COVID 19's impact on crude oil and natural gas S&P GS Indexes

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Abstract

On 12 March 2020, the sharp fell of U.S. crude oil price to 30 dollars was explained by the outspreads of coronavirus pandemic and the OPEC's inability to reach a production quota agreement. We employ the structural VAR model with time-varying coefficients and stochastic volatility (TVP-SVAR model) developed by Primiceri (2005) to asses the impact of COVID-19 shocks on the energy futures markets, particularly on crude oil and natural gas S&P GS Indexes. The findings confirm that energy commodities S&P GS Indexes respond to COVID-19 shock that varying over time due to fundamentals factors as well as behavioral and psychological factors.

keywords: COVID-19, oil price war, health crisis, drop oil price, S&P GS commodities Indexes, TVP-SVAR model, crude oil, natural gas.
JEL Classification:

1 Introduction

For a long time, oil has been considered the engine of the world's economy. Crude oil so-called "black gold" is considered one of the world's most precious commodities that affect the global economy as well as world trade. Indeed, the sudden price drops or unexpected can send the global world into uncertainty and fears. Crude oil prices are subject to booms and busts and it depends on the economic conjuncture, business cycle, and crisis. Previously, supply shortages triggering by political events have caused change dramatically in oil prices, such as the Iranian revolution, Iran-Iraq war, Arab oil embargo, and Gulf wars. Besides, the Asian financial crisis and the global economic crisis of 2008 have been generating also price fluctuations (Baumeister and Kilian (2015)).

In 2014, after reaching monthly peaks of $112, crude oil prices fell sharply following a production that exceeded demand (Baumeister and Kilian (2016)). Currently, we are facing the biggest oil price drop since the Gulf War in 1991 ((OPEC, 2020a)). This is illustrated by the dramatically falling since Mars 12, 2020 in reaction to the coronavirus pandemic that led an unexpectedly sharp drop in demand for oil (OPEC (2020a)). The current drop in oil demand is essentially caused by the quarantine of countries particularly restriction and containment measure that causes a drop in consumption. Besides, an oil price war went off following a spat about oil production between Russia and the Saudi-led Organization of Petroleum Exporting Countries (OPEC). OPEC wanted to slash production to match a drop off in demand and the global economic turndown, while Russia was not cooperative (OPEC (2020b)).

It seems that Russia, by refusing to reduce production quotas, undermine the extraction of shale oil in the United States. According to Rosneft, which is a Russian state-owned company specializing in the extraction, processing, and distribution of petroleum, if Russia had accepted a drop in oil production to maintain the price, American shale oil would have found takers on the world energy market, which would not have been favorable for the flow of Russian oil. However, Saudi Arabia and Russia failed to reach an agreement on production cuts that exacerbate the crisis (OPEC (2020b)). As a result, the price of U.S. crude oil was fluctuating just around $30 per barrel. As we can see, the crude oil prices can vary greatly from $150 per barrel in 2014 to $30 in 2020 (Alkhathlan et al. (2014)).

It turns out that crude oil prices react to many variables, including, the current health crisis caused by coronavirus outspread, economic news, overall supplies, consumer demand, and speculators and hedgers behavior. Besides, OPEC as an international oil-producing cartel plays a considerable role in determining global oil supplies that influence oil prices (Kaufmann et al. (2008); Kaufmann et al. (2004)). The oil supply is also determined by the new technology that allows extracting oil from the rock so-called shale oil his allowed the USA to become the world's largest producer of oil in 2018 and a major source of global oil supplies (Frondel and Horvath (2019)).

Presumably, oil demand fell sharply as a result of the global COVID-19 pandemic (OPEC (2020b)). In December 2019, a virus designed as a severe acute respiratory syndrome (SARS) has spread in Wuhan, a Chinese city. The first contaminated case was a 55-year-old patient reported on November 17, 2019. The cases infected has increased to twenty-seven, on December 15 and reached to sixty in five days. It has been identified as a viral zoonotic disease later named the coronavirus (COVID-19) that was spread rapidly in China and was declared, on 30 January 2020, as being a public health emergency of international concern that causing 811 deaths within 3373 confirmed cases, on 8 February 2019 (WHO (2020)).

Too soon, the World Health Organization (WHO (2020)) announced that the disease can be transmitted between humans by droplets ejected, direct contacts or via contaminated objects and an early detection process must be put in place to avoid the spread of this virus with exponential growth. Unfortunately, the coronavirus has, speedily, emerged as an alarming contagious disease increasing dramatically the number of death that requires a rigorous containment measure around the world. On 11 March 2020, the epidemic was qualified as a pandemic by the WHO (2020). The COVID-19 pandemic has spread rapidly to many other countries and territories, causing border closures, a sudden slowdown in the global economy and a stock market crash on March 12, 2020, due to the failure of negotiations of OPEC to reach a production quotas agreement.

Although, there is a vast oil market literature (Frondel and Horvath (2019); Chuliá et al. (2019); Charlier and Kahouli (2019); Cleveland and Kaufmann (2003); Baumeister and Kilian (2016); Kilian (2017)), the health crisis only recently has become a topic of interest, and the economic impact of the COVID-19 on oil price is not widely analyzed yet. To fill this gap in literature this study performs the TVP-SVAR model to asses the COVID-19 chocks on the energy market. The reason we choose the energy market, particularly crude oil and natural gas, is due to the following considerations. Commodity markets are closely related to economic conjuncture, in contrast to financial assets. They play a considerable role in related risk-sharing. As a result, energy commodities, particularly crude oil and natural gas have become an asset class, which is widely used for diversification, hedging or speculation prospects (De Roon et al. (2000); Gorton and Rouwenhorst (2006); Jin and Jorion (2006)). So, investors, speculators, hedgers, and policymakers consider commodity markets as an alternative investment instrument for hedging against the equity market risk (Gatfaoui (2019)).

The remainder of this paper is organized as follows. Section 2 provides a related literature review. Section 3 introduces the methodology, data, and the model investigating the effect of coronavirus on crude oil and natural gas price. In Section 5, we discuss the estimation results and we draws the main conclusions.

2 Related literature

2.1 The coronavirus's impact on world economy

The outbreak of coronavirus has disrupted china's economy ensuring uncertainties that slowed world trade. China's demand for raw materials has declined which penalized the commodity-exporting countries such as Saudi Arabia, Russia, and Australia. The shutdown of many Chinese companies has resulted in a shortage of spare parts in other countries' industries, such as the Hyundai company that has shut down factories in South Korea due to a lack of supplies. Pharmaceutical and manufactured supply shortages get worse due to the disruption of Chinese factories. In some affected countries such as Italy and Hong Kong, the pandemic has generated panic purchases and food shortages OPEC (2020b).

Besides, the impact on tourism and airlines has worsened so Thai tourism will be affected by the number of Chinese tourists that could drop by 20% in 2020. According to the OECD (2020), global growth could drop at 2.4% this year, compared to 2.9% expected and the central banks could drop key rates to revive the economy by adopting expansionary monetary policy as did by several central banks in several countries. Several studies have highlighted the impact of economic activity on the oil price. Baumeister and Kilian (2016) shows that a slowing on the global economy has reduced the Brent price per barrel by $49 between June and December 2014. Kilian (2017) explained this decline by a weakening of the demand for crude oil.Yardimcioglu and Gülmez (2013) shows that there is a strong cointegration relationship between oil prices and economic growth in the 10 OPEC countries over the period from 1970 to 2011 and he confirms the impact of Dutch Disease on price oil fluctuations. Several empirical studies have been focused on understanding the macroeconomic consequences of oil price shocks on the US economy. Ghalayini (2011) investigates whether economic world growth can be explained by changes in the oil price. For the oil-importing countries, oil price increase and economic growth are negatively correlated while the relationship is positively correlated for oil-exporting countries. This study covered the G-7 group, OPEC countries in addition to Russia, China and India.

Recently many studies investigated COVID-19's impact on global economic activity. Yilmazkuday (2020),by using daily data on the global coronavirus disease 2019 (COVID-19) deaths, shows that the effect of COVID-19 deaths is insignificant, and explained the plunge of oil price on March 2020 by the OPEC disagreement. In the same line of work, Maijama'a et al. (2020) investigates the impact of coronavirus outbreak on the global energy demand by using daily data on china's population, currency Chinese exchange rate and international crude oil prices, from 23rd January to 8th February 2020. The result revealed that the total population has a positive and significant impact on total coronavirus infected cases while the crude oil price is negative and significantly related to the coronavirus infected cases.

2.2 Determinants of oil price fluctuation

The fundamental driver of oil's price is supply and demand in the market. So, oil supply is controlled by a cartel of oil-producing countries called OPEC (Alkhathlan et al. (2014)) and Oil demand is driven by production and transport activity such as electricity, gasoline, and kerosene. A large literature on the economic determinants of oil price fluctuations has emerged. Initially, oil price fluctuations were explained by the disruptions of global oil production associated with political events such as wars and revolutions in OPEC countries (Hamilton (2003)). Subsequent research has shown that oil price fluctuations since 1973 are explained by shifts in the crude oil demand (Kilian (2008); Kilian (2017); Gong and Lin (2018); Kilian (2014); Baumeister and Kilian (2015); Kilian and Hicks (2013); Kilian and Lee (2014)).

According to Hamilton (2003), the oil price shock of 1973-74 has been explained by the lack of supply that led to the rise of its price. Hamilton (2003) attributes the Arab oil production cuts to the Arab oil embargo against selected Western countries, which lasted from October 1973 to March 1974. This crisis was followed by a second oil crisis in 1979-80, when the West Texas Intermediate price rose from less than $15 in September 1978 to almost $40 in April 1980. Hamilton (2003) explained this oil price surge by the reduction in Iranian oil production following the Iranian Revolution.The price rise was, also, explained by an increased inventory demand in anticipation of oil future shortages and high future oil demand from a booming global economy.

From 1980 until 1990, Hamilton (2003) attributes the increase in the West Texas Intermediate price of oil from $36 in September to $38 in January 1981 to an oil supply disruption following the outbreak of the Iran-Iraq war causing the destruction of Iranian oil facilities. However, the rise of the U.S. interest rates and the global recession that emerged lowered the oil demand and hence its prices. Hence, this economic conjuncture caused a sell-off of the oil inventories accumulated in 1979. The most surge of the oil price since 1979 has occurred between mid-2003 and mid 2008, the West Texas Intermediate price climbed from $28 to $134. The price surge was caused by an increase in crude oil demand. Kilian (2008), Hamilton (2009), and Kilian and Hicks (2013) have shown that this dramatic increase in demand was explained by an unexpected expansion of the global economy driven by a strong rise in oil demand from Asiatic emerging countries. This surge in oil prices in the physical market can be explained as the result of speculator behavior in the future market. Recently the financial crisis of 2008 illustrates the powerful effects of a sharp drop in commodities demand worldwide that was sharply curtailed in the second half of 2008 as crude oil that plummeted, causing a fall in the price of oil from $134 in June 2008 to $39 in February 2009.

Currently, as a result of the COVID-19 pandemic, global industrial production is reduced causing lower oil consumption that decreases the barrel price. As announced, on February 15, 2020, by the International Energy Agency (IEA (2020)), global demand could decrease by 425,000 barrels per day following a dramatic drop in Chinese consumption. Global oil demand drop compared to 2019: China, which consumes about 14% of world oil production and air carriers, which consume 8% of world demand, have greatly reduced their activities. As a consequence, OPEC decides to regulate the supply of oil to set the price on the world market while other oil-producing countries, such as Russia, have braked OPEC's ability to control supply.

The OPEC decision consists of reducing their production by 1.5 million barrels per day during the second quarter of the year by negotiating with Russia as well as other producer countries. On March 6, 2020, Russia refused to collaborate causing the fell by 10% of the price of oil. Hence, Saudi Arabia cuts the price of its oil and decides to increase its production, to force Russia to return to negotiating with them (OPEC (2020a)). Previous studies have focused on OPEC behavior. Kaufmann (1995), Frondel and Horvath (2019), Kaufmann et al. (2004), and Dees et al. (2007) have investigated OPEC's influence on oil prices over the medium- and long-run.They found that the key decision variables are the OPEC production quota and the OPEC ability to add production capacity. Dees et al. (2007) emphasizes that if the OPEC cartel fails to cooperate, it results in a sharp drop in the crude oil price, as the competition among OPEC countries leads to supply quantities that surpass demand which will be stored.

2.3 Oil Prices and future market

As a component of derivative markets, futures markets are hedging markets allowing economic agents to protect themselves against price risk. In recent years, traders have significantly increased their investment in the commodities futures market that has led to a significant development of speculation in these markets. Several researchers have studied the importance of commodity speculation and have analyzed the bidirectional relationship between spot prices and futures prices, (Buchanan et al. (2001); Sanders et al. (2004); Bu (2011)). On the one hand, the assessment of future contracts is done by using the cost-of carry model, which requires that the futures price should depend on spot price and the cost of carrying or storing goods (Nicolau et al. (2013)).On the other hand, transaction and speculation in the futures market could affect oil spot prices (Kaufmann (2011); Wen et al. (2019)).They assume that oil price fluctuations are not only correlated to the real fundamentals of the economy but also follow speculative logic. According to behaviour theory, it turns out that investors' sentiment can influence oil prices. Thus, when they anticipate a decrease in oil demand in the future, investors made short selling oil futures contracts that leads to a dramatic drop in prices, this is meaning that prices can depend on market psychology (Kaufmann and Ullman (2009)). The behavioural finance theory emphasize the importance of psychology in the evolution of commodity market prices (Deaton and Laroque (1992); Deaton and Laroque (1996); Chambers and Bailey (1996); Shiller (2003)).

Other researches suggest that the futures market movements involve relevant information on commodity spot price evolution. They are based on the fact that fluctuations of the oil prices are difficult to predict and extremely uncertain that's why economic agents use the crude oil price of the futures markets as a measure to predict future spot prices. In other words, oil futures prices are used to determine oil price expectationsBaumeister and Kilian (2016). This relationship between spot prices and futures prices is based on the wisdom of the participants in the financial market, which are considered as the best-informed agent about the financial and economic environment of oil price determinants.

Therefore, it is interesting to study the dynamics of futures prices during this health crisis and to assess the investor's behavior in the face of this unpredictable crisis. This paper discusses whether the health crisis of COVID-19 could affect crude oil and natural gas in futures markets.

3 Methodology

Due to the rapid and unpredictable development of this health phenomenon, there have been structural changes in the commodity market, which will cause changes in investor behavior on oil prices at different times. For that reason, it is interesting to examine the time-varying effects of COVID-19 on commodity indices. Therefore, we opt for a Structural VAR model with time-varying coefficients and stochastic volatility (TVP-SVAR model) developed by Primiceri (2005). This model was recently adopted by Gong and Lin (2018) and Wen et al. (2019) to examine macroeconomic and financial determinants of oil price fluctuations. This model allows us to measure variables' responses to structural shocks and capture their changes over time.

3.1 The model

In order to asses the impact of Covid-19 chocks on the energy market, we use a Structrual VAR model with time varying coefficients and stochastic volatility (TVP-SVAR model) as presented by Primiceri (2005). The model can be expressed as follows:

$$Y_t = c_t + b_{1,t}Y_{t-1} + +b_{p,t}Y_{t-p} + u_t \tag{1}$$

Where Y_t is a vector composed of two dependent variables, namely: the SP Goldman Sachs indices of Crude Brent and Natural Gas and a shock variable related to covid-19. c_t is $n \times 1$ vector of the time variable constant , $b_{p,t}$ is

$n \times n$ matrix of coefficients varying over time and u_t is $n \times 1$ vector of structural innovations which are normally distributed.

The covariance variance matrix of the residues u_t ,which is varying over time, is expressed as follows:

$$VARu_t = \Omega_t = A_t^{-1} H_t (A_t^{-1})^{'} \tag{2}$$

$$H_t = \Sigma_t \Sigma_t^{'} \tag{3}$$

$$\Sigma_t = \begin{pmatrix} \sigma_{1,t} & 0 & .... & 0 \\ 0 & \sigma_{2,t} & \ddots & \vdots \\ \vdots & \ddots & \ddots & 0 \\ 0 & ... & 0 & \sigma_{n,t} \end{pmatrix} \tag{4}$$

$$A_t = \begin{pmatrix} 1 & 0 & .... & 0 \\ a_{21,t} & 1 & \ddots & \vdots \\ \vdots & \ddots & \ddots & 0 \\ a_{n1,t} & ... & a_{nn-1,t} & 1 \end{pmatrix} \tag{5}$$

The TVP-SVAR model can be summarized as follows:

$$y_t = X_t^{'} C_t + A_t^{-1} \Sigma_t \varepsilon_t \tag{6}$$

Where :

$$X_t = I \otimes [1, y_{t-1}^{'}, ..., y_{t-l}^{'}] \tag{7}$$

$$C_t = vec([c_t, b_{1,t}, ..., b_{p,t}]) \tag{8}$$

and

$$VAR(\varepsilon_t) = I_n \tag{9}$$

This model supposes the variation of the matrix A_t. This econometric specification allows a structural shock to generate effects varying overtime on the variables studied and thus to capture the change in the relationships between the variables over time. In order to obtain the impulse response functions and stochastic volatility, we estimate our model according to the method of Primiceri (2005).

3.2 Estimation

In order to obtain the impulse response functions and stochastic volatility, we estimate our model according to the method of Primiceri (2005). His method consists of estimating the covariance variance matrix Ω_t which is varying over time in three blocks. The first block consists of the vector of the coefficients $C_t = [c_t, b_{1,t}, ..., b_{p,t}]^{'}$ the second block consists of the non-zero and non-unitary elements of the matrix A_t namelyk_t where $k_t = (a_{21,t}, \ldots, a_{n1,t}, \ldots a_{n1,t})$ and the third block h_t includes the standard deviations $\sigma_{1,t}; \sigma_{2,t}; \ldots \sigma_{n,t}$ which are located on the diagonal of the matrix Σ_t with $h_t = ln(\sigma_t)$ is the stochastic volatility of innovations. This process can replace the ARCH specification. Primiceri (2005) In addition, the coefficients of the model follow an autoregressive random walk as follows:

$$C_t = C_{t-1} + \omega_t \tag{10}$$

Similarly, the non-zero and non-unitary elements of the matrix A_t follow an autoregressive random process:

$$k_t = k_{t-1} + \varphi_t \tag{11}$$

While the block representing volatility follows a geometric random walk:

$$h_t = ln\sigma_t = ln\sigma_{t-1} + \epsilon_t \tag{12}$$

$$h_t = h_{t-1} + \epsilon_t \tag{13}$$

We assume that the residual vectors follow the normal distribution as follows:

$$\begin{pmatrix} \epsilon_t \\ \omega_t \\ \varphi_t \\ \varepsilon_t \end{pmatrix} \sim \mathcal{N}(0, V) \tag{14}$$

$$V_t = \begin{pmatrix} I_n & 0 & 0 & 0 \\ 0 & Q & 0 & 0 \\ 0 & 0 & S & 0 \\ 0 & 0 & 0 & W \end{pmatrix} \tag{15}$$

It is the identity matrix of dimension n. Q, S, W are matrices that represent the hyper-parameters. According to Primiceri (2005) the most suitable method for estimating these parameters is the Bayesian simulation method. Following the work of Primiceri (2005) and Korobilis (2009), we use the Gibbs sampler to estimate the parameters in question. It is a Bayesian estimation method based on the Markov chain Monte Carlo simulation method (MCMC). This technique allows the determination of the posterior distribution of the parameters and hyper-parameters.

3.3 Priors

The estimation by the TVP-SVAR model requires the fixing of several hypotheses beforehand. We follow the choices adopted by Primiceri, (2005) to establish these hypotheses. We assume, first of all, that the coefficients, the parameters as well as the hyper-parameters are independent. The first 30 observations represent the training sample from which we can extract prior distributions. Based on the work of Primiceri, (2005) the coefficient matrix is normally distributed, the average is obtained by the OLS ordinary least squares method from the pre-sample.

$$C_0 \sim \mathcal{N}(\widehat{C_{OLS}}, 4.V(\widehat{C_{OLS}}) \tag{16}$$

The previous distribution of the standard deviation as well as the lower elements of the covariance variance matrix A_t also follow the normal distribution with an average estimated by the OLS ordinary least squares method:

$$ln_{\sigma_0} \sim \mathcal{N}(\widehat{\sigma_{OLS}}, I_n) \tag{17}$$

$$A_0 \sim \mathcal{N}(\widehat{A_{OLS}}, 4.V(\widehat{A_{OLS}}) \tag{18}$$

Q, W and S are assumed to be distributed according to the inverse Wishart distribution expressed as follows:

$$Q \sim \mathcal{IW}(k_Q^2.30.V(\widehat{C_{OLS}}, 30) \tag{19}$$

The value 30 corresponds to the size of the pre-sample.

$$W \sim \mathcal{IW}(k_w^2.4.I_n, 4) \tag{20}$$

$$S_1 \sim \mathcal{IW}(k_S^2.2.V(\widehat{A_{1OLS}}, 2) \tag{21}$$

$$S_2 \sim \mathcal{IW}(k_S^2.3.V(\widehat{A_{2OLS}}, 3) \tag{22}$$

S_1 and S_2 are two blocks that constitute S and A_1 , A_2 two blocks of A. $k_Q^2 = 0,01$, $k_W^2 = 0,01$ and $k2_S = 0,1$. This model provides flexible estimate of the mechanism for transmitting structural shocks.

4 Data and Results

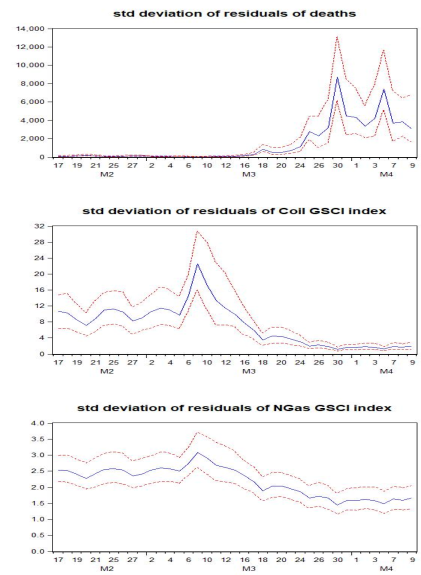
4.1 Data

The aim of this paper is to analyze the impact of COVID 19 shocks on the energy market. We use the number of deaths to measure the evolution of COVID 19 and S& P Goldman Saches indices. According to the Commodity Future Trading Commission (CFTC), the value of the Goldman Sachs indices increases with the futures prices of the selected contracts and vice versa. We use daily data from January 2, 2020, to April 9, 2020. The objective is to study the impact of a COVID 19 shock on the oil and natural gas futures indices, distinguishing 3 periods: (i)the first period, from February 22 to March 10, is before WHO (2020) announces a global pandemic, (ii)the second period from March,10 to March 20: during this period the WHO (2020) announces a global pandemic and (iii) the third period from 20 March to April, 9: this period is characterized by a high spread of the Virus in the USA. All variables are studied in the first difference.

4.2 Results

4.2.1 Stochastic volatility

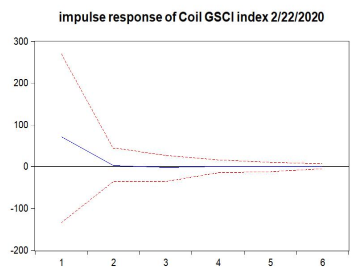
Figure 1 shows the stochastic volatility of the three studied variables: deaths from COVID-19, S&P GSCI Crude Oil and S&P GSCI. We can observe the

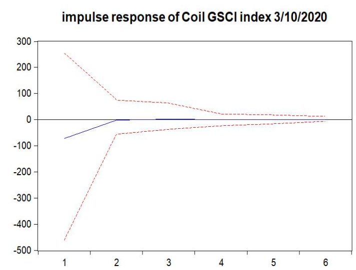


high volatility of the number of deaths between March, 12 and April, 9. This period is characterized by a very rapid worldwide spread of the virus accompanied by a significant increase in the number of deaths especially in Italy, France, Spain, and the USA. The volatility curve of the Goldman Sachs crude oil index shows high volatility during February to attend a peak during 6 March and 10 March. This period precedes the announcement of the World Health Organisation (WHO) that qualifies the virus as a global pandemic on 11 Mars, 2020. Investors changed their investment strategy during the first period of the coronavirus spread when the oil spot price registered the first drops leading to high volatility in the future commodity market. We can notice a peak in volatility during the same period for the natural gas future index. However, the stochastic volatility of natural gas remains moderate compared to the other two series. Our results are consistent with the theory of expectations in the futures market which suggests that speculators considered as economic agents who are able to predict future price trends (Kaldor (1987)).

4.2.2 Impulse responses

The charts show that the Goldman Sachs indices for the two commodities react during the first two days after the shock. During the first period namely before WHO announces a global pandemic, we observe an insignificant decrease in the oil index and a significant decrease of only 5 units in a natural gas index. In the Second period which is featured by a stock market crash due to COVID-19, we notice a slight increase in the two commodities indices. This result could be explained as follows: during periods of the financial crisis when stock


impulse response of Coil GSCI index 2/22/2020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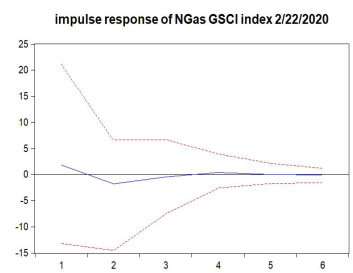
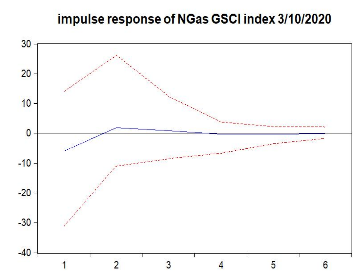
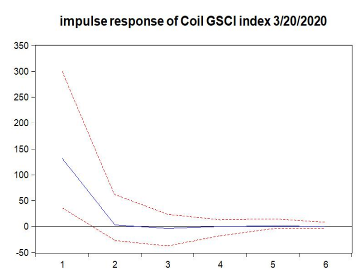

impulse response of NGas GSCI index 2/22/2020


impulse response of NGas GSCI index 3/10/2020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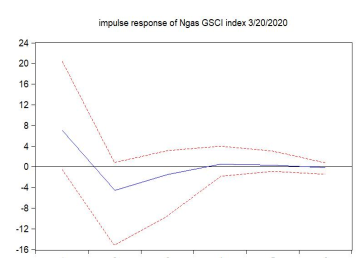
impulse response of Ngas GSCI index 3/20/2020

market prices , speculators move their investments from the equity market to the commodity market. Indeed, investors tend to move towards the commodity futures market since it is considered as a less risky market with higher expected profitability compared to the equity market. In the third period, the figure shows a significant decrease of two indices, especially, the oil index which registered a decline of about 150 units. This result is mostly linked to the spread of the virus in the USA. During this health crisis, the USA suffers from a high decrease in dollars' exchange rates and an economic recession. Commodity futures indices are not only linked to the imbalance between supply and demand of oil but also the exchange rate of the dollar, the state of the global economic system and equity market.

5 Conclusion

Using a TVP- SVAR with a stochastic volatility model, we investigate the impact of COVID-19 on the commodity futures market. First, we show the importance of investors expectations in future commodity price dynamics. Speculators in the futures markets anticipate price movements which caused high stochastic volatility during the period that precedes the huge increase in the number of deaths. Then, we show that commodity responses to COVID-19 shock varied from one period to another. The determinants likely to explain the dynamics of the SP GSCI Crude oil index and SP GSCI natural gas index face the COVID-19 include fundamental factors as well as financial factors. In fact, the fall in oil futures prices is partly due to a structural imbalance between supply and demand, particularly a strong decreasing of energy demand following the COVID 19 in large emerging countries such as China and an oil shock caused by disagreements between the Organization of the Petroleum Exporting Countries (OPEC) and Russia, triggering the drop in oil spot prices. In addition,the spread of the virus in the USA impacted negatively the commodity futures market. On the other side, based on behavioral finance theorist, the commodity indices fluctuations are linked to the investors' expectations. In fact, during the crisis , speculators operating on a purely financial logic, turned to the commodity markets to increase their returns which lead to a slight increase in commodity futures index during stock market crash. The short-term outlook for the commodity futures market will depend on the efficiency of government policy to contain the COVID-19 outbreak, and to weaken the impact of the global health crisis has on economic activity.

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