



# World Oil Crisis and its Impacts on the Petroleum Market and the Economy of Vietnam

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## ABSTRACT

On April 21<sup>st</sup> 2020, for the 1<sup>st</sup> time in the world's history, the price of oil contracts for May delivery in the US dropped sharply to below 0 USD and stopped at a negative price as of 37.63 USD/barrel. The world oil market really fell into crisis, which had a significant impact on the oil industry of Vietnam. This article focuses on analyzing and clarifying the essence of “negative oil price” as well as the world oil market crisis and its impacts on the petroleum market in Vietnam. The findings indicate that the negative oil price was simply the result of a trading session in futures market, but its nature was the interaction between oil futures market and the physical market characterized by the disequilibrium in short-term. A scenario of low oil price dynamics is analyzed and predicted for the coming time. Thereby, the paper provides recommendations to the oil industry and macro governance of Vietnam in order to appropriate countermeasures in this difficult period.

**Keyword:** Oil Price, International Oil Market Dynamics, Vietnam's Oil Industry and Economy

**JEL Classifications:** D4, Q31, Q41, Q43, Q48

## 1. INTRODUCTION

Fluctuations of international oil price always attract a special interest from scientists as well as policy makers. In 2019, oil prices edged a little lower, with dated Brent averaging \$64.21/bbl compared with \$71.31/bbl in 2018. For that, in early 2020, oil transactions around \$65/bbl forecasted a promising year for the world oil industry. However, competitive strategies of important actors in the international oil market and especially the reduction in global oil demand due to negative effects of the Covid-19 pandemic has made the oil price back to “the price war,” and even oil transactions in the futures market has also created a milestone in the global oil scene: a negative oil price.

On the basis of the theory of fundamental economics, the characteristics of oil futures markets and the interaction between the global oil market and the domestic ones, this paper aims to analyze and clarify the essence of “negative oil price” as well as to evaluate

global oil market shock and determine its impacts on the petroleum market in Vietnam as crude oil plays an important role in the economic development of emerging market like Vietnam. From that, the last part of this paper gives conclusions and recommendations for the Vietnam's oil industry and macro-policy of government, thereby carrying out appropriate policies during this difficult period.

## 2. LITERATURE REVIEW

Crude oil has been established as one of the important commodities in the world and crude oil prices, like many other commodity prices, have not only been volatile but have also been characterized by unprecedented severity and frequency according to Bui (2018) and Mehrara and Oskoui (2007). In fact, the research papers written by Regnier (2007) and Frankel (2010) have shown that oil price swings have been larger than those of other mineral resources, their dynamics especially in the short-term is an outcome of exogenous shocks.

Historically, there were “producer prices, set unilaterally by a group of major actors on the petroleum scene. This “producer’s role fell first to “Seven Sisters,” which set posted prices between 1928 and 1973, and then to OPEC, which imposed official prices from 1973 to 1986. From 1986 till now, we can observe the cyclic dynamic of crude oil prices in the long term (see for example Plourde and Watkins (1998), Bui (2015), and Cosnard (2018)) but the sharp volatilities of these prices in the short-term. It has left many observers perplexed as to the underlying mechanisms involved (Loungani, 1986). In other words, the factors that explain short-term oil price fluctuations are very different from those determining the dynamics of oil prices in mid-term and long-term. In fact, the explanation for this increased variance is not so much that the determinants of oil price have changed, but that conditions which feed into these mechanisms are now different because the world oil market is a very different thing today from what it was in just the decades ago. In our opinion, three essential parameters reflect the evolution of the petroleum sector.

The first parameter is the composition of the energy balance. At the time of the first oil crisis in 1973, oil occupied about 60% of the world energy balance, coal took 20%, natural gas accounted for 10% and the remaining 10% were divided between nuclear power, hydroelectricity and the rest. Today, according to the data of B.P Statistical Review, oil occupies 33% of the total with 24% of natural gas, 27% of coal and 15% of the rest (Table 1). The obvious conclusion from reading these figures is that even if oil remains the main source of world energy balance, and its consumption at the world level has increased continually in absolute value, its share between 1973 and 2019 found almost divided by 2.

The second parameter is the reserves/production ratio (R/P): if we take the same reference period of 1973-2019, we will see that the R/P ratio in 1973 was 31 years (that means at the time, the proved reserves were sufficient for 31 years of production at the same level as 1973), but this ratio was 42 years in 2007 and today it is 49.9 years, which, all other things being equal, means an improvement and not a deterioration of oil reserves (Table 2). According to Ayoub (2010), the dynamics of oil prices in the international scene therefore reflects the context of these physical and economic depletion of world oil resources.

The last parameter is the explosive growth of oil derivatives markets. The oil transactions in these markets, the speculations, etc. have a significant effect on the fluctuation of oil price in the

physical market. For that, any short-term adjustment from oil supply and demand or geopolitical issues can quickly influence oil trading on futures market and lead to fluctuations in oil physical market. However, these factors in oil price volatility in the short term will not explain the oil price movements in the medium term because in a long enough time, the actors of the market will make adjustments to their strategies and then the oil price as a result of these strategic adjustments will be different.

The brief literature review above allows us to draw the conclusion that the factors in oil price determination need to be studied over the different time horizons: short-term, medium-term and long-term. Indeed, three basic processes that collectively determine prices continue to be a central part of the functioning of the global oil industry. In the short-term, oil prices are determined by the equilibrium between current supply and demand, and oil price are deeply influenced by the dynamics of oil futures market. In the medium-term, the structure of the industry determines how closely prices conform to the competitive price because the structure of industry may allow a dominant group of actors to implement a strategy aimed at insulating the market from competitive forces, leading to a rise in oil price. And finally, over the long-term, prices tend to reflect the real cost of producing enough oil to satisfy demand.

The next section of this paper will describe these three mechanisms that collectively determine crude oil prices and their time horizons. Using this analytical framework, we will analyze and clarify the current state of global oil market and especially the recent and special fluctuations of oil price proceeding from the assumption that prices are determined by the interaction of the three mechanisms described earlier. Finally, we will evaluate and determine the impacts of international oil dynamics on the petroleum market in Vietnam before providing conclusions and recommendations for Vietnam.

### 3. AN OVERVIEW OF THE ANALYTICAL FRAMEWORK

#### 3.1. Oil Price Fluctuation in Short-term: Interaction of Oil Supply and Demand and Influence of Oil Future Markets Dynamics

The time horizon so-called “short-term” may be defined as a period that is short enough to preclude any significant modification in either oil supply or demand capacities. So, during this time horizon, the oil demand is inelastic with respect to price and a change in oil price will produce a less than proportional change in demand. According to Angelier (1990) and Bacon et al. (1990), the economic and technical characteristics of the oil industry and of petroleum products are reasons why this is so. In fact, the inelasticity of oil demand is confirmed by several empirical studies. Since 1975, Kalyon (1975) has concluded that world oil demand in short term was price-inelastic. The price-elasticity coefficient of oil demand fluctuates only from  $-0.6$  to  $-0.2$ . Crooper (2003), for example, used a multiple regression model derived from an adaptation of Nerlove’s partial adjustment model to estimate both the short-run and long-run elasticities of demand for crude oil in

**Table 1: Fuel shares of primary energy and contributions to growth in 2019**

Energy source	Consumption (exajoules)	Annual change (exajoules)	Share of primary energy
Oil	193.0	1.6	33.1%
Gas	141.5	2.8	24.2%
Coal	157.9	-0.9	27%
Renewables*	29.0	3.2	5.0%
Hydro	37.6	0.3	6.4%
Nuclear	24.9	0.8	4.3%
Total	583.9	7.7	

Source: B.P. Statistical Review of world Energy 2020. \*Renewable power (excluding hydro) plus biofuels

**Table 2: Total proved reserves (thousand million barrels) and R/P ration**

Proved reserves	At end 1999	At end 2009	At end 2019		
			Share of total	R/P ratio	
Total world	1277.1	1531.8	1733.9	100.0%	49.9
Of WHICH: OECD	256.4	234.7	260.1	15.0%	25.1
Non-OECD	1020.9	1297.1	1473.7	85.0%	60.4
OPEC	821.8	1040.8	1214.7	70.1%	93.6
Non-OPEC	455.3	491.0	519.2	29.9%	23.9
EU	8.8	6.0	5.0	0.3%	9.0

Source: B.P. Statistical Review of world Energy 2020

23 countries. The obtained estimations confirmed that the demand for crude oil internationally is highly insensitive to changes in price especially in short run. This price-elasticity coefficient is very small, which fluctuates in interval between  $-0.109$  and  $-0.023$ . Recently, the research of Dario Caldara et al. (2019) has also confirmed the inelasticity of oil demand.

From the other side, oil supply is also inelastic in short time because the volume availability depends largely on the decisions of oil producing countries. The principal revenue sources of these countries are from oil industry (oil exportation value, tax, oil rents etc.). Therefore, the decisions of supply depend on the national expenditure rather than on the world oil price. Moreover, the variable costs represent only a small fraction in the structure of oil production costs. Consequently, supplying oil is profitable as long as its variable costs are covered by the market price. Similarly, the insensible supply with respect to price is important.

Because of this price-inelasticity, crude oil price is an ineffectual market adjustment tool, a large price shift is required to elicit any change in oil supply and demand. This is the first fundamental mechanism to explain the high fluctuations of international oil price in the short-term.

The second factor of unprecedented severity and frequency in oil price evolution is the influence of commercial mechanisms in international oil scene. Formula contracts, oil spot markets and especially the oil derivative markets (forward market, futures market etc.) strongly influenced the oil price dynamics in short-term. Since 1987, the increasingly widespread use formula contracts led to wider price swings. Firstly, formula contracts are based on oil stable quantities over long-term. Because the exchange quantities are stable, any instant change of oil demand or supply is adjusted from narrow spot market (about 10% of global trading volumes). With price-inelastic characteristics of physical oil demand and supply, price fluctuations can be quite substantial. Moreover, formula contracts are based on prices tied to the benchmarking price of spot market, so oil prices fluctuate due to all instantaneous adjustments on this small spot market. Research in the short-run cannot ignore the influences of international oil dealings on derivative market dynamics. Oil derivative markets are strictly financial markets, and today every expert has recognized that the transactions on derivative markets have tended to influence the oil price swings and the dynamics of international oil market although it is very difficult to measure these influences.

### 3.2. Oil Price Dynamics in Medium-term: The Role of Structure of Oil Industry

The medium-term is a time period during which significant adjustments in production and consumption capacity are possible and the structure of oil industry may remain stable in this time horizon. That means, the medium term is a period of time that is long enough for the actors of the market to adjust their behavior in a way that is most beneficial for them and that affects price fluctuations in the medium-term. If a group of dominant actors emerges and that is capable of insulating itself from or muting the industry's characteristic competitive forces, so the dynamics of oil price in medium-term will be close to monopoly prices, as, for example, the "Majors" which were able to do between 1928 and 1950, or OPEC in the 1970s.

Originally, micro-economics theory proposed that the structure of an industry could be understood in terms of number of firms in it. According to these fundamentals, an industry with a large number of vendors is typically highly competitive, with little likelihood that one or more vendors could exercise market power, we observe the competitive price in this case. On the other hand, with fewer firms, the structure more closely resembles an oligopoly or monopoly and a handful of firms are able to exercise some degree of market power by increasing prices relative to what they would be in a competitive market structure. There are many models developed by economists (Nash, Cournot, Strakelberg, Bertrand etc.) that can be applied to oil market structure and dynamics of oil price in medium-term analysis.

The concept of structure, particularly, in the theory of industrial organization, is used to describe the nature and intensity of the competitive forces within a given industry. According to this school, the structure of an industry is largely determined by the basic conditions in which the industry operates – the nature of supply and demand relations for the product involved and the institutional, legal and socio-political environment. Enterprises select their strategies according to the current structural situation and these strategies in turn affect the industry's performance, especially the prices and product volumes delivered to the marketplace. These are the fundamental tenets of industrial economics presented in the study of Tirole (1988). Analysis of industrial structure has a number of important developments during the 1980s with contribution from Baumol (1982) or another of Porter (1985). Baumol, argued that the competition is common in markets with only a few firms, and that it is rather the presence or absence of potential competitors that determines whether or not market power can be exercised and price can be set above the

competitive price. Porter, with famous five forces model confirmed that when competitive pressures are strong, existing firms cannot exercise market power, no matter how few their number. In each case, applying these different theoretical frameworks to the oil industry's structure analysis allows an explanation of oil prices dynamics in medium-term.

### 3.3. Oil Price Evolution in Long-term: Reflecting the Real Production Cost of Crude Oil

The long-term is a time period during which changes may occur in production technologies, petroleum consumption patterns, and production zone and in this time horizon the real cost of production is a critical variable because the market price cannot deviate from it very much for very long due to responses from both supply and demand sides. If market price drops below the real cost of production for a long period, producers having the highest costs will drop out of the sector, that drives down supply and pushes upward pressure on price. On the other hand, if the market price is higher than the real cost of production for any appreciable length of time, so the investment effect on the supply side (increasing supply) and the substitution and saving effects on the demand side (reducing demand) causes the market price to drop and gravitate around the real cost of production at highest cost production sites, the output of which remains necessary to satisfy demand.

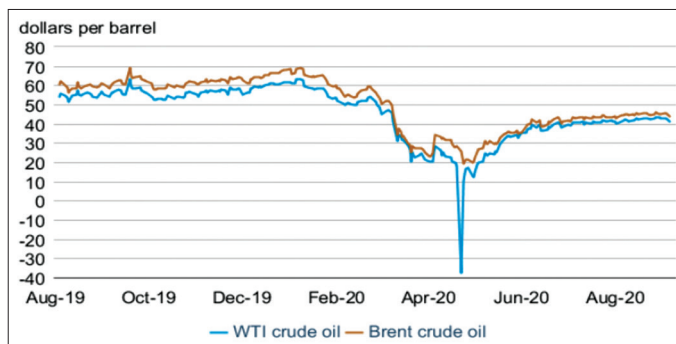
This analytical framework will be used to explain the phenomenon of “negative” oil price and/or the oil price war by studying the true dynamics of the current international oil market. After that we will evaluate its impact on the oil market in Vietnam because oil trading is strongly associated with domestic and international market.

## 4. ANALYTICAL RESULTS AND DISCUSSION

### 4.1. Negative Oil Price and Dynamics of International Oil Markets

At the end of 2019, the global oil market passed a “normal year” in which international oil prices fluctuated around \$65/bbl. From statistic data of actual oil supply, stock, and demand, most experts of oil economics forecasted that although some possible high fluctuations caused by season effects (climate conditions), international oil price in 2020 will be stable and fluctuate around the price level of \$60-65/bbl. However, the scenario of the 1<sup>st</sup> months of 2020 took place in an unexpected way with oil prices at times falling below \$0/bbl (Figure 1). In other words, it was negative oil price. Although they are transactions of future contracts and their implications are not as great as reported by media, no matter you want it or not, April 20<sup>th</sup> 2020 would be one of the worst days in the history of the world oil industry as the crude oil transactions occurred at a negative price for the 1<sup>st</sup> time, which means the seller had to pay extra for the buyers of these contracts to release the oil barrels for May delivery—a historic milestone of the oil industry in America in particular and in the world in general because from its inception in 1983 to now, the WTI oil trading never dropped below \$10/bbl and in early 2020, a crude oil barrel in New York remained open trading at \$60/bbl or even 3 days earlier (April 17<sup>th</sup>) it remained at \$1827/bbl. However, the

**Figure 1:** Crude oil front-month futures price in international markets (\$/barrel)



Source: EIA-US Energy Information Administration (2020)

negative price of an oil futures contract phenomenon needs to be explained satisfactorily, it reflects the true dynamics of the world oil market in the current period.

#### 4.1.1. Nature of negative oil prices

First of all, it is necessary to clarify that the crude oil futures price at  $-\$37.63/\text{bbl}$  results from a trading session of oil futures contract for May delivery, not the spot price on the physical oil markets. It is easy to find that the same oil futures contracts for June delivery still stay at between \$17 and 20 \$/bbl at the same trading time, thereby we can see the difference between the physical oil trading and the derivative oil trading. The breakdown of “negative oil prices” can be seen as an incident for speculators in American futures market because for the oil future markets, the process of buying and selling these contracts goes on continuously in the trading sessions and on due date, it is usually traded close to the oil price on the physical spot market. However, what happened indicates that there are no buyers for the contract of May trading that expire on April 21<sup>st</sup> to carry out physical transactions, resulting in the fact that the speculators continually reduce the price and even down to below \$0/bbl, meaning that they have to pay extra for the buyers to accept the release of the oil barrels delivered in May. Essentially, the phenomenon in short-term that there are no buyers on due date even though the prices have been reduced to floor level is the consequence of what happened in the physical market fundamentals. It was such an oversupply that never happened in which no buyer had reserve capacity any more to buy more oil barrels delivered in May even for free.

Negative oil prices are actually just the result of a trading session of futures contracts, but the oil price of physical trading, in fact, also dropped deeply at only 18 USD/barrel. The developed analytical framework allows us to fully explain the current dynamics of the market and the fluctuations of oil prices. Indeed, as mentioned above, the short-term oil price results from the immediate equilibrium of supply and demand characterized by price-inelasticity and so small instant adjustments can also make oil prices strongly fluctuate. The current price on physical oil market like “price war” is the result of both supply and demand fluctuations in short-term and the interaction between financial and physical oil transactions leads to the historic mark of the oil industry that is negative oil prices.



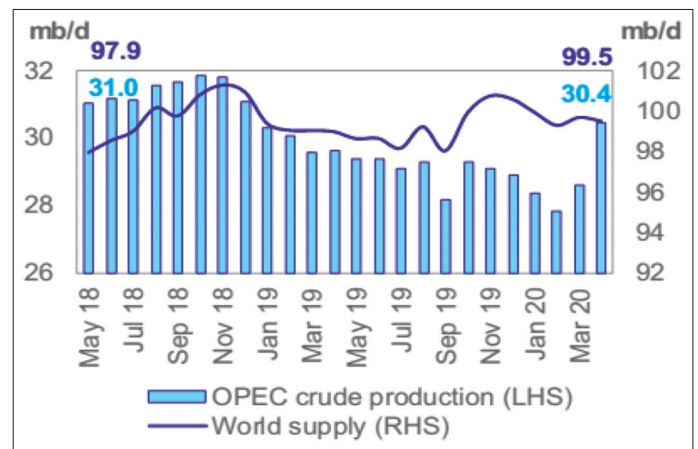
#### 4.1.2. Oil price war: result of disequilibrium's Strackelberg and demand crises from the Covid 19 pandemic

Oil price war on physical market has the first reason for the supply side. Indeed, the current structure of global oil market is exactly a model of imperfect competition based on a non-cooperative game developed by Strackelberg. This is also the analysis of many international studies on oil prices in the current period especially the contribution of Percebois (1998). It can be considered that the world oil market is structured by OPEC and Non-OPEC producers, in which OPEC is a leader and non-OPEC producers are followers but also important producers like Russia or other non-OPEC. In this kind of structure their behavior affects the dynamics of price and market. In this case, their non-cooperative strategy has led to market disequilibrium characterized by a large supply excess and that pushes the price of crude oil down very low.

Indeed, as a result of the COVID-19 pandemic has just appeared in China, factory output and transportation demand fell, bringing overall demand for oil down as well, and causing oil prices to fall. OPEC agreed to cut oil production by an additional 1.5 million bbl/d through the second quarter of the year (a total production cut of 3.6 bbl/d from the original 2016 agreement), with the group expected to review the policy on 9 June during their next meeting. OPEC called on Russia and other non-OPEC members of OPEC+ to abide by the OPEC decision but, Russia rejected the demand, marking the end of the unofficial partnership. Therefore, neither OPEC nor the followers but large producers such as Russia haven't acted in cooperation to control international oil price. On the contrary, both of them increased their production, leading to an excessive supply. Saudi Arabia actively initiate the crude oil war with Russia by increasing output by 1.5 million barrels/day and that pushes OPEC production up to 30.4 mb/d in April of 2020 (Figure 2, the previous month's production of OPEC was 28.9 mb/d). Of course, Russian shows its non-cooperation by claiming to take full advantage of capacity in order to boost output sold in the crude oil market. Since February 2020, oil production of America has also reached its highest level ever with 13.2 million barrels/day. It is the oligopoly market structure in which the large producers such as OPEC, Russia and America did not cooperate with each other (i.e. decrease of output), instead, they choose a competitive strategy by increasing output supply, which makes oil prices even more plummeted due to large supply excess in comparison with demand at that time.

However, when launching a non-cooperative strategy to dispute market share, it is certain that OPEC, Russia and even America did not take full consideration of rapid spread of the pandemic and its immediate and large impact to oil demand, as well. From China to Europe and America, a series of blockades and social distance were enforced, leading to world economy paralysis, resulting in a rapid collapse of oil demand at a global scale - the biggest drop ever seen in history. According to the calculations by the IEA and OPEC, oil consumption in March and April decreased at record level and was the lowest level in the past 25 years. The reduction can be up to 19 million barrels/day (according to data of OPEC) or more than 25 million barrels/day (according to forecast of IEA), equivalent to approximately 25%-30% of total global demand (Table 3— data of OPEC, world oil demand in Q2 2020 is only

Figure 2: OPEC and world oil supply



Source: Monthly oil market report May 2020

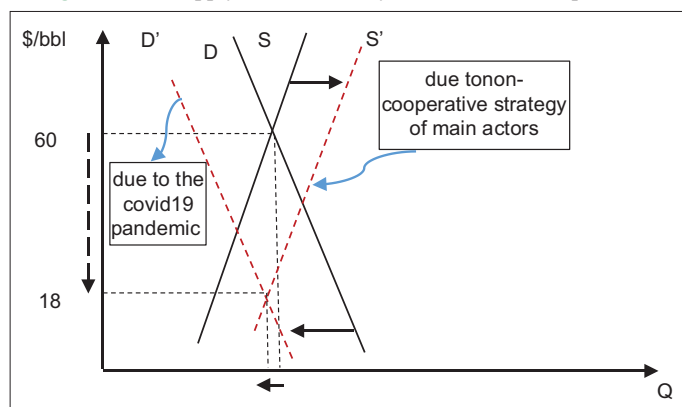
Table 3: World Oil demand in 2020

	2019	1Q20	2Q20
World oil demand			
Americas	25.62	24.47	18.95
of which US	20.85	20.26	15.22
Europe	14.34	12.95	9.67
Asia Pacific	7.96	7.88	6.25
Total OECD	47.91	45.30	34.87
Other Asia	13.86	13.15	12.20
of which India	4.87	4.74	3.90
Latin America	6.58	6.25	6.00
Middle East	8.20	7.81	7.01
Africa	4.43	4.41	4.25
Total DCs	33.08	31.62	29.46
FSU	4.84	4.50	3.88
Other Europe	0.76	0.71	0.54
China	13.07	10.27	12.55
Total "Other regions"	18.68	15.47	16.97
Total World	99.67	92.40	81.30

Source: Monthly Oil market report May 2020

81 mb/d compared to the 2019 average of 99 mb/d, which is a 19% reduction).

Thus, the international oil market is simultaneously impacted by two factors: the sudden and sharp decrease in demand due to Covid pandemic and large oversupply from the market-share competition strategy while both supply and demand are inelastic with respect to price, then the international crude price will definitely decrease and fall deeply is inevitable (Figure 3). To sum up, the crude oil price war is the consequence of the non-cooperative strategic choice of majors in global oil market in the context of a severe decline in oil demand caused by the pandemic. The price war is one of the major causes and effects of the currently ongoing global stock-market crash in general, and of oil futures market in particularly. Moreover, the physical oil supply excess is so large that almost all stockpiles run out of capacity and it is very difficult to increase their immediate storage ability, which are the main reasons that no one wants to buy the oil contracts for May 2020 delivery on the maturity date of these contracts and therefore, international oil prices have fallen freely to negative prices in the end of trading session. That created a historic milestone in the world oil industry.

**Figure 3:** Oil supply and demand dynamics and the oil price war

Source: Simulation by author

In this current situation, what is the outlook for the market and volatility of international oil prices? In fact, after the increase in oil production in April 2020, both Russia and Saudi Arabia encountered a huge drop in demand and as a result, the price war happened, OPEC and other countries in the oil alliance had to come up with an agreement to cut down output at 9.7 million barrels/day from May to June 2020. Showed a positive signal for oil trading, that agreement, however, was not enough to rapidly push oil prices back compared to large decline in demand. Therefore, in the second quarter or even the third and fourth ones of 2020, the international oil market is likely to remain in a state of low demand and oil price scenario could last long time. According to EIA (2020) projection, the consumption of petroleum and liquid fuels globally will average 93.1 million b/d for all of 2020, down 8.3 mbb/d from 2019, before increasing by 6.5 mbb/d in 2021, that's still 1.8 mbb/d below the 2019 average consumption. Brent crude oil spot prices averaged \$43/bbl in July 2020, were down \$21/bbl from average price (\$64/bbl) in July 2019. By the end of August, crude oil prices had moved into an increasingly narrow trading range with some of the lowest levels of price fluctuation since 2015. Although considerable uncertainty in the global economy and global oil markets remains, price volatility may have declined primarily because of the large volume of oil inventories accumulated during the first half of 2020 and a slowing rate of oil consumption growth.

The evolution of crude oil price in international scene depends a lot on recovery of the world economy after the Covid 19 pandemic as well as compliance with the oil production commitments made by the "majors"-that is the dynamics of Stackelberg equilibrium of the oil oligopoly market. If the deal breaks down – corresponding to Stackelberg disequilibrium or non-cooperative strategy of the monopolists - the low oil prices will last. Despite expected inventory draws in the coming months, EIA expects high inventory levels and surplus crude oil production capacity will affect on international oil prices. EIA projection monthly Brent spot prices will average \$44/b during the fourth quarter of 2020 and rise to an average of \$49/b in 2021 as oil markets become more balanced. That means oil prices will approach to the critical variable of long-term – real cost of oil production. However, all projections remain subject to heightened levels of uncertainty because mitigation and reopening efforts related to the COVID-19 continue to evolve.

Reduced economic activity related to the COVID-19 pandemic has caused changes in energy demand and supply patterns in the near future.

## 4.2. Dynamics of Global Oil Market and their Impacts on Petroleum Market in Vietnam

As discussed above, though it is not advisable to exaggerate negative oil prices because it is simply an immediate result of trading session on the last time of due futures contract, but we need to admit that the crude oil prices go down too low due to current interaction between oil supply and demand. These movements of global oil market also certainly have a great impact on the Vietnam's domestic petroleum market due to internationalization of oil trading. The oil industry of Vietnam is relatively typical with enterprises in all stages of the oil value chain: crude oil exploitation and export, petrochemical refining and commercial trading of petroleum products. Therefore, the level of influence is very different for each participant in this value chain. First of all, the firms that exploit and export crude oil will suffer the severe impacts from the international price war. Their turnover decreased dramatically when oil was sold according to international price and trading volume decreased. According to our preliminary quantitative calculations, it is expected that by 2020, PVN (PetroVietnam Group) will exploit 8,8 million tons of crude oil and if the average oil price is \$40/bbl, its turnover will decrease by about \$1,85 billion (if oil price is \$30/bbl so this reduction is \$2.4 billion), and national budget remittance decreased about \$600 million in comparing with the calculations in their projections in the end of 2019. But more seriously, the cost for exploiting oil in Vietnam is currently higher too much than the world oil price, so the more oil it exploits, the more loss it suffers. Thus, the damage is huge for oil exploitation enterprises of PVN and for the country.

For petrochemical refineries, the difficulties lie the inventories of crude oil and the petroleum products as well as the price reduction of petroleum products. Crude oil contracts at the beginning of the year were still at \$60-65/bbl traded for refining activities, but low oil prices brought about immediately decrease of the petroleum product prices. The lag effect makes refinery activities lose much when the input price is high and selling price of finished product is low. According to the Quarter 1 report in 2020 of Binh Son Refining and Petrochemical Joint Stock Company – the unit operating Dung Quat oil refinery, in the first 3 months of the year, the company suffered a loss of 2.300 billion VND (equivalent to \$100 million), which was the result of three simultaneous effects, namely high input crude oil price, low selling price of petroleum products in domestic market, inventories of crude oil and increase in amount of petroleum products due to a sharp decline in consumption.

For importers and traders of petroleum products, so far petroleum is still strategic products and their prices regulated by the government, the import price of petroleum products is the input in the mechanism for determination of the selling price of petroleum products for domestic customers. If the international crude oil price dropped deeply, so did the domestic price of petroleum products by adjustment cycles every 2 weeks. See for example, A95 gasoline price of the adjustment cycle on April 28 was only 11.631 VND/l (equivalent to \$0.47 USD-Figure 4). For units that

trade petroleum in domestic market, the biggest impact for them is the sharp drop in domestic demand, leading to a dramatic drop in sales and turnover, as well. Data indicates that total petroleum demand across the country in the first quarter of 2020 is estimated to decrease by about 30% and is expected to decrease further in the coming time. Sometimes, the gasoline inventories surpass 90%, exceeding allowable level.

However, whether the petroleum products price will continue to decrease further or increase in the upcoming price adjustment periods? That will depend on decision of the government because oil value only accounts for a part in the price structure paid by the end consumer and the rest are taxes, fees as well as the input/output of the petroleum stabilization fund. If the government continues to increase the stabilization fund and the current tax and fee rates unchanged, the domestic petroleum price cannot be reduced further. However, if the State adjusts petroleum prices, balances macro goals, minimizes provision from a stabilization fund and considers to reduce taxes and fees in order to stimulate demand, it is expected that domestic petroleum price will continue to decrease further, then price of petroleum products will be likely to decrease below 10.000 VND/liter if international oil prices remain at the low level. In fact, with the slight rebound in international oil prices, domestic petroleum products prices have been adjusted to increase in the following periods, although prices are still low compared to the prices at the beginning of the year (Figure 4).

### 4.3. Opportunities for Economy from Decrease of Petroleum Price

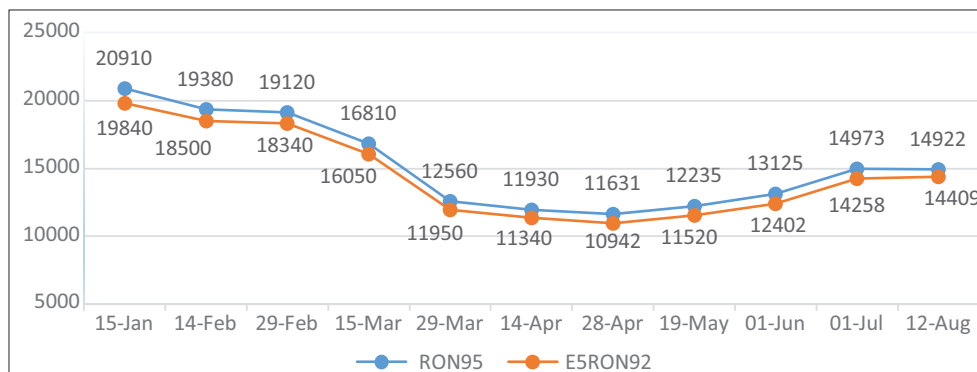
To sum up, the sharp decrease of the world oil prices due to excesses in the global market has a negative impact on the operation of petroleum enterprises in Vietnam as well as the contribution of the petroleum industry to the national budget. However, from the aspect of consumption and the whole Vietnamese economy, this brings many positive signals and even opportunities for various other sectors to break-out as soon as the

pandemic is over: developing economy when the oil price is low while keeping security stable in the oil supply. In the framework of this article, we analyze the positive points from deep fall in oil prices according two aspects: input costs and the international trade balance related to oil activities.

First of all, petroleum products are an important input for many economic activities. One of the industries that benefit from this is transport when the cost of petroleum accounts for a large proportion, up to 35-40% of the total cost of transport industry, so this is an opportunity to reduce costs and prices of transport services, thereby stimulating the economy by providing low-cost transport services to community. Apart from transport sector, a number of other industries also benefit such as plastic production, virgin plastic particles, fertilizer, metallurgy, seafood fishing, construction of transport works and oil-fired thermal power plants, etc. which petroleum cost accounts for 20-35% of the input cost. Therefore, the petroleum products prices fall is also a great opportunity to reduce production costs and end-users are the beneficiaries. Thus, overview on the whole economy, the deep fall of oil prices on the one hand is an opportunity for industries using petroleum products as an input factor to reduce costs, stimulate the economy. The direct price reduction for groups of essential items such as electricity, water, fuel, construction materials (petroleum products accounts for 4% of the package structure to calculate the CPI items), and indirect reduction for food, etc. (the group with the largest proportion in the CPI: 36.12%) will allow to reduce the pressure on the CPI, which is very effective in controlling inflation when the economy is stagnant due to pandemic.

The second positive aspect of the deep petroleum products fall relates to international trade balance of Vietnam regarding petroleum activities. In fact, from 2010 until now, Vietnam is still a trade deficit petroleum importer (Table 4). Therefore, the oil prices fall will also be a positive factor to reduce trade deficit

Figure 4: Adjustment of selling price for petroleum products in Vietnam 2020 (VNĐ/l)



Source: Data announced by the Ministry of Industry, Trade and Ministry of Finance

Table 4: Trade balance for Vietnam’s oil, 2010-2019

MTOE/year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Production	15.3	15.4	17.0	16.9	15.9	17.2	15.5	13.9	12.4	11.4
Consumption	15.3	16.7	17.1	18.2	18.7	20.8	21.9	22.6	23.6	24.6
Trade surplus	0.0	-1.3	-0.1	-1.3	-2.7	-3.6	-6.4	-8.7	-11.2	-13.2

Source: BP Statistical Review of World Energy 2020



as well as reduce import costs, thereby saving a large amount of foreign currency. This contributes to Vietnam's international trade movements become more balanced in this difficult period.

Thus, in addition to negative impacts, the deep oil price shock also brings positive effects to the Vietnamese economy in general and for enterprises/organizations/consumers using petroleum products in particular. However, whether Vietnamese economy can take advantage of this opportunity and overcome the "decrease" oil price shock or not, depends on the ability of the economy to absorb the price decrease based on increase level in total demand, which is also the direction that the Vietnam's government should aim for in the course of operating the post-pandemic economy.

## 5. CONCLUSION AND RECOMMENDATIONS

The results above show that the prospect for prolongation of low oil price is relatively clear. The negative and positive effects for Vietnam, as well, from the deep oil prices fall have also been mentioned. It is also consistent with most other oil economic analysts, even those who have a more extreme analysis, consider it as a new era of the oil industry as analysis of Blas (2020). Below are some recommendations towards the subjects of the Vietnamese economy in order to minimize negative impacts while quickly taking advantage of opportunities from the positive impact of oil shock to quickly stabilize and promote economic development of country.

First of all, the enterprises exploiting and exporting crude oil can be considered as the economic subjects that suffered the most loss from the deep oil price fall. Our enterprises have no advantage on cost of exploitation, so the more we exploit the more losses we suffer due to the difference between the production costs and international oil price. In addition to the necessary solutions to minimize costs, PVN needs to consider a plan to close some mines that have a low capacity under permissible technical conditions, thereby both saving resources and minimizing damage caused by oil price fall. Besides, PVN also seeks the support from the government by proactively submitting proposals on a more suitable rate of state budget deduction from crude oil export for pressure minimization on this industry.

For petrochemical refining and petroleum business firms, they should review the current status for inventories of crude oil and petroleum products if possible to enhance their storage capacity because in national scale, it is beneficial to purchase petroleum now if economic and technical condition is possible. In terms of macro governance, we need to give strategic policy on petroleum storage by mobilizing all qualified facilities, not only petroleum business firms, but also the other sectors and the military, etc. Moreover, the State needs to perform mechanisms and policies that facilitate this activity such as preferential loans for petroleum business enterprises to be able to import a large amount of crude oil and petroleum products for storage. We hope that the world economy cannot be stagnant too long, so when it

returns to normal, the demand for oil definitely increases again, bringing about increase of oil prices or at least it is not too low like present. Therefore, we miss a great opportunity if we cannot launch a strategy to increase storage capacity for crude oil and petroleum products.

For the petroleum prices management policy, the prices applied to end-consumers depend a lot on management mechanism enforced by the government. In current condition, the first priority when the normal conditions returns is to stimulate the economy. It is necessary to consider carefully whether to continue to increase of the stabilization fund and simultaneously to accept a reduction of taxes and fees in petroleum prices when its proportion is still very large (nearly 55-60% for gasoline, 35-40% for other oil products, in which, environmental protection tax accounts for about 32% for gasoline and 11-20% for other). If petroleum tax and fee reduce, it is a great opportunity for consumers to receive the gasoline good prices. The interaction in the economy takes place in the beneficial direction from stimulus, growth to inflation control and so on. Finally, for enterprises that depend much on petroleum products, the record oil prices shock is also a "golden" opportunity for those own strong finance resources to buy cheap fuel inputs, even accumulate enough for whole-year production, reduce costs, lower production costs to compensate for the loss caused by production stoppage due to pandemic, thereby catch up with growth rate in the end of this year 2020—a very special year in the socio-political economy in the world.

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