

The Impact of COVID-19 Pandemic on Safe Havens: Bitcoin Currency, Crude Oil and Gold Prices

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Abstract

Aim/purpose – The main purpose of the research is to examine the impact of COVID-19 pandemic on bitcoin currency, crude oil and gold prices.

Design/methodology/approach –Time series design used in research to analyze the data to answer research questions about the impact of COVID-19 pandemic on bitcoin currency, crude oil, and gold prices. Data was collected for all new cases of infection and death that occurred due to the COVID-19 and were expressed in our research through COVID-19 cases rate (CCR) and COVID-19 death rate (CDR) from the beginning of the pandemic 21-Jan-2020 according to WHO estimates until to 29-May-2020. The data stationary tested by Dicky Fuller unit root testing. In addition NLS and ARMA technique is applied.

Findings – The study found a negative effect of the Corona pandemic on gold prices, and a positive effect of the Corona pandemic on oil, in addition to a negative effect of the CDR on the bitcoin currency but positive affect by CCR.

Originality/value – Our findings will be considered with a great interest for scholars, policy makers, as well as investment professionals interested in COVID-19's financial consequences. We consider that our study plays a role in the rapid growth of work on COVID-19's financial effects; the literature also focuses on whether bitcoin, oil, and gold as safe haven investments.

Keywords : COVID-19, Safe havens, Bitcoin, Crude oil, Gold prices.

تأثير جائحة كوفيد 19 على الملاذات الآمنة: عملة البيتكوين والنفط الخام وأسعار الذهب

الملخص

ان الغرض الرئيسي من البحث هو دراسة تأثير جائحة كورونا على عملة البيتكوين والنفط الخام وأسعار الذهب. وقد تم استخدام تحليل السلاسل الزمنية في البحث لتحليل البيانات للإجابة على أسئلة البحث حول تأثير جائحة كورونا على عملة البيتكوين والنفط الخام وأسعار الذهب. تم جمع البيانات لجميع حالات العدوى والوفاة الجديدة التي حدثت بسبب كورونا وتم التعبير عنها في بحثنا من خلال معدل حالات الإصابة (CCR) ومعدل الوفيات (CDR) منذ بداية الوباء 21 يناير 2020 حسب تقديرات منظمة الصحة العالمية حتى 29 مايو 2020. تم اختبار البيانات بواسطة اختبار جذر وحدة ديكي فولر بالإضافة الى NLS و ARMA. وجدت الدراسة أثراً سلبياً لوباء كورونا على أسعار الذهب، وتأثيراً إيجابياً لوباء كورونا على النفط، بالإضافة إلى تأثير معدل الوفيات (CDR) سلبى على عملة البيتكوين ولكن تأثير إيجابي من معدل حالات الإصابة (CCR).

الكلمات المفتاحية: كوفيد 19 ، الملاذات الآمنة، عملة البيتكوين، النفط الخام ، أسعار الذهب.

1. Introduction

History has seen many epidemic diseases which have caused many deaths. First, the Black Death "The Plague Outbreak" which killed 75 to 100 million people among 1347 and 1351. Second, the hemorrhages fever that occurred in Mexico throughout 1545 to 1548. Third, the cholera outbreak among 1899 and 1923. Fourth, the AIDS virus which first emerged in Cameroon in 1908. Fifth, the Severe Acute Respiratory Syndrome (SARS), effective in Asia and Canada from 2002 to 2003, also Ebola and swine flu.

Recently, Covid-19 Coronavirus is a form of epidemic that first spread in Wuhan, Hubei Province , China in December 2019 (Ruiz Estrada et al., 2020). The outbreak of COVID-19 emerged in China, resulting in more than 3.5 million recorded cases and more than 300,000 deaths worldwide. There is no doubt that the outbreak of COVID-19 has turned within three months from a regional epidemic in China into a global pandemic, which has threatened to inflict significant harm to human health and the global economy. A coronavirus known as COVID-19 has been declared a pandemic by the World Health Organization (WHO), which has been monitoring daily COVID-19 numbers since 21 January , 2020. COVID-19 is known to induce fear and depression in community, which is nourished with new infections cases every day as well as increased death rate.

COVID-19 malignant virus causes severe harm. The serious damage affects not only multinational health care programs but the world economies as well. The outbreak has triggered further negative impacts and harm from the 2008 global financial crisis (GFC), or also from SARS-COV-2. The epidemic is impacting the global economy because it has caused the financial and energy markets to collapse. Globally, stock prices have dropped to their lowest rates since the global financial crisis of 2008 (BBC, 2020).

It is noted that the negative effect of the COVID-19 outbreak on stock markets had a greater influence than all prior epidemic disease outbreaks, including the 1918 Spanish flu (Baker et al., 2020). The pandemic outbreak of COVID-19 2020 is a worldwide indication of the instability and susceptibility of the planet to such threats. Bhuyan et al. (2010) observed in previous epidemics and diseases, such as the 2003 outbreak, that stock market returns for

countries afflicted by the disease had a substantial rise in mutual relationships and competitive opportunities compared with the pre-SARS era. In addressing both the capital markets' physically and psychologically reassessment of how global capitalism has returned to normal in the midst of the latest global crisis, our perception of the relationships between financial assets needs to be studied.

COVID-19 outbreak has affected Crude Oil and Gold prices significantly, as gold prices declined with COVID-19 outbreak, but this was followed by an increasing trend in February 2020. The theory of behavioral finance states that investment decisions are strongly influenced by Investors' feelings in such uncertain periods. Oil rates collapsed significantly in April 2020 through COVID-19 outbreak. The U.S. crude prices have plummeted to unfavorable levels, collapsing from \$18 a barrel to -\$38 for the first time in history and has left oil markets reeling. COVID-19 figures have prompted US capital markets to respond to what is occurring directly after Mr. Trump's declaration that the coronavirus is a national disaster. Furthermore, on March 9, 2020, the Kingdom of Saudi Arabia agreed to flood the world with oil and reduced foreign costs by more than 20 percent.

Gil-Alana et al. (2020) suggested the possible role of cryptocurrencies for portfolios as a diversification tool and alternatives for investing, the researcher focused on Bitcoin and Ethereum in particular. Liu (2019) noted that the portfolio's inclusion of cryptocurrency brings several benefits. The bitcoin and other conventional financial factors were checked, Bouri et al. (2017) stated that bitcoin was found to be poor as a hedge so it is mostly appropriate for purposes of diversification. Conlon and McGee (2020) noted that because of the widespread COVID-19 crisis, bitcoin was not a secure haven, nor a hedge against the severe bear market of the S & P500. The fast spreading of the COVID-19 pandemic is producing shock waves both on the financial and product markets and in the actual economy. The severity of the current economic slowdown would rely on the political reaction to the crisis over coronavirus. This paper explores how official COVID-19 numbers (new cases of infection and the death ratio) affect the US EPU. The reports suggest that the global COVID-19 figures had little significant effects on the U.S. EPU. However, these outcomes are primarily affected by the recent situation in China, which seems to be leading the war against the virus. When we analyze issues outside of China. The conscious of the positive influence of COVID-19 figures on the U.S. EPU. Therefore, they underline the rise of COVID-19 risk to the financial and actual economies as a consequence of growing economic uncertainty in the U.S. as a result of policies (Albulescu, 2020).

The emergence of the COVID-19 outbreak generated the importance of checking and defining conventional safe assets for investing such as bitcoin, crude oil and gold prices as havens from the stock market and cryptocurrency. In addition, the COVID-19 pandemic offers an opportunity to study whether the prices of bitcoin, crude oil and gold are a safe haven.

1.1 Research Problem & Question

The problem of the study lies in the lack of studies that have studied the effect of COVID-19 pandemic represented in the CCR and CDR on the most important economic indicators (bitcoin, crude oil and the price of gold). Where the period of the emergence of this pandemic affected all economic indicators significantly.

The problem of study can be illustrated by the following main and sub-questions:

1. Is the Covid-19 pandemic affect bitcoin currency?
 - A. Is CCR affect bitcoin currency?
 - B. Is CDR affect bitcoin currency?
2. Is the Covid-19 pandemic affect crude oil?
 - A. Is CCR affect crude oil?
 - B. Is CDR affect crude oil?
3. Is the Covid-19 pandemic affect gold prices?
 - A. Is CCR affect gold prices?
 - B. Is CDR affect gold prices?

1.2 Research Importance

This study derives its significance from the fact that the Covid-19 pandemic is a new disease that affected the whole world. Impact on all walks of life, including economics. And the fact that the economy is the main support for the entity of any country and the occurrence of any tremor or contraction in the economy will negatively affect the state. Covid-19 has sparked a strong reaction in the global financial markets. As it led to the collapse of some of them and a major impact on commodity prices. What increases the impact of the disease on the economy is the lack of preparedness of financial markets and countries to face this effect, in addition to the lack of strategies to combat the disease and its dimensions. Among the most important economic indicators that were affected during the spread of Covid-19 pandemic are bitcoin currency, crude oil and gold prices. This study came to know the effect of Covid-19 pandemic on these indicators. Based on the researcher's knowledge, there are not many studies researched in this field due to the novelty of the topic. Previous studies such as, Luo and Tsang (2020) attempt to explain the potential effects of Covid-19 on the economic situation. To our knowledge, this is the first study to examine the effect of the COVID-19 pandemic on the economy's most significant factors, which is the bitcoin, crude oil and gold prices for the period from January 21, 2020 according to forecasts by the WHO up to May 30, 2020 by using time series analysis. The research also specifies which one of three variables became a secure haven during an epidemic of COVID-19.

1.3 Research objective

The purpose of this research is to examine the impact of COVID-19 Pandemic on bitcoin Currency, crude oil, and gold prices. Of worldwide CCR and CDR data. The examination of Covid19 and economic indicators utilizing the ARMA model to accomplish the study aim from 21-Jan-2020 to 29-May-2020.

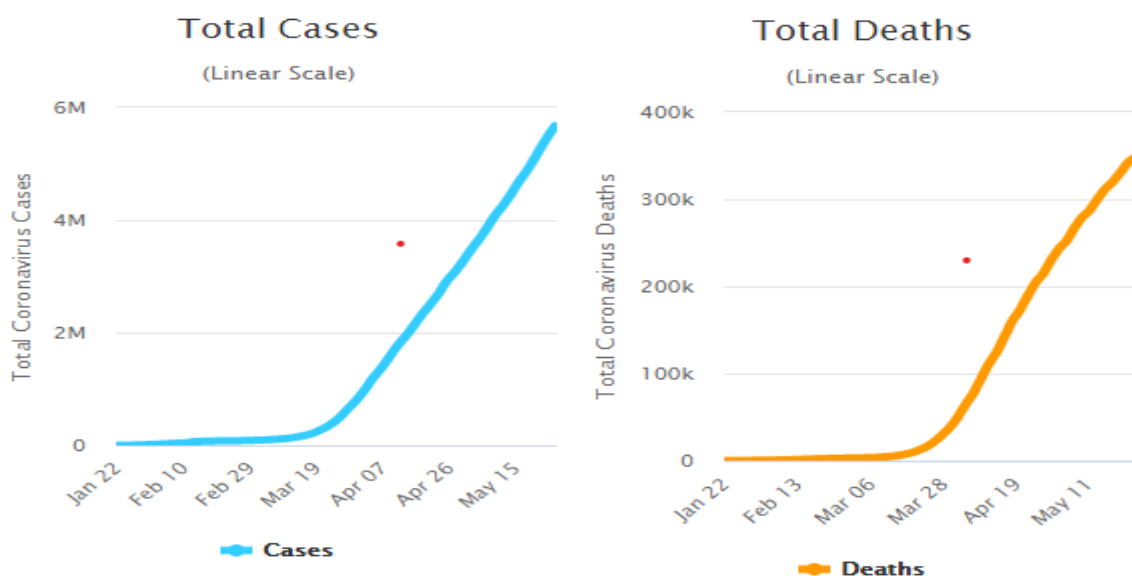
The rest of this paper is structured according to the following. Chapter 2 reviews previous literature and studies that deals with COVID-19 pandemic, bitcoin currency, crude oil and gold prices. Chapter 3 provides the research methodology used to complete this study, including research data, source of data collection, empirical models and research technique used to complete this study. Chapter 4 provides results about the impact of COVID-19 pandemic on bitcoin currency, crude oil and gold prices. Lastly, Chapter 5 concludes this study and provides some proposals for further research.

2. Literature Review

2.1 Background about COVID-19

The persistence of the COVID-19 pandemic, with the magnitude of the potential epidemic not yet known, makes us painfully conscious of the continued cost of sustaining the epidemic. The possible economic effects of this virus' epidemic and its effect on financial markets are particularly worrying (Goodell & Goutte, 2020). The COVID-19 crisis is considered as indicator of the growing global economic danger.

Figure 1 : Total cases and death



Source : worldometers.info

COVID-19 Incubation Period

The virus' incubation period (time from exposure to symptom development) is estimated to be between 2 and 14 days. In a study published by WHO, an additional period of 24 days (range: 0-24 days; average: 3.0 days) indicated that a very long incubation period could reflect a double exposure. In wahan the mean incubation time was measured at 6.4 days. The time of incubation varies from 2.1 to 11.1 days.

Therefore, the benefit of knowing the incubation time is recognizing that the incubation duration is very useful to health officials because it helps them to implement more efficient quarantine measures for individuals accused of having the virus as a means to contain and potentially avoid the virus from spreading.

Table 1: Comparison Covid19 with other viruses Incubation period

Virus	Incubation Period
(COVID-19)	2-14 or 0-24 days *
SARS	2-7 days, as long as 10 days
MERS	5 days (range: 2-14)
Swine Flu	1-4 days, as long as 7 days
Seasonal Flu	2 days (1-4 range)

Source: worldometers.info

2.2 Background about Safe Havens

During periods of political, financial and economic turmoil, investors tend to flee towards which called safe haven assets such as gold and bitcoin. Klein et al. (2018) emphasized that bitcoin has an important recognized role as an investment asset and the bitcoin currency is called the new gold. Bitcoin is introduced as secure and safe haven for traditional assets due to its independence from monetary policies, as it stores value and has relatively minimal ties to conventional assets. The optimum investment portfolio for losers indicates that a partial portfolio insurance strategy is followed by the investor refusing the loss. There is no separation between aversion to loss and risk aversion. Aversion towards loss leads to optimum portfolio selection adjustments (Berkelaar et al., 2004).

This study determine whether bitcoin and gold would still act as safe haven assets through Covid-19 period.

2.3 COVID-19 and Bitcoin Currency

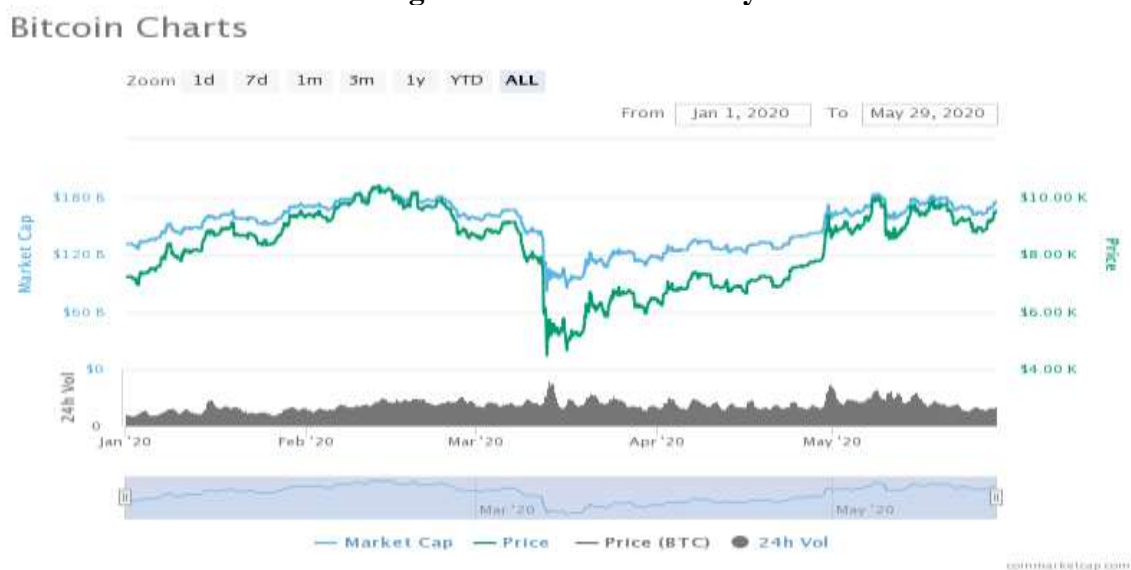
The study of Conlon & McGee (2020) presents a question about whether the Bitcoin currency under Covid-19 is considered as safe and secure haven or a risk-stricken haven and surrounded by dangers. The study aims to assess the effectiveness of safe haven assets during the period of sharp decline in the market. In particular, features of Bitcoin safe haven. As the bearish market COVID-19 shows the company's first significant declines since the beginning of active bitcoin trading. In general, the study findings doubted the capability of Bitcoin to offer insulation from perturbations in conventional markets. The study suggests that investments in Bitcoin can increase portfolio risk rather than serve as a safe haven. As a consequence, investors should not depend on bitcoin as an alternative asset which provides security from turmoil in conventional markets. The results showed that Bitcoin does not work as a safe haven and thus adding bitcoin to the portfolio increases the risks in the portfolio over the periods when investors want to recover from market turmoil. It should be noted that the two key downside risk values are measured by the relative shift in portfolio at risk value (VaR) and at risk conditionality (CVaR). Cornish-Fisher Extension is used for measuring VaR and CVaR. Using methodology by calculating the passive risk deviation and kurtosis also was often performed in a study of (Bredin et al. ,2017).

The popularity of cryptocurrencies calls for research into the properties of hedging and safe havens (Urquhart and Zhang, 2019). The study examines whether Bitcoin will serve as a hedge or a safe haven against global currencies, and analyses the connection between Bitcoin and the currencies used in the hourly level. Researchers discovered that Bitcoin may be a hedge for CHF, EUR, and GBP every day. On the other hand, for the Australian dollar, the Canadian dollar and the Japanese yen, bitcoin works as a diversion. In addition, Bitcoin is a safe haven for the Canadian dollar, Swiss franc and British pound during times of severe market turmoil. Finally, in general, for diverse currencies, bitcoin acts as a hedge, diversification and safe haven. Bitcoin has a positive correlation with falling markets (Klein et al., 2018).

The study of Goodell & Goutte (2020) used the wavelet method was used for daily data for both COVID-19 global deaths and bitcoin currency prices for the time period from December 31, 2019 to April 29, 2020. The findings showed that especially for the period post April 5, the levels of COVID-19 caused rise in Bitcoin prices. Therefore, the financial impacts of COVID-19 on Bitcoin prices for identify whether Bitcoin is a safe haven investment.

The five largest conventional cryptocurrencies by market capitalization are Bitcoin (BTC), Ethereum (ETH), Ripple (XRP), Bitcoin Cash (BCH) and Litecoins (LTC).

Figure 2 : Bitcoin Currency



2.4 COVID-19 and Crude Oil Prices

The latest coronavirus in capital markets has triggered visible shock waves, but also on energy values, including crude. Oil prices reported the hardest downturn after 1991, which at present benefited the economies of oil-importing countries badly impacted by the Covid19 crisis. Dey et al., (2020) Crude oil is one of today's most significant energy resources. Crude oil prices are a core determinant of the price of our needs and luxury items, and they play vital roles in the global economy, such as industrial growth, innovation, international development and so on. But the crude oil price isn't stable; it's very extremely unpredictable. Several external factors influence the nature of the price of crude oil. The U.S. Energy Information Administration identifies the following seven key factors affecting the price of crude oil :Oil supply from countries outside the Organization of Petroleum Exporting Countries (OPEC), OPEC production, spot rates, stock markets, supply and demand equilibrium, demand in Organization for Economic Cooperation and Development (OECD) countries, oil use in developed countries that are not part of OECD.

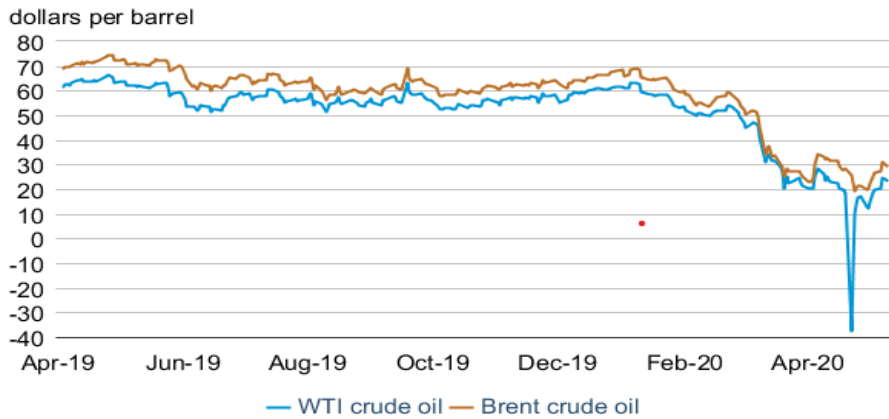
Albulescu (2020) showed that COVID-19 creates uncertainty and fear, hitting the global economy and exacerbating the volatility of financial markets. The oil price reaction to COVID-19 was gradually accommodated until March 09, 2020, when, 49 days after the World Health Organization (WHO) release of its first Covid19 monitoring report, Saudi Arabia is flooding the oil market. As a result, in one day, international prices are falling by more than 20 per cent. Against this backdrop, the aim of this paper is to analyze the effect of COVID-19 on crude oil prices, while adjusting for the effects of financial instability and economic policy uncertainty in the United States (US). The ARDL estimate showed that in the long term, the COVID-19 reported daily cases of new infections have a marginal negative impact on crude oil prices. Nonetheless, COVID-19 also has an indirect impact on the latest fluctuations of crude oil rates, by enhancing the volatility of financial markets.

Ozili (2020) This article aims at Nigeria's current economic downturn. This revealed that the Covid19 pandemic spillover into Nigeria combined with falling oil prices, which were global shocks, triggered Nigeria's economic crisis in 2020.

Shari and Yarovaya (2020) examined the relation within a time-frequency context between the recent spread of COVID-19, oil price volatility impact, the stock market, geopolitical risk and US economic policy uncertainties. The coherence wavelet approach and the Granger wavelet-based causality tests applied to recent regular data from the US show the significant effect of COVID-19 and oil price fluctuations on global risk rates, economic policy instability, and low-frequency equity market volatility. COVID19 's impact on the geopolitical instability is considerably greater than on the economic uncertainty in the US. In the short and the long term, the COVID-19 risk is interpreted differently and can be regarded as an economic downturn first. Our study offers to policymakers and asset managers several pressing prominent implications.

West Texas Intermediate (WTI) is a grade of crude oil used in oil pricing as a benchmark. It is the underlying commodity of the oil futures contracts on the New York Mercantile Exchange (NYMEX). According to CNN news, US oil rates crashed, slipping to \$-37.63 a barrel below \$0 Monday. This is the lowest point since NYMEX began trading in oil futures in 1983. The selloff can be partly due to market economics. The May futures contract for the US benchmark WTI . A futures contract for U.S. oil prices fell more than 100 percent and for the first time in history turned negative, demonstrating exactly how badly demand declined due to the coronavirus pandemic. WIT crude settle at \$37.63 per barrel negative, suggesting producers will charge traders to move off their hands on the oil. The negative price for an oil futures contract had never existed before. Futures exchange contracts through the month. The June WTI contract, which expired on May 19, dropped to settle at \$20.43 a barrel to almost 18 cents. This offer, which has been exchanged more strongly, is a clearer reflection of the oil market fact. The deal for July was nearly 11 per cent lower at \$26.18 a barrel. The international benchmark, Brent oil, which has already agreed the June deal, has settled down to \$25,57 a barrel by 8.9% according to the analysis of the cnbc.com. figure 3 shows the collapse in WTI and Brent oil prices.

Figure 3: WTI and Brent crude oil front month futures price:

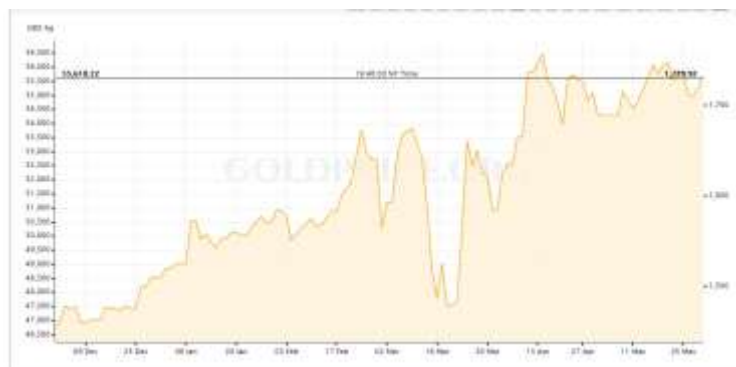


Source : U.S. Energy Information Administration (eia)

2.5 COVID-19 and Gold Prices

Over the years, gold has been an excellent hedge against inflation, because it is an significant investment. As it is considered a safe spot for buyers, gold typically increases as risk avoidance and shares are in free fall. The yellow metal price rose from Rs. 39.038 on January 01 to Rs. 44.913 per 10 gram on Marc9h 6. The yellow metal 's price was down to Rs 43228 per 10 grams on March 12. Gold safe haven property were developed in the course of the financial crises. Investors try secure haven investing like gold (Bredin et al., 2015). The study used wavelet analysis to test the gold safe haven properties for investors seeking long and short term prospects. The analysis showed that for long term prospects of year, gold acts as a shield for a number of foreign equity and bond markets. In addition, gold over a duration for long term prospects of year is a secure haven over investors in securities with long term prospects. However, it is worth noting that gold was not used as a secure haven during the economic crisis in the early of 1980s. The study of Venkatesh (2020) introduced the impact of COVID 2019 on major sectors, such as gold prices, stock markets, oil prices and economy currency in India. The researcher concluded that increasing liquidity buffers to firms in affected sectors are also needed to prevent debt default by otherwise sound firms. Reducing fixed costs and fees, as well as loan forbearance, will also help alleviate the burden on businesses experiencing an sudden market decline.

Figure 4: Gold prices



Source : Gold Price

Table 2: Covid19 and expected effects on the economic indicators

Independent variable	Dependent Variable	Expected Sign
CCR	Bitcoin currency	(-)
CDR	Bitcoin currency	(-)
CCR	Crude oil	(-)
CDR	Crude oil	(-)
CCR	Gold prices	(-)
CDR	Gold prices	(-)

Where CCR : Covid19 Cases Rate , CDR : Covid19 Death Rate

3. Research Methodology

Time series is widely used in environmental epidemiology such as determining the associations. This type of analysis has been used in previous research dealing with environmental issues such as air pollution and weather variables and linking them to the health outcomes such as death preparation, myocardial infarction or hospitalization as a result of disease. It can be said that the two variables related to exposure and outcome have data at regular time intervals such as daily pollution levels such as exposure and daily mortality calculation as a result and therefore the use of sloping time series to explore correlations between them. Based on what was mentioned previously, this study use growth of Covid-19 cases and growth on Covid-19 death as exposure and prices of Bitcoin, Oil and Gold as outcomes of exposure that resulted by Covid-19 epidemic.

Time series is a continuous sequence of observations about a population, often taken over time (usually at equal intervals). The design of time series is appropriate for this study, based on the type of data available during the time period of the Covid 19 epidemic and the nature of the study, which aims to determine the impact that Covid 19 on Bitcoin, Oil and Gold. Therefore, determining which of them is a safe haven.

Table 3: Different research on prediction of disease incidence using the time series approaches

Diseases	Approach	Researchs
SARS	ARIMA	Earnest et al., (2005)

Influenza	ARIMA	Chen et al., (2020)
Infectious Diarrhea	ARIMA/X models, RF	Fang et al., (2020)
Malaria	ARIMA	Gaudart et al., (2009)
HBV	ARIMA, GM (1,1)	Wang et al., (2018)
Hepatitis	ARIMA, GRNN	Wei et al., (2016)
Pertussis	SARIMA, NAR	Wang et al.(2018)
SFTS	ARIMA, NBM, and GAM	Sun et al., (2018)

3.1 Research Data

The research depend on the worldwide data about covid19 matrices in additional to the biticon, oil and gold prices. covid19 variables include covid19 new cases rate (CCR) and covid19 new death rate(CDR) that are calculated according growth equation. So CCR or CDR equal $(X2-X1)/X1$. As for the prices of bitcoin and gold, it was taken based on the adjusted closing price . While the research taken crude oil WTI futures prices. The daily data for the economic indicators and Covid19 were taken for five days each week as a result of holidays, during which the financial markets stop work and exchange.

3.2 Source of Data Collection

The Covid-19 data about number of cases and death required for this study were obtained from ourworldindata.org . And data about the economic indicators bitcoin currency and Gold prices collected from finance.yahoo but the data about crude oil WTI futures gathered from investing.com The sample period starts 21 January 2020 and ends 29 May 2020. The model of this study is determined by daily data to provide a accurate forecast.

3.3 Empirical Model

The impact COVID-19 pandemic (independent variable) on safe havens: bitcoin currency, crude oil and gold price (dependent variables) as the following three models that were estimated to test the questions of the research model 1 refers to Bitcoin, model 2 refers to crude oil and model 3 refers to gold.

Three models of study are:

$$\text{Model 1: } \Delta \text{Bitcoin}_t = c + \delta_{\text{CCR}} \text{COVID-19}_t + \delta_{\text{CDR}} \text{COVID-19}_t + \delta_{\text{Bitcoin}} \text{Bitcoin}_{t-1} + \sum_{i=1}^p \beta_i \Delta \text{COVID-19}_{t-i} + \sum_{i=0}^p \alpha_i \Delta \text{Bitcoin}_{t-i} + \theta \text{ECT}_{t-1} + \varepsilon_t$$

$$\text{Model 2: } \Delta \text{Oil}_t = c + \delta_{\text{CCR}} \text{COVID-19}_t + \delta_{\text{CDR}} \text{COVID-19}_t + \delta_{\text{Oil}} \text{Oil}_{t-1} + \sum_{i=1}^p \beta_i \Delta \text{COVID-19}_{t-i} + \sum_{i=1}^p \alpha_i \Delta \text{Oil}_{t-i} + \theta \text{ECT}_{t-1} + \varepsilon_t$$

$$\text{Model 3: } \Delta \text{Gold}_t = c + \delta_{\text{CCR}} \text{COVID-19}_t + \delta_{\text{CDR}} \text{COVID-19}_t + \delta_{\text{Gold}} \text{Gold}_{t-1} + \sum_{i=1}^p \beta_i \Delta \text{COVID-19}_{t-i} + \sum_{i=0}^p \alpha_i \Delta \text{Gold}_{t-i} + \theta \text{ECT}_{t-1} + \varepsilon_t$$

where:

CCR : Covid-19 Cases Rate
CDR : Covid-19 Death Rate
 Δ and δ : are short/long run terms respectively
i : represents the maximum number of lags
ECT: error correction adjustment
 θ : is speed of adjustment
 ϵ : is error

The following figures explain the study models briefly:

Where, CCR is Covid19 Cases Rate and CDR is Covid19 Death Rate.

3.4 Research technique

The variables used in the time series model are evaluated with the support of econometric software E-Views using the NLS and ARMA (Least Square Regression) technique. The results of the regression analysis are presented in chapter 4. Due to the research aim of measuring the effect of the covid19 pandemic on the currency of bitcoin, crude oil and gold prices. Among many other statistical techniques such as descriptive analysis, root unit analysis and analyze of correlations.

Empirical time series analysis allows the time series data to be stationary. The variables are tested for data stationarity using the Dicky Fuller unit root testing (ADF) before analyzing the model. However, the research considers the data to be stationary if the paramount estimate preferred 5% of the estimator for testing stationary significance in the data increased ADF critical value (Ali and Li, 2016). Stability of time series is the absence of a general trend for the phenomenon up and down in the time path of the series, as well as the absence of seasonal fluctuations, the properties of which do not change over time, which makes the data fluctuate around an arithmetic medium independent of time, so it is necessary to check the silence of the time series for each variable In the model, there are several indications that the estimation of the model is false due to the instability of time series such that the value of the determination coefficient (R2) is greater than the Durban Watson statistic (DW) i.e. (R2 > DW).

4. Results

Table 4 below is a description and a simple introduction of the variables used in this current research . In all models and tables, Covid19 is the key independent variable; Bitcoin currency, crude oil and gold price are the key dependent variable. As it's demonstrated that the mean of bitcoin currency equal 8297.806 USD and it is the highest one , where the standard deviation is 1393.491USD .while the mean of the gold price indicates 1648.724. However the mean of crude oil is 33.58\$. It is low percentage, but in otherwise minimum value of crude oil is - 37.63\$ this is the lowest price of a barrel of crude oil, which has caused economic problems and media uproar.

Table 4 : Descriptive analysis

	Bitcoin	Gold price	Crude Oil
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Mean	8297.806	1648.724	33.58500
Median	8789.077	1645.750	31.61500
Maximum	10326.05	1769.400	58.34000
Minimum	4970.788	1477.900	-37.63000
Std. Dev.	1393.491	73.89698	15.70704

Pearson correlation analysis was used for examine the degree of correlation between Covid-19 variables and the three economic indicators bitcoin currency, crude oil and gold price. Table 5 provides the correlation for the key variables have been taken. In all models , Three economic are the dependent variables and Covid-19 figures that include CCR and CDR are the independent variable.

According the table 5 which provides at first the correlation between Covid-19 and bitcoin , it suggests that there is a positive insignificant correlation between CCR and bitcoin , where the CDR correlation less than other which is 3.2% . However, the correlation between CDR and bitcoin is negative. While correlation between Covid19 and crude oil, it suggests that there is a positive significant correlation between CCR and oil which is 22.3% (where sig. equal 3% that less than 5%). However, there is positive insignificant correlation between CDR and oil which is 7.8%. On other hand the relationship between Covid19 and gold price , it suggests that there is a negative significant correlation between CCR and gold price which equal 21.2% , where the CCR more significant than CDR . However, there is a negative correlation between CDR and gold price.

Table 5 : Person Correlation

		Bitcoin Currency	Crude Oil	Gold price
CCR	Pearson Correlation	.077	.223	-.212
	Sig. (2-tailed)	.462	.032	.041
CDR	Pearson Correlation	-.032	.078	-.075

	Sig. (2-tailed)	.081	.455	.478
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Correlation is significant at level 5% (2-tailed)

As shown in table 6, Unit Root Analysis is performed for three models related to bitcoin, oil and gold. Augmented Dickey-Fuller (ADF) Test is using for examining the nature of time series, in order to avoid the negatives contained in that formula, which is not concerned with the problem of self-correlation in the extent of random error, since the residues in the simple regression model are often self-related, and to avoid this, an extensive Dicky Fuller Test (ADF) is performed for The way the test function includes a certain number of differences in the dependent variable. The table provide the t-values and probability of bitcoin, oil and gold at level and 1st differences level. In model 1 of bitcoin, the t-values at level and 1st differences level are -2.010530 and -10.49697 respectively. In model 2 of oil, the t-values at level is -2.043609 and 1st differences level is -14.49910 respectively. Moreover, in In model 3 of gold, the t-values at level and 1st differences level are -2.010530 and -8.806119 respectively. The absolute calculated value of (t) is greater than the tabular value (t*), which indicates the significance of the statistical information and the absence of the unit root, that is, the time series of the variable is stable and stationary. Time series in study is stable and integrated at first class I (1).

Table 6 : Dicky Fuller Unit Root Testing

Variables	At level		1st differences level	
	T-Values	Probability	T-Values	Probability
Bitcoin	-2.010530	0.2820	-10.49697	0.0000
Oil	-2.043609	0.2680	-14.49910	0.0001
Gold	-2.010530	0.2820	-8.806119	0.0000

Table7 showed the result of NLS and ARMA analysis that indicate overall three model isn't good whereas model 1 (Prob. F-stat. 0.711 and the value of F-stat. is about .34) The value of R2 is .7%. The Durbin-Watson value is .12 All the variables are insignificant at different level of significance .05 but CDR has a negative sign effect on bitcoin that match with expected sign. In the second model, the analysis shows that CCR has positive significant (at level .05) effect on crude oil . It is unexpected and surprisingly that increase in covid19 cases have a positive significant influence on crude oil prices.Despite the occurrence of a major collapse in the price of crude oil in the period of the most recent pandemic, the result of the test shows the effect of CCR and CDR was positive on oil which means that there are other more powerful

factors that negatively affected on the barrel of oil, leading to a collapse .It opposes a (Albulescu, 2020) study that showed that the new cases had a negative impact on crude oil. Finally, analyzes of the third model indicate the CCR has significant negative effect on the gold prices which it prob equal .05 .Also CDR has a negative sign with prices that match with current research expected sign. It explains that increased prevalence of Covid19 negatively affects the price of gold, causing its decrease. As the demand for gold decreases during this period, people resort to satisfying the basic needs of life. In addition to the commitment of most of them to the home stone and also closed the shops selling gold. As a result of the lack of demand for gold, its prices decrease.

Table 7: NLS and ARMA analysis

	V	Coeffi.	Std. Error	T-Stat	Prob.	R square	Prob (F-stat)	F-stati	Durbin Watson
Bitcoin	CCR	122.0806	151.4313	0.8061	0.4223	0.00760	0.711916	0.341096	.1248
	CDR	- 86.83161	268.2978	- 0.3236	0.7470				
Crude Oil	CCR	3.432366	1.659202	2.0686	0.0414	0.05125	0.093719	2.430833	.3624
	CDR	1.100102	2.938855	0.3743	0.7090				
Gold Price	CCR	- 15.46910	7.882716	- 1.9624	0.0528	0.04636	0.118104	2.187703	.253
	CDR	- 4.962141	13.96223	- 0.3553	0.7231				

5. Conclusion and Future Research

5 Conclusion

This study was carried out to achieve the aim of the study, which is the impact of the Covid19 pandemic on bitcoin, crude oil and the price of gold. The daily data was collected from various sources, and the Covid19 was expressed through two variables CCR and CDR. Based on the time series model, three study models were constructed. The stationarity of the data was examined through a dicky fuller unit root analysis, which resulted that the data is stationary. Then a NLS and ARMA analysis was performed, the result of analyses which showed a positive effect of CCR and a negative effect of CDR on the value of the bitcoin currency. Interpreting the movement of cryptocurrencies is a difficult process, due to the immaturity of the components of the market for these currencies, and the absence of legislation that legalize trading and prevent it in some countries. The rise in the Bitcoin currency with the increase in new cases of COVID 19 could be due to the rise of stocks and the return of liquidity to the markets as Bitcoin is a kind of safe havens, and in light of the dangerous economic situations

and crises that the world is living due to the spread of the Coronavirus, many people have turned to the cryptocurrency has contributed to its appreciation. As investors feel the risk of currencies in light of the unstable situation, so they went to cryptocurrencies like bitcoin. This result is inconsistent with study of Goodell & Goutte (2020) who showed that especially for the period post April 5, the levels of COVID-19 global deaths but not new cases caused rise in Bitcoin prices. Also, the result of the analysis showed that there is a positive effect of CDR on WTI oil and an significant positive effect of CCR on oil as well. This is a surprising result in light of the collapse of the oil price in the period of the spread of the virus. An important point must be noted here, which is related to the distinction between futures contracts and current oil prices (daily). Most oil contracts are concluded and executed in the future (three or six months) and since these contracts are concluded at prices at the level of \$ 60 a barrel and currently oil prices range at \$ 20 a barrel so people who entered into these contracts at prices at levels of \$ 60 will sell them today at a price at Negative levels \$ 40 a barrel. Moreover, perhaps the reason is due to the presence of the positive effect is that the quarantine and the interruption of work and mobility was not imposed by Trump on the individual of America, so there were no effect of cases or death on WTI oil .Whereas, according to other countries, it prohibits movement and forced its residents to adhere to the domestic quarantine, so these countries will have less demand for oil. Thus, the import of US oil will decrease. And also because of difficulties in movement and travel as well as a result of precautionary measures for countries.This is due to its low on WTI oil price due to other factors that was previously mentioned in studies such as: OPEC production, spot rates, stock markets, supply and demand equilibrium. (Dey et al., 2020) or dollar exchange , inflation and financial volatility. the study result opposes a (Albulescu, 2020) study that showed that the new cases had a negative impact on crude oil. The study also showed that there was a negative impact of the Corona pandemic on the price of gold. This result is agreed with Venkatesh (2020). This is due to the decrease in demand for gold as a result of people fulfilling basic needs in light of the spread of the covid19 pandemic.

Future research

As a result of the novelty of Covid19 topic and because there are not many studies so far related to the effect of Covid19 covering all different topics, the study recommends conducting many future researches :

1. The effect of the Covid19 pandemic on various economic indicators such as: dollar exchange, euro exchange, silver prices, stock prices, financial markets.
2. The impact of the Covid19 pandemic on various aspects of life, such as: tourism, sports and communications.
3. Covid19 impact on energy, such as: fuel, gas, oil.
4. Covid19 impact on job loss and unemployment.
5. The effect of the Covid pandemic on the prices of basic goods such as wheat and coffee.

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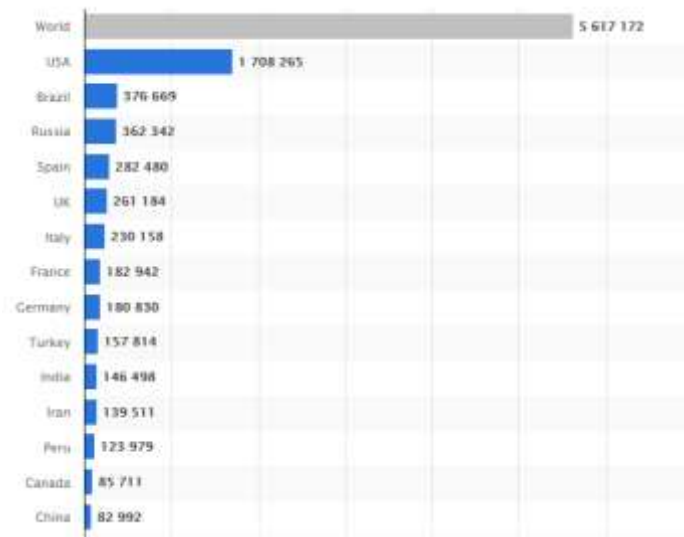
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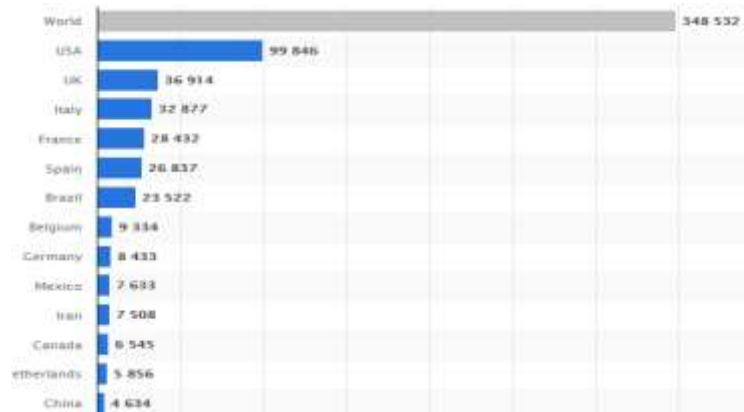
Appendix 1 : Countries cases distribution

Figure 5 :Number of coronavirus (COVID-19) cases worldwide as of May, 2020, by country



Source : statista.com

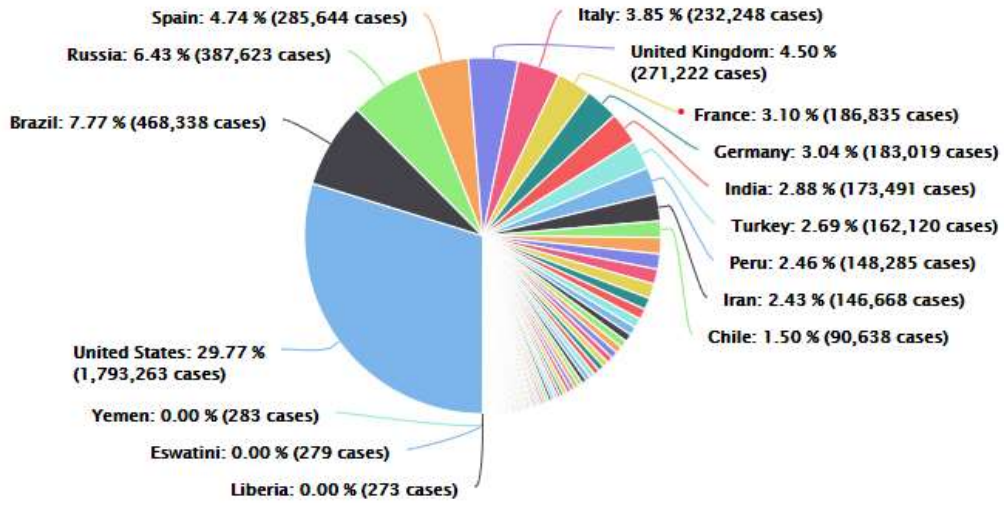
Figure 6 : Number of novel coronavirus (COVID-19) deaths worldwide as of May, 2020, by country



Source : statista.com

Figure 7 : Distribution of cases by country

Distribution of cases



Source : Worldometer

Figure 11 : Daily new cases



Source : worldometers.info