe haven property of Bitcoin is also checked for comparison purposes. The paper found that During the COVID-19 outbreak, gold acts as a safe haven for both WTI and Brent crude oil markets. During this time, Bitcoin, on the other hand, serves only as a diversifier. As a result, the findings of this study could aid investors in these markets in developing an effective portfolio strategy. Also, (Mensi, Sensoy & Kang, 2020) examines the effects of COVID-19 on the multifractality of gold and oil prices built on upward and downward trends. The study's exam covers the whole two-year period from April 23, 2018 to April 24, 2020, and the breakpoint is December 1, 2019, at what time COVID-19 spread in Hubei Province and then spread to 212 countries. The results present clear evidence of asymmetric multifractality that rises as the factuality scale increases. Besides, multifractality is especially higher in the downside (upside) trend for Brent oil (gold), and this additional asymmetry has been more accentuated during the COVID-19 outbreak. Before the epidemic, the gold (oil) market was more inactive during downward (upward) trends. In the COVID-19 outbreak period, it was clear that results have

changed. In indeed, it found that gold (oil) is more inefficient during upward (downward) trends. Gold and oil markets have been inefficient, exceptionally during the outbreak. The efficiency of gold and oil markets is sensitive to scales, market trends, and to the pandemic outbreak, emphasizing the investor sentiment influence. Moreover (Gharib, Mefteh-Wali & Jabeur, 2021) explores the causal relationship between crude oil and gold spot prices to evaluate how COVID-19 is affecting the price of the most important commodities; and also how gold could act as a hedge or safe haven during this time. For this purpose, the daily WTI and gold prices from January 4, 2010, to May 4, 2020 were analyse. The results show that there are common bubbles in the WTI oil and gold markets in March 2020 and April 2020 which correspond to the global COVID-19 outbreak. Policy-makers who must make decisions on financial stability initiatives will find these results instructive. Given the relations between oil prices and overall economic activity, including other commodity prices, recognizing explosive behaviour and bubbles is important.

By reviewing the Literature, that tried to explore the effect of COVID-19 on oil market, we find that the studies relied on different methods, some study used events study and found that the event related to declaring COVID-19 a pandemic had the greatest impact, while another study found that the number of reported cases had the negative impact on oil prices, and another study found that the death rate from the COVID-19 is what drives oil prices, not just infections. However, oil prices were not related to Internet searches about COVID-19. These Literature show that COVID-19 affected the economy in general and on oil prices and the oil market in particular, and this effect has extended to include Brent crude, Texas crude. Also, some studies have developed indicators that help predict potential levels of oil market fluctuations, which can help in Enhancing the design of crude oil-based portfolios.

Moreover, the impact of COVID-19 on oil prices has extended to stock markets in a number of countries, including US, Germany and Japan. This is due to increased fears of a global recession. COVID-19 has also created unparalleled levels of risk, and caused investors to lose a lot of money in a short period of time. Moreover, COVID-19 had a greater impact on oil and equity market volatility than the 2008 global financial crisis.

Studies have also shown the existence of a mutual effect between oil prices and some industries under the influence of COVID-19, as two studies clarified the mutual relationship between oil prices and the aviation industry, and between oil prices and agricultural futures contracts.

Finally, as a result of lower oil prices, studies have found that gold acts as a safe haven asset for international crude oil markets. Hence, this can assist investors in these markets in developing an effective portfolio strategy.

Results discussion.

1- World economic growth was unexpectedly hampered by the COVID-19 coronavirus pandemic. Just in one month, the world economy was frozen, industries and budgetary incomes fell to high levels, investor activities distorted, employment plunged, and so on.

2- Oil prices suffered an historic collapse. US oil prices crashed as much as 34% to a four-year low of $27.34 a barrel After Saudi Arabia shocked the market by launching a price war against onetime ally Russia.

3- The impact of COVID-19 has extended to include Brent crude, Texas crude. Crude finished with a staggering loss of nearly 26% to settle at $31.13 a barrel. Brent crude, the global benchmark, plunged 24% to close at $33.36 a barrel. Both oil contracts suffered their worst day since 199.

4- The impact of COVID-19 on oil prices has extended also to stock markets in a number of countries. This is due to increased fears of a global recession. COVID-19 had a greater influence on oil and stock market volatility than the global financial crisis of 2008

5- There is existence of a mutual effect between oil prices and some industries under the influence of COVID-19. For example, the aviation industry, and agricultural futures contracts.

6- during the COVID-19 period, there exists a significant negative relationship between gold and oil markets. So It has been found that gold acts as a safe haven asset for international crude oil markets which can help investors to develop an effective portfolio strategy.

The recommendations.

1- It is a good chance for future research to look into the precautionary processes that the markets should take to protect investor' money from any external factors that negatively affect it, such as epidemics.

2- As it has been found that gold acts as a safe haven asset for international crude oil markets, it could help investors to develop an effective portfolio strategy.

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