

# Oil Demand Shifts for The Period 2000-2018 And Its Future Trends

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***Abstract**---The importance of the research comes from identifying the changes in the structure of oil demand and the reasons behind these transformations and their impact on the stability of the oil market during the period 2000-2018. What are the future trends in World Oil Demand, The research was based on the hypothesis that "any shift in the demand side of oil that contributes to high or lower demand rates will have reflections on the stability of the international oil market."? The study revealed a set of conclusions, the most important of which was that there is a fundamental shift in the structure of oil demand, as the dynamics of oil demand shifted from industrialized countries represented by OECD to developing countries non-OECD mainly in emerging countries like China and India.*

***Keywords**---World Oil Demand, oil demand in OECD, oil demand non-OECD.*

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## 1. Introduction

The oil market witnessed a significant shift in the side of oil demand at the beginning of this century. As there was a decline in the oil demand in the industrialized countries represented by the OECD countries, it was noted that these countries have reached the peak of oil demand and that there is a downward trend in the course of her demand. On the other hand, there was an expansion in the volume of oil demand non-OECD, mainly in emerging countries such as China and India. This made up for the shortfall in demand from industrialized countries, this shift in demand structure Arrange it Shift in the driving forces of oil demand, hence any changes in the demand of these countries It will have repercussions on the stability of the international oil market. The paper seeks to know the transformations in the structure of oil demand and what are the reasons for this and its results, and shed light on the future prospects for global oil demand within the framework of OECD and non-OECD. Thus, the paper aims to:

- 1- Determine the factors behind the shift in oil demand.
- 2- Analysis of shifts in the structure of oil demand.
- 3- Knowing the contribution of oil demand shifts to instability in the international oil market.
- 4- Determining future directions for global oil demand.

## 2. The Factors Explaining the Shifts in Demand for Oil

The international oil market has undergone fundamental shifts in oil demand that have had an important and clear impact on the stability of the oil market and its trends. Hence, determining the factors behind these transformations is important and essential to knowing and analyzing the behavior of the demand side and the results and determining the decisions and policies that are supposed to be taken from prior to the concerned and decision-makers in the countries and

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companies participating in the international oil market (Khaghaany, Kbelah, & Almagtome, 2019). Before taking with the specific factors of oil demand shifts, the status requires identifying the parties responsible for demand in the international oil market. The side of demand for crude oil is mainly the demand of the advanced industrial countries, in particular the countries of the Organization for Economic Cooperation, Development (OECD), developing countries, and Transition countries.

1. **Advanced industrial countries:** The demand of the advanced industrial countries represents the largest share of oil demand in the international market, especially the United States of America, Japan, and the Eurozone countries. The demand of the industrialized countries reached about 47.9 million barrels per day in 2018, representing 49% of the total global demand, which amounts to 98.8 million barrels per day (Willner, 2018).

2. **The Developing Countries:** The economic development achieved by the developing countries contributed to the expansion of its demand for crude oil. India and China were among the most important countries that achieved a remarkable increase in oil demand. The demand of developing countries in 2018 reached about (45.4) million barrels per day (Dietrich, 2017), which means (46%) of the total global demand.

3. **Transition countries:** It is the countries of the former Soviet Union, the most important of which are the Russian Federation, Kazakhstan and Ukraine. The demand of transition countries in 2018 was about (5.6) million barrels per day (Willner, 2018), It constitutes 5% of the total global demand.

After summarizing the demand structure in the international oil market, the discussion will focus on the most important factors explaining the shift in demand for oil:

### **Global Economic Growth**

Crude oil has become one of the main indicators of economic activity worldwide, Because of its prominent importance in providing global energy requirements. There is a strong correlation between a country's economic growth rate and changes in oil demand. In determining the format of this relationship lies in the fact that the recovery in global economic growth contributes to increasing demand for oil. The fact that oil is one of the most important sources of energy that is used as an essential input in most economic activities (Kbelah, Almusawi, & Almagtome, 2019). From this function, any stagnation or decline in the rate of economic growth will have a negative impact on the volume of oil demand. Therefore, the relationship between oil demand and the growth of the global economy is positive. According to the previous relationship, the change in the demand for oil and the price movement are related to the changes that path in the course of economic growth based on the stages of the economic cycle. The amount of change is determined by the energy intensity index, more precisely, the intensity of oil use in generating GDP. That is, the ratio of total oil consumption to GDP. Energy intensity varies depending on the degree of development and progress experienced by each country and the structure of the productive sector (Al-Wattar, Almagtome, & AL-Shafeay, 2019). Another indicator that determines the relationship of oil demand to economic growth is the income elasticity of demand. Which measures the degree of response to the change in the required quantity of oil as a result of the change in income. The experimental estimates differed for the elasticity of income demand for oil. Despite the difference in the estimate, it is possible to draw the following conclusions (Fattouh, 2007):

- Oil demand is more responsive to income than prices.
- the long run income elasticity for oil demand is higher than the short
- There is large heterogeneity in estimated income elasticity across countries and/or regions with developing countries exhibiting higher income elasticity than OECD.
- The responsiveness of oil demand to income has been declining over time in OECD.

According to the foregoing, the growth of average income in developing countries will be reflected in a greater positive in the demand for oil compared to the growth in the average income in advanced countries.

### **Population Growth**

The demand for oil is closely related to the size of the population, the development of living conditions, and the state of welfare that society is going through, the increasing population and the development of the living situation mean more demand for energy sources to provide the necessary needs for population growth (Almusawi, Almagtome, & Shaker, 2019). In other words, an increase in consumption of energy sources due to the increased demand for agricultural and industrial goods, transport services, housing, and all goods and services whose economic activities are related to energy use, On this basis, there is a positive correlation between the size of the population and the demand for oil, so the factors that contribute to increasing the population, such as a low death rate , increased births and Improved standard of living Positive indirect determinants of oil demand and vice versa. During the period 2000-2018, the world population increased by (1.429) million people, to reach (7,594) billion people, and with an annual growth rate of (1.2%), However, this rate varied between international groups. For example, the population growth rate reached (0.4%) in Europe and Central Asia, and (0.8%) in North America, while this rate reached (2.7%) in South Africa, and (2) % In the Middle East and North Africa, (1.5%) in South Asia, and (1.2%) in Latin America and the Caribbean (Bank, 2012). In light of these rates, it is clear that developing countries were the main source of the global population increase achieved during the period mentioned. Which means that the population increase in developing countries was an important reason for increasing global demand for oil, mainly in these countries, as will be seen later.

### **The Price of Oil**

The price of oil is a factor affecting the required quantity of oil. Economic theory indicates an inverse relationship between the price and the quantity demanded of a commodity. In other words, any increase in the price of a barrel of oil leads to a decrease in the quantity required of it, and vice versa. But the question is how much is the decrease or increase in the quantity demanded as a result of the price change, Price elasticity determines the amount of decrease or increase in the quantity demanded. As is well known, the demand for oil is inelastic or low elastic in the short term, but in the medium and long term, the elasticity may increase (Almagtome & Abbas, 2020). The reason for the low elasticity of demand for oil lies in the absence of the full alternative to oil at equal cost and with the same efficiency, especially in the transport and industrial sector. As the transport sector depends by (95%) on petroleum products (Andoni et al., 2019). Its use also in the petrochemical industries in addition to its use also in the petrochemical industries in addition to its use in the domestic sector. If the demand for oil is inelastic, the price fluctuations in the oil markets it has less effect on demand change significantly.

In the context of the volatile oil prices witnessed by the market some specialists refer to the role of spot prices in the fluctuations in the price of long-term contracts that were subject to a fixed and stable pricing system (Ali, Hameedi, & Almagtome, 2019). The low spot price did not have a significant impact on the announced or official prices that govern long-term contracts. However, the imbalance that occurred since the early eighties led to a large surplus in the world oil supply, And Intense competition between producers OPEC and non- OPEC, Prompted the increasing importance of spot prices It became the basis for dealing in the international oil market, And major cause is the instability of these markets, This is because spot prices are not only subject to economic and political forces, but are also affected by other psychological and organizational factors, which make them vulnerable to rapid fluctuations With the spread of news and

rumors. The expansion of the spot markets paved the way for the severe fluctuations in oil prices. And It gave the opportunity to the emergence and growth of speculation on those prices (Kilian, 2017).

### **Strategic Oil Stocks**

The idea of creating strategic oil stocks dates back to US President Warren Harding in 1923, when he ordered to work to find oil stocks on the northern continental slope of Alaska, the reason for this measure was in response to fears of interruption in oil supplies after the First World War (Painter, 2006). And after the emergence of the International Energy Agency in 1974 Affiliated to the Organization for Economic Cooperation and Development and a result of the decision of the oil embargo adopted by the Arab countries in OPEC against the United States of America and the Netherlands One of the agency's goals was for each member country to keep emergency stocks plugs the need for consumption For a period of up to 180 days, The purpose of it Restrict demand for oil when necessary (Elwerfelli & Benhin, 2018). However, the policy used at the present time It is the release of stockpiling as an alternative to imports in the event of significant increases in the level of oil prices (Ali, Almagtome, & Hameedi, 2019). This policy would increase the price elasticity of oil demand relatively, More precisely, higher prices lead to a decrease At the demand of consuming countries due to their dependence on their strategic stocks. In addition, the situation is reflected when prices drop, as consumer countries expand level their demand to bridge the shortfall in their reserves. From this it shows the effect of strategic stocks on demand and price elasticity of oil demand. Moreover, promises The US strategic oil stock is the largest in the world. Its capacity is 727 million barrels, the maximum withdrawal rate is estimated at (4.4) million barrels per day with a marine capacity of about 2.5 million barrels per day (Scheitrum, Carter, & Jaffe, 2017). Because of the large stock size and the large demand of the United States for oil, accordingly, the amount of stocks held is an indication of the path of demand and prices in the future (Difiglio, 2014).

### **Alternative Energy Sources**

The share of crude oil is decreasing In the face of increasing development and The continuing decline in capital costs of other energy technology, And Countries have made concerted efforts to reduce dependence on crude oil Especially the industrialized countries, as crude oil was replaced by natural gas for industrial uses and electric power generation, Energy demand decreased in most activities with a high consumption density of oil, especially the transportation sector (Alekklett et al., 2010), Natural gas represents the strongest competitor to crude oil, And the increase in demand for natural gas was not in a way Faster as fuel More pure than oil only, But on renewables as well, despite the rapid growth in renewable energy sources, especially solar and wind energy (Abdulwahab M Jawad AL.Musawi, Ali, Al-Yasiri , & Bekheet, 2020). And all these changes make up Challenges and determinants facing the future of oil and the demand for it.

### **Technological Development**

Technological developments have been attached to an important aspect of studies and research which Interested in the determinants of oil demand and the role of technological developments in improving energy efficiency, rationalize it consumption, and the effect of these developments on reducing demand for oil. Most of the countries that are interested in technological developments seek to improve the efficiency of the work of machines, equipment and devices in all activities and sectors, especially the transportation sector, which accounts for the largest percentage of oil demand, Governments in the United States, Japan and Europe are optimistic about their ability to reduce oil consumption in the

transportation sector, By requiring strict fuel efficiency standards as in the United States, As well as the expansion in the use of hybrid vehicles and the introduction of hybrid and electric cars, raise the oil prices as in the European Union and Japan And increase the production and import of biofuels (Umbach, 2010). Energy consumers are reacting to higher prices by reducing the demand for energy services by seeking to improve the energy efficiency provided by technological development and/ or by replacing the fuel whenever possible. And both things will reduce the demand for oil.

### **Dollar Exchange Rate**

The US dollar represents the international trade process, As is evident, the barrel of crude oil is denominated in US dollars, Hence, any increase or decrease in the value of the dollar will affect the value of the barrel of oil, as well as the supply and demand for oil, And that the value of the dollar changes have different effects between the oil exporting and consuming countries, on the one hand, and the United States on the other. With regard to consuming countries, the depreciation of the US dollar leads to a decrease in the real price of a barrel of oil as a result of the rise in the value of the local currencies of consuming countries against the value of the dollar. According to this analysis, the effect of the dollar exchange rate on oil demand is through the effect of income and the effect of substitution. The effect of income is achieved by increasing the value of other currencies against the dollar, which makes the value of a barrel of oil cheaper. The result is an increase in the real income of consuming countries, and thus an increase in oil demand. As for a result of the substitution, the increase in the value of currencies of consuming countries against the value of the dollar pushes them to increase the demand for oil at the expense of reducing consumption from other energy sources. On the part of oil producing countries, the depreciation of the dollar is working to decrease the value of oil revenues in the sense of a decrease in real income. The decrease in real income is negatively reflected on investment plans, development of production capacity and the level of supply (Al-Yasiri, Ali, Ali, Latif K, & Bekheet, 2020). As for in the United States of America, the depreciation of the dollar increases the demand for oil. Because most American tourists prefer to spend their holidays inside America, which leads to an increase in demand for petroleum products.

### **3. Shifts in Demand for Crude Oil for The Period 2000-2018**

The oil demand is a demand derived from the demand for goods and services whose work is related to the substance of oil. And any shift in the structure of demand will have repercussions on the stability of the balance in the oil market. The demand for oil is determined by two types of influencing variables, which are price variables (such as the price of a barrel of oil, the prices of alternative sources and interest rates) and non-price variables (such as economic growth, population growth, technical development, and geopolitical factors), All of the above variables are involved in bringing about changes in the course of oil demand and trends. It is noted with the beginning of the current century that there have been two shifts in demand for oil, and in opposite directions. The first shift is the shrinking of oil demand in the countries of the Organization for Economic Cooperation and Development (OECD), and the resulting decline in the contribution of the Organization (OECD) to the total world oil demand from (63.4%) in 2000 to about (48.4%) in the year 2018.

On the other hand, there was another shift in the demand for oil, represented in the remarkable expansion of demand from countries non-OECD, particularly in emerging economies such as China and India. This expansion was in response to the high economic growth rates that exceeded the rate of global economic growth, as well as significant population growth. As these two factors play their role in expanding the demand for oil. To look closely at the course of these shifts, the oil demand will be analyzed in OECD and non-OECD.

### Evolution of Oil Demand By OECD

The international oil market witnessed an important fundamental transformation represented in the decline in the level of oil demand in the countries of the Organization for Economic Cooperation and Development (OECD), within the period 2000-2018, which contributed to the decline in the contribution of the Organization (OECD) to the total global demand for crude oil. While it was seen that OECD countries were responsible for more than three quarters of global oil consumption in 1974, the share of oil in energy consumption in OECD is currently in a declining trend (OZCAN, 2015). The Organization for Economic Cooperation and Development (OECD) emerged in 1961 and replaced the European Economic Cooperation Organization (OEEC), which was founded in 1948 with the support of the United States and Canada to coordinate the Marshall Plan for the reconstruction of Europe after World War II, and currently has 33 members\*. Most of the members are advanced industrialized countries. The main goal of the organization is to achieve sustainable economic growth and provide job opportunities and high standards of living in member countries while maintaining financial stability (Kaufmann, Karadeloglou, & Di Mauro, 2008). OECD has endeavored to adopt various methods, regulations and policies to rationalize oil consumption. This is within the framework of the goals of the International Energy Agency, which since its inception has sought to reduce the dependence of its members on importing oil, especially the oil of OPEC countries, since 1973 (Kaufmann et al., 2008). The demand for oil in the Organization (OECD) occupies an important place on the global energy map, due to the economic position of its members. As the United States is the first consumer of energy in the world with (25%) of the total global energy, and (50%) of gasoline used by cars in the countries of the world, and it also consumes (25%) of oil and gas production globally, Hence, it is not surprising that the American per capita consumption reaches 8 tons of equivalent oil annually, which is ten times what the individual consumes in China (Al-Yasiria, Ali, Ali, & Bekheet, 2020). And if the consumption of European countries is added, as it consumes about (15%) of the global energy in which oil constitutes (44%) (Abdulwahab Mohammed Jawad AL.musawi, Shebib, AL.musawy, & Bekheet, 2019), The role of the OECD countries in the total world oil demand is clear. Hence, any shift in the demand path will undoubtedly have repercussions and repercussions affecting the oil market. The development of oil demand in the Organization (OECD) for the period 2000-2018 can be tracked from the table (1).

It is clear from the same table that the demand for oil in the Organization (OECD) witnessed an increase during the period 2000-2005, as it increased to (50,407) million b/d in 2005 compared to (48.460) million b/d in 2000 and an increase of (1.947) million B / y. This increase constituted more than a quarter of the increase in world oil demand for the same period. The main reason for this is due to the high rates of economic growth, mainly during the period 2003-2005, where the average economic growth was around (2.8%) (Beck, 2011). After that, the demand for oil took a descending path, as all annual growth rates were negative for the period 2006-2014, with the exception of the years 2010 and 2013, as shown in Figure 1. As the average annual demand growth rate reached (-1.05) for the aforementioned period, and the demand for oil declined remarkably from (50.235) million b/d in 2006 to (45.756) million b/d in 2014, a decrease of (4,470) million b/d. As a result, the OECD contribution to the global demand size shrank to 49.7% compared to 63.44% in 2000. Then demand for oil returned to achieve positive growth rates for the period 2015-2018, but modestly and below the level of global demand growth, despite the low level of the oil price within this period, as the average annual demand growth did not exceed (0.97%), while the average Global demand for oil is approximately (1.66%) for the same period. The contribution rate to the total global demand decreased to approximately (48.40%). In this context, it is noted that the low level of oil prices since 2014 contributed to moving the demand for oil, but in relative terms, which means that there are

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\* These countries are: Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United States, Japan, Finland, Australia, New Zealand, Mexico, Czech Republic, South Korea, Hungary, Poland, Slovakia, Estonia, Israel, Chile and Slovenia.

other factors that led to the shrinking of the demand of the Organization (OECD) except for the high oil prices. The most important factors that contributed to the decline in oil demand in OECD countries can be identified by the following points:

1. High levels of oil prices, as oil prices have witnessed an upward trend since the end of the last century, and after the Asian financial crisis has passed, as the average price of Brent crude increased from (17.9) dollars in 1999 to (65.1) dollars in 2006, then to (111.6) Dollars in 2012, an increase of \$ 93.7 at a compound growth rate of 15.1% compared to 1999, Despite the high elasticity of income demand in OECD countries, which is estimated at (0.671) in the short term, and (0.243) in the long term compared to the price elasticity of oil demand, which is estimated at (-0.025) in the short term, and ( -0.093) in the long term, during the period 1980-2013 (Ono, 2017).

Table (1). Evolution of oil demand in the Organization for Economic Cooperation and Development for the period 2000-2018 (million b/d)

years	Demand Organization )OECD( (1)	World demand (2)	oil demand growth in )OECD( (3) %	World oil demand growth (4) %	Ratio (1) \ (2) (5)
2000	48.460	76.390	-	-	63.44
2005	50.407	84.057	4.02	2.0	59.97
2006	50.235	85.370	-0.34	1.56	58.84
2007	50.122	86.771	-0.22	1.64	57.76
2008	48.325	86.152	-3.59	-0.71	56.09
2009	46.349	85.047	-4.09	-1.28	54.50
2010	47.058	87.646	1.53	3.06	53.69
2011	46.477	88.553	-1.23	1.03	52.48
2012	46.011	89.521	-1.00	1.09	51.40
2013	46.113	91.146	0.22	1.82	50.59
2014	45.756	92.068	-0.77	1.01	49.70
2015	46.441	94.078	1.50	2.18	49.36
2016	46.900	95.541	0.99	1.56	49.09
2017	47.413	97.196	1.09	1.73	48.78
2018	47.811	98.730	0.83	1.61	48.40

Source: Columns (1), (2), depending on OPEC, Annual Statistical Bulletin, file Excel. <https://www.opec.org>. The rest of the columns are from the researcher's work.

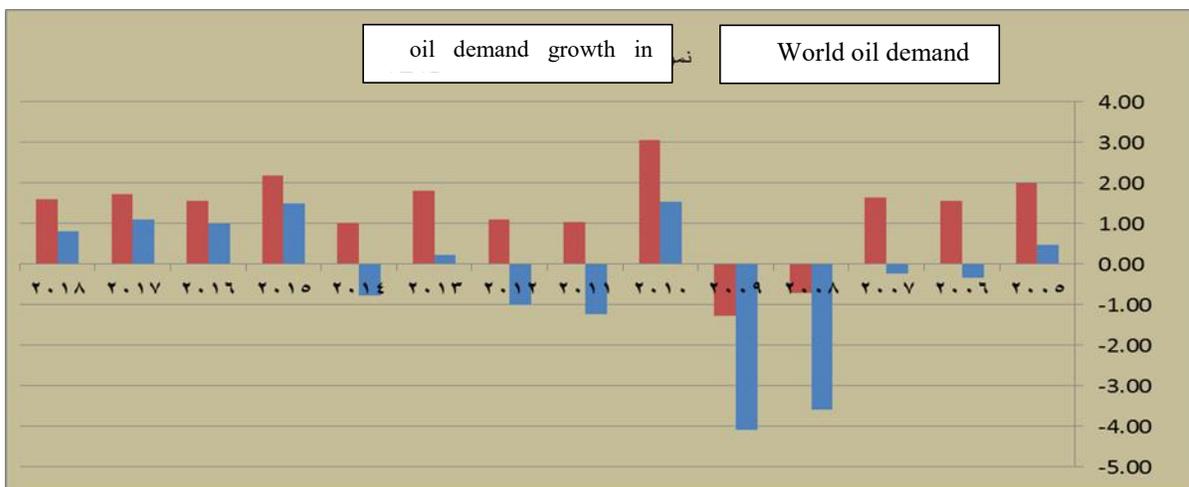


Figure 1. oil demand growth in OECD and World.

Source: From the researcher's work depending on the table (1)

The high level of prices had a clear impact on reducing the demand for oil, as spending on oil constituted an important proportion of the total spending, meaning that the negative effect of high oil prices is greater than the positive effect of increasing income. In the 1990s, the proportion of oil spending in OECD countries was relatively low, mainly due to the low level of oil prices. With the rise in prices at the beginning of the current century, the proportion of spending on oil began to rise, reaching approximately (10%) in 2002, but this rise in oil prices was not at a level that pushes families to change their pattern of spending behavior on oil. However, with the oil prices continuing to rise remarkably after the year 2005, the percentage of expenditures on oil out of the total volume of expenditures in OECD countries became very large, as the percentage of spending on gasoline and other oil products amounted to (22%) of the total expenditure, which is what led to a reduction in oil consumption in the end, as there is a specific price point when exceeded, any rise in oil prices can reduce the demand for oil significantly (Fattouh & Darbouche, 2011).

There was a mature belief during the decades of the 1980s and 1990s that oil prices cannot see significant increases continuously. This belief came as a result of the interaction of supply and demand mechanisms, as high oil prices will lead to high levels of global inflation, and thus weak economic growth and recession, which leads to a slowdown in growth in demand for oil, and the decrease in demand will result in the return of prices to their previous times. Also, high oil prices would stimulate strong growth in supply from non-OPEC, and OPEC would increase its supply in order to avoid higher prices. Hence, this interaction would prevent oil prices from continuing to rise continuously. Therefore, the continuous rise in oil prices since the beginning of the first decade of this century has been the subject of analysis in many studies and research (Fattouh, 2010). It was noticed that the previous mechanism lost its effectiveness, or rather it seemed to work in reverse. As the rise in oil prices was the result of the interaction of a group of factors, some of which are related to the fundamentals of the oil market (supply and demand), including some due to the role of speculation. The significant economic growth non-OECD, especially in China and India, has increased the demand for oil rapidly. What drove oil prices to rise remarkably? On the other hand, the oil supply did not match the demand parallel. This is due to the slowdown in investments in the oil industry since the decline in oil prices in 1986, as well as the disruption of oil supplies in some OPEC producing countries for several reasons, such as the violence in Venezuela in 2002, the war on Iraq in 2003, and violence in Nigeria, in addition to that. The response non-OPEC was weak except for the Russian Federation. OECD oil supplies achieved a negative average annual growth of (2.45%) for the period 2000-2011, as oil supplies decreased from (17.266) million b/d in 2000 to (13.117) million b/d in 2011 (Fantini & Quinn, 2017). That is, by a decrease of (4.149) million b / d. On this basis, the role of the factors related to the fundamentals of the oil market are reflected in their

impact on the high level of prices. There is no doubt that the role of supply and demand had a clear impact on the rise of oil prices, but it was not at that level that justifies the size of fluctuations in prices, especially in 2008 and 2009, as speculations in future oil markets contributed to the volatility of oil prices down and up, as 60% -70% of oil futures contracts are invested by speculative entities, and not by companies that need oil itself. The future (paper) barrels traded daily in 2002 were four times the real barrels in that year, and oil futures became traded in 2008, it equals fifteen times the actual daily production volume, which indicates the increasing role of speculation in determining the price of a barrel of oil. The financial contribution of this investment may explain the rise in the price of oil in the first half of 2008 to approximately (147) dollars in spite of adequate supply, or slightly above demand, and then decrease to (33) dollars at the end of the same year. And re-increase to (80) dollars in 2009 (Marza, Shaaibith, & Daly, 2018). This fluctuation in oil prices reveals that the imbalance in the oil market cannot alone explain the sharpness of fluctuations in prices, as the flow of money and speculative activities were somewhat responsible in causing these fluctuations.

2. The decline in oil demand in OECD countries is also attributed to the repercussions of the global financial crisis, which were visible since the end of 2007. With the decline in economic growth in the OECD countries as a result of the financial crisis, a significant decrease in the level of global oil demand was observed (Bouri, 2015). As it is clear from the data of Table (1) that the global growth rate of oil demand achieved negative growth rates for the years 2008 and 2009, which is the first time that a negative growth rate has been achieved in the annual demand for oil 25 years ago (Almagtome, Shaker, Al-Fatlawi, & Bekheet, 2019). It can be seen from the above table that the global demand for oil decreased by (1.105) million b/d in 2009, while the decrease in the demand of OECD countries was around (1.976) million b/d for the same year, meaning that the decrease in organized demand (OECD) was responsible for the decline in global demand, It is noted that in the period between 2007-2009, demand decreased in the United States by about (1.909) million b/d, in Europe, by (0.819) million b/d, and in Japan by about (0.623) million b / d (Bouri, 2015). As a result, Imbalance between supply and demand in the oil market has been strikingly distorted and prices have fallen to low levels, which prompted OPEC to reduce the cumulative production volume to the limits of (4.2) million b / d, starting in 2009 to balance the market (Energy, 2018).

The decrease in the growth of global demand for oil after the global financial crisis, which was caused by declining demand in OECD countries as a result of low economic growth, as it is noted that the International Monetary Fund reduced its estimates for the growth of the global economy for the year 2010 to (2.2%), while its previous estimates About (5.1%), Then The International Monetary Fund (IMF) has downgraded its forecast for global economic growth for 2015 by 0.3–3.5 %. The downgrade comes despite the economic boost provided by lower commodity prices (Sun, Lu, Yue, & Li, 2017). The weak global demand for oil contributed to the rise in global oil stocks, as the Organization (OECD) stated in January of 2015 that the total commercial oil stocks reached their highest levels since August 2010, as a result of the decline in oil demand due to the decline in economic growth, a tangible role in The low level of oil prices at the end of 2014 (Yoshino & Taghizadeh-Hesary, 2015).

3- One of the factors that contributed to the decline in OECD demand for oil is fuel efficiency and increased use of alternatives. Fatih Birol, chief economist at the International Energy Agency, stated at the end of 2010 that the Oil use in rich industrialized countries will never return to 2006 and 2007 levels because of more fuel efficiency and the use of alternatives, as he indicated that the economic crisis had played a role in curbing OECD demand but the main reasons were more efficient cars and the increasing use of electricity and gas instead of oil in areas outside transport, adding that the decrease in demand in the OECD will reduce Pressure on oil prices to rise (Khatib, 2012), In its report on oil sources and reserves for the year 2013, the International Energy Agency expected the continuation of the decline in oil demand in OECD countries until it reaches (33) million b/d in 2035. This decrease in demand is largely due to efficiency gains in the

transport sector and the continuing transformation About oil in other sectors. The demand for non-oil fossil fuels has expanded, as demand for natural gas increases in OECD countries, as the main fuel for power generation and fuel remains important in the industrial, service and housing sectors (Verly, David, Journal, & Marechal, 2013).

The key factor making it unlikely for OECD demand to ever return to its 2005 peak is that petroleum demand in the transportation sector -- which accounts for 60 percent of OECD petroleum demand -- is likely to flatten out after years of steady growth. Oil demand outside the transportation sector has already been relatively flat since 1980. Now the conjunction of several long-term factors is doing the same to transportation (CERA, 2009):

- Demographic and socioeconomic changes -- Vehicle ownership rates in developed countries have reached a "saturation" level while aging populations with low to negative population growth suggests a flattening of demand for mobility. The growth of women's participation in the labor force is also leveling off, meaning the flattening of another source of demand growth.

- Stronger governmental and consumer push for passenger vehicle fuel economy gains -- Energy security concerns and climate change initiatives have led OECD governments to tighten fuel economy standards. The rise in energy prices over the past several years has pushed consumers to value increased efficiency and the auto industry through a major reorientation toward greater efficiency.

- Greater penetration of alternative fuels and vehicle technologies -- Governments across the OECD continue to favor mandates that increase the share of alternative fuels in the transportation sector. New technologies such as plug-in hybrid electric vehicles and next-generation biofuels could also have a greater impact in the future.

The drive behind the reduction in oil consumption was the fear of facing a new shock in oil prices and adopted a set of policies to increase fuel efficiency, such as providing tax concessions and imposing exorbitant taxes on fuel-consuming cars, as well as expanding research and development in the field of high-efficiency cars in the use of the fuel. As these policies paved the way towards further improving the efficiency of auto fuel, and would reduce approximately (3.6) million b/d in 2020 (Zou, Zhao, Zhang, & Xiong, 2016).

In general, the history of declining demand for oil dates remarkably in the industrialized countries since the early eighties of the last century, when there was almost a disintegration between the economic growth rates on the one hand and the rates of oil demand growth, due to several factors, the most important of which is the policy of rationalizing energy use and the progress that The industrialized countries have achieved it in switching from the use of oil to generate electricity to other energy sources such as natural gas, coal, and nuclear energy. The nineties of the last century, as energy efficiency improved by (17.5%) in advanced countries (Berhad, 2011). Despite the previous evidence, but it is not expected that there will be a significant decrease in demand for oil in the short and medium term, it seems clear that oil products will not diminish their use continuously gradually, even if they have a strong desire among some developed countries to do so. The most optimistic future forecast indicates that the internal combustion engine will continue to dominate the transportation means for quite some time spanning a minimum of twenty years, and that the widespread use of vehicles that do not use petroleum products cannot happen quickly.

### **The Development of Oil Demand Outside OECD**

Countries non-OECD have witnessed rapid growth in oil demand, which are developing countries, but there are a few of these countries that dominate this growth, as (China and India) play the role of the engine of growth in demand for oil globally after the role of OECD countries has declined. In boosting global oil demand. It is clear that the demand for oil in emerging countries is growing much faster than the demand in developed countries, due to several reasons, including: the shift in the sectoral structure in favor of industry, the rate of GDP growth, the rate of population growth, and migration

from the countryside to the city. The oil Demand non-OECD was only 25% of global demand in 1970 (Finley, 2012). However, what is noticed is the high of this percentage to constitute (36%) in 2000, then to more than half the global demand in 2018. Most of the increase in oil demand is derived from emerging economies in Asia such as China and India, in addition to OPEC countries. As shown in Table (2). The above table shows the development of oil demand non-OECD, with a focus on the development of oil demand in China, India and OPEC countries. It is noted that the oil demand non-OECD has grown in an ascending manner, as is evident from Figure 2, as demand increased from (27.930) million b/d in 2000 to (50.919) million b/d in 2018, an increase of (22.989) Million b / d, and with a compound growth rate of (3.36%), while the World oil demand for the mentioned period achieved a compound growth rate of (1.42%), and an increase of (22,340) million b / d, It is clear from this that the oil demand non-OECD accounted for more than (100%) of the achieved increase in global demand, which led to an increase in the contribution rate non-OECD from (36.56%) to (51.60%) within the period 2000 - 2018. This remarkable expansion in oil demand non-OECD during the period 2000-2018 is mainly due to higher demand in China and India and OPEC countries (Saudi Arabia, Iran, UAE), as it is noted that the demand in China increased from (4.746) Million b/d to about (12.712) million b/d, an increase of (7,966) million b/d. Also, the demand in India increased from (2.129) million b/d, to approximately (4.761) million b/d, and an increase of (2.632) million b/d, while the demand of OPEC countries expanded from (5.053) million b/d To about (8,827) million b/d, achieving an increase of (3.774). In total, demand in these countries increased from (11.928) million b/d to about (26,300) million b/d, and with an increase of (14.372) million b/d. This increase constituted about (62.5%) of the increase in oil demand non-OECD, and (64.3%) of the increase in World demand.

Table (2). Evolution oil demand non-OECD for the period 2000-2018 (million b/d,%)

Years	oil demand non-OECD (1)	of which			World Oil Demand (5)	Demand growth non-OECD (6)	Demand growth in China (7)	Demand growth in India (8)	Demand growth in OPEC (9)	World oil demand growth (10)
		China (2)	India (3)	OPEC (4)						
2000	27.930	4.746	2.129	5.053	76.390	-	-	-	-	-
2005	33.650	6.730	2.609	6.243	84.057	4.09	8.36	4.5	5.17	2.00
2006	35.135	7.224	2.799	6.585	85.370	4.41	7.34	7.28	5.48	1.56
2007	36.649	7.587	2.999	6.890	86.771	4.31	5.02	7.15	4.63	1.64
2008	37.827	7.971	3.072	7.234	86.152	3.21	5.06	2.43	4.99	-0.71
2009	38.698	8.260	3.231	7.498	85.047	2.30	3.63	5.18	3.65	-1.28
2010	40.588	8.951	3.306	7.888	87.646	4.88	8.37	2.32	5.20	3.06
2011	42.076	9.410	3.433	8.090	88.553	3.67	5.13	3.84	2.56	1.03

20	43.5	9.79	3.6	8.4	89.	3.41	4.07	5.7	3.99	1.09
12	10	3	29	13	521			1		
20	45.0	10.3	3.6	8.7	91.	3.50	6.19	1.0	4.47	1.82
13	33	99	68	89	146			7		
20	46.3	10.7	3.7	8.9	92.	2.84	3.71	3.2	2.25	1.01
14	12	85	86	87	068			2		
20	47.6	11.4	4.0	9.0	94.	2.86	6.54	7.0	0.92	2.18
15	37	90	51	70	078			0		
20	48.6	11.8	4.3	8.9	95.	2.11	2.71	8.2	-1.84	1.56
16	41	01	87	03	541			9		
20	49.7	12.3	4.4	8.9	97.	2.35	4.41	1.7	0.75	1.73
17	83	21	65	70	196			8		
20	50.9	12.7	4.7	8.8	98.	2.28	3.17	6.6	-1.59	1.57
18	19	12	61	27	730			2		

Source: Columns (1),(2),(3), (4),(5) depending on Organization of Petroleum Exporting Countries, Annual Statistical Bulletin, file Excel. <https://www.opec.org>. The rest of the columns are from the researcher's work.

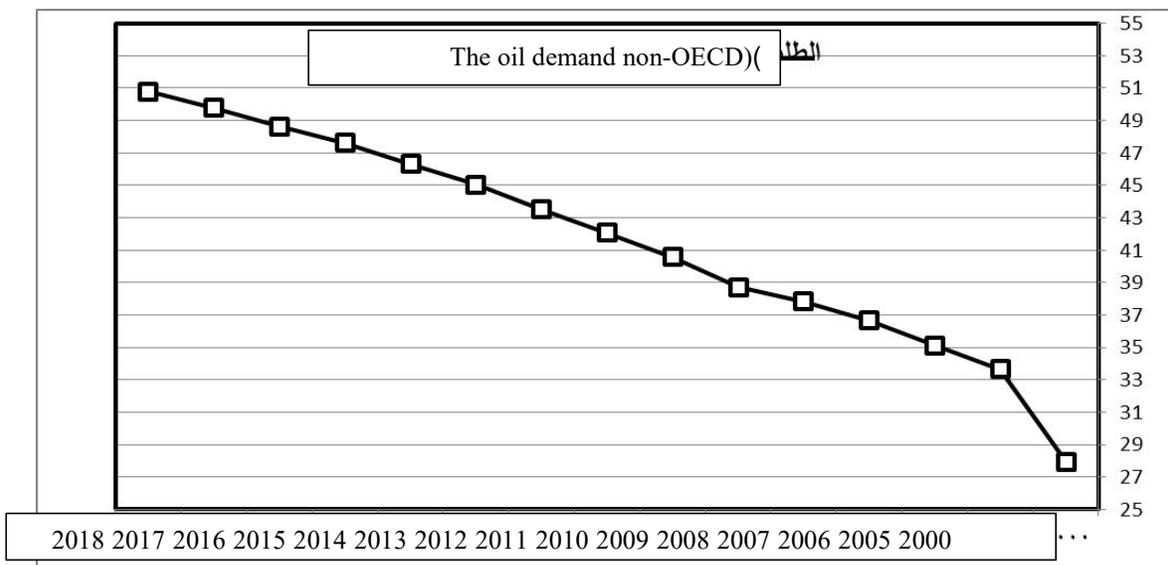


Figure 2. The oil demand non-OECD the (OECD)

Source: From the researcher's work depending on the table (2)

From these data, it is necessary to refer to some important notices, which are:

- The annual oil demand growth rates non-OECD are higher than the global demand growth rates, while the annual demand growth rate in China, India and OPEC countries was higher than the demand growth rates in the other countries non-OECD.
- It is noted that the annual demand growth rates non-OECD achieved during the period 2000-2013 exceed the achieved annual demand growth rates within the period 2014-2018, as the average annual growth rate within the first period reached (3.75%), while the average growth rate swallowed Annual demand for the second period is about (2.48%).

It is less (1.27%) than the average for the first period, which indicates a decrease in demand growth non-OECD after 2013, in addition to that some OPEC countries have achieved a negative growth rate in demand during the second period.

- It is clear that the annual growth rate of global demand for oil in 2014 is the lowest positive annual growth rate within the study period, as it reached (1.01%). This decrease in demand growth is due to two things: The first is that the annual demand rate in OECD countries achieved a decrease of 0.77%, i.e. limits of (357) thousand b/d compared to the previous year. The second issue is the slowdown in the growth rate of oil demand non-OECD, as the growth rate of oil demand decreased from (3.5%) in 2013 to (2.8%) in 2014, and this decrease in demand was caused by a decline in demand growth in China from (6.19%) to (3.71%). Likewise, the rate of demand growth in OPEC countries fell from (4.47%) to (2.25%). In India, it is observed that the rate of growth in oil demand has started to slow since 2013, as it decreased to (1.07%) After it was (5.71%) in the year 2012, while it reached (3.22%) in the year 2014.

This slowdown in the growth rate of oil demand in China, India and OPEC countries, which was responsible for approximately (64%) of the increase achieved in global oil demand during the study period, in addition to the weak demand growth in other countries non-OECD Contributed to the shock of oil prices at the end of 2014 and instability in the oil market, despite the rate of negative demand growth in OECD countries during the period 2005-2014, the high demand non-OECD was compensating for the decrease in demand of countries Organization (OECD), therefore it is noted that oil prices have not decreased significantly as a result of this decline in previous years, on the contrary, there was an increase in the price level, but in 2014 when the contraction of demand coincided in both groups resulted in a clear decline in This oil price, while not neglecting the supply-side factors of unconventional oil supplies (which are outside the scope of this research). This conclusion is in line with what many studies have gone through, that the decline in the level of oil prices at the end of 2014 is due (60%) of it to increase supply, while the rest is due to a decline in the growth rates of oil demand (Illing & König, 2014).

Based on the foregoing, it is clear that the path of the apparent decline in the demand of the advanced industrial countries, which reduced the surplus of demand, can be achieved in the oil market after the size of the important increases that resulted from the demand of developing countries, especially the demand of China and India. And in which demand has been slowing down since 2014, this interaction doubled the size of the decline in global demand and the imbalance in the oil market, and its results were the apparent collapse in the price level. After OPEC abandoned its strategy as a likely producer and supportive of prices, to the strategy of maintaining market shares.

### **The Prospects for Global Oil Demand**

The effective economic contribution of oil to all economies of the world makes the future of oil demand crucial to the international community. This fact is based on the oil will remain the main source of energy in the coming years., and it is not possible to see a significant decline in oil demand in the short and medium term, and this is due to positive economic growth in most countries of the world and mainly in emerging countries, especially China and India, and the accompanying Of improved living and urban expansion, as well as the increasing population of the world. Assumptions related to specific variables are drawn the future course of oil demand, according to the type of policies adopted related to energy security, environmental legislation and rationalization of consumption. Energy Agency accredited three scenarios for the outlook for the future of global oil demand through 2040, as follows (Mastepanov, 2019):

- Stated Policies Scenario: in the Scenario, global oil demand rises by around 1 mb/d on average every year until 2025 .Oil use in passenger cars peaks in the late-2020s and during the 2030s demand increases by only 0.1 mb/d on average each year . There is no definitive peak in oil use, given increases in petrochemicals, trucks and the shipping and aviation sectors.

- The Current Policies Scenario provides a reminder that, if the effects of new policies and alternative technologies are discounted, there is scope for more rapid growth in oil demand. In this scenario, global oil demand rises by 1.1 mb/d on average every year to 2040, similar to the average increase seen since 2000. Without strengthened policies on fuel efficiency or the use of alternative fuels, there is little restraint on the pace of oil demand growth. Growth is led by road transport, accounting for nearly half of the increase to 2040.

- Sustainable Development Scenario: in the Scenario determined policy interventions lead to a peak in global oil demand within the next few years. Demand falls by around 2 mb/d each year on average during the 2030s and is 30 mb/d below today's level by 2040. Demand falls by more than 50% in advanced economies between 2018 and 2040, and by 10% in developing economies. Reductions in oil use in road transport are particularly significant. By 2040, 50% of cars are electric (with 900 million electric cars on the road), as are most of the world's urban buses; almost 2 million barrels of oil equivalent (mboe) per day of biofuels are consumed in the aviation and shipping sectors; and almost 20% of the fuel used by trucks worldwide is low-carbon. The only sector to see demand growth is petrochemicals.

It is noticed from the above scenarios, there are significant differences in expectation, amounting to approximately (50) million b/d between the current policy scenario and the sustainable development scenario, and with the limits of (36) million b/d between the established policy scenario and the sustainable development scenario, and this difference is reduced to about (13) million b/d between the current policy scenario and the established policy. This difference reinforces the uncertainty in the international oil market. In addition to the extent of ability and seriousness in putting the declared goals and policies into practice, The International Energy Agency Outlooks, according to the sustainable development scenario, to decrease the demand for oil by (5.4) million b/d in 2030, then by (24.2) million b/d in 2040 compared to its level in 2018, and that this decline is mainly in industrialized countries. It has been shown before that industrialized countries, despite the policies and procedures followed in order to reduce dependence on oil, did not decrease their demand to the limits of (2.6) during the period 2005-2018, and this decline coincided with the rise in the level of oil prices, as well as the economic crises that afflicted these the countries, According to the sustainable development scenario, demand for oil in North America, Europe and Japan shrinks by about (10.4) million b/d until 2030. This is unlikely, according to historical evidence and the current prices of a barrel of oil. Therefore, the expectation of the other two scenarios may be closer to the ground. Meaning that the demand for oil will continue to rise. There are many factors that support the demand for oil in the short and medium term, among them is the continuing increase in demand in the transportation sector, as statistics indicate that about 96 million new cars were sold worldwide in 2018, and the petrochemical industry is expected to be another source The increased demand is driven by strong demand for a wide range of petrochemical products, and it is expected that there will be a significant expansion in the petrochemical capacity, especially in the United States and China, as the petrochemical projects currently planned for start-up will lead to an increase in oil demand of about (2) million b/d (Aguilera, 2019). as well, the increasing level of incomes and the increase in population numbers, which will be mostly in developing countries and emerging economies, will lead to an increase in global demand for oil, so increased demand in developing countries can compensate for any expected decline in the demand of developed countries, and then the bottom line is the expansion of global demand for The oil.

### **Oil Demand Trends in OECD Countries**

Most energy analysts believe that the demand for oil in the (OECD) organization has already reached its peak level, and the organization is expected to witness a significant reduction in the next two decades, mainly due to the population factor, slow economic growth in most of the OECD countries, and high oil products prices , And the number of cars reaching the level of glut, as well as government policies that encourage reducing oil consumption and switching to other

energy sources. In this context, OPEC expects, according to the data of Table (3), that the demand for oil in the Organization (OECD) will witness a significant decline during the period 2018-2040, as it will decrease from (47.8) million b/d in 2018 to about (44.4) million b In the year 2030, then to approximately (38.3) million b/d in 2040, that is, the demand for oil will decrease by up to (9.6) million b/d and by (20%) from its level in 2018, and the expected level of decline varies among the members of the organization In American countries, the rate of decline is about (17.6%), while European countries have a rate of decline of approximately (20.9%), while countries in Asia and Oceania raise the rate of decline to more than (26%).

This expected decline in OECD countries' demand is due to the following reasons (Aguilera, 2019):

- Real GDP growth decline, as the average GDP growth during the period 2018-2040 is expected to be about (1.7%) compared to (2.3%) in 2018.
- Increasing the improvement in the efficiency of use, through the pursuit of most OECD countries in taking the necessary measures and measures to improve the efficiency of oil use in a wide manner and in all sectors, especially in the transport sector. And the development of technology that reduces the energy density per unit of GDP.
- The continuation of the shift towards alternative energy sources, as it is expected to continue the policy of replacing oil with other energy sources, especially towards natural gas, and examples of this policy is the gradual replacement of gas in the place of heavy fuel oil in the energy sector, as well as the increasing number of ships operating with liquefied natural gas, as well Expanding the use of renewable energy sources, especially solar and wind energy.

Table (3). World oil demand Outlooks for OPEC to 2040 (million b/d)

year Region	2018 actual	2020	2025	2030	2035	2040
<b>OECD countries</b>	47.8	48.1	46.9	44.4	41.5	38.3
OECD America	25.5	25.9	25.6	24.3	22.8	21.1
OECD Europe	14.3	14.3	13.9	13.1	12.2	11.3
OECD Asia Oceania	8.0	7.9	7.5	7.0	6.4	5.9
<b>Non-OECD</b>	50.9	52.9	58.6	63.9	68.5	72.3
Latin America	5.9	6.0	6.4	6.8	7.0	7.3
Middle East & Africa	4.2	4.4	5.0	5.6	6.2	6.8
India	4.7	5.1	6.2	7.4	8.8	10.2
China	12.7	13.4	14.7	15.7	16,5	17.1
Other Asia	9.0	9.3	10.3	11.2	12.1	2.81
OPEC	8.8	9.0	10.0	10.9	11.5	11.8
Russia	3.6	3.7	3.9	3.9	3.9	3.8
Other Eurasia	2.0	2.1	2.3	2.4	2.4	2.5
<b>World</b>	98.7	101.0	105.6	108.3	109.9	110.6

Source: OPEC. **World Oil Outlook 2019**, Vienna, Austria, 2019, p91.

### Oil Demand Trends Non-OECD

It has already been established that countries non-OECD, especially emerging countries such as China and India, were responsible for the increase in global oil demand during the period 2000-2018, due to strong economic and

population growth, industrial development and urban expansion. And the need continues in the countries non-OECD to demand more oil, due to the economic and social transformation that these countries are going through and which needs more energy, For example, the International Energy Agency predicts that the increase in Africa's oil consumption until 2040 will exceed China's demand, and more than five hundred million people will move to urban areas, which is much higher than the growth experienced by the urban population in China between 1990 and 2010. It follows from this situation that the oil demand will continue to expand in these countries. Table (3) data that indicates OPEC's expectations during the period 2018-2040 shows that the oil demand non-OECD will rise from (50.9) million b/d in 2018 to (63.9) b/d in 2030, then To (72.3) million b/d in 2040 an increase of (21.9) million b/d and with an increase of (42%), which is an approach to the increase achieved during 2000-2018 of approximately (23) million b/d. China and India are expected to dominate most of this increase, with a limit of (9.8) million b / d, as the above-mentioned schedule data indicate that demand in China will witness an increase from (12.7) million b/d in 2018 to (17.1) million b/d In 2040, an increase of (4.4) million b / d, while demand in India will increase from (4.7) million b/d in 2018 to (10.2) million b/d in 2040, and an increase of (5.4) million b / d, That is, the amount of the increase in India will exceed the expected increase in China, due to several reasons, the most important of which is achieving high economic growth rates that average, approximately (6.3%) during the forecast period, and also a large population increase, as the population of India is expected to rise by the limits ( 240) million people to reach 1.593 billion people in 2040, as the population of India is expected to exceed the population of China and is expected to reach about 1.449 billion people for the same period (Aguilera, 2019). This large and simultaneous population increase with high economic growth will be a platform for more oil consumption in India in the future. Among other regions non-OECD), which will witness an increase in oil demand in the future, are other Asian countries and OPEC countries, as the level of demand in them is expected to increase from (17.8) million b/d in 2018 to about (24.6) million b/d In 2040, an increase of (6.8) million b/d. This increase is distributed within the limits of (3.8) and (3) million b/d each, respectively. From previous expectations, both the International Energy Agency (with the exception of the sustainable development scenario) and the OPEC expectations, OECD countries will witness a decrease in oil demand in the future, while demand non-OECD will witness a noticeable increase. According to the established policy scenario, which approaches OPEC's expectations, demand in OECD countries will decrease by (4.3) million b/d until 2030, and according to OPEC's expectations, it will decrease by about (3.4) million b/d for the same period, by a difference of (900) thousand b/d on the expectations of the International Energy Agency, The demand of these countries reached its peak in 2005 by (50.4) million b/d, then it decreased to (47.8) million b/d in 2018, and within the limits of (2.6) million b/d, over a period of thirteen years, and on the reality of a slowdown in Economic growth, economic and financial crises, and an increase in the level of oil prices (until 2014), in addition to huge technological developments that have reduced the energy intensity used, so it is expected that there will be stability and stability in the demand of OECD countries, or there may be a similar decrease in the aforementioned decline, The low oil price environment supports this view. As the growing unconventional supply could be an important factor in the continued decline in oil prices, which may weaken efforts to switch to alternative energy sources or investment programs in rationalizing consumption and thus improve future oil demand opportunities, at least in the short and medium term. As for the demand of countries non-OECD, the likelihood of a decline is weak, due to the correlation of oil demand with the rates of economic and population growth, which are expected to witness high levels, in addition to the state of urbanization that these countries are expected to witness, and the accompanying increased demand for oil and the shift from Traditional non-commercial energy sources to modern commercial sources, as India, China and most countries of Asia and Africa are still awaiting many population transformations that will have significant implications for oil and energy demand in general.

#### 4. Conclusions

The research shows that the global demand for crude oil is determined by a set of determinants, and that any change in one of these determinants will have repercussions on the course of global oil demand. The result is an imbalance in the oil market. There has been a fundamental shift in the structure of oil demand, as the dynamics of oil demand have shifted from industrialized countries represented by OECD countries to developing countries non-OECD, mainly in emerging countries such as China and India and OPEC countries. The Asian market is expanding in importance and increasing its importance after the great demand in its countries has grown, which indicates the change in the map of global oil demand from north to south. Simultaneity contributed to a slowdown in oil demand in countries non-OECD, as demand in the countries of this organization shrank to a decline in global demand for crude oil in 2014, which led to a sharp drop in the level of oil prices at the end of the aforementioned year. It is expected that the future path of oil demand will continue according to the current trends, as it is expected to continue expanding the demand of countries non-OECD, in addition to a decline in the demand of the OECD. The necessity of determining the nature of the factors affecting the global volume of oil demand, to determine whether this shift in demand is structural, periodic or seasonal. In order to develop an appropriate policy to confront this transformation in producing and consuming countries alike. The new status of the structure of demand for crude oil requires knowledge of the economic situation of countries non-OECD, particularly China, India and other emerging countries, because they will be responsible for changes in the volume of oil demand after the OECD countries' contribution to total global demand has decreased. Among the important findings of the research is that the decline in global demand for oil contributed to the shock of oil prices in 2014, which caused financial losses for the oil exporting countries, especially OPEC countries, resulting in difficult economic and social conditions, this necessitates this serious work towards Reducing dependence on oil resources through diversification of income sources, and reducing the size of the structural imbalance in GDP.

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