Universitat de les Illes Balears

BACHELOR'S THESIS

ECONOMIC IMPACT OF COVID-19 ON THE OIL MARKET

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Degree in Economics

Faculty of Economics and Business

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ABSTRACT

The oil production is affected by low consumer demand. Crude oil prices also suffer large drops in the financial markets. The scarce storage sites together with the shortage of demand causes the fall of crude oil in the financial markets, with the price of WTI barrel trading negative for the first time in history on April 30, 2020. This paper, by relying on tables and graphs from sources recognized by verified agencies worldwide, reviews recent historical data of the oil market. The aim of the work is to understand how the recent pandemic has affected the oil market and whether this crisis is showing original characteristics.

RESUMEN

La producción de petróleo se ve afectada por la baja demanda de los consumidores. Los precios del crudo también sufren grandes caídas en los mercados financieros. La escasez de lugares de almacenamiento junto con la escasez de demanda provocan la caída del crudo en los mercados financieros, con el precio del barril WTI cotizando en negativo por primera vez en la historia el 30 de abril de 2020. Este trabajo, apoyándose en tablas y gráficos de fuentes reconocidas por organismos verificados de todo el mundo, repasa los datos históricos recientes del mercado del petróleo. El objetivo del trabajo es comprender cómo la reciente pandemia ha afectado al mercado del petróleo y si esta crisis está mostrando características originales.

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INTRODUCTION

COVID-19 has affected the planet both socially and economically. To limit the spread of the virus governments have applied restrictions such as: limiting the mobility of citizens between regions, countries and continents, including lockdowns, as well as the closure of stores, businesses and entertainment venues. As expected, this led to a global decrease in production, consumption and tourism. Covid-19 is taking us towards probably one of the worst recessions in world history. Almost all sectors of economy are affected due to the global freeze on goods and services. The oil market is not an exception and is also being hit hard because of the pandemic, the global paralysis has led to a decrease in the demand for the most important natural resource of the industrialized countries, as well as low storage capacity and oversupply, causing a fall in oil prices which was reflected in the financial markets with historical falls in the main stock market indexes. Nowadays, oil is the most widely used fuel in almost all sectors, so the impact of Covid-19 has been felt in almost every industry. One of the markets more closely related to petroleum, and therefore more affected is the airline industry. The closure of borders for tourist purposes had terrible consequences in the airline industry. Empty airports and grounded planes are the reflection of an unprecedented crisis in aviation which is one of the main causes of low oil demand.

This work, throughout a literary review, aims to analyze the study the impact and effects of Covid-19 in the oil market. Analyzing the behavior of oil demand, supply and prices. I based this analysis on 3 mainly articles.

It is important to analyze how the oil market behaves due to the outbreak of the virus for different reasons. The pandemic is a very current issue that affects the world economy and has negative consequences in all industries, also it is interesting to see the shock in the oil market analyzing the falls in price. On the other hand, there is no doubt about the magnitude and the enormous amount of money that moves every day in this market. World is currently facing a very difficult economic situation. Many small stores and businesses are forced to close and a lot of people are losing their jobs. Covid-19 has shaken the bases of one of the most important markets worldwide, which has been lately affected by the Price war between Russia and Saudi Arabia, a sector that has already witnessed several shocks throughout its history but never one of such dimensions. The panic in the stock market is immense, although the harsh consequences will not only be felt in oil producing countries, but also in all the other countries due to globalization. It is interesting to see what strategies the oil companies follow to minimize losses and be affected as little as possible and what kind of policies the governments of the producing countries apply in this situation to protect the industry. Finally, it is important to be able to draw conclusions about the impact of a global pandemic paralyzing the world and to see how the supply, demand and prices of oil, which is the world's engine, behaves.

The objective of this work is to analyze in depth the three most important elements of the market: prices, supply, and demand. In the first chapter I define a theoretical framework where I describe the two main elements of the work: Covid-19 and oil, explaining in detail the basic aspects of each of them. I talk

about what petroleum is, which are its derivates and what many different types of uses it has in our daily lives. I also describe what are the largest oil reserves and what numbers are moving in such a powerful market. Moreover, in order to contextualize, I explain the situation of the oil market before the appearance of the virus in order to be able to see how the market has developed and to compare the actual with the previous situation. On the price side, I mainly investigate how Brent Crude and West Texas Intermediate prices are moving in the stock market and show what are the similarities and differences of the two most important barrels of crude oil worldwide. I also analyze the reasons why the WTI barrel traded negative on April 30 and the chaotic situation that was generated on the stock markets. I examine all the oil shocks that have occurred throughout history with special emphasis on the current covid-19 shock. I compare the different crises and see parallels distinctions and consequences of each of them. In the following section I analyze the impact of the virus on oil supply and its consequences, as well as which countries and exporting companies are most affected and how OPEC intervenes and regulates the market. Finally, I analyze the impact on demand, where I see how the most oil-importing countries are experiencing the shock. In this section I also talk about oil consumption and which sectors have been most affected. I make a comparison of demand and supply in 2020 with 2019 to see the short-term impact. Finally, I will draw conclusions about the position of the oil market after the pandemic and what its future may be like. Can renewable energies take the place of what has been the most used fuel for the time being?

1. THEORETICAL FRAMEWORK, CONTEXTUALIZATION AND BACKGROUND

To understand the analysis of the impact that Covid-19 has had on the oil market, it is first necessary to know the key elements of the target to be analyzed (oil market) and the cause of the analysis (Covid-19). To do so, I establish a theoretical framework in which I define the most salient aspects of each.

1.1 OIL AND IT'S DERIVATES, OIL INDUSTRY AND RESERVES.

"Petroleum: a dark thick oil obtained from under the ground, from which various substances including petrol, paraffin, and diesel oil are produced". Cambridge Advanced Learner's Dictionary & Thesaurus

According to the IEA, oil is today the world's most widely used energy source, representing almost one third of the world's energy supply.

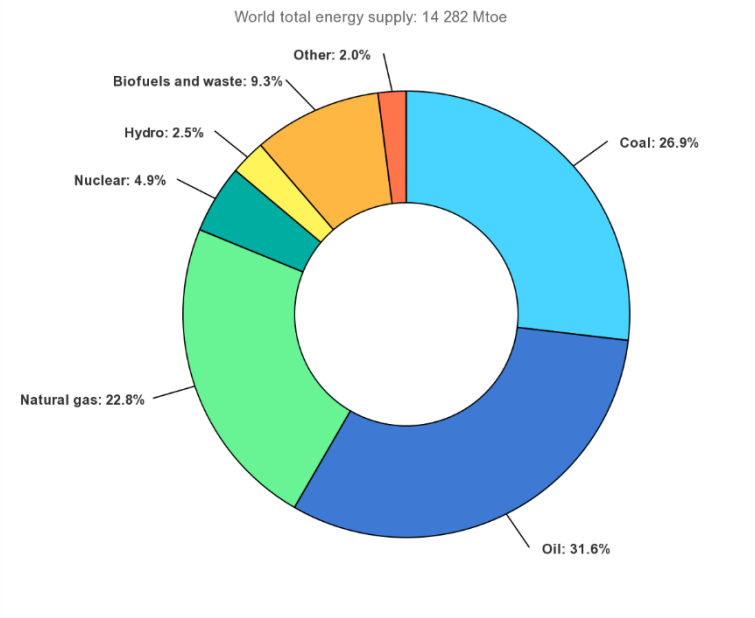

Figure 1. Source IEA, Global share of total energy supply, 2018, IEA, Paris.[1]

One of the reasons why it is the energy source with the highest supply and demand in the world is due to its wide variety of uses. We can divide them into three different sections. Energy use: where we include fuels for all types of transportation, industrial use, agriculture, heating and lighting. In the second section we find special products such as asphalts, lubricants or greases. Finally, it is also used to produce basic products that are present in our daily lives, such as plastics, gloves, insecticides and detergents.
It must be considered that oil is a non-renewable natural resource and will come to an end someday. Oil reserves are running out, so in the future alternatives will have to be sought and it will have to be replaced by another energy source, although in the short term there is still a lot of oil to be extracted.

[1] https://www.iea.org/data-and-statistics/charts/global-share-of-total-energy-supply-by-source-2018

According to data from OPEC, the percentage of the world's oil reserves of the countries that belong to the OPEC account for 79.4%, which is the same as 1189.80 billion barrels. The other 20.6% belongs to non-OPEC countries. Venezuela is the country with the largest oil reserves in the world, representing 25.5% of the OPEC countries, followed by Saudi Arabia (22.4%) and Iran (13.1%).

1.2 COVID-19

The cause of the current shock is Covid-19, the world has been economically affected by a global pandemic that has paralyzed many sectors. Throughout the world history there have already occurred some pandemic. Asian Flu, SARS, HIV, Spanish Flu are the most recent in the last century.

According to the World Health Organization (WHO, 2020), "COVID-19 is the disease caused by a new coronavirus called SARS-CoV-2. WHO first learned of this new virus on 31 December 2019, following a report of a cluster of cases of 'viral pneumonia' in Wuhan, People's Republic of China."

The World Health Organizaion (2020) explains the severity of the disease as follows, "Among those who develop symptoms, most (about 80%) recover from the disease without needing hospital treatment. About 15% become seriously ill and require oxygen and 5% become critically ill and need intensive care."

1.3 CONTEXTUALIZATION AND BACKGROUND

Before analyzing the impact on the oil sector, it is useful to have a global overview of how the pandemic has affected it in every way. Next, I will briefly analyze two of the most widely used economic indices to measure the state of the economy in countries and their evolution in recent years.
One of the most important indicators to measure an economy is the Real GDP, which measures the wealth of countries. There are several methods to calculate it, one of them is through expenditure, or what is the same as aggregate demand. GDP= C+I+G+XN. This is the sum of consumption, investment, government spending and net exports. Over the last 40 years, Real GDP has been growing at a positive annual rate except for the 2008 financial crisis where there was negative growth. The following graph shows the negative impact of the pandemic on the world economy, where real GDP fell 4.4% in one year. According to the International Monetary Fund, growth expectations are positive for the following years, returning to the global growth average of the last 40 years.

Figure 2. Source International Monetary Fund, Real GDP Growth, 2020.[2]

A second index that reflects the state of the economy is the unemployment rate. It measures the percentage of people who are willing to work and cannot find a job. This other graph shows the increase in the unemployment rate in Covid's time for the 37 countries that make up the Organization for Economic Cooperation and Development (OECD), reaching an average of 8.5% unemployment in the middle of the pandemic.

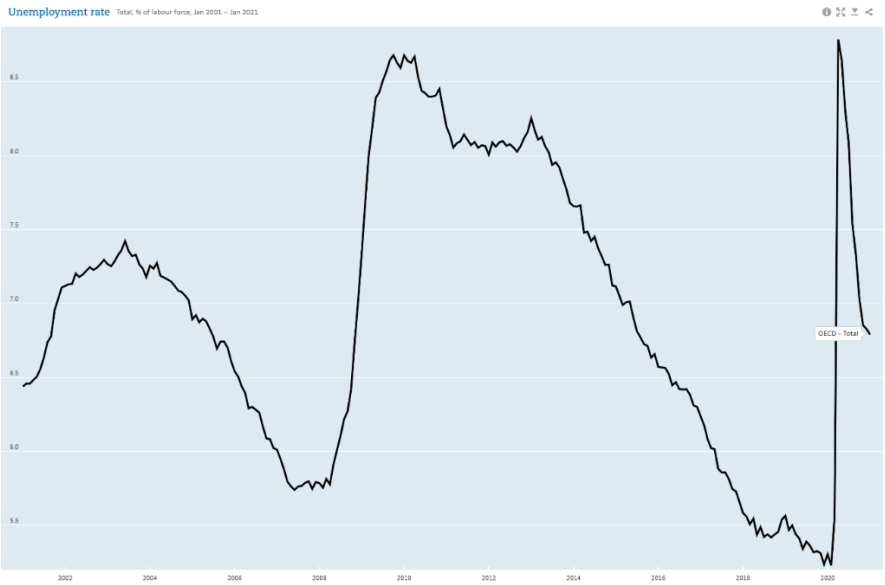

Figure 3. Source OECD Unemployment rate, 2021.[3]

We can draw a fairly obvious conclusion from these two graphs and that is that if the unemployment rate rises, income falls, household consumption also falls and therefore aggregate demand falls, affecting Real GDP. This effect is observed both in the current shock and in the 2008 financial crisis. The opposite effect is also observed, in expansion periods when the unemployment rate decreases, household income increases, consumption increases and aggregate demand grows.

[2] World Economic Outlook (October 2020) - Real GDP growth (imf.org)
[3] Unemployment - Unemployment rate - OECD Data

2. OIL, PRICE EVOLUTION, FINANCIAL MARKET

2.1 KEY MARKET ELEMENTS

There are several key elements that we must know before analyzing the oil market.
How does the oil market work? Oil is traded in barrels, each barrel has a capacity of 159 liters and its price is determined by the laws of supply and demand, as well as sometimes by the intervention of OPEC, which when there is a shortage of demand, they limit the production of member countries so that prices do not drop sharply and remain at acceptable levels.
For oil trading in the financial markets there are three ways of trading: futures, options and CFDs, however futures contracts are mostly used. "Futures contracts are a contract that is signed between two parties, whereby one party agrees to buy something on a certain date, at a certain price, and the other to sell it." Moro, V. B. (2020, April 21).
Both parties, buyer and seller, cover their backs against price variations that may occur in the future. There is a large part of the market that is dedicated to speculation, seeking to buy at low prices and sell at higher prices to obtain profits, for this reason the price of oil is quite volatile and therefore there is uncertainty about future prices.

2.2 BRENT CRUDE AND WEST TEXAS INTERMEDIATE

Below a table with the main characteristics of the two barrels:

	Brent	WTI
Place of extraction	North Sea	Texas, Louisiana and North Dakota
Stock Market	ICO on the London Stock Exchange	NYMEX
Production	Diesel and gasoline fuel	Refined gasoline
Composition	Sulfur: 0'37% API Gravity: 38'0	Sulfur: 0'24% API Gravity: 39'6

Figure 4. Source Own elaboration.

The two most popular types of crude oil in the world are Brent and Texas Intermediate. Although there are other popular ones such as Dubai crude, these are the ones that occupy the largest amount of world demand and are the ones we are going to analyze.
The Brent barrel, extracted from the North Sea and quoted on the ICO stock index on the London Stock Exchange, is the reference barrel for Europe, Africa and the Middle East. WTI, on the other hand, is the reference barrel for the United States, Canada and South America, and is traded on the NYMEX (New York Mercantile Exchange). The two most important characteristics for analyzing oil quality are

the sulfur level and API gravity. Oils with a lower density and a lower percentage of sulfur, being lighter, are cheaper and easier to refine. The WTI and Brent barrels are the oils in the world that best fulfill these characteristics and are therefore the most popular and best performing for producing refined gasoline.

2.3 NEGATIVE PRICES

On April 20, 2020, a historical event never seen before in the oil market took place. WTI barrel prices traded negative for the first time in history. This means that oil producers are paying buyers to take barrels of crude home. The causes of this situation are low demand and oversupply as a result of the pandemic. Oil storage facilities have reached their maximum capacity and to store this oversupply, producers have to rent tankers and other storage facilities, but these costs are very expensive, which caused the price of a barrel of oil to reach -$37.63 a barrel. In an attempt to mitigate the consequences and try to balance the market, OPEC and member countries reached an agreement to reduce production by 10%, although it seems that this is not enough.
But negative prices do not mean free gasoline, far from it. Many times the price of the barrel has a positive trend with the price of gasoline, but the price of gasoline is always much more expensive since it is a retail price and it is not bought on a large scale as it happens in the futures market. Service stations have fixed costs of refining, transporting and taxes, but they take advantage of the situation to increase their profit margins and even though they lower prices a little, consumers still pay a disproportionate amount considering how cheap it is for gas stations to produce gasoline.

In the figure 5 (represents the daily barrel prices expressed in dollars) we see graphically the negative prices in the WTI barrel.

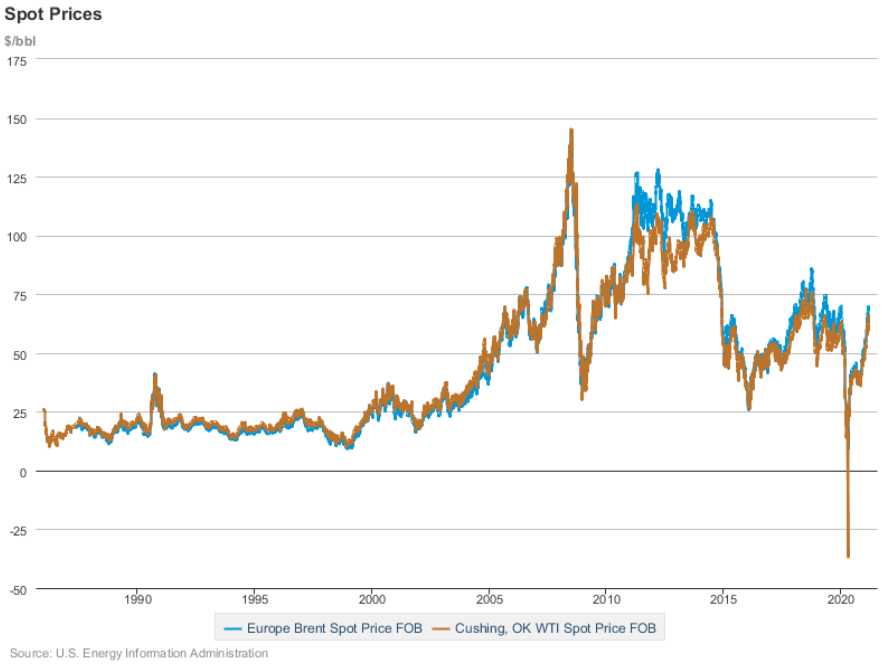

Figure 5. Source U.S. Energy Information Administration, daily WTI and Brent crude prices (2020).[4]

2.4 HISTORICAL OIL PRICE ANALYSIS (COVID-19 SHOCK AND COMPARISON WITH OTHER HISTORICAL SHOCKS)

In the figure 6 we see the monthly prices expressed in dollars of the two most important barrels of crude oil in the world over the last 35 years. We can see how throughout history the prices of Brent and WTI have gone hand in hand, this is due to the great similarities in terms of production quality. Logically, the correlation between them is very high as we see that there are hardly any deviations in prices. It is also worth noting the high volatility of the asset, as price variations are very high in very short periods of time. Historically, the price of Brent has been slightly lower until 2010, when it started to be the other way around, this is due to different factors such as transport and production costs.
Chronology of major historical events that have affected oil prices causing supply and demand shocks that can be seen in the graph:

- 1990. Gulf War between Kuwait and Iraq causes demand to increase and prices to rise to $40 a barrel.
- 1997-1998. prices fall due to the Asian financial crisis.
- 2001. Panic due to terrorist attacks on September 11th, also frauds are discovered in the Enron company and they go bankrupt.
- 2003. Political instabilities in producing countries.
- 2004-2006. Worldwide increase in oil demand. Historic highs of $78.30 per barrel are reached.
- 2006. Moderate drop in prices due to OPEC production cuts.
- 2008. Historic price high, oil bubble due to speculation with futures contracts.
- 2008. The Great Recession causes prices to plummet 268% in just one year.
- 2010-2012. Prices rise again due to high world oil demand.
- 2020, March. Price war between Arabia and Russia. Russia does not want to reduce its production despite falling prices. A war starts to see who is able to hold out longer without lowering production despite the fact that this leads to huge losses.
- 2020, April. Demand shock due to COVID-19. The world economy gradually slows down due to the emergence of a deadly virus, which causes house lockdowns in many countries. Many oil-dependent sectors, such as industry and transportation, see their activity reduced. The pandemic is causing oil consumption to fall drastically. The decline in global demand for crude oil has a rapid impact on the financial markets. Investors stop buying and prices fall rapidly to negative.

[4] Spot Prices for Crude Oil and Petroleum Products (eia.gov)

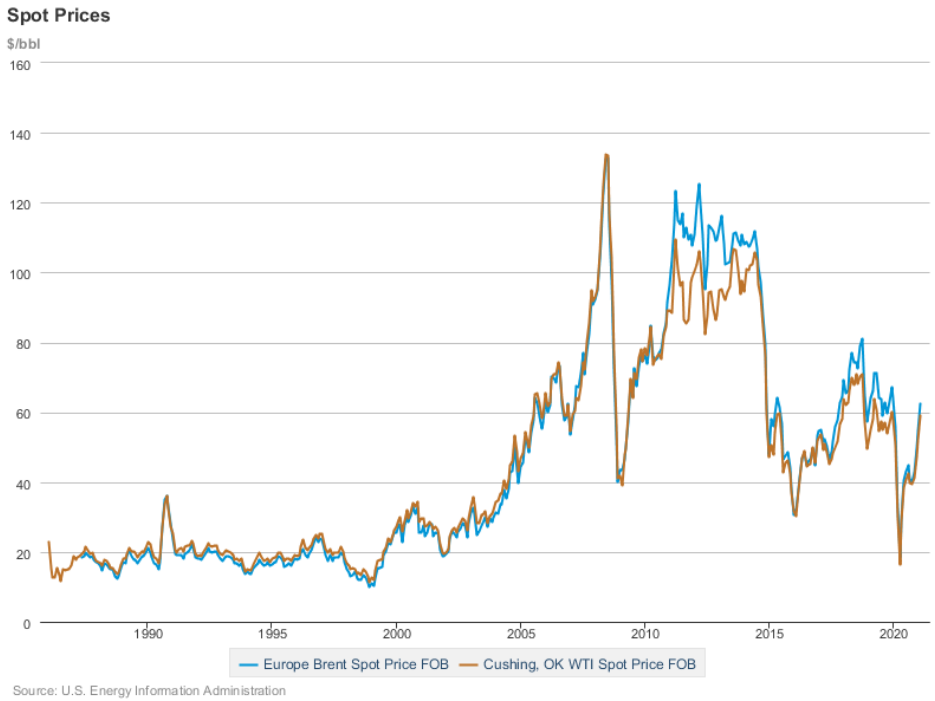

Figure 6. Source U.S.Energy Information Administration, Monthly WTI and Brent crude prices (2020). [5]

[5] Spot Prices for Crude Oil and Petroleum Products (eia.gov)

3. OIL, DEMAND AND SUPPLY

3.1 SUPPLY

3.1.1 COVID-19 IMPACT ON THE SUPPLY

The oversupply since the beginning of the pandemic is evident, the main oil producers cannot sell everything they produce due to the low demand caused by the global health crisis. They have to adapt to the situation and the market, but it is not easy. The scarce demand complicates a lot the producers, who see how the warehouses are at full capacity so they have to rent other places to store the barrels of oil.
The price war between the main world powers to see who gets a larger share of the market and not reduce supply is exactly what happened before Covid between Russia and Saudi Arabia, which has also caused price drops over the last year.
Another factor conditioning supply is geopolitical; the great dependence of many countries on oil has led to numerous conflicts between countries over the possession of oilfields.
An important factor determining oil supply is OPEC, which intervenes by applying measures to regulate the market, reducing the production of member countries so that the negative impact on prices is minimized.

3.1.2 OPEC AND ITS ROLE

What is OPEC?
“The Organization of the Petroleum Exporting Countries (OPEC) is a permanent, intergovernmental Organization, created at the Baghdad Conference on September 10–14, 1960, by Iran, Iraq, Kuwait, Saudi Arabia and Venezuela.” (OPEC,2020)

The motivation and objective of this organization, according to OPEC (2020):

> “*OPEC’s objective is to co-ordinate and unify petroleum policies among Member Countries, in order to secure fair and stable prices for petroleum producers; an efficient, economic and regular supply of petroleum to consuming nations, and a fair return on capital to those investing countries.*”

3.1.3 TOP EXPORTING COUNTRIES, COMPANIES AND STOCKS

Saudi Arabia heads the list of the top 5 oil exporting countries with a commercial value that represents 14.7% of world exports. It is followed by Russia (12.5%), Canada (6.87%), United States (6.28%) and United Arab Emirates (6.28%). If we make the division by continents, we observe that Asia is the continent that exports

the most crude oil with 43.62%, almost half of the world's oil. On the opposite side is Oceania, which does not reach 1%.
The main oil producing companies are the following:
Saudi Aramco, Sinopec Group, China National Petroleum Corporation, Exxon Mobile, Royal Dutch Shell
All of them have seen their production reduced in 2020 due to the pandemic

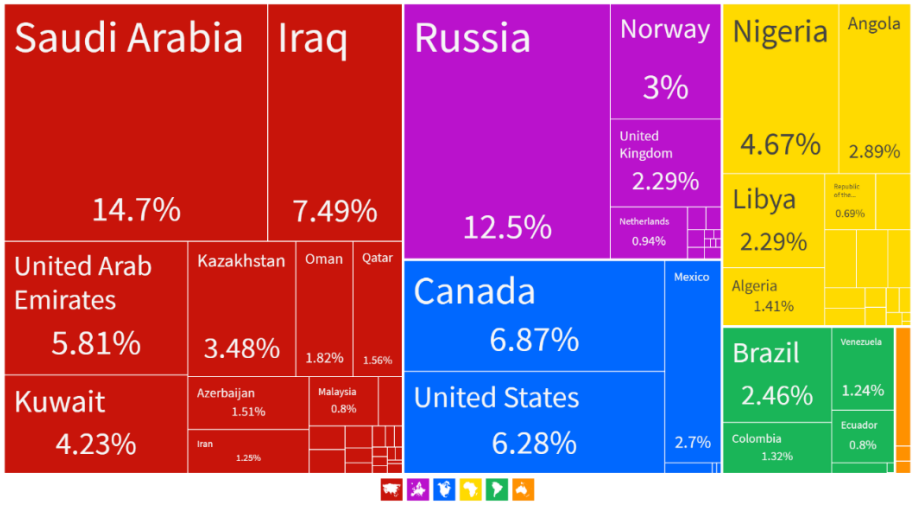

Figure 7. Source OEC, Exporters of crude petroleum, 2019.[6]

3.2 DEMAND

3.2.1 COVID-19 IMPACT ON THE DEMAND

The oversupply coincides with a shortage of demand. During the last decade, world oil demand has increased and was expected to continue to do so for the next 5 years according to predictions by the International Energy Agency.
However, with the emergence of COVID-19 we see how demand has fallen by 2020. According to the IEA projections, the expectations for demand growth are positive, almost touching the trend of the pre-pandemic forecasts. This prediction of demand growth is likely to be related to 2 reasons:
On the one hand, the likely easing of short-term restrictions and the vaccination of the population will probably lead to an increase in consumption, exports and imports.
On the other hand, savings by households that have not lost their jobs have increased from pre-pandemic levels. Households have decreased consumption especially in travel, restaurants and leisure. It is possible to expect a consumption boom in the short/medium term with the removal of all restrictions.

[6] Crude Petroleum (HS: 2709) Product Trade, Exporters and Importers | OEC - The Observatory of Economic Complexity

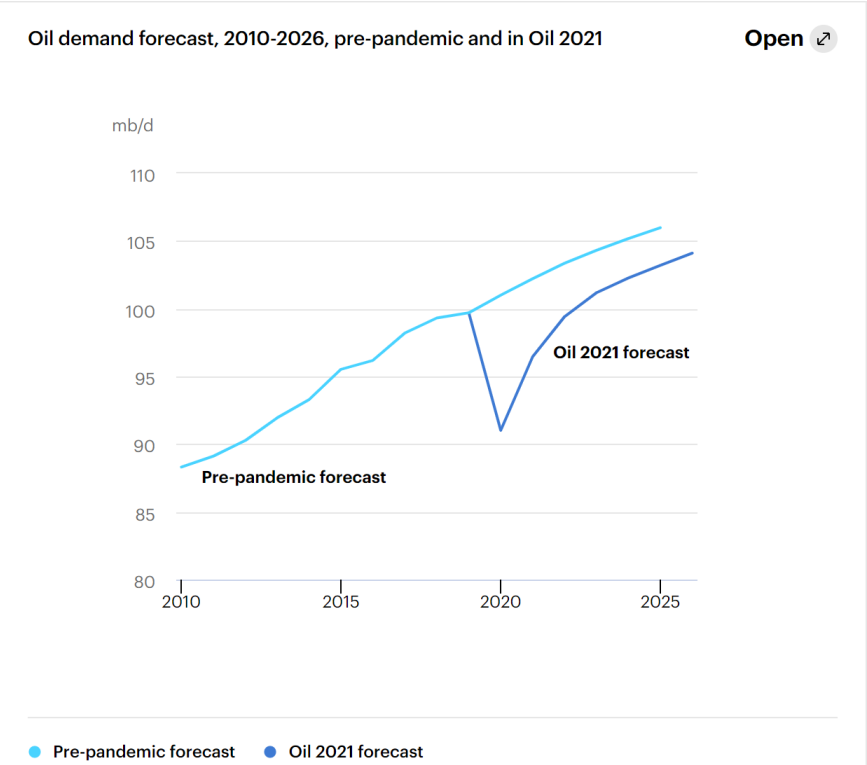

Figure 8. Source IEA, Oil demand forecast, 2010-2026, IEA, Paris.[7]

3.2.2 TOP IMPORTING COUNTRIES

If we look at world oil imports, China leads the list by far. More than 20% of the world's oil is imported by the most energy-consuming country in the world. China has been the country that has imported the most barrels of oil since the outbreak of the pandemic, taking advantage of the fear of other world powers such as the United States and taking advantage of the low market prices, closing large-scale agreements with Iraq and Venezuela.
The second largest importer is the United States with 12.4%. Asian countries such as India, South Korea and Japan are next on the list.

[7] Oil demand forecast, 2010-2026, pre-pandemic and in Oil 2021 – Charts – Data & Statistics - IEA

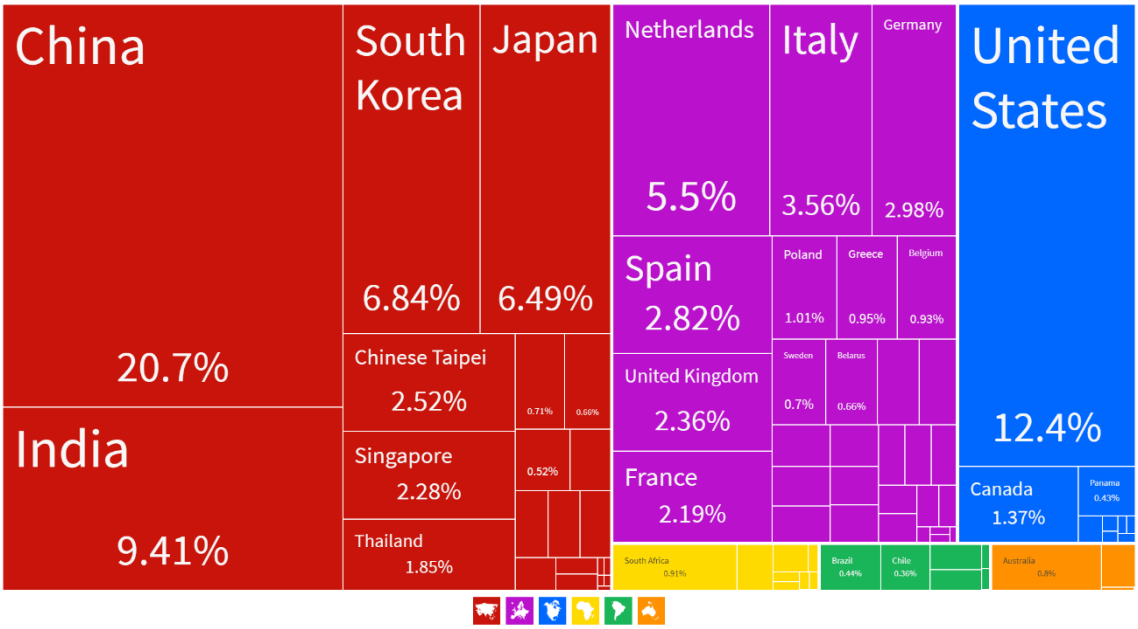

Figure 9. Source OEC, Importers of crude petroleum, 2019.[8]

3.2.3 CONSUMPTION OF PETROLEUM AND PETROLEUM PRODUCTS (DIFFERENT SECTORS)

In Graph 9, we observe oil consumption in the USA by sector from 1990 to 2020. The graph measures consumption in thousands of barrels per day. Almost 50% of the consumption comes from the transportation sector. The second largest oil consuming sector is industry. The other three sectors that occupy a small percentage are the residential sector, commercial sector and electric power sector. It is worth noting the drop in consumption in 2020 due to Covid-19. We can see how this reduction is mainly because of the low consumption in the transport sector, which proves the impact of mobility restrictions, including worldwide confinements.

Within the transport sector, the airline industry has been the most economically damaged due to mobility restrictions between countries and autonomous communities. According to IATA, losses amounted to $118 billion and demand fell by 65.9% compared to 2019.

Moreover, according to IATA's January-February 2021 economic report:

> “because of growing optimism about growth in the wider economy, oil and jet fuel prices strengthened in March and hovered close to pre-pandemic levels for second consecutive month. The higher fuel prices will add to the challenge of making the restart of air travel cash positive.”

[8] Crude Petroleum (HS: 2709) Product Trade, Exporters and Importers | OEC - The Observatory of Economic Complexity

So we can get a slight idea of the negative impact and the enormous losses in this sector that had been growing for many years and how much it will cost it to recover completely. One of the quickest ways for recovery will be the use of the state subsidies that will play an important role in the recovery of the airline industry.

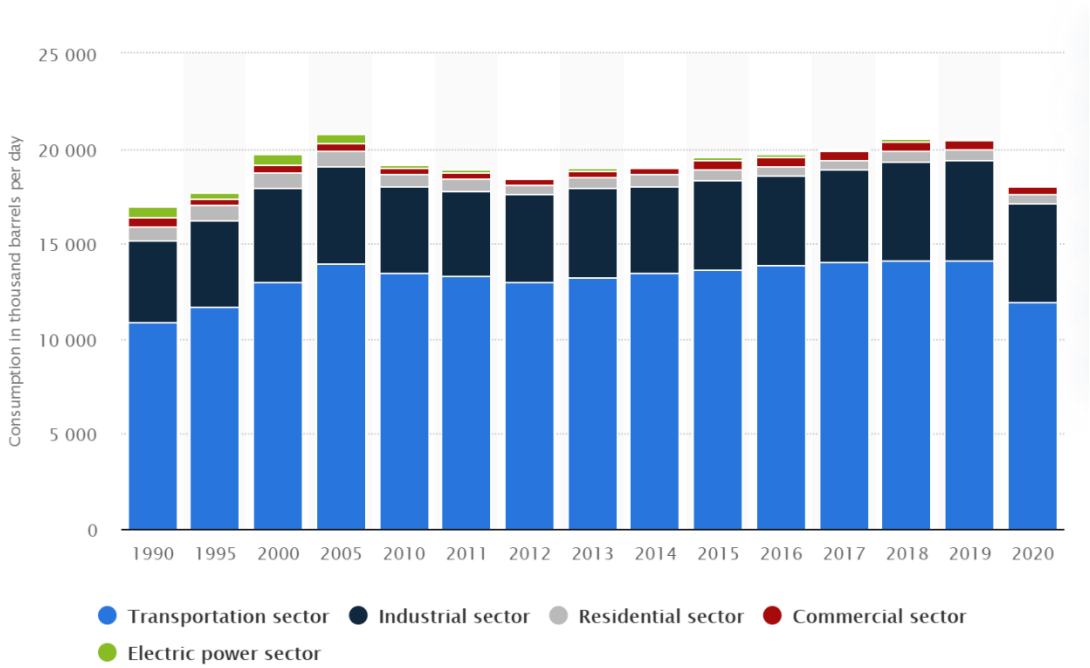

Figure 10. Source Statista, Petroleum consumption in the United States in selected years from 1990 to 2020, by sector.[9]

[9] • U.S. petroleum consumption by sector 2020 | Statista

3.3 NET OIL TRADE

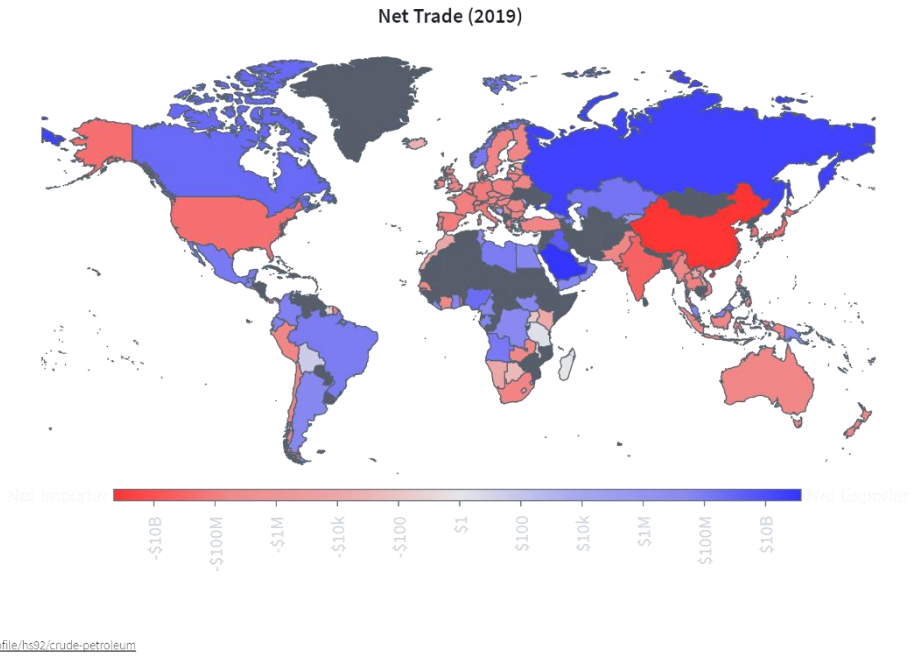

Figure 10. Source OEC, Net Trade, 2019.[10]

Being a major oil-exporting country does not mean that the oil trade balance is positive. A great example of this is the United States, which despite being the fourth largest exporter of oil in the world, is in a deficit situation because its imports are larger than its exports. If we look at Europe we see that almost all countries are in a deficit situation as they are dependent on foreign oil imports due to scarce reserves. Russia and Saudi Arabia are the countries with the largest oil surpluses in the world, which also happen to be the two countries that export the most oil, as can be seen in Figure 9. China is also the country with the most negative net oil exports, despite the country's large surface area; there are not many oilfields, so it exports very little crude.

[10] Crude Petroleum (HS: 2709) Product Trade, Exporters and Importers | OEC - The Observatory of Economic Complexity

4. CONCLUSIONS

This work has mainly focused on studying the short-term impact and which are the future consequences of Covid-19 oil market, analyzing the three key elements of any market: price, demand and supply.

Covid-19 has altered the roadmap of one of the largest markets that exists today in terms of trade volume. Over the last decade, demand and prices for black gold have been growing at a high rate. The appearance of the virus, causing a global pandemic, affects the whole world, with mobility restrictions and lockdowns, causing a negative demand shock of dimensions never seen before in the oil market. The demand for oil falls sharply, significantly affecting the financial market. The price of barrels of crude oil drops in a very short period of time, reaching negative prices for the first time in history. Producing countries, with the help of OPEC, are forced to cut oil production and reduce their supply to try to mitigate the fall in prices. On the other hand, the transport sector, and in particular the airline industry, has seen its activity and therefore the demand for crude oil fall the most. It is very likely that sectors such as the industrial and commercial sectors will recover sooner. One year later, the world economy is slowly beginning to accelerate thanks to the emergence of the vaccine. Prices, after bottoming out in the middle of the pandemic, have already started to recover and look set to rise over the next few years. We are at the beginning of the recovery of a market in which economic and geopolitical interests prevail, where conflicts and wars between countries for the control of oil-filled territories will continue and where the large profits are only for a few, but which one day will not dominate as it does now due to the scarcity of the natural resource.

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